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Fixed-income strategies for low and rising rates

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Institutional investors face unprecedented risk in meeting pension liabilities and spending goals as a result of historically low and rising interest rates. They are caught between traditional fixed-income strategies falling short of expected portfolio returns and equity strategies involving too much risk. The issue: Yields on a high-quality U.S. bond portfolio have fallen below 2.5%[1] — less than half the average 20 years ago. Despite rising rates, low yields represent the more serious challenge, with yields likely to remain under 3% for the rest of the decade. Furthermore, institutions are reluctant to face the high cost of reducing their expected rate of return, leaving them with difficult choices.

Some are holding fast with fixed income investments, relying on a U.S. bond market benchmark that exposes them to low yields *and* heightened interest-rate risk. Others are increasing equity exposure to boost returns, undermining their protection against stock market volatility. The eight-year equity bull market and a benign credit environment created

EXECUTIVE SUMMARY

- Despite concern about rising rates, the more serious issue for institutional investors is historically low yields and the outlook for below-average fixed-income returns in the future.
- The eight-year bull market and benign credit environment have largely masked the risks of increasing equity exposure or relying on a broad U.S. bond market benchmark to meet expected rates of return.
- Diversifying fixed-income portfolios with "plus" sectors, such as emerging-markets debt and floating-rate loans, and private strategies — middle market senior loans and mezzanine debt — can be a partial solution to low yields and rising rates.
- Research based on historical returns showed that allocations to these out-of-benchmark securities significantly increased risk-adjusted returns during periods of rising rates, compared to a traditional 60/40 stock-bond portfolio.

by Fed monetary policy have largely masked the risks of these strategies. Either way, suboptimal diversification increases the danger of failing to meet financial objectives.

DIVERSIFYING WITH "PLUS" SECTORS AND ALTERNATIVE CREDIT AS PART OF THE SOLUTION

Following a 30-year interest-rate decline, any approach to boosting returns will involve more risk. But cutting fixed-income exposure is unlikely to prove a long-term solution, particularly when market conditions change. What's needed is a broader diversification strategy for fixed-income portfolios to address low yields and structural changes that have increased sensitivity to rising rates.

Diversifying with out-of-benchmark and private market securities offering a better risk-return tradeoff may be part of the solution. These securities offer the potential for higher yield, lower volatility, and less exposure to interest-rate risk than more traditional fixed-income investments. They include "plus" sectors, such as emerging markets debt, high-yield bonds, and floating-rate bank loans. Private securities, such as middle-market senior loans and mezzanine debt, also offer the potential for higher risk-adjusted returns compensating for their limited liquidity.

PRESSURE TO INCREASE RISKY ASSET EXPOSURE

Institutional investors are under pressure to bridge the returns gap. The question for many is how much additional risk would be required to maintain their expected rate of return. A 2016 study by consultant Callan Associates found that institutional investors would have to nearly triple their risk exposure to earn the typical pension plan's 7.5% expected annual return, compared to two decades ago[2] (Figure 1). The study projected that in 1995, a portfolio of 100% investment-grade U.S. bonds could have met the return objective with the lowest level of risk. By 2015, private equity, public equity, and real estate would comprise 88% of a portfolio designed to achieve the 7.5% return objective with minimum risk, according to Callan's modeling. Fixed income would represents only 12% of the portfolio, causing volatility — measured by standard deviation — to nearly triple, from 6% in 1995 to 17% in 2015.

From a different perspective, keeping volatility low — for example, to improve asset-liability matching — would pose severe shortfall risk. Callan found that returns would have to fall by 270 basis points to 4.8% if volatility were limited to the 6% level projected for the 100% bond portfolio in 1995. The conundrum illustrates why institutions are compelled to embrace risk as a way of maintaining pension payouts or spending levels without the expense of massive cash contributions to their funds.

Figure 1: Maintaining high return expectations can lead to significantly higher risk exposure

				Volatility constraint: 6%
	1995	2005	2015	2015
Projected return	7.5%	7.5%	7.5%	4.8%
Standard deviation	6.0%	8.9%	17.2%	6.0%
Fixed-income exposure	100.0%	52.0%	12.0%	71.0%

The data reflect asset allocation studies to determine the risk associated with portfolios designed to generate an expected return. Return and risk are based on Callan's asset class return expectations for relevant time periods. Fixed-income exposure reflects optimization modeling to determine the asset allocation providing the highest return for the lowest risk. Please see Page 9 for the limitations of optimization analysis.

Source: Callan Associates, September 2016.

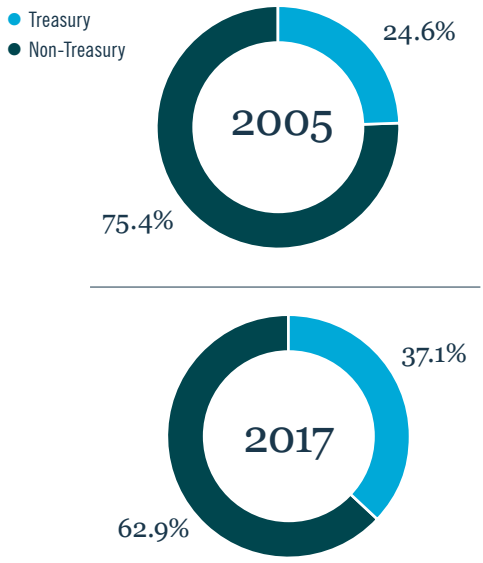
EVOLVING FIXED-INCOME BENCHMARK POSES HIGHER RISK

Changes in a dominant fixed-income benchmark are exposing institutional investors to historically low yields, combined with higher interest-rate risk. Using the Bloomberg Barclays U.S. Aggregate Bond Index as proxy, a high-quality U.S. bond portfolio returned nearly 7.5% per year on average between 1990 and 2005. The benchmark's current yield of 2.5% — a

5 percentage-point drop — translates to a 2 percentage-point reduction in overall return for a traditional portfolio of 60% stocks and 40% bonds, assuming no change in stock returns.

In addition to the 5 percentage-point drop in yields compared to 20 years ago, the U.S. aggregate bond index's composition has changed markedly, making it more sensitive to rising interest rates. A dramatic rise in Treasury issuance resulting from Fed monetary policy has caused the index's U.S. Treasury component to jump from 25% in 2005 to 37% in July 2017 (Figure 2). This has raised the index's average duration — a measure of interest-rate sensitivity — from 4.5 in 2005 to 6.0 in 2017. As a result, a 1% rise in interest rates would trigger a 6% drop in the value of bonds in the index. Overall, the U.S. aggregate bond index is likely to provide weaker returns in both a low and rising-rate environment, making it a less than ideal benchmark for institutional portfolios.

Figure 2 – Core Fixed-income benchmark is now heavier in U.S. Treasury securities



Source: Bloomberg as of 1 January 2005 and 25 July 2017.

ARE RISING RATES A LONG-TERM YIELD SOLUTION?

While the risk of rising rates garners attention, we think the more serious risk for investors is rates remaining low for an extended period. An investment-grade bond portfolio based on the U.S. aggregate bond index will likely return 2% to 3% annually for the rest of this decade, before accounting for inflation, based on expected Federal Reserve interest-rate policy. The Fed has committed to raising rates only gradually in response to slow economic growth and inflation below its 2% target. In addition, global demand for U.S. Treasury bonds in response to higher rates in the U.S. and macro shocks, such as Brexit, have depressed Treasury yields. Although the Fed began raising short-term rates in December 2015, the 10-year Treasury rate dropped to an all-time low of 1.37% in July 2016 following Brexit, and settled in a range of 2.1% to 2.6% in 2017. The low-rate outlook has two important implications. First, high-quality bonds provide less protection against an equity bear market than if rates were higher. Second, a flattening of the yield curve — short rates rising and longer rates falling — has made lengthening duration even less attractive as a strategy for increasing yield.

DIVERSIFYING BEYOND THE BENCHMARK

Diversifying with securities outside the U.S. aggregate bond index offers the opportunity to partially close the performance gap and reduce sensitivity to rising rates. Our analysis considers exposure to the following four public and two private asset categories:

Public Assets	Private Assets
Emerging-market bonds	Middle market senior loans
Floating-rate loans	Mezzanine debt
U.S. high-yield bonds	
Preferred securities	

Emerging-market (EM) bonds

Emerging-market bonds have performed well during periods of gradually rising rates, as their relatively high credit spreads can help cushion against potential price declines. EM economies tend to benefit when rising U.S. yields reflect improving economic growth, as in the current rate-hike cycle. In this scenario, spreads tend to tighten over time, helping offset the effect of rising rates on bond prices. EM bonds can be denominated in "hard" currencies like U.S. dollars or euros as well as in the local currencies of more than 60 countries, including Brazil, Mexico, India, and China. These bonds offer attractive spreads above U.S. Treasury yields[3] to compensate investors for their higher risks, such as geopolitical events, a potential economic slowdown in China, and central bank missteps.

During periods of rising interest rates over the past 20 years, EM bonds returned 8.41% per year, on average, while the U.S. aggregate index lost an average of 1.01%. In the last two periods of Fed tightening — 2004-2006 and since December 2015 — EM bonds generated impressive gains of 12.12% and 9.33%, respectively.[4]

During the "taper tantrum" in 2013, EM bonds posted negative returns as Treasury rates rose rapidly amid fear that Fed monetary tightening could choke off EM growth. A similar reaction is less likely today because EM economies are stronger fundamentally, the global economy is improving, and low inflation means central banks are likely to be gentle in applying policy brakes.

Floating-rate bank loans

Floating-rate loans — also known as senior secured or leveraged loans — are less sensitive to rising Treasury yields because their coupons adjust to changes in prevailing rates. When rates are rising, investors in floating-rate loans generally earn higher income and experience smaller price declines. Their coupons move periodically in response to fluctuations in a reference rate, commonly the 30- or 90-day LIBOR (London Interbank Offered Rate).

These regular coupon adjustments shorten the security's duration, thereby reducing its price sensitivity to rate changes.

During periods of rising rates over the past 20 years, floating-rate loans have outperformed rate-sensitive fixed-income sectors.[5] Generally issued to companies that are rated below investment grade, these loans have a higher risk of default and loss than investment-grade bonds. This risk is partly offset by their senior position in the capital structure, resulting in lower default and higher recovery rates than bonds issued by the same company.

High-yield bonds

High-yield bonds are typically more effective in reducing the risk of rising interest rates than other fixed-income categories. Rated below-investment grade, they pay a higher yield to compensate investors for greater default risk. Their higher incremental yield — or spread — over Treasury bonds serves as a cushion. The spread can narrow when rates rise without necessarily causing high-yield bond prices to decline. For example, there have been 16 periods when interest rates increased 50 basis points or more between 1998 and September 2017.[6] High-yield total returns averaged 4.86%, compared with negative returns for investment-grade, mortgage-backed, and 10-year Treasury bonds. Higher coupons and the positive impact of spread compression accounted for their positive returns. More recently, high-yield spreads have narrowed 147 basis points, from 497 on 30 September 2016, to 350 on 30 September 2017, providing less protection against principal losses as rates rise. High-yield bonds provide effective diversification for stock and bond portfolios, with low correlations to investment-grade bonds and equities.

Preferred securities

Preferred securities — a hybrid asset class with stock and bond characteristics — may be less sensitive to the Fed's rate hikes, particularly when it raises rates slowly. Preferred securities typically pay higher yields than most bond categories because they are lower in the capital

structure and have higher default risk. During the last period of gradual Fed rate increases between 2004 and 2006, they outpaced most investment-grade fixed-income asset classes — and have been doing so again during the current rate-hike cycle.[7] This advantage is partly offset by longer duration since many preferred stocks are known as "perpetual," meaning they don't mature. As a result, preferred securities are more sensitive to changes in longer-term rates, such as the 10-year Treasury. Two factors account for preferred securities' potential to outperform when the Fed tightens. First, banks, which issue about 75% of all preferred securities, tend to benefit as the economy improves. Second, some preferred securities have a fixed-to-variable coupon structure, which means their dividend adjusts after a certain time period, making them less sensitive than fixed-rate securities to rising interest rates.

Middle market senior loans

Middle market senior loans offer multiple advantages, including higher yields, lower default rates, and floating-rate structures that reduce rate sensitivity, compared to public bonds. Senior leveraged loans represent a rapidly growing segment of alternative credit as banks have largely withdrawn from the middle market. Private "club" loans — issued by groups of up to 10 investors and structured for a single borrower — represent the sweet spot of this market. These loans pay a liquidity premium of 100 to 200 basis points over larger, syndicated bank loans that are publicly traded. Club loans are generally held to maturity, rather than traded, reducing their volatility. Although below investment grade, middle market senior loans generally have lower default and loss rates than high-yield public debt due to strict covenants and lender supervision that reduce risk. Long-term investors, such as insurance companies and pension plans, have become more willing to invest in private debt, trading off liquidity to earn higher yields. They may consider middle market senior loans as a lower-risk alternative to public high-yield bonds.

Mezzanine debt

Mezzanine loans — a form of private debt usually invested as unsecured subordinated debt or second-lien term debt — has offered a large yield premium to compensate investors for limited liquidity and lower credit quality.

These loans typically are used in leveraged buyout transactions to fill the gap between the sponsor's equity capitalization and optimal senior debt levels. Mezzanine loans have offered higher yields reflecting their junior debt position, but their performance has implied less risk than spreads would suggest. Market participants partly attribute this to private equity sponsors' willingness to support borrowers, reducing default rates. With relatively low volatility reflecting infrequent trading, mezzanine debt offers the potential for higher risk-adjusted returns than public debt or other categories of private debt.

PERFORMANCE CHARACTERISTICS AND CORRELATIONS

In this section, we compare the performance characteristics of four "plus" sectors and two private debt categories (Figures 3 and 4). Four of the six categories — emerging markets debt, high-yield bonds, middle market senior loans, and mezzanine debt — offered better absolute returns with higher volatility, compared to investment-grade U.S. bonds for the 20-year period, April 1997 - March 2017. Generally low to moderate correlations with traditional assets and 10-year Treasury rates also offered diversification benefits.

Long-term investors, such as insurance companies and pension plans, have become more willing to invest in private debt, trading off liquidity to earn higher yields.

Figure 3: "Plus" sectors and private debt offer diversifying characteristics and low correlations to interest rates

20-year period, 1 April 1997 - 31 March 2017

	Emerging Markets Debt	U.S. High Yield	Floating-Rate Loans	Preferred Securities	Middle Market Senior Loans	Mezzanine Debt	Mix of six public and private fixed-income assets	U.S. Investment-Grade Bonds	U.S. Stocks
Annual Return	8.83%	7.15%	4.92%	4.96%	6.32%	9.54%	7.20%	5.36%	8.11%
Standard Deviation	10.13%	9.76%	7.97%	13.58%	6.90%	6.56%	6.55%	3.51%	17.41%
Sharpe Ratio	0.62	0.48	0.31	0.18	0.56	1.07	0.72	0.83	0.32
Correlation to 10-year U.S. Treasury yield	0.17	0.43	0.53	-0.10	0.47	0.25	0.35	-0.88	0.57
Correlation to Russell 3000 Index	0.56	0.67	0.56	0.29	0.51	0.56	0.71	-0.36	1.00

Performance is based on the following indexes: emerging markets debt: J.P. Morgan EMBI Global Total Return Index; U.S. high- yield bonds: BofA Merrill Lynch U.S. Cash Pay High Yield Index; floating-rate loans: Credit Suisse Leveraged Loan Total Return Index; preferred securities; BofA Merrill Lynch Fixed Rate Preferred Securities Index; middle-market senior loans: S&P LSTA Leveraged Loan Index, middle-market segment; mezzanine debt: Cambridge Associates data base of private mezzanine loans; U.S. investment-grade bonds: Bloomberg Barclays U.S. Aggregate Bond Index; U.S. equity: Russell 3000 Total Return Index. It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs. Source: Bloomberg, based on quarterly data for 1 April 1997 through 31 March 2017.

Figure 4: Diverse "plus" sectors share low correlations to traditional bonds (1 April 1997-31 March 2017)

	Emerging Markets Debt	U.S. High Yield	Floating-Rate Loans	Preferred Securities	Middle Market Senior Loans	Mezzanine Debt	U.S. Invest-ment-Grade Bonds	U.S. Stocks
Emerging Markets Debt	1.00							
U.S. High Yield	0.61	1.00						
Floating-Rate Loans	0.40	0.87	1.00					
Preferred Securities	0.31	0.46	0.28	1.00				
Middle Market Senior Loans	0.34	0.75	0.92	0.20	1.00			
Mezzanine Debt	0.28	0.24	0.26	0.07	0.23	1.00		
U.S. Investment-Grade Bonds	0.09	-0.07	-0.19	0.33	-0.20	-0.20	1.00	
U.S. Stocks	0.56	0.67	0.56	0.29	0.51	0.56	-0.35	1.00

Performance is based on the following indexes: emerging markets debt: J.P. Morgan EMBI Global Total Return Index; U.S. high- yield bonds: BofA Merrill Lynch U.S. Cash Pay High Yield Index; floating-rate loans: Credit Suisse Leveraged Loan Total Return Index; preferred securities; BofA Merrill Lynch Fixed Rate Preferred Securities Index; middle-market senior loans: S&P LSTA Leveraged Loan Index, middle-market segment; mezzanine debt: Cambridge Associates data base of private mezzanine loans; U.S. investment-grade bonds: Bloomberg Barclays U.S. Aggregate Bond Index; U.S. equity: Russell 3000 Total Return Index. It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs. Source: Bloomberg, based on quarterly data for 1 April 1997 through 31 March 2017.

PORTFOLIO ANALYSIS: POTENTIAL FOR HIGHER RETURNS AND VOLATILITY BY INVESTING OUTSIDE THE BENCHMARK

The following portfolio analysis illustrates potential advantages of diversifying traditional portfolios with various public and private debt categories. We show the impact of individually adding a 10% allocation to each category and 20% to all six categories combined, replacing a portion of fixed-income in the traditional 60/40 stock-bond portfolio. Overall, four of the six categories produced higher absolute returns, with higher volatility resulting in slightly lower risk-adjusted returns for the 20-year period, April 1997-March 2017 (Figure 5). Mezzanine debt provided the highest absolute and risk-adjusted returns, while preferred securities and middle market senior loans provided similar and slightly lower returns, respectively, compared to the 60/40 reference portfolio. Combining all six categories in a 20% allocation produced similar results — higher returns and volatility, resulting in slightly lower risk-adjusted returns.

Figure 5: Investing outside the benchmark generally provided higher returns with higher volatility

20 years: 1 April 1997 - 31 March 2017

	60% / 40% Stock-Bond Portfolio	Adding 10% Emerging Markets Debt	Adding 10% U.S High-Yield Bonds	Adding 10% Floating-Rate Loans	Adding 10% Preferred Securities	Adding 10% Middle-Market Senior Loans	Adding 10% Mezzanine Debt	Adding 20%: Mix of six public and private fixed-income assets
Annual Return	7.47%	7.79%	7.61%	7.39%	7.46%	7.53%	7.85%	7.74%
Standard Deviation	10.03%	10.75%	10.81%	10.59%	10.65%	10.49%	10.49%	11.20%
Sharpe Ratio	0.50	0.49	0.47	0.46	0.47	0.48	0.51	0.47

Performance is based on the following indexes: U.S. stock: Russell 3000 Index; U.S. investment-grade bonds: Bloomberg Barclays U.S. Aggregate Bond Index; emerging markets debt: J.P. Morgan EMBI Global Total Return Index; U.S. high- yield bonds: BofA Merrill Lynch U.S. Cash Pay High Yield Index; floating-rate loans: Credit Suisse Leveraged Loan Total Return Index; preferred securities; BofA Merrill Lynch Fixed Rate Preferred Securities Index; middle-market senior loans: S&P LSTA Leveraged Loan Index, middle-market segment; mezzanine debt: Cambridge Associates data base of private mezzanine loans. It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs.

Source: Bloomberg, based on quarterly data for 1 April 1997 through 31 March 2017.

DIVERSIFICATION PROVIDED GREATER BENEFITS DURING PERIODS OF RISING RATES

A key question is how broader fixed-income diversification may affect performance in periods like the current one when interest rates are rising. Indeed, we expect both the federal funds target rate and the 10-year U.S. Treasury yield to rise gradually from their current low levels in the next two to three years. Our next analysis considers 16 periods from 1998 to 2017 in which the 10-year U.S. Treasury yield rose by 50 basis points or more.

Adding a 10% allocation to plus sectors produced nearly across-the-board increases in both absolute and risk-adjusted returns, compared to the traditional 60/40 portfolio (Figure 6). Mezzanine debt and high-yield bonds, for example, increased returns by 150 and 138 basis points, respectively, with only modest increases in volatility. The combination of six categories in a 20% overall allocation produced the highest absolute return and nearly the highest risk-adjusted return. The combined portfolio's return of 15.38% was 217 basis points higher than the reference portfolio's 13.21% return, while volatility increased by only 70 basis points, resulting in a higher Sharpe Ratio. Performance benefits were largely the result of higher yields providing a cushion against bond price declines and lower sensitivity to rising rates, compared to traditional bond categories.

Figure 6: Diversification provided higher risk-adjusted returns during periods of rising interest rates

20 years: 1 April 1997 - 31 March 2017

	60% / 40% Stock-Bond Portfolio	Adding 10% Emerging Markets Debt	Adding 10% U.S High-Yield Bonds	Adding 10% Floating-Rate Loans	Adding 10% Preferred Securities	Adding 10% Middle-Market Senior Loans	Adding 10% Mezzanine Debt	Adding 20%: Mix of six public and private fixed-income assets
Annual Return	13.21%	14.22%	14.59%	14.46%	13.33%	14.43%	14.71%	15.38%
Standard Deviation	8.51%	8.92%	8.86%	8.62%	9.54%	8.62%	8.66%	9.21%
Sharpe Ratio	1.30	1.35	1.40	1.43	1.17	1.43	1.45	1.44

Performance is based on the following 12 periods when the 10-year U.S. Treasury yield increased by 50 basis points or more: 30 September 1998-31 December 1999, 31 March 2001-30 June 2001, 30 September 2001-29 March 2002, 30 June 2003-31 December 2003, 31 March 2004-30 June 2004, 30 June 2005-30 June 2006, 31 March 2008-30 June 2008, 31 December 2008-30 June 2009, 30 September 2009-31 December 2009, 30 September 2010-31 March 2011, 30 September 2012-31 December 2013, 30 June 2016-31 December 2016.

Performance is based on the following indexes: U.S. stock: Russell 3000 Index; U.S. investment-grade bonds: Bloomberg Barclays U.S. Aggregate Bond Index; emerging markets debt: J.P. Morgan EMBI Global Total Return Index; U.S. high- yield bonds: BofA Merrill Lynch U.S. Cash Pay High Yield Index; floating-rate loans: Credit Suisse Leveraged Loan Total Return Index; preferred securities; BofA Merrill Lynch Fixed Rate Preferred Securities Index; middle-market senior loans: S&P LSTA Leveraged Loan Index, middle-market segment; mezzanine debt: Cambridge Associates data base of private mezzanine loans. It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs.

The stronger results in Figure 6 should be considered in context. Risk-adjusted returns for all the portfolios, including a traditional 60/40, were extraordinarily high during periods of rising interest rates over the past 20 years. These timeframes included the late 1990s, the mid- 2000s, and much of the initial recovery from the global financial crisis — all marked by strong equity market performance. While these impressive returns should come as little surprise, it's important to note that equity returns — and bond yields — are widely expected to be lower in the next decade. Nonetheless, the results provide evidence of the benefits of diversifying fixed-income portfolios using "plus" sectors and private investments that are less sensitive to rising interest rates.

BOND DIVERSIFICATION IS NOT A PANACEA

Implementing a diversification strategy may involve additional cost and complexity. Callan's study highlighted the difference between investing 100% in high-quality U.S. bonds in 1995 and using more complex asset classes, such as private equity and real estate, to achieve the same rate of return in 2015. Deeper due diligence is required to address the risks of investing in esoteric markets, including potential for wider dispersion of returns, lack of transparency, and limited liquidity. In addition to security selection, constructing multi-asset portfolios matching an institution's risk-return profile also can be challenging. Institutions lacking expertise in specialized markets, such as private debt or emerging-market bonds, should identify managers with deep research capabilities and track records of success in specific sectors.

CONCLUSION

Diversify and maintain fixed-income exposure

- A prolonged equity bull market and benign credit environment have masked the potential dangers of increasing exposure to equity markets or relying on a broad fixed-income benchmark to address the twin threats of low yields and rising interest rates.
- Institutional investors can diversify portfolios using a range of sub-asset classes, while maintaining their overall fixed-income allocation as partial protection against a recession-related equity bear market.
- A range of fixed-income "plus" sectors and private investments offer the potential to improve yields and risk-adjusted returns, while reducing sensitivity to rising rates — compared to traditional portfolios based on the Bloomberg Barclays U.S. Aggregate Bond Index.

For more information, please visit nuveen.com.

Endnotes

1 The yield on the Bloomberg Barclays U.S. Aggregate Bond Index was 2.42%, as of 31 August 2017.

2 Callan Associates, "Risky Business," Callan Institute Research, September 2016.

3 The spread for U.S. dollar-denominated sovereign bonds (JP Morgan EMBI Global Diversified Index) was 308 basis points over U.S. Treasuries, as of 18 July 2017.

4 The two periods of rising rates were 61 June 2004 to 30 June 2006, and 1 December 2015 to 30 June 2017. Data reflect returns for JPMorgan EMBI Global Core Bond Index and fed funds rates. Sources: Bloomberg and Nuveen/TIAA Investments.

5 Nuveen, Symphony Asset Management, The Case for Loans, January 2017.

6 Nuveen/TIAA Investments, "The enduring case for high-yield bonds," November 2016, page 4.

7 Nuveen, Nuveen Asset Management, Fixed Income Perspective: Preferred Securities, December 2016.

Limitations of optimization methodology

Optimization is a technique for determining the asset allocation designed to provide the maximum return for a given level of risk. Optimization is highly sensitive to data inputs, such as historical returns for certain time periods, and relies on statistical assumptions that may not represent actual returns. Results should be considered broadly illustrative and directional, rather than predictive or precise.

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Bonds and other fixed-income investments are subject to various risks including, but not limited to interest rate risk or the risk that interest rates will rise, causing bond prices to fall; and credit risk, which is the risk that an issuer will be unable to make interest and principal payments when due.

High-yield bonds are subject to interest rate and inflation risks, and have significantly higher credit risk than investment-grade bonds.

Investments in emerging market bonds involve higher risk. Investments in debt securities issued or guaranteed by governments or governmental entities are subject to the risk that an entity may delay or refuse to pay interest or principal on its sovereign debt because of cash flow problems, insufficient foreign reserves, or political or other considerations. In this event, there may be no legal process for collecting sovereign debts that a governmental entity has not repaid.

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