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BRINGING BALANCE TO INCOME PORTFOLIOS

HOW TO TAKE CONTROL OF YOUR BOND MARKET RISK

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IN THIS PAPER: Each of the major bond market risks—interest rate and credit—pays off over time. But they usually don't pay at the same time. In this paper, we'll take a look at why managing both risks in a single portfolio may offer income-oriented investors a better trade-off between risk and return.

TAKING CONTROL OF YOUR BOND MARKET RISK

Investors often ask us which of the two main bond market risks they should focus on—interest rate or credit. Our answer? Both—and the way they interact with each other.

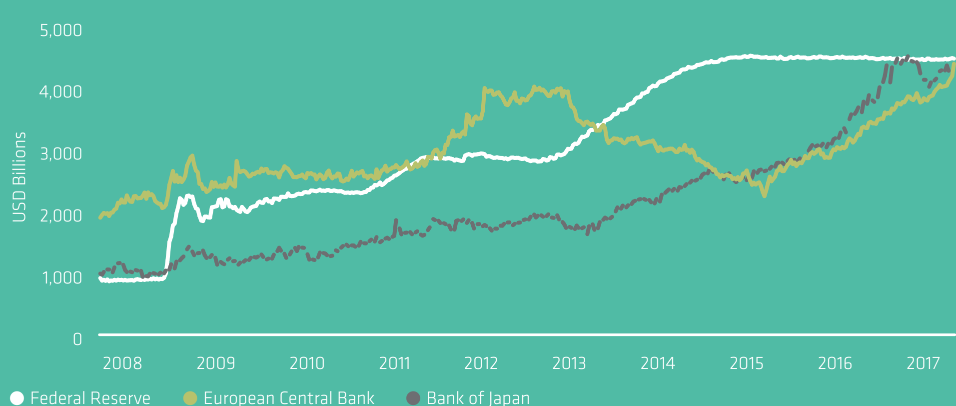
Most investors know they need to take both risks if they want to generate more income and diversify their stock exposure. But in today's bond market, it's more important than ever to get a handle on how to manage interest-rate and credit risk in an integrated way.

Investors typically view interest-rate–sensitive bonds (global government bonds, inflation-linked bonds) and growth-sensitive credit assets (high-yield corporate bonds, bank loans, emerging-market debt) as two separate groups. And they use different managers for each.

In theory, the divide-and-conquer approach works like this: if the assets in the credit-oriented portfolio get too expensive to justify the risk, a manager might sell some of them and shift those assets into the rate-sensitive portfolio.

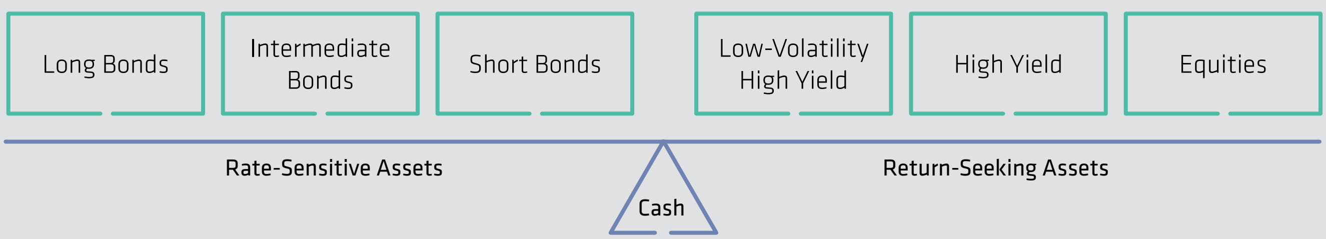
But there's a problem with this approach. Managing these pools of assets separately can cause investors to miss income-generating opportunities and take on too much exposure to the risk of losses.

DISPLAY 1: CENTRAL BANK BALANCE SHEETS HAVE SWELLED SINCE 2008



As of March 31, 2017
Source: International Monetary Fund and AB

DISPLAY 2: THE ASSET-ALLOCATION SEESAW



THE PROBLEM WITH DIVIDE AND CONQUER

It's not easy to shift money quickly from one portfolio to another. For one thing, nobody who manages assets for a living has a crystal ball. It's hard to forecast interest-rate changes or credit events. Anyone can get lucky once or twice. But even the most seasoned investors struggle to get it right consistently.

Even if crystal balls did exist, they probably wouldn't do bond investors much good, because credit markets—especially high-yield bonds—are relatively illiquid. With about 5,000 global credit issuers and a dizzying array of securities, it can be a major challenge to buy or sell a specific bond or block of bonds.

Some investors may try to address this hurdle by putting their bonds on autopilot—and taking active managers out of the equation. But that's not much of a solution. Strategies that passively track a market index can't pick and choose their exposures at all—they're locked into exposures just because those issuers are part of the index.

What's more, most passive managers don't even try to own every security in the index. They compensate by buying more of the biggest ones. This should worry investors, because bond issuers with the biggest weights in indices are countries or companies that issue the most debt. If any of these issuers run into trouble, there's no way passive investors can limit their exposure.

Finally—and maybe most importantly—investors who manage interest-rate and credit risk separately, whether in active or passive strategies, may overlook the crucial interplay between the two.

This is something market participants haven't had to think much about over the last decade. Interest rates plunged after the global financial crisis, inflation evaporated and central bank policy—not the real economy—became the most important variable for global bond markets. For years, investors could almost ignore interest-rate risk. At the same time, central banks' easy money policies made companies less likely to default, leaving investors free to load up on credit risk to boost returns.

WITH BONDS, COMBINE AND CONQUER IS BETTER

But the long bull market for bonds was the exception that proves the rule. More recently, the macroeconomic sands around the world have started to shift. The global economy is gaining traction, and interest rates have started to rise.

The US Federal Reserve began lifting borrowing costs in 2015 and may soon sell some of the US Treasuries and mortgage-backed bonds it acquired during the crisis. If the world economy strengthens further and inflation rises, the European Central Bank and Bank of Japan may soon follow suit. How the three go about shrinking balance sheets totaling nearly US$13 trillion could have major implications for market stability (*Display 1, previous page*).

Governments, meanwhile, are moving toward more expansionary fiscal policies, which could stoke inflation, especially in economies at or near full employment. At the same time, many corporate bond valuations are stretched, and credit cycles are diverging across sectors and regions, with some nearing the end of a multiyear expansion (*see* "The Credit Cycle," *page* 3).

In other words, investors today must pay constant attention to interest-rate and credit risk. That means having a manager who understands how the two interact and has the flexibility to tilt toward one or the other, depending on rapidly changing conditions.

Doing this effectively calls for a "combine-and-conquer" approach: pairing the two groups of assets in a single strategy known as a credit

> Investors today must pay attention to interest-rate and credit risk.

barbell and letting managers adjust the balance as conditions and valuations change.

When managed effectively, this strategy may minimize large drawdowns while still providing a strong and steady stream of income. For investors, that can mean more efficient income.

In this paper, we'll take a look at how investors can build a barbell and how it stacks up against other fixed-income strategies. But there are a couple of things to keep in mind:

We use US Treasuries throughout to represent interest-rate–sensitive assets and US high-yield bonds as a proxy for growth assets. As the appendix tables on pages 10 and 11 show, performance results are similar when using global high yield, though they rely on a slightly shorter data set.

In practice, of course, investors will want to own a broader array of rate-related and growth-sensitive assets from a variety of sectors, industries and regions.

THE ASSET-ALLOCATION SEESAW: HOW TO FIND BALANCE

When building a portfolio, it helps to visualize your investment options as an asset-allocation seesaw, with cash in the middle, government bonds on the left and return-seeking assets such as high-yield bonds or equities on the right (*Display 2, page 1*).

The assets on each side of the seesaw tend to react differently to most macroeconomic factors. The reason they behave as they do is connected to their dominant risk premiums. Just as each person represents a unique combination of genetic building blocks, each fixed-income asset class carries a unique combination of premiums for various kinds of risk.

Interest-rate–sensitive assets such as US Treasuries or German Bunds have two main risk premiums. The **real-interest-rate** risk premium is the portion of the coupon that compensates investors for lending money to the government, while the **inflation-protection** risk premium protects the purchasing power of a bond's principal.

Corporate bond yields consist of the yield on comparable-maturity government bonds plus a credit spread, which can be broken down into further risk premiums. So in addition to the two mentioned above, corporate bonds carry a **credit,** or **default,** risk premium, the portion of the spread that compensates for the possibility that the issuer will suffer a credit downgrade, become unable to make coupon payments or go bankrupt.

For example, faster growth tends to feed inflation, which erodes the purchasing power—and market value—of government bonds. But it can boost consumer spending and corporate profits—good news for high-yield bonds because it lowers the odds of default.

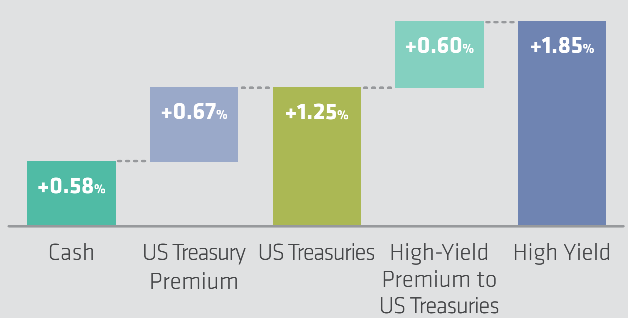
Investors get paid to take both types of risk. US Treasuries offer a premium over cash, while high-yield bonds offer an additional premium over US Treasuries (*Display 3*). The returns on all three assets will vary over time, but the premium you're paid for taking additional risk remains.

THE SWEET SPOT ON THE SEESAW

Moving away from cash in either direction on the seesaw increases return. On the rate-sensitive side, moving away from the center increases duration—a measure of interest-rate risk—but investors are compensated with higher yields. On the return-seeking side, higher yields compensate investors for rising credit risk.

There's a catch, though: yields on bonds with different maturities don't move in lockstep. When they rise, they rise on a curve, not a straight line. The further out one moves, the smaller the yield increase. Moving from cash to three-year government bonds can

DISPLAY 3: MORE RISK, MORE REWARD
Average Quarterly Returns: 1997–2016



As of December 31, 2016
Historical analysis does not guarantee future results.
Cash is represented by Bloomberg Barclays US Treasury Bellwether 3-Month Index, US Treasuries are represented by Bloomberg Barclays US Treasury, and high yield is represented by Bloomberg Barclays US High-Yield 2% Issuer Capped.
Source: Bloomberg Barclays and AB

THE CREDIT CYCLE: THERE'S MORE THAN ONE

Investors often speak of "the credit cycle" as if there were only one. But there are nearly always multiple credit cycles under way at any given time in different sectors and different parts of the world. They vary by starting period, length and degree.

The credit cycle refers to the ongoing expansion and contraction of credit extended to borrowers over time. As the *Display* illustrates, credit cycles have distinct stages. During the expansionary period, easy access to credit helps boost earnings and prompts companies to take on debt. As those debt levels rise, so does credit risk. Asset values start to decline, causing lenders to get stingier. A rise in interest rates then usually leads to a period of contraction and balance-sheet repair and, eventually, a recovery phase.

In the past, credit cycles tended to be correlated. That's not the case today. The global financial crisis exposed vast differences among countries and regions, both in underlying economic well-being and in policy choices. That's led to a wide divergence in monetary and fiscal policies as well as overall growth rates.

It follows, then, that credit cycles today vary considerably by region. Some markets are in the late stages of expansion with downturn looming. Others are already in repair and moving into recovery.

With different markets and sectors at different stages, one of the most important things investors can do is diversify. Exposure to various regions and sectors expands the opportunity set and varies credit risk.

But making the right choices calls for a hands-on approach and a thorough understanding of how individual credit cycles compare to others in different parts of the world.

KEEP AN EYE ON CREDIT CYCLES

THE CREDIT CYCLE

REPAIR

Leverage	Decreasing
Debt Growth	Decreasing
EBITDA Growth	**Stable**
Financial Policy	Extend Maturities
Event Risk	Low

RECOVERY

Leverage	Decreasing
Debt Growth	**Stable**
EBITDA Growth	Increasing
Financial Policy	**Opportunistic Refinancing**
Event Risk	**Cost-Driven M&A**

DOWNTURN

Leverage	Increasing
Debt Growth	**Stable**
EBITDA Growth	Decreasing
Financial Policy	**Survival**
Event Risk	Downgrades/Defaults

EXPANSION

Leverage	Increasing
Debt Growth	Increasing
EBITDA Growth	**Peaking**
Financial Policy	Share Repurchases
Event Risk	Growth M&A

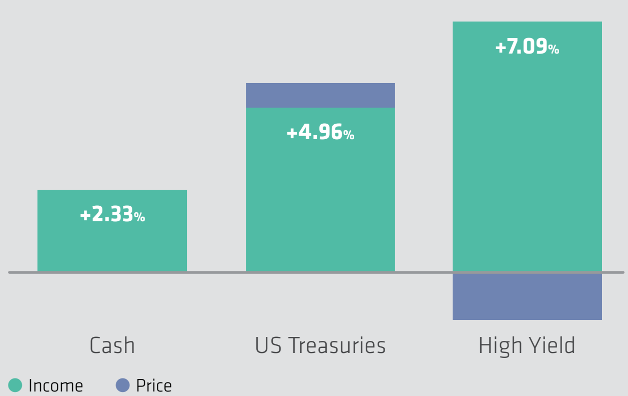
For illustrative purposes only
Source: AB

provide a hefty bump in yield. But the pickup available when moving from 10-year to 30-year bonds can be tiny. It's a similar story on the return-seeking side: return expectations increase as one moves away from cash, but by ever-diminishing amounts. Moving from high-yield bonds to equity, for instance, increases returns only slightly, but doubles drawdown risk.

That means it's almost never efficient to tilt all the way left or all the way right. In a rising-interest-rate environment, investors might be tempted to reduce all their interest-rate risk and load up on credit. But leaning that far in one direction would probably overexpose them to a single risk and leave them vulnerable to large drawdowns.

It would also overlook the critical contributions that duration makes to a fixed-income portfolio, namely stability, diversification and income. Sure, government bonds, mortgage-backed securities and even many investment-grade corporate bonds are highly sensitive to rate movements. But as these bonds mature, their prices drift back toward par. That means investors can reinvest the coupon income in newer—and higher-yielding—bonds.

DISPLAY 4: IN THE LONG RUN, IT'S ALL ABOUT INCOME
Average Annual Returns: 1997–2016



As of December 31, 2016
Past performance and historical analysis do not guarantee future results.
Cash is represented by Bloomberg Barclays US Treasury Bellwether 3-Month, US Treasuries are represented by Bloomberg Barclays US Treasury, and high yield is represented by Bloomberg Barclays US High-Yield 2% Issuer Capped.
Source: Bloomberg Barclays and AB

THE BOND HOLY GRAIL: MORE INCOME, LESS RISK

And bonds are extraordinarily good at generating income. As *Display 4* shows, bond returns come from two places—capital appreciation and coupon income. Over the long run, though, it's the income that dominates.

For instance, average annual returns for US high-yield bonds over the last 20 years came entirely from income. But here's some more surprising news: income accounted for nearly all the average annual return of US Treasuries—a purely interest-rate–related asset—as well, even though rates fell sharply over that period and US Treasury prices rose.

This illustrates why rate-sensitive assets should always have a seat at the asset-allocation table. It also helps to explain why a skilled active manager who pairs them with return-seeking assets such as high yield and adjusts the balance as needed has the potential to produce relatively high returns.

NEGATIVE CORRELATION: AN INVESTOR'S BEST FRIEND

But what about the other benefit of the barbell—lower risk? For that, let's recall how each type of bond behaves. As we detailed above, government bonds and other risk-reducing assets tend to do well when growth slows, while return-seeking assets such as high-yield corporates shine when growth accelerates and interest rates rise.

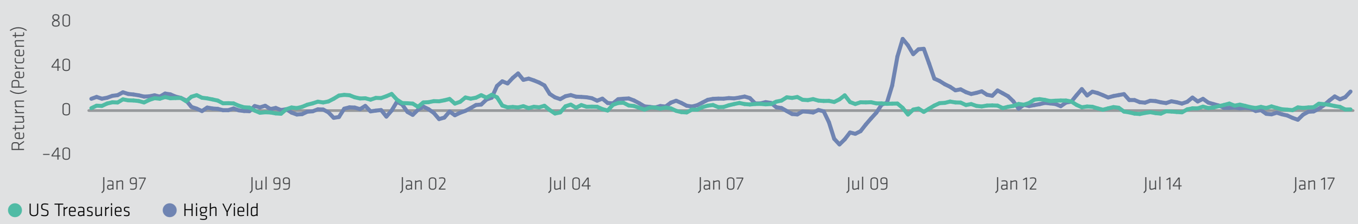
This is a big reason why credit barbells work so well: they blend assets whose returns are usually negatively correlated. Strong returns on one side usually outweigh weakness on the other. For instance, during the global financial crisis, a rally in government bonds compensated investors for weakness in financials sector corporate bonds and high-yield credit.

Because these assets tend to take turns outperforming each other, investors can sell the outperformers on one side and buy the underperforming bonds on the other. That limits drawdown risk. There's no free lunch in the world of asset allocation. But rebalancing a portfolio of negatively correlated assets may be the closest thing to it.

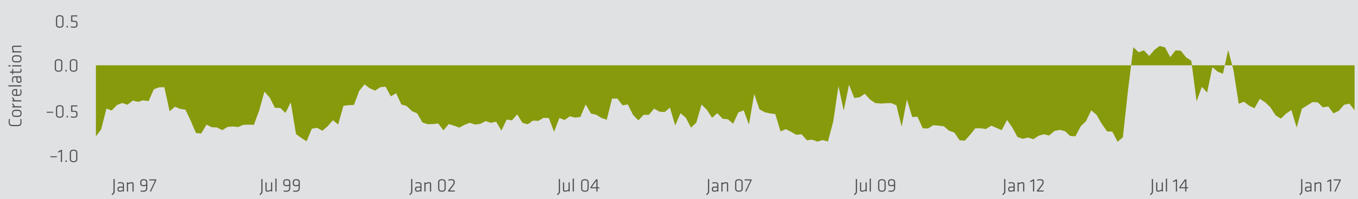
Over time, of course, both types of assets pay off. An investor over the past two decades would have wanted exposure to both (*Display 5, page 5*).

DISPLAY 5: RATES AND CREDIT—BOTH PAY, BUT USUALLY AT DIFFERENT TIMES

Trailing 12-Month Returns 1997-2016



12-Month Rolling Correlation of High-Yield Excess Return to 10-Year US Treasury



As of December 31, 2016

Historical analysis does not guarantee future results.

Upper display: US Treasuries are represented by Bloomberg Barclays US Treasury, and high yield is represented by Bloomberg Barclays US High-Yield 2% Issuer Capped.

Lower display: Correlation between Bloomberg Barclays US Corporate High-Yield Excess Return and Bloomberg Barclays US Treasury Bellwether 10-Year.

Source: Bloomberg Barclays and AB

SURVIVING IN STORMY WEATHER

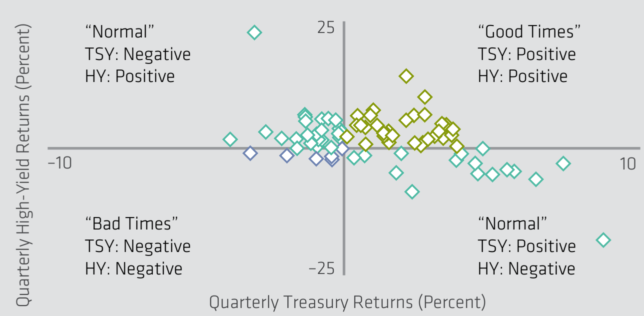
But what happens when interest-rate and credit risk pay—or don't pay, as the case may be—at the same time? As *Display 6* illustrates, occasionally the prices of US Treasuries and high-yield bonds rise or fall together.

Few investors will object when both sectors rally. We'll call these the good times. Between 1997 and 2016, US Treasury and global high-yield returns were positive during the same quarter 41% of the time. The reason? Again, it comes down to the income. Sometimes, what you earn by clipping your bonds' coupons even outweighs losses sustained when bond prices fall.

Correlated sell-offs—the bad times—are another story. Fortunately, these episodes have been rare—US Treasuries and high yield posted simultaneous quarterly declines just six times over the last 20 years. Still, these episodes are highly stressful and difficult to navigate, largely because it's hard to know which way to lean.

DISPLAY 6: STRESS-TESTING THE BARBELL

20 Years Ending December 31, 2016



As of December 31, 2016

Past performance and historical analysis do not guarantee future results.

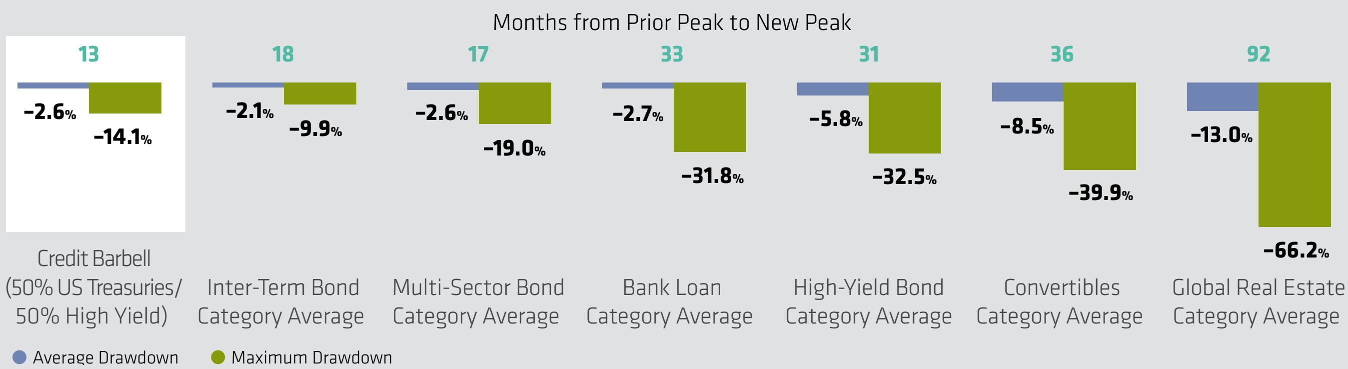
Treasuries (TSY) are represented by Bloomberg Barclays US Treasury. High yield (HY) is represented by Bloomberg Barclays US High-Yield 2% Issuer Capped.

Source: Bloomberg Barclays and AB

DISPLAY 7: LESS DOWNSIDE AND QUICKER RECOVERIES

20-Year Average and Maximum Drawdowns

Credit Barbells vs. Morningstar Category Averages: January 1997–December 2016



As of March 31, 2017

Past performance and historical analysis do not guarantee future results. Any index cited herein is for comparison purposes only. An investor generally cannot invest in an index. The unmanaged index does not reflect fees and expenses associated with the active management of an AB portfolio.

High yield is represented by Bloomberg Barclays US Corporate High-Yield; US Treasuries are represented by Bloomberg Barclays US Treasury Bellwether 10-Year.

Source: Bloomberg Barclays, Morningstar Direct and AB

Take mid-2006, when both sides of the barbell sold off. Should investors have decided that improving global growth and rising inflation justified a tilt toward credit assets? Or should they have gone the other way, reasoning that rate hikes from the Fed and European Central Bank would stall economic growth?

What about the "taper tantrum" of 2013? Did Fed plans to start winding down monthly asset purchases mean the postcrisis economy was strong enough to get on without them (good for credit)? Or would it bring on a new recession (good for rates)?

The biggest mistake investors or their managers can make in these situations is to sell both types of assets and lock in losses. But when investors entrust their rate-sensitive and growth-sensitive assets to separate managers working on separate platforms, that's a very real risk because each set of managers will be focused on one type of risk.

Like any strategy, a credit barbell can lose money in down markets and correlated sell-offs. But we think it stands a better chance of minimizing damage and positioning a portfolio to rebound when correlations turn negative again.

A portfolio split evenly between US Treasuries and high yield would have lost less on average over the last 20 years and recovered more quickly than other asset classes (*Display 7*).

GETTING THE BALANCE RIGHT

So what's the ideal construction? Would maintaining a simple 50/50 split between risk-reducing and return-seeking assets do the trick? Or could we improve the results by adjusting the balance? Moreover, how much leeway should a manager have to adjust the weights?

To some extent, the answers to these questions will depend on each investor's needs and comfort level. Those who want to generate a high level of income and can tolerate higher risk may want a bigger weighting in credit, while investors with lower risk tolerance might opt for a more balanced strategy.

Below, we examine three potential barbell strategies that an investor might choose.

A simple 50/50 construction might appeal to investors with high income requirements and a high risk tolerance. This is because high-yield bonds are at least twice as volatile as government debt.

Credit barbells may minimize large drawdowns.

So when it comes to risk exposure, an even market-weighted split between the two—we'll call it the **naïve barbell** approach—is actually tilted toward credit.

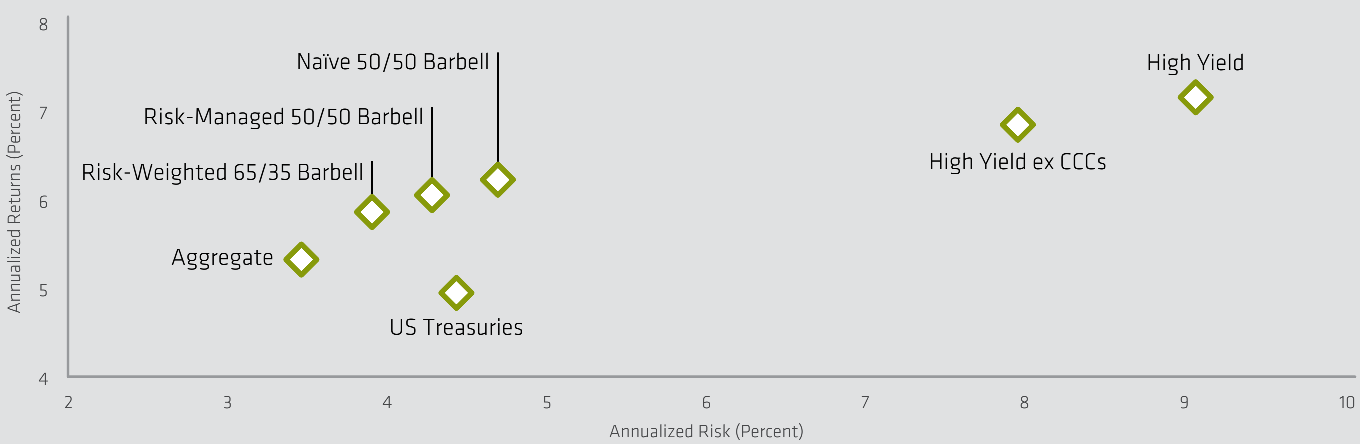
To reduce some credit risk, an investor might cut out low-credit-quality, CCC-rated "junk" bonds, the riskiest slice of the high-yield universe. These securities are at the highest risk of default, and steering clear might make sense during the late stages of a credit cycle. This **risk-managed barbell** would still be an even split between rate and credit, but would give up a small amount of return in exchange for lower risk.

Investors who want to take the same amount of risk on each side of their bond portfolio, however, would need to build a **risk-weighted barbell**. Because credit is at least twice as risky as rates, investors would have to hold more rate exposure to even out the risk weightings—roughly 65% in US Treasuries and 35% in high yield.

Display 8 shows how the annualized returns and risk of each approach vary. But compared to US Treasuries and high yield alone, all three had better returns per unit of risk.

DISPLAY 8: THE TRADEOFF BETWEEN RISK AND RETURN

20 Years Ending December 31, 2016



Return per Unit of Risk			
US Treasuries	1.1%	Naïve Barbell	1.3%
Aggregate	1.5	High Yield ex CCCs	0.9
Risk-Weighted Barbell	1.5	High Yield	0.8
Risk-Managed Barbell	1.4		

As of December 31, 2016

Past performance and historical analysis do not guarantee future results.

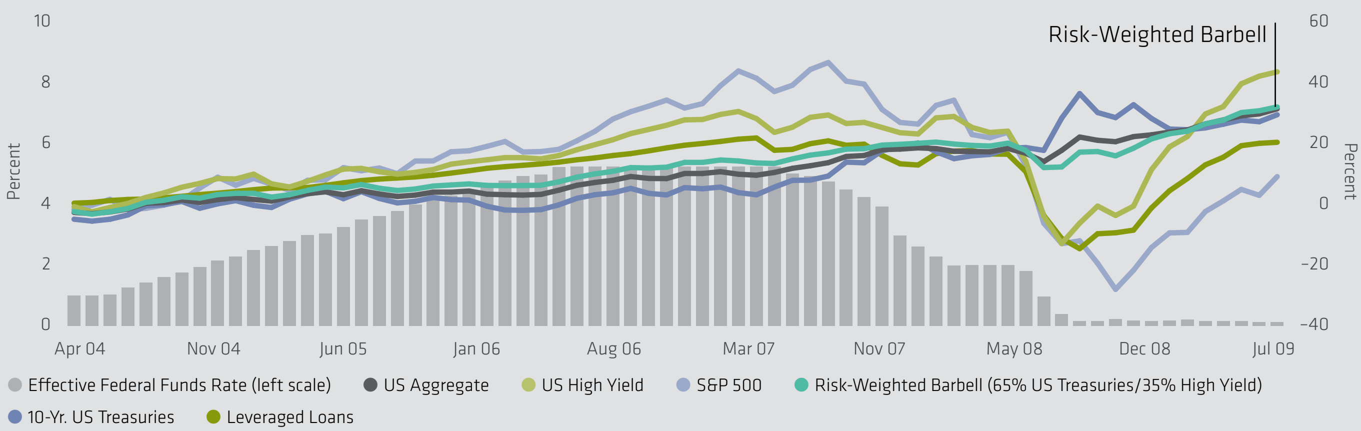
Aggregate is represented by Bloomberg Barclays US Aggregate Bond, US Treasuries are represented by Bloomberg Barclays US Treasury, high yield is represented by Bloomberg Barclays US High-Yield 2% Issuer Capped, high yield ex CCCs is represented by Bloomberg Barclays US High-Yield Ba/B 2% Issuer Capped, naïve barbell is represented by 50% US Treasuries and 50% high yield—rebalanced monthly, risk-managed barbell is represented by 50% US Treasuries and 50% high yield ex CCCs—rebalanced monthly, and risk-weighted barbell is represented by 65% US Treasuries and 35% high yield—rebalanced monthly.

Source: Bloomberg Barclays and AB

DISPLAY 9: NAVIGATING A RISING-RATE ENVIRONMENT

Returns Over Full Market Cycle: April 2004–November 2009

Fed Raises Rates 4.75%: April 2004–July 2006



	Fed Raises Rates Apr 04–Jul 06	Risk Asset Sell-Off Jun 07–Nov 08	Market Recovery Dec 08–Nov 09	Full Cycle Apr 04–Nov 09
65% US Treasuries/35% Credit	7.64%	–2.20%	21.53%	36.99%
US Aggregate	4.75	7.15	11.63	31.58
10-Year US Treasuries	–0.10	23.65	0.86	29.62
Bank Loans	14.00	–26.96	35.75	20.54
US High Yield	16.19	–33.31	64.95	43.78
S&P 500	18.21	–39.54	25.39	9.23

As of March 31, 2016

Past performance and historical analysis do not guarantee future results. Hypothetical portfolios have inherent limitations, including that they may not reflect the effect that numerous factors may have had on an investment decision in designing a portfolio. Any benchmark or index cited herein is for comparison purposes only. An investor generally cannot invest in an index. The unmanaged index does not reflect fees and expenses associated with the active management of an AB portfolio. US aggregate is represented by Bloomberg Barclays US Aggregate Bond, US high yield is represented by Bloomberg Barclays US Corporate High-Yield, and 10-Year US Treasuries are represented by Bloomberg Barclays US Treasury Bellwether 10-Year. Source: Bloomberg Barclays, Federal Reserve Bank of St. Louis, Morningstar Direct, Standard & Poor's (S&P) and AB

DIVERSIFY WITH A GLOBAL APPROACH

Of course, the most effective strategies will stretch beyond US Treasuries and high-yield bonds. Today's opportunities are global, so investors need exposure to different sectors, industries and regions—and varying interest-rate and credit cycles around the world.

The ability to use global government bonds, bank loans, emerging-market debt, inflation-linked bonds and securitized assets gives managers more levers to pull in the search for high-income opportunities. That's particularly important when credit spreads are tight and the political and policy outlook is uncertain.

It's also important to actively manage the weights. Setting a static allocation and forgetting it won't produce solid long-term returns. If the assets on one side of the barbell look expensive, a manager should be able to change the balance and lean toward lower-priced opportunities on the other side. If asset prices on both sides seem high, the manager may need to reduce overall portfolio risk.

However, sticking to a maximum allocation for riskier credit assets makes sense. For example, an investor who uses the risk-weighted portfolio described above might decide at any given moment that valuations justify a 70% allocation to interest-rate risk and just 30% to credit risk. But if credit should subsequently become more attractive, he would still face a cap on his exposure at 35%.

An investor who wants to maintain a risk-weighted allocation but needs higher income can use leverage to boost potential returns. Using 40% leverage on both sides of the 65/35 portfolio would increase credit exposure to nearly 50%, in line with the risk-managed and naïve barbells.

RISING RATES DON'T HAVE TO DERAIL RETURNS

But how much rate or credit exposure is too much? For example, wouldn't a 65% allocation to US Treasuries or other interest-rate–sensitive assets be too big in a rising-rate environment?

Not necessarily. As we detailed earlier, government bonds provide important diversification to credit exposure in all environments. But there's another important point to remember: rising rates ultimately lead to slower growth. When that happens, credit cycles fizzle out and growth-sensitive assets struggle. Eventually, slower growth causes interest rates to fall.

For example, the Fed raised rates 17 times between 2004 and 2006 to quell inflation, taking the fed funds rate to 5.25%. In 2007, it reversed course, and over the next year brought borrowing costs to zero as the global financial crisis deepened.

A hypothetical 65/35 portfolio would have returned a healthy 7.64% during the two years the Fed was raising rates. Like most income strategies, it would have struggled during the crisis that followed—though by much less than a pure high-yield strategy did—and would have lagged high yield during the recovery. But over the full cycle, it would have returned nearly 37%—within range of high yield and well above bank loans and the S&P 500 (*Display 9, page 8*).

Not every rising-rate cycle will end in a global financial crisis, of course. But they all eventually slow the rate of growth. Those who understand how cycles evolve and interact can move tactically between rate-sensitive and growth-sensitive assets before others do. Selling assets that are doing well can be an uncomfortable exercise. But, in our view, investors who can get comfortable being uncomfortable tend to make the wisest investment decisions.

THE GLUE THAT HOLDS IT TOGETHER

Managing a barbell strategy effectively isn't easy—and it isn't something a single investor or portfolio manager can do on her own. In our view, it requires a cohesive team of traders, managers, economists and analysts—and a cross-fertilization of quantitative and fundamental research as the glue to keep it all together.

Knowing which way to lean—and when—requires a deep understanding of the interest-rate and credit cycles around the world and how they interact. On a security-specific level, the ability to carry out intensive credit analysis on each security lets managers find the winners and—more importantly—avoid the losers.

And as we've seen, there's no one best way to build a barbell. Investment weights, leverage ratios, and mix of assets can all vary. It's important to vet potential managers carefully and learn about their investment processes and approaches to balancing interest-rate and credit risk over time.

SUMMING IT UP

These are uncertain times in markets, and uncertainty can create dilemmas for investors who need high levels of income but can't stomach a high level of risk. By mixing interest-rate–sensitive assets with higher-yielding credit securities in one portfolio, investors may increase their chances of earning extra income without taking on unacceptable levels of risk. But to do it right, they or their managers must understand current interest-rate and credit cycles and the interplay between them.

Investing, like most things in life, is better with balance. A carefully constructed and disciplined barbell strategy can create that balance in investors' fixed-income portfolios by reducing risk without sacrificing much return.

Investors will face some emotional challenges when markets are volatile—and short-term volatility is almost a given with US Treasuries and higher-yielding credit assets. That's especially true today because market liquidity for many fixed-income assets, including corporate bonds, has been drying up.

But the key to long-term success isn't avoiding volatility. It's generating a consistently high level of income and avoiding large drawdowns. Do that, and you're likely to win over time.

APPENDIX
RESULTS USING US AND GLOBAL HIGH YIELD

Fixed-Income Sectors Pay Risk Premiums	US: 12/31/1996–12/31/2016		
Average Quarterly Returns	**Premium**	**Return**	
Cash	0.00%	0.58%	
Treasuries	0.67	1.25	
High Yield	0.60	1.85	
Income-Driven Returns			
Annualized Returns	**Income[1]**	**Price**	**Total[2]**
Cash	2.33%	0.00%	2.33%
Treasuries	4.65	0.70	4.96
High Yield	7.40	–1.34	7.09
Credit Barbell & Correlation (20-Year Correlation to the Aggregate)			
Aggregate	1.00		
100% TSY	0.91		
90/10	0.97		
80/20	0.96		
70/30	0.88		
60/40	0.74		
50/50	0.60		
40/50	0.47		
30/70	0.37		
20/80	0.29		
10/90	0.23		
100% HY	0.18		

Credit Barbells May Improve Risk/Return Profile		
20 Years Ending 12/31/2016	**Annualized Std.-Dev.**	**Annualized Returns**
US Aggregate	3.45%	5.29%
Global Aggregate	2.77	5.30
Treasuries	4.41	4.96
High Yield	9.01	7.09
High Yield ex CCCs	7.91	6.81
Naïve Barbell	4.67	6.17
Risk-Managed Barbell	4.27	6.00
Risk-Weighted Barbell	3.89	5.84
Stress-Testing the Barbell (Number of Quarterly Returns)		
	TSY: Negative	TSY: Positive
HY: Positive	25	33
HY: Negative	6	16
Stress-Testing the Barbell (Percent of Quarterly Returns)		
	TSY: Negative	TSY: Positive
HY: Positive	31%	41%
HY: Negative	8	20

Definitions	
Cash	Bloomberg Barclays US Treasury Bellwether 3-Month Index
Treasuries	Bloomberg Barclays US Treasury Index
High Yield	Bloomberg Barclays US High-Yield 2% Issuer Capped Index
High Yield ex CCCs	Bloomberg Barclays US High-Yield Ba/B 2% Issuer Capped Index
Naïve Barbell (US)	50% US Treasuries and 50% High Yield—rebalanced monthly
Risk-Managed Barbell (US)	50% US Treasuries and 50% High Yield ex CCCs—rebalanced monthly
Risk-Weighted Barbell (US)	65% US Treasuries and 35% High Yield—rebalanced monthly

Past performance and historical analysis do not guarantee future results. The performance of an index is not an exact representation of any particular investment, as an investor cannot invest directly in an index.

1 Income return represented as coupon return with reinvestment

2 Totals may not equal the compounding of components.

Source: Morningstar and AB

Fixed-Income Sectors Pay Risk Premiums	Global: 12/31/1998–12/31/2016			
Average Quarterly Returns	Premium	Return		
Cash	0.00%	0.50%		
Treasuries	0.62	1.12		
Global High Yield	1.06	2.18		
Income-Driven Returns				
Annualized Returns	Income[1]	Price	Other[2]	Total[3]
Cash	1.99%	0.00%		1.99%
Treasuries	3.96	0.45		4.44
High Yield	8.43	–0.06	0.10%	8.47
Credit Barbell & Correlation (Correlation to the Global Agg 12/98–12/16)				
Global Aggregate	1.00			
100% TSY	0.88			
90/10	0.92			
80/20	0.90			
70/30	0.81			
60/40	0.68			
50/50	0.54			
40/60	0.42			
30/70	0.33			
20/80	0.25			
10/90	0.19			
100% Global HY	0.14			

Credit Barbells May Improve Risk/Return Profile		
12/31/1998–12/31/2016	Annualized Std. Dev.	Annualized Returns
US Aggregate	3.46%	4.86%
Global Aggregate—hedged to USD	2.75	4.79
Treasuries	4.46	4.44
Global High Yield	9.23	8.47
Global High Yield ex CCCs	8.41	7.44
Naïve Barbell	4.85	6.59
Risk-Managed Barbell	4.56	6.06
Risk-Weighted Barbell	4.05	5.98
Stress-Testing the Barbell (Number of Quarterly Returns)		
	TSY: Negative	TSY: Positive
Global HY: Positive	22	29
Global HY: Negative	7	14
Stress-Testing the Barbell (Percent of Quarterly Returns)		
	TSY: Negative	TSY: Positive
Global HY: Positive	31%	40%
Global HY: Negative	10	19

Definitions	
Cash	Bloomberg Barclays US Treasury Bellwether 3-Month Index
Treasuries	Bloomberg Barclays US Treasury Index
Global High Yield	Bloomberg Barclays Global High-Yield Index, hedged to US Dollars
Global High Yield ex CCCs	Bloomberg Barclays US High-Yield Ba/B 2% Issuer Capped Index for the period Jan 1999–Nov 2002, then Bloomberg Barclays Global High-Yield Index ex CCCs hedged to US dollars from Dec 2002 through Dec 2016
Naïve Barbell (US)	50% US Treasuries and 50% Global High Yield—rebalanced monthly
Risk-Managed Barbell (US)	50% US Treasuries and 50% Global High Yield ex CCCs—rebalanced monthly
Risk-Weighted Barbell (US)	65% US Treasuries and 35% Global High Yield—rebalanced monthly

Past performance and historical analysis do not guarantee future results. The performance of an index is not an exact representation of any particular investment, as an investor cannot invest directly in an index.

1 Income return represented as coupon return with reinvestment

2 Other includes currency hedging.

3 Totals may not equal the compounding of components.

Source: Morningstar and AB

DEFINITIONS

Bloomberg Barclays US Treasury Bellwether 10-Year Index: Represents Treasury bonds, and used as a benchmark against the market for long-term maturity fixed-income securities.

Bloomberg Barclays US Treasury Bellwether 3-Month Index: Represents Treasury bonds, and used as a benchmark against the market for short-term-maturity fixed-income securities.

Bloomberg Barclays US Treasury Index: Represents the performance of US Treasuries within the US government fixed-income market.

Bloomberg Barclays US High-Yield 2% Issuer Capped Index: Represents the 2% issuer-capped component of the US Corporate High-Yield Index, which represents the performance of fixed-income securities having a maximum quality rating of Ba1, a minimum amount outstanding of $150 million and at least one year to maturity.

Bloomberg Barclays US High-Yield Ba/B 2% Issuer Capped Index: Represents the Ba/B component of the US High Yield 2% Issuer Capped Index.

Bloomberg Barclays US Corporate High-Yield Index: Represents the corporate component of the Barclays US High-Yield Index.

Bloomberg Barclays US Aggregate Bond Index: A broad-based benchmark that measures the investment-grade, US dollar–denominated, fixed-rate taxable bond market, including US Treasuries, government-related and corporate securities, mortgage-backed securities (MBS [agency fixed-rate and hybrid ARM pass-throughs]), asset-backed securities (ABS) and commercial mortgage-backed securities (CMBS).

Bloomberg Barclays Global High-Yield Index: A broad-based measure of the global high-yield fixed-income markets. The Global High-Yield Index represents the union of the US High-Yield, Pan-European High-Yield, US Emerging Markets High-Yield, CMBS High-Yield and Pan-European Emerging Markets High-Yield Indices.

S&P 500 Index: Includes a representative sample of 500 leading companies in leading industries of the US economy.

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