Shaping bond allocations to hedge equity risk: think carry, not just correlation

**KEY POINTS**

- Our research indicates that developed market sovereigns such as US Treasuries can’t hedge sufficiently against the risk of a significant equity-market downturn.
- Examining a range of options, we consider how investors can position themselves if they believe a meaningful fall in equity values will occur in the medium term.
- Investors concerned about equity risk should think about broadening their fixed income allocations to include sectors such as investment-grade and high-yield corporates, hard-currency emerging markets debt and liquid alternatives. Even though such assets may be more highly correlated with equities than developed market sovereigns are, their higher yields and expected returns can cushion equity losses.
- For hedging 20%+ equity-market corrections, investors should stick with core-bond investments. During such episodes, the negative impact of credit-spread widening more than offsets the greater carry of higher-risk assets.

**DURING A CRISIS, WE ARE TOLD, “ALL CORRELATIONS GO TO ONE”**.

A correlation that does not go to one, though, is that of perceived safe-haven bonds to equities. In periods of market stress, when central banks typically hurry to cut interest rates and money flows from risky to safe assets, bonds of highly rated government and corporate issuers rise — at least partly offsetting the losses from equity assets and pushing the correlation to something more like minus one. With equity valuations at all-time highs at this writing, one might take comfort from this. Yet bond yields are at all-time lows; surely they cannot go low enough to offset a significant downturn in equities?

**The good news: sovereign bonds diversify equity risk**

The good news is, developed market (DM) sovereign bonds historically have diversified equity risk in periods of market stress. To show this, we examine a hypothetical 50/50 equity/bond portfolio, with equities represented by the MSCI World Index and DM sovereign bonds by...
an even (25/25) mix of the BofA Merrill Lynch Global Government and US Treasury indexes. Figure 1 reveals no upward spike in correlations between bonds and equities during bouts of market volatility, represented here by the Chicago Board Options Exchange (CBOE) Volatility Index, or VIX. (Although the VIX is tied to the S&P 500, it is generally regarded as a good proxy for global market volatility.)

**Figure 1**
**Correlation of DM government bonds with global equities typically has not spiked in market stress periods**
20 years ended 30 June 2017

DM government bonds proxied by a 50/50 blend of the BofA Merrill Lynch Global Government and US Treasury indexes. Global equities by the MSCI World Index. Past results are not necessarily indicative of future results. Source: Bloomberg

Some investors believe that low bond yields have made bonds less effective at hedging equity risk. To test this belief, we examined historical data since 1997 to see if we could find a relationship between the level of bond yields and the amount of protection they have offered when equities decline. A key metric we used to gauge this relationship was something we call the Fixed Income Loss Prevention ratio. This is the percentage of an equity decline that would be offset by a fixed income gain in our hypothetical 50/50 equity/bond portfolio. For example, if the equities fell in value by 6% and the bonds rose by 3%, this would be a 50% loss prevention. We constrained our analysis to all occasions over approximately the past 20 years when equities fell by a medium-sized 4% to 6%. To align the analysis with many investors’ time frames, returns were measured over a series of rolling 90-day periods.

©Since US Treasuries are a component of the BAML Global Government Index, this mix results in an overall DM sovereign allocation that is approximately two-thirds US Treasuries and one-third non-US DM sovereigns. Of note, our research did not reveal any major differences in performance between US and non-US DM sovereigns for the analyses in this paper. A complete list of the market indexes used as asset-class proxies in this piece is included in “Important disclosures” at the end of the paper.
As can be seen in Figure 2, over this period a very low starting yield for yields (leftmost bar) would not have affected the level of equity-loss prevention that the bond half of our hypothetical 50/50 equity/bond portfolio would have provided.

**Figure 2**  
**Very low starting yields may not impair DM government hedging ability**  
1 January 1997 – 30 June 2017

Examine all instances over the review period in which equities as represented by the MSCI World Index fell between 4% and 6%. This range was selected by Wellington Management in its discretion for purposes of this analysis; however, we believe the use of alternatively sized shocks (larger or smaller) would yield similar results. Past results are not necessarily indicative of future results. | Please refer to “Important disclosures” for a list of market indexes used as asset-class proxies. | Sources: Bloomberg, BofA Merrill Lynch.

**The not-so-good news: government bonds can’t protect a portfolio against major stock-market downturns**

Even though DM government bonds have historically diversified equity risk as seen in Figure 1, their values simply haven’t had enough variability to match the magnitude of major stock-market declines; hence, they haven’t been able to adequately offset the risk of a big stock-market fall.

Returning to our 50/50 portfolio, there is a clear relationship between the size of the fall in the equity assets and the loss-prevention capabilities of the hypothetical fixed income allocation (again, an even mix of the BAML Global Government and BAML US Treasury indexes).
Figure 3 shows that DM governments have offered excellent loss prevention in smaller equity downturns. However, the level of loss protection decreases as the equity falls grow in size. For equity declines greater than 25%, fixed income assets are only offsetting about 10% of that loss; that is, they are only gaining 2.5% of value, leaving the aggregate hypothetical portfolio with a 22.5% loss. For larger equity declines, multiple-standard-deviation (and therefore highly improbable) appreciation in the hypothetical bond allocation would be needed to fully mitigate the decline in equities.

Figure 3
Loss-protection power of DM sovereign bonds fades as magnitude of equity downturn rises
1 January 1997 – 30 June 2017

See “Important disclosures” for a list of market indexes used as asset-class proxies. Height of bars denotes the probability, expressed in standard deviations, of a rise in the hypothetical bond portfolio sufficient to fully offset the specified equity decline. The higher the bar, the more unlikely it has historically been that such a rise could occur. Past results are not necessarily indicative of future results. Sources: Bloomberg, BofA Merrill Lynch

Whilst the level of long-dated bond yields appears to be irrelevant, is it possible that changes in central bank policy rates might have an effect on the loss-prevention ability of fixed income assets? Our research suggests that they do not. Figure 4 shows four periods over the past two decades during which equities, as represented by the MSCI World Index, suffered significant declines. The level of policy rates as proxied by the US federal funds rate differed markedly across these periods. In two of the periods the fed funds rate was cut sharply, and in two of them it was not. Yet the level of loss prevention offered by bonds appears not to have been affected by the level of rates, or by whether or not there were cuts.
The loss-prevention power of US Treasuries seems not to have been affected by policy rates

<table>
<thead>
<tr>
<th>Market crisis</th>
<th>When occurred</th>
<th>Equities fell by</th>
<th>Change in fed funds rates</th>
<th>Loss prevention provided by USTs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech bust</td>
<td>March 2000 – October 2002</td>
<td>-48.4%</td>
<td>-4.25%</td>
<td>36%</td>
</tr>
<tr>
<td>Global financial crisis</td>
<td>July 2007 – March 2009</td>
<td>-57.7%</td>
<td>-5.00%</td>
<td>22%</td>
</tr>
<tr>
<td>Eurozone crisis</td>
<td>April 2011 – October 2011</td>
<td>-18.7%</td>
<td>0.00%</td>
<td>44%</td>
</tr>
<tr>
<td>Chinese stock panic</td>
<td>May 2015 – January 2016</td>
<td>-17.8%</td>
<td>0.25%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Includes the four major fundamental stock market declines occurring in the past two decades. See “Important disclosures” for a list of market indexes used as asset-class proxies and additional disclosures. Sources: Bloomberg, BofA Merrill Lynch. Past results are not necessarily indicative of future results. *Percent of losses in global equities as proxied by the MSCI World Index that would have been offset by US Treasuries, for a hypothetical portfolio of 50% equities and 50% US Treasuries, based on daily historical market data 1 January 1997 – 30 June 2017. From this data, rolling three-month returns were calculated to mimic the typical observation period of an institutional investor.

We’re not sure when the shock will be, so the carry matters

The analysis so far of the equity-hedging effectiveness of DM governments is only looking at half the total picture. The loss-prevention power of defensive assets also needs to be evaluated in light of their carry: the cost (negative or positive) of holding the asset over a period of time.

In order to bring carry into the analysis, we established a hypothetical scenario in which equities experience a 10% fall in value lasting two years. (We believe this scenario approximates the size and length of downturn that many asset owners are concerned about.) Since the defensive asset will be held for two years, carry costs are important. We also created a hypothetical portfolio consisting 50% of the MSCI World and 50% of a specific fixed income asset type, as laid out in Figure 5 below.

Figure 5

Behaviour of various fixed income asset types in 8% – 12% equity falls
1 January 1997 – 30 June 2017

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Yield as of 1 July 2017</th>
<th>Valuation change if equity shock</th>
<th>Loss prevention</th>
<th>Total portfolio performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM governments</td>
<td>1.05%</td>
<td>2.31%</td>
<td>23%</td>
<td>-2.89%</td>
</tr>
<tr>
<td>US Treasuries</td>
<td>1.95%</td>
<td>3.25%</td>
<td>33%</td>
<td>-1.62%</td>
</tr>
<tr>
<td>US IG corporates</td>
<td>3.28%</td>
<td>1.74%</td>
<td>18%</td>
<td>-1.18%</td>
</tr>
<tr>
<td>US high yield</td>
<td>6.10%</td>
<td>2.94%</td>
<td>-30%</td>
<td>-0.97%</td>
</tr>
<tr>
<td>External EMD</td>
<td>4.52%</td>
<td>1.15%</td>
<td>-12%</td>
<td>-1.51%</td>
</tr>
</tbody>
</table>

The hypothetical portfolio consists of a 50% allocation to the MSCI World and a 50% allocation to the indicated fixed income asset class. A range of 8% to 12% equity falls was chosen for purposes of this analysis as typical of the magnitude of shock that many clients are concerned about; other ranges yielded similar results. For additional disclosure regarding hypothetical portfolios and market indexes used as asset-class proxies, please refer to Important Disclosures at the end of the document. Past results are not necessarily indicative of future results.
Initially, we looked at a range of fixed income assets under this scenario: DM sovereigns ex-US, US Treasuries, US investment-grade and high-yield corporate bonds, and hard-currency-denominated emerging markets debt. The “Valuation change if equity shock” column shows how the specific bond asset type has historically tended to perform when equities have fallen 8% – 12%. “Loss prevention” shows the change in value of the bond asset as a percentage of the equity decline. “Total portfolio performance” is the return of the overall hypothetical portfolio — the accrued carry from the bonds, plus the equity and bond valuation changes — over the two-year period.

Correlation is not the sole measure of hedging power: carry also matters

As shown in the previous figure, DM sovereigns are less than optimal assets for hedging a medium-sized equity downturn. The hypothetical portfolios with corporate bonds as their fixed income allocations, by contrast, have the best total performance. This is because — even though we have observed that corporate bonds do not perform as well as sovereign bonds in an equity shock situation — they accumulate a significant buffer of additional return over the period, which can also be offset against equity losses.

A counterintuitive conclusion to be drawn from this analysis is that assets with little to no correlation to equities, or even a modestly positive correlation — that is, assets that underperform when equities do — can still be considered defensive assets if their expected return outweighs any valuation losses they experience during an equity fall.

Correlation, beta and loss prevention

Correlation, beta and loss prevention are all measures of the degree to which two assets diversify one another. Correlation (which is most commonly used) measures the extent to which two assets move together; thus a negative correlation is desirable for diversification. However, correlation is not useful for assessing bond and equity diversification effects, because it standardises by their variance, and so ignores the fact that bonds have much lower risk. So a bond index and an equity index can have a highly negative correlation even when the bonds are only offsetting a tiny percentage of equity losses. Beta is a better metric for our purposes, because it more accurately measures the degree to which bonds offset equity gains. However, we believe that loss prevention (used in this paper) is a better measure still, since it specifically gauges the potential impact of downside equity scenarios.
The most effective hedging asset? Depends on the size of the shock

We next look at how well the hedging assets we have introduced so far perform under other shock scenarios, while keeping our scenario time-frame constant at two years. To do this, we compare the total (un-annualised) change in the value of various hypothetical portfolios consisting of a 50/50 mix of equities and specific hedging assets over the two-year period across a range of equity-fall sizes (Figure 6).

**Figure 6**
Performance of various hypothetical portfolios by size of equity fall

<table>
<thead>
<tr>
<th>Equity fall</th>
<th>% of total falls observed 1 January 1997 – 30 June 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0% to -5%</td>
</tr>
<tr>
<td>DM governments</td>
<td>0.36%</td>
</tr>
<tr>
<td>US Treasuries</td>
<td>1.28%</td>
</tr>
<tr>
<td>US IG corporates</td>
<td>2.40%</td>
</tr>
<tr>
<td>US high yield</td>
<td>4.38%</td>
</tr>
<tr>
<td>External EMD</td>
<td>3.55%</td>
</tr>
<tr>
<td>Liquid alternative</td>
<td>2.82%</td>
</tr>
</tbody>
</table>

Wellington Management analysis based on BofA Merrill Lynch and MSCI index data via Bloomberg. Analysis based on historical market data 1 January 1997 – 30 June 2017. Results of more than one standard deviation from the mean are highlighted in red or dark green. Past results are not necessarily indicative of future results. The hypothetical portfolios consist of a 50% allocation to the MSCI World (equities) and a 50% allocation to the indicated asset type. For additional disclosure regarding hypothetical portfolios and market indexes used as asset-class proxies, see Important Disclosures at the end of the document.

As can be seen in the second row of the table (and as common sense would denote), declines greater than 10% were a minority, comprising only a quarter of the equity falls during the review period. For falls of up to 10%, the higher-carry assets — high yield and emerging-markets bonds — performed best, and DM government bonds performed the worst. In fact, the pattern of DM sovereign underperformance persisted for all equity falls apart from the very largest (greater than 15%), for which US Treasuries did better and US high yield worst as spreads for the sector widened. But overall, it is clear that DM government bonds historically have not been good diversifiers of equity risk.

US investment-grade corporates are reasonably effective for all equity falls; they are roughly as effective at offsetting equity risk as DM sovereigns, but have a higher yield. This implies that their credit spreads do not tend to widen enough, even during fairly large equity falls, to eliminate their equity-hedging qualities.
Diversifying beyond core bonds may better hedge small- and medium-sized equity downturns

The fixed income allocations of many institutional investors are composed solely of “core” sectors such as DM governments and investment-grade corporates. In Figure 7 we compare the performance of two hypothetical portfolios: one composed of equities and core bonds, the other of equities and “diversified” bonds — mostly US investment-grade corporates, with additional smaller allocations to high-yield bonds, external-currency EMD and our hypothetical liquid alternative. The total performance of these two portfolios is plotted across ascending levels of equity losses.

It is clear from our analysis that for small- or medium-sized equity falls, the hypothetical portfolio with diversified bonds offers generally better carry and loss-prevention capabilities than the portfolio with only core bonds. Of course, these equity-hedging benefits come at the price of taking on more credit risk.

For small- or medium-sized equity falls, our hypothetical portfolio with diversified bonds offers generally better carry and loss-prevention capabilities than the portfolio with only core bonds.
Regime change?

Many investors are worried about rising interest rates, potentially higher inflation and the market impact of central banks beginning to sell assets they purchased as part of their post-crisis quantitative easing programmes.

It is beyond the scope of this paper to forecast the next paradigm markets may face, but we believe that:

- Over shorter time frames, the returns of safe-haven assets and risky assets are greatly influenced by flows between the two, and should remain inversely correlated.
- Healthy, demand-driven inflation will tend to boost equities while harming safe-haven bonds, creating a negative correlation. Stagflation — a scenario in which the central bank has lost control of inflation — would probably create a positive correlation, but this is less likely.
- It is difficult, if not impossible, to identify a situation where a developed economy that issues bonds in its own (fiat) currency has faced a sovereign credit crisis. We think sovereign credit risk among developed countries is consistently overestimated by market commentators.
- The unwinding of quantitative easing may push down the prices of both bonds and equities. However, it is unclear if this risk is avoidable, and even cash — the main alternative to bonds and equities — has a negative real return for most investors, and a negative nominal return for many.

To hedge equities, think beyond sovereign bonds

The negative correlation of higher-credit-quality bonds to risk assets — the tendency for perceived safe-haven bonds such as DM sovereigns to outperform during periods of market turmoil — has historically helped stabilise portfolios at such times. Whilst we do not see any immediate reason for this correlation to turn positive, the low variability of many sovereign bond assets means that, viewed in terms of carry and loss prevention, they are not optimal hedging assets. Simply put, we think DM sovereign bonds offer too little diversification to equity risks in relation to their carry.

If sovereign bonds are the surprising “losers” in our equity-hedging competition, then the surprising “winners” may be the riskier fixed income sectors. If sovereign bonds are the surprising “losers” in our equity-hedging competition, then the surprising “winners” may be the riskier fixed income sectors.
Important disclosures

Market indexes used as asset-class proxies in this paper

- Developed market sovereign bonds: BofA Merrill Lynch Global Government Index
- US Treasuries: BofA Merrill Lynch US Treasury Index
- US investment-grade corporate bonds: BofA Merrill Lynch US Corporate Index
- US high-yield corporate bonds: BofA Merrill Lynch US High Yield Index
- External emerging markets debt (EMD): BofA Merrill Lynch Emerging Markets External Debt Sovereign Index
- Global equities: MSCI World Index

Calculation of the Loss Prevention Ratio

The loss-prevention data shown in the article is based on daily historical market data for the period 1 January 1997 — 30 June 2017. From this data, rolling three-month returns were calculated to mimic the typical observation period of an institutional investor.

Hypothetical portfolio disclosures

Hypothetical portfolios are provided for illustrative purposes only and are represented by blends of indexes. Hypothetical results are developed with the benefit of hindsight (i.e., actual knowledge of market conditions, results of similar strategies) and are subject to numerous other limitations. Index blends are not representative of an actual portfolio or Wellington Management strategy. Assumptions were selected by Wellington Management, and using different indexes or time periods might produce different results. Indexes are unmanaged and cannot be invested into directly. Index returns do not reflect trading costs, commissions, investment management fees, custody charges and other expenses associated with investments, but do include reinvestment of dividends and interest. If these costs were considered, the results would be lower. Since trades in an actual client account have not been executed, results may have under- or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity, and may not reflect the impact that certain economic or market factors may have had on a manager’s decision-making process if client funds were actually managed in the manner shown. Hypothetical performance cannot completely account for the impact that financial risk would have on actual trading. Certain of the assumptions have been made for modelling purposes and might not be repeated. The management of an actual account would produce different results than the hypothetical results presented. PAST RESULTS AND HYPOTHETICAL RESULTS ARE NO GUARANTEE OF FUTURE RESULTS.
otherwise make this material available to any person.

Wellington Management Company LLP (WMC) is an independently owned investment adviser registered with the US Securities and Exchange Commission (SEC). WMC is also a commodity trading advisor (CTA) registered with the US Commodity Futures Trading Commission. In certain circumstances, WMC provides commodity trading advice to clients in reliance on exemptions from CTA registration. In the US for ERISA clients, WMC is providing this material solely for sales and marketing purposes and not as an investment advice fiduciary under ERISA or the Internal Revenue Code. WMC has a financial interest in offering its products and services and is not committing to provide impartial investment advice or give advice in a fiduciary capacity in connection with those sales and marketing activities. WMC, along with its affiliates (collectively, Wellington Management), provides investment management and investment advisory services to institutions around the world. Located in Boston, Massachusetts, Wellington Management also has offices in Chicago, Illinois; Radnor, Pennsylvania; San Francisco, California; Beijing; Frankfurt; Hong Kong; London; Luxembourg; Singapore; Sydney; Tokyo; and Zurich. ■ This material is prepared for, and authorised for internal use by, designated institutional and professional investors and their consultants or for such other use as may be authorised by Wellington Management. This material and/or its contents are current as of the time of writing and may be reproduced or distributed in whole or in part, for any purpose, without the express written consent of Wellington Management. This material is not intended to constitute investment advice or an offer to sell, financial services provided by Wellington Management Company LLP (WMC), a US SEC-registered investment adviser also registered in the provinces of Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Prince Edward Island, Quebec and Saskatchewan in the categories of Portfolio Manager and Exempt Market Dealer. ■ In the UK, this material is provided by Wellington Management International Limited (WMIL), a firm authorised and regulated by the Financial Conduct Authority (FCA). This material is directed only at persons (Relevant Persons) who are classified as eligible counterparties or professional clients under the rules of the FCA. This material must not be acted on or relied on by persons who are not Relevant Persons. Any investment or investment service to which this material relates is available only to Relevant Persons and will be engaged in only with Relevant Persons. ■ In Germany, this material is provided by Wellington Management International Limited, Niederlassung Deutschland, the German branch of WMIL, which is authorised and regulated by the FCA and in respect of certain aspects of its activities by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). This material is directed only at persons (Relevant Persons) who are classified as eligible counterparties or professional clients under the German Securities Trading Act. This material does not constitute investment advice, a solicitation to invest in financial instruments or financial analysis within the meaning of Section 34b of the German Securities Trading Act. It does not meet all legal requirements designed to guarantee the independence of financial analyses and is not subject to any prohibition on dealing ahead of the publication of financial analyses. This material does not constitute a prospectus for the purposes of the German Capital Investment Code, the German Securities Sales Prospectus Act or the German Securities Futures Prospectus Act. ■ In Hong Kong, this material is provided to you by Wellington Management Hong Kong Limited (WM Hong Kong), a corporation licensed by the Securities and Futures Commission to conduct Type 1 (dealing in securities), Type 2 (dealing in futures contracts), Type 4 (advising on securities) and Type 9 (asset management) regulated activities, on the basis that you are a Professional investor as defined in the Securities and Futures Ordinance. By accepting this material you acknowledge and agree that this material is provided for your use only and that you will not distribute or otherwise make this material available to any person. ■ In Singapore, this material is provided for your use only by Wellington Management Singapore Pte Ltd (WM Singapore) (Registration Number 201415544E). WM Singapore is regulated by the Monetary Authority of Singapore under a Capital Markets Services Licence to conduct fund management activities and is an exempt financial adviser. By accepting this material you represent that you are a non-retail investor and that you will not copy, distribute or otherwise make this material available to any person. ■ In Australia, Wellington Management Australia Pty Ltd (WM Australia) (ABN19 167 091 090) has authorised the issue of this material for use solely by wholesale clients (as defined in the Corporations Act 2001). By accepting this material, you acknowledge and agree that this material is provided for your use only and that you will not distribute or otherwise make this material available to any person. ■ Wellington Management Company LLP is exempt from the requirement to hold an Australian financial services licence (AFSL) under the Corporations Act 2001 in respect of financial. A registered investment adviser regulated by the SEC, among others, is exempt from the need to hold an AFSL for financial services provided to Australian wholesale clients on certain conditions. Financial services provided by Wellington Management Company LLP are regulated by the SEC under the laws and regulatory requirements of the United States, which are different from the laws applying in Australia. ■ In Japan, Wellington Management Japan Pte Ltd (WM Japan) (Registration Number 19990504987R) has been registered as a Financial Instruments Firm with registered number: Director General of Kanto Local Finance Bureau (Kin-Sho) Number 428. WM Japan is a member of the Japan Investment Advisers Association (JIAA) and the Investment Trusts Association, Japan (ITA). ■ WMIL, WM Hong Kong, WM Japan and WM Singapore are also registered as investment advisers with the SEC, however, they will comply with the substantive provisions of the US Investment Advisers Act only with respect to their US clients.

©2017 Wellington Management Company LLP. All rights reserved.