

Strategy Insights

January 2018

Xpert Spotlight

Thought Leadership, Exchange Traded Funds



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What do you get when you cross a stock and a bond?

High-yield bonds are, of course, regular corporate bonds like any other. They generally have a set principal due to be repaid on a known maturity date (ignoring for now any "call provisions" that allow the company to refinance early), and pay a regular coupon. Why then the equity-like features? Well, because high-yield bonds are issued by businesses that have lower credit ratings (typically below BBB), their likelihood of being repaid in full tends to fluctuate with the business cycle. As such, high yield tends to trade in an "equity-like" manner, rallying when times are good and falling when economic conditions call into question firms' ability to service their debts.

But, when it comes to trying to create a broad and well-diversified portfolio, high yield is just like any other asset class, and it demands the same analysis to gauge whether its inclusion is justified. And so, with that goal in mind, we will offer, firstly, a brief discussion of the relative merits, and risks, of high yield as an asset class, and secondly, an overview of some of the unique features of accessing these bonds via an exchange traded fund (ETF).

For those who are convinced of the case for inclusion, we will finish by introducing five high-yield bond ETFs managed here at Deutsche Asset Management: Deutsche X-trackers USD High Yield Corporate Bond ETF (HYLB), Xtrackers High Beta High Yield Bond ETF (HYUP), Xtrackers Low Beta High Yield Bond ETF (HYDW), Xtrackers Short Duration High Yield Bond ETF (SHYL) and Deutsche X-trackers High Yield Corporate Bond—Interest Rate Hedged ETF (HYIH).

They offer:

- **Access** to a broad index of U.S. dollar denominated, high yield, fixed-income securities with the additional ability to target, or dial up or down, specific credit, yield, and duration exposures, all at low cost.
- **Exposure** either on a traditional basis (i.e. an index of cash bonds), or via funds that shorten duration, change the vanilla index's credit and yield profile, or remove interest rate risk entirely through hedging.

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Credit ratings are measured on a scale that generally ranges from AAA (highest) to D (lowest). All Fund securities except for those labeled "Not Rated" and "Other" have been rated by Moody's, S&P or Fitch, which are each a Nationally Recognized Statistical Rating Organization ("NRSRO"). All Index securities except for those labeled "Not Rated" have been rated by Moody's or S&P. Credit ratings are subject to change. One cannot invest directly into an index.

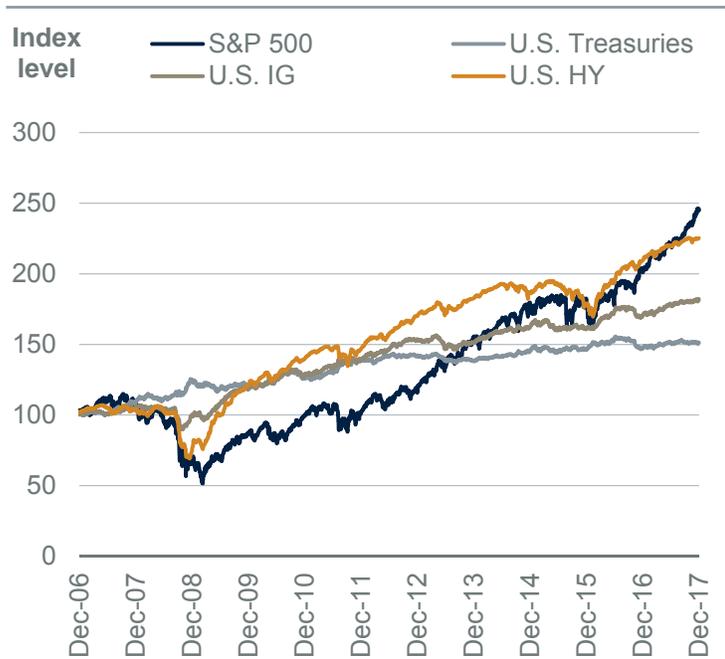


High-yield bonds

The high-yield landscape

A good starting point in assessing any asset class is to examine its historical return, risk and correlation to get a sense of how it has looked in the past and, perhaps more importantly, how it might gel with an investor's other holdings. **Figure 1** speaks to the first of these metrics. It shows the relative performance of the S&P 500 along with three segments of the U.S. bond markets - treasuries, investment grade and high yield.

Figure 1: Historical performance of U.S. equities, treasuries, investment-grade and high-yield

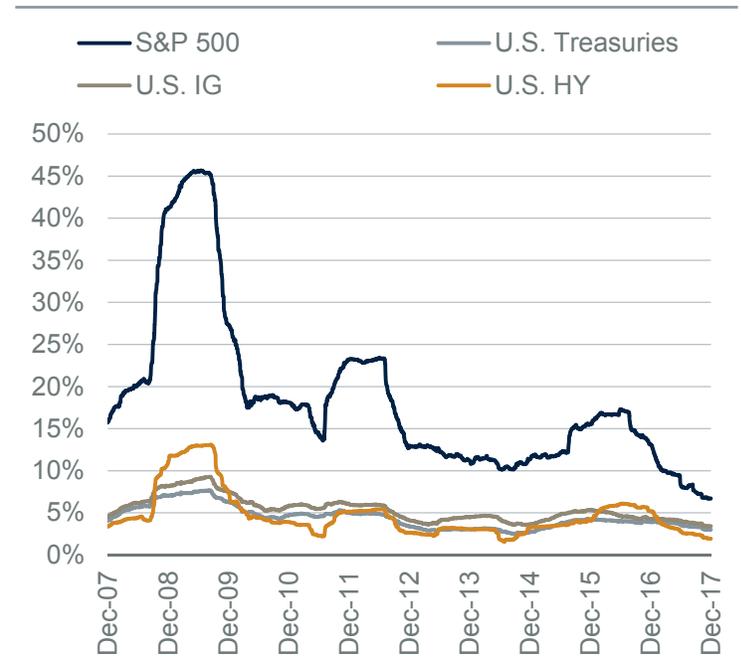


Three features are of note. The **first** is the relatively sharper decline, and subsequent recovery, that both high-yield bonds and stocks had through the 2008 financial crisis. The **second** is the visually similar nature of the profile of those two asset classes over this period. It clarifies our previous assertion in the introduction that high-yield bonds trade in a similar manner to stocks. The **third** is that high yield actually outperformed equities over this 10-year period.

Figure 2 shows the risk of these same asset classes over time and here we'd simply note the clearly higher risk that equities had relative to all three fixed income sectors.

We would also caution that, although there are times when high yield had a lower one-year volatility than the other fixed-income sectors, one should generally assume that high yield is riskier given our earlier comments about credit quality. The volatility spike through the financial crisis is important to note in this regard, as is the higher volatility when considering all the returns over the last ten years. (7.84% for high yield, 5.74% for investment grade, 3.71% for treasuries and 7.44% for equities).

Figure 2: Historical volatility of U.S. equities, treasuries, investment-grade and high-yield bonds



Of course, as investors consider the impact that an investment in high-yield fixed income will have on their portfolios, they must also assess its correlation to their current holdings to gauge the overall impact on risk-adjusted returns. And here, we would argue that high yield offers quite an attractive feature - it has a relatively low correlation both to the stock market and to other sectors of the fixed-income markets, as demonstrated in **Figure 3**.

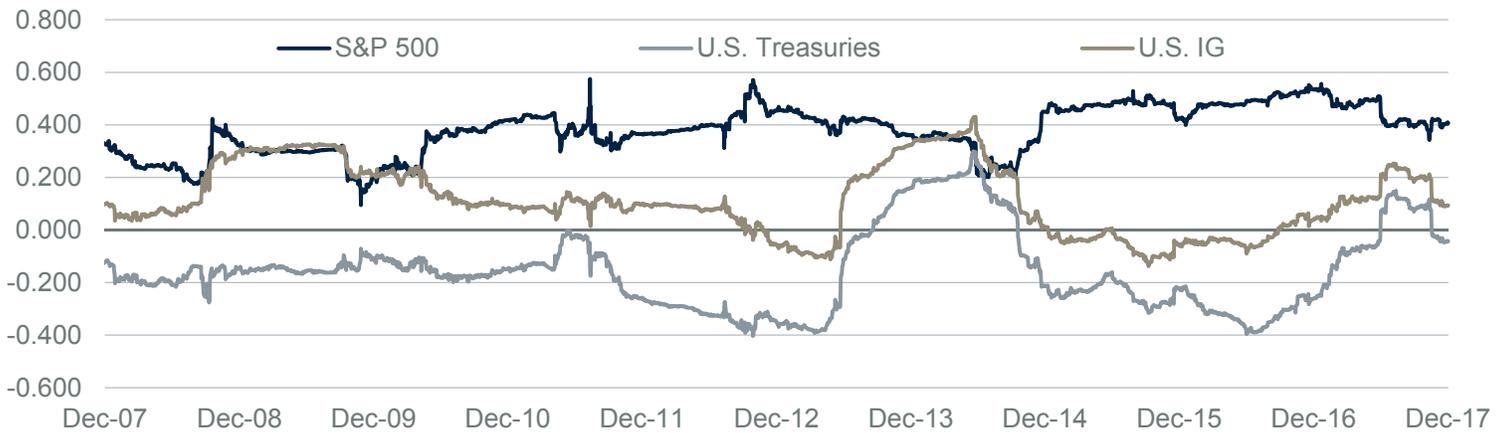
Source: SIFMA, Bloomberg Barclays 11/8/06–12/29/17. Indexed to 100. **Past performance does not guarantee future results.** Index representation as follows: U.S. Treasuries – Bloomberg Barclays U.S. Treasury Index; U.S. IG – Bloomberg Barclays U.S. Corporate Investment Grade Index; U.S. HY – Bloomberg Barclays U.S. Corporate High Yield Index.

The high-yield landscape continued

Figure 3 shows the rolling one-year correlation between high yield and the other three asset classes. Note the relatively stable profile of the correlation between equities and high yield. The average correlation over the period shown was 0.34, a relatively low level that could be interesting to those that are looking to reduce the overall risk of their portfolios.

It is also worth calling out the spike in correlations between the fixed-income sectors that occurred in 2013. This was the so-called "taper tantrum", when market concerns about an end to the Fed's quantitative easing (QE) policy caused rates to spike and, consequently, all three fixed-income sectors to sell off at the same time.

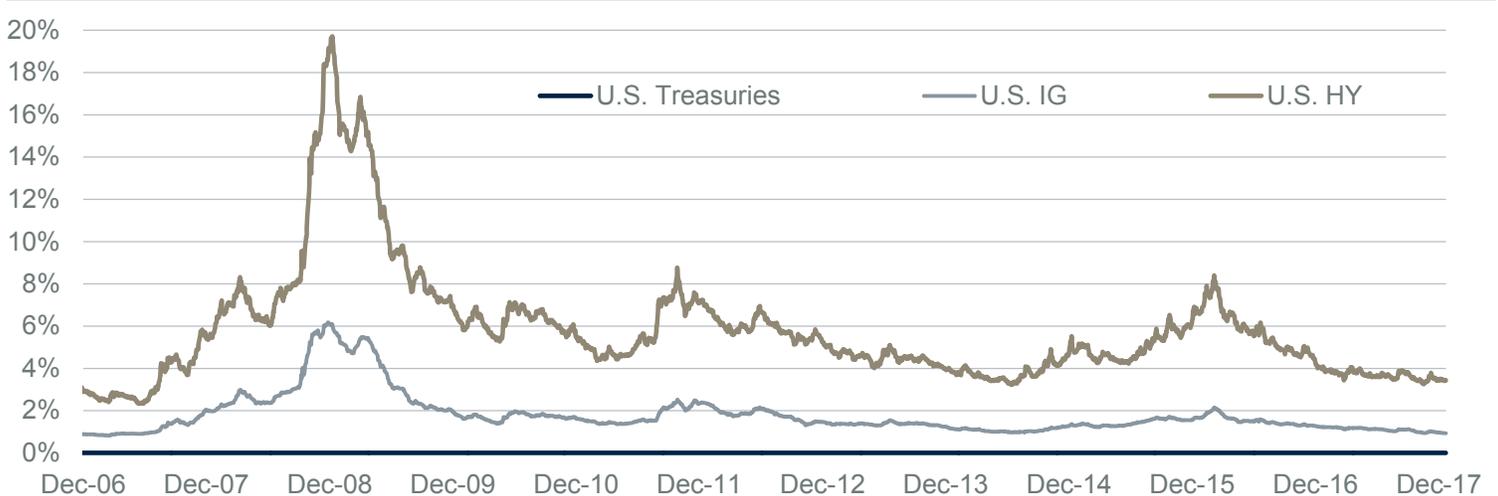
Figure 3: Historical correlation of U.S. equities, treasuries, investment-grade and high-yield bonds



No survey of the high-yield market would be complete without consideration of two other metrics that are unique to corporate fixed-income markets: credit spreads and duration. The first of these, credit spreads, is a very closely watched indicator of the additional yield above Treasury bonds that investors require in order to take on the additional risk inherent in a bond of a similar maturity, be it investment grade or high yield, that has some probability of default (as opposed to U.S. treasuries where the assumption is that you always get your money back). Clearly, the higher this spread or additional yield, the greater the risk and more concerned investors are about default, and hence the lower the bond price.

Figure 4 shows the credit spread over treasuries for both investment grade and high yield over the last ten years. Note what happened at the height of the crisis.

Figure 4: Historical credit spread of investment-grade and high-yield bonds over U.S. Treasuries



Sources: SIFMA. Bloomberg Barclays 11/8/06–12/29/17. **Past performance does not guarantee future results.** Index representation as follows: U.S. Treasuries – Bloomberg Barclays U.S. Treasury Index; U.S. IG – Bloomberg Barclays U.S. Corporate Investment Grade Index; U.S. HY – Bloomberg Barclays U.S. Corporate High Yield Index. Diversification can neither ensure a profit nor protect against loss. Spread represented by option-adjusted spread.

The high-yield landscape continued

As default concerns crystallized, bond prices dropped precipitously, and investors demanded excess returns over treasuries of more than 20% in order to hold high-yield bonds. Another spike can be seen in 2011 when the U.S. had its credit rating downgraded, and another in late 2015 when a low oil price raised concerns for U.S. energy companies, who are traditionally relatively large issuers of high yield debt.

The other metric, duration, can be interpreted in two ways. Firstly, it can be used as a weighted average time in years for an investor to receive their cash flows. Note that, interpreted in this way, it will always be less than the time to maturity but, because the largest cash flow is the principal repayment (which comes at the end of the bond's life) it will generally be close. For example, the duration of the current US ten-year Treasury note is 8.9 years.

The other useful way of interpreting duration is as a gauge of interest rate sensitivity. That same 8.9-year duration for the Treasury note implies that, if interest rates were to rise by one percent, then the price of the note would fall by around 8.9%. Keep in mind though that, for a number of reasons, duration is an imperfect measure. It unrealistically assumes parallel shifts in the yield curve (all maturities moving by the same amount), and a completely linear relationship between bond prices and yields, which is not the case in practice. Think of it as a useful approximation of sensitivity to rate moves rather than a precise instrument.

One final word of caution about duration as a risk measure. If an investor were to look at a Treasury bond and a high-yield bond of the same maturity, they would almost certainly find that the high yield bond had a lower duration, the reason being that the high-yield bond's higher coupons bring forward its average repayment time. On the surface, this would wrongly suggest that the high-yield bond is less risky. But of course, duration doesn't take into account a key difference: high-yield bonds have a default risk that the treasuries do not. So, again, use duration with care.

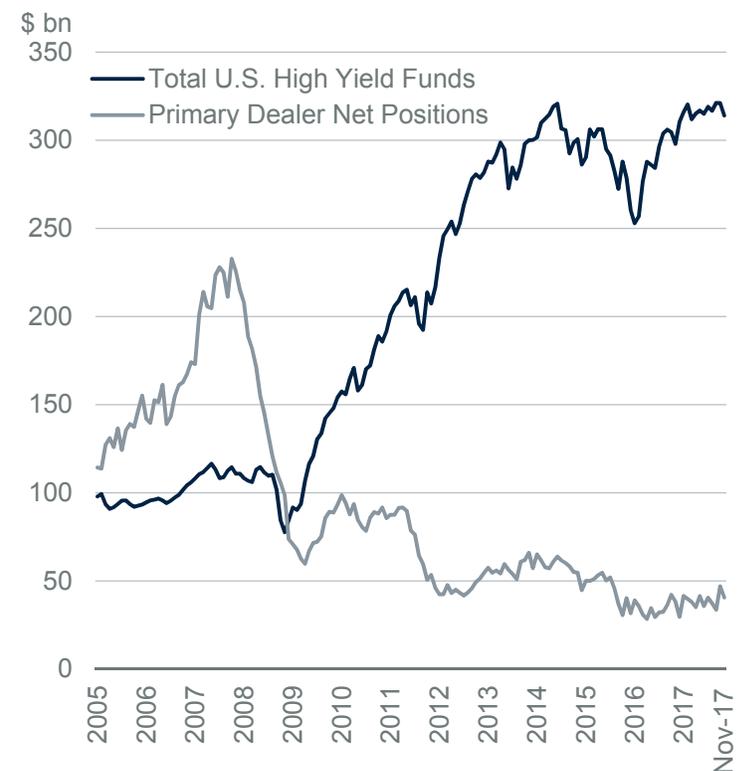
Understanding fixed-income ETFs

So far we have discussed some of the features of the high-yield market itself, and deliberately kept that separate from another key question that investors will need to ask - how should I access high-yield bonds? Here, we will argue that ETFs are a very interesting possible vehicle for investors to consider.

It is probably fair to say that the high-yield market has historically been quite an "institutional" one. The relatively illiquid nature of the bonds, coupled with the occasional difficulties in sourcing them, has meant that large, institutional investors have had a tendency to hold them, with markets generally being made by investment banks with the resources and funds to hold inventory.

However over the last few years, there has been a change in the high-yield ecosystem, as shown in Figure 5. Since the financial crisis, regulatory constraints on bank balance sheets have resulted in less primary dealer inventory while, at the same time the amount of bonds being held by mutual funds and ETFs has grown. According to a 2016 survey by Greenwich Associates, 71% of respondents found the trading, liquidity and sourcing of high-yield bonds "more challenging" (with 29% finding it the same, none believing it has become easier). In the same survey, the three most popular reasons given for accessing high yield bonds via ETFs were low trading costs, operational simplicity and speed of execution.

Figure 5: Bond dealer inventories and high-yield fund assets (\$ billion)



Source: Dealogic, SIFMA, German Finance Agency, Deutsche Bank Research 1/1/05-11/30/17.

Understanding fixed-income ETFs continued

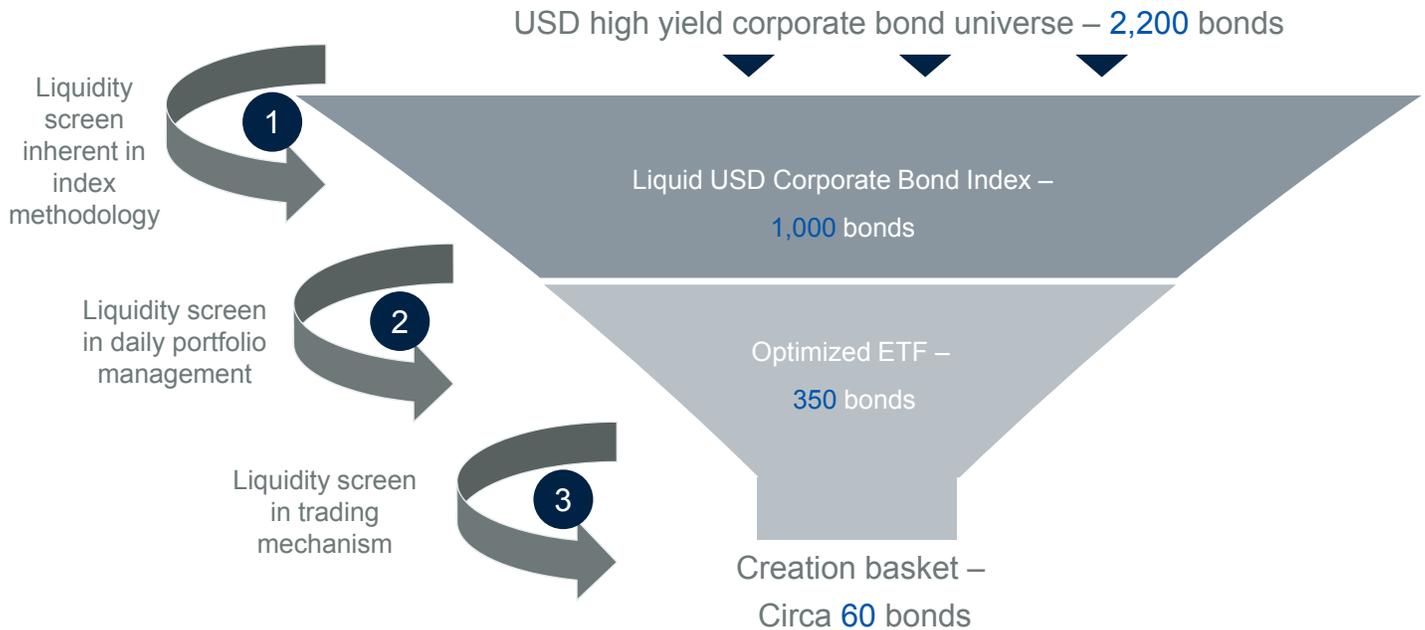
So how do ETFs hold bonds and track indices? The **first** important point to know is that, because of the often very large numbers of individual securities in an index, fixed-income ETFs will generally not even attempt to hold every security. Instead the Portfolio Managers (PMs) use a technique known as "stratified sampling", meaning they attempt to replicate the key features of the index—its duration, credit spread, country and sector weightings, credit ratings, etc.—by using a far smaller and more manageable representative portfolio of bonds. Figure 6 shows the three steps of the "funnel" approach the PMs often use to track their indices. Firstly, the index provider screens the investable universe according to its pre-determined measures to develop an index that it believes will appeal to investors.

Secondly, the fixed-income PMs use the stratified sampling technique discussed above to replicate that index using a far smaller number of bonds (the numbers in the chart are just guidelines, actual numbers will vary all the time).

Finally, and this is more detail than an end investor really needs to know given that they won't be party to the process, the PMs can create and redeem more or less ETF shares according to demand and supply by receiving and delivering "customized" creation baskets. This last step results in a nice degree of flexibility on the part of the PMs and their trading counterparts - to tailor their incoming, or outgoing bonds, according to the preferences of both.

The result: a fund that, ideally, closely tracks its index, trades on a stock exchange with reasonable bid offer spreads (indeed sometimes tighter than that available on the underlying assets themselves), and enables investors to easily and cost effectively access a broad index of bonds in a large sector, all in one trade.

Figure 6: The "funnel" approach - investable universe, to index, to ETF, to creation basket



Source: Index data is from Bloomberg Barclays. For illustrative purposes only. Number of index bonds, portfolio and basket size shown are rounded numbers.

High-yield flexibility – Options for changing the credit, yield and duration profile

In the interest of giving high-yield ETF investors more flexibility, we offer a number of additions to our benchmark high-yield fund (HYLB). Essentially we have two solutions for dialing up and down the risk (beta) of the high-yield market, and two options to dial down the interest-rate sensitivity (duration).

Taking the high and low beta options first. We have created two funds that effectively split the high yield universe in two based on the yields of the underlying bonds. The way the process operates is that all the bonds in the broad universe are allocated into their sectors, are ranked by yield, and are then split at the median yield. The higher yielding bonds are allocated to our high beta fund (HYUP) and the lower yielding bonds are allocated to our lower beta fund (HYDW). Taking a 50:50 position in both of these funds would approximately put an investor back into our total high yield fund (HYLB). The reason why the bonds are split within sectors is that, absent this step, there would be too much sector deviation from the original universe. Ensuring that around half the bonds are taken from each sector neatly corrects for that risk.

The result of this process is that the high yield universe is now effectively carved into two smaller universes, both containing roughly half the bonds of the parent index:

- **HYUP** will typically have a higher yield, a higher beta to the total high yield universe, and a lower credit quality (more weighting in lower rated credits than the original universe). Essentially this can be thought of as a “risk-on” fund in the high yield context.
- **HYDW** will typically have a lower yield, a lower beta to the total high yield universe, and a higher credit quality (more weighting in higher rated credits than the original universe). Essentially this can be thought of as a “risk-off” fund in the high yield context.

The other direction in which investors can take their exposure is towards a fund with shorter maturity bonds (SHYL). This fund tracks an index that takes as its starting universe the U.S. high yield market but restricts it to only those bonds that

have five years or less to maturity. The key feature of such a fund is that it will typically have less interest rate sensitivity so might appeal to those who believe that higher rates will hurt bond returns but, at the same time, want to retain their exposure to high yield markets. Note though that the credit profile of the fund does change somewhat when shorter maturity bonds are targeted. Specifically there tend to be more CCC rated bonds, hence the reduction in interest rate risk is somewhat countered by an increase in credit risk.

The final option that we offer investors, a targeted removal of all interest rate sensitivity is discussed in the next section.

Interest-rate hedging—Mechanics and motivations

The last point that we would like to discuss is the option to hedge interest-rate sensitivity from a corporate fixed-income portfolio. And we'll do that with regard to two topics - the mechanics of how it is done, and the motivation for possibly wanting to do so.

Our interest-rate hedged high-yield ETF targets a zero duration, meaning that it tries to protect the portfolio from moves in the U.S. yield curve (i.e. the fund's performance should not be positively or negatively affected by yield moves, up or down). Our PMs do this by holding short positions in U.S. Treasury futures which, because they have U.S. government bonds as their underlying, are pure plays on interest rates alone, not credit.

And there are a couple of benefits to doing it this way. Not only is the U.S. Treasury futures market deep, liquid and easy to access, but, because there are futures contracts on multiple Treasury maturities, the PMs are able to adopt a more granular hedge, targeting, in the case of our high-yield fund, the contracts on the two-, five- and 10-year notes. Keep in mind that duration, like return, combines linearly—a 50% holding in a six year duration, combined with a 50% holding in a four year duration, results in an overall duration of five. This more granular hedge allows for more nuanced moves in the yield curve, mitigating the “parallel shift” assumption that a single duration figure may imply.

Interest-rate hedging—Mechanics and motivations continued

Of course, there is an implicit cost to this hedge. Shorting Treasury futures is like shorting the bonds themselves, which means that the fund effectively has to pay, rather than receive, the Treasury bond's coupon (though this is offset of course, by continuing to receive the high-yield coupons). As a result, an interest-rate-hedged fund will always have a lower yield than an un-hedged one (at least while yields are positive, as they are in the United States). So why would an investor choose such an option?

This speaks to our second point, the motivation. We would argue that interest-rate-hedged ETFs can serve as tactical investments for an investor who believes higher interest rates may result in a drag on bond performance (recall that higher rates imply lower bond prices). So the critical consideration really becomes one of an investor's views of the macroeconomic cycle. If investors believe that higher growth and inflation will lead to the Fed continuing to raise rates, then they may want to mitigate this exposure within their bond portfolio.

Getting to know our high-yield suite (HYLB, HYUP, HYDW, SHYL and HYIH)

As with all asset classes, we believe that an assessment of return, risk and correlation is critical to evaluating whether or not to add high-yield exposure to an investor's portfolio. **High yield combines equity and bond like features to provide another potential arrow in the investment quiver.**

Deutsche Asset Management currently provides access to the U.S.-dollar high yield market in many efficient ways:

- **HYLB** tracks the Solactive USD High Yield Corporates Total Market Index to offer investors exposure to a broad swath of the high yield sector with the ease, transparency, and liquidity of an ETF—and at low cost.
- **HYUP** tracks the Solactive USD High Yield Corporates Total Market High Beta Index which effectively cuts the broad index into two and gives investors the higher yielding, lower credit quality half of the broad index.
- **HYDW** tracks the Solactive USD High Yield Corporates Total Market Low Beta Index which contains the other half of the broad index. It contains the bonds that are in the lower half for each sector in terms of yield, effectively giving access to lower beta, higher credit quality names.
- **SHYL** tracks the Solactive USD High Yield Corporates Total Market 0-5 Year Index. This gives investors similar total market exposure to HYLB, but with the universe constrained to bonds that have maturities of less than five years.
- **HYIH** tracks the Solactive High Yield Corporate Bond - Interest Rate Hedged Index, a broadly similar universe of high yield bonds coupled with a series of short Treasury futures positions that target a zero duration, with the goal of minimizing the fund's interest-rate exposure.

Fund risk information

HYLB/HYDW: Investing involves risk, including the possible loss of principal. Bond investments are subject to interest rate, credit, liquidity and market risks to varying degrees. When interest rates rise, bond prices generally fall. Credit risk refers to the ability of an issuer to make timely payments of principal and interest. Foreign investing involves greater and different risks than investing in U.S. companies, including currency fluctuations, less liquidity, less developed or less efficient trading markets, lack of comprehensive company information, political instability and differing auditing and legal standards. Funds investing in a single industry (or group of industries), country or in a limited geographic region generally are more volatile than more diversified funds. Investments in lower-quality ("junk bonds") and non-rated securities present greater risk of loss than investments in higher-quality securities. Performance of the Fund may diverge from that of the Underlying Index due to operating expenses, transaction costs, cash flows, use of sampling strategies or operational inefficiencies. An investment in this fund should be considered only as a supplement to a complete investment program for those investors willing to accept the risks associated with that fund. See the prospectus for details.

HYIH: Investing involves risk, including the possible loss of principal. Bond investments are subject to interest rate, credit, liquidity and market risks to varying degrees. When interest rates rise, bond prices generally fall. Credit risk refers to the ability of an issuer to make timely payments of principal and interest. Investments in lower-quality ("junk bonds") and non-rated securities present greater risk of loss than investments in higher-quality securities. The fund seeks to mitigate the potential negative impact of rising Treasury interest rates by taking short positions in U.S. Treasury notes or bonds, or futures relating to those instruments. These short positions are not intended to mitigate credit risk or other factors that may have a greater impact on performance than rising or falling interest rates. The short positions may limit the potential positive impact of falling interest rates and there is no guarantee that the short positions will completely eliminate the interest rate risk of the long positions. Investing in derivatives entails special risks relating to liquidity, leverage and credit that may reduce returns and/or increase volatility. Performance of the Fund may diverge from that of the Underlying Index due to operating expenses, transaction costs, cash flows, use of sampling strategies or operational inefficiencies. An investment in this fund should be considered only as a supplement to a complete investment program for those investors willing to accept the risks associated with that fund. See the prospectus for details.

HYUP: Investing involves risk, including the possible loss of principal. Bond investments are subject to interest rate, credit, liquidity and market risks to varying degrees. When interest rates rise, bond prices generally fall. Credit risk refers to the ability of an issuer to make timely payments of principal and interest. Foreign investing involves greater and different risks than investing in U.S. companies, including currency fluctuations, less liquidity, less developed or less efficient trading markets, lack of comprehensive company information, political instability and differing auditing and legal standards. Funds investing in a single industry (or group of industries), country or in a limited geographic region generally are more volatile than more diversified funds. Investments in lower-quality ("junk bonds") and non-rated securities present greater risk of loss than investments in higher-quality securities. Distressed securities are speculative and involve substantial risks beyond the risks of investing in junk bonds, such as no interest payments or repayment of principal, or the loss of the entire investment in the distressed security. Performance of the Fund may diverge from that of the Underlying Index due to operating expenses, transaction costs, cash flows, use of sampling strategies or operational inefficiencies. An investment in this fund should be considered only as a supplement to a complete investment program for those investors willing to accept the risks associated with that fund. See the prospectus for details.

SHYL: Investing involves risk, including the possible loss of principal. Bond investments are subject to interest rate, credit, liquidity and market risks to varying degrees. When interest rates rise, bond prices generally fall. Credit risk refers to the ability of an issuer to make timely payments of principal and interest. Foreign investing involves greater and different risks than investing in U.S. companies, including currency fluctuations, less liquidity, less developed or less efficient trading markets, lack of comprehensive company information, political instability and differing auditing and legal standards. Emerging markets tend to be more volatile and less liquid than the markets of more mature economies, and generally have less diverse and less mature economic structures and less stable political systems than those of developed countries. Funds investing in a single industry (or group of industries), country or in a limited geographic region generally are more volatile than more diversified funds. Investments in lower-quality ("junk bonds") and non-rated securities present greater risk of loss than investments in higher-quality securities. This fund is non-diversified and can take larger positions in fewer issues, increasing its potential risk. Performance of this fund may diverge from that of the Underlying Index due to operating expenses, transaction costs, cash flows, use of sampling strategies or operational inefficiencies. An investment in this fund should be considered only as a supplement to a complete investment program for those investors willing to accept the risks associated with this fund. Please read the prospectus for more information.

The opinions and forecasts expressed herein by the ETF strategists are as of the date of this paper and may not come to pass.

The **Bloomberg Barclays U.S. Treasury Index** tracks the performance of the U.S. Treasury obligations with a remaining maturity of one year or more. The **Bloomberg Barclays U.S. Corporate Index** tracks the performance of the investment grade, fixed-rate, taxable, corporate bond market. The **Bloomberg Barclays U.S. Corporate High Yield Index** tracks the performance of fixed-rate non-investment—grade debt. The **S&P 500 Index** tracks the performance of 500 leading U.S. stocks and is widely considered representative of the U.S. equity market. The **Solactive USD High Yield Corporates Total Market Index** seeks is a rules based, market value weighted index engineered to mirror the performance of high-yield-rated corporate bonds issued in the U.S. dollars. **Duration** which is express in years measures sensitivity of the price of the bond or bond fund to a change of interest rates. **Option-adjusted credit spread (OAS)** refers to the excess yield various bond sectors offer over financial instruments with similar maturities. When spreads widen, yield differences are increasing between bonds in the two sectors being compared. When spreads narrow, the opposite is true. The **Solactive USD High Yield Corporates Total Market High Beta Index** is designed to track the performance of U.S. dollar-denominated high yield corporate fixed income securities that exhibit high overall beta to the broader high yield corporate fixed income market. The **Solactive USD High Yield Corporates Total Market Low Beta Index** is designed to track the performance of U.S. dollar-denominated high yield corporate fixed income securities that exhibit low overall beta to the broader high yield corporate fixed income market. **Beta** is a measure of a security's price sensitivity (i.e., volatility); it reflects the rate of change in a security's price that results from overall market movements. This is accomplished through reviewing the yields of all securities in the eligible universe on a sector basis. If an individual security's yield is lower than that of its sector's median, it will be eligible for inclusion in the Underlying Indexes. The **Solactive USD High Yield Corporates Total Market 0-5 Year Index** is designed to track the performance of short-term publicly issued U.S. dollar-denominated below investment grade corporate debt. The **Solactive High Yield Corporate Bond - Interest Rate Hedged Index** tracks the performance of a basket of liquid US dollar denominated high yield corporate bonds. The treasury rate exposure of the USD HY Corp bonds is hedged by a Duration-matched short position in US Treasury bonds.

Effective Monday, October 2, 2017, each of the "Deutsche X-trackers" ETFs changed its name to "Xtrackers" ETFs. A list of new names of each of our ETFs is available at our website www.Xtrackers.com.

Xtrackers ETFs ("ETFs") are managed by DBX Advisors LLC or DBX Strategic Advisors LLC (the "Advisors"), and distributed by ALPS Distributors, Inc. ("ALPS"). The Advisors are subsidiaries of Deutsche Bank AG, and are not affiliated with ALPS.

Nothing contained herein is fiduciary or impartial investment advice that is individualized or directed to any plan, plan participant, or IRA owner regarding the advisability of any investment transaction, including any IRA distribution or rollover.

Carefully consider the fund's investment objectives, risk factors, and charges and expenses before investing. This and other information can be found in the fund's prospectus, which may be obtained by calling 1-855-329-3837, or by viewing or downloading a prospectus from xtrackers.com. Read the prospectus carefully before investing.

Important information

Shares are not individually redeemable, and owners of Shares may acquire those Shares from the Fund, or tender such Shares for redemption to the Fund, in Creation Units only.

Investment products: No bank guarantee | Not FDIC insured | May lose value

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