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# HY model refined – the rules

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**We refine our HY spread model, allowing us to better capture 'rating habitats' and callability risk. Our analysis points to a 'name-pickers' paradise' with more dispersion than would have been expected. We find little premium from going down in rating *within* BBs and Bs alike (compared with history), emphasizing the focus on avoiding downside, whereas there is a sizable gap between BB and Bs, reinforcing our preference for Bs over BBs. Compensation for taking rate risk on the 2s5s is smaller than expected, with seemingly better compensation from buying bonds with 1yr to call instead. Our model points to little upside in owning UK risk, and a premium on US-domiciled bonds makes us cautious on US issuers.**

## Model refinements – small but powerful

We define the sample universe, our explanatory variables and present our model estimates.

### Sample

For our estimation, we use the Barclays Bloomberg High Yield index, restricting ourselves to non-financial bonds in €, rated between BAA2 and Caa1, between 10 and 1200bp in OAS, between 1 and 10 in OAD. We perform cross-sectional regressions for each month-end. We include the two lower BBB ratings in order to better "anchor" our model and better capture the pricing of Fallen Angels/Rising Stars.

### Explanatory variables

*Regional risk*

To quantify shifting sentiment and pricing for this for different regions, we include dummy variables to indicate if the issuer of a given bond is domiciled in the "Periphery" (Ireland, Portugal, Spain, Italy, Greece), the UK, or the US. In order to better capture the likely differences between "reverse Yankees" in IG and HY we have dummy variables for IG and HY for US-domiciled entities.

*Commodity exposure*

We add a dummy variable to reflect whether the bond's issuer has exposure to commodities. We define commodity exposure as being in the Energy sector or the Metals & Mining sector of Bloomberg Barclays Pan-European High Yield index.

*Liquidity*

We measure liquidity using Barclays Liquidity Cost Score (LCS), defined as the cost of a standard, institutional-size, round-trip transaction. Hence, a lower LCS means better liquidity for the individual bond. LCS is expressed as a percentage of the bond's price and can be aggregated across bonds in a portfolio and compared over time (for details, see *Measuring Bond-Level Liquidity: Liquidity Cost Scores (LCS)*, 24 July 2015).

*Credit rating*

To quantify credit risk, we rely on the index ratings of individual bond issues. In previous iterations of the model we relied on the numerical rating (with an increment of 1 for each notch of ratings). Although we think this is a sensible approach, we refine this further by using Moody's WARF instead, and we also include a dummy variable for "IG fund habitat" for BBs, to capture a potential change in the buyer base. We discuss this in detail later in the report.

*Duration*

Credit curves are typically upward sloping, flattening out for further maturities. We capture this effect using a polynomial form of option adjusted duration (OAD) as factors in the model.

*Callability*

A meaningful part of the HY market has issuer-calls which attract a premium. We observe that some bonds (more so IG than HY) have calls very close to the final maturity of the bond, making them more akin to "clean-up calls". As such, we only consider bonds "callable" if the next call date is more than six months away from the final maturity date.

We capture callability with a dummy variable for callable bonds, but we refine this further as, from analysing residuals, it seems clear that the time (in years) to the first call date matters. Therefore, we include both a dummy variable for callable bonds as well as the number of years to the first call date – setting this to zero for non-callable bonds.

## Model estimate

For 25-Jan-2018 we present the model estimates in Figure 1. The parameters with direct interpretations all have the intuitively "correct" sign. And although not all parameter estimates are currently statistically significant (approximated as t-stat higher 2 in absolute terms), they have been at other points in time. The explanatory power of the model is significant, with R-squared at 81% currently.

FIGURE 1

**Current parameter estimates**

| | Intercept | Peripheral | UK | US & HY | US & IG | Cmdty | Rating | IG habitat | Liquidity | OAD | OAD sq | Callable | Time to call |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coefficients | -61.6 | 15.4 | 8.1 | -27.8 | 8.0 | -4.4 | 0.084 | -15.7 | 57.4 | 28.2 | -1.90 | 116.0 | -19.6 |
| Std. error | 11.4 | 5.9 | 7.6 | 9.8 | 8.6 | 8.0 | 0.0 | 5.9 | 7.5 | 4.6 | 0.4 | 12.4 | 3.3 |
| t Stat | -5.4 | 2.6 | 1.1 | -2.8 | 0.9 | -0.6 | 21.0 | -2.7 | 7.7 | 6.1 | -4.2 | 9.4 | -5.9 |
| R squared | 81% | | | | | | | | | | | | |

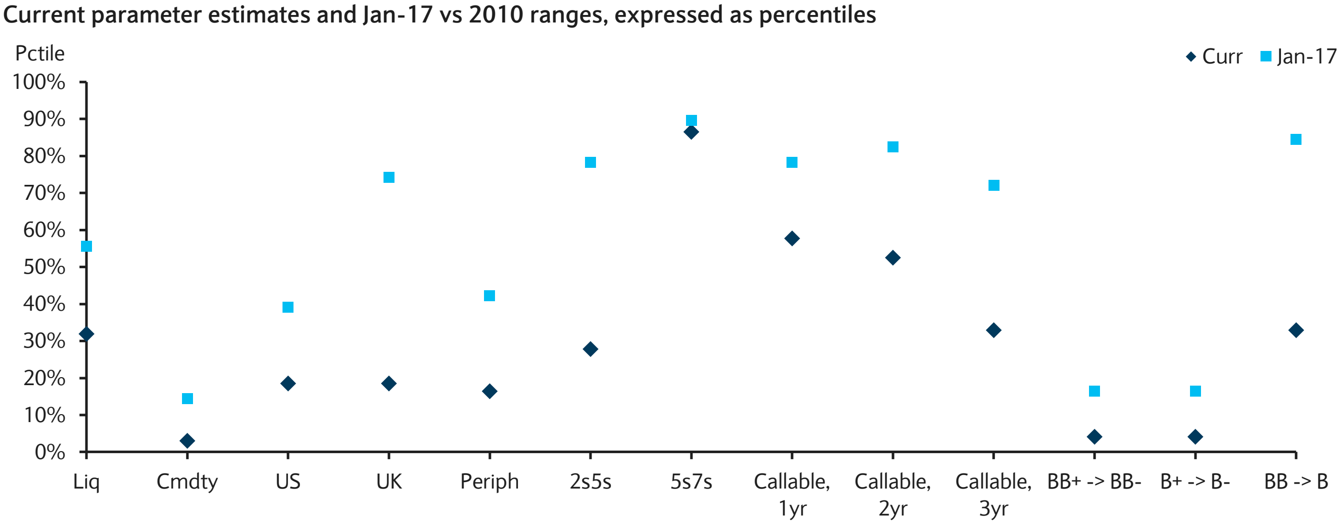
Note: Model estimates as of 25-Jan. Source: Barclays Research.

Before discussing current individual parameter estimates, it is instructive to compare the estimates (and interpretations of these, see later in the report) to one another and across time. To do this, we express the current parameter estimate (and the ones for Jan-17) as percentiles of their ranges since 2010 (Figure 2). This gives a range of initial conclusions:

- Compensation for liquidity currently stands at the 30th percentile. Although this is down since the same time in 2017, it is up from the 10th percentile when we published our outlook.

FIGURE 2

**Current parameter estimates and Jan-17 vs 2010 ranges, expressed as percentiles**




Note: Current and Jan-17 parameter estimates/conversions expressed as percentiles since Jan-2010. Source: Barclays Research.

- The premium for buying US names is low – and in fact negative (at -28bp).
- The premium for buying UK-domiciled names is low, at its 19th percentile, similar in range to the peripheral premium.
- The 2s5s curve, although near the 30th percentile, has flattened meaningfully since Jan-17. Meanwhile, the 5s7s curve remains relative steep versus history (although flat in absolute terms).
- The premium for callable bonds with 1yr to the next call is trading relatively wide in their range, whereas bonds with 3yrs to the next call are trading relatively tight in their range.
- The rating pick-up from going down in rating inside BBs and Bs is very low – but the pick-up available from going from mid BB to mid B is at its 33rd percentile.

## Trading implications

We discuss attributes of the parameter estimates both in a historical context and relative to current market dynamics.

### Dispersion and liquidity

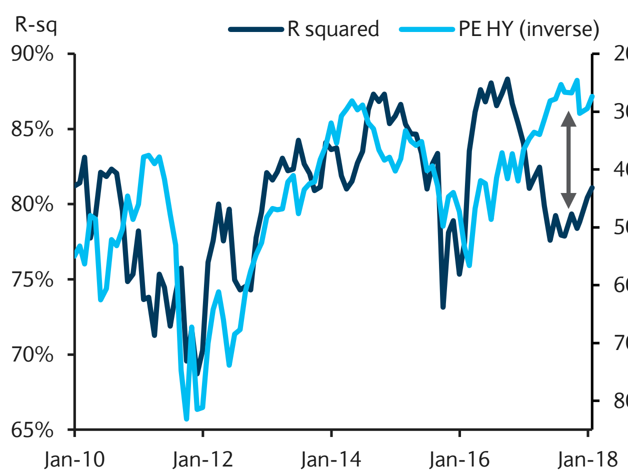
The ability of the model to explain the variation in credit spreads (measured as the $R^2$) has historically shown a strong correlation to spread levels (Figure 3): When spreads are wide, $R^2$ is low because the market is behaving "irrationally" and market pricing cannot be explained well. When spreads are mid-range or tight, historically the $R^2$ has been high. This makes the current setup an exception: right now spreads are relatively tight versus history, and normally the model $R^2$ would be high, but it is not as high as one would have expected.

We see this as a quantifiable way to the somewhat anecdotal statement that "dispersion is on the rise"; considering the market environment, there are many HY bonds which trade wider/tighter than can be explained by observable quantities. This makes the HY market a very fruitful field for generating alpha by stock selection, in our view, particularly in the context of generally tight spreads.

Although this change in the market often comes up in discussions, in particular as it relates to the downside, one aspect that should give rise to caution is that the market premium for buying illiquid bonds (measured by LCS) is quite low versus history (Figure 4). So in spite of much discussion about increased dispersion and idiosyncratic risk, the market is – in aggregate – not (yet) demanding an increased premium for holding illiquid bonds. While

FIGURE 3

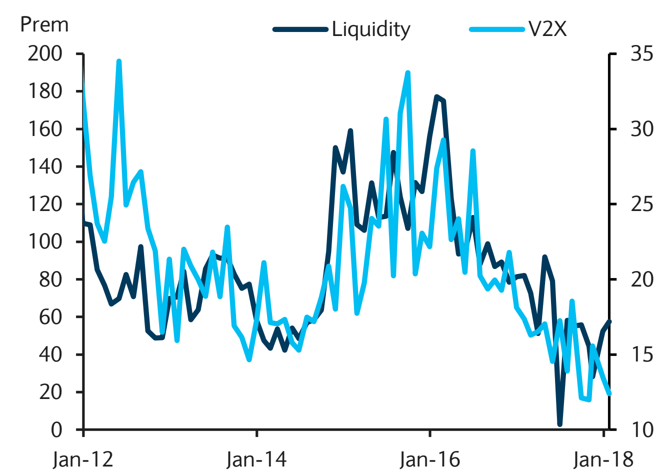
**R-sq of the model has historically had a strong inverse relationship to spreads, but not currently**




Source: Barclays Research

FIGURE 4

**Compensation for liquidity risk has a strong correlation to market volatility, measured by the V2X index**




Source: Barclays Research

this may be justified, at a macro level, by overall low market volatility (measured in the chart as V2X), at a single-name level this appears not to be justified.

One further angle to this is that market volatility may be low currently, but with the market squarely focussed on the risk of rising interest rates and the potential for this to cause HY retail fund outflows, the pricing of liquidity, even at a macro level, could change quickly. As such, we caution investors against seeking a spread pick-up by buying less liquid bonds as the compensation there does not appear attractive.

## Rating compression

The rating is arguably one of the most important factors to consider for HY bonds. We can obtain a satisfactory fit overall by converting the rating of each bond into a numeric (1 higher per 1 notch lower in rating) and estimating a flat, linear, parameter for this.

However, when analysing the model residuals by rating bucket for this "linear" specification (Figure 5, dark blue line) there is a distinct pattern: the model thinks BB and BB- should be wider and that B and B- should be tighter.

While this simply justifies our preference for Bs over BBs in general, to better quantify the pricing of rating risk (over time more than anything), we first introduce the Moody's WARF measures (essentially an exponential rather than a linear function) and estimate the straight parameter of this. Also shown in Figure 5, this "flattens" the model residuals somewhat, but there is still a distinct "BBs are rich, Bs are cheap" pattern.

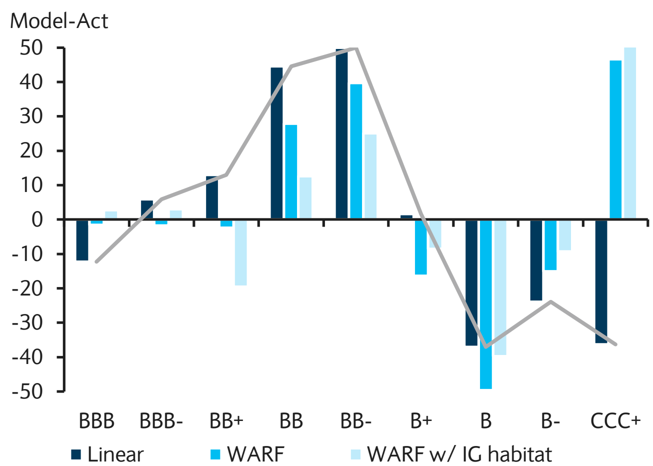
To better understand what is going on, we can calculate the model-implied rating pickup at each rating (Figure 6) and we introduce a fully-flexible model where we have independent dummy variables for each notch of rating (labelled 'Dummy driven'). This is very revealing, showing that the Linear and WARF specifications fail to match a very sharp spread pick-up when going from BB- to B+ of almost 100bp.

With the material drop in (risk free and risky) yields in recent years, anecdotal evidence suggest a grab for yield into BBs from IG mandates, and we believe this can partly explain the large rating pick-up seen when going from BB- to B+.

We can model this by introducing an 'IG habitat' dummy variable, which is 1 if the bond rating is BB+/BB/BB-. Using such a specification, the model residuals across ratings (Figure 5) are much flatter, we can better capture the "cliff effect" seen in Figure 6 and we can quantify this effect better over time.

FIGURE 5

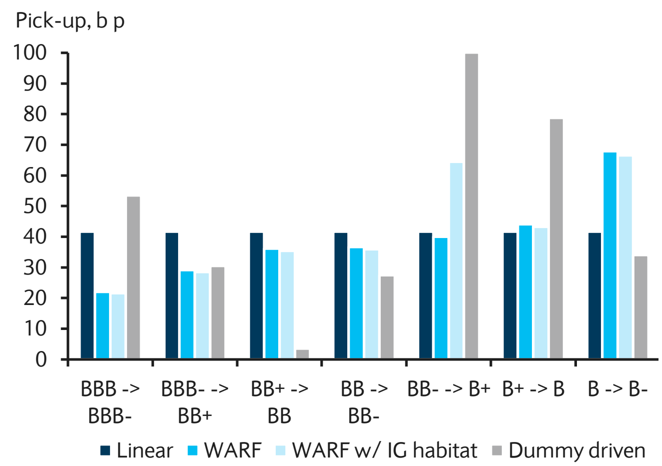
**Residual by rating for different specifications**




Note: Models as of 25-Jan. Source: Barclays Research

FIGURE 6

**Rating pick-ups implied by different specifications**




Note: Models as of 25-Jan. Source: Barclays Research

*Rating premia – habitat evolution reinforces preference for Bs over BBs*

Armed with our "WARF w/ IG habitat" specification for ratings, we can examine the spread pick-up from moving down in rating within BBs, Bs and from BB to B (mid-ratings) over time. The results (Figure 7) are revealing. The pick-up from moving within BBs has been very stable over the years and is currently near the lows, reflecting their 'low beta' behaviour.

The spread pick-up from going down in rating within Bs is in contrast much more volatile, although also quite low vs history; although the pick-up is meaningful in an absolute sense, the pick-up relative to history is quite low.

The pick-up from going from mid-BB to mid-Bs, in contrast, has shown a notable change over the years. Before 2014, the BB-B pick-up had been moving between the within-BB and within-B pick-up. Since early 2014 there has been a marked change, with the pick-up from BB-B now higher than the within-B pick-up.

Comparing the BB-B pick-up vs 5yr Bunds (Figure 8), it is revealing that the appearance of the 'cliff effect' occurred around the time that risk-free yields dropped materially, reflecting to us a distinct change in 'IG fund habitat' and demand for BBs as all-in yields dropped. Although the BB-B pick-up has been dropping in absolute terms, it is still relatively high. As this appears to reflect a change in habitat as yields dropped, when/if yields rise again this may run in reverse, reinforcing our preference for Bs over BBs.

## Curve and callability

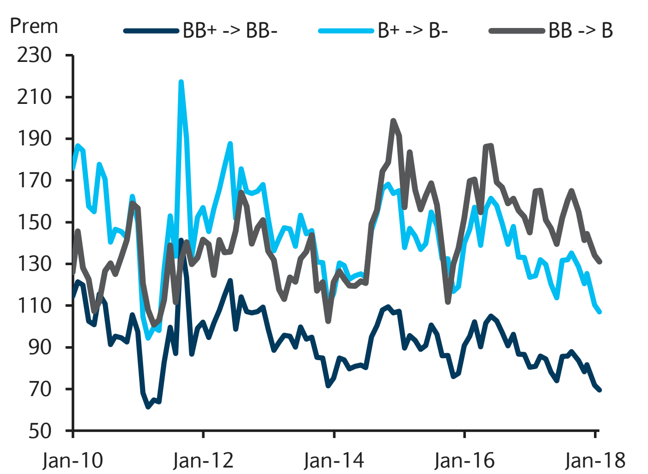
Away from rating risk, duration risk is an essential component in HY investing, closely interlinked with the premium for callable bonds.

In spite of interest rate risk often surfacing in discussions with investors, and concerns around risking rates in general, it is revealing to us that for all the talk, the premium for going out the curve in 2s5s in HY is relatively low in absolute terms (Figure 9) but also compared with Bund volatility (Figure 10). This makes us cautious in going out the curve in 2s5s to pick up spreads.

For 5s7s (Figure 9), in contrast, the curve at 10bp is close to the highs, so although the pick-up is not high in absolute terms, it is less likely to steepen as much as the 2s5s, in our view. As such, for investors who really want to go out the curve, extension trades from the 5s to 7s area would appear more worthwhile than those from 2s to 5s.

FIGURE 7

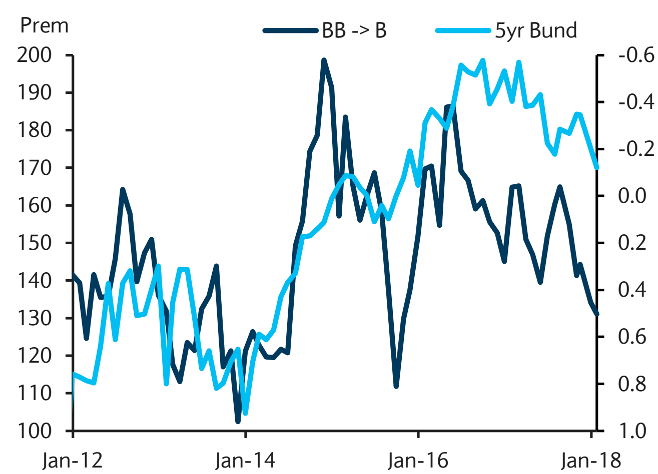
**Rating pick-ups within BBs is very low, pick-up within Bs is low vs. history whereas the BB-B pickup is meaningfully high**




Source: Barclays Research

FIGURE 8

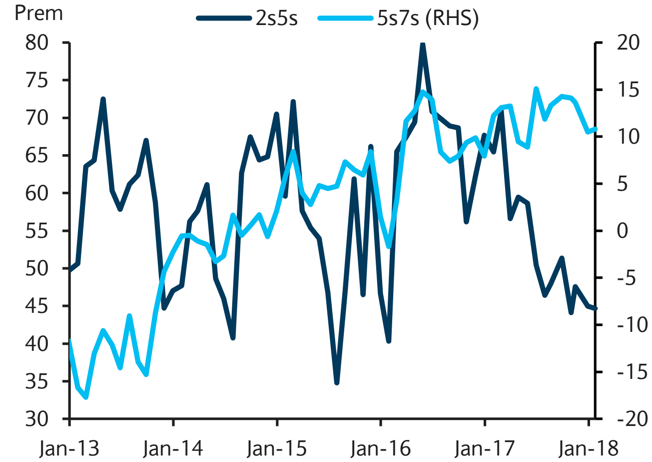
**BB->B spread pick-up had a "regime shift" when Bund yields started dropping**




Source: Barclays Research

FIGURE 9

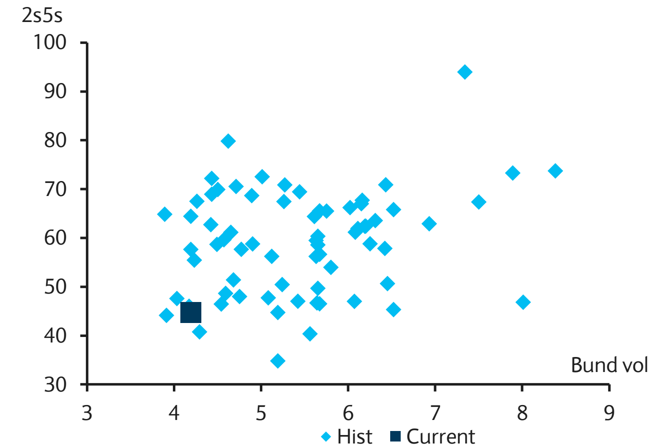
**The 2s5s term structure is relatively flat, whereas 5s7s are near highs**




Source: Barclays Research

FIGURE 10

**Relative to history, 2s5s appear flat considering where Bund volatility is, particularly if Bund volatility is expected to rise**




Note: Bund volatility is measured as ATM implied volatility of Bund futures.
Source: Barclays Research

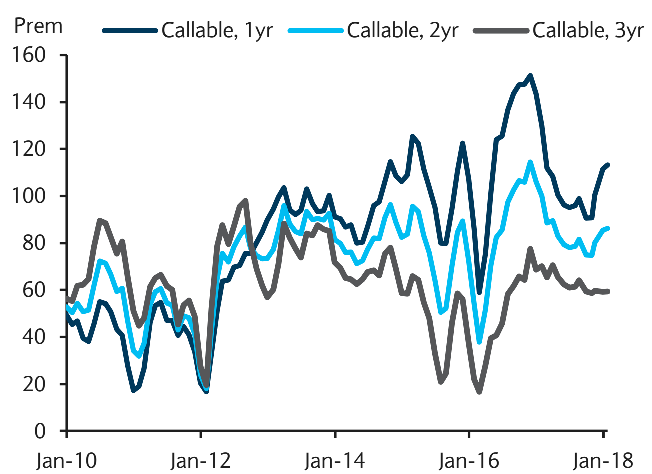
Issuer calls are a dominant feature in HY markets. We refine our previous model by including both a dummy variable for callable bonds as well as capturing how many years there are to the call, to measure investor preference. Although this variable obviously interacts with our general curvature measurements just discussed, it is highly significant and allows us to calculate the premium for callable bonds with different times to call.

Applying a 3mth smoothed average to the premium for callable bonds with 1/2/3yrs to first call (Figure 11) is revealing. Before 2014 there was virtually no difference in when the next call was, but since then there has been a distinct term structure developing, with bonds callable in the near term (all else equal) trading wider than bonds with the first call in later years.

We consider this a reflection of interest rate risk being priced by investors: bonds up for call in the next year have more extension risk, all else equal, than bonds up for call later, and the market demands a premium for this.

FIGURE 11

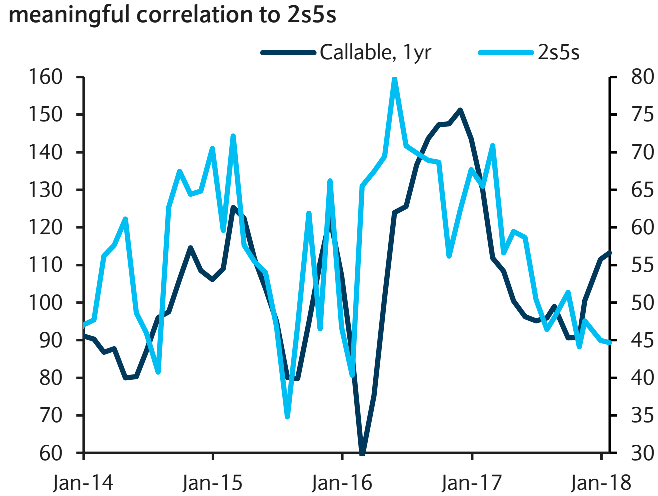
**Meaningful inversion in "term structure to call"…**




Source: Barclays Research

FIGURE 12

**… with the premium for bonds with near calls showing meaningful correlation to 2s5s**




Source: Barclays Research

The premium for buying bonds with 1yr to call also shows a strong relationship to the 2s5s (Figure 12), reinforcing our view that the 'term structure to call' is an expression of interest rate risk. Although the correlation is high, it appears from the chart (as well as from Figure 2) that the compensation for taking interest rate risk by buying bonds up for call in 1yrs' time is better than for going out the curve in general.

### Brexit risk and reverse Yankees

Different regions, at different times, have attracted premiums (and discounts) that our model captures in a quantifiable way.

Within €HY we saw a distinct UK premium (Figure 13) develop in the run-up to the EU referendum in June 2016. Since then, the UK premium has shown a strong correlation to the EURGBP, with GBP weakness translating into UK premium dropping. While as an expression of sentiment, this correlation appears lopsided, we think it reflects that a weakening GBP (in general) should benefit exporters on the margin. However, should Brexit negotiations deteriorate (a tail scenario for us), we could see a reversal of this relationship, so although we are relatively sanguine on UK risk in €HY, we do not see any upside from being overweight.

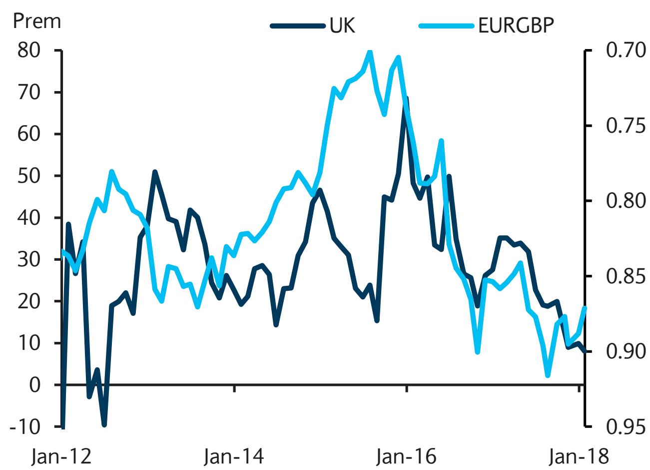
For gauging a US-specific premium/discount, we have refined our model somewhat, by creating separate dummy variables for the HY and IG universe. The conclusions from this change in estimation (Figure 14) are themselves a justification for this change. Whereas reverse Yankees in IG command a (small) premium, owing an uptick in supply in recent years (although not currently), in the past two years US HY companies in € trade tight, all else equal. This was also the case during the sovereign crisis in 2011/12, where US richness was justified, but arguably not the same drivers are at play currently.

One aspect could be the general hunt-for-yield dynamic, which pushed some investors into buying US issuers that other types of investors would normally not buy, creating a 'scarcity premium' of sorts. Ironically, this period also coincides with a pick-up in reverse Yankee HY supply which, it appears, was well-received.

With European HY Bs currently trading wide vs the US (*Cross-Atlantic divide in Bs*, 19 Jan 2018) we do not believe we will see much reverse Yankee supply in HY Bs in the near term, so the US 'scarcity premium' could remain in the near term. However, given the generally negative implications of the US tax reform for US HY companies, the premium they trade at makes us cautious on US issuers.

FIGURE 13

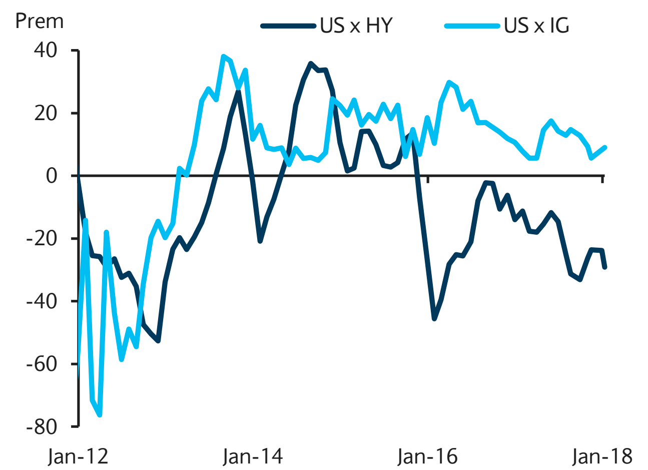
**Premium for UK risk rose ahead of the EU referendum and has since subsided, showing a strong correlation to EURGBP**




Source: Barclays Research

FIGURE 14

**Reverse Yankees: US issuers in HY trade tight, all else equal, whereas US issuers in IG trade marginally wide**




Note: US HY factor shown with a 3mth rolling average. Source: Barclays Research

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**Market Weight (MW):**

For sectors rated against the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or the Bloomberg Barclays EM USD Corporate and Quasi-Sovereign Index, the analyst expects the six-month excess return of the sector to be in line with the six-month excess return of the relevant index.
For sectors rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index, the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials, the Bloomberg Barclays Pan-European High Yield Finance Index or the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index, the analyst expects the six-month total return of the sector to be in line with the six-month total return of the relevant index.

**Underweight (UW):**

For sectors rated against the Bloomberg Barclays U.S. Credit Index, the Bloomberg Barclays Pan-European Credit Index, the Bloomberg Barclays EM Asia USD High Grade Credit Index or the Bloomberg Barclays EM USD Corporate and Quasi-Sovereign Index, the analyst expects the six-month excess return of the sector to be less than the six-month excess return of the relevant index.
For sectors rated against the Bloomberg Barclays U.S. High Yield 2% Issuer Capped Credit Index, the Bloomberg Barclays Pan-European High Yield 3% Issuer Capped Credit Index excluding Financials, the Bloomberg Barclays Pan-European High Yield Finance Index or the Bloomberg Barclays EM Asia USD High Yield Corporate Credit Index, the analyst expects the six-month total return of the sector to be less than the six-month total return of the relevant index.

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Barclays U.S. Credit Index.
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**Market Weight (MW):** The analyst expects the six-month excess return of the issuer's index-eligible corporate debt securities to be in line with the six-month expected excess return of the relevant sector.
**Underweight (UW):** The analyst expects the six-month excess return of the issuer's index-eligible corporate debt securities to be less than the six-month expected excess return of the relevant sector.
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