Do the Twist and Shift

Shobhit Gupta
+1 212 412 2056
shobhit.gupta@barclays.com

Eric Gross
+1 212 412 7997
eric.gross@barclays.com

Bruno Velloso
+ 1 212 412 2345
bruno.velloso@barclays.com

With our rates strategists forecasting a significant bear flattening – the 2s10s curve is forecast to flatten nearly 50bp as yields rise – we investigate the effect of changes in the Treasury yield curve on investment grade and high yield credit curves.

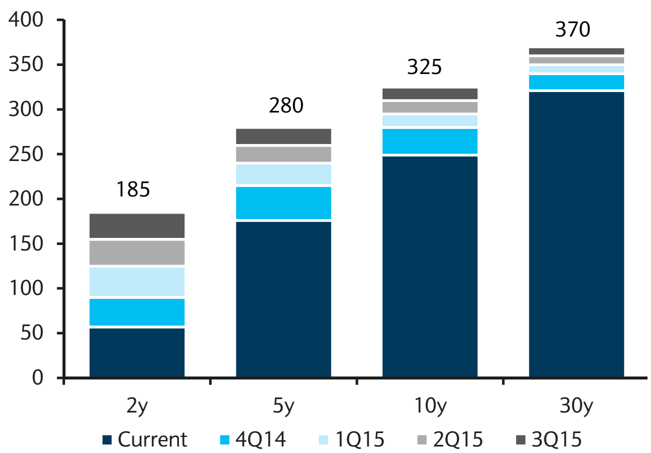
- **Investment grade: We expect fairly uniform tightening in credit spreads in the 3y, 5y, and 10y maturity buckets. We expect only a modest flattening (less than 5bp) in the non-financial 10s30s curve in response to the rate move.**
- **High yield: Despite the significant bear flattening, we expect HY yield curves to steepen owing to substantial steepening in the spread curve. This is likely to be more pronounced for lower-quality buckets, which benefit more from the positive macroeconomic signal implied by rate increases.**

Introduction

With the Fed's Treasury and MBS purchases set to end this month and rate hikes likely to begin in 2015, concerns about the effect of rising rates on credit spreads have once again come to the fore. As we have discussed previously (see *The Great Rotation: Myth or Reality?* and *Global Credit Outlook*, pp 41-43), credit spreads generally exhibit a negative correlation with rates – interest rates usually increase in an improving fundamental backdrop, which also drives credit spreads tighter. This is true for both investment grade and high yield credit, although the magnitude of spread tightening is usually higher in the latter owing to its wider spreads and greater reliance on strong economic growth.

That said, the expected nature of the selloff in rates warrants a deeper analysis of how credit curves could respond. Indeed, our rates strategists are forecasting bear flattening in the Treasury curve, and the change in curve steepness is material. Specifically, through the third quarter of next year, the forecast calls for a 133bp backup in the 2y Treasury yield, 113bp in the 5y, and 86bp in the 10y (Figure 1). It is worth noting that the combination of rising rates and curve flattening – nearly 50bp in 2s10s flattening is implied in the forecast – is a relatively uncommon occurrence. Figure 2 lists fourteen periods of substantial 10y Treasury selloffs over the past 20 years, along with the corresponding 2s10s curve change.

FIGURE 1
Barclays Treasury Yield Levels and Forecasts (bp)



Source: Barclays Research

FIGURE 2
Selloffs in 10y Treasuries and Corresponding 2s10s Change

Period	10yr Tsy Yield Change (bp)	2s10s Change (bp)
Sep 93-Nov 94	252	-100
Jan 96-May 96	127	-4
Nov 96-Mar 97	86	2
Jan 99-Jan 00	201	-1
Feb 01-Jun 01	52	66
Oct 01-Dec 01	82	22
Sep 02-Nov 02	61	24
May 03-Aug 03	109	45
Mar 04-May 04	81	-15
Aug 05-Oct 05	54	-3
Feb 06-May 06	57	21
Feb 08-May 08	55	-48
Dec 08-Jun 09	132	98
Aug 10-Dec 10	83	70
Apr 13-Aug 13	111	92

Source: Federal Reserve, Barclays Research. Note: negative 2s10s changes mean flattening of the Treasury curve.

Only three periods show substantial flattening: those beginning in late 1993, mid-2004, and early 2008. Furthermore, each selloff period post-crisis coincides with a 2s10s steepening of at least 50bp, which is unsurprising given that the Fed's extraordinarily accommodative monetary interventions have kept historically low short-term rates from drifting upward.

Credit curves generally steepen in a rising rate environment as investors shorten duration to mitigate losses on a total return basis. However, this holds only when the yield curve steepens or remains unchanged. In an interest rate environment with bear flattening, investors face a trade-off: either move into shorter-maturity credit to lower duration exposure or remain in medium- to long-term bonds to avoid the significantly more pronounced rate increases at the short end of the curve. We look first to the above pre-crisis selloff periods to investigate[1] the historical relationship between Treasuries and spreads, then to a more formal model of the relationship between spreads and changes in Treasury curve shape.

Implications for Investment Grade Curve Positioning

As mentioned above, investment grade spreads tighten in a rising rate environment. Between 1993 and 2014, the beta of Barclays Corporate Index spreads to 10y interest rates has been approximately -0.2, meaning that spreads have moved in the opposite direction of and offset about 20% of the move in 10y interest rates (see *The Great Rotation: Myth or Reality?*). However, the reaction of credit spreads to interest rate rises has been varied across the credit curve. We focus our analysis on how both general Treasury yield increases and shifts in the shape of the Treasury curve have affected different parts of the spread curve.

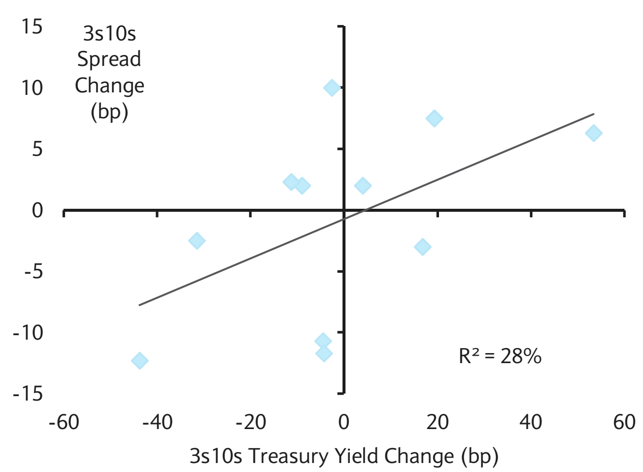
10 Years and In

During rate rises, credit curves tend to be positively correlated with the Treasury curve in the short to medium term (i.e., 2s10s and 3s10s). Figure 3 shows the relationship between 3s10s[2] credit and Treasury curves during eleven pre-crisis Treasury selloff periods. A steepening (flattening) of the Treasury curve tends to cause a steepening (flattening) of the spread curve (Figure 3).

A more robust regression analysis confirms this relationship. Over the past 20 years, we decompose monthly Treasury yield changes into parallel curve "shifts" and changes in the

FIGURE 3

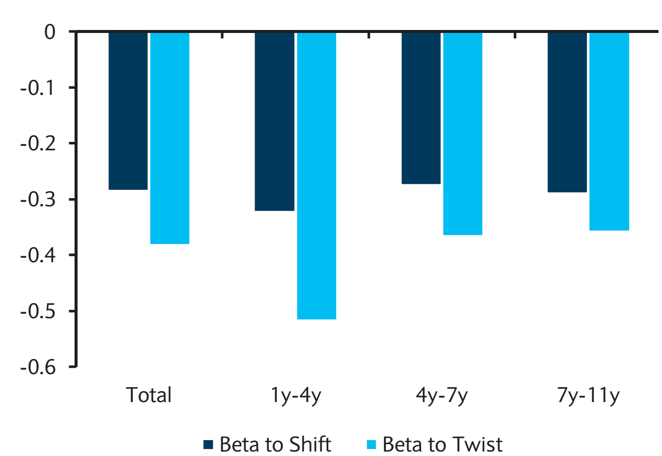
Treasury 3s10s Curve Monthly Changes versus Spread 3s10s Curve



Source: Barclays Research, Federal Reserve. Note: A positive 3s10s change implies a steepening.

FIGURE 4

The Betas of Investment Grade Spreads to Treasury Curve Shifts and Twists



Source: Barclays Research

[1] We exclude post-crisis and 2001 periods, as spreads were very wide and macro volatility was elevated.
[2] The 3y yield curve more directly corresponds with our short-term maturity bucket for spreads (1y-4y), and so we use it for the investment grade spread analysis.

curve slope (a "twist" component). We define a positive twist as Treasury curve steepening around the 5y point. The results of the regression of 3y, 5y, and 10y credit spreads (which correspond to 1y-4y, 4y-7y, and 7y-11y maturity buckets, respectively) to these two factors are shown in Figure 4. We limited our analysis only to periods of rate rises.

- **Shift:** The shift beta measures the response to a parallel shift movement in Treasuries (i.e., the average of the 2y, 5y, 10y, and 30y monthly yield changes in our analysis). The coefficients can be interpreted as follows: a 10bp parallel shift upward in Treasury yields is associated with 3.2bp in spread compression for bonds set to mature in one to four years. The beta to curve shifts is most negative for the short end of the spread curve, suggesting that when rates are increasing, investors move to shorter-duration assets to reduce interest rate sensitivity. The result is that spreads on shorter-duration credit (1-4y) compress slightly more than those in longer-duration buckets.

- **Twist:** The beta to curve twists is similarly most negative in the front end of spread curves. Thus, during periods of increasing rates, Treasury flattening will lead to more widening in shorter-maturity corporate bonds (i.e., 1-4y) than longer-maturity bonds (i.e., 4y-7y and 7y-11y). Once again, this makes sense with respect to investor behavior. If 3y rates back up more than 10y rates, investors will look to avoid the front end, leading to incremental spread widening in that maturity bucket and, correspondingly, to a flattening in the credit curve.

This leaves us with two counteracting effects. Parallel rate increases point to outperformance in the front end of the curve, while 3s10s flattening points to outperformance in the 10y range. Over the next year (through 3Q15), our rates team projects a "shift" of 98bp and a 2s10s flattening of roughly 47bp (our rates team does not project 3y yields). We find that any credit curve steepening due to the selloff in Treasuries is completely offset by flattening due to the flattening in the yield curve. As a result, the expected spread compressions for shorter-maturity buckets and longer-maturity buckets are not materially different in this scenario (they are well within the error bounds). The credit curve remains generally unchanged, with an 18bp compression in the 1-4y range roughly in line with 19bp compression in the 7-11y range (Figure 5).

FIGURE 5

Model-implied Spread Changes for Different Maturity Buckets

Period	10y Tsy Yield	1y-4y	4y-7y	7y-11y
1Q15	2.95%	-12 bp	-11 bp	-12 bp
3Q15	3.25%	-19 bp	-18 bp	-20 bp

Source: Barclays Research

While the model provides insights about the directional movement of the spread curve, there are a few caveats. We continue to expect spreads to compress as rates rise; however, because investment grade spreads are near historical tights, we think that any tightening may be somewhat lower than the model predicts.

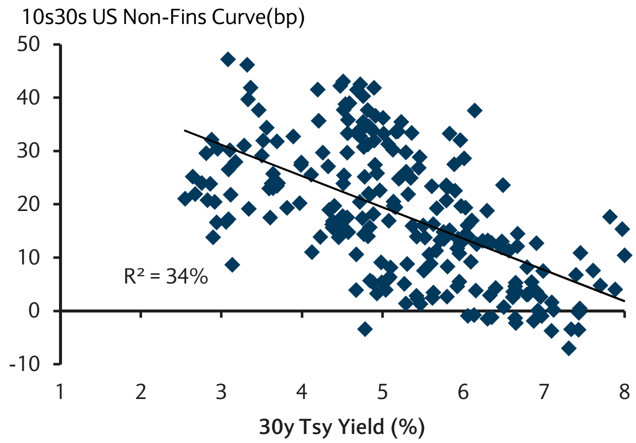
Longer-dated Bonds

As we discuss in *Get Long Long Bonds*, longer-dated yields are driven by the level of 30y yields and the 10s30s yield curve. Indeed, the R-squared between 30y yields and the 10s30s non-financials curve[3] is about 34%. Figure 8 shows the results of a two-variable regression between the 10s30s non-financial credit curve and the 30y yield and 10s30s Treasury curve. Credit curves flatten with a rise in 30y Treasury yields (with a beta of -0.1), but steepen if there is flattening in the 10s30s curve (with a beta of -0.18).

[3] Note that we include only non-financials since many financial long bonds are subordinated.

FIGURE 6

10s30s Credit Curve versus 30yr Treasury Yield



Source: Barclays Research

FIGURE 7

Regression Results: 10s30s Spread Curve versus 30y Treasury Yields and 10s30s Treasury Curve

	30y Yield	10s30s Tsy Curve	Constant
Coefficient	-9.6	-17.5	77.7
t-statistic	-15.2	-8.8	4.1
R-squared	51%		

Source: Barclays Research

With our rates strategists forecasting a 60bp increase in 30y Treasury yields to be accompanied by a flattening in the 10s30s curve (about 25bp), we expect the two effects partly to offset each other. In particular, based on our Treasury yield forecasts, we expect only a modest flattening (less than 5bp) in the non-financial 10s30s curve in response to the rate move.

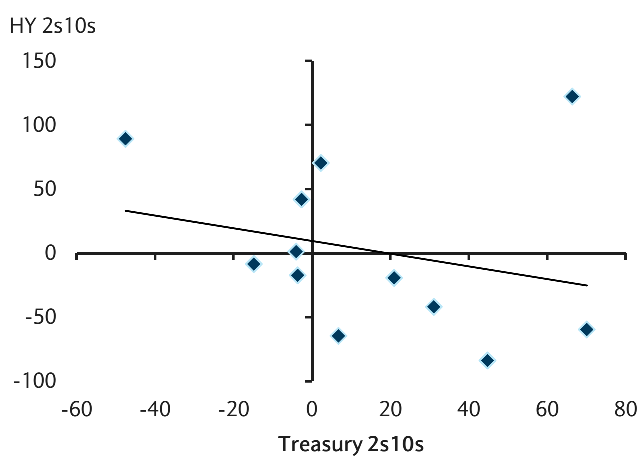
Implications for High Yield Curve Positioning

As previously mentioned, our rates strategists anticipate a bear flattening of the Treasury curve, with the 2y point set to experience the largest changes. If Barclays' base case forecasts are realized, 2s10s will end up 47bp flatter by 3Q15. While we have written extensively about the reaction of high yield cash spreads to shifts in the Treasury curve (see *Global Credit Outlook*, pp 41-43), the implications of such a pronounced expected change in rate curve steepness require further analysis.

First of all, it is clear that a negative relationship exists between the spread curve and the rates curve: as the rates curve steepens, the spread curve flattens, and vice versa (Figure 8).

FIGURE 8

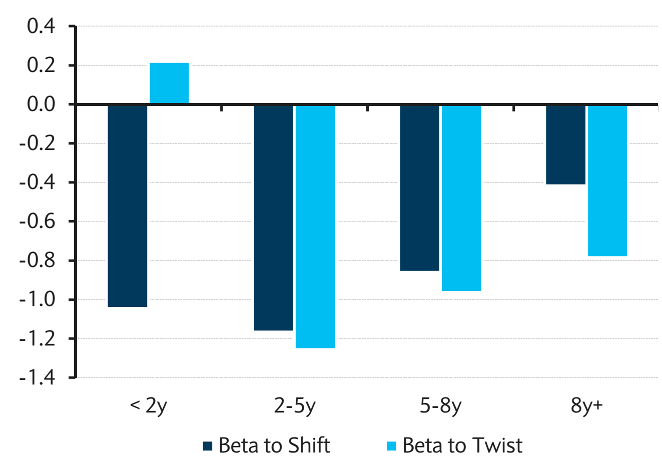
Overall High Yield Curve Changes Are Negatively Related to Treasury Curve Changes



Note: Rising rate months from May 1993 to August 2014.
Source: Bloomberg, Barclays Research

FIGURE 9

The Betas of High Yield Spreads to Treasury Curve Shifts and Twists Are Both Negative



Note: Rising rate months from May 1993 to August 2014.
Source: Bloomberg, Barclays Research

This contrasts with the behavior of investment grade spread curves, as described above. Differences in rate hedging and quoting conventions between the two markets are likely partly responsible for the divergence.

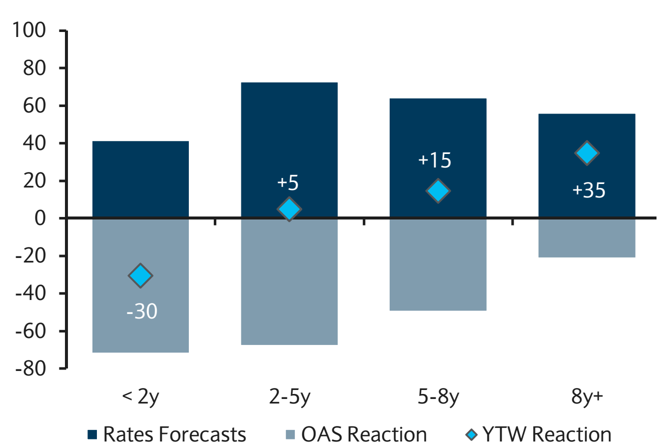
Replicating the analysis performed in investment grade, we look to isolate the distinct response of high yield spreads to parallel shifts in rates versus those to changes in rates curve steepness. Figure 9 confirms what we already knew about the response of spreads to shifts, i.e., that historically, most, if not all, of the shift is absorbed by spread compression. The curve element is new, however. With a positive twist beta in the front end and negative twist beta in the long end, positive twists (rates steepening) will lead to wider front-end spread and tighter back-end spread (curve flattening), and vice versa. As a reminder, it is worth noting that the correlation between high yield spreads and Treasuries is low,[4] making both beta estimates relatively rough. Said another way, although it sometimes feels otherwise, there is much more to high yield volatility than what is going on in rates markets.

With the important caveats that these betas are approximate and that rates are notoriously difficult to forecast, we can nonetheless get an idea of what parts of the high yield market would be most affected by a bear flattening such as the one our rates team anticipates. We do this by running shift and twist betas on high yield, broken up across different duration buckets. Specifically, we segregate the high yield market into four broad categories: short duration (0-2y OAD), average duration (2-5y OAD), long duration (5-8y OAD), and very long (8y+), with the last group small and composed mainly of fallen angels (i.e., not traditional high yield debt).

Figures 10 and 11 illustrate the anticipated reaction of spreads in each bucket to 1Q15 and 3Q15 rates forecasts. The change in spreads for each duration category is compared with the anticipated change in the Treasury yields that most closely matches the average duration of that category: 1y Treasury for the sub-2y OAD bucket, 4y Treasury for 2-5y group, 6y for 5-8y, and 10y for 8y+. In all cases, history predicts a significant absorption of rates moves, and importantly, the model suggests that the front end will outperform despite the significant rate flattening that is anticipated. That said, the effect of flattening in rates is evident in the similar expected backup in yields in the belly (2-5y) and long (5-8y) parts of the high yield curve. Naturally, given the different durations, the longer bucket would still

FIGURE 10

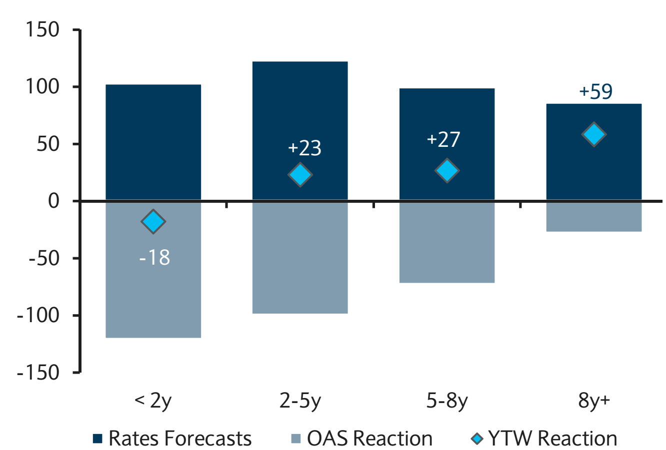
Modeled Reaction of High Yield Bonds to 1Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE 11

Modeled Reaction of High Yield Bonds to 3Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

[4] R^2 in our regressions range from 10% to 20% depending on quality and duration buckets.

experience a bigger price drop, but this analysis sheds light on the relative performance across duration buckets if historical relationships hold.

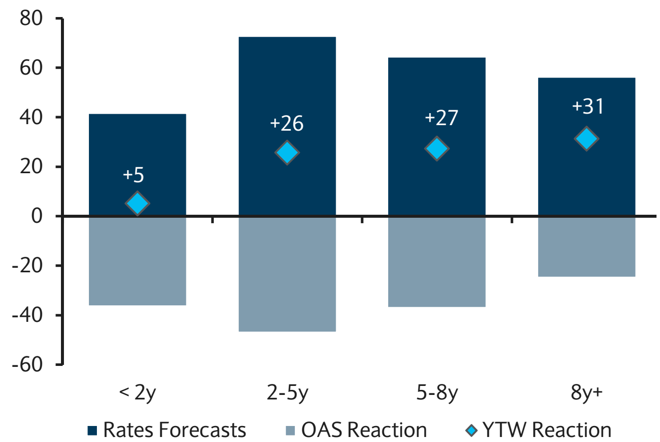
A more granular analysis by ratings can be found in the Appendix and confirms the intuition that higher quality high yield is most exposed to an increase in rates. Interestingly, according to the model, triple-Cs are expected to be slightly worse than single-Bs because of the way in which they have historically responded to curve flattening.

While the specific numbers predicted by history provide a useful base case, the future will almost certainly not unfold along historical averages. We continue to expect spreads to absorb a significant fraction of any backup in rates, although the near-term effect of higher rates could be retail outflows and a brief period of positive correlation between rates and spreads. Over the medium term, we expect shorter-duration and lower-quality bonds to be more shielded from rates, with the lower-quality bucket benefiting most from the positive macroeconomic signal implied by rates increases. When going down in quality, we favor issuers with several years of runway, as those with nearer-term debt may come under pressure if their ability to use a call to term out maturities comes into question. Conversely, when going to shorter duration, investors should be cognizant of whether they are receiving sufficient spread compensation for potential extension risk (see *The Price of Extension Risk*).

Appendix

FIGURE A.1

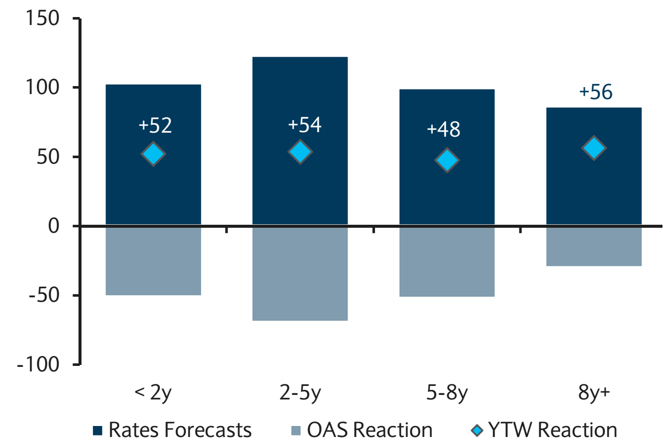
Modeled Reaction of BB Bonds to 1Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE A.2

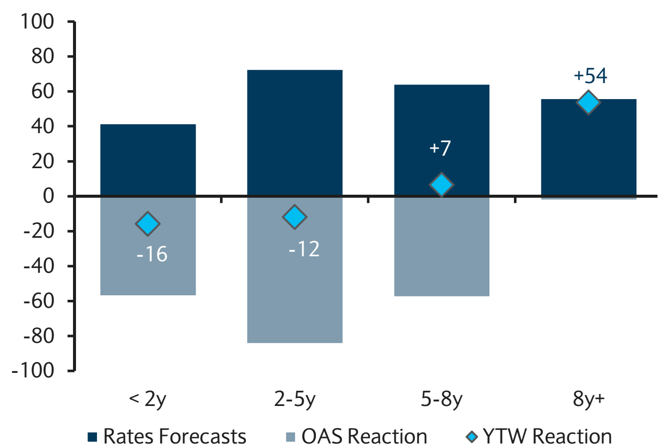
Modeled Reaction of BB Bonds to 3Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE A.3

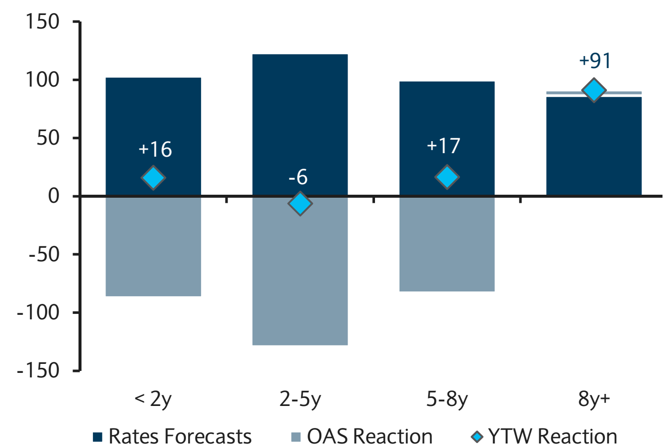
Modeled Reaction of B Bonds to 1Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE A.4

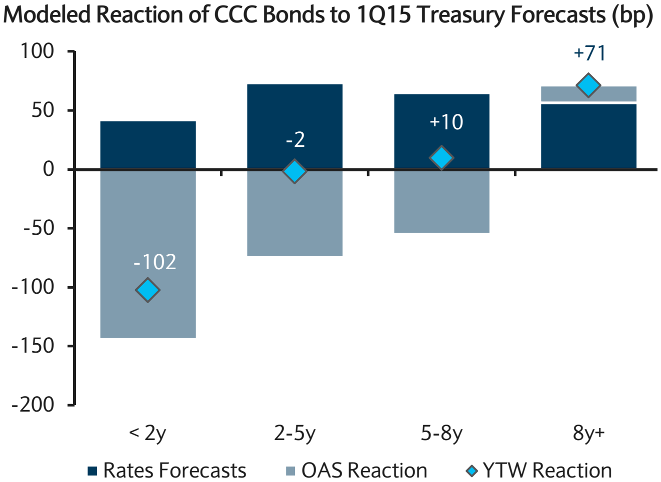
Modeled Reaction of B Bonds to 3Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE A.5

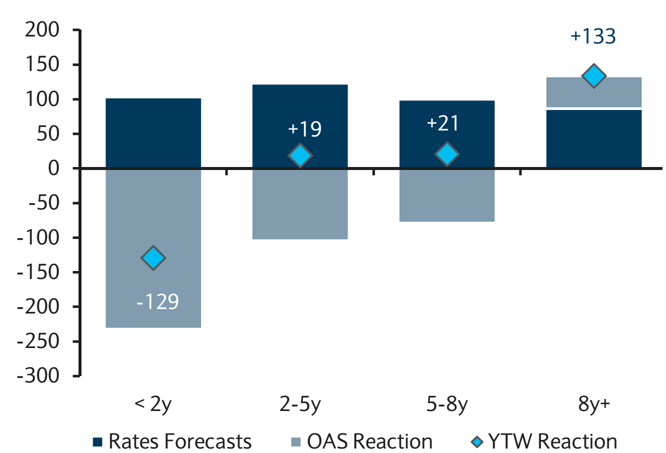
Modeled Reaction of CCC Bonds to 1Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

FIGURE A.6

Modeled Reaction of CCC Bonds to 3Q15 Treasury Forecasts (bp)



Note: Comparable Treasury bond used: 1y, 4y, 6y, and 10y. Source: Barclays Research

Analyst Certification

We, Eric Gross, Shobhit Gupta and Bruno Velloso, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

Important Disclosures:

Barclays Research is a part of the Corporate and Investment Banking division of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays"). For current important disclosures regarding companies that are the subject of this research report, please send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 14th Floor, New York, NY 10019 or refer to http://publicresearch.barclays.com or call 212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and/or short position in such securities, other financial instruments and/or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the investment banking department), the profitability and revenues of the Fixed Income, Currencies and Commodities Division and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. Barclays produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations contained in one type of research may differ from recommendations contained in other types of research, whether as a result of differing time horizons, methodologies, or otherwise. Unless otherwise indicated, Barclays trade ideas are provided as of the date of this report and are subject to change without notice due to changes in prices. In order to access Barclays Statement regarding Research Dissemination Policies and Procedures, please refer to https://live.barcap.com/publiccp/RSR/nyfipubs/disclaimer/disclaimer-research-dissemination.html. In order to access Barclays Research Conflict Management Policy Statement, please refer to: https://live.barcap.com/publiccp/RSR/nyfipubs/disclaimer/disclaimer-conflict-management.html.

African) Financial Advisory and Intermediary Services Act, 37 of 2002, or any other financial, investment, trading, tax, legal, accounting, retirement, actuarial or other professional advice or service whatsoever. Any South African person or entity wishing to effect a transaction in any security discussed herein should do so only by contacting a representative of the Corporate & Investment Banking Division of Absa Bank Limited in South Africa, 15 Alice Lane, Sandton, Johannesburg, Gauteng 2196. Absa Bank Limited is a member of the Barclays group.

In Japan, foreign exchange research reports are prepared and distributed by Barclays Bank PLC Tokyo Branch. Other research reports are distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokucho (kinsho) No. 143.

Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong.

Information on securities/instruments that trade in Taiwan or written by a Taiwan-based research analyst is distributed by Barclays Capital Securities Taiwan Limited to its clients. The material on securities/instruments not traded in Taiwan is not to be construed as 'recommendation' in Taiwan. Barclays Capital Securities Taiwan Limited does not accept orders from clients to trade in such securities. This material may not be distributed to the public media or used by the public media without prior written consent of Barclays.

This material is distributed in South Korea by Barclays Capital Securities Limited, Seoul Branch.

All equity research material is distributed in India by Barclays Securities (India) Private Limited (SEBI Registration No: INB/INF 231292732 (NSE), INB/INF 011292738 (BSE) | Corporate Identification Number: U67120MH2006PTC161063 | Registered Office: 208 | Ceejay House | Dr. Annie Besant Road | Shivsagar Estate | Worli | Mumbai - 400 018 | India, Phone: + 91 22 67196363). Other research reports are distributed in India by Barclays Bank PLC, India Branch.

Barclays Bank PLC Frankfurt Branch distributes this material in Germany under the supervision of Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin).

This material is distributed in Malaysia by Barclays Capital Markets Malaysia Sdn Bhd.

This material is distributed in Brazil by Banco Barclays S.A.

This material is distributed in Mexico by Barclays Bank Mexico, S.A.

Barclays Bank PLC in the Dubai International Financial Centre (Registered No. 0060) is regulated by the Dubai Financial Services Authority (DFSA). Principal place of business in the Dubai International Financial Centre: The Gate Village, Building 4, Level 4, PO Box 506504, Dubai, United Arab Emirates. Barclays Bank PLC-DIFC Branch, may only undertake the financial services activities that fall within the scope of its existing DFSA licence. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.

Barclays Bank PLC in the UAE is regulated by the Central Bank of the UAE and is licensed to conduct business activities as a branch of a commercial bank incorporated outside the UAE in Dubai (Licence No.: 13/1844/2008, Registered Office: Building No. 6, Burj Dubai Business Hub, Sheikh Zayed Road, Dubai City) and Abu Dhabi (Licence No.: 13/952/2008, Registered Office: Al Jazira Towers, Hamdan Street, PO Box 2734, Abu Dhabi).

Barclays Bank PLC in the Qatar Financial Centre (Registered No. 00018) is authorised by the Qatar Financial Centre Regulatory Authority (QFCRA). Barclays Bank PLC-QFC Branch may only undertake the regulated activities that fall within the scope of its existing QFCRA licence. Principal place of business in Qatar: Qatar Financial Centre, Office 1002, 10th Floor, QFC Tower, Diplomatic Area, West Bay, PO Box 15891, Doha, Qatar. Related financial products or services are only available to Business Customers as defined by the Qatar Financial Centre Regulatory Authority.

This material is distributed in the UAE (including the Dubai International Financial Centre) and Qatar by Barclays Bank PLC.

This material is distributed in Saudi Arabia by Barclays Saudi Arabia ('BSA'). It is not the intention of the publication to be used or deemed as recommendation, option or advice for any action(s) that may take place in future. Barclays Saudi Arabia is a Closed Joint Stock Company, (CMA License No. 09141-37). Registered office Al Faisaliah Tower, Level 18, Riyadh 11311, Kingdom of Saudi Arabia. Authorised and regulated by the Capital Market Authority, Commercial Registration Number: 1010283024.

This material is distributed in Russia by OOO Barclays Capital, affiliated company of Barclays Bank PLC, registered and regulated in Russia by the FSFM. Broker License #177-11850-100000; Dealer License #177-11855-010000. Registered address in Russia: 125047 Moscow, 1st Tverskaya-Yamskaya str. 21.

This material is distributed in Singapore by the Singapore branch of Barclays Bank PLC, a bank licensed in Singapore by the Monetary Authority of Singapore. For matters in connection with this report, recipients in Singapore may contact the Singapore branch of Barclays Bank PLC, whose registered address is One Raffles Quay Level 28, South Tower, Singapore 048583.

Barclays Bank PLC, Australia Branch (ARBN 062 449 585, AFSL 246617) is distributing this material in Australia. It is directed at 'wholesale clients' as defined by Australian Corporations Act 2001.

IRS Circular 230 Prepared Materials Disclaimer: Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Please be advised that any discussion of U.S. tax matters contained herein (including any attachments) (i) is not intended or written to be used, and cannot be used, by you for the purpose of avoiding U.S. tax-related penalties; and (ii) was written to support the promotion or marketing of the transactions or other matters addressed herein. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.