

## Macro Daily Focus

Implications of Rising Rates for  
Treasury Portfolios

*Extracted from Global Macro Daily (Sydney Open): Tense calm spurs risk rally, 3 September 2015.*

Markets have been rife with speculation as to the timing and magnitude of anticipated rate hikes by the Fed and other central banks. We examine the implications of rising rates in terms of projected total returns on government bond portfolios of different types over a one-year horizon. In a rising rates scenario, even low-risk portfolios of short-dated Treasuries could suffer negative returns. In Japan and Germany, the parallel shifts in yield curves needed to make portfolio returns negative are much smaller than in the US or UK.

Figure 1 illustrates three possible scenarios for zero-coupon US yield curves as of July 31, 2016.<sup>1</sup> The first curve reflects Barclays' current expectations.<sup>2</sup> The second curve is based on the assumption that the yield curve evolves according to current forward rates,<sup>3</sup> while the third curve simply reflects an unchanged zero-coupon curve.<sup>4</sup>

Both Barclays' view and the forward curve imply higher yields with an overall flattening of the curve. Compared with the forward curve, Barclays' scenario predicts a higher increase in yields for maturities up to 10 years and increases of similar magnitude for longer maturities.

We calculate the 12-month holding period return under each scenario for various Barclays Treasury Indices that span the entire maturity spectrum up to 30 years. The index is rebalanced monthly, with newly issued bonds entering at the long end of the maturity range as older issues flow out at the short end. This keeps index durations and the maturity profile fairly stable. To approximate this effect, we keep the portfolio composition constant, but shift the maturities of each constituent bond one month forward each month.

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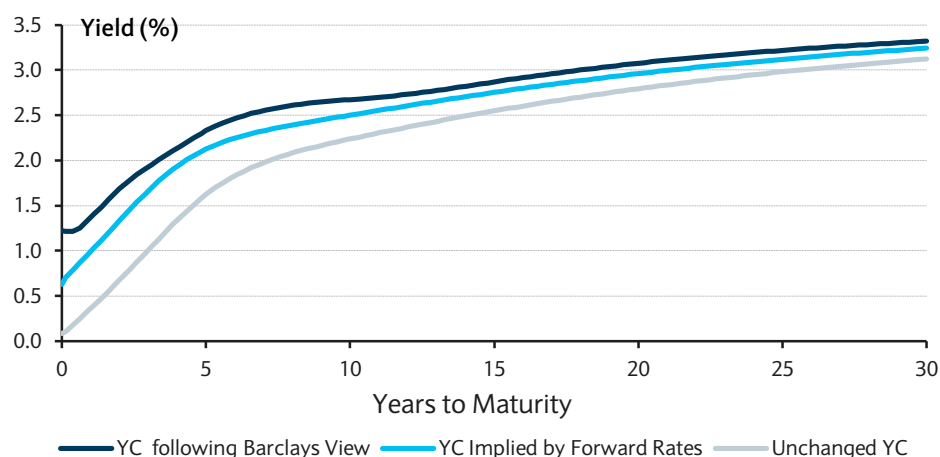
<sup>1</sup> This is based on a snapshot of market curves and Barclays views as of a point in time. Despite market volatility in the interim, prospects on a 12-month horizon are not so different as of today. The analysis described here can be repeated upon request at different points in time and different scenarios; an approximate method for accomplishing this is described in the full version of the article.

<sup>2</sup> Barclays' views were presented in *Global Bond Yield Forecasts*, Barclays Research, 30 July 2015. They are expressed as an expectation of the fed funds rate and par rates of key maturities: 2y, 5y, 10y, and 30y.

<sup>3</sup> We assume that the projected curve coincides with the respective current 1-year forward rates.

<sup>4</sup> The current zero coupon curve is based on Barclays US Treasury Strips as of 31 July 2015.

FIGURE 1  
Possible scenarios for US zero coupon yield curve on 31 July 2016



Source: Barclays Research

**Error! Reference source not found.** Figure 2 reports the results for six US Treasury Indices (1-3, 3-5, 5-7, 7-10, 10-20, and 20+) under the three rate scenarios described earlier. The fourth scenario reported in the right-most panel of the table is the parallel shift in the yield curve that would make the total return of a given index zero over the 12-month horizon. We call this the “break-even change in yield curve.”<sup>5</sup> For each index and scenario, the table shows the average curve shift in the relevant maturity range, the carry, roll-down, and pull-to-par return component,<sup>6</sup> and the total return assuming monthly rebalancing.

FIGURE 2  
Returns to U.S. Treasury Maturity Sub-Indices by Rate Scenario

|          | YC following Barclays View |                                   |              | YC Implied by Forward Rates |                                   |              | Unchanged YC     |                                   |              | BE Change in YC      |                                   |              |
|----------|----------------------------|-----------------------------------|--------------|-----------------------------|-----------------------------------|--------------|------------------|-----------------------------------|--------------|----------------------|-----------------------------------|--------------|
|          | Avg. Curve Shift           | Carry, Roll-down, and Pull-to-Par | Total Return | Avg. Curve Shift            | Carry, Roll-down, and Pull-to-Par | Total Return | Avg. Curve Shift | Carry, Roll-down, and Pull-to-Par | Total Return | Parallel Curve Shift | Carry, Roll-down, and Pull-to-Par | Total Return |
| 1-3 yr   | 1.01                       | 1.63                              | -0.13        | 0.63                        | 1.52                              | 0.37         | 0.00             | 1.21                              | 1.22         | 0.91                 | 1.61                              | 0.00         |
| 3-5 yr   | 0.79                       | 2.65                              | -0.39        | 0.59                        | 2.61                              | 0.37         | 0.00             | 2.46                              | 2.49         | 0.74                 | 2.83                              | 0.00         |
| 5-7 yr   | 0.63                       | 2.85                              | -0.70        | 0.42                        | 2.73                              | 0.37         | 0.00             | 2.71                              | 2.75         | 0.55                 | 3.00                              | 0.00         |
| 7-10 yr  | 0.50                       | 2.77                              | -1.16        | 0.30                        | 2.74                              | 0.36         | 0.00             | 2.69                              | 2.73         | 0.38                 | 2.91                              | 0.00         |
| 10-20 yr | 0.33                       | 2.88                              | -0.97        | 0.21                        | 2.85                              | 0.36         | 0.00             | 2.78                              | 2.81         | 0.31                 | 2.96                              | 0.00         |
| 20-30 yr | 0.24                       | 3.29                              | -1.46        | 0.14                        | 3.27                              | 0.36         | 0.00             | 3.22                              | 3.27         | 0.19                 | 3.35                              | 0.00         |

Source: Barclays Research

Our results indicate that under Barclays’ forecasts, all indices are expected to generate negative returns, ranging from -13bp for the 1-3y Index to -146bp for the 20-30y Index. Performance would be quite different if the yield curve evolved according to the forward rates. In this case, all indices would essentially earn identical returns of about 37bp. Under the third scenario, in which current rates stay unchanged, the mark-to-market is zero and

<sup>5</sup> The BE shifts are calculated using exact re-pricing and the complete universe of index constituents. Alternatively, they can be estimated using index-level statistics and linear approximation, resulting in only small differences. The approximation method is described in the full version of the report.

<sup>6</sup> The carry, roll-down and pull-to-par components represent returns under an unchanged yield curve from the beginning of the month. The carry return includes all coupon income paid or accrued over the holding period. The roll-down and pull-to-par component is calculated by re-pricing all of the constituent bonds as of the end of the period under the assumption of an unchanged yield curve. Portfolio total return is equal to the sum of the carry, roll-down and pull-to-par, and mark-to-market (calculated from re-pricing the bonds using the projected scenario yield curve as of the end of the holding period) components.

the sum of carry, roll-down, and pull-to-par equals a bond's return (notice that a bond's yield-to-maturity would not equal its return in this case except when the yield curve is flat). In this case, the performance of all indices would be substantially higher, ranging from 122bp to 327bp for the 1-3y and 20-30y indices, respectively.

The last panel of the table shows that the yield curve would need to shift up more than 91bp for the 1-3y index to generate a negative 12-month return.<sup>7</sup> This is a relatively small increase, which is likely to occur in a typical tightening cycle, assuming the Fed tightens 25bp per quarter. If, however, the Fed chooses a slower pace of interest rate hikes, short-maturity portfolios are still likely to generate positive returns.

Figure 3 extends the results to the rest of the G4 currencies, with the euro being represented by German Bunds. Both the Barclays scenario and the forward rates imply non-positive returns to German and Japanese Treasuries across the maturity spectrum. The results differ substantially for the Japanese market. For example, while the forward curve implies a zero return for long Japanese Treasuries, the Barclays forecast would lead to a -354bp loss. In the UK market, the forward rates indicate a more significant flattening of the Gilt curve compared with Barclays' outlook (ie, a larger and smaller rise in the short and long ends of the curve, respectively).

Break-even changes in YC for the UK market are quite comparable to those in the US. The results for Germany and Japan are, however, quite different; very small increases in interest rates are enough to make portfolio returns over a one-year horizon negative.

FIGURE 3  
Returns to G4 (ex-US) Treasury Indices by Rate Scenario

|                | YC following Barclays View |                                   |              | YC Implied by Forward Rates |                                   |              | Unchanged YC     |                                   |              | BE Change in YC      |                                   |              |
|----------------|----------------------------|-----------------------------------|--------------|-----------------------------|-----------------------------------|--------------|------------------|-----------------------------------|--------------|----------------------|-----------------------------------|--------------|
|                | Avg. Curve Shift           | Carry, Roll-down, and Pull-to-Par | Total Return | Avg. Curve Shift            | Carry, Roll-down, and Pull-to-Par | Total Return | Avg. Curve Shift | Carry, Roll-down, and Pull-to-Par | Total Return | Parallel Curve Shift | Carry, Roll-down, and Pull-to-Par | Total Return |
| <b>UK</b>      |                            |                                   |              |                             |                                   |              |                  |                                   |              |                      |                                   |              |
| 1-3 yr         | 0.35                       | 1.56                              | 0.99         | 0.57                        | 1.60                              | 0.57         | 0.00             | 1.42                              | 1.43         | 0.97                 | 1.84                              | 0.00         |
| 3-5 yr         | 0.42                       | 2.21                              | 0.54         | 0.36                        | 1.96                              | 0.57         | 0.00             | 1.79                              | 1.80         | 0.53                 | 2.05                              | 0.00         |
| 5-7 yr         | 0.57                       | 2.52                              | -0.31        | 0.34                        | 2.36                              | 0.57         | 0.00             | 2.25                              | 2.28         | 0.48                 | 2.50                              | 0.00         |
| 7-10 yr        | 0.50                       | 2.74                              | -0.91        | 0.28                        | 2.72                              | 0.57         | 0.00             | 2.64                              | 2.67         | 0.39                 | 2.85                              | 0.00         |
| 10-30 yr       | 0.31                       | 2.92                              | -1.57        | 0.14                        | 2.78                              | 0.57         | 0.00             | 2.75                              | 2.79         | 0.21                 | 2.89                              | 0.00         |
| <b>Germany</b> |                            |                                   |              |                             |                                   |              |                  |                                   |              |                      |                                   |              |
| 1-3 yr         | 0.14                       | -0.17                             | -0.34        | 0.08                        | -0.10                             | -0.28        | 0.00             | -0.18                             | -0.18        | -0.13                | -0.24                             | 0.00         |
| 3-5 yr         | 0.15                       | 0.48                              | -0.06        | 0.19                        | 0.42                              | -0.28        | 0.00             | 0.31                              | 0.31         | 0.09                 | 0.36                              | 0.00         |
| 5-7 yr         | 0.25                       | 0.98                              | -0.36        | 0.22                        | 0.94                              | -0.27        | 0.00             | 0.81                              | 0.81         | 0.16                 | 0.89                              | 0.00         |
| 7-10 yr        | 0.24                       | 1.49                              | -0.38        | 0.23                        | 1.51                              | -0.28        | 0.00             | 1.43                              | 1.44         | 0.20                 | 1.54                              | 0.00         |
| 10-30 yr       | 0.17                       | 1.61                              | -0.86        | 0.12                        | 1.57                              | -0.28        | 0.00             | 1.55                              | 1.56         | 0.11                 | 1.62                              | 0.00         |
| <b>Japan</b>   |                            |                                   |              |                             |                                   |              |                  |                                   |              |                      |                                   |              |
| 1-3 yr         | 0.08                       | 0.05                              | -0.07        | 0.02                        | 0.05                              | 0.00         | 0.00             | 0.01                              | 0.01         | 0.02                 | 0.03                              | 0.00         |
| 3-5 yr         | 0.12                       | 0.34                              | -0.12        | 0.06                        | 0.23                              | 0.00         | 0.00             | 0.16                              | 0.16         | 0.06                 | 0.24                              | 0.00         |
| 5-7 yr         | 0.24                       | 0.63                              | -0.70        | 0.09                        | 0.50                              | 0.01         | 0.00             | 0.31                              | 0.31         | 0.07                 | 0.41                              | 0.00         |
| 7-10 yr        | 0.33                       | 1.19                              | -1.42        | 0.13                        | 1.02                              | 0.00         | 0.00             | 0.86                              | 0.86         | 0.13                 | 1.02                              | 0.00         |
| 10-30 yr       | 0.38                       | 2.02                              | -3.54        | 0.11                        | 1.90                              | 0.00         | 0.00             | 1.79                              | 1.79         | 0.13                 | 1.93                              | 0.00         |

Source: Barclays Research

<sup>7</sup> Here, we assume that the break-even shift in the yield curve occurs gradually over the 12-month period. The overall BE change in YC is the sum of the BE yield changes over respective monthly periods.

We find that Barclays' view implies negative returns across most maturities and markets, with the short end of the UK market the only exception. Forward rates predict slightly higher returns across all sectors.

Government bond portfolios of German and Japanese government bonds are more exposed to hikes in interest rates; very small shifts in respective yield curves would be sufficient to generate negative returns. This contrasts with the US and UK, where the necessary rate hikes would have to be higher.

Risk parity portfolios often feature a large (or even leveraged-up) exposure to rates. As a result, these portfolios may also experience impaired performance in a rising rates scenario. In the full version of this report, we consider return implications for risk parity portfolios as well.

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