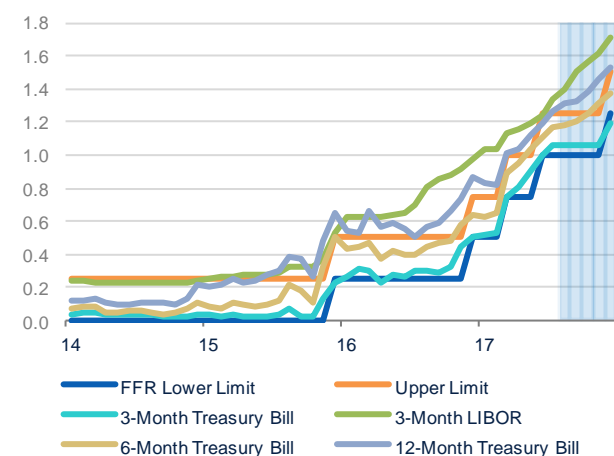


8. What happens to the yield curve when the system goes into reverse?

In the diverging global monetary policy landscape, what is the expected shape of the U.S. yield curve? The pass-through of four Fed funds rate increases by the FOMC to short-term rates has been in line with past tightening cycles. The relationship between Treasury bill yields and other money market interest rates has on average remained stable with the exception of 2016, the period in which U.S. money market reform was implemented and during which spreads widened. The projected path of short term rates continues to reflect this steady relationship between short-term rates and the Fed funds rate with expectations of an increase in short term rates slightly ahead of each rate hike, and the three-month Treasury bill yield fluctuating near the lower end of the Fed funds target rate. Consistent with the documented research, retail interest rates are stickier and there is a lower Fed funds rate increase pass-through in this early stage of the monetary policy tightening cycle.⁵

Figure 8.1 Short-term rates baseline forecast (%)



Source: BBVA Research & FRB

Figure 8.2 10-Year Treasury yield baseline forecast (%)



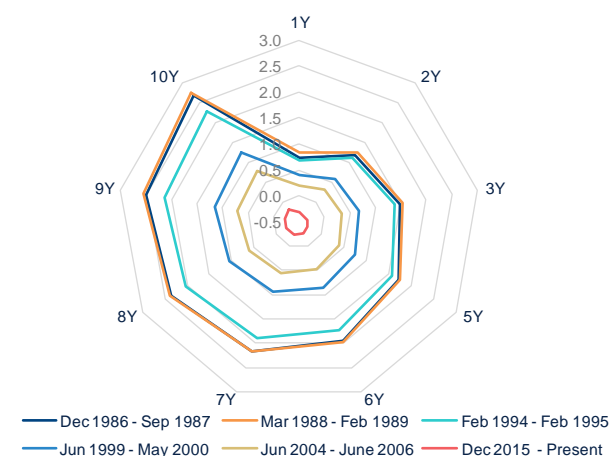
Source: BBVA Research & FRB

Long-term yields are expected to rise only moderately in the medium term, supported by robust growth expectations, a tightening labor market, and upward pressure from term premium given the FOMC's indication to trigger balance sheet normalization. The ongoing downward pressure on long-term yields has been determined to be primarily driven by lower term premium. Indeed, the 2015-2017 term-premium curve is unprecedentedly low when compared to any previous Fed tightening cycle. The period is also significant due to the flattening of term premium across maturities. For example, in 2016 the average estimate of the 10-year Treasury term-premium was negative and on par with the 1-year to 7-year Treasuries' term premium.

5: Hannan and Berger (1991), Neumark and Sharpe (1992), Driscoll and Judson (2013), Craig and Dinger (2014), and Yankov (2014).

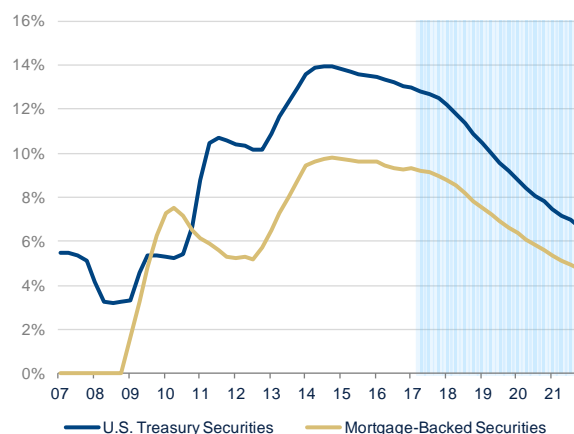
Thus, the effect of the Fed's depleting balance sheet on long-term yields has been in the spotlight, specifically the effect of the reversal of the Large Scale Asset Purchases (LSAP) program on the term premium of long-term yields.

Figure 8.3 Treasury yield curve term premium (% , Fed tightening cycle averages)



Source: BBVA Research & FRBNY

Figure 8.4 Fed balance sheet: long-term holdings as percentage of U.S. nominal GDP (%)



Source: BBVA Research & FRB

A series of empirical analyses on the effect of LSAP on long-term premiums has yielded a wide variety of outcomes for each Quantitative Easing program and for the Maturity Extension Program (MEP). While estimates vary, the Federal Reserve Board estimates suggest that the combined effect of LSAP on the 10-Year Treasury term premium is as high as 100 basis points.⁶ The first asset purchases and the MEP have overall yielded the strongest negative effect on the 10-Year Treasury's term premium with the Board's estimates of 40 and 20 basis points respectively.⁷

The effect on the term premium of long term yields resulting from the ceasing of the FOMC reinvestments varies depending on the methodologies used and the type of term premium estimated.⁸ The Board of Governors' estimate suggests a roughly 10 to 15 basis point increase in term premium for the first several years of balance sheet normalization.⁹ Another study estimates only a 4.4 basis point increase in term premium for a \$190 billion decrease in balance sheet – equivalent to 1% of the U.S. GDP.¹⁰ Overall, the size and swiftness of the increase in the long-term yields' term-premium is not expected to match the decline that had been attributed to the initiation of LSAP because the scale of expansion of the balance sheet was much larger than the scale of reduction and because, the reinvestment will be phased out gradually and in line with the FOMC published path. Additionally, the Fed balance sheet is expected to remain permanently larger than it was before the Great Recession due to higher demand for liquidity.

6: Bonis, Brian, Ihrig, and Wei (2017).

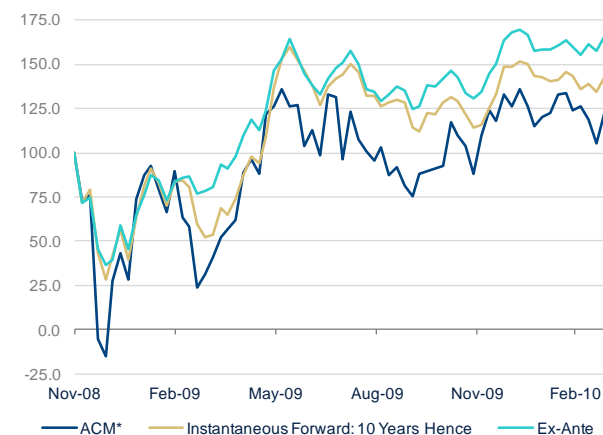
7: Ihrig, Klee, Li, Schulte, and Wei (2012).

8: Durham (2014).

9: Ihrig, Klee, Li, Schulte, and Wei (2012).

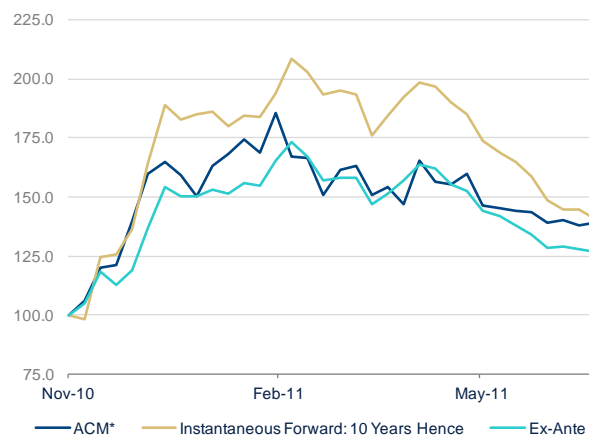
10: Davig and Smith (2017).

Figure 8.5 QE1: 10-Year Treasury term premium cumulative change from the start of the program (bp, normalized to the announcement date=100)



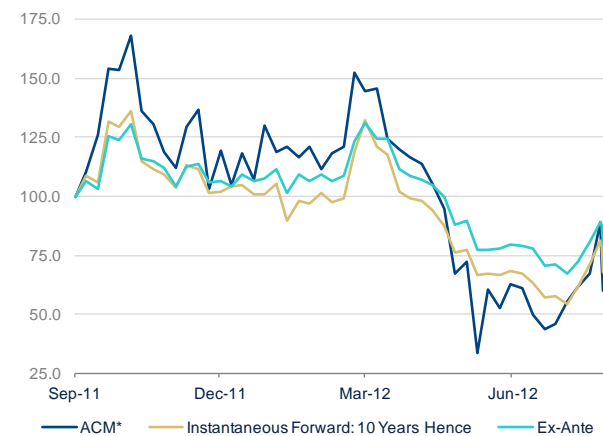
*Adrian, Crump, and Moench (2013) five-factor model
Source: BBVA Research, FRBNY & FRB

Figure 8.6 QE2: 10-Year Treasury term premium cumulative change from the start of the program (bp, normalized to the announcement date=100)



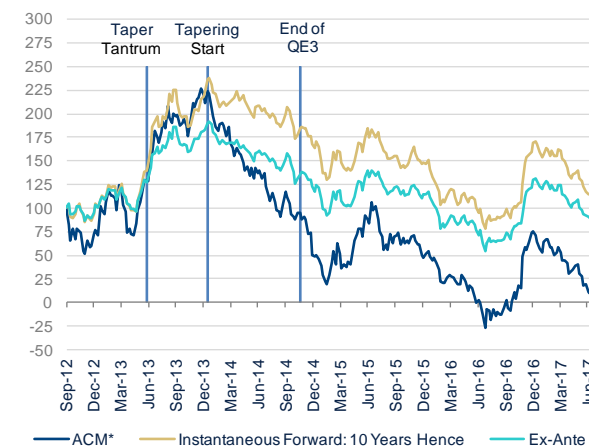
*Adrian, Crump, and Moench (2013) five-factor model
Source: BBVA Research, FRBNY & FRB

Figure 8.7 MEP: 10-Year Treasury term premium cumulative change from the start of the program (bp, normalized to the announcement date=100)



*Adrian, Crump, and Moench (2013) five-factor model
Source: BBVA Research, FRBNY & FRB

Figure 8.8 QE3: 10-Year Treasury term premium cumulative change from the start of the program (bp, normalized to the announcement date=100)



*Adrian, Crump, and Moench (2013) five-factor model
Source: BBVA Research, FRBNY & FRB

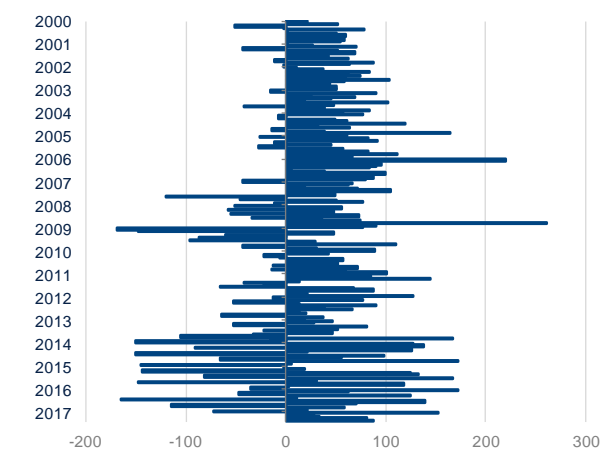
Moreover, downward pressure on term premium is expected to remain, since the Fed's large balance sheet and maturity composition are only part of the dynamics keeping term-premium low. Two years of negative term premium in the back-end of the curve have been a function of several additional factors highlighted below.

Net flight-to-quality flows and the amplified role of duration risk as a global shock absorber: Treasury Security net capital inflows and outflows dynamics have changed significantly since 2013, marking an increase in both the monthly volatility of net flows and in the volume of monthly flows, which is likely attributable to heightened volumes of safe haven

trades. The amplified role of duration risk as a global shock absorber has resulted in further downward pressure on term premium and flattened duration risk across maturities.

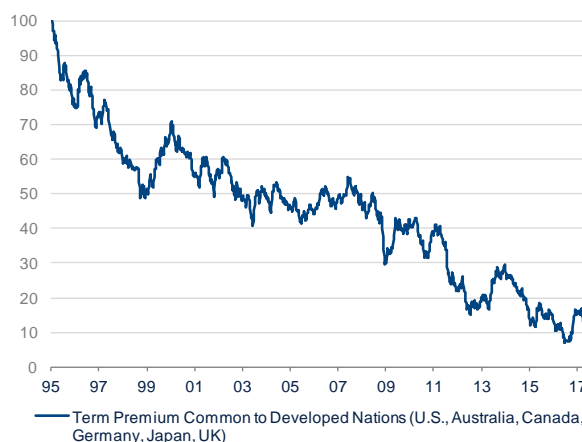
Divergence in monetary policy stances: As many central banks continue to embark on highly accommodative policies and hold downward pressure on global term premium, our estimates suggest that as much as 20% of the 10-Year Treasury yield term premium variation is attributable to the common term-premium of six developed countries – Germany, Japan, Australia, Canada, UK, and the U.S.

Figure 8.9 Treasury international capital net monthly inflows volatility (\$bn)



Source: BBVA Research & Bloomberg

Figure 8.10 International term premium (1995=100)



Source: BBVA Research

Under the baseline projections, the yield curve is expected to flatten due to upward pressure on short-term rates from projected Fed funds rate hikes while long-term yields will remain under downward pressure from low term-premium, a decline in inflation expectations, and from continued risk-off sentiment. Long-term yields have adjusted to reflect expectations of constancy and predictability of market fundamentals and reduced uncertainty around the path of monetary policy in light of explicit forward guidance. The volatility in long-term yields has remained contained.

However upside and downside risks to the baseline scenario can arise if the status quo perceived by markets is challenged. Upside risks can arise if expansionary fiscal policy materializes and/or a boost in domestic and global demand results in solid positive momentum for inflation expectations, which would cause yields to be projected on a steeper upward path. Further upside pressure on long-term yields can arise from loosening of the domestic supply of long-term treasuries if the effect of Fed balance sheet normalization on term premium and duration risk were to be higher than anticipated. Downside risks can arise due to maturity of the U.S economic cycle, the intensification of geopolitical risks and decline in global growth. In that economic environment, the sustained downward pressure would resume on both short-term and long-term rates.

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