# Fixed Income

## What Drives Bond Yields?

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What determines the level of government bond yields and what drives their variation over time? With yields recently testing uncharted depths, it is not surprising there are many questions as to why yields are low and where they may venture from here. As is often the case, difficult questions attract loose speculation and erroneous logic. In the paper *What Drives Bonds Yields?*, which can be downloaded here, I provide a framework for identifying and understanding important drivers of bond yields. In this way, I hope to arm the reader with a structure to thoughtfully produce their own answers to topical questions.

Below, I address one of these questions, which is especially timely: *is bond market risk one-sided?*

Many believe, explicitly or tacitly, government bond risk is one-sided, with zero-to-negative short-term interest rates implying there is no room for bonds to rally. Both theory and empirics support a different conclusion: bond risk remains two-sided. Fundamentals continue to drive bond markets in both directions, directly and through the policy response of central banks. And government bonds can provide significant returns should economic conditions drive yields lower.

**Decomposing bond yields**

The yield on a long-maturity bond is equal to the average expected (short-term) interest rate over the life of the bond plus a "term premium" – the incremental expected return investors demand for bearing duration risk. Three factors, therefore, determine the level of bond yields – the current interest rate, expected future interest rates, and term premia:

$$\textit{Bond Yield} \sim \textit{Current Interest Rate} + \textit{Expected Future Interest Rates} + \textit{Term Premium}$$

**Monetary policy drivers**

Central banks set the interest rate. The current interest rate, however, is only one of three primary monetary policy tools. Through "forward guidance" central banks influence expected future interest rates. And through "quantitative easing" – targeted purchases of long-maturity bonds and other long-duration assets – central banks influence term premia.

By manipulating the current interest rate, the expected path of future interest rates, and term premia, central banks influence long-maturity bond yields. Long-maturity yields, in turn, influence a variety of borrowing rates and asset valuations across the economy, which impacts aggregate spending, and, ultimately, employment and inflation.

Given central bank goals of maintaining low and stable inflation and full employment, policymakers react to changes in the outlook for employment and inflation. Expectations of improving economic conditions or increasing inflation leads to a more contractionary policy stance and higher yields. Worsening economic conditions or falling inflation leads to a more accommodative stance and lower yields.

Despite prolonged periods of zero-to-negative interest rates, news about the near-term outlook for employment and inflation continues to induce variation in developed market bond yields (see Exhibit 4 in *What Drives Bond Yields?*), consistent with a well-functioning monetary transmission mechanism.

**Non-policy drivers**

While monetary policy affects bond yields, it is far from the sole determinant. Fundamental macroeconomic forces exert considerable influence on yields, particularly at long-maturities.

The near-term outlook for employment and inflation, as well as central bank forward guidance, influences near-term expectations of future interest rates. Long-horizon interest rate expectations, however, are anchored to the sum of long-term inflation expectations and the natural rate of interest (aka "r-star," the real interest rate consistent with full employment and stable inflation, closely related to the trend growth rate of output). Since long-maturity yields are largely determined by long-horizon interest rate expectations, they should be very sensitive to changes in either variable. This is precisely what we observe in the data: *ten-year yields move virtually one-for-one with changes in long-term inflation and growth expectations.*

**Exhibit 1: Ten-Year Yields Regressed on Long-Term Inflation Expectations, Long-Term Real GDP Growth Expectations, and the Interest Rate**

| | Long-Term Inflation | Long-Term Growth | Interest Rate | $R^2$ |
|---|---|---|---|---|
| Coefficient<br>(T-stat) | 0.91<br>(3.2) | 0.95<br>(5.1) | 0.68<br>(14.6) | 88% |

Source: Consensus Economics, Bloomberg. Sample is G6 (Australia, Canada, Germany, Japan, UK, US), quarterly, December 1990 through January 2020. Long-term inflation and growth are median forecasts of average inflation and real GDP growth rates between 6-10 years ahead from Consensus Economics. Yield and interest rate (T-bill) are from Bloomberg. Dynamic OLS regression includes country effects and two leads/lags of changes in the dependent variables. Please see the Disclosures for important information.

Term premia are likewise driven by real macroeconomic forces in addition to central bank policy. Inflation uncertainty (term premia tend to be higher when there is heightened uncertainty about inflationary outcomes), countercyclical risk aversion (term premia tend to be higher in recessions than in expansions), and exogenous variation in the demand for risk-free assets all influence term premia, which can vary meaningfully over time.

**What does this tell us about where yields are now and where they may go from here?**
Macroeconomic fundamentals provide the backdrop for exceptionally low bond yields. Despite the recent uptick in inflation, long-term expectations remain low, and estimates for the natural rate of interest are near zero due to declining productivity growth and labor force demographics. Even abstracting from the actions of central banks, current long-maturity yields would likely be low relative to historical levels. Indeed, falling inflation expectations and natural rate of interest estimates have been a primal force spurring the secular decline in bond yields over the past few decades.

**Exhibit 2: Natural Rate of Interest + Long-Term Inflation Expectations and 10-Year Yields**




Source: Federal Reserve Bank of New York, Federal Reserve Bank of Cleveland. Sample is January 1990 through April 2020 for the natural rate of interest and January 1990 through December 2020 for inflation expectations. Natural rate of interest estimates follow Holston, Laubach, and Williams (2017) and are maintained by the Federal Reserve Bank of New York (https://www.newyorkfed.org/research/policy/rstar). Long-term inflation estimates follow Haubrich, Pennacchi, and Ritchken (2012), and are maintained by the Federal Reserve Bank of Cleveland (https://www.clevelandfed.org/our-research/indicators-and-data/inflation-expectations.aspx). Please see the Disclosures for important information.

Some have argued bond yields cannot meaningfully decline because central banks have set interest rates at their lower bound. This line of reasoning is flawed. The current interest rate is only one determinant of long-maturity bond yields. Even with policy rates fixed, yields can move lower or higher due to either changes in expected future interest rates or changes in term premia. Both policy and non-policy factors can drive these components lower or higher.

Should economic conditions warrant, central banks can put downward pressure on bond yields through forward guidance and quantitative easing. These remain potent policy tools even if interest rates are floored. Regardless of monetary policy actions, should long-term inflation expectations or the trend growth outlook deteriorate, this would also put downward pressure on yields by suppressing expected future interest rates. And if financial market conditions dramatically worsen, safe-haven demand for government bonds would suppress term premia and drive yields lower.

This is not a forecast. There are upside risks to yields as well, a potential increase in inflation expectations foremost among them. The important takeaway is yields continue to be determined by macroeconomic fundamentals, and fundamentals can evolve in either direction.

If the fundamentals driving bond markets deteriorate, do low yields impair upside returns? Should US Treasury yields decline from today's values to lows realized in Germany (1.3% to -0.8% for the 10-year and 1.9% to -0.5% for the 30-year), the associated price appreciation would be roughly 24% for the 10-year note and 75% for the 30-year bond. More conservatively, should yields decline to zero, the associated price appreciation would be roughly 15% for the 10-year note and 55% for the 30-year bond. For the 10-year note these returns are greater than 99th and 95th percentile annual excess returns over the last 75 years. Upside return potential is clearly not impeded.

Despite noise to the contrary, government bond risk remains two-sided. Bonds can provide exceptional returns if economic developments drive yields lower.

With that key question addressed, I encourage readers to review the full paper, which provides a framework that can be used to help think through this and other questions about bond yields as they arise.

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