Monetary Policy Drivers of Bond and Equity Risks

John Y. Campbell, Carolin Pflueger, and Luis M. Viceira

Harvard Economics, UBC Sauder, and HBS

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Treasuries are Hedges

- We have become used to the idea that US Treasury bonds are hedges:
  - Asset class gained in value during global financial crisis
  - Negative beta with stocks since 2000

- When economy weakens
  - Inflation falls
  - Real interest rates decline
  - Investors “flee to quality” into Treasuries and out of stocks

- All three factors drive up prices of Treasuries
  - And the last two drive up prices of TIPS
But This is New

- The past 15 years are highly unusual
- In earlier decades, Treasuries had positive beta with stocks
- In the 1980s in particular, when the economy weakened
  - Inflation rose
  - Real interest rates rose
  - Flight to quality was into cash or commodities, and out of both stocks and Treasuries
- All three factors drove down the prices of Treasuries
  - And the last two would have driven down TIPS (which had not yet been issued)
Changing Risks of Treasury Bonds

CAPM Beta of 5-yr Nominal Bond (1961.Q1-2015.Q2)

Monetary Policy Break 1 (1977.Q2)  
Monetary Policy Break 2 (2001.Q1)
Why Does This Matter? (1)

The ability of Treasuries to hedge economic and equity risks has huge implications for investors

- Treasuries hedge stocks in endowment portfolios
  - Reduces portfolio volatility for all-long long-term investors
- Equity investing is riskier for pension funds with long-term liabilities
  - Stocks will do poorly at the same time as interest rates decline
  - The “perfect storm” of underfunding
  - “Over the past decade, the correlation for stocks and bonds has remained persistently negative (causing big problems for pension funds that are essentially long stock and short bonds)” – Bridgewater Associates LP, 2013
- We should see effects on bond risk premia (Campbell, Sunderam, and Viceira 2015)
Why Does this Matter? (2)

The ability of Treasuries to hedge economic and equity risks has huge implications for investors.

- Corporations issuing long-term nominal debt are taking on extra risk (Kang and Pflueger, *Journal of Finance* 2015)
  - During recession, inflation declines so real burden of debt increases just as real earnings decrease
  - Defaults are likely just when Treasuries are doing particularly well
- We should see effects on corporate bond spreads
Inflation Risk and Corporate Bonds (Kang-Pflueger)
Inflation Volatility and Corporate Credit Spreads (K-P)

Australia

Canada

Germany

Japan

U.K.

U.S.

Corporate Log Yield Spread (% Ann.)  Inflation Volatility (% Ann.)
Consequences for Investors

Inflation Cyclicality and Corporate Credit Spreads (K-P)

[Graphs showing the relationship between inflation and corporate credit spreads for Australia, Canada, Germany, Japan, U.K., and U.S.]
Macroeconomic Sources of Changing Risks

- What has caused this change in bond risks? Two hypotheses:
  1. Changes in macroeconomic shocks
  2. Changes in monetary policy

Campbell, Pflueger, and Viceira (2015) uses a structural macroeconomic model to disentangle these effects.
Model Overview

- Expanded version of modern New Keynesian macro model
  - Like the standard model, it produces dynamics of difference between output and potential output (output gap), inflation, and Fed Funds rate (monetary policy instrument)
  - Habit formation as in Campbell and Cochrane (1999) endogenously generates countercyclical asset return volatility and risk premia, needed to fit movements in bond and stock prices

- Why a New Keynesian framework?
  - It allows inflation to affect the real economy and hence carry a risk premium
  - It allows monetary policy to have real effects
Building Blocks of New Keynesian Macroeconomics

- A New Keynesian framework has three building blocks:
  - A description of consumers’ behavior that links output and real interest rates in equilibrium: the Investment and Savings (IS) curve.
  - A description of firms’ price-setting behavior that links inflation and output in equilibrium: the Phillips Curve (PC).
  - A description of the Fed’s procedure for setting interest rates: the Monetary Policy (MP) rule.

- I will spare you the details except for the monetary policy rule.
Fed Behavior: Monetary Policy Rule

\[ i_t = \rho^i i_{t-1} + (1 - \rho^i) \left[ \gamma^x x_t + \gamma^\pi (\pi_t - \pi^*_t) + \pi^*_t \right] + u^M_P \]

- Taylor (1993) rule with Fed funds rate \( i_t \) as policy instrument (Clarida, Gali, and Gertler 1999).
- Fed funds target (in square brackets) increases in the output gap \( x_t \), the inflation gap \( \pi_t - \pi^*_t \), and the long-run inflation target \( \pi^*_t \).
- Fed funds rate adjusts gradually to target.
Fed Behavior: Long-Run Inflation Target

\[ \pi_t^* = \pi_{t-1}^* + u_t^* \]

- Shocks to long-run inflation target \( \pi_t^* \) are persistent, capturing
  - Changes in Fed policy not immediately accompanied by interest rate changes, such as forward guidance.
  - Changes in public expectations of Fed behavior and credibility.
Fed Behavior: What Do the Parameters Mean?

\[ i_t = \rho^i i_{t-1} + (1 - \rho^i) \left[ \gamma^x x_t + \gamma^\pi (\pi_t - \pi^*_t) + \pi^*_t \right] + u^M_{t} \]

- \( \gamma^x \) tells you how much the Fed worries about **recessions** and cuts interest rates to prevent them.
- \( \gamma^\pi \) tells you how much the Fed worries about **inflation** and raises interest rates to prevent it.
- \( \rho^i \) tells you how **gradually** the Fed moves when it changes rates.
- Volatility of shock \( u^M_{t} \) tells you how much unexplained short-term variation there is in the Fed funds rate.
- Volatility of inflation target shock \( u^*_{t} \) tells you how much the Fed’s long-run rate target moves around (this movement also shows up in long-term bond yields).
Monetary Policy Regimes

Break date tests indicate three monetary policy regimes.

- **Pre-Volcker period (1960.Q2-1977.Q1):**
  - Accommodation of inflation.

  - Aggressive counter-inflationary policy (Clarida, Gali, and Gertler 1999).

- **Late Greenspan - Bernanke period (2001.Q1-2011.Q4):**
  - Coincides with end of great economic expansion of 1990s.
  - Renewed focus on fighting recessions.
  - Fed acts much more gradually.
  - May be related to new emphasis on transparency and forward guidance.
Monetary Policy Regimes and Bond Beta

CAPM Beta of 5-yr Nominal Bond (1961.Q1-2015.Q2)

Monetary Policy Break 1 (1977.Q2)

Monetary Policy Break 2 (2001.Q1)
Estimating the Model in Three Regimes

<table>
<thead>
<tr>
<th>Monetary Policy Rule</th>
<th>60.Q2-77.Q1</th>
<th>77.Q2-00.Q4</th>
<th>01.Q1-11.Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Weight $\gamma^x$</td>
<td>0.33</td>
<td>0.28</td>
<td>0.84</td>
</tr>
<tr>
<td>Inflation Weight $\gamma^\pi$</td>
<td>0.60</td>
<td>1.61</td>
<td>1.60</td>
</tr>
<tr>
<td>Persistence MP $\rho^i$</td>
<td>0.60</td>
<td>0.64</td>
<td>0.82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Std. Shocks</th>
<th>60.Q2-77.Q1</th>
<th>77.Q2-00.Q4</th>
<th>01.Q1-11.Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std. PC</td>
<td>0.80</td>
<td>0.35</td>
<td>0.27</td>
</tr>
<tr>
<td>Std. MP</td>
<td>0.77</td>
<td>1.56</td>
<td>0.61</td>
</tr>
<tr>
<td>Std. Infl. Target</td>
<td>0.10</td>
<td>0.11</td>
<td>0.40</td>
</tr>
</tbody>
</table>
How the Shocks Move the Economy

- Our model has three shocks and three regimes.
- Shocks are PC (supply), MP (short-term monetary), and inflation target (long-term monetary).
- Regimes are 60.Q2-77.Q1 (blue), 77.Q2-00.Q4 (green), 01.Q4-11.Q4 (red).
- We show “impulse responses”, initial effects and subsequent adjustment paths.
60.Q2-77.Q1 = blue, 77.Q2-00.Q4 = green, 01.Q4-11.Q4 = red
60.Q2-77.Q1= blue, 77.Q2-00.Q4=green, 01.Q4-11.Q4=red
$\pi^*$ Shock

60.Q2-77.Q1 = blue, 77.Q2-00.Q4 = green, 01.Q4-11.Q4 = red
60.Q2-77.Q1 = blue, 77.Q2-00.Q4 = green, 01.Q4-11.Q4 = red
Impulse Response Functions: PC and MP Shocks

- Inflationary PC shock has a persistent inflationary and contractionary effect:
  - Stock prices fall as a result of a persistent decline in dividends and output and an increase in the equity risk premium.
  - Bond prices fall as a result of persistent inflation; an aggressive anti-inflationary central bank reaction (Paul Volcker) adds to this decline.
  - **Positive** impact on nominal bond beta is strongest in the Volcker period.

- MP shock acts raises nominal and real short-term interest rates and causes a recession:
  - Stock and bond prices both fall.
  - **Positive** effect on nominal bond beta is largest in the third subperiod where MP shocks are persistent.
Impulse Response Functions: Inflation Target Shocks

- Inflation target shocks have a permanent but delayed impact on inflation and create a temporary boom.

- Stock prices rise in response to higher dividends and lower risk premia.

- Nominal bond prices fall due to higher expected inflation.

- Inflation target shocks have a **negative** effect on the nominal bond beta.
Putting It Together: Monetary Policy Matters
Why Has the Bond Beta Changed Over Time?

- Anti-inflationary US monetary policy stance after 1977 (Paul Volcker) increased nominal bond beta:
  - Large increase in Fed funds rate in response to inflation shock.
  - Increase in Fed Funds rate depresses output, stock prices, and bond prices.

- Negative nominal bond beta in 2000s due to
  - Smaller supply shocks.
  - Renewed Fed focus on recessions.
  - Inflation target shocks (which may represent changes in investors’ expectations of future Fed actions).
What About Flight to Quality?

- Flight to quality cannot by itself explain the change in bond risks.
- If bonds are seen as risky (moving in the same direction as stocks), then flight to quality hurts bonds and stocks together, amplifying the positive bond beta.
- If bonds are seen as hedges (moving opposite stocks), then flight to quality hurts stocks but helps bonds, amplifying the negative bond beta.
- Flight to quality is an amplification mechanism (built into the CPV model), but cannot be the whole story.
Implications for International Debt Portfolios
(Du, Pflueger, and Schreger 2015)

- Mostly negative bond betas in developed markets, but huge dispersion in bond betas across emerging markets

- Governments with credible monetary policy should be better able to tap local currency (as opposed to USD) bond markets, thereby lowering default risk

- If bond betas indicate central bank’s ability to credibly communicate future actions
  - We should see international bond-stock betas related to availability of local currency bonds
  - We should see international bond-stock betas related to sovereign default risk
International Bond Betas and CDS Spreads

![Graph showing the relationship between bond-stock betas and mean CDS spreads for various countries. The x-axis represents mean CDS spreads (percentage point), while the y-axis represents bond-stock betas. Countries are color-coded and labeled, with a trend line indicating a positive correlation.](image-url)
Asset Class Risks Are Not Stable

- Asset allocation exercises often treat the risks of asset classes as stable, even if the expected returns are thought to vary over time.
  - Use of very long-run historical data to estimate these risks.
- In the case of Treasuries, this practice is dangerous.
  - Bond risks have moved over time and depend on macroeconomic shocks and the stance of monetary policy.
  - While there is no reason to expect any immediate change, investors must keep a careful eye out for a change in the bond beta back towards the historical norm.
  - **You can’t count on Treasuries!**
- Similar principles apply to many other asset classes such as commodities and real estate.
References


