

Discussion of

**A Probability-Based Stress Test of Federal Reserve
Assets and Income**

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Summary

Goal of the paper is to measure the interest rate risk of the Fed's Treasury and MBS portfolio amassed through quantitative easing

In particular, the paper

- Estimates a term structure model that respects the zero lower bound
- Uses the model to simulate projections for
 - The value of the Fed's portfolio
 - The Fed's net income
- Concludes that risks are modest
- Well executed, clearly explained, includes many interesting institutional features

My Comments and Questions

- Observations on the model's zero lower bound
- Is this a stress test?
- What about a consolidated view of the Fed and Treasury?

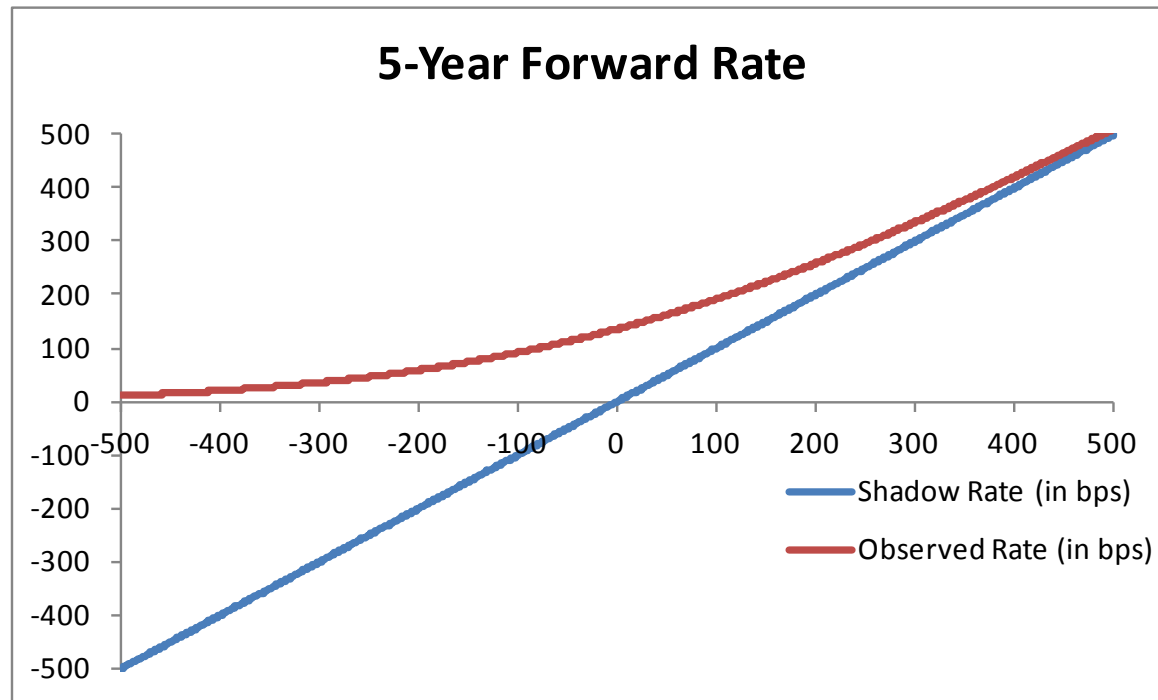
Comments on the Model

- Start with the arbitrage-free Nelson-Siegel model
 - Nelson-Siegel fits the yield curve using level, slope, and curvature components
 - Interpret these as loadings on three Gaussian factors
 - Add a drift correction to the make model arbitrage-free
- To ensure positive rates
 - Use AFNS model for (unobserved) shadow rates
 - Observed bond prices are shadow bond prices capped at par
- Powerful, practical framework

Keeping Rates Positive

Easiest to understand through forward rates:

Forward Rate = Normal-Black-Scholes(Shadow Forward Rate)
with zero strike and vol determined by rate at zero*



*Negative at maturities shorter than 1.3 years?

An Observable Shadow Rate?

- We have
$$\text{Forward Rate} = \text{Normal-Black-Scholes}(\text{Shadow Forward Rate})$$

- We observe
 - Forward Rate and its volatility
- The equation can in principle be inverted to get
 - Shadow Forward Rate and its volatility

the way the Merton model is inverted to get asset value from equity value
(but easier because the strike is fixed at zero)

- Is this practical? Paper uses an extended Kalman filter for estimation

Is This a Stress Test?

- I would call it a value-at-risk calculation
 - It describes losses at moderately rare quantiles under the assumption that the future will behave roughly like the past
- If the risks the paper seeks to measure are important, why not consider stress scenarios
 - China cuts backs on Treasuries
 - An inflation shock (absent in the estimation period 1986-2013)
 - For the MBS holdings (treated as bond equivalents in the paper)
 - Recovery leading to unexpectedly fast prepayments?
 - Spike in interest rate volatility increases the value of the prepayment option?

Possible Structural Changes in Demand for Treasuries

- Basel III liquidity coverage ratio requires banks to hold buffers of high quality liquid assets
- The derivatives world is increasingly collateralized, and central counterparties accept more limited collateral than OTC participants
- Money market reform: Investors (institutional or retail) who want a fixed NAV with no possibility of redemption fees or gates will need to be in government funds. Several prime MMFs have recently converted to government funds.

Increased demand could be of similar magnitude as Fed portfolio

Higher demand for Treasuries should mitigate the risks considered in the paper

What About a Consolidated View?

- The paper considers losses in the mark-to-market value of the Fed's Treasury portfolio
 - Isn't every MTM dollar loss to the Fed a MTM dollar gain to the Treasury?
 - Why is this a concern?
- For the net income analysis, consider
 - Remittances to Treasury = Carry on Portfolio + Remittances w/o Portfolio
- Would we worry about remittances without QE?
- How is Fed's funding cost (in particular, IOER) different from interest expense on short-term Treasuries? Isn't one displacing the other?

The Paper's View

- The paper recognizes that the “risks” it analyzes are accounting and perception issues
- The paper quotes Donald Kohn: losses do not have *“any economic significance, but losses could be used as a political weapon by those who seek to curtail the Federal Reserve’s independence or limit its powers.”*
- The authors: *“it is the political consequences of the financial costs that are a key concern to the Fed.”*
- OK. But can one go further and separate appearance from reality in measuring losses to counter the political argument rather than just estimating the chances the argument will come up?

Summary

- Interesting and informative paper
- Perhaps the framework could be pushed further in identifying and analyzing interest rate risks