Yield Curve Momentum

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The views expressed are those of the author.
Paper at the intersection of three literatures:

1. Time Series Momentum (e.g. Moskowitz et al. 12)
   - Autocorrelation in returns for many asset classes
2. Bond Risk Premia (e.g. Cochrane and Piazzesi 05)
   - Which variables predict bond returns?
3. Term Structure Models (e.g. Ang and Piazzesi 03)
   - No-arbitrage factor models describing the whole yield curve

1. largely disconnected from 2. and 3.
Baseline Regression

- Apply dataset on zero coupon US Treasury yields constructed by Liu and Wu (2020)

\[ rx_{t+1}^n = \alpha + \beta rx_{t-h,t}^n + \epsilon_{t+1} \quad (1) \]

- Explain excess return on \( n \) maturity bond \( rx_{t+1}^n \) on the excess return of a same maturity bond between periods \( t - h \) and \( t \).
Baseline Regression

Figure: shows the slope coefficients and the relevant 95% confidence bounds from regressing the returns of different maturity bonds (years) on the past return for the same maturity bond for lookback horizons of 1, 3, 6 and 12 months.
Excess Returns Much Larger Following Positive Months

**Figure:** shows the mean returns for different maturity bonds both for the full sample and in subsamples following positive and negative past month returns.
Sources of Momentum

- Study momentum sources using three decompositions:
  - Mostly due to autocorrelation in yield changes rather than in bond carry
  - Both because of autocorrelation in risk premia and because positive shocks increase the premium
  - Momentum effects only partly spanned by current yields (inconsistent with standard models)
- Yield curve momentum can also be largely captured using a single factor
Brooks et al. 19: Treasury yields react sluggishly to target rate (FFTR) changes

Does this explain my findings?

Yield changes partly induced by FFTR changes.

Hence Post-FOMC announcement drift contributes to yield curve momentum

But momentum also following yield changes unrelated to FFTR changes

Implies that post-FOMC drift does not fully explain yield curve momentum.
Momentum and Term Structure Models

- Momentum might be captured with a multifactor term structure model with a time-varying risk premium
- But these models tend to imply full spanning: past returns should not predict future returns controlling for current yields
- Inconsistent with sizable unspanned portion in the data
- Same problem with standard macrofinance, DSGE and behavioral models
- Can be solved by parametrizing the model to a knife-edge case in which spanning condition fails.
Show that momentum consistent with a model where first principal component of yields follows an AR(2)-process.

To violate the spanning condition, the second lag must be unpriced.

Discuss two possible economic interpretations:

Behavioral: Agents believe and price bonds as if the true factor process is AR(1), while in the data it is AR(2).

Arbitraugers and rule-based traders:

- Demand from RBT modifies amount of duration risk borne by arbitraugers.
- This can offset standard effects of short rates on bond prices and imply a violation of the spanning condition.
Conclusion

- Past bond returns predict future returns due to autocorrelation in yield changes
- Due to both autocorrelation in risk premia and because return shocks increase the premium
- Strong factor structure
- Unspanned by current yields
- Related to but not fully driven by post-FOMC announcement drift
- Standard models do not explain the violation of the spanning condition
- Results consistent with un-priced longer term dependencies