# Yield Curve Momentum

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The views expressed are those of the author.

# Time Series Momentum and Term Structure Modelling

- 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)

$$rx_{t+1}^{n} = \alpha + \beta rx_{t-h,t}^{n} + \epsilon_{t+1} \tag{1}$$

- 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

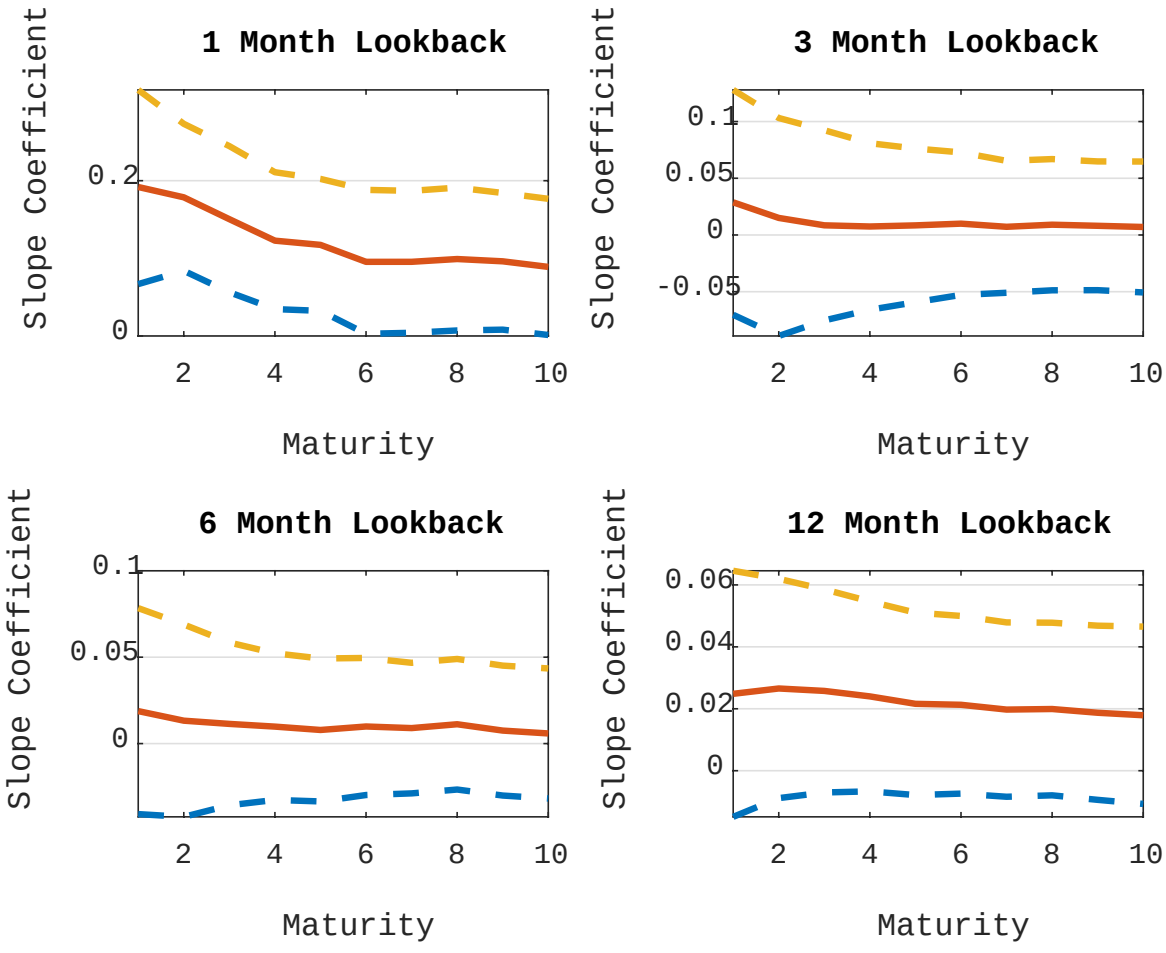


Figure: shows the slope coefficients and the relevant 95% confidence bounds from regressing the returns of different maturity bonds (years) on the past return for the same maturity bond for lookback horizons of 1,3,6 and 12 months.

# Excess Returns Much Larger Following Positive Months

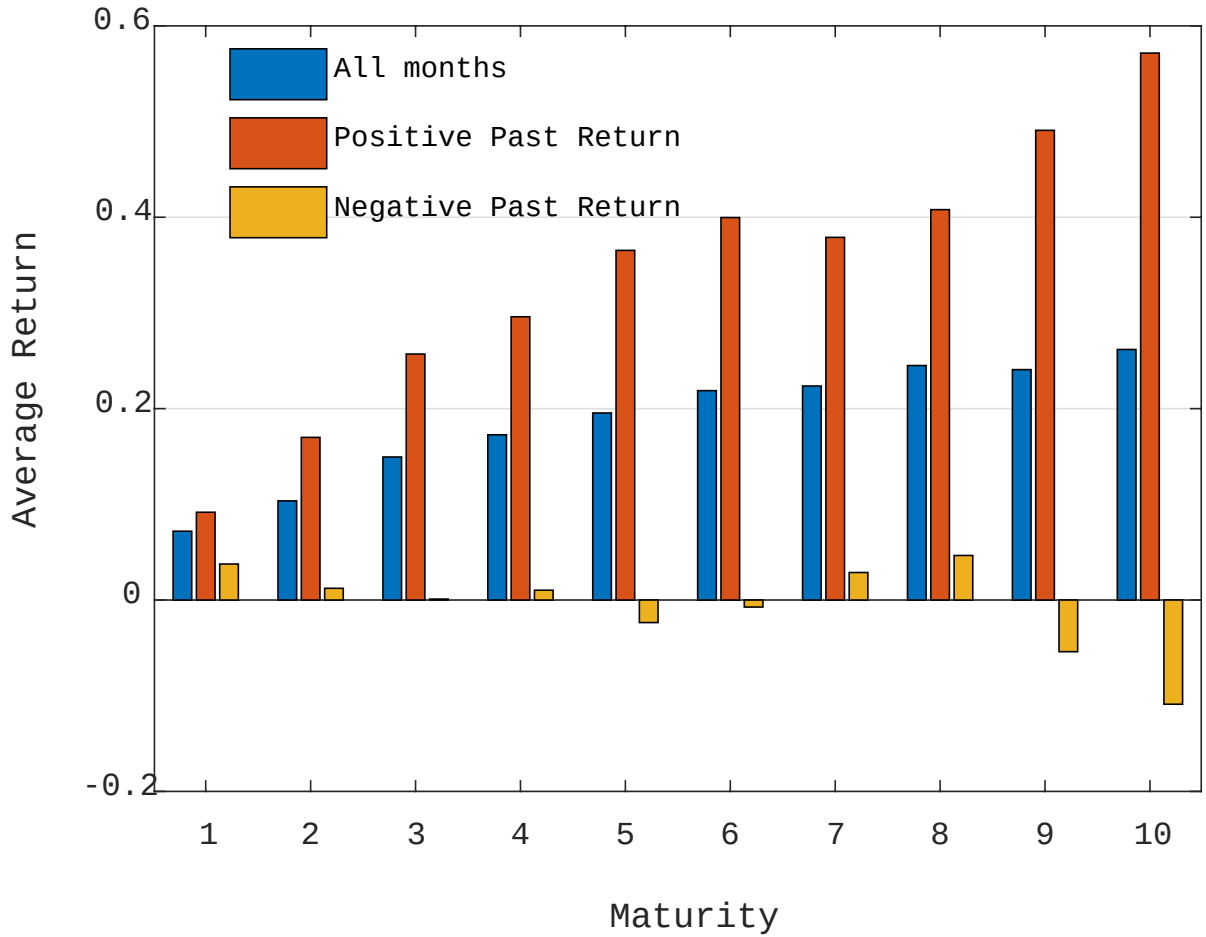


Figure: shows the mean returns for different maturity bonds both for the full sample and in subsamples following positive and negative past month returns.

# 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

# Momentum and Post-FOMC Announcement Drift

- 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 stucture 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.

# Momentum and Term Structure Models

- 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 unpriced longer term dependencies