TRANSPARENT EXPECTED S&P 500 RETURNS

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Risky Asset Allocation:
excess return/(risk aversion*variance)

- Thesis: Public expected returns for stock indexes such as the S&P 500 would be useful:
  - for long-term financial planning
  - to complement correlated wealth-contingent risk aversion
  - as a point of departure for proprietary active asset allocation.
- Required:
  - Usable forecast efficiency over extensive history
  - Accommodate different time horizons
  - Transparent methods and data

Approach for US Large-Stock Return Estimates:

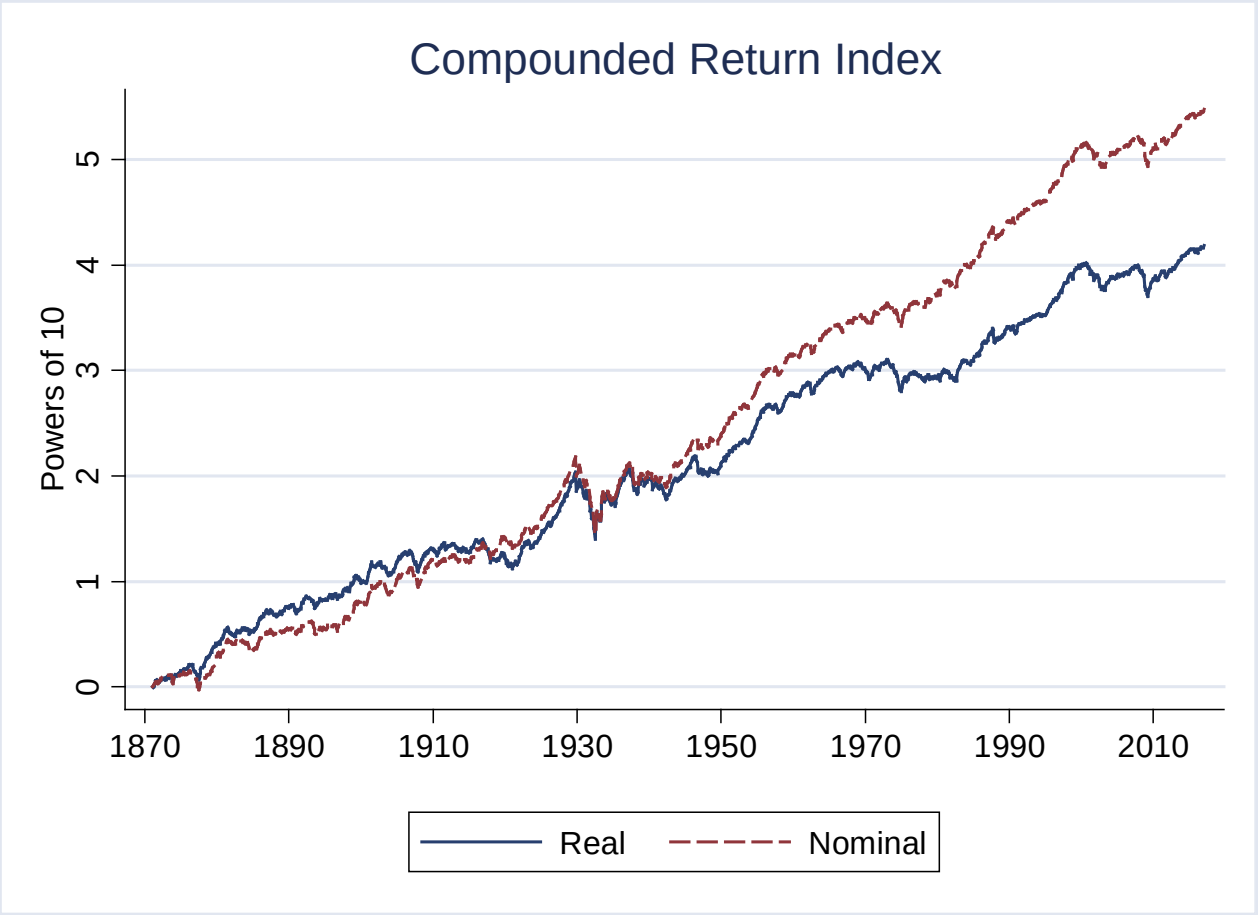
Long-Term Consistency with Disasters Along the Way

A Bayesian viewpoint:

Long-term evidence acts like a prior to condition shorter-term evidence.

For means, this can be realized simply by weighting very long term, 10 year and 1-year components.

Confidence intervals would benefit from a more formal approach.



Source: R. Shiller online

SCOPE

- Just stocks, not bonds or real estate – most impact
- Just US large capitalization – S&P 500 – ready data
- Opportunities for international models on same principles -- parsimonious model layers over different time horizons, with...
  - Global prior
  - Conditioned by country differences in choice of value and anticipation
- Popular interest rate indicators were not significant additions to core explanations, at least in the U.S.

Very Long-Term Estimates: Real S&P 500 Return

- Ibbotson & Sinquefield

  1926-2012: 6.8%
- Shiller

  1871-2016: 6.8%
- Bernstein

  Controlled for price-earnings variation

  1871-1976: 5.7%

- Economy + Gordon model?

  r = real GDP growth 3%

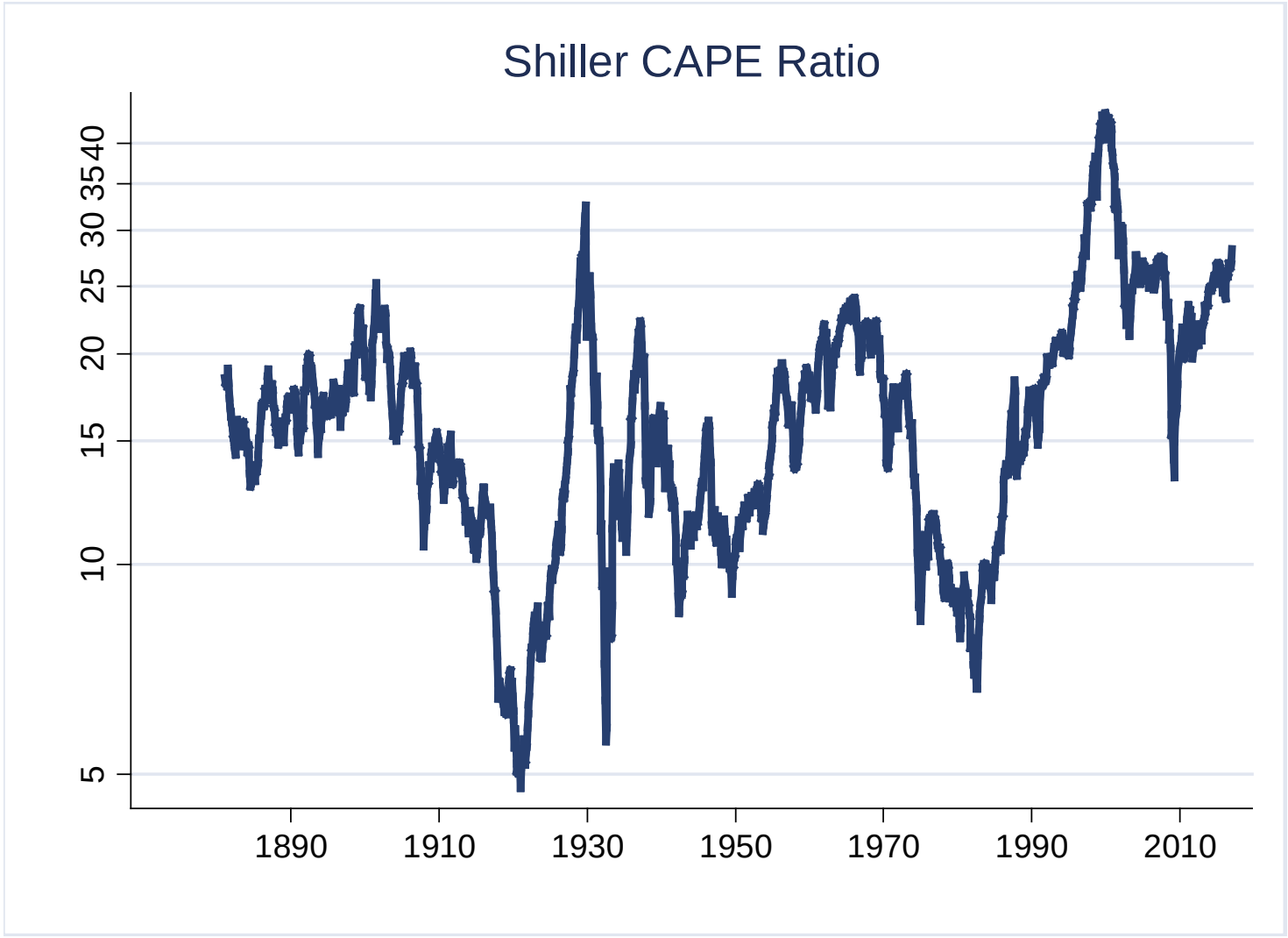
  + dividend yield 3%

  r = g + d = 6%, Cornell: 4%
- Shareholder equilibrium?

  r = allocation 60% * risk aversion 2.5 * variance .04

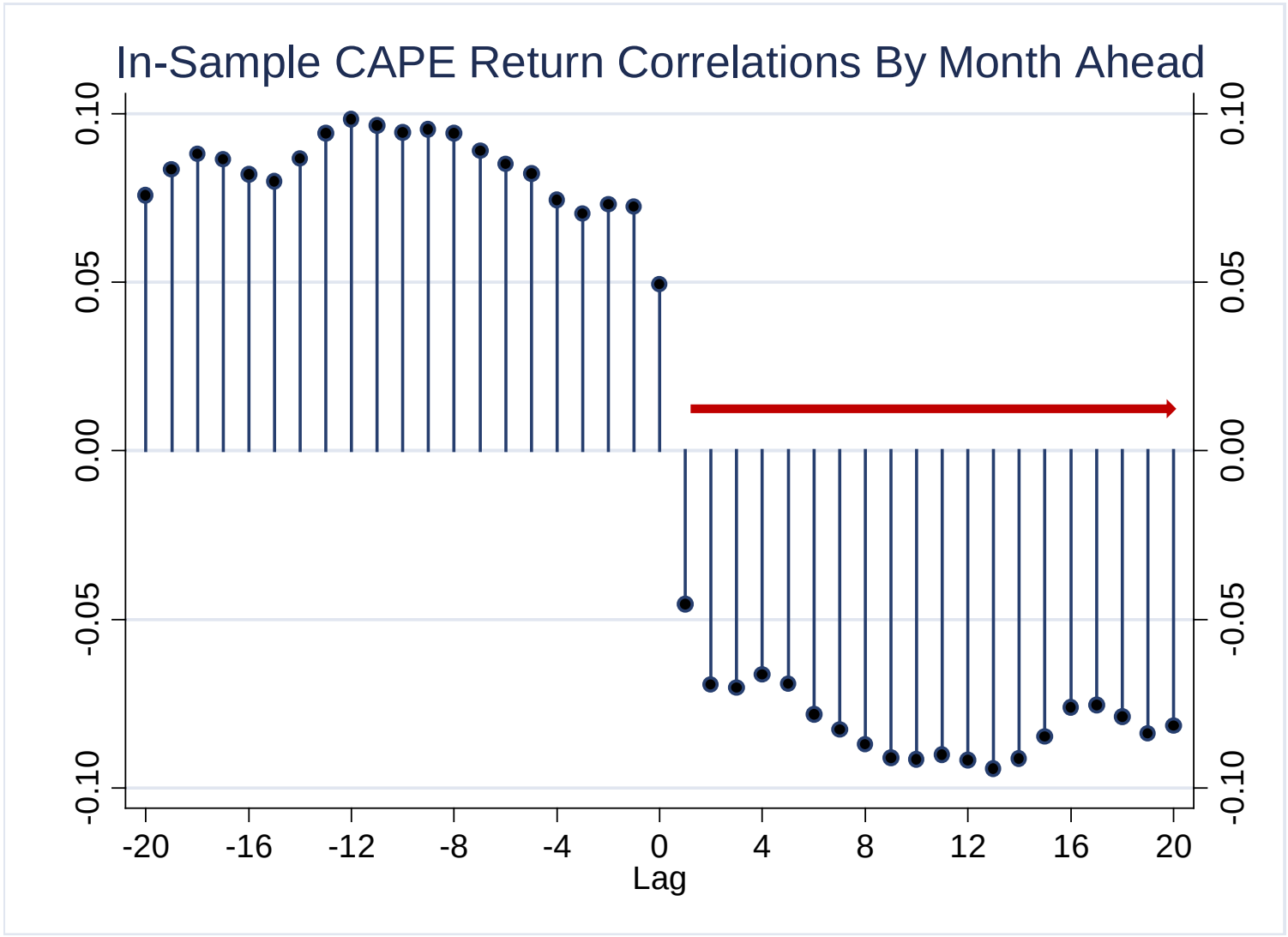
  r = 6%

10-Year Real Return Forecaster



Source: R. Shiller online

CAPE Predicts Near-Term Months

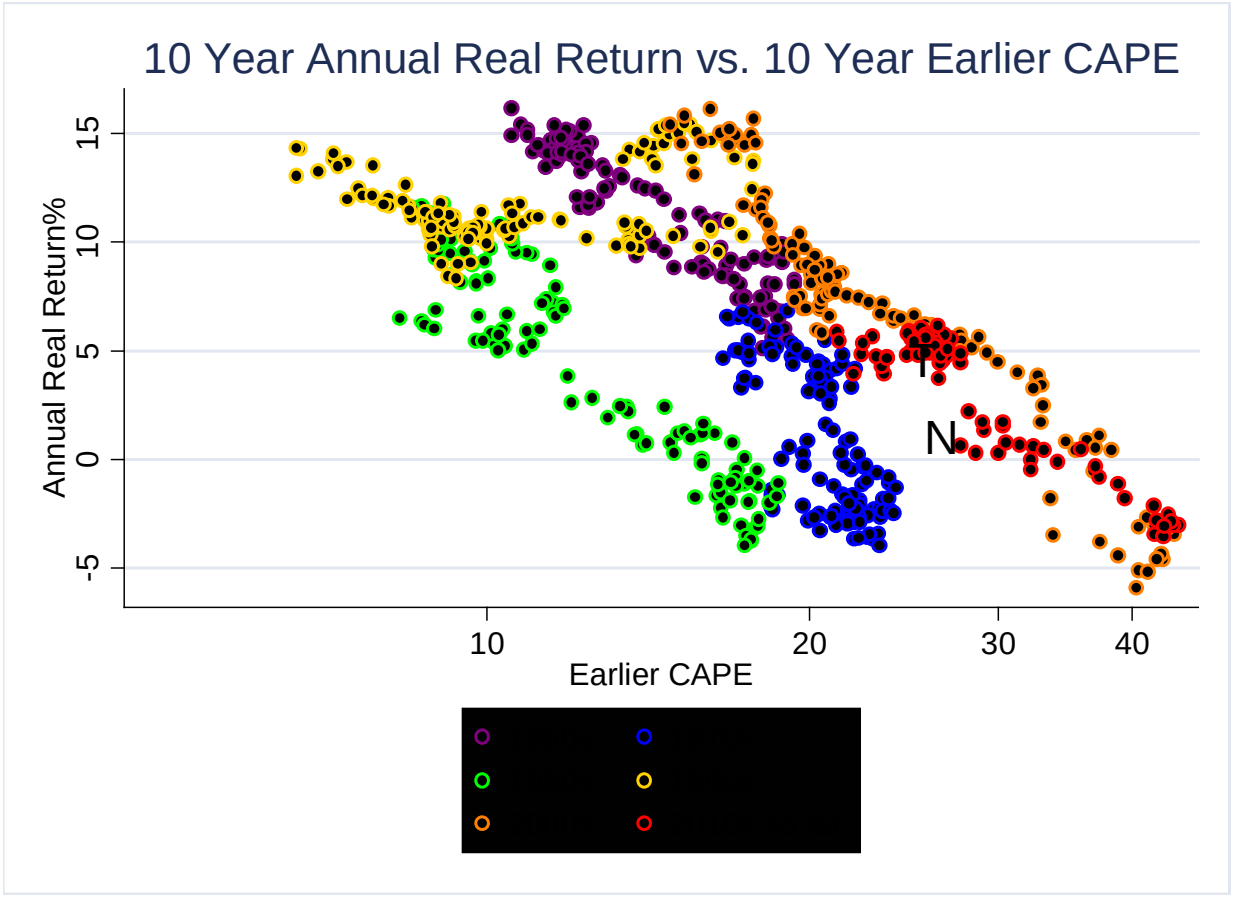


Source: R. Shiller online

CAPE and 10-Year Real Returns

Campbell & Shiller study -- valuation of 10-year average earnings does show next 10-year predictive power.

But its power is less than at first appears.



T: outcome prior 10 yrs,
N: 1960-2016 Prediction = 1.9%

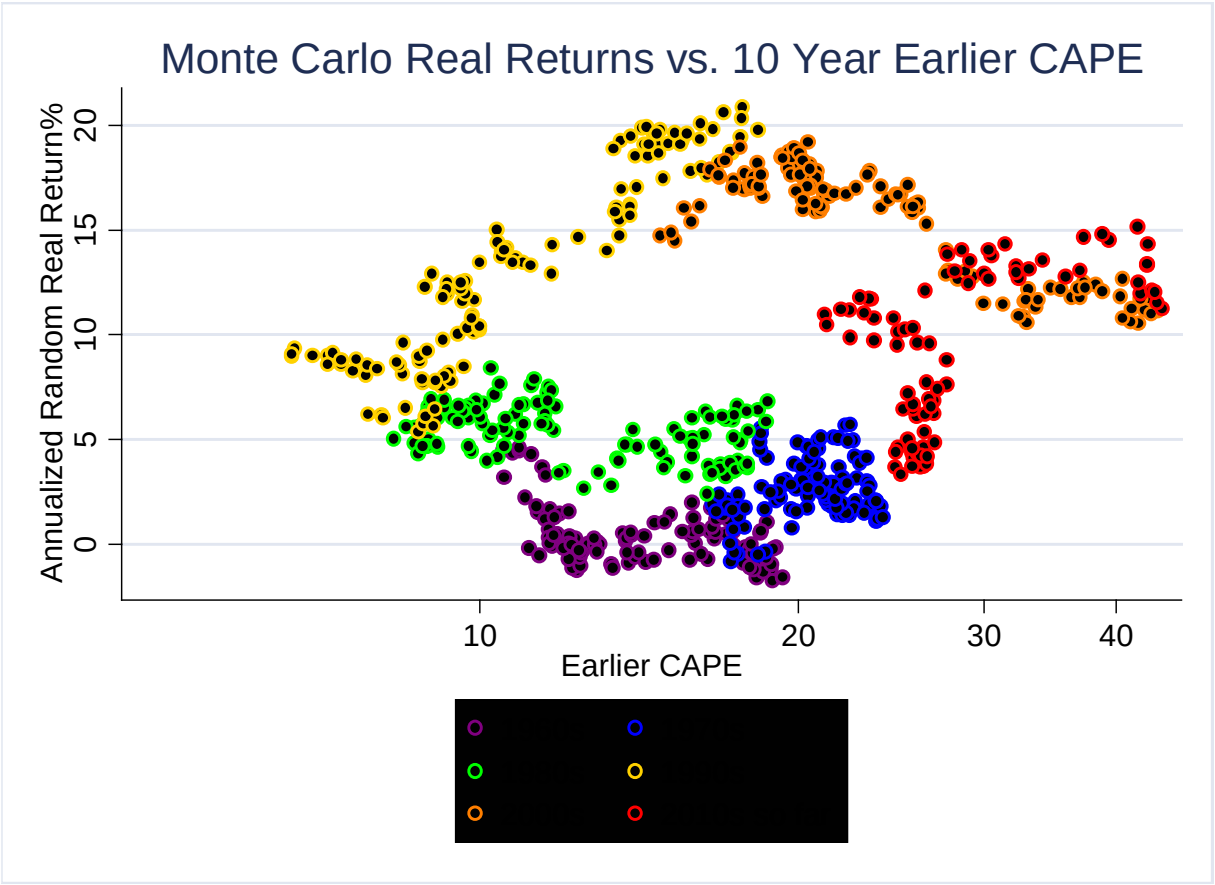
Overlapping 10 Year Observations Can be Deceptive: An Example

Overlapping randomly-generated returns creates:

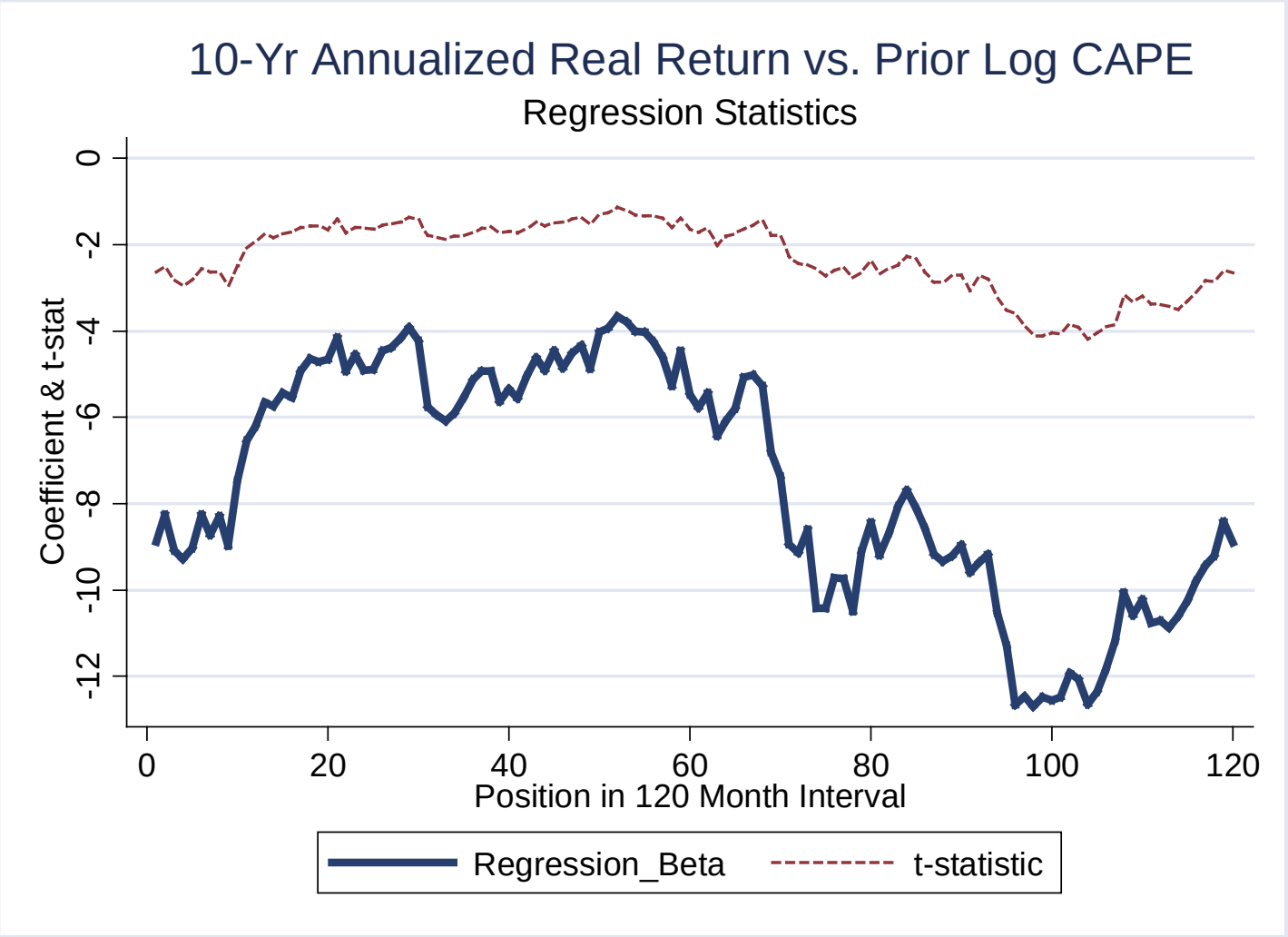
Time-linked neighbor points

Positive or negative apparent slope

Appearance of hysteresis.



Wide Variation in Coefficients
(120 Non-Overlapping Data Regressions)



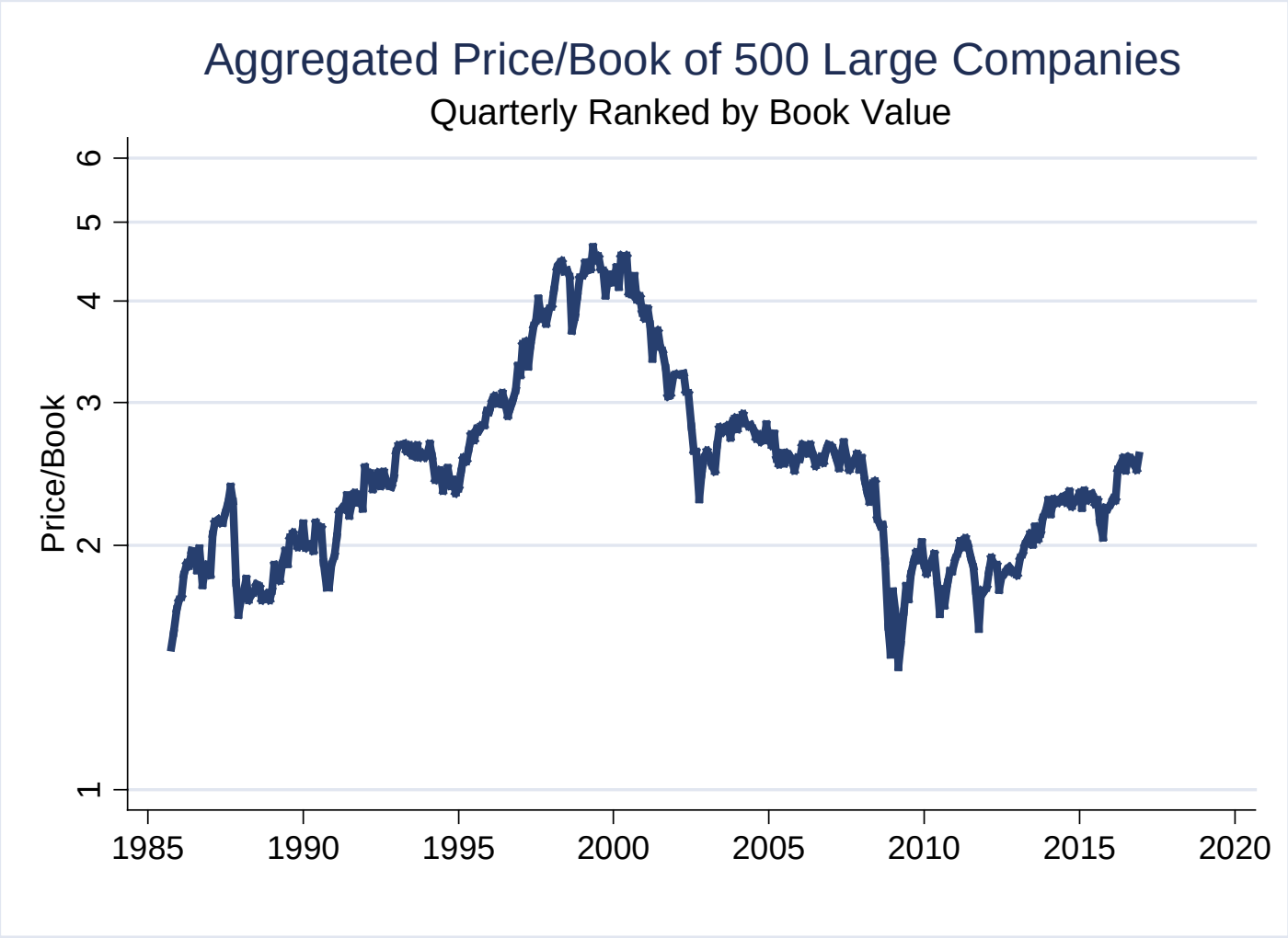
CAPE Ratio for 10-Year Forecasts

- Current 10 year real return forecast based on median of 120 model intercepts and slopes, 1890-2016: 1.9%.
- Mean t-statistic of 120 regressions: -2.2
- Using a longer-term forecast (6%) as a Bayesian prior for CAPE's prediction appears likely to produce better outcomes.

12 Month Forecaster

- Valuation:
  - Residual of log (P/B) = a + b*real_ROE
    - Low correlation with CAPE
    - More responsive because does not require 10-year earnings averaging
- Momentum/Anticipation
  - Stock return momentum
    - DROPPED, for low power and requiring reduction of multicollinearity with valuation
  - Return momentum in real value of the dollar

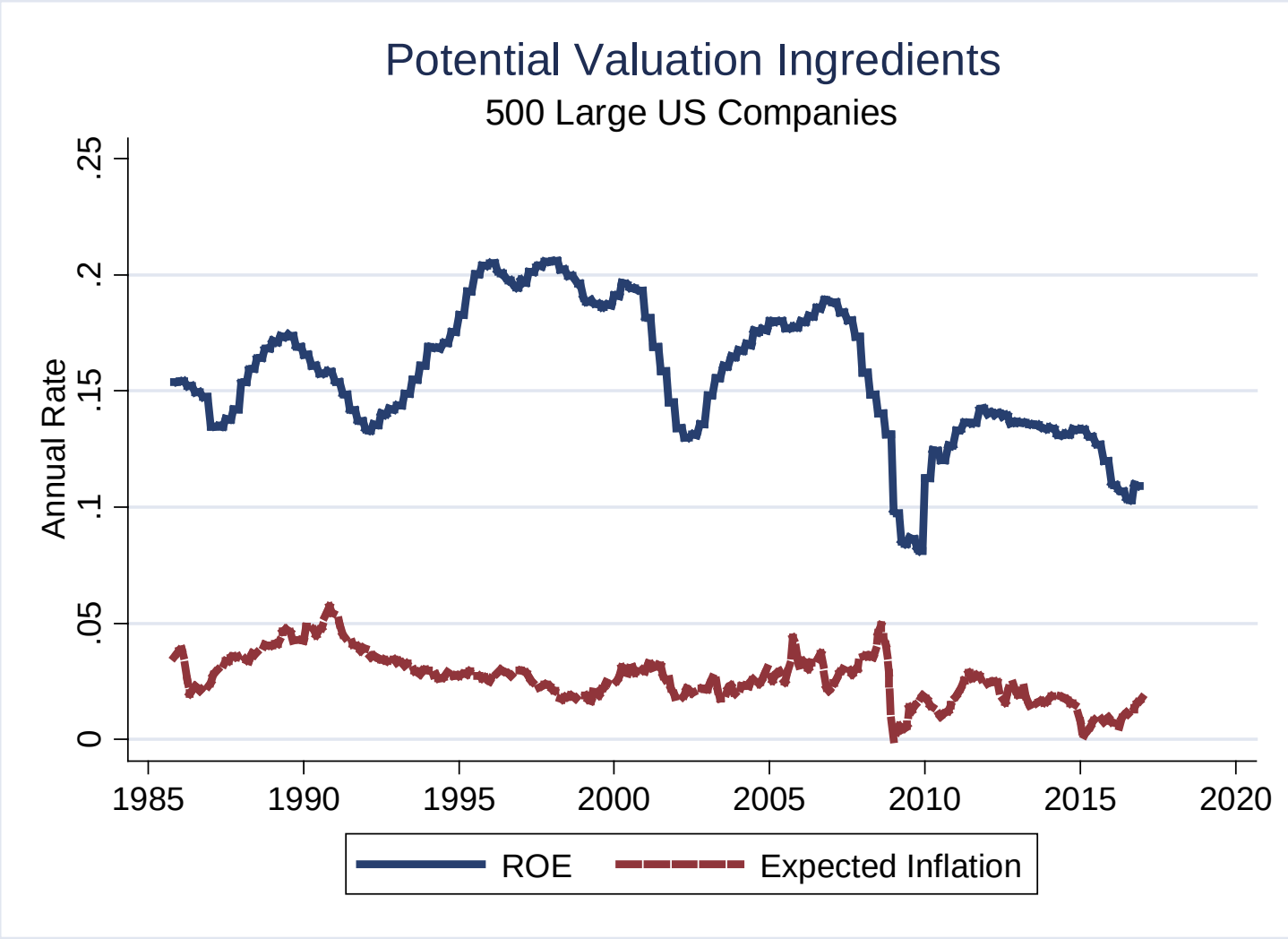
Price/Book Variation



Source: ValueLine

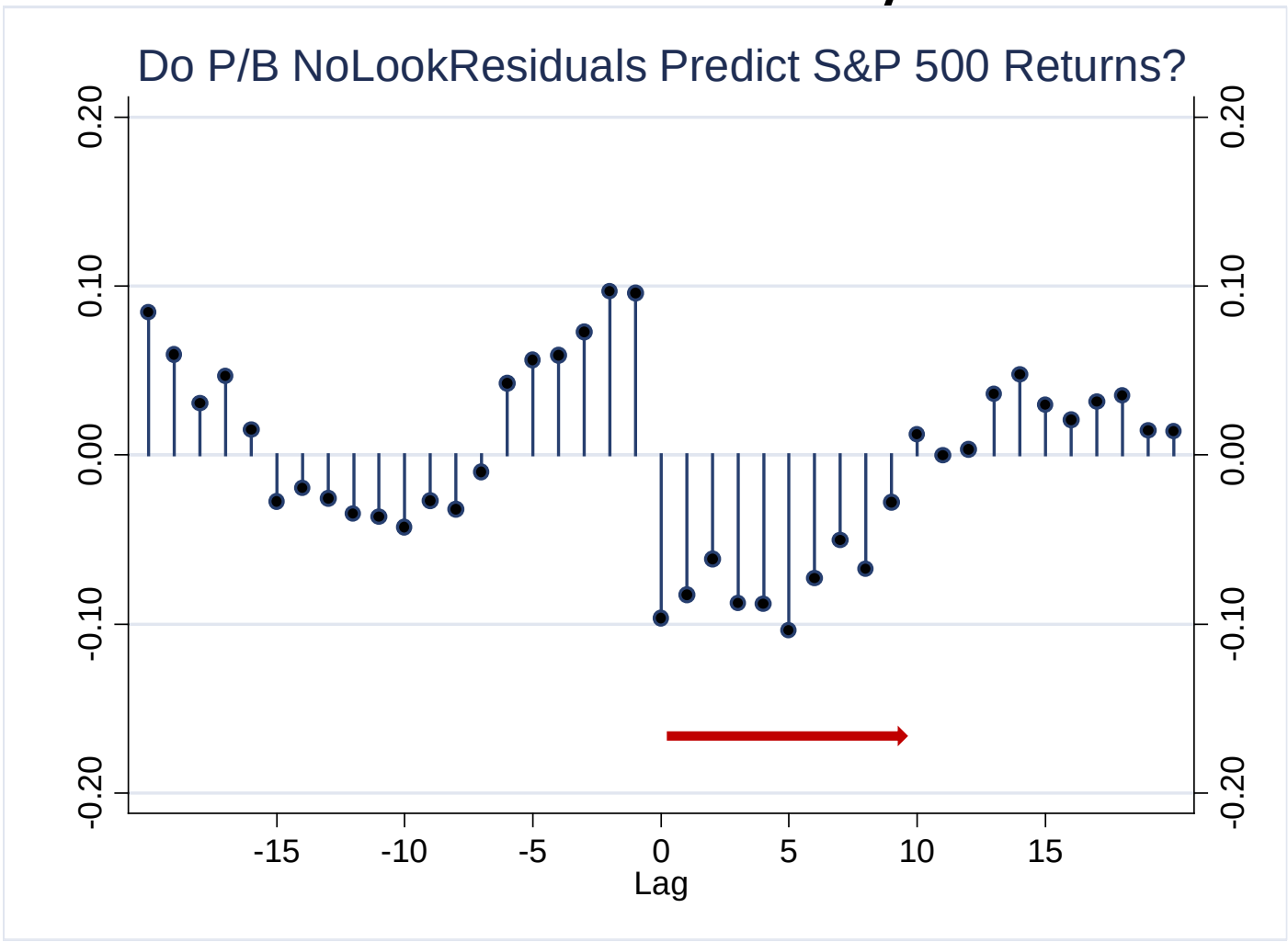
Real Return on Equity

PB-ROE model Statistics: b = 7.2, R-squared=0.53



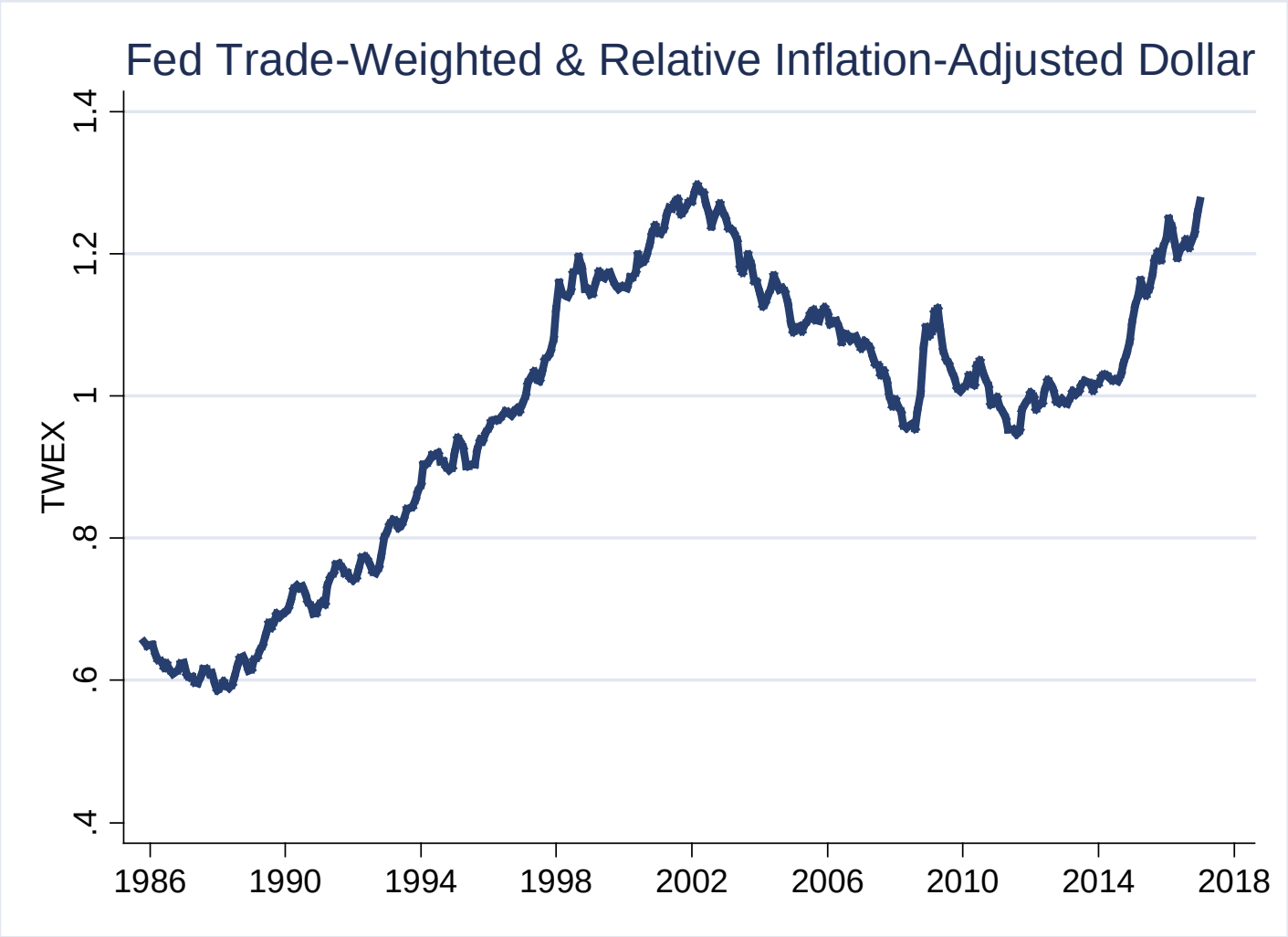
Sources: ValueLine, Federal Reserve

No-Look-Ahead PB/ROE



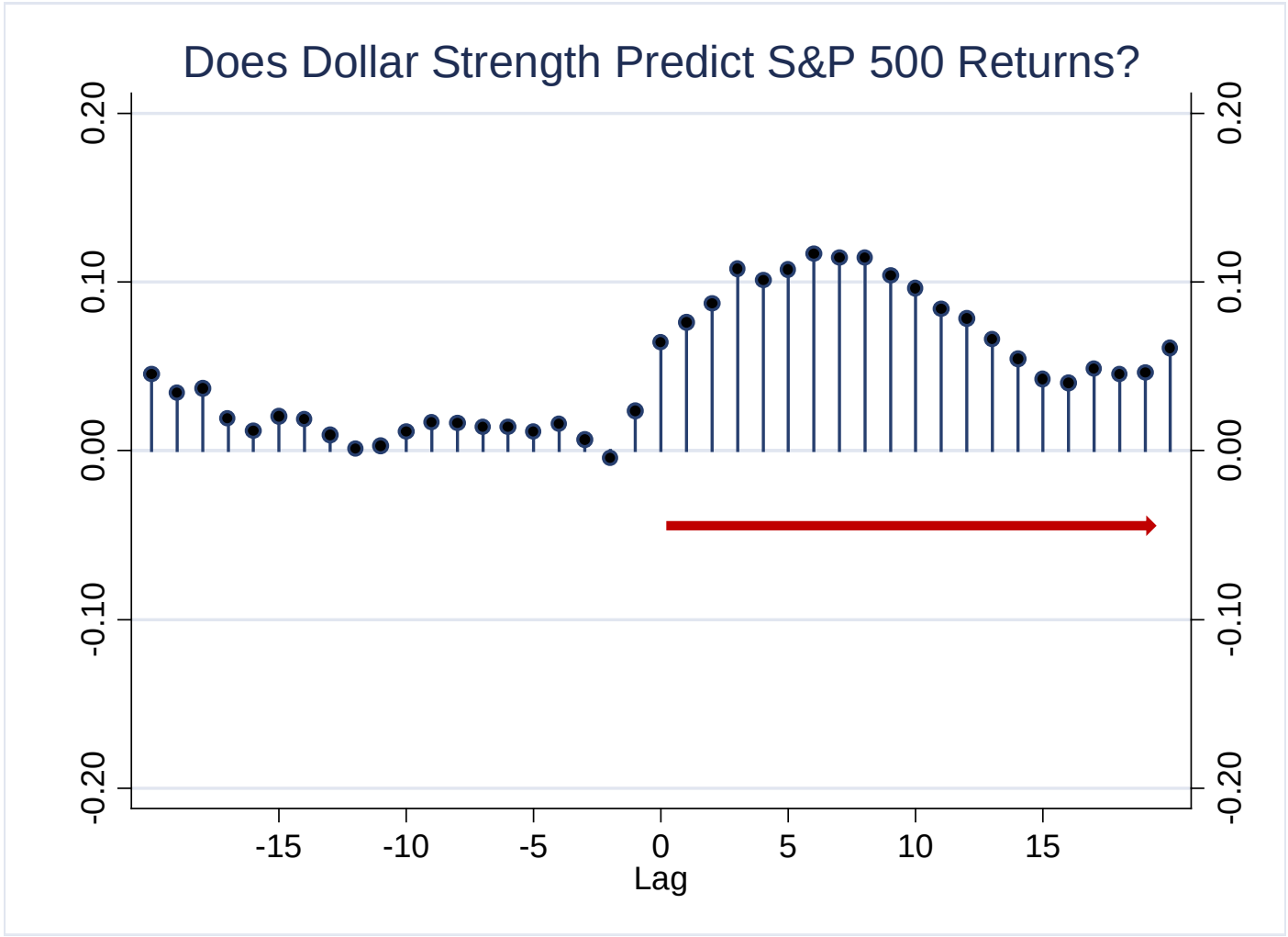
Note: The PB-ROE residuals calculated with no look-ahead are negatively correlated with returns for the next 10 months.

What Does Dollar Momentum Forecast?

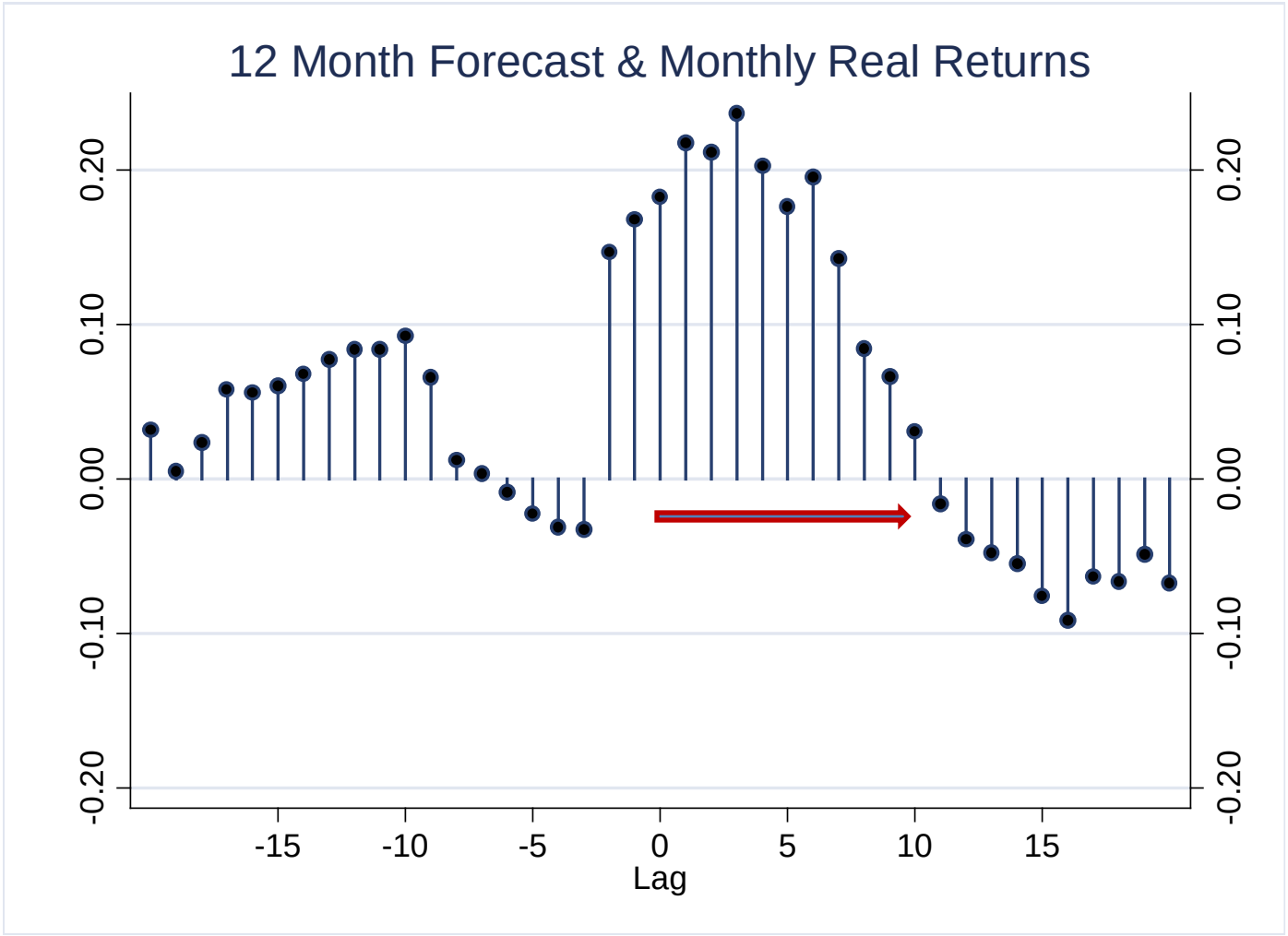


Source: Federal Reserve

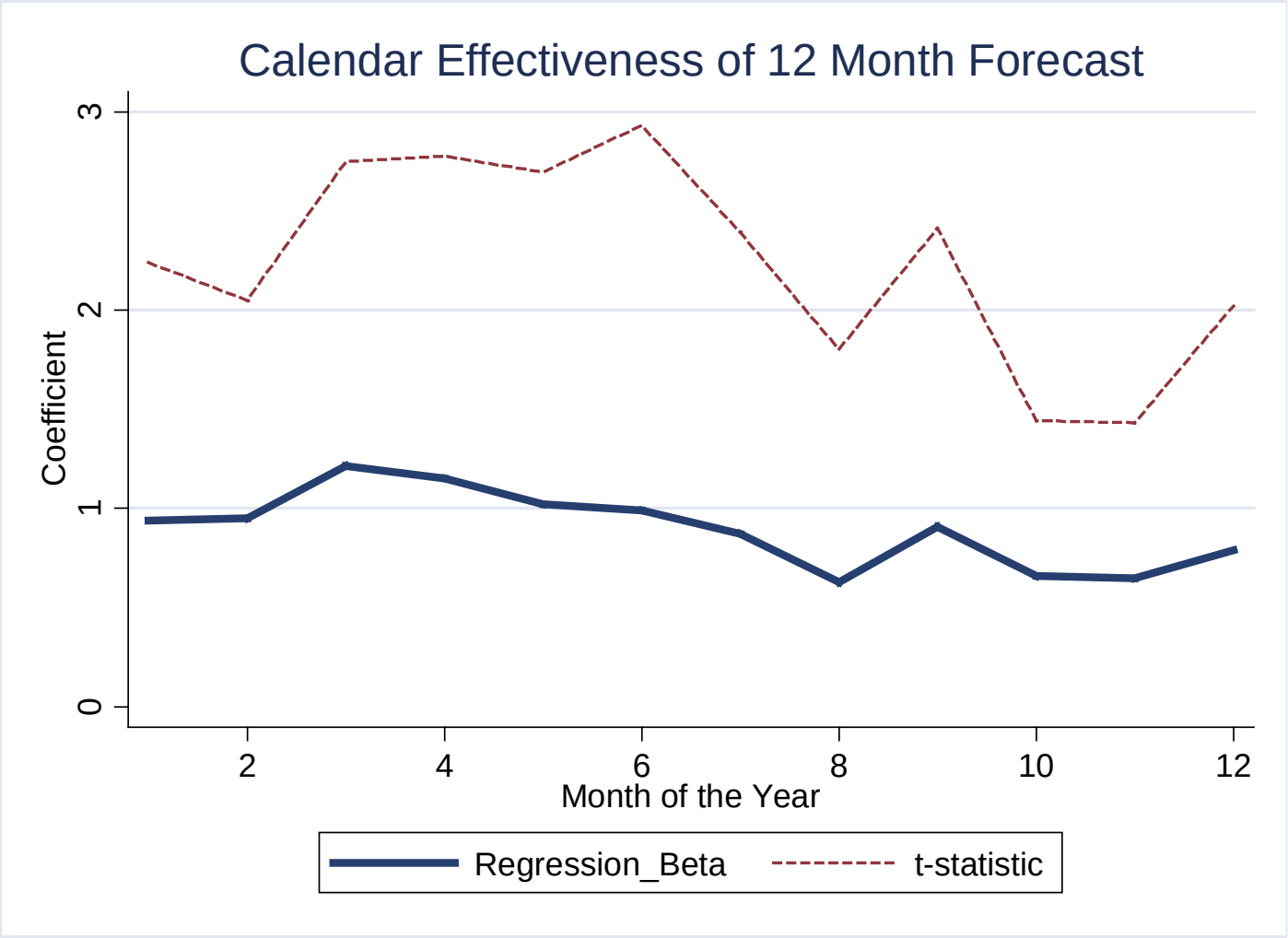
Recent Dollar Returns: Economic Momentum Signal



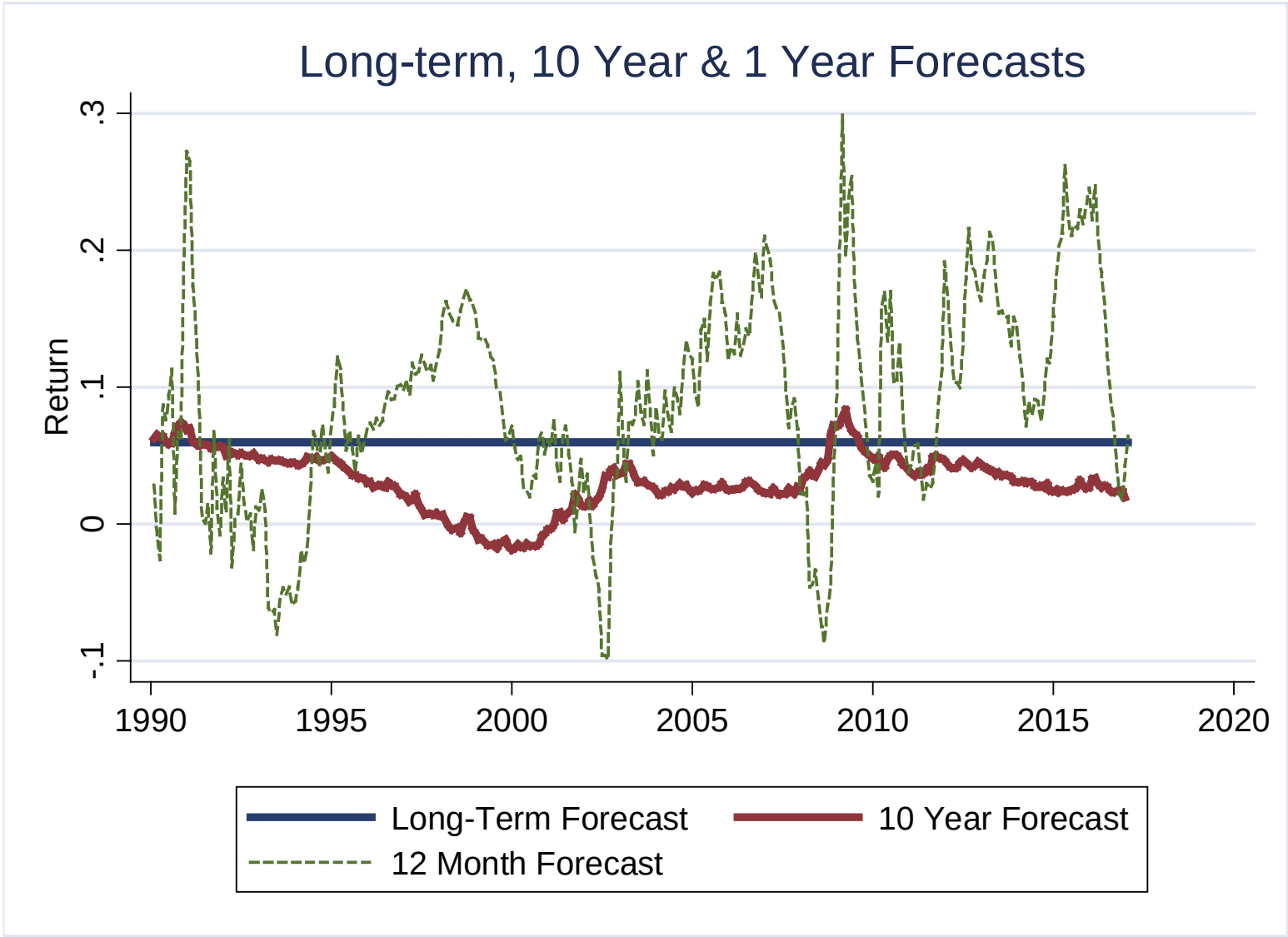
Combined 12 Month Model
(No-Look-Ahead)



12 Models Using Non-Overlapping Data



Treat Longer Forecasts As Bayesian Priors



Note little correlation. Yield slope is not a significant addition.

January 2017 Transparent Forecast S&P 500 Real Return

- Components:
  - Very long-term (L): 6.0%
  - 10-year based on CAPE (M): 1.9%
  - 1-year based on PB/ROE & FX (S) : 6.4%
- Bayesian Prior Conditioning of Point Estimates of Means By Simple Weighting:
  - Financial Plan: 75%L + 25%M = 5%
  - Discretionary Wealth Complement: 60%L + 35%M + 5%S = 4.5%
  - Active departure point: 50%L + 40%M + 10%S = 4.2%