Internet Appendix for
"Under- and Overreaction in Yield Curve Expectations"

Chen Wang

Appendix A Derivation and Additional Results

A.1 FE-on-FR regression coefficients in commonly used models of expectations

Suppose that the underlying variable z_t follows an AR(1) process:

$$z_{t+1} = \rho z_t + \varepsilon_{t+1}, \quad \varepsilon_t \sim \mathcal{N}\left(0, \sigma^2\right).$$

The forecaster's one-period ahead forecast in time t is denoted as $F_t(z_{t+1})$. Below I derive coefficients of Coibion and Gorodnichenko (2015, CG) regression, which regresses forecast errors on forecast revisions, as predicted by several commonly used models of expectations.

1. Backward-looking extrapolative expectations

In backward-looking extrapolative expectations, the forecast is defined as

$$\begin{aligned} F_t z_{t+1} &= z_t + \phi\left(z_t - z_{t-1}\right) \\ &= \left(1+\phi\right) z_t - \phi z_{t-1}, \end{aligned}$$

where $\phi > 0$ captures degree of extrapolation and is unrelated to the autocorrelation of the true process. The forecast error (FE) and forecast revision (FR) are defined as

$$FE_{t+1} = z_{t+1} - F_t z_{t+1},$$

and

$$FR_{t+1} = F_t z_{t+1} - F_{t-1} z_{t+1}.$$

The covariance between FE and FR, which is the numerator of FE-on-FR regression, can be calculated as

$$\begin{aligned} \mathcal{C} &= \text{Cov}\left(FE_{t+1}, FR_{t+1}\right) \\ &= \text{Cov}\left(z_{t+1} - F_t(z_{t+1}), F_t(z_{t+1}) - F_{t-1}(z_{t+1})\right) \\ &= \text{Cov}\left(\rho z_t + \varepsilon_{t+1} - \left(1+\phi\right) z_t + \phi z_{t-1}, \left(1+\phi\right) z_t - \phi z_{t-1} - \left\{\left(1+\phi\right) z_{t|t-1} - \phi z_{t-1}\right\}\right) \\ &= \frac{\left(\theta+1\right)\left(-\rho^2\theta + \rho\left(\theta^2+\theta+1\right) - \left(\theta+1\right)^2\right)}{\rho+1}\sigma^2. \end{aligned}$$

The sign of $\mathcal{C}$ depends on the true autocorrelation of the process ρ and the extrapolation parameter ϕ. If $\rho \to 1$, as is the case for interest rates, and $\phi > 0$, we obtain $\mathcal{C} < 0$. The negative sign of $\mathcal{C}$ indicates that forecasters, with backward-looking extrapolative beliefs, *overreact* to new information for the underlying process.

2. Extrapolative expectations with exponential weights ($k \geq 0$ case)

Another form of extrapolative beliefs, perhaps a more widely used one, posits that people's expectation is a weighted average of the past realized values, where the weights on the past observations are positive and larger for more recent ones.

$$F_t\left(z_{t+1}\right) = X_t \equiv (1-\theta)\sum_{k=0}^{t-1}\theta^k\left(z_{t-k}\right) + \theta^{t-1}X_1$$
$$X_t = \theta X_{t-1} + (1-\theta)\,y_t = X_{t-1} + (1-\theta)\left(y_t - X_{t-1}\right)$$

The two-period-ahead extrapolative expectations can be calculated as

$$\begin{aligned}
F_{t-1}\left(z_{t+1}\right) &= F_{t-1}\left(F_t\left(z_{t+1}\right)\right)\\
&= F_{t-1}\left(X_t\right)\\
&= F_{t-1}\left(\theta X_{t-1} + (1-\theta)\,z_t\right)\\
&= \theta X_{t-1} + (1-\theta)\,F_{t-1}\left(z_t\right)\\
&= \theta X_{t-1} + (1-\theta)\,X_{t-1}\\
&= X_{t-1},
\end{aligned}$$

where the first line assumes that the law of iterated expectations holds. Since this model of extrapolative expectations does not take into account true properties of the underlying process, time t forecasts for different horizons are the same, i.e. $F_t\left(z_{t+i}\right) = X_t \ \forall i > 0$. I define forecast error and forecast revision as follows

$$FE_{t+1} = z_{t+1} - F_t(z_{t+1}) \qquad\qquad = (\rho+\theta-1)\,z_t - \theta X_{t-1} + \varepsilon_{t+1},$$

and

$$FR_{t+1} = F_t(z_{t+1}) - F_{t-1}(z_{t+1}) = X_t - X_{t-1} = (1-\theta)\left(z_t - X_{t-1}\right)$$

The covariance of FE and FR can be calculated as

$$\begin{aligned}
\mathcal{C} &= \operatorname{Cov}\left(FE_{t+1}, FR_{t+1}\right)\\
&= \operatorname{Cov}\left(z_{t+1} - F_t(z_{t+1}), F_t(z_{t+1}) - F_{t-1}(z_{t+1})\right)\\
&= \operatorname{Cov}\left((1-\theta)\left(z_t - X_{t-1}\right), (\rho+\theta-1)\,z_t - \theta X_{t-1} + \varepsilon_{t+1}\right)\\
&= (1-\theta)(\rho+\theta-1)\operatorname{Var}\left(z_t\right) + (1-\theta)\,\theta\operatorname{Var}\left(X_{t-1}\right) - (1-\theta)\left[\rho+2\theta-1\right]\operatorname{Cov}\left(z_t, X_{t-1}\right).
\end{aligned}$$

To determine the sign of the covariance, we need to obtain unconditional variance of z_t, unconditional variance of X_t and covariance between z_t and X_{t-1}. The unconditional variance of X_t can be expressed as a sum of variance terms and covariance terms:

$$\begin{aligned}\mathrm{Var}\left(X_t\right) &= \mathrm{Var}\left(\left(1-\theta\right)\sum_{k=0}^{t-1}\theta^k\left(z_{t-k}\right)\right)\\ \frac{\mathrm{Var}\left(X_t\right)}{\left(1-\theta\right)^2} &= \mathrm{Variances} + 2\times\mathrm{Covariances},\end{aligned}$$

The variance terms can be calculated as

$$\mathrm{Variances} = \left(1+\theta^2+\theta^4+...+\theta^{2(t-1)}\right)\sigma_z^2 = \frac{1-\theta^{2t}}{1-\theta^2}\frac{\sigma^2}{1-\rho^2},$$

and the covariance terms can be calculated as

$$\begin{aligned}\frac{\mathrm{Covariances}}{\sigma_z^2}\cdot\frac{1-\theta\rho}{\theta\rho} =& \left(1-\left(\theta\rho\right)^{t-1}\right)+\theta^2\left(1-\left(\theta\rho\right)^{t-2}\right)+\theta^4\left(1-\left(\theta\rho\right)^{t-3}\right)+...+\theta^{2t-4}\left(1-\theta\rho\right)\\ =&1+\theta^2+\theta^4+...+\theta^{2t-4}\\ &-\left[\left(\theta\rho\right)^{t-1}+\theta^2\left(\theta\rho\right)^{t-2}+\theta^4\left(\theta\rho\right)^{t-3}+...+\theta^{2t-4}\left(\theta\rho\right)\right]\\ =&A-B,\end{aligned}$$

where

$$\begin{aligned}A &= \frac{1-\theta^{2t-2}}{1-\theta^2},\\ B &= \frac{\rho\left(\left(\theta\rho\right)^{t-1}-\theta^{2t-2}\right)}{\rho-\theta}.\end{aligned}$$

The sum of the covariance terms are

$$\mathrm{Covariances} = \frac{\theta\rho}{1-\theta\rho}\left[\frac{1-\theta^{2t-2}}{1-\theta^2}-\frac{\rho\left(\left(\theta\rho\right)^{t-1}-\theta^{2t-2}\right)}{\rho-\theta}\right]\frac{\sigma^2}{1-\rho^2}.$$

We therefore obtain the unconditional variance of X_t as

$$\mathrm{Var}\left(X_t\right) = \frac{\sigma^2}{1-\rho^2}\left\{\frac{1-\theta^{2t}}{1-\theta^2}+\frac{2\theta\rho}{1-\theta\rho}\left[\frac{1-\theta^{2t-2}}{1-\theta^2}-\frac{\rho\left(\left(\theta\rho\right)^{t-1}-\theta^{2t-2}\right)}{\rho-\theta}\right]\right\}$$

When time t is far enough from the initial time, i.e., $t\to\infty$, we have

$$\lim_{t\to\infty}\mathrm{Var}\left(X_t\right) = \frac{\sigma^2}{1-\rho^2}\frac{1}{1-\theta^2}\frac{1+\theta\rho}{1-\theta\rho}.$$

Next, we calculate the covariance between z_t and X_{t-1} as

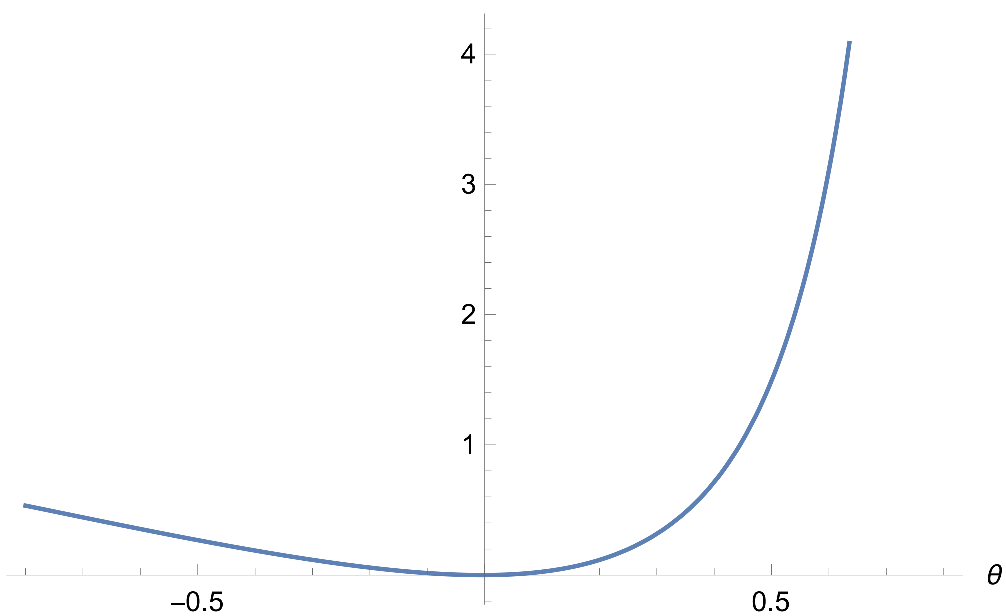
$$\begin{aligned}\mathrm{Cov}\left(z_t, X_{t-1}\right) &= \mathrm{Cov}\left(z_t, (1-\theta)\sum_{k=0}^{t-2}\theta^k\left(z_{t-1-k}\right)\right)\\ &= \frac{(1-\theta)\,\sigma^2\rho}{1-\rho^2}\frac{1-(\theta\rho)^{t-1}}{1-\theta\rho}\\ \lim_{t\to\infty}\mathrm{Cov}\left(z_t, X_{t-1}\right) &= \frac{(1-\theta)\,\sigma^2\rho}{(1-\theta\rho)\left(1-\rho^2\right)}.\end{aligned}$$

Similarly, assume that t is large enough and we obtain the covariance between FE and FR as

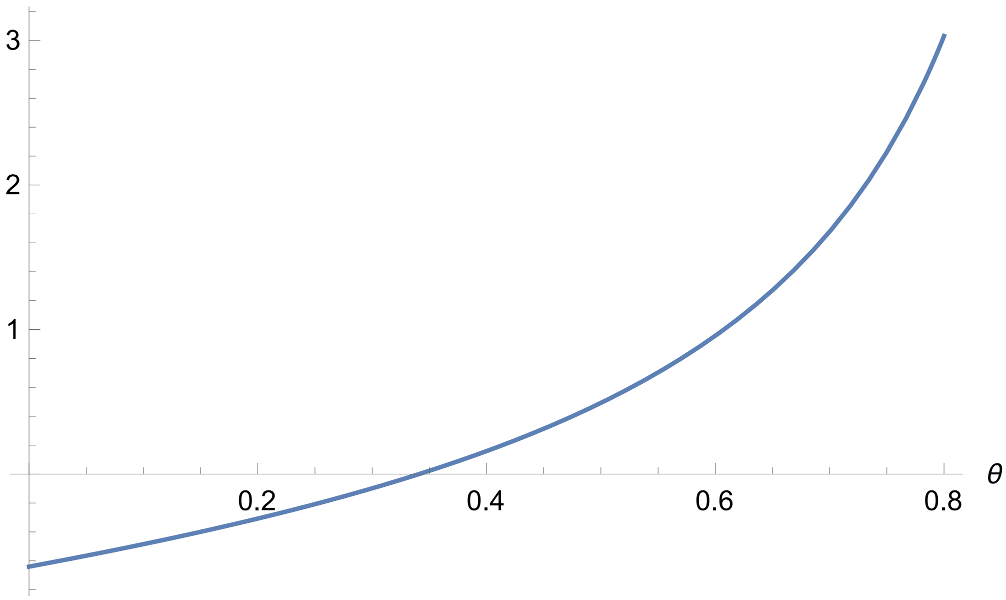
$$\mathcal{C} = (1-\theta)\frac{\sigma^2}{1-\rho^2}\left[(\rho+\theta-1) + \frac{\theta}{1-\theta^2}\frac{1+\theta\rho}{1-\theta\rho} - \frac{(1-\theta)\,\rho}{(1-\theta\rho)}(\rho+2\theta-1)\right].$$

The sign of $\mathcal{C}$ is determined as follows:

- For very a persistent process z_t (i.e., $\rho \to 1$) such as the interest rate for a certain maturity, the sign of $\mathcal{C}$ is always positive. The covariance $\mathcal{C}$, as a function of the degree of extrapolation θ, is plotted in the following figure.



- For a non-persistent process z_t (i.e., $\rho \to 0$) such as a typical asset return, the sign is negative for smaller degree of extrapolation θ. The following figure plots $\mathcal{C}$ for the non-persistent case.



3. Sticky expectations

See Coibion and Gorodnichenko (2015) Section I for detailed derivations.

4. Diagnostic expectations

See Bordalo et al. (2020) Proposition 2 and proofs for detailed derivations.

A.2 Motivating "autocorrelation averaging" using "slow" learning

In Section 3, I explicitly assume that the forecaster anchors her subjective autocorrelation to the default and simple model, which uses the average autocorrelation across many time series. The motivation of the choice of the simple model stem from the limited cognitive or institutional processing power in light of many demanding tasks such as correctly estimate the autocorrelations of short rate and term premium components for each interest rate in real-time.

Alternatively, the "autocorrelation averaging" behavior can be motivated using supervised learning. The forecaster assumes that all autocorrelations are drawn from the same distribution with mean $\bar{\rho}$. Suppose she has the following prior with respect to autocorrelations of EH and TP components across M maturities

$$\boldsymbol{\rho} \sim \mathcal{N}\left(\bar{\rho}\mathbb{1}, \boldsymbol{\Sigma}\right), \tag{26}$$

where $\boldsymbol{\rho}$ is a $2M \times 1$ vector of autocorrelations of EH and TP components across maturities, $\mathbb{1}$ is a vector of ones, and the mean autocorrelation $\bar{\rho}$ is the same across maturities. Empirically, $\bar{\rho}$ can be obtained from cross-sectional average of autocorrelations. At each period, the forecaster uses all available data $\boldsymbol{y}_t$ to estimate the autocorrelations with least-squared estimation but penalizes estimation results that deviate too much from her prior

$$\hat{\boldsymbol{\rho}} = \arg\min_{\boldsymbol{\rho}} \left\{ \left(\boldsymbol{y}_t - \boldsymbol{\rho}'\boldsymbol{y}_{t-1}\right)' \left(\boldsymbol{y}_t - \boldsymbol{\rho}'\boldsymbol{y}_{t-1}\right) + \lambda(\boldsymbol{\rho} - \bar{\rho}\mathbb{1})'(\boldsymbol{\rho} - \bar{\rho}\mathbb{1}) \right\}, \tag{27}$$

where λ is the penalty parameter and $(\boldsymbol{\rho} - \bar{\rho}\mathbb{1})'(\boldsymbol{\rho} - \bar{\rho}\mathbb{1})$ is an L_2-norm penalty. This penalized estimation method is essentially a ridge regression. When $\lambda = 0$, we obtain an OLS estimator. The penalty weight is a way to express prior knowledge about autocorrelations. As long as the forecaster has a strong prior and penalizes any deviation from the prior significantly (a high λ), her posterior estimates of the cross section of autocorrelations $\hat{\boldsymbol{\rho}}$ remain close to the mean autocorrelation $\bar{\rho}$, i.e. she learns very "slowly." In doing so, the forecaster exhibits "autocorrelation averaging" behavior, which resembles what we have observed in the survey expectations data.

One testable implication of the "slow learning" behavior is that there will be no significant differences in the reactions to new information in early and late periods. I empirically examine this assertion by splitting the sample into halves. I do this in two ways at the individual level: (a) I split the sample at 2003 for all forecasters; (b) I split each forecaster's sample into halves. The results are plotted in Figure A.5 where each panel corresponds to one splitting scheme. I also apply the first way to the consensus-level forecasts, the results of which are plotted in Figure A.6. The regression coefficients are quantitatively similar among the first and second halves in all plots, consistent with the "slow learning" behavior.

A.3 Banks' stated beliefs and portfolio allocation: Details on data construction

A large proportion of the forecasters in the BCFF survey are banks, enabling me to merge the survey forecasts of this subsample of forecasters to details about their balance sheets. The variables of interest are each bank's holdings of Treasury securities of various maturities. The balance sheet information of banks is tracked by the FR Y-9C (at the bank holding company level) and Call Reports (at the commercial bank level) data from the Federal Reserve. I use the granular and comprehensive information on the maturity of assets and liabilities on banks' balance sheets, which becomes available on the Call Reports starting in 1997Q2. I closely follow two previous papers, namely English et al. (2018) and Drechsler et al. (2017), to extract the bank-level portfolio holding variables. I use the quarterly data obtained from regulatory filings by the BHCs (FR Y-9C forms) and their commercial bank subsidiaries (the Call Reports) available from WRDS and merge them with the survey expectations using manually matched identifiers from FFIEC.

The Call Reports do not record the holdings of individual securities on banks' balance sheets; instead, they group securities by asset class and by maturity. The maturity ranges the Call Reports use are: less than 3-month, 3-month to 1-year, 1- to 3-year, 3- to 5-year, 5- to 15-year, and beyond 15-year. I match these ranges to the yield forecasts with the closest maturity, i.e., to forecasts of 3-month, 1-, 2-, 5-, 10-, and 30-year yields, respectively. Though the matching is not perfect, the term structure of interest rates is preserved. This feature is potentially an advantage of the interest rate forecasts over the stock market surveys, which mostly ask for people's expectations of the aggregate stock market.

A.4 Return predictability from overreaction: Additional robustness checks

Robustness test of the spanning hypothesis. Bauer and Hamilton (2017) cast doubt on the statistical power of auxiliary bond predictors in addition to yields and point out significant small-sample distortions in many recently discovered predictors. To establish the robustness of the "excess" predictive evidence of $FE10Y$, I use the parametric bootstrap procedure of Bauer and Hamilton (2017) to test the statistical significance under the "spanning hypothesis." I simulate 5,000 artificial samples of bond yields with the same historical length as the data under the null hypothesis. I then calculate the bootstrap p-value as the fraction of samples in which the t-statistics of predictor $FE10Y$ exceeds the typical threshold. The detailed results using the bootstrap procedure are reported in Table A.14. Regression model 1 contains only three PCs and model 2 adds $FE10Y$. In Panel A, the column "Wald" reports results for the χ^2 test that $FE10Y$ has no additional predictive power, which both the Newey-West and bootstrap inferences firmly reject. Panel B reports the R^2 of models 1 and 2 and their difference. The bootstrap procedure also rejects the null of no difference in R^2: the incremental predictive power in R^2 is sizable (24.7%) and well beyond the 95%-confidence interval. Unlike the commonly used predictors analyzed by Bauer and Hamilton (2017), the overreaction-based lagged forecast error $FE10Y$ passes the scrutiny of small-sample inference, underscoring the uniqueness of the belief channel.

Other bond return predictors. One may worry that the predictive power from overreaction is driven by exposure to existing bond return predictors. To address this concern, I include the following known predictors as additional independent variables: 1) the first three PCs of the yield curve, which explain 99.9% of the cross-sectional yield variation in the sample, 2) the Cochrane and Piazzesi (2005) factor (CP), which is a tent-shaped linear combination of the forward rates across various maturities and constructed using the Fama-Bliss yields, 3) the cycle factor (cf) from Cieslak and Povala (2015), obtained from yields and trend inflation predictive regressions of excess returns, 4) a growth factor (GRO) which is the three-month moving average of the Chicago Fed National Activity Index (CFNAI), and an inflation factor ($INFL$) which is the Blue Chip survey forecast of the one-year forward inflation rate from Joslin, Priebsch, and Singleton (2014), and 5) the eight PCs of a large set of macroeconomic variables from Ludvigson and Ng (2009).[45] The correlations between $FE10Y$ and these predictors are reported in Table A.11. Notice that $FE10Y$ has positive correlations with CP, GRO, the first yield curve PC, and especially with the two inflation-related factors: cf (0.57) and $INFL$ (0.55).

Table A.12 runs the multivariate predictive regressions as "horse races." Panel A includes PCs, CP and cf, and Panel B adds two additional predictors from Joslin, Priebsch, and Singleton (2014). Despite these other predictors, the strong predictability from $FE10Y$ survives, albeit with slightly weaker statistical significance, given the positive correlations with the other predictors. Interestingly, none of these alternative return predictors offers consistent and significant predictive power across maturities and $FE10Y$ has the most robust statistical significance across predictors. If we focus on the average return, only cf has similar-but-weaker predictive power. Moreover, the economic magnitudes of $FE10Y$ in these two panels are close to those in Table 9. Table A.15 reports the "horse race" with the eight bond factors from Ludvigson and Ng (2009); the strong performance of $FE10Y$ persists. Admittedly, there are limitations in interpreting the results from the multivariate regressions when many of the regressors are correlated. I run bivariate regressions of $FE10Y$ with each alternative predictor; the predictive power of $FE10Y$ is still clearly evident.

[45]I am grateful to Sydney Ludvigson for sharing the updated series.

Predicting coupon bond returns. I test the predictive power of $FE10Y$ using actual coupon bond excess returns across different maturity brackets. The coupon bond returns are available from the CRSP Fama bond portfolios for the sample period 1988–2018. The actual bond returns can address potential measurement issues with the synthetic zero-coupon yields in previous regressions. Each maturity-sorted portfolio return is calculated as the equal-weighted average of unadjusted holding period returns for all bonds in the portfolio. I convert the return to an excess return by subtracting T-bill rates of the corresponding holding periods. Table A.13 reports the prediction results for 1-, 3-, 6-, and 12-month holding-period coupon bond excess returns. The return in the last column is the average return across maturities. At the one-month holding period, $FE10Y$ is statistically significant, but its predictive power is limited. The return predictability increases as the holding period increases. The one-year holding period evidence is close to that in Table 9 for the synthetic zero-coupon bond returns.

A.4.1 Unique information in forecast errors

Given the robust return predictability from the survey-based lagged forecast errors $FE10Y$, two questions naturally arise: Do these results reflect unique information in professional forecasts? To what extent could other related measures from the yield curve replicate the return predictability? To answer these questions, I consider several distinct but closely related measures that can help us tease out the unique information that the survey-based forecast error $FE10Y$ embeds: (a) forecast errors using an econometrician's real-time information set, (b) realized yield changes which can be regarded as a measure of the forecast error under FIRE, $\Delta y_{t+1}^{(10)} = y_{t+1}^{(10)} - y_t^{(10)}$, and (c) differences between the realized and the contemporaneous forecasts of the 10-year yield, defined as $y_t^{(10)} - \mathbb{E}_t^S\left(y_{t+1}^{(10)}\right)$.

Following Cieslak (2018), I proxy for the econometrician's one-year-ahead forecast of the 10-year yield using a simple linear system that captures the yield variation well in-sample:

$$y_{t+1}^{(10)} = \gamma_0 + \gamma_1 y_t^{(10)} + \gamma_2 FFR_t + \gamma_3 \Delta Unemp_t + \gamma_4 CFNAI_t + \gamma_5 \Delta CPI_t + \epsilon_{t+1}. \tag{28}$$

The additional independent variables include the unemployment rate ($Unemp$), the Chicago Fed National Activity Index ($CFNAI$), and changes in inflation (ΔCPI). This predictive regression augments the past realizations of the bond yield with information from the macroeconomy, making it a reasonable approximation of the econometrician's information set. In the full sample estimation, Regression (28) has an R^2 over 0.9 and all regressors except the change in the unemployment rate are statistically significant. I estimate Regression (28) recursively each month using information that is available in real time and obtain the one-step-forward forecast based on the estimated coefficients. I define the econometrician's forecast errors as $\widehat{FE}10Y = y_t^{(10)} - \widehat{\mathbb{E}}_{t-1}\left(y_t^{(10)}\right)$. The correlation between the survey and the econometrician's forecast errors is 0.86.

Table A.16 contrasts the predictive power of $FE10Y$ to that of the related measures. The dependent variable is the average return $\overline{rx}_{t+1}$. Panel A runs univariate predictive regressions, Panel B adds yield curve PCs as control variables, and Panel C adds the full set of auxiliary predictors from Table A.12, Panel B. The first column reproduces the average return predictability from $FE10Y$; Columns 2–4 are the results for the four alternative measures. When entering the regression alone, both the econometrician's forecast error $\widehat{FE}(y^{(10)})_t$ and changes in yields $\Delta y_t^{(10)}$ significantly predict future average returns, though the predictability is about half that of $FE10Y$. When more control variables are added in Panels B and C, neither of these alternative forecast errors maintains the same statistical significance. The contemporaneous differences $y_t^{(10)} - \mathbb{E}_t^S\left(y_{t+1}^{(10)}\right)$, both terms available at time t, does not have any predictive power across panels.

Panel A of Table A.17 directly contrasts $FE10Y$ with each alternative forecast error measure by running bivariate regressions predicting average excess returns. Interestingly, all columns feature only $FE10Y$ as a significant predictor and almost the same amount of variation is explained across specifications. As different measures of the forecast error are highly correlated, I project $FE10Y$ on each alternative measure and test the residual's predictive power. The results are reported in Panel B of Table A.17, where all coefficients of the residuals are significantly positive.

Appendix B Additional Tables and Figures

Table A.1 Blue Chip Financial Forecasts participants, grouped by institution types

Firms' commonly used names are reported, which may slightly differ from their legal names. I manually check the name changes of the forecasters—due to mergers and acquisitions or other reasons—using the information provided by the Federal Financial Institutions Examinations Council (FFIEC) and concatenate the observations that belong to the same entity. Only participants with more than 60 months of observations are reported. For institutions with multiple classifications, I report its primary type.

	Count	Institution Names
Asset Manager	13	ASB Capital Management, Sanford C. Bernstein, J.W. Coons, ING Aeltus, JPMorgan Chase Wealth Management, Loomis Sayles, Mesirow, Northern Trust, RidgeWorth, Stone Harbor, US Trust Company, Wayne Hummer, Wells Capital
Bank	26	Banc One Corp, Bankers Trust, First National Bank of Chicago/Bank One (Chicago), Barnett Banks, Bank of America, Comerica Bank, CoreStates Financial, First Fidelity Bancorp, First Interstate Bank, Fleet Financial Group, Huntington National Bank, JPMorgan, LaSalle National Bank, MUFG Bank, National City Bank of Cleveland, PNC Financial Corp, Bank of Nova Scotia, SunTrust, Tokai Bank, Valley National Bank, Wachovia, Wells Fargo
Broker/Dealer	15	Amherst Pierpont, Barclays, Bear Stearns, BMO, Chicago Capital, Daiwa, Deutsche Bank, Goldman Sachs, Lanston, Merrill Lynch, Nomura Securities, Prudential Securities, RBS, Societe Generale, UBS
Mortgage	2	Fannie Mae, Mortgage Bankers Association
Insurance	5	Kemper, Metropolitan Insurance Companies, New York Life, Prudential Insurance, Swiss Re
Rating	2	Moody's, Standard & Poor's
Research	21	Action Economics, Investor's Briefing, Chmura Economics & Analytics, ClearView, Cycledata, DePrince & Associates, Economist Intelligence Unit, Genetski & Associates, GLC Financial Economics, Independent Econ Advisory, Kellner Economic Advisers, MacroFin Analytics, MMS International, Moody's Economy.com, Naroff Economic Advisors, Oxford Economics, Maria Fiorini Ramirez, RDQ Economics, Technical Data, Thredgold Economic, Woodworth Holdings
Others	3	National Association of Realtors, US Chamber of Commerce, Georgia State University

Table A.2 Summary statistics of the consensus-level forecasts of interest rates

This table reports summary statistics for the consensus-level forecast errors and forecast revisions. The observations are pooled across forecast horizons. Panels A1 and A2 report quarterly-frequency statistics, and Panels B1 and B2 report monthly-frequency statistics. The underlying variables are the Federal Funds Rate (ffr) and Treasury yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data cover 1988–2018.

	Count	Mean	SD	Min	p25	p50	p75	Max
Panel A1: Quarterly consensus forecast errors								
ffr	490	-0.27	0.83	-4.08	-0.50	-0.08	0.09	2.42
$tb3m$	496	-0.30	0.85	-3.95	-0.59	-0.13	0.11	2.58
$tb1y$	496	-0.32	0.88	-3.67	-0.71	-0.16	0.11	2.58
$tn2y$	496	-0.41	0.84	-3.07	-0.87	-0.28	0.05	2.57
$tn5y$	496	-0.37	0.74	-2.70	-0.79	-0.34	0.06	2.27
$tn10y$	496	-0.20	0.66	-2.22	-0.63	-0.24	0.19	2.02
$tn30y$	496	-0.19	0.59	-1.91	-0.56	-0.19	0.14	1.81
Panel A2: Quarterly consensus forecast revisions								
ffr	459	-0.15	0.47	-1.94	-0.29	-0.05	0.11	0.97
$tb3m$	459	-0.15	0.46	-1.83	-0.28	-0.08	0.11	1.17
$tb1y$	456	-0.16	0.47	-1.73	-0.32	-0.10	0.10	1.23
$tn2y$	456	-0.16	0.47	-1.58	-0.36	-0.12	0.09	1.28
$tn5y$	456	-0.15	0.44	-1.60	-0.34	-0.13	0.12	1.21
$tn10y$	456	-0.13	0.38	-1.38	-0.38	-0.15	0.09	1.08
$tn30y$	459	-0.12	0.33	-1.04	-0.36	-0.13	0.08	0.85
Panel B1: Monthly consensus forecast errors								
ffr	1470	-0.31	0.92	-4.21	-0.62	-0.09	0.11	2.48
$tb3m$	1488	-0.33	0.93	-4.02	-0.69	-0.15	0.14	2.58
$tb1y$	1488	-0.37	0.95	-3.78	-0.82	-0.19	0.12	2.64
$tn2y$	1484	-0.46	0.90	-3.45	-0.97	-0.31	0.05	2.65
$tn5y$	1488	-0.40	0.79	-2.72	-0.91	-0.37	0.06	2.68
$tn10y$	1488	-0.23	0.70	-2.37	-0.67	-0.27	0.18	2.14
$tn30y$	1488	-0.22	0.62	-2.14	-0.60	-0.24	0.14	1.88
Panel B2: Monthly consensus forecast revisions								
ffr	1452	-0.05	0.20	-1.30	-0.10	-0.01	0.03	0.65
$tb3m$	1452	-0.05	0.20	-1.10	-0.11	-0.02	0.04	0.58
$tb1y$	1449	-0.05	0.20	-1.15	-0.12	-0.03	0.04	0.61
$tn2y$	1442	-0.05	0.21	-1.09	-0.14	-0.03	0.05	0.57
$tn5y$	1449	-0.05	0.21	-1.06	-0.14	-0.03	0.05	0.55
$tn10y$	1449	-0.04	0.19	-1.19	-0.13	-0.04	0.05	0.48
$tn30y$	1452	-0.04	0.17	-1.21	-0.12	-0.03	0.05	0.40

Table A.3 Summary statistics of the individual-level forecasts of interest rates by horizon

This table reports summary statistics for the individual-level forecast errors and forecast revisions at different forecast horizons. Panels A1 and A2 report statistics at the one-quarter horizon, and Panels B1 and B2 report statistics at the four-quarter horizon. The underlying variables are the Federal Funds Rate (ffr) and Treasury yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data cover 1988–2018.

	Count	Mean	SD	Min	p25	p50	p75	Max
Panel A1: Quarterly individual forecast errors, $h = 1Q$								
ffr	5856	-0.07	0.34	-2.84	-0.16	-0.02	0.04	1.75
$tb3m$	5747	-0.09	0.43	-2.19	-0.23	-0.05	0.09	2.16
$tn5y$	5372	-0.08	0.50	-2.51	-0.29	-0.04	0.16	2.04
$tb1y$	5808	-0.16	0.52	-2.58	-0.42	-0.11	0.10	1.94
$tn2y$	5788	-0.14	0.53	-2.32	-0.45	-0.14	0.18	1.81
$tn10y$	5849	0.02	0.51	-1.95	-0.32	-0.03	0.34	2.20
$tn30y$	5633	-0.01	0.50	-2.27	-0.34	-0.04	0.33	2.02
Panel A2: Quarterly individual forecast revisions, $h = 1Q$								
ffr	5753	-0.10	0.53	-5.15	-0.25	0.00	0.10	6.30
$tb3m$	5630	-0.11	0.55	-4.80	-0.30	-0.02	0.10	2.70
$tb1y$	5183	-0.13	0.58	-4.70	-0.38	-0.06	0.14	2.40
$tn2y$	5645	-0.14	0.59	-4.10	-0.40	-0.09	0.17	2.50
$tn5y$	5621	-0.13	0.58	-3.00	-0.41	-0.10	0.20	2.30
$tn10y$	5693	-0.13	0.54	-6.00	-0.42	-0.10	0.20	2.21
$tn30y$	5492	-0.11	0.50	-5.90	-0.40	-0.10	0.19	2.00
Panel B1: Quarterly individual forecast errors, $h = 4Q$								
ffr	5589	-0.49	1.29	-5.07	-1.18	-0.22	0.25	5.85
$tb3m$	5618	-0.53	1.28	-4.95	-1.26	-0.31	0.22	4.36
$tb1y$	5298	-0.57	1.30	-4.66	-1.38	-0.41	0.19	3.89
$tn2y$	5644	-0.66	1.21	-4.71	-1.45	-0.58	0.08	3.60
$tn5y$	5624	-0.60	1.02	-3.59	-1.31	-0.62	0.04	3.45
$tn10y$	5682	-0.41	0.91	-3.60	-1.01	-0.48	0.12	4.60
$tn30y$	5480	-0.37	0.83	-3.83	-0.88	-0.38	0.12	3.09
Panel B2: Quarterly individual forecast revisions, $h = 4Q$								
ffr	3755	-0.19	0.60	-5.00	-0.42	0.00	0.05	2.17
$tb3m$	3663	-0.19	0.59	-4.80	-0.40	-0.02	0.10	1.90
$tb1y$	3370	-0.19	0.59	-4.80	-0.40	-0.05	0.10	1.90
$tn2y$	3692	-0.19	0.58	-4.30	-0.40	-0.09	0.10	1.75
$tn5y$	3666	-0.16	0.55	-3.30	-0.40	-0.10	0.10	5.89
$tn10y$	3722	-0.14	0.49	-2.83	-0.40	-0.10	0.10	2.05
$tn30y$	3510	-0.12	0.45	-2.70	-0.36	-0.10	0.10	2.00

Table A.4 Forecast error on forecast revision regression results for interest rates across maturities: 1982Q4-2018Q4

This table reports the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate:

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h},$$

where the individual-level forecasts are pooled across horizon h, standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. Panel A reports the baseline results using individual-level forecasts. Pane B reports results for an extended list of short-maturity interest rates. Panel C reports results for an extended list of long-maturity interest rates. The underlying variables are the Federal Funds Rate (ffr), Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$), one-month commercial paper rate ($cp1m$), prime bank rate (pr), three-month LIBOR rate ($libor$), Aaa and Baa corporate bond yields (aaa and baa) and home mortgage rate (hmr). The data are quarterly and cover the period 1982Q4 to 2018Q4. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable: $FE_{i,t}\left(x_{t+h}\right)$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline results							
	ffr	$tb3m$	$tb1y$	$tn2y$	$tn5y$	$tn10y$	$tn30y$
$FR_{i,t}\left(x_{t+h}\right)$	0.17**	0.16**	0.16**	0.02	-0.17**	-0.20***	-0.23***
	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)	(0.06)
N	22,971	22,775	18,831	20,470	20,377	20,892	21,308
R^2	0.06	0.06	0.07	0.04	0.07	0.10	0.12
Panel B: Short-maturity interest rates							
	ffr	$tb3m$	$tb1y$	$tn2y$	$cp1m$	pr	$libor$
$FR_{i,t}\left(x_{t+h}\right)$	0.17**	0.16**	0.16**	0.02	0.33***	0.18**	0.23***
	(0.07)	(0.07)	(0.08)	(0.07)	(0.09)	(0.07)	(0.08)
N	22,971	22,775	18,831	20,470	12,384	22,435	18,522
R^2	0.06	0.06	0.07	0.04	0.08	0.06	0.06
Panel C: Long-maturity interest rates							
	$tn5y$	$tn10y$	$tn30y$	aaa	baa	hmr	
$FR_{i,t}\left(x_{t+h}\right)$	-0.17**	-0.20***	-0.23***	-0.16***	-0.24***	-0.16***	
	(0.07)	(0.07)	(0.06)	(0.05)	(0.07)	(0.05)	
N	20,377	20,892	21,308	20,072	10,925	21,483	
R^2	0.07	0.10	0.12	0.12	0.11	0.09	

Table A.5 Forecast error on forecast revision regression results for interest rates across maturities: No fixed effects

This table reports the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate:

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h},$$

where the individual-level forecasts are pooled across horizon h, standard errors are clustered by both forecaster and time, and *no* fixed effects are included. Panel A reports the baseline results using individual-level forecasts. Pane B reports results for an extended list of short-maturity interest rates. Panel C reports results for an extended list of long-maturity interest rates. The underlying variables are the Federal Funds Rate (ffr), Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$), one-month commercial paper rate ($cp1m$), prime bank rate (pr), three-month LIBOR rate ($libor$), Aaa and Baa corporate bond yields (aaa and baa) and home mortgage rate (hmr). The data are quarterly and cover the period 1988Q1 to 2018Q4. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable: $FE_{i,t}\left(x_{t+h}\right)$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline results							
	ffr	$tb3m$	$tb1y$	$tn2y$	$tn5y$	$tn10y$	$tn30y$
$FR_{i,t}\left(x_{t+h}\right)$	0.33***	0.30***	0.20**	0.07	-0.13*	-0.18**	-0.20***
	(0.07)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Constant	-0.20***	-0.24***	-0.29***	-0.39***	-0.38***	-0.22***	-0.21***
	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.05)	(0.05)
N	20,603	20,406	18,831	20,440	20,346	20,613	19,821
R^2	0.06	0.04	0.02	0.002	0.01	0.02	0.02
Panel B: Short-maturity interest rates							
	ffr	$tb3m$	$tb1y$	$tn2y$	$cp1m$	pr	$libor$
$FR_{i,t}\left(x_{t+h}\right)$	0.33***	0.30***	0.20**	0.07	0.37***	0.30***	0.26***
	(0.07)	(0.08)	(0.08)	(0.08)	(0.09)	(0.07)	(0.08)
Constant	-0.20***	-0.24***	-0.29***	-0.39***	-0.33***	-0.17***	-0.22***
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.05)	(0.06)
N	20,603	20,406	18,831	20,440	12,384	20,068	18,522
R^2	0.06	0.04	0.02	0.002	0.06	0.05	0.03
Panel C: Long-maturity interest rates							
	$tn5y$	$tn10y$	$tn30y$	aaa	baa	hmr	
$FR_{i,t}\left(x_{t+h}\right)$	-0.13*	-0.18**	-0.20***	-0.12*	-0.17**	-0.13**	
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)	
Constant	-0.38***	-0.22***	-0.21***	-0.32***	-0.38***	-0.32***	
	(0.06)	(0.05)	(0.05)	(0.05)	(0.07)	(0.05)	
N	20,346	20,613	19,821	18,184	10,925	19,160	
R^2	0.01	0.02	0.02	0.01	0.01	0.01	

Table A.6 Forecast error on forecast revision regression results for interest rates across maturities: Monthly regressions 1988:01-2018:12

This table reports coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate:

$$FE_{i,t}(x_{t+h}) = \alpha_i + \beta FR_{i,t}(x_{t+h}) + \epsilon_{i,t,h},$$

where the individual-level forecasts are pooled across horizon h, standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. Unlike the main specification of quarterly regressions, this regression is monthly and uses a one-month forecast revision. Panel A tabulates the baseline results of the Federal Funds Rates and US Treasury yields. Panel B and C include additional short- and long-maturity rates, respectively. The underlying variables are the Federal Funds Rate (ffr), the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$), one-month commercial paper rate ($cp1m$), prime bank rate (pr), three-month LIBOR rate ($libor$), Aaa and Baa corporate bond yields (aaa and baa) and home mortgage rate (hmr). The data are monthly and cover 1988–2018. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable: $FE_{i,t}(x_{t+h})$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline results							
	ffr	$tb3m$	$tb1y$	$tn2y$	$tn5y$	$tn10y$	$tn30y$
$FR_{i,t}(x_{t+h})$	0.43***	0.32***	0.18**	0.02	-0.18***	-0.25***	-0.30***
	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)
N	66,553	65,966	61,458	66,062	66,064	66,918	64,392
R^2	0.07	0.07	0.06	0.05	0.07	0.09	0.12
Panel B: Short-maturity interest rates							
	ffr	$tb3m$	$tb1y$	$tn2y$	$cp1m$	pr	$libor$
$FR_{i,t}(x_{t+h})$	0.43***	0.32***	0.18**	0.02	0.46***	0.27***	0.29***
	(0.08)	(0.08)	(0.07)	(0.07)	(0.10)	(0.09)	(0.08)
N	66,553	65,966	61,458	66,062	38,247	64,849	60,069
R^2	0.07	0.07	0.06	0.05	0.07	0.06	0.06
Panel C: Long-maturity interest rates							
	$tn5y$	$tn10y$	$tn30y$	aaa	baa	hmr	
$FR_{i,t}(x_{t+h})$	-0.18***	-0.25***	-0.30***	-0.27***	-0.29***	-0.25***	
	(0.07)	(0.06)	(0.06)	(0.04)	(0.05)	(0.04)	
N	66,064	66,918	64,392	59,137	33,784	62,122	
R^2	0.07	0.09	0.12	0.13	0.11	0.10	

Table A.7 Forecast error on forecast revision regression results for interest rates across maturities: Regression by horizon 1988Q1-2018Q4

This table reports coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate and forecast horizon:

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h}, \quad h \in \{1, 2, 3, 4Q\},$$

where Standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. Each panel corresponds to a certain forecast horizon. The underlying variables are the Federal Funds Rate (ffr) and the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data are quarterly and cover 1988–2018. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable: $FE_{i,t}\left(x_{t+h}\right)$						
	ffr	$tb3m$	$tb1y$	$tn2y$	$tn5y$	$tn10y$	$tn30y$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: $h = 1Q$							
$FR_{i,t}\left(x_{t+h}\right)$	0.12***	0.13***	0.09	-0.004	-0.10*	-0.09	-0.11*
	(0.03)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
N	5,753	5,630	5,183	5,645	5,621	5,693	5,492
R^2	0.07	0.08	0.04	0.004	0.02	0.03	0.05
Panel B: $h = 2Q$							
$FR_{i,t}\left(x_{t+h}\right)$	0.25***	0.23***	0.13	-0.01	-0.21***	-0.25***	-0.28***
	(0.07)	(0.07)	(0.09)	(0.08)	(0.08)	(0.08)	(0.07)
N	5,687	5,606	5,164	5,618	5,597	5,667	5,472
R^2	0.09	0.09	0.05	0.02	0.06	0.08	0.11
Panel C: $h = 3Q$							
$FR_{i,t}\left(x_{t+h}\right)$	0.39***	0.33***	0.19*	0.04	-0.20**	-0.28***	-0.34***
	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)	(0.08)	(0.08)
N	5,533	5,507	5,114	5,485	5,462	5,531	5,347
R^2	0.11	0.09	0.06	0.04	0.08	0.11	0.16
Panel D: $h = 4Q$							
$FR_{i,t}\left(x_{t+h}\right)$	0.39***	0.30**	0.20	0.06	-0.18	-0.33***	-0.36***
	(0.14)	(0.14)	(0.14)	(0.13)	(0.11)	(0.12)	(0.10)
N	3,630	3,663	3,370	3,692	3,666	3,722	3,510
R^2	0.08	0.06	0.06	0.05	0.08	0.14	0.17

Table A.8 Determinants of time-varying subjective autocorrelations: Extended explanatory variables

This table relates forecasters' time-varying subjective autocorrelations to various cross-sectional and time-series characteristics. The dependent variable is the signed distance $\|\rho\|$ between each forecaster's subjective autocorrelations and the true autocorrelations for FFR and 10-year Treasury yield:

$$\|\rho\| = \begin{cases} \sqrt{(\rho_1^s - \rho_1)^2 + (\rho_{p,10}^s - \rho_{p,10})^2}, & \text{if } \rho_1^s < \rho_1 \text{ and } \rho_{p,10}^s > \rho_{p,10} \\ -\sqrt{(\rho_1^s - \rho_1)^2 + (\rho_{p,10}^s - \rho_{p,10})^2}, & \text{otherwise} \end{cases}$$

The explanatory variables include forecaster experience (in years); 1- and 5-year cumulative absolute monetary policy shocks constructed by Swanson; Recession months in the past 1 and 5 years; 1- and 5-year average volatility of 10-year Treasury yields; 1- and 5-year average economic policy uncertainty (EPU); and numbers of scheduled/unscheduled Fed meetings and special programs during the past 1 and 5 years. Standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. The data are monthly and cover the period 1993 to 2018. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable: Signed distance $\|\rho\|$												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Forecaster Experience	-0.01***											-0.02***	0.005
	(0.00)											(0.003)	(0.004)
1Y Cum MP Shock		0.19***										0.05	
		(0.05)										(0.04)	
5Y Cum MP Shock			0.53***										0.63***
			(0.17)										(0.15)
Recession Past 1Y				0.01***								0.00**	
				(0.002)								(0.001)	
Recession Past 5Y					0.01***								-0.00**
					(0.001)								(0.001)
1Y Avg Yield Volatility						-5.10**						-5.4	
						(2.0)						(4.2)	
5Y Avg Yield Volatility							-9.50***						-41.40***
							(2.4)						(9.1)
1Y Avg EPU								0.04				0.17***	
								(0.03)				(0.05)	
5Y Avg EPU									0.11**				1.0***
									(0.05)				(0.11)
1Y Fed Meetings/Programs										0.01***		-0.02**	
										(0.003)		(0.006)	
5Y Fed Meetings/Programs											0.01***		0.003
											(0.0007)		(0.002)
R^2	0.40	0.30	0.20	0.28	0.31193	0.29454	0.32	0.28	0.29	0.32	0.36	0.47	0.61
N	5,569	5,464	5,023	5,569	5,569	5,569	5,569	5,569	5,569	5,464	5,373	5,464	5,023
Forecaster FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table A.9 Predicting one-year excess bond returns with forecast revisions

The table presents regressions of one-year bond excess returns on forecast revisions of 10-year Treasury yield $FR_t(y^{(10)}_{t+3Q})$ at the monthly frequency

$$rx^{(n)}_{t+1} = \alpha + \beta FR_t(y^{(10)}_{t+3Q}) + \varepsilon_{t+1},$$

where $rx^{(n)}_{t+1}$ is the one-year holding period excess return of an n-year bond and $\overline{rx}_{t+1}$ is the average excess return weighted by the inverse of bond maturities. Panel A reports monthly frequency regression using one-month forecast revision. Panel B reports monthly frequency regression using three-month forecast revision. t-statistics are reported for two types of standard errors: Newey and West (1987) standard errors with 12 lags (in parentheses) and Hodrick (1992) standard errors obtained from reverse regressions (in brackets). The data cover 1988–2018. The results for the intercept are omitted.

	$rx^{(2)}_{t+1}$	$rx^{(3)}_{t+1}$	$rx^{(5)}_{t+1}$	$rx^{(7)}_{t+1}$	$rx^{(10)}_{t+1}$	$rx^{(20)}_{t+1}$	$rx^{(30)}_{t+1}$	$\overline{rx}_{t+1}$
Panel A: Monthly regression, $h = 3Q$, 1-month forecast revision								
$FR_t(y^{(10)}_{t+3Q})$	0.01	0.02	0.03	0.05	0.08	0.17	0.24	0.07
	(2.16)	(2.65)	(3.10)	(3.37)	(3.67)	(4.46)	(3.98)	(4.27)
	[1.90]	[2.05]	[2.19]	[2.28]	[2.39]	[2.60]	[2.60]	[2.64]
N	359	359	359	359	359	359	359	359
R^2	0.01	0.01	0.02	0.03	0.04	0.06	0.05	0.05
Panel B: Monthly regression, $h = 3Q$, 3-month forecast revision								
$FR_t(y^{(10)}_{t+3Q})$	0.00	0.01	0.02	0.03	0.05	0.11	0.15	0.05
	(2.57)	(3.07)	(3.41)	(3.62)	(3.86)	(4.38)	(3.94)	(4.29)
	[2.36]	[2.48]	[2.59]	[2.67]	[2.76]	[2.88]	[2.92]	[2.97]
N	357	357	357	357	357	357	357	357
R^2	0.02	0.03	0.05	0.06	0.08	0.11	0.10	0.10

Table A.10 Forecast revision and lagged forecast errors

This table reports the relationship between forecast revision and contemporaneous lagged forecast error for for long-maturity interest rates:

$$FR_t(x_{t+k}) = \alpha + \beta FE_{t-k}(x_t) + \varepsilon_{t+1}.$$

The left part of the table uses $k = 1$ quarter, and the right part of the table uses $k = 4$ quarters. The underlying variables are the Treasury bond yields with maturities of 2, 5, 10 and 30 years. The data are quarterly and cover 1988–2018. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	$FR_t(x_{t+k}), k = 1Q$				$FR_t(x_{t+k}), k = 4Q$			
$x =$	$y^{(2)}$	$y^{(5)}$	$y^{(10)}$	$y^{(30)}$	$y^{(2)}$	$y^{(5)}$	$y^{(10)}$	$y^{(30)}$
$FE_{t-k}(x_t)$	0.63***	0.58***	0.56***	0.46***	0.27***	0.28***	0.27***	0.24***
	(17.71)	(15.17)	(14.10)	(11.38)	(9.14)	(7.94)	(6.88)	(6.51)
Intercept	-0.03	-0.04	-0.11***	-0.11***	0.02	0.04	-0.01	-0.00
	(-1.18)	(-1.50)	(-4.80)	(-4.35)	(0.44)	(0.96)	(-0.20)	(-0.15)
N	124	124	124	124	87	87	87	87
R^2	0.72	0.65	0.61	0.50	0.50	0.43	0.36	0.33

Table A.11 Correlations between lagged forecast error $FE10Y$ and other bond predictors

This table reports the pairwise correlations between overreaction-motivated predictor $FE10Y$ and other commonly used bond predictors. Panel A reports the correlations between $FE10Y$, econometrician's lagged forecast error $\widehat{FE}10Y$, Cochrane and Piazzesi (2005) factor (CP), the cycle factor (cf) from Cieslak and Povala (2015), the growth factor (GRO) and the inflation factor ($INFL$) from Joslin, Priebsch, and Singleton (2014), and first three yield curve principal components. Panel B reports the correlation between $FE10Y$ and the eight PCs of a large set of macroeconomic variables from Ludvigson and Ng (2009). The data are monthly and cover 1988–2018.

Panel A: Correlations with other bond predictors

	$FE10Y$	$\widehat{FE}10Y$	CP	cf	GRO	INF	PC1	PC2
$\widehat{FE}10Y$	0.86							
CP	0.24	0.00						
cf	0.57	0.51	0.55					
GRO	0.26	0.23	-0.01	-0.08				
INF	0.55	0.26	0.29	0.49	0.34			
PC1	0.41	0.30	0.34	0.84	0.21	0.82		
PC2	-0.08	-0.01	0.73	0.38	-0.49	0.07	0.00	
PC3	-0.60	-0.73	-0.29	-0.56	-0.27	0.06	0.00	0.00

Panel B: Correlations with Ludvigson and Ng (2009) factors

	f1	f2	f3	f4	f5	f6	f7	f8
$FE10Y$	-0.30	-0.05	-0.05	-0.07	0.14	-0.08	0.00	-0.03

Table A.12 Predicting one-year excess bond returns with overreaction-motivated predictor $FE10Y$: Controlling for other return predictors

This table presents results of the predictive regressions of one-year bond excess returns on the overreaction-motivated predictor $FE10Y$, controlling for other commonly used predictors

$$rx_{t+1}^{(n)} = \alpha + \beta FE10Y_t + \gamma \cdot X_t + \varepsilon_{t+1},$$

where $rx_{t+1}^{(n)}$ is the one-year holding period excess return of an n-year bond and $\overline{rx}_{t+1}$ is the average excess return weighted by the inverse of bond maturities. Panel A includes the Cochrane and Piazzesi (2005) factor (CP) and the Cieslak and Povala (2015) factor (cf). Panel B adds growth (GRO) and inflation ($INFL$) factors from Joslin et al. (2014). The first three yield curve principal components (PCs) are included in both panels. T-statistics are reported for two types of standard errors: Newey and West (1987) standard errors with 12 lags (in parentheses) and Hodrick (1992) standard errors obtained from reverse regressions (in brackets). The data are monthly and cover 1988–2018. The results for the intercept are omitted.

	$rx_{t+1}^{(2)}$ (1)	$rx_{t+1}^{(3)}$ (2)	$rx_{t+1}^{(5)}$ (3)	$rx_{t+1}^{(7)}$ (4)	$rx_{t+1}^{(10)}$ (5)	$rx_{t+1}^{(20)}$ (6)	$rx_{t+1}^{(30)}$ (7)	$\overline{rx}_{t+1}$ (8)
Panel A: CP and cf								
$FE10Y_t$	0.25	0.56	1.08	1.62	2.64	6.24	8.05	2.63
	(1.18)	(1.45)	(1.61)	(1.83)	(2.37)	(3.45)	(2.75)	(2.88)
	[1.73]	[1.74]	[1.72]	[1.81]	[2.04]	[2.32]	[2.01]	[2.23]
CP_t	0.04	0.04	-0.12	-0.39	-0.71	0.18	2.79	-0.02
	(0.35)	(0.17)	(-0.26)	(-0.58)	(-0.77)	(0.11)	(1.13)	(-0.02)
	[0.01]	[0.08]	[0.01]	[-0.06]	[-0.07]	[0.36]	[0.79]	[0.40]
cf_t	0.12	0.54	2.02	3.79	6.14	12.76	23.33	5.70
	(0.16)	(0.38)	(0.84)	(1.24)	(1.64)	(2.31)	(2.89)	(1.89)
	[0.19]	[0.54]	[0.99]	[1.23]	[1.39]	[1.63]	[1.99]	[1.70]
R^2	0.25	0.28	0.34	0.41	0.47	0.50	0.46	0.47
Panel B: CP, cf, GRO, and $INFL$								
$FE10Y_t$	0.46	0.89	1.43	1.89	2.75	6.02	7.32	2.73
	(2.41)	(2.34)	(1.98)	(1.91)	(2.19)	(3.14)	(2.42)	(2.70)
	[3.37]	[2.85]	[2.24]	[2.04]	[2.07]	[2.31]	[1.99]	[2.27]
CP_t	0.40	0.58	0.45	0.02	-0.59	-0.32	1.38	0.09
	(3.15)	(2.33)	(0.93)	(0.03)	(-0.64)	(-0.22)	(0.63)	(0.13)
	[2.01]	[1.50]	[0.76]	[0.31]	[0.02]	[0.30]	[0.64]	[0.39]
cf_t	0.87	1.83	3.72	5.54	7.89	15.07	25.18	7.34
	(1.17)	(1.22)	(1.36)	(1.52)	(1.72)	(2.26)	(2.67)	(1.99)
	[1.62]	[1.57]	[1.51]	[1.48]	[1.45]	[1.63]	[1.92]	[1.74]
GRO_t	-0.01	-0.01	-0.01	-0.01	-0.00	0.01	0.04	-0.00
	(-3.30)	(-2.80)	(-1.79)	(-1.00)	(-0.18)	(0.90)	(1.67)	(-0.19)
	[-2.88]	[-2.11]	[-1.10]	[-0.51]	[-0.07]	[0.02]	[-0.02]	[-0.10]
$INFL_t$	0.00	0.01	0.02	0.02	0.03	0.05	0.06	0.02
	(1.07)	(1.11)	(1.05)	(1.02)	(1.11)	(1.50)	(1.17)	(1.30)
	[1.20]	[1.09]	[0.87]	[0.75]	[0.67]	[0.65]	[0.58]	[0.68]
R^2	0.42	0.39	0.39	0.43	0.49	0.52	0.48	0.49
PCs	✓	✓	✓	✓	✓	✓	✓	✓
N	328	328	328	328	328	328	328	328

Table A.13 Predicting coupon bond portfolio excess returns with lagged forecast errors $FE10Y_t$

This table reports the predictive regressions of actual coupon bond excess returns from CRSP Fama Maturity Portfolios on lagged forecast errors $FE10Y_t$ at different investment horizons. The column labels reflect the maturity bin for each bond portfolio: from less than two years to above ten years. The last column is the average excess return across maturities. The returns are in excess of Tbill rates obtained from H.15 Fed table (one-month Tbill for $h < 3$, three-month Tbill for $3 < h < 6$ and six-month Tbill for $h > 6$). T-bill rates are converted to a continuous basis. Each panel corresponds to a certain horizon h. T-stats from Hodrick (1992) reverse regressions are reported in brackets. The data are monthly and cover 1988–2018. The results for the intercept are omitted.

	$rx < 24m$	$rx < 36m$	$rx < 48m$	$rx < 60m$	$rx < 120m$	$rx > 120m$	$\overline{rx}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: $h = 1m$							
$FE10Y_t$	0.04	0.08	0.12	0.15	0.20	0.42	0.15
	[1.81]	[1.82]	[2.00]	[2.08]	[2.23]	[2.42]	[2.36]
N	359	359	359	359	359	359	359
R^2	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Panel B: $h = 3m$							
$FE10Y_t$	0.16	0.30	0.43	0.55	0.71	1.38	0.51
	[2.87]	[2.89]	[2.96]	[2.96]	[3.03]	[3.03]	[3.21]
N	357	357	357	357	357	357	357
R^2	0.04	0.04	0.05	0.05	0.05	0.06	0.06
Panel C: $h = 6m$							
$FE10Y_t$	0.31	0.59	0.87	1.11	1.46	2.78	1.02
	[3.04]	[3.10]	[3.17]	[3.15]	[3.23]	[3.16]	[3.37]
N	354	354	354	354	354	354	354
R^2	0.07	0.08	0.10	0.10	0.11	0.12	0.12
Panel D: $h = 12m$							
$FE10Y_t$	0.59	1.11	1.57	1.94	2.52	4.60	1.75
	[3.96]	[3.84]	[3.66]	[3.44]	[3.34]	[2.98]	[3.54]
N	348	348	348	348	348	348	348
R^2	0.15	0.16	0.17	0.17	0.20	0.21	0.22

Table A.14 Test of the spanning hypothesis using Bauer and Hamilton (2017) bootstrap procedure

This table reports results of testing whether the predictive power of $FE10Y$ is spanned by current yields using Bauer and Hamilton (2017) bootstrap procedure. The dependent variable is the future one-year holding period excess return averaged across all maturities $\frac{1}{29}\sum_2^{30} rx_{t+1}^{(n)}$. Regression model 1 contains only three principal components, and model 2 adds the proposed predictor $FE10Y$. Panel A reports the model 2 regression coefficients, Newey and West (1987) t-stat and p-value, and Bauer and Hamilton (2017) small sample adjusted critical value and p-value using 5000 bootstrap runs. The column "Wald" reports results for the χ^2 test that $FE10Y$ has no predictive power. Panel B reports R^2 of model 1, 2 and their difference. The first row reports the in sample R^2 in the data. The following rows report bootstrap mean and 95%-quantiles (in parentheses). The bootstrap imposes the null hypothesis that the additional predictor has no incremental predictive power.

Panel A: Bootstrap inference

	PC1	PC2	PC3	$FE10Y$	Wald
Coefficient	-0.114	2.024	-0.009	7.169	
NW t	-1.013	3.595	-0.003	6.837	46.740
NW p-value	0.312	0.000	0.997	0.000	0.000
Bootstrap 5% C.V.				3.003	9.021
Bootstrap p-value				0.000	0.000

Panel B: Additional R^2 from $FE10Y$

	R_1^2	R_2^2	$R_2^2 - R_1^2$
Data	0.164	0.412	0.247
Bootstrap mean	0.262	0.283	0.021
Bootstrap 95% C.I.	(0.081,0.466)	(0.102, 0.485)	(0.000, 0.103)
Bootstrap p-value			0.000

Table A.15 Predicting one-year excess bond returns with overreaction-motivated predictor $FE10Y$: Controlling for Ludvigson and Ng (2009) bond factors

The table presents regressions of one-year bond excess returns on the overreaction-motivated predictor $FE10Y$ with other commonly used predictors at the monthly frequency $rx_{t+1}^{(n)} = \alpha + \beta FE10Y_t + \gamma \cdot X_t + \varepsilon_{t+1}$, where $rx_{t+1}^{(n)}$ is the one-year holding period excess return of an n-year bond and $\overline{rx}_{t+1}$ is the average excess return weighted by the inverse of bond maturities. Panel A includes the eight PCs of a large set of macro variables from citetLudvigson2009. Panel B adds the first three PCs of the yield curve. T-statistics are reported for two types of standard errors: Newey and West (1987) standard errors with 12 lags (in parentheses) and Hodrick (1992) standard errors obtained from reverse regressions (in brackets). The results for the intercept are omitted.

	$rx_{t+1}^{(2)}$ (1)	$rx_{t+1}^{(3)}$ (2)	$rx_{t+1}^{(5)}$ (3)	$rx_{t+1}^{(7)}$ (4)	$rx_{t+1}^{(10)}$ (5)	$rx_{t+1}^{(20)}$ (6)	$rx_{t+1}^{(30)}$ (7)	$\overline{rx}_{t+1}$ (8)
Panel A: Ludvigson and Ng (2009) factors								
$FE10Y_t$	-0.19*	-0.55***	-1.47***	-2.41***	-3.58***	-5.90***	-8.49***	-2.88***
	(-1.92)	(-2.82)	(-4.05)	(-4.61)	(-4.76)	(-4.43)	(-4.57)	(-4.67)
	[3.28]	[3.04]	[2.83]	[2.82]	[2.88]	[2.59]	[2.02]	[2.61]
f1	0.02***	0.03***	0.05***	0.05***	0.04***	0.01	0.01	0.03***
	(4.74)	(4.81)	(4.61)	(4.01)	(2.78)	(0.52)	(0.18)	(2.67)
	[1.51]	[0.99]	[0.33]	[0.00]	[-0.17]	[-0.46]	[-0.87]	[-0.48]
f2	0.01*	0.02	0.02	0.03	0.03	0.02	-0.04	0.02
	(1.75)	(1.58)	(1.40)	(1.31)	(1.18)	(0.49)	(-0.64)	(0.85)
	[-0.42]	[-0.33]	[-0.15]	[0.07]	[0.33]	[0.37]	[-0.04]	[0.24]
f3	0.01	0.01	0.01	0.01	0.01	-0.01	-0.08*	0.00
	(1.50)	(1.31)	(1.10)	(0.98)	(0.81)	(-0.32)	(-1.81)	(0.14)
	[-1.23]	[-0.97]	[-0.60]	[-0.38]	[-0.28]	[-0.84]	[-1.82]	[-0.99]
f4	0.01***	0.02**	0.02	0.02	0.03	0.06	0.04	0.03
	(2.74)	(2.07)	(1.32)	(1.10)	(1.19)	(1.37)	(0.52)	(1.39)
	[-1.74]	[-1.84]	[-1.81]	[-1.59]	[-1.25]	[-1.26]	[-1.75]	[-1.48]
f5	0.00	-0.01	-0.02	-0.03*	-0.05*	-0.08*	-0.06	-0.04*
	(0.09)	(-0.60)	(-1.30)	(-1.66)	(-1.96)	(-1.71)	(-0.95)	(-1.71)
	[0.16]	[0.12]	[-0.02]	[-0.18]	[-0.31]	[-0.01]	[0.10]	[-0.03]
f6	0.02***	0.03***	0.03**	0.03*	0.03	-0.01	-0.07	0.01
	(4.14)	(3.40)	(2.44)	(1.75)	(1.00)	(-0.25)	(-0.99)	(0.61)
	[1.77]	[1.22]	[0.64]	[0.26]	[-0.11]	[-0.56]	[-0.66]	[-0.45]
f7	0.01***	0.02***	0.03**	0.03*	0.03	0.01	0.03	0.02
	(2.72)	(2.61)	(2.31)	(1.93)	(1.30)	(0.27)	(0.60)	(1.20)
	[1.46]	[1.57]	[1.94]	[2.09]	[1.91]	[1.03]	[0.81]	[1.18]
f8	0.00	0.01	0.01	0.03	0.06**	0.19***	0.30***	0.07***
	(0.67)	(0.54)	(0.79)	(1.29)	(2.12)	(3.66)	(3.54)	(2.92)
	[0.09]	[-0.09]	[-0.06]	[0.07]	[0.19]	[-0.08]	[-0.52]	[-0.15]
N	357	357	357	357	357	357	357	357
R^2	0.44	0.40	0.35	0.32	0.28	0.22	0.22	0.26

Panel B: Ludvigson and Ng (2009) factors, yield curve PCs

$FE10Y_t$	-0.24**	-0.58***	-1.55***	-2.62***	-4.02***	-7.15***	-10.30***	-3.36***
	(-2.40)	(-2.85)	(-3.69)	(-4.08)	(-4.24)	(-4.33)	(-4.41)	(-4.41)
	[1.03]	[0.81]	[0.76]	[0.99]	[1.41]	[1.92]	[1.56]	[1.76]
f1	0.01***	0.03***	0.04***	0.03***	0.02*	-0.00	-0.00	0.02
	(5.79)	(5.76)	(4.84)	(3.48)	(1.73)	(-0.05)	(-0.04)	(1.53)
	[1.14]	[0.47]	[-0.26]	[-0.51]	[-0.55]	[-0.66]	[-0.94]	[-0.71]
f2	-0.02***	-0.03***	-0.04**	-0.04	-0.03	-0.00	-0.00	-0.02
	(-2.71)	(-2.76)	(-2.20)	(-1.62)	(-0.94)	(-0.00)	(-0.02)	(-0.82)
	[-0.80]	[-0.96]	[-1.08]	[-1.04]	[-0.90]	[-0.83]	[-0.98]	[-0.92]
f3	-0.01***	-0.02***	-0.03**	-0.03*	-0.03	-0.02	-0.05	-0.02
	(-2.83)	(-2.92)	(-2.39)	(-1.85)	(-1.22)	(-0.53)	(-0.83)	(-1.29)
	[-1.33]	[-1.32]	[-1.19]	[-1.06]	[-0.97]	[-1.65]	[-2.48]	[-1.78]
f4	0.01**	0.01	0.01	0.00	0.01	0.03	0.00	0.01
	(2.16)	(1.34)	(0.42)	(0.16)	(0.25)	(0.61)	(0.01)	(0.50)
	[-2.32]	[-2.38]	[-2.29]	[-2.03]	[-1.65]	[-1.69]	[-2.31]	[-1.95]
f5	-0.01***	-0.03***	-0.05***	-0.06***	-0.08***	-0.10*	-0.06	-0.06**
	(-2.66)	(-3.14)	(-3.21)	(-3.09)	(-2.83)	(-1.80)	(-0.81)	(-2.44)
	[-0.33]	[-0.54]	[-0.80]	[-0.95]	[-0.98]	[-0.42]	[-0.02]	[-0.45]
f6	0.02***	0.04***	0.05***	0.04*	0.03	-0.05	-0.15*	0.01
	(5.12)	(4.35)	(2.88)	(1.83)	(0.82)	(-0.79)	(-1.78)	(0.37)
	[0.51]	[0.28]	[0.02]	[-0.11]	[-0.19]	[-0.38]	[-0.61]	[-0.40]
f7	0.00	0.00	0.01	0.01	0.00	-0.01	0.03	0.00
	(0.48)	(0.50)	(0.57)	(0.45)	(0.07)	(-0.29)	(0.48)	(0.08)
	[0.62]	[0.66]	[0.96]	[1.14]	[1.08]	[0.41]	[0.23]	[0.49]
f8	0.01**	0.02**	0.03*	0.04**	0.07**	0.18***	0.27***	0.08***
	(2.25)	(2.03)	(1.96)	(2.14)	(2.54)	(3.30)	(3.05)	(3.13)
	[-0.09]	[-0.15]	[0.03]	[0.25]	[0.48]	[0.32]	[-0.18]	[0.21]
PCs	✓	✓	✓	✓	✓	✓	✓	✓
N	357	357	357	357	357	357	357	357
R^2	0.61	0.55	0.47	0.41	0.35	0.25	0.24	0.31

Table A.16 Comparing the return predictability of survey-based lagged forecast error $FE10Y$ with related measures

This table compares the predictive power of overreaction-motivated predictor $FE10Y$ and other related measures for one-year bond excess returns:

$$\overline{rx}_{t+1} = a + bX_t + \gamma \cdot \Gamma_t + \varepsilon_{t+1},$$

where $\overline{rx}_{t+1}$ is the one-year average excess return weighted by the inverse of bond maturities. Related measures include the econometrician's lagged forecast error $\widehat{FE}10Y_t$, the changes in realized yields $\Delta y_t^{(10)}$, and the contemporaneous differences between realized yields and forecasts $y_t^{(10)} - \mathbb{E}_t^S\left(y_{t+1}^{(10)}\right)$. Panel A runs univariate predictive regressions for each measure Panel B adds the first three yield curve principal components (PCs), and Panel C adds the full set of auxiliary predictors from Panel B of Table A.12. T-statistics are reported for two types of standard errors: Newey and West (1987) standard errors with 12 lags (in parentheses) and Hodrick (1992) standard errors obtained from reverse regressions (in brackets). The data are monthly and cover 1988–2018. The results for intercept and control variables are omitted.

	$\overline{rx}_{t+1} = a + bX_t + \gamma \cdot \Gamma_t + \varepsilon_{t+1}$			
$X_t =$	$FE10Y_t$	$\widehat{FE}10Y_t$	$\Delta y_t^{(10)}$	$y_t^{(10)} - E_t^S(y_{t+1}^{(10)})$
	(1)	(2)	(3)	(4)
Panel A: No control				
b	3.81	3.10	3.20	2.28
	(5.69)	(2.83)	(4.46)	(1.80)
	[3.21]	[2.00]	[2.85]	[0.96]
N	348	348	348	348
R^2	0.25	0.13	0.16	0.03
Panel B: Controlling for PCs				
b	3.78	2.52	3.09	0.20
	(5.90)	(2.52)	(5.08)	(0.14)
	[3.35]	[1.83]	[3.29]	[0.73]
N	348	348	348	348
R^2	0.42	0.30	0.38	0.25
Panel C: Full set of controls				
b	2.73	0.16	1.75	0.85
	(2.70)	(0.13)	(1.93)	(0.54)
	[2.27]	[0.55]	[2.11]	[2.65]
N	328	328	328	328
R^2	0.49	0.43	0.45	0.43

Table A.17 Comparing the return predictive power of lagged forecast errors $FE10Y$ with related measures

This table reports the results that contrast the return predictive power of lagged forecast errors $FE10Y$ with related measures. The dependent variable is the average one-year holding period excess return $\overline{rx}$. Panel A adds another related measure in each regression. Panel B uses the error from projecting $FE10Y$ onto another related measure as a return predictor. The first three yield curve principal components (PC) are included in each regression. T-stats based on Newey and West (1987) standard errors with 12 lags are reported in the parentheses. The data are monthly and cover 1988–2018. Results for PCs and intercept are omitted.

$Z_t =$	$\widehat{FE}10Y$	$\Delta y_t^{(10)}$	$y_t^{(10)} - E_t^S(y_{t+1}^{(10)})$
	(1)	(2)	(3)
Panel A: $\overline{rx}_{t+1} = a + bFE10Y_t + cZ_t + \gamma \cdot \Gamma_t + \varepsilon_{t+1}$			
b	5.23***	3.68***	3.99***
	(5.28)	(4.00)	(5.94)
c	-2.37**	0.11	-1.69
	(-2.07)	(0.13)	(-1.24)
R^2	0.44	0.42	0.43
Panel B: $\overline{rx}_{t+1} = a + bFE10Y_t \vert Z_t + \gamma \cdot \Gamma_t + \varepsilon_{t+1}$			
b	5.23***	2.98***	3.86***
	(4.74)	(2.94)	(5.70)
R^2	0.39	0.28	0.42
N	348	348	348

Table A.18 Summary statistics of survey and futures-based forecast errors and forecast revisions of the Federal Funds Rate

This table reports summary statistics of survey-based (denoted with superscript "S") and futures-based (denoted with superscript "FUT") forecast errors and forecast revisions. The last column reports the correlation between survey-based and futures-based measures. The results are pooled across forecast horizons h. The underlying variable is the Federal Funds Rate. The data are quarterly and cover 2002–2018.

	Count	Mean	SD	Min	p25	p50	p75	Max	$corr(FUT, S)$
Federal funds rate									
FR^S	249	-0.15	0.38	-1.94	-0.21	-0.035	0.017	0.33	
FR^{FUT}	249	-0.24	1.03	-5.59	-0.22	-0.035	0.095	1.64	0.41
FE^S	249	-0.22	0.69	-3.85	-0.29	-0.064	0.075	0.86	
FE^{FUT}	249	-0.26	0.95	-5.59	-0.17	-0.034	0.052	1.23	0.64

Table A.19 Subjective beliefs and portfolio allocation: Regression by asset class

This table reports results from regressing banks' asset allocations on survey forecasts at the monthly frequency.

$$\text{Allocation}(5-15Y)_{i,t} = \alpha_i + \beta \mathbb{E}^S_{i,t}(y^{(10)}_{t+h}) + \gamma X_{i,t} + \varepsilon_{i,t}$$

The dependent variables are bank i's dollar allocations to US Treasury, total assets, total securities, and RMBS with maturities 5-15 years. The independent variable is bank i's 10-year Treasury yield forecasts $tn10y$. Monthly forecasts within each quarter are matched with quarter-end allocations. Panel A fixes the forecast horizon to 4 quarters, and Panel B pools across forecast horizons. Standard errors are clustered by firm and month. *, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	Dependent variable:			
	Treasury$(5-15Y)$	Assets$(5-15Y)$	Securities$(5-15Y)$	RMBS$(5-15Y)$
	(1)	(2)	(3)	(4)
Panel A: $h=4Q$				
$tn10y$	-1.31**	-6.87*	-2.15**	-0.84**
	(0.64)	(3.84)	(0.98)	(0.37)
Firm FE	✓	✓	✓	✓
N	2,583	4,734	2,583	2,583
R^2	0.57	0.60	0.59	0.41
Panel B: $h=1,2,3,4Q$				
$tn10y$	-2.27*	-7.59**	-3.30**	-1.04**
	(1.17)	(3.59)	(1.55)	(0.41)
Firm FE	✓	✓	✓	✓
N	13,365	22,570	13,365	13,365
R^2	0.57	0.65	0.60	0.42

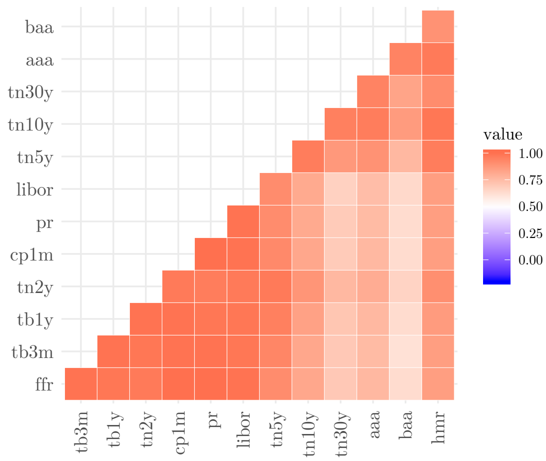
US Quarterly Forecasts
October 2019

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Effective Federal Funds Rate[1]	Prime Rate[2]	LIBOR 3-Mo Rate[3]	Commercial Paper 1-Mo Rate[4]	Treasury Bill 3-Mo Yield[5]	Treasury Bill 6-Mo Yield[5]	Treasury Bill 1-Yr Yield[5]	Treasury Note 2-Yr Yield[5]	Treasury Note 5-Yr Yield[5]	Treasury Note 10-Yr Yield[5]	Treasury Bond 30-Yr Yield[5]	Corporate Aaa Bond Yield[6]	Corporate Baa Bond Yield[7]	State & Local Bond Yield[8]	Mortgage Rate 30-Yr Fixed[9]	Fed's Advanced Foreign Economies (AFE) Index[10]	Real GDP (Q/Q %Chg, SAAR)[11]	GDP Price Index (Q/Q %Chg, SAAR)[12]	Consumer Price Index (Q/Q % Chg, SAAR)[13]
Q4 2019																			
Q1 2020																			
Q2 2020																			
Q3 2020																			
Q4 2020																			
Q1 2021																			

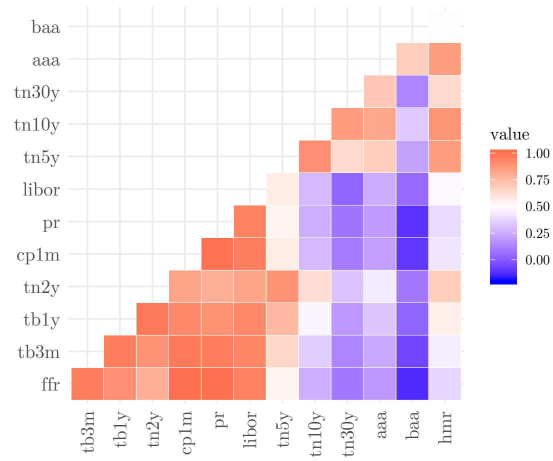
[1] Federal Funds Rate: Charged on loans of uncommitted reserve funds among banks; Federal Reserve Statistical Release (FRSR) H.15
[2] Prime Rate: One of several base rates used by banks to price short term business loans; FRSR H.15.
[3] London Interbank Offered Rate (LIBOR): The interbank offered rate for 3-month dollar deposits in the London market. The Wall Street Journal publishes a LIBOR quote on a daily basis, The Economist on a weekly basis.
[4] Commercial Paper: Financial; 1-month bank discount basis; Interest rates interpolated from data on certain commercial paper trades settled by The Depository Trust Company; The trades represent sales of commercial paper by dealers or direct issuers to investors; FRSR H.15
[5] Treasury Bills, Notes, and Bonds: 3-month, 6-month, 1-year bills, 2-year, 5-year, 10-year notes and 30-year bond; Yields on actively traded issues, adjusted to constant maturities; U.S. Treasury; FRSR H.15
[6] Aaa Corporate Bonds: BofA Merrill Lynch Corporate Bonds: AAA-AA: 15+ Years; Yield to Maturity (%)
[7] Baa Corporate Bond: BofA Merrill Lynch Corporate Bonds: A-BBB: 15+ Years; Yield to Maturity (%)
[8] State & Local Bonds: BofA Merrill Lynch Municipals: A Rated: 20-year; Yield to Maturity (%)
[9] Conventional Mortgages: Contract interest rates on commitments on 30-year fixed rate first mortgages; FreddieMac
[10] Federal Reserve Board's Advanced Foreign Economies (AFE) Nominal Dollar Index. FRB H.10
[11] Real Gross Domestic Product (Chain-type): Percent change (SAAR) Economic Indicators; BEA
[12] Chained Gross Domestic Product Price Index: Percent change (SAAR) Economic Indicators; BEA
[13] Consumer Price Index (All Urban Consumers): Percent change (SAAR); Economic Indicators; BLS

Figure A.1 Blue Chip Financial Forecasts sample survey questionnaire

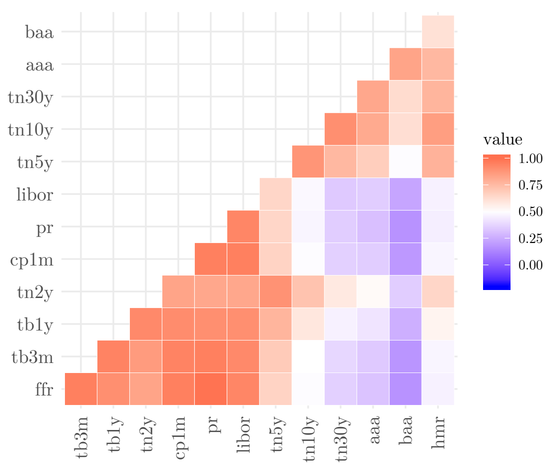
This figure presents a screenshot of the latest iteration of the Blue Chip Financial Forecasts survey questionnaire. The definition of each target variable is specified in the footnote.



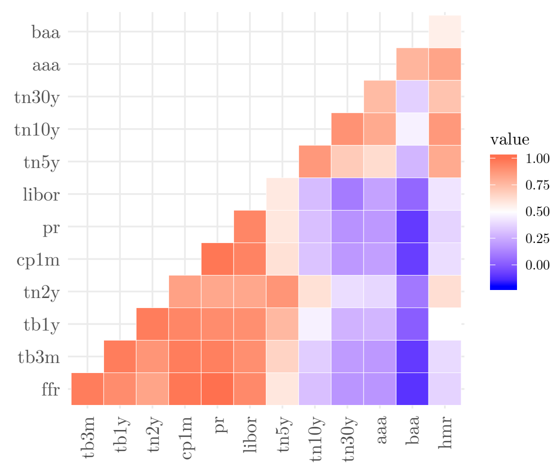
A. Realized Interest Rates



B. One-year Realized Changes



C. Forecast Revisions



D. Forecast Errors

Figure A.2 Cross-sectional correlations between short- and long-maturity interest rates

This figure shows the cross-sectional correlations between short and long-maturity interest rates along the following four dimensions: realized interest rates (Panel A), one-year realized changes (Panel B), individual forecast revisions (Panel C), and individual forecast errors (Panel D). All correlations are calculated using quarterly observations. Red color indicates correlation > 0.5 and blue color indicates correlation < 0.5.

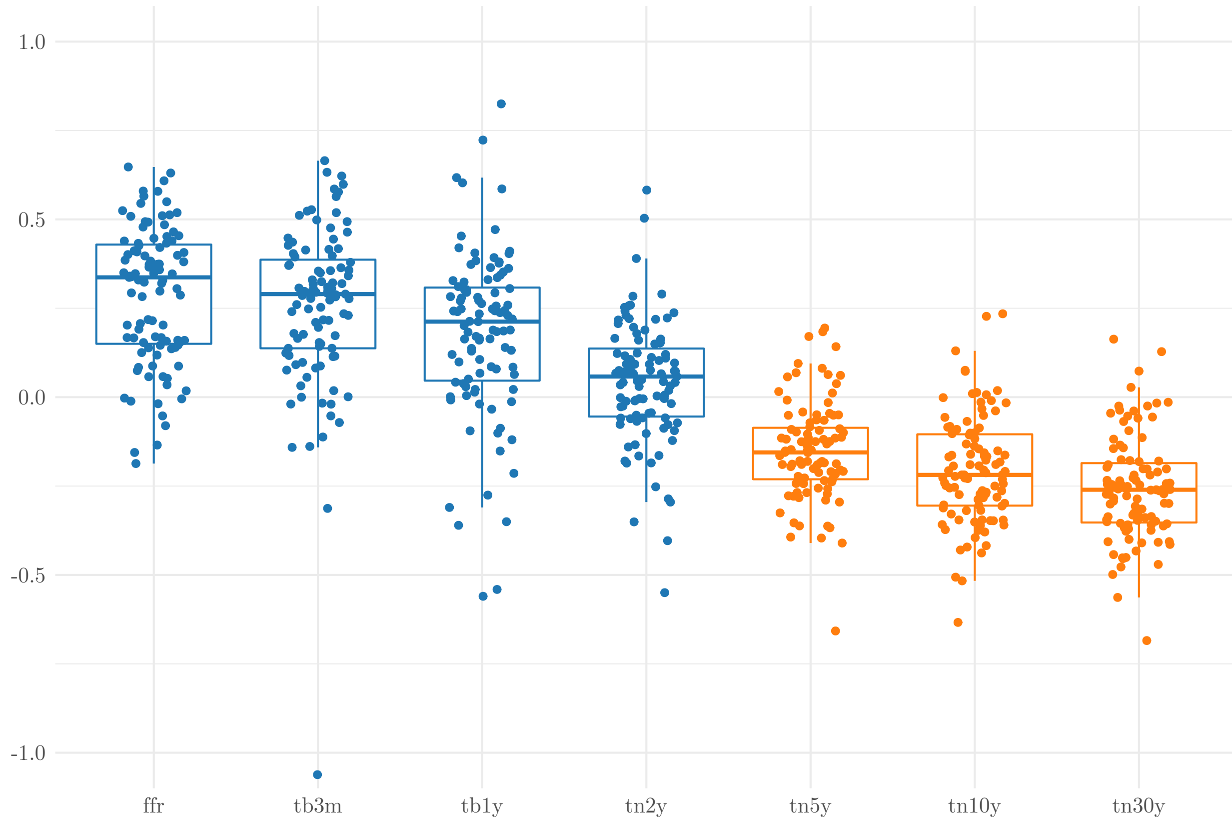


Figure A.3 Forecast error on forecast revision regression coefficients of short- and long-maturity interest rates: Forecaster-by-forecaster regression results

This figure plots the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate and each individual forecaster

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h},$$

where the forecasts are pooled across horizon h and standard errors are calculated following Driscoll and Kraay (1998). The underlying variables are the Federal Funds Rate (ffr), and the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data are quarterly and cover 1988–2018. The range of each whisker depicts the 95%-confidence interval.

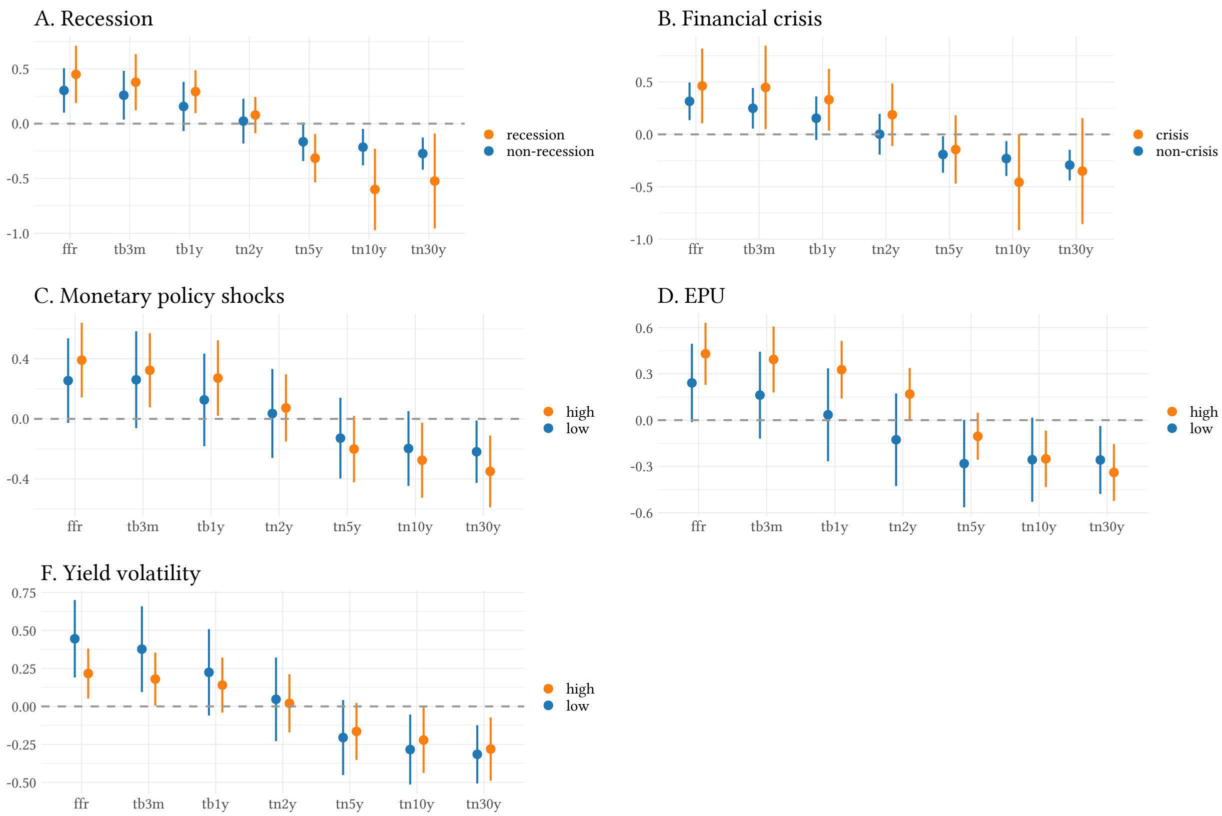
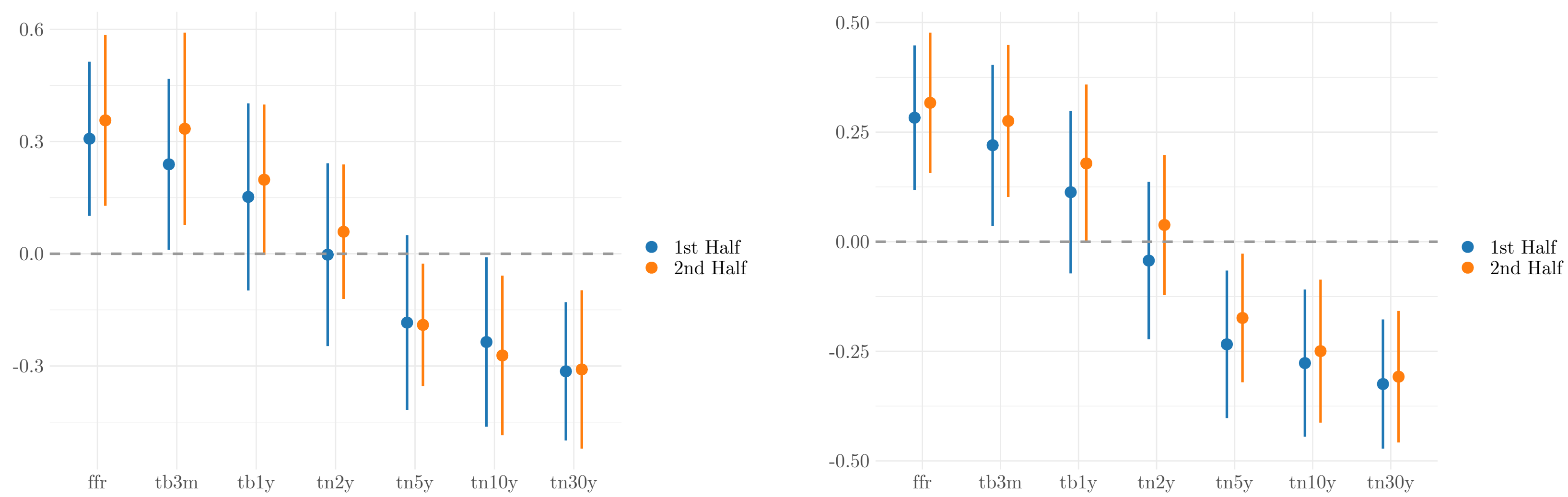


Figure A.4 Forecast error on forecast revision regression coefficients of short- and long-maturity interest rates: Conditional evidence

This figure plots the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate using individual-level forecasts

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h},$$

where the forecasts are pooled across horizon h, standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. The regressions are estimated separately for recession an non-recession periods. The blue dots represent coefficients from recession-period regressions, and the orange dots represent coefficients from non-recession-period regressions. The underlying variables are the Federal Funds Rate (ffr), and the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data are quarterly and cover 1988–2018. The range of each whisker depicts the 95%-confidence interval.



A. Split at 2003

B. Split each forecaster's sample in half

Figure A.5 Forecast error on forecast revision regression coefficients of short- and long-maturity interest rates: Subsample results at the individual level

This figure plots the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate using individual-level forecasts

$$FE_{i,t}\left(x_{t+h}\right) = \alpha_i + \beta FR_{i,t}\left(x_{t+h}\right) + \epsilon_{i,t,h},$$

where the forecasts are pooled across horizon h, standard errors are clustered by both forecaster and time, and forecaster fixed effects are included. The regressions are estimated separately for subsamples. In Panel A, I split the entire sample at the midpoint of the date range (end of 2003). In Panel B, I split each forecaster's sample in half. In both panels, the blue dots represent coefficients from the first half of the sample, and the orange dots represent coefficients from the second half of the sample. The underlying variables are the Federal Funds Rate (ffr), and the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data are quarterly and cover 1988–2018. The range of each whisker depicts the 95%-confidence interval.

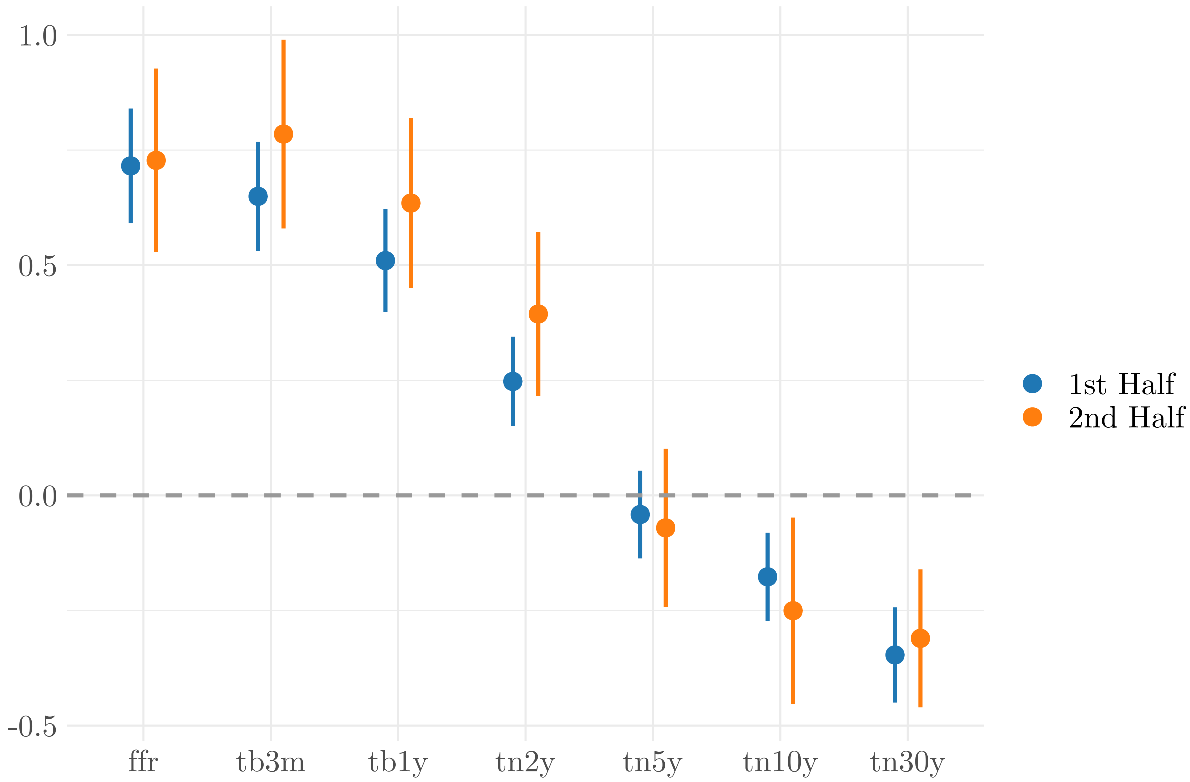


Figure A.6 Forecast error on forecast revision regression coefficients of short- and long-maturity interest rates: Subsample results at the consensus level

This figure plots the coefficients from the forecast error on the forecast revision regression of Coibion and Gorodnichenko (2015) for each interest rate using consensus-level forecasts

$$FE_t\left(x_{t+h}\right) = \alpha_i + \beta FR_t\left(x_{t+h}\right) + \epsilon_{t,h},$$

where the forecasts are pooled across horizon h, standard errors are calculated following Driscoll and Kraay (1998). The regressions are estimated separately for subsamples split at the midpoint of the date range (end of 2003). The blue dots represent coefficients from the first half of the sample, and the orange dots represent coefficients from the second half of the sample. The underlying variables are the Federal Funds Rate (ffr), and the Treasury bill, note and bond yields with maturities of 3 months, 1, 2, 5, 10 and 30 years ($tb3m$, $tb1y$, $tn2y$, $tn5y$, $tn10y$ and $tn30y$). The data are quarterly and cover 1988–2018. The range of each whisker depicts the 95%-confidence interval.