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KEY FINDINGS

- Textual analysis of monetary tones in media coverage of central bank policies can be applied to ameliorate temporal discontinuities in information flow from central banks between monetary policy meetings.
- Central bank monetary tones contain predictive information pertaining to future weekly fluctuations in yields.
- Those relationships manifest across various prediction horizons and yield maturities, are more pronounced between monetary policy meetings, and are robust to controlling for autocorrelation structures in yields and spreads.

ABSTRACT

This article examines the ramifications of central bank monetary tones on future changes in yields. The authors observe that monetary tones in media coverage of central bank policies contain predictive information pertaining to future weekly fluctuations in yields. Those relationships are more pronounced between monetary policy meetings suggesting that investors may use monetary tones to ameliorate temporal discontinuities in information flow from central banks between monetary policy meetings. Bottom-to-top decile fluctuations in Federal Reserve monetary tones precipitate a roughly 5.58 basis point 1-week increase in Treasury 10-year yields. A strategy designed to capture those weekly fluctuations earns roughly 0.56% weekly or roughly 29% in annualized terms during the period January 2015 through February 2021. The authors observe that those relationships manifest across various prediction horizons and yield maturities and are robust to controlling for autocorrelation structures in yields and spreads. They also find that those relationships are present within distinct geographic regions.

entral bank monetary policy is of paramount importance in financial markets. However, monetary policy is directly observable only during monetary policy meetings and through sporadic statements and press conferences from central bank officials. This article aims to ameliorate those temporal discontinuities in information flow by calculating central bank monetary tones, both during and between monetary policy meetings, by applying textual analysis to articles covering the Federal Reserve and other country central banks. While official central bank communications may be heavily scrutinized by internal bank policies before being released (i.e., bank's legal, compliance, and communication functions), the aggregated monetary tones in media coverage of central bank policies may capture more transparent interpretations of information flow from central banks. Using a large set of articles covering central bank policy, we develop a framework to quantify central bank monetary tones within media coverage. The method uses the articles stored in a proprietary reservoir of news articles to measure the intensity of hawkish and dovish media coverage pertaining to a given central bank each day. This process yields continuous measures of monetary tones in media coverage of central bank policies. For brevity within the context of this article, we refer to those measures as central bank monetary tones. We observe that central bank monetary tones contain predictive information pertaining to future weekly fluctuations in yields. Those relationships manifest across various prediction horizons and yield maturities, are more pronounced between monetary policy meetings, and are robust to controlling for autocorrelation structures in yields and spreads. We also find that those relationships are present within distinct geographic regions.

There is an expansive body of literature that considers the ramifications of monetary policy on asset prices. For example, Thorbecke (1997), Bernanke and Kuttner (2005), Kurov (2010), Kontonikas and Kostakis (2013), Maio (2014), and Chortareas and Noikokyris (2017) find that monetary tightening tends to be associated with negative stock returns. Kuttner (2001), Cochrane and Piazzesi (2002), Gürkaynak, Sack, and Swanson (2005), and Hanson and Stein (2015) find that fluctuations in policy rates tend to be associated with significant changes in Treasury yields. Guo, Kontonikas, and Maio (2020) find that bond premium news is the primary factor that accounts for the response of corporate bond returns to monetary shocks. Textual analysis has been recently used in the financial literature mostly in the context of measuring stock-level equity sentiment (Chen, De, Hu, and Hwang 2014; Bartov, Faurel, and Mohanram 2018; McGurk, Nowak, and Hall 2020) and in analyzing firm disclosures (Loughran and McDonald 2011). Tobback, Nardelli, and Martens (2017) present a methodology for constructing an index that reflects the media's assessment of the official communications of the European Central Bank (ECB). To our knowledge, our article is the first to apply textual analysis in measuring Federal Reserve monetary tones during non-Federal Open Market Committee (FOMC) meeting periods and in examining the relationships between those tones and future fluctuations in yields.

The rest of this article proceeds as follows. The data section outlines the construction methodology underlying our central bank monetary tones measures. The monetary tones and yields section presents our primary empirical analyses and results. The conclusion summarizes our primary findings and concludes the article.

DATA

For all articles collected in a proprietary reservoir of news articles, relevant articles are tagged as pertaining to a given central bank according to analyses of keywords. For our empirical tests, we consider monetary tones pertaining to the Federal Reserve, the ECB, and the Bank of England.¹ For each central bank, a further stratification of hawkish and dovish tagging is performed. Articles are classified as hawkish if they contain keywords or regular expressions representing hawkish policy, quantitative tightening, raising of rates, balance sheet reductions, or increasing inflation expectations. Conversely, articles are classified as dovish if they contain keywords or regular expressions representing hawkish policy, balance sheet expansions, or decreasing inflation expectations. The measures of the intensity of central bank coverage capture the daily ratio of central bank—related articles out of the entire set of articles in the reservoir. The central bank dovish measures capture the daily ratio of central bank dovish out of the

¹Monetary tones are also available for additional central banks.





NOTES: We regress Federal Reserve coverage intensities on event-time indicators surrounding the start of Federal Open Market Committee (FOMC) meetings, as well as on day-of-week effects. This exhibit presents the regression coefficients (line) and *t*-statistics (dots) associated with Federal Reserve coverage intensities on the (t - 5) through (t + 5) days surrounding the start of FOMC meetings. We observe that Federal Reserve coverage intensities tend to increase in the days preceding the start of FOMC meetings and reach an apex one day after the first day of FOMC meetings (FOMC 2). These findings are intuitive as Federal Reserve monetary decision announcements are typically made on the second day of FOMC meetings. Coverage intensities then decrease on days (t + 2) through (t + 5). The underlying sample period roughly spans January 2015 through February 2021.

entire set of articles in the reservoir. The central bank hawkish measures capture the daily ratio of central bank–related articles that are tagged as hawkish out of the entire set of articles in the reservoir. For the period spanning January 2015 through February 2021, the total number of articles underlying the Federal Reserve measures is 209,556. Of those articles, 91,042 are tagged as hawkish and 90,092 are tagged as dovish. For the ECB, the total number of articles is 85,517; of those 31,915 are tagged as hawkish and 42,957 are tagged as dovish. For the Bank of England, the total number of articles is 49,279; of those 22,485 are tagged as hawkish and 22,943 are tagged as dovish.

In Exhibit 1, we examine the time-series dynamics of Federal Reserve coverage intensities surrounding FOMC meetings. The underlying sample period (Day Index *t*) spans roughly January 2015 through February 2021. We regress Federal Reserve coverage intensities on event-time indicators surrounding the start of FOMC meetings, as well as on day-of-week effects. FOMC Meeting (*t*) [labeled FOMC 1 in Exhibit 1] is an indicator variable that takes on a value of 1 if a given date demarcates the start of a given FOMC meeting and 0 otherwise. We observe that Federal Reserve coverage intensities tend to increase in the days preceding the start of FOMC meetings and reach an apex one day after the first day of FOMC meetings (*t* + 1) [labeled FOMC 2 in Exhibit 1]. These findings are intuitive as Federal Reserve monetary decision announcements are typically made on day (*t* + 1). Coverage intensities then decrease on days (*t* + 2) through (*t* + 5).





NOTES: This exhibit presents the time series of the 7-day moving average of Federal Reserve monetary tones as well as Treasury 3-month yields. We observe that the decline in Federal Reserve monetary tones toward the end of 2018 portends the subsequent reduction in Treasury 3-month yields. The underlying sample roughly spans January 2015 through February 2021.

MONETARY TONES AND YIELDS

In measuring the aggregated monetary tones of media coverage pertaining to a given central bank, we scale the difference between hawkish and dovish coverage intensities by their sum [(H - D)/(H + D)]. Within the primary empirical tests of this article, we explore the ramifications of central bank monetary tones on future changes in yields. Specifically, we consider 1-week to 6-week future weekly innovations across 1-month through 10-year maturity yields. We obtain Treasury, LIBOR, and ICE swap yields from the Federal Reserve Bank of St. Louis. We consider monetary tones pertaining to the Federal Reserve, Bank of England, and ECB.

Exhibit 2 presents the time series of the 7-day moving average of Federal Reserve monetary tones as well as Treasury 3-month yields. The underlying sample roughly spans January 2015 through February 2021. We observe that the decline in Federal Reserve monetary tones toward the end of 2018 portends the subsequent reduction in Treasury 3-month yields.

In Exhibit 3, we examine the relationships between future weekly changes in Treasury 3-month yields for weeks (t + 1) through (t + 6) and weekly Federal Reserve monetary tones during week (t). We control for week (t) levels and changes in Treasury 3-month yields as well as for Treasury 3-month minus 1-month spreads (both levels and changes). The variable FOMC meeting (t) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during week (t) and 0 otherwise. We interact this variable with the controls as well as with the Federal Reserve monetary tones

Weekly Changes in Treasury 3-Month Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones

			∆[Treasury	3-Month]		
	(<i>t</i> + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(t + 6)
FOMC Meeting (<i>t</i>)	-0.43	-0.15	-0.73	2.13***	1.4	0.56
	[-0.65]	[-0.17]	[-0.93]	[2.9]	[1.31]	[0.91]
Δ [Treasury 3M] (t)	0.52***	0.05	-0.20**	-0.20**	-0.08	-0.09
	[3.05]	[0.41]	[-2.42]	[-2.07]	[-0.98]	[-1.42]
Δ [Treasury 3M] * [FOMC Meeting] (<i>t</i>)	-0.05	0.03	0.15	0.11	-0.09	-0.03
	[-0.32]	[0.22]	[1.32]	[1.25]	[-0.75]	[-0.32]
Treasury 3M (t)	0	-0.01	-0.01*	-0.01	0	0
	[-0.83]	[-1.31]	[-1.67]	[-1.43]	[-1.32]	[-1.13]
[Treasury 3M] * [FOMC Meeting] (t)	-0.01	0	0.01	0	-0.01	-0.01*
	[-1.06]	[0.06]	[1.32]	[-0.15]	[-1.12]	[-1.73]
Δ [Treasury 3M-1M] (t)	0.05	0.05	0.24*	0.21**	-0.09	-0.08
	[0.28]	[0.27]	[1.83]	[2.35]	[-1.12]	[-0.84]
Δ [Treasury 3M-1M] * [FOMC Meeting] (t)	-0.22	0.13	-0.23	-0.13	0.15	0.1
	[-1.08]	[0.56]	[-1.34]	[-1.09]	[0.75]	[0.63]
Treasury 3M-1M (t)	0.03	0.14**	0.13**	0.10*	0.06	0.03
	[0.86]	[2.15]	[2.17]	[1.9]	[1.12]	[0.49]
[Treasury 3M-1M] * [FOMC Meeting] (t)	0.34**	0.28	0.15	-0.30***	-0.21	0.08
	[1.97]	[1.61]	[1.21]	[-3.21]	[-1.18]	[0.85]
FED $(H - D)/(H + D)(t)$	2.17***	2.91***	3.76**	3.99*	3.15**	3.99**
	[3.3]	[2.99]	[2.14]	[1.96]	[2.35]	[2.24]
[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	-4.53**	-4.56**	-3.88*	1.69	5.83	-0.02
	[-2.02]	[-2.18]	[-1.83]	[0.81]	[1.29]	[-0.01]
Observations	321	320	319	318	317	316

NOTES: The specifications feature regressions of weekly changes in Treasury 3-month constant maturity yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. A constant is included but not reported. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroscedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

variable [FED (H – D)/(H + D)]. The time index (t) roughly spans January 2015 through February 2021.

The results in Exhibit 3 suggest positive predictive relationships between Federal Reserve monetary tones and future weekly fluctuations in Treasury 3-month yields. Those relationships are present during weeks (t + 1) through (t + 6) and are statistically significant even with a relatively small sample size of weekly observations. The coefficients on the interaction effects between Federal Reserve monetary tones and FOMC meeting weeks are negative, statistically significant, and larger in magnitude than the uninteracted coefficients during weeks (t + 1) through (t + 3), suggesting that Treasury markets appear to overreact to Federal Reserve monetary tones during FOMC meeting weeks. The effect seems to last for three weeks following FOMC meeting weeks and subsequently reverses during weeks (t + 4) and (t + 5).

Despite the statistical significance reported in Exhibit 3, the economic magnitudes of the effects are difficult to interpret as the coefficients are expressed as the response of yields to hawkish-dovish tones. Exhibit 4 examines the economic

Weekly Changes in Treasury 3-Month Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones: Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)		
	∆[Treasury 3-Month]							
SDR[FED (H – D)/(H + D)] (<i>t</i>)	3.46***	3.60***	3.48***	3.76***	2.97***	4.53**		
	[3.4]	[3.09]	[2.85]	[2.67]	[2.86]	[2.47]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-0.62	-0.8	-1.68	1.84	9.68	2.84		
	[-0.19]	[-0.38]	[-0.85]	[0.83]	[1.15]	[0.71]		

NOTES: The specifications feature regressions of weekly changes in Treasury 3-month constant maturity yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroscedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

magnitudes of those effects. Specifically, we examine the consequences of bottom-to-top decile fluctuations in Federal Reserve monetary tones on future weekly changes in Treasury 3-month yields. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. Decile 0 of monetary tones is the lowest decile of monetary tones, and Decile 9 of monetary tones is the highest decile of monetary tones. We find that bottom-to-top decile fluctuations in Federal Reserve monetary tones during week (t) lead to a roughly 3.46 basis point increase in Treasury 3-month yields during week (t + 1). This effect is statistically significant at the 1% level and manifests following both FOMC and non-FOMC meeting weeks. We also observe predictive relationships between Federal Reserve monetary tones and future changes in 1-month and 6-month maturity Treasury yields (Appendix Exhibit A1).

Exhibit 5 presents the evolution of the week (t + 1) through week (t + 6) shocks to Treasury 3-month yields stemming from bottom-to-top decile fluctuations in Federal Reserve monetary tones. We observe that the ramifications of bottom-to-top decile increases in Federal Reserve monetary tones are gradually incorporated into yields over the weeks following these shocks. For example, the 3.46 basis point increase in Treasury 3-month yields during week (t + 1), relative to week (t), is followed by a 3.60 basis point increase in yields during week (t + 2), relative to week (t + 1). This gradual incorporation of monetary tones within yields, over a multi-week temporal horizon, presents trading opportunities to fixed-income traders. Ceteris paribus, higher levels of monetary tones tend to imply more pronounced future elevations in yields and consequent augmented declines in Treasury security prices over subsequent weeks.

Exhibit 6 extends these analyses to long-term maturity Treasury markets. We find that Federal Reserve monetary tones appear to also predict future weekly changes in 1-year, 2-year, 3-year, 5-year, and 10-year Treasury yields. These effects are economically and statistically significant. For example, a bottom-to-top decile fluctuation in Federal Reserve monetary tones precipitates a roughly 5.58 basis point increase in Treasury 10-year yields at week (t + 1). This effect is statistically significant at the 1% level. A 5.58 basis point weekly change in 10-year yields constitutes a roughly 0.56% change in Treasury 10-year security prices. This translates to roughly 29% in annualized terms.

Exhibit 7 presents the week (t + 1) through week (t + 6) shocks to the Treasury term structure stemming from bottom-to-top decile fluctuations in Federal Reserve

Weekly Changes in Treasury 3-Month Constant Maturity Yields: Decile Spread Response Function, Distinct Prediction Horizons



NOTES: This exhibit presents the evolution of the week (t + 1) through week (t + 6) shocks to Treasury 3-month yields stemming from bottom-to-top decile fluctuations in Federal Reserve monetary tones during week (t). This exhibit focuses on baseline effects during non-FOMC meeting weeks with week index (t). The time index (t) roughly spans January 2015 through February 2021.

EXHIBIT 6

Week (t + 1) Changes in Treasury Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones: Long-Term Yields, Economic Magnitude

	1-Year	2-Year	3-Year	5-Year	10-Year		
	Δ [Treasury Yield, Week (t + 1)]						
SDR[FED (H - D)/(H + D)](t)	2.67**	3.37**	3.37**	4.40**	5.58***		
	[1.99]	[2.58]	[2.17]	[2.42]	[2.92]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	1.03	0.19	1.64	4.03	6.84		
	[0.36]	[0.06]	[0.41]	[0.76]	[1.07]		

NOTES: The specifications feature regressions of week (t + 1) changes in Treasury constant maturity yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroscedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

monetary tones. The exhibit summarizes the results in Exhibits 4 through 6 as well as the results in Appendix Exhibits A1 and A2. We observe that the relationships between Federal Reserve monetary tones and Treasury yields manifest across various prediction horizons and yield maturities. For a given prediction horizon, we tend to observe more pronounced yield responses for longer-maturity securities.

Next, we examine the relationships between Federal Reserve monetary tones and the future yield in non-Treasury securities. In Exhibit 8, we examine the relationships between Federal Reserve monetary tones and future changes in USD LIBOR 3-month yields. As in the Treasury market settings, we observe predictability between Federal

Weekly Changes in Treasury Constant Maturity Yields: Decile Spread Response Function, Distinct Treasury Yield Maturities, and Prediction Horizons



NOTES: This exhibit presents the week (t + 1) through week (t + 6) shocks to the Treasury term structure stemming from bottom-to-top decile fluctuations in Federal Reserve monetary tones during week (t). This exhibit focuses on baseline effects during non-FOMC meeting weeks with week index (t). The time index (t) roughly spans January 2015 through February 2021.

EXHIBIT 8

Weekly Changes in US Dollar LIBOR 3-Month Yields vs. Weekly Federal Reserve Monetary Tones: Economic Magnitude

	(<i>t</i> + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)
			Δ [USD LIBO	R 3-Month]		
SDR[FED (H – D)/(H + D)] (t)	4.00***	4.74***	3.66**	3.48***	3.56***	4.45***
	[2.9]	[2.94]	[2.56]	[3.87]	[5.1]	[4.83]
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-1.19	-1.32	5.54***	9.97**	13.96***	11.87**
	[-0.45]	[-0.38]	[2.66]	[2.58]	[2.68]	[2.45]

NOTES: The specifications feature regressions of weekly changes in US dollar LIBOR 3-month yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroscedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

Reserve monetary tones and future changes in LIBOR yields across distinct prediction horizons. These effects are statistically and economically significant. Appendix Exhibits A3 and A4 present statistically and economically significant response functions in the context of other LIBOR and ICE SWAP yield maturities.

In Exhibit 9, we augment our baseline models to control for weekly levels of the CBOE Volatility (VIX) index, weekly changes in the VIX index, weekly levels of the Merrill Lynch Option Volatility Estimate (MOVE) index, as well as weekly changes in the

Weekly Changes in Yields vs. Weekly Federal Reserve Monetary Tones: Additional Macroeconomic Controls (VIX and MOVE Index), Economic Magnitude

	(<i>t</i> + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)		
	∆[Treasury 3-Month]							
SDR[FED (H - D)/(H + D)](t)	4.35***	4.48***	3.98***	4.21**	3.64**	5.39**		
	[3.44]	[2.92]	[2.69]	[2.59]	[2.25]	[1.98]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-0.34	-0.64	-1.77	1.87	9.79	3.02		
	[-0.11]	[-0.3]	[-0.88]	[0.86]	[1.14]	[0.73]		
			Δ [USD LIBO	R 3-Month]				
SDR[FED (H - D)/(H + D)](t)	4.07***	5.01***	3.88***	3.05***	3.37***	4.91***		
	[3.18]	[3.21]	[2.92]	[3.16]	[3.42]	[2.98]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-1.41	-1.26	5.76***	9.78***	13.61***	11.52**		
	[-0.52]	[-0.37]	[2.86]	[2.7]	[2.71]	[2.51]		

NOTES: The specifications feature regressions of weekly changes in yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. We augment our baseline models to control for weekly levels of the CBOE Volatility (VIX) index, weekly changes in the VIX index, weekly levels of the Merrill Lynch Option Volatility Estimate (MOVE) index, as well as weekly changes in the MOVE index. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

MOVE index. We continue to observe positive predictive relationships between weekly Federal Reserve monetary tones and future weekly changes in yields. These results suggest that media-derived monetary tones are not simply aggregated, forwardlooking reflections of investor sentiment as yield predictability continues to manifest after controlling for measures of equity and Treasury market sentiment.

In Exhibit 10, we extend our analyses to international central banks. In the first panel, we examine the ability of Bank of England monetary tones to predict future changes in LIBOR 3-month yields (denominated in GBP). As in the Federal Reserve setting, we observe positive predictive relationships between Bank of England monetary tones and future fluctuations in LIBOR 3-month yields. These effects are statistically and economically significant for distinct prediction horizons. In the second panel, we examine these effects in the context of the ECB. Interestingly, the predictive relationships in the ECB setting (ECB monetary tones and LIBOR 3-month yields denominated in EUR) tend to be relatively less pronounced when compared with their analogs in the Federal Reserve and Bank of England settings.

CONCLUSION

Media-derived measures of central bank monetary tones are valuable tools in modeling future innovations in yields. We find that these media measures contain information that is orthogonal to, and that augments, information in market-based measures of yields and spreads. We observe that the information in central bank monetary tones is gradually incorporated into yields over a temporal horizon spanning several weeks following shocks to monetary tones. Our results suggest that media-derived monetary tones are not simply aggregated reflections of investor sentiment as yield predictability continues to manifest after controlling for measures of equity and Treasury market sentiment.

Weekly Changes in British Pound and EURO LIBOR 3-Month Yields vs. Weekly Central Bank Monetary Tones of International Central Banks: Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(t + 6)		
	∆[GBP LIBOR 3-Month]							
SDR[BOE (H – D)/(H + D)] (t)	1.36**	1.68***	2.33***	2.26**	2.21**	1.62**		
	[2.57]	[2.72]	[2.91]	[2.44]	[2.28]	[2.35]		
SDR[BOE (H – D)/(H + D)] * [Rate Decision] (t)	-1.09	-1.59	-2.24**	-0.51	0.13	1.37		
	[-1.21]	[-1.63]	[-2.52]	[-0.55]	[0.09]	[1.1]		
			∆[EURO LIBOI	R 3-Month]				
SDR[ECB (H – D)/(H + D)] (t)	0.2	0.3	0.26	0.36	0.71*	0.42		
	[0.64]	[0.91]	[0.8]	[1.06]	[1.94]	[1.1]		
SDR[ECB (H – D)/(H + D)] * [Monetary Decision] (t)	-0.69	-0.24	0.49	0.24	-0.58	0.57		
	[-0.89]	[-0.49]	[1]	[0.63]	[-1.12]	[1.07]		

NOTES: The specifications feature regressions of weekly changes in the British pound and euro LIBOR 3-month yields on weekly levels of Bank of England and European Central Bank (ECB) monetary tones, respectively. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable Rate Decision (*t*) is an indicator variable that takes on a value of 1 if a Bank of England rate decision occurs during a given week and 0 otherwise. The variable Monetary Decision (*t*) is an indicator variable that takes on a value of 1 if an ECB monetary policy decision occurs during a given week and 0 otherwise. The scaled decile rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics use Newey–West adjusted standard errors, which account for heteroscedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

APPENDIX

ROBUSTNESS TESTS

Exhibit A1 presents the consequences of bottom-to-top decile fluctuations in Federal Reserve monetary tones on future weekly changes in 1-month and 6-month treasury yields. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. We observe predictive relations between Federal Reserve monetary tones and future changes in 1-month and 6-month maturity Treasury yields.

Exhibit A2 extends these analyses to long-term maturity Treasury markets. We find that Federal Reserve monetary tones appear to also predict future changes in 1-year, 2-year, 3-year, 5-year, and 10-year Treasury yields. These effects are economically and statistically significant.

Within Exhibits A3 and A4, we examine the relations between Federal Reserve monetary tones and future changes in LIBOR and ICE swap yields. As within the Treasury market settings, we observe predictability between Federal Reserve monetary tones and future changes in LIBOR and ICE swap yields across distinct prediction horizons and maturities. These effects are statistically and economically significant.

In Exhibit A5, we examine the manifestations of the previous effects as stratified within the first and second temporal halves of our primary samples. We find that the relations between Federal Reserve monetary tones and fluctuations in yields appear more pronounced during the second halves of our samples.

In Exhibit A6, we observe that the primary full sample intuition from previous results is robust to excluding Friday media levels as the last day of weekly media levels. These results suggest that the relations between weekly Federal Reserve monetary tones and future weekly changes in yields are not solely derived from Friday media levels.

EXHIBIT A1

Weekly Changes in Treasury Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones: Short-Term Yields, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(t + 6)		
	∆[Treasury 1-Month]							
SDR[FED (H - D)/(H + D)](t)	0.78	2.34**	3.45**	3.06**	2.36**	2.89*		
	[0.84]	[2.05]	[2.59]	[2.22]	[2.07]	[1.96]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	1.07	-1.22	-3.4	1.02	5.56	7.93		
	[0.35]	[-0.53]	[-1.23]	[0.53]	[1.03]	[1.24]		
			Δ [Treasury (6-Month]				
SDR[FED (H – D)/(H + D)] (t)	3.81***	3.78***	4.21***	3.66***	3.72***	4.74**		
	[3.61]	[3.57]	[3.54]	[2.67]	[3.37]	[2.3]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-3.63	1.28	-1.57	2.9	10.02	2.9		
	[-1.19]	[0.55]	[-0.71]	[0.94]	[1.14]	[0.88]		

NOTES: The specifications feature regressions of weekly changes in Treasury constant maturity yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

EXHIBIT A2

Weekly Changes in Treasury Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones: Long-Term Yields, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(t + 6)		
	∆[Treasury 1-Year]							
SDR[FED (H - D)/(H + D)](t)	2.67**	4.27***	4.60***	4.27***	5.04***	5.22**		
	[1.99]	[3.33]	[3.62]	[2.89]	[3.74]	[2.4]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	1.03	-0.83	-4.98**	1.68	5.84	1.05		
	[0.36]	[-0.3]	[-2.22]	[0.42]	[0.93]	[0.38]		
			∆[Treasur	y 2-Year]				
SDR[FED (H - D)/(H + D)](t)	3.37**	4.98***	4.25***	3.31*	4.67***	4.61**		
	[2.58]	[3.51]	[2.8]	[1.86]	[3]	[2.38]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	0.19	-2.85	-5.93**	4	7.08	3.77		
	[0.06]	[-0.69]	[-2.14]	[0.91]	[1.5]	[1.11]		
	∆[Treasury 3-Year]							
SDR[FED (H - D)/(H + D)](t)	3.37**	4.76***	4.58***	3.85*	4.73**	4.30**		
	[2.17]	[3.01]	[2.62]	[1.83]	[2.49]	[2.08]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	1.64	-1.1	-8.15**	3.96	6.05	2.64		
	[0.41]	[-0.21]	[-2.41]	[0.8]	[1.24]	[0.69]		
			∆[Treasur	y 5-Year]				
SDR[FED (H - D)/(H + D)](t)	4.40**	5.76***	4.47**	4.37*	5.62**	4.61**		
	[2.42]	[3.04]	[2.12]	[1.77]	[2.38]	[2]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	4.03	0.25	-8.08*	4.66	7.54	2.41		
	[0.76]	[0.03]	[-1.83]	[0.75]	[1.32]	[0.46]		

(continued)

EXHIBIT A2 (continued)

Weekly Changes in Treasury Constant Maturity Yields vs. Weekly Federal Reserve Monetary Tones: Long-Term Yields, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(t + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(t + 6)		
	∆[Treasury 10-Year]							
SDR[FED (H – D)/(H + D)] (<i>t</i>)	5.58***	6.73***	5.31**	5.42**	5.99**	4.13*		
	[2.92]	[3.07]	[2.37]	[1.97]	[2.12]	[1.69]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	6.84	4.73	-7.51	4.55	9.17	3.26		
	[1.07]	[0.47]	[-1.4]	[0.72]	[1.62]	[0.52]		

NOTES: The specifications feature regressions of weekly changes in Treasury constant maturity yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

EXHIBIT A3

Weekly Changes in US Dollar LIBOR Yields vs. Weekly Federal Reserve Monetary Tones: Short-Term Yields, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(t + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)		
	∆[USD LIBOR 1-Month]							
SDR[FED (H - D)/(H + D)](t)	3.62***	4.08***	3.68***	3.97***	3.80***	3.39***		
	[3.14]	[3.07]	[3.29]	[3.41]	[4.29]	[4.91]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-1.19	1.59	5.68***	7.48***	10.64***	9.18***		
	[-0.63]	[0.91]	[3.17]	[3.03]	[2.87]	[3.03]		
			Δ [USD LIBO	R 6-Month]				
SDR[FED (H - D)/(H + D)](t)	4.42***	5.24***	4.44***	4.26***	3.86***	4.75***		
	[3.33]	[3.46]	[2.95]	[4.17]	[4.61]	[4.4]		
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-3.47	-5.64*	1.09	5.94**	10.01***	6.95**		
	[-1.61]	[-1.8]	[0.58]	[2.13]	[2.67]	[2.28]		

NOTES: The specifications feature regressions of weekly changes in US dollar LIBOR yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and auto-correlation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

EXHIBIT A4

Weekly Changes in US Dollar ICE Swap Yields vs. Weekly Federal Reserve Monetary Tones: Long-Term Yields, Economic Magnitude

	(t + 1)	(t + 2)	(t + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)
			Δ [USD ICE	Swap 1-Year]		
SDR[FED (H - D)/(H + D)](t)	2.25***	4.06***	3.88***	3.52***	4.83***	4.78***
	[2.96]	[3.64]	[3.67]	[3.91]	[4.39]	[3.53]
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	2.7	-0.92	0.61	-2.01	-0.24	-0.41
	[1.45]	[-0.34]	[0.31]	[-0.61]	[-0.13]	[-0.22]
			Δ [USD ICE	Swap 2-Year]		
SDR[FED (H - D)/(H + D)](t)	2.04*	4.54***	3.98***	4.24***	5.72***	4.44***
	[1.9]	[3.24]	[3.08]	[3.11]	[4.04]	[2.94]
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	5.59**	-1.92	-1.12	-4.35	-2	-1.17
	[1.99]	[-0.57]	[-0.38]	[-1.12]	[-0.84]	[-0.4]
			Δ [USD ICE	Swap 3-Year]		
SDR[FED (H - D)/(H + D)](t)	1.72	4.91***	3.94**	4.19**	5.15***	3.30*
	[1.24]	[2.79]	[2.44]	[2.38]	[2.98]	[1.82]
SDR[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	9.64***	-2.16	-1.83	-8.21*	-0.52	-1.88
	[2.72]	[-0.45]	[-0.48]	[-1.8]	[-0.18]	[-0.5]
			Δ [USD ICE	Swap 5-Year]		
SDR[FED (H – D)/(H + D)] (t)	2.71*	5.84***	4.47**	4.81**	6.43***	3.96*
	[1.71]	[2.95]	[2.36]	[2.46]	[3.03]	[1.81]
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	10.23**	-0.83	-2.09	-6.65	-2.12	0.28
	[2.38]	[-0.12]	[-0.44]	[-1.23]	[-0.6]	[0.06]
			Δ [USD ICE S	Swap 10-Year]		
SDR[FED (H - D)/(H + D)](t)	3.05*	5.79***	4.57**	5.16**	5.24**	2.19
	[1.95]	[2.85]	[2.39]	[2.56]	[2.42]	[1.03]
SDR[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	9.62**	0.61	0.16	-7.56	-0.35	1.31
	[1.99]	[0.08]	[0.03]	[-1.56]	[-0.08]	[0.28]

NOTES: The specifications feature regressions of weekly changes in US dollar ICE swap yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

EXHIBIT A5

Weekly Changes in Yields vs. Weekly Federal Reserve Monetary Tones: Sample Stratifications, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(t + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)				
		∆[Treasury 3-Month]								
	First Half Sample									
SDR[FED (H – D)/(H + D)] (<i>t</i>)	0.95	1.45	1.51	2.23**	1.13	1.13				
	[0.96]	[1.25]	[1.25]	[2.5]	[1.15]	[1.09]				
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	3.08	0.87	-2.37	0.23	2.02	0.39				
	[1.27]	[0.35]	[-1.2]	[0.13]	[0.7]	[0.22]				

(continued)

EXHIBIT A5 (continued)

Weekly Changes in Yields vs. Weekly Federal Reserve Monetary Tones: Sample Stratifications, Economic Magnitude

	(t + 1)	(t + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)			
	Second Half Sample								
SDR[FED (H - D)/(H + D)] (t)	5.50***	2.11	1.67	2.17	2.62	6.20*			
	[2.78]	[1.01]	[1.06]	[1]	[1.5]	[1.84]			
SDR[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	-0.07	3.12	2.96	5.72	14.02	6.76			
	[-0.01]	[0.58]	[0.99]	[1.29]	[0.82]	[0.79]			
	∆[USD LIBOR 3-Month]								
	First Half Sample								
SDR[FED (H - D)/(H + D)] (t)	-0.08	-0.03	-0.58	-0.26	-0.06	0.12			
	[-0.19]	[-0.07]	[-0.97]	[-0.38]	[-0.07]	[0.19]			
SDR[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	0.09	-0.25	1.56*	0.11	0.8	2.44			
	[0.12]	[-0.25]	[1.87]	[0.11]	[0.73]	[1.64]			
	Second Half Sample								
SDR[FED (H - D)/(H + D)](t)	8.92***	8.70**	5.17	4.97**	5.49***	5.76***			
	[3.11]	[2.58]	[1.54]	[2.58]	[2.95]	[3.08]			
SDR[FED (H - D)/(H + D)] * [FOMC Meeting] (t)	-6.01	-4.24	6.23	14.02***	17.96***	16.99***			
	[-1.12]	[-0.61]	[1.63]	[3.35]	[3.65]	[2.85]			

NOTES: The specifications feature regressions of weekly changes in yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

EXHIBIT A6

Weekly Changes in Yields vs. Weekly Federal Reserve Monetary Tones: Media Week Definition Robustness, Economic Magnitude

	(t + 1)	(<i>t</i> + 2)	(<i>t</i> + 3)	(<i>t</i> + 4)	(<i>t</i> + 5)	(<i>t</i> + 6)			
	∆[Treasury 3-Month]								
SDR[FED (H - D)/(H + D)] (t)	3.29***	3.61***	3.37***	3.60***	2.70***	4.53**			
	[3.32]	[3.22]	[2.81]	[2.61]	[2.65]	[2.53]			
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-1.76	-1.69	-1.91	1.96	9.22	2.05			
	[-0.59]	[-0.87]	[-0.97]	[0.91]	[1.16]	[0.55]			
	∆[USD LIBOR 3-Month]								
SDR[FED (H - D)/(H + D)] (t)	3.76***	4.59***	3.33**	3.28***	3.23***	4.20***			
	[2.82]	[2.91]	[2.38]	[3.6]	[4.58]	[4.51]			
SDR[FED (H – D)/(H + D)] * [FOMC Meeting] (t)	-0.91	-1.06	6.13***	10.56***	14.62***	12.50**			
	[-0.33]	[-0.29]	[2.91]	[2.67]	[2.71]	[2.49]			

NOTES: The specifications feature regressions of weekly changes in yields on weekly levels of Federal Reserve monetary tones. The variable (H - D)/(H + D) is the difference between hawkish and dovish media intensities divided by their sum. The variable FOMC Meeting (*t*) is an indicator variable that takes on a value of 1 if an FOMC meeting occurs during a given week and 0 otherwise. The scaled decile-rank (SDR) of a given variable is constructed by first ranking the respective variable into decile order (0 to 9) and dividing by 9. The *t*-statistics utilize Newey–West adjusted standard errors which account for heteroskedasticity and autocorrelation of a maximum order of three available weeks. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The time index (*t*) roughly spans January 2015 through February 2021.

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