Price Drift before U.S. Macroeconomic News: Private Information about Public Announcements? INTERNET APPENDIX*

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1 Overview

This Internet Appendix presents additional details and robustness checks for the "Price Drift before U.S. Macroeconomic News: Private Information about Public Announcements?" paper. Section 2 shows summary statistics for the announcements listed in Table 1 in the paper. Section 3 provides additional detail for Figure 1 in the paper by showing cumulative average returns for individual announcements. Section 4 compared cumulative average returns in the expanded $[t-180min, t+60min]$ window to the $[t-60min, t+60min]$ window reported in the paper. Section 5 checks the robustness of testing multiple hypotheses using the Holm (1979) step-down procedure. Section 6 analyzes the pre-announcement drift conditional on the sign of the post-announcement return. Complementing the time-series methodology followed in the paper, Section 7 repeats the analysis based on event study methodology including robustness checks for outliers, event window length, effect of order flows, and other markets (E-mini Dow futures and 30-year Treasury bond futures). Section 8 provides additional information on forecasting the announcement surprise using proprietary data sets. Section 9 provides additional information on forecasting the announcement surprise using individual analyst forecasts.

2 Summary Statistics for Announcements Data

Table B1 shows summary statistics for the 30 announcements listed in Table 1 in the paper.

3 Cumulative Average Returns for Individual Announcements

Figure 1 in the paper presents cumulative average returns (CARs) averaged across announcements. Here, in Figure B1 we present CARs for the individual announcements that exhibit drift per Table 2 in the paper (four in the E-mini S&P 500 market and nine in the 10-year Treasury note market).

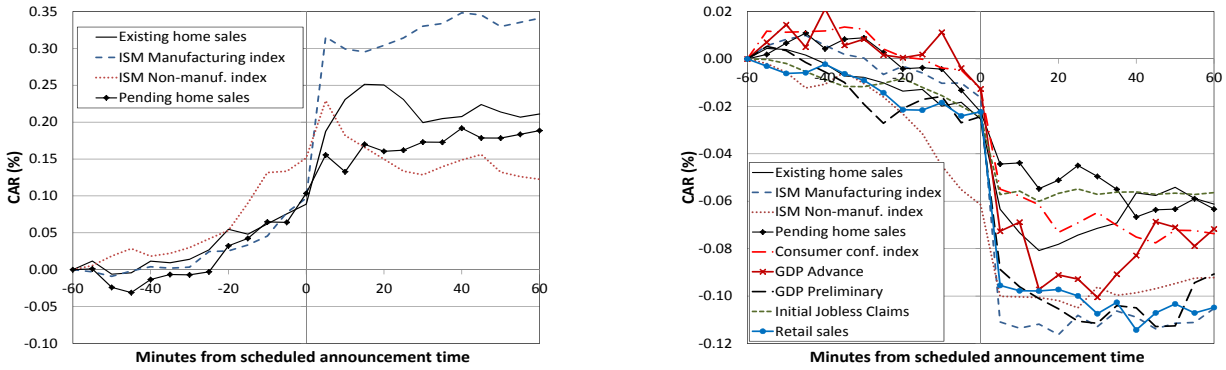
Table B1: Macroeconomic Announcements - Summary Statistics

Announcement	Unit	Mean	Median	Min	Max	Std
GDP advance	%	1.44	2	-6.1	5.7	2.39
GDP preliminary	%	1.40	2	-6.2	5.9	2.62
GDP final	%	1.40	1.9	-6.3	5.6	2.58
Personal income	%	0.25	0.3	-3.6	2.6	0.66
ADP employment	Number of jobs (1,000)	13.39	93	-742	325	240.56
Initial jobless claims	Number of claims (1,000)	421.95	399.5	292	669	85.16
Non-farm employment	Number of jobs (1,000)	-4.97	69	-663	431	234.83
Factory orders	%	0.09	0.6	-5.2	4.8	1.99
Industrial production	%	0.07	0.1	-2.8	1.3	0.76
Construction spending	%	-0.13	0	-3.3	2.7	1.01
Durable goods orders	%	-0.04	0.05	-13.2	9.9	3.60
Wholesale inventories	%	0.32	0.5	-1.7	1.9	0.86
Advance retail sales	%	0.18	0.3	-2.8	2.7	0.86
Consumer credit	USD (Billion)	4.99	6.35	-21.6	21.36	10.50
Personal consumption	%	0.26	0.3	-1	1.3	0.36
Building permits	Number of permits (1,000)	737.12	680	494	1091	179.20
Existing home sales	Number of homes (Million, Annual rate)	4.93	4.91	3.83	6.54	0.41
Housing starts	Number of homes (1,000)	720.73	658	458	1066	175.90
New home sales	Number of homes (1,000)	383.15	368	250	604	83.09
Pending home sales	%	0.37	0.25	-30	10.4	6.08
Government budget	USD (Billion)	-88.29	-94.3	-237.2	159.3	89.95
Trade balance	USD (Billion)	-44.04	-42.9	-63.1	-26	9.02
Consumer price index	%	0.14	0.1	-1.7	1.1	0.39
Producer price index	%	0.20	0.2	-2.8	1.8	0.88
CB Consumer confidence index	Index	59.60	59.6	25	87.9	13.37
Index of leading indicators	%	0.31	0.3	-0.8	1.4	0.45
ISM Manufacturing index	Index	51.56	52.5	32.4	61.4	6.30
ISM Non-manufacturing index	Index	51.96	53	37.3	59.7	4.53
UM Consumer sentiment - Final	Index	71.23	72.5	55.3	85.1	7.67
UM Consumer sentiment - Prel	Index	70.39	71.8	54.9	84.9	7.73

The sample period covers January 1, 2008 to March 31, 2014. The columns show the mean, median, minimum, maximum and standard deviation values for each announcement listed in Table 1 in the paper.

Figure B1: Cumulative Average Returns for Individual Announcements

E-mini S&P 500 **10-year Treasury Note**



The sample period is from January 1, 2008 through March 31, 2014. We classify each event as "good" or "bad" news based on whether the announcement surprise has a positive or negative effect on the stock and bond markets using the coefficients in Table 3 in the paper. Cumulative average returns (CARs) are then calculated in the $[t - 60min, t + 60min]$ window. Only announcements showing evidence of pre-announcement drift in each market in Table 2 in the paper are included (four in the E-mini S&P 500 market and nine in the 10-year Treasury note market).

4 Cumulative Average Returns for $[t-180min, t+60min]$ Window

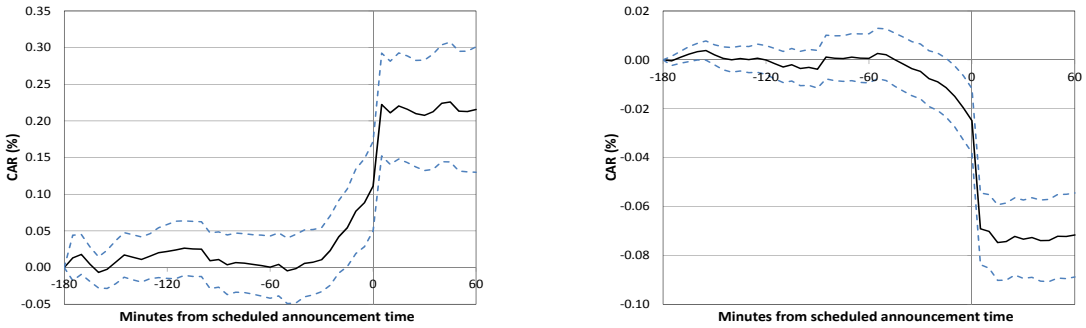
Figure 1 in the paper presents CARs for the $[t - 60min, t + 60min]$ window. Figure B2 presents CARs in the expanded $[t - 180min, t + 60min]$ window. The CARs during the $[t - 180min, t - 60min]$ window hover around zero similarly to the $[t - 60min, t - 30min]$ window.

5 Robustness Check: Multiple Hypotheses Testing and Data Snooping

Table 2 in Section 4.1 in the paper presents results showing the pre-announcement price drift. In that table, we test multiple hypotheses. Increasing the number of hypotheses leads to the rejection of an increasing number of hypotheses with probability one, irrespective of the sample size. Failure to adjust the p-values can be viewed as data snooping. To rule out this possibility, we use the Holm (1979) step-down procedure. This procedure adjusts the

Figure B2: Cumulative Average Returns for $[t - 180min, t + 60min]$ Window

E-mini S&P 500 **10-year Treasury Note**



The sample period is from January 1, 2008 through March 31, 2014. We classify each event as "good" or "bad" news based on whether the announcement surprise has a positive or negative effect on the stock and bond markets using the coefficients in Table 3 in the paper. Following Bernile, Hu, and Tang (2016), we invert the sign of returns for negative surprises. Cumulative average returns (CARs) are then calculated in the $[t - 180min, t + 60min]$ window for the "drift" category based on Table 2 in the paper. In the stock market, there are four drift announcements. In the bond market, there are nine drift announcements. The solid line shows the mean CAR. Dashed lines mark two-standard-error bands (standard error of the mean).

hypothesis rejection criteria to control the probability of encountering one or more type I errors, the familywise error rate (see, for example, Romano and Wolf (2005)). Denote the hypotheses by $H_1, ..., H_M$, one for each of the $M = 30$ announcements in Table 2. Denote the corresponding p-values by $p_1, ..., p_M$. Consider the significance level of 0.05. The procedure orders the Table 2 joint test p-values from the lowest to the highest. Denoting the ordered hypotheses by $k = 1 \ldots 30$, it computes $\frac{0.05}{M+1-k}$ for each k and compares this computed value to the Table 2 p-value. The null hypothesis of no drift is rejected if $\frac{0.05}{M+1-k}$ exceeds the p-value in Table 2. Based on this *conservative* approach, four announcements ranked at the top of Table 2 (ISM Manufacturing, Pending Home Sales, ISM Non-Manufacturing and CB Consumer Confidence Index) show a statistically significant drift.

6 Robustness Check: Conditioning on Sign of Post-Announcement Return

The results in Section 4 in the paper show that the pre-announcement drift is in the direction of the *surprise*. In this section, we focus instead on returns and show that the pre-announcement drift exists also conditional on the sign of the post-announcement *return*.

Table B2: Holm's Step-down Procedure

Announcement	Table 2 Joint Test p-value	$\frac{0.05}{M+1-k}$	Null Hypothesis of No Drift Rejected
ISM Non-manufacturing index	8.033E-11	0.0017	Yes
Pending home sales	7.560E-08	0.0017	Yes
ISM Manufacturing index	0.150E-05	0.0018	Yes
CB Consumer confidence index	0.109E-04	0.0019	Yes
Existing home sales	0.012	0.0019	No
Advance retail sales	0.016	0.0020	No
GDP preliminary	0.018	0.0021	No
Initial jobless claims	0.020	0.0022	No
GDP advance	0.049	0.0023	No
Factory orders	0.060	0.0024	No
Industrial production	0.203	0.0025	No
Trade balance	0.219	0.0026	No
Construction spending	0.226	0.0028	No
Consumer credit	0.238	0.0029	No
Building permits	0.244	0.0031	No
Personal income	0.296	0.0033	No
Government budget	0.333	0.0036	No
Personal consumption	0.433	0.0038	No
New home sales	0.456	0.0042	No
Wholesale inventories	0.539	0.0045	No
Durable goods orders	0.644	0.0050	No
Consumer price index	0.648	0.0056	No
UM Consumer sentim. - Prel	0.671	0.0063	No
Index of leading indicators	0.678	0.0071	No
Non-farm employment	0.686	0.0083	No
Housing starts	0.704	0.0100	No
Producer price index	0.858	0.0125	No
ADP employment	0.859	0.0167	No
UM Consumer sentim. - Final	0.895	0.0250	No
GDP final	0.978	0.0500	No

The sample period is from January 1, 2008 through March 31, 2014. All 30 announcements are included.

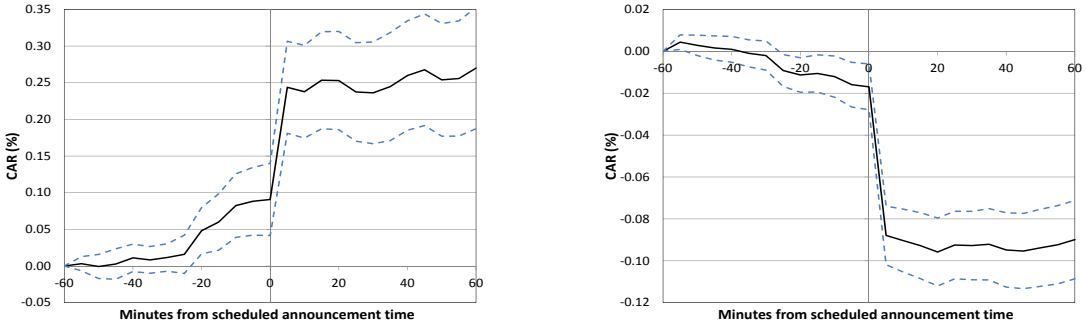
For announcements showing drift in Table 2 in the paper, the returns in the $[-30min, -5sec]$ window are strongly correlated with the returns in the $[-5sec, +1min]$ window. The correlation of returns in these two windows is highly significant with values of 0.19 and 0.15 in the stock and bond markets, respectively. In contrast, for no-drift announcements this

correlation is not significant with values of -0.01 and -0.02 in the stock and bond markets, respectively.

We show CARs conditioned on the sign of the returns in the $[-5sec, 1min]$ window in Figure B3 following Ederington and Lee (1995). The CARs suggest that the pre-announcement drift is in the direction of the post-announcement price move.[1]

Figure B3: Cumulative Average Returns Conditional on Sign of Return in $[-5sec, 1min]$ Window for Drift Announcements

E-mini S&P 500 **10-year Treasury Note**



The sample period is from January 1, 2008 through March 31, 2014. Similarly to Ederington and Lee (1995), if the return in the $[-5sec, +1min]$ window in the stock market is negative, we multiply the returns by -1. In the bond market, if the return in the $[-5sec, +1min]$ window is positive, we multiply the returns by -1. Cumulative average returns (CARs) are then calculated in the $[t-60min, t+60min]$ window for each of the drift announcements per Table 2 in the paper. We omit the weekly Initial Claims announcement to avoid this announcement disproportionately affecting the results comprised of monthly and quarterly announcements. The solid line shows the mean CAR. Dashed lines mark two-standard-error bands (standard error of the mean).

7 Robustness Check: Event Study Methodology

Complementing the time-series methodology used in the paper, we repeat the analysis here based on event study methodology. We start with an OLS regression, followed by outlier robustness checks, then present cumulative average return graphs and perform additional robustness checks with event window length, the effect of order flows, and other markets.

[1] As we would expect, the *magnitude* of the pre-announcement price move as a proportion of the total price move is slightly lower in Figure B3 (about a third) compared to Figure 1 in the paper (about a half) because returns are not predictable. Therefore, even an informed trader that perfectly forecasts the announcement surprises and enters a position based on this information before the announcement release may experience the market move against this position due to reasons unrelated to the announcement.

7.1 OLS Regression

Let $R_{t-\underline{\tau}}^{t+\overline{\tau}}$ denote the continuously compounded asset return around the official release time t of announcement m, defined as the first difference between the log prices at the beginning and at the end of the intraday event window $[t-\underline{\tau}, t+\overline{\tau}]$. Let S_{mt} denote the unexpected component of news announcements ("the surprise") as in the paper. The effect of news announcements on asset prices can then be analyzed by standard event study methodology (Balduzzi, Elton, & Green, 2001). The reaction of asset returns to the surprise is captured by the ordinary least squares regression

$$R_{t-\underline{\tau}}^{t+\overline{\tau}} = \gamma_0 + \gamma_m S_{mt} + \varepsilon_t, \tag{1}$$

where γ_0 captures the unconditional return around the release time (Lucca & Moench, 2015), and ε_t is an i.i.d. error term reflecting price movements unrelated to the announcements.

As in the paper, the standardized surprise, S_{mt}, is based on the difference between the actual announcement, A_{mt}, released at time t and the market's expectation of the announcement before its release, $E_{t-\underline{\tau}}[A_{mt}]$, proxied by the median response of professional forecasters during the days before the release, $E_{t-\Delta}[A_{mt}]$.[2] As in the paper, we standardize the difference by the standard deviation of the respective announcement, σ_m, to convert them to equal units. Specifically,

$$S_{mt} = \frac{A_{mt} - E_{t-\underline{\tau}}[A_{mt}]}{\sigma_m}. \tag{2}$$

To isolate the pre-announcement effect from the post-announcement effect, we first identify market-moving announcements among our set of 30 macroeconomic announcements. We estimate equation (1) with an event window spanning from $\underline{\tau} = -5$ seconds before the official release time to $\overline{\tau} = 5$ minutes after the official release time. Analogously, the dependent variable $R_{t-\underline{\tau}}^{t+\overline{\tau}}$ is the continuously compounded futures return over the $[t-5sec, t+5min]$ window.

Table B3 shows that there are 21 market-moving announcements based on the p-values from the joint test of both stock and bond markets using a 5% significance level. The coefficients have the expected signs: Good economic news (for example, higher than anticipated GDP) boosts stock prices and lowers bond prices. Specifically, a one standard deviation positive surprise in the GDP Advance announcement increases the E-mini S&P 500 futures price by 0.171 percent, and its surprises explain 22 percent of the price variation within the announcement window. Our subsequent analysis is based on these 21 market-moving

[2] We also estimate equation (1) including the market's expectation of the announcement, $E_{t-\Delta}[A_{mt}]$, on the right-hand side. The coefficients are not significant suggesting that markets indeed do not react to the *expected* component of news announcements.

announcements.

Table B3: Announcement Surprise Impact During $[t-5sec, t+5min]$ Using Event Study Methodology

Announcement	E-mini S&P 500 Futures γ_m	R^2	10-year Treasury Note Futures γ_m	R^2	Joint Test p-value
GDP advance	0.171 (0.052)***	0.22	-0.028 (0.026)	0.04	0.002
GDP preliminary	0.113 (0.051)**	0.15	-0.056 (0.015)***	0.25	<0.001
GDP final	0.053 (0.039)	0.06	-0.042 (0.018) **	0.17	0.025
Personal income	0.020 (0.012)	0.01	0.000 (0.012)	0.00	0.253
ADP employment	0.178 (0.023)***	0.59	-0.093 (0.017)***	0.49	<0.001
Initial jobless claims	-0.115 (0.013)***	0.23	0.043 (0.006)***	0.19	<0.001
Non-farm employment	0.420 (0.046)***	0.50	-0.261 (0.043)***	0.43	<0.001
Factory orders	0.035 (0.026)	0.04	-0.017 (0.009)*	0.07	0.060
Industrial production	0.043 (0.013)***	0.17	-0.008 (0.004)*	0.04	0.001
Construction spending	-0.005 (0.039)	0.00	0.007 (0.013)	0.00	0.863
Durable goods orders	0.096 (0.020)***	0.23	-0.045 (0.012)***	0.20	<0.001
Wholesale inventories	-0.033 (0.021)	0.04	0.005 (0.007)	0.01	0.239
Advance retail sales	0.161 (0.024)***	0.42	-0.073 (0.015)***	0.27	<0.001
Consumer credit	0.036 (0.015)**	0.07	-0.004 (0.003)	0.03	0.019
Personal consumption	0.007 (0.014)	0.00	-0.015 (0.008)*	0.02	0.147
Building permits	0.045 (0.022)**	0.06	-0.020 (0.013)	0.04	0.037
Existing home sales	0.120 (0.030)***	0.20	-0.038 (0.010)***	0.17	<0.001
Housing starts	0.050 (0.024)**	0.08	-0.039 (0.015)***	0.17	0.003
New home sales	0.122 (0.026)***	0.25	-0.044 (0.006)***	0.39	0.001
Pending home sales	0.087 (0.032)***	0.11	-0.032 (0.008)***	0.18	<0.001
Government budget	0.013 (0.013)	0.02	0.001 (0.007)	0.00	0.612
Trade balance	0.024 (0.016)	0.01	-0.003 (0.007)	0.00	0.280
Consumer price index	-0.111 (0.041)***	0.15	-0.030 (0.013)**	0.06	0.002
Producer price index	0.013 (0.033)	0.00	-0.023 (0.011)**	0.06	0.124
CB Consumer confidence index	0.196 (0.029)***	0.47	-0.051 (0.008)***	0.41	<0.001
Index of leading indicators	0.058 (0.027)**	0.05	-0.009 (0.008)	0.01	0.058
ISM Manufacturing index	0.240 (0.034)***	0.46	-0.111 (0.014)***	0.50	<0.001
ISM Non-manufacturing index	0.064 (0.037)*	0.07	-0.041 (0.009)***	0.25	<0.001
UM Consumer sentim. - Final	0.046 (0.020)**	0.06	-0.014 (0.006)**	0.07	0.005
UM Consumer sentim. - Prel	0.071 (0.025)***	0.10	-0.017 (0.007)**	0.08	0.001

The sample period is from January 1, 2008 through March 31, 2014. The reported response coefficients γ_m are the ordinary least squares estimates of equation (1) with the White (1980) heteroskedasticity consistent covariance matrix. Standard errors are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. The p-values are for the joint Wald test that the coefficients of announcement surprises for the E-mini S&P 500 and 10-year Treasury note futures are equal to zero. The intercept, γ_0, is significant only for the Pending Home Sales announcement in the stock and bond markets.

Next, we re-estimate equation (1) for the 21 market-moving announcements identified in Table B3 using the pre-announcement window $[t-30min, t-5sec]$. Accordingly, we now

use the continuously compounded futures return over the $[t - 30min, t - 5sec]$ window.[3]

Table B4 shows the results sorted by the p-values of the joint test for stock and bond markets. There are seven announcements significant at 5% level.[4] Most of these announcements show evidence of significant drift in both markets. A joint test of the 21 hypotheses overwhelmingly confirms the overall statistical significance of the pre-announcement price drift.[5] In all seven announcements, the drift is in the "correct" direction, i.e., direction of the price change predicted by the announcement surprise.

Although there are some differences in the results using the above event study methodology compared to the results using the time-series methodology in Section 4 in the paper, overall the event study methodology results confirm the time-series methodology results: A substantial number of announcements exhibits substantial pre-announcement drift.

7.2 Outliers

Since our sample period includes the turbulent financial crisis, a possibility arises that our results are driven by a few unusual, large observations. We verify that this is not the case. We conduct two robustness checks. First, we re-estimate equation (1) with the robust procedure of Yohai (1987). Second, we split surprises by size into deciles and estimate equation (1) using the pre-announcement $[t - 30min, t - 5sec]$ window for each decile.

7.2.1 Yohai (1987) Procedure

We re-estimate equation (1) with the robust procedure of Yohai (1987). This so-called MM-estimator is a weighted least squares estimator that is not only robust to outliers but also refines the first-step robust estimate in a second step towards higher efficiency. Table B5 shows that all seven announcements significant in Table B4 remain significant. We label them as "strong drift" announcements. Ten announcements do not display significant drift either in the robust regression or in the Table B4 joint test. We label them as "no drift"

[3] At first sight, this "two-step" procedure could be subject to a sample selection bias. The bias would be present if selection of market-moving announcements based on the estimated surprise regression coefficient using the post-announcement $[t-5sec, t+5min]$ window is correlated with the surprise regression coefficient using the pre-announcement $[t-30min, t-5sec]$ window. However, if this were the case, the error terms in the pre- and post-announcement regressions would have to be (conditionally) correlated. This would violate market efficiency, and it would be evidence of a significant pre-announcement drift.

[4] As a robustness check, we estimate the model using seemingly unrelated regressions to allow for the covariance between parameters γ_m in the stock and bond markets to be used in the joint Wald tests. The results confirm those reported in Table B4.

[5] Assuming the t-statistics in Table B4 are independent and standard normal, squaring and summing them gives a χ^2-statistic with 21 degrees of freedom. The computed values of this statistic for the E-mini S&P 500 and 10-year Treasury note futures are 63.5 and 79.1, respectively. This translates into statistical significance of the pre-announcement drift at the 1% level.

Table B4: Announcement Surprise Impact During $[t-30min, t-5sec]$ Using Event Study Methodology

Announcement	E-mini S&P 500 Futures γ_m	R^2	10-year Treasury Note Futures γ_m	R^2	Joint Test p-value
ISM Non-manufacturing index	0.139 (0.030)***	0.19	-0.058 (0.011)***	0.30	<0.0001
Pending home sales	0.154 (0.083)*	0.09	-0.035 (0.010)***	0.16	0.001
ISM Manufacturing index	0.091 (0.036)**	0.06	-0.027 (0.009)***	0.09	0.001
Existing home sales	0.113 (0.040)***	0.10	-0.019 (0.009)**	0.04	0.002
CB Consumer confidence index	0.035 (0.052)	0.01	-0.031 (0.010)***	0.12	0.007
Industrial production	0.066 (0.023)***	0.15	-0.007 (0.008)	0.01	0.013
GDP preliminary	0.146 (0.068)**	0.15	-0.022 (0.011)*	0.08	0.013
Housing starts	0.000 (0.021)	0.00	-0.020 (0.010)**	0.05	0.112
Non-farm employment	0.040 (0.021)*	0.07	-0.009 (0.010)	0.01	0.123
Advance retail sales	0.009 (0.029)	0.00	-0.020 (0.011)*	0.06	0.190
Consumer credit	-0.072 (0.051)	0.03	0.007 (0.009)	0.01	0.271
ADP employment	0.035 (0.027)	0.03	-0.006 (0.007)	0.01	0.291
UM Consumer sentiment - Final	-0.055 (0.042)	0.04	-0.007 (0.014)	0.00	0.361
Initial jobless claims	-0.009 (0.012)	0.00	0.007 (0.006)	0.01	0.369
New home sales	0.030 (0.033)	0.01	-0.005 (0.009)	0.01	0.539
Building permits	-0.023 (0.025)	0.02	-0.007 (0.012)	0.01	0.567
GDP advance	0.024 (0.044)	0.01	-0.023 (0.027)	0.06	0.608
GDP final	0.005 (0.022)	0.00	0.008 (0.011)	0.01	0.739
UM Consumer sentiment - Prel	-0.023 (0.055)	0.00	-0.005 (0.012)	0.00	0.845
Durable goods orders	-0.004 (0.016)	0.00	-0.003 (0.007)	0.00	0.852
Consumer price index	-0.005 (0.035)	0.00	-0.001 (0.011)	0.00	0.981

The sample period is from January 1, 2008 through March 31, 2014. Only the announcements with a significant effect on the E-mini S&P 500 and 10-year Treasury note futures prices (based on the joint test in Table B3) are included. The reported response coefficients γ_m are the ordinary least squares estimates of equation (1) with the White (1980) heteroskedasticity consistent covariance matrix. Standard errors are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. The p-values are for the joint Wald test that the coefficients of announcement surprises for the E-mini S&P 500 and 10-year Treasury note futures are equal to zero. The intercept, γ_0, is significant only for the Initial Claims announcement in the stock market, CPI announcement in the bond market, and Non-Farm Employment announcement in both markets.

announcements.[6] Four announcements are not significant in the joint test of Table B4 but show significant coefficients in the robust regression using 5% significance level (mainly in the bond market). We label them as "some drift" announcements. Overall, the Yohai (1987) outlier-robust procedure confirms results from the OLS regression in Section 7.1.

Similarly to the paper, we quantify the magnitude of the pre-announcement price drift. We divide the γ_m coefficients from Table B4 by the corresponding sum of coefficients from Ta-

[6]We include the Building Permits announcement among the ten announcements that do not move markets because this announcement is not significant in Table B4 and shows a drift in the "incorrect" direction in Table B5.

Table B5: Announcement Surprise Impact During $[t-30min, t-5sec]$ Using Event Study Methodology and Robust Regression

Announcement	E-mini S&P 500 γ_m	R^2	10-year Treasury Note γ_m	R^2
Strong Evidence of Pre-Announcement Drift				
CB Consumer confidence index	0.023 (0.035)	0.01	-0.036 (0.009)***	0.14
Existing home sales	0.091 (0.034)***	0.02	-0.016 (0.007)**	0.05
GDP preliminary	0.063 (0.034)*	0.06	-0.026 (0.013)**	0.16
Industrial production	0.077 (0.016)***	0.10	-0.007 (0.001)	0.01
ISM Manufacturing index	0.076 (0.034)**	0.03	-0.025 (0.009)***	0.09
ISM Non-manufacturing index	0.139 (0.033)***	0.12	-0.042 (0.009)***	0.15
Pending home sales	0.087 (0.031)***	0.09	-0.028 (0.007)***	0.16
Some Evidence of Pre-Announcement Drift				
Advance retail sales	0.028 (0.016)*	0.01	-0.021 (0.009)**	0.07
Consumer price index	-0.051 (0.013)***	0.08	0.001 (0.009)	0.00
GDP advance	0.035 (0.032)	0.05	-0.067 (0.015)***	0.16
Initial jobless claims	-0.009 (0.007)	0.00	0.013 (0.005)***	0.01
No Evidence of Pre-Announcement Drift				
ADP employment	0.008 (0.014)	0.01	-0.006 (0.008)	0.01
Building permits	-0.036 (0.016)**	0.05	0.005 (0.009)	0.00
Consumer credit	-0.043 (0.028)	0.02	0.004 (0.007)	0.00
Durable goods orders	0.005 (0.015)	0.00	-0.007 (0.006)	0.01
GDP final	0.005 (0.025)	0.00	0.010 (0.013)	0.00
Housing starts	-0.006 (0.016)	0.00	-0.016 (0.009)*	0.02
New home sales	0.021 (0.031)	0.01	-0.005 (0.008)	0.00
Non-farm employment	0.018 (0.016)	0.00	0.000 (0.009)	0.00
UM Consumer sentiment - Final	-0.019 (0.031)	0.00	0.003 (0.011)	0.00
UM Consumer sentiment - Prel	0.003 (0.035)	0.00	-0.009 (0.009)	0.00

The sample period is from January 1, 2008 through March 31, 2014. Only the announcements that have a significant effect on the E-mini S&P 500 and 10-year Treasury note futures prices (based on the joint test in Table B3) are included. The reported response coefficients γ_m of equation (1) are estimated using the MM weighted least squares (Yohai, 1987). Standard errors are shown in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. Classification as "strong drift", "some drift" and "no drift" uses combined results from Tables B4 and B5. "Strong drift" announcements show significance at 5% level in Table B4 joint test and at least one market in Table B5. "No drift" announcements are not significant in either Table B4 or B5 at 5% level. "Some drift" announcements are not significant in Table B4 joint test but show significance in Table B5 in at least one market at 5% level.

bles B3 and Table B4, i.e., $\Gamma_m = \gamma_m^{\overline{\tau}=-5sec}/(\gamma_m^{\overline{\tau}=-5sec}+\gamma_m^{\overline{\tau}=+5min})$. Table B6 shows these ratios sorted by the proportion obtained for the stock market. The ratio Γ_m ranges from 15 percent in the CB Consumer Confidence Index up to 69 percent in the ISM Non-Manufacturing Index indicating that the pre-announcement price move is a substantial proportion of the total price move. The mean ratio across all seven announcements and both markets is 44 percent.

Table B6: Pre-announcement Price Drift as a Proportion of Total Price Change Using Event Study Methodology

	E-mini S&P 500			10-year Treasury Note		
	γ_m $[t-5sec, t+5min]$	γ_m $[t-30min, t-5sec]$	Γ_m	γ_m $[t-5sec, t+5min]$	γ_m $[t-30min, t-5sec]$	Γ_m
ISM Non-manufacturing index	0.064	0.139	69%	-0.041	-0.058	59%
Pending home sales	0.087	0.154	64%	-0.032	-0.035	52%
Industrial production	0.043	0.066	60%	-0.008	-0.007	46%
GDP preliminary	0.113	0.146	56%	-0.056	-0.022	28%
Existing home sales	0.120	0.113	49%	-0.038	-0.019	34%
ISM Manufacturing index	0.240	0.091	28%	-0.111	-0.027	20%
CB Consumer confidence index	0.196	0.035	15%	-0.051	-0.031	37%
Mean			49%			39%

The sample period is from January 1, 2008 through March 31, 2014. Only the announcements classified as having strong evidence of pre-announcement drift in Table B5 are included.

7.2.2 Decile Analysis

We split surprises by size into deciles and estimate equation (1) using the pre-announcement $[t-30min, t-5sec]$ window for each decile. In these estimations, we pool together all seven announcements exhibiting strong drift in Table B5.[7] Since our sample includes positive and negative surprises, deciles 1 and 10 correspond to the largest surprises in absolute value, and deciles 5 and 6 correspond to the smallest surprises in absolute value. Table B7 shows that all deciles except for 5 and 6 in the stock market and 3 and 8 in the stock and bond market exhibit a significant drift. These results, therefore, again confirm that the results in Section 7.1 using the OLS regression are not driven by a few unusual, large observations.

7.3 Cumulative Average Returns

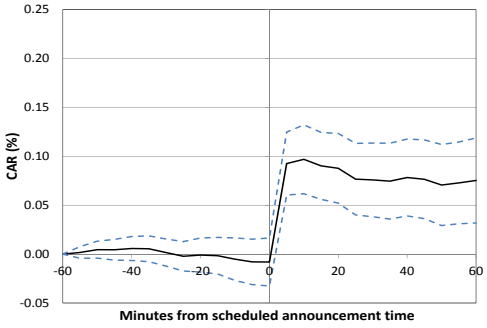
This section illustrates our findings from the above Sections 7.1 and 7.2 graphically using cumulative average return (CAR) graphs. As in the paper, we classify each event as "good" or "bad" news based on whether the surprise has a positive or negative effect on the stock and bond markets using the coefficients in Table B3. Following Bernile et al. (2016), we invert the sign of returns for negative surprises. CARs are then calculated in the $[t-60min, t+60min]$ window for each of the "strong drift", "some drift" and "no drift" categories defined in Table B5. The CARs in Figure B4 reveal what happens around the announcements.

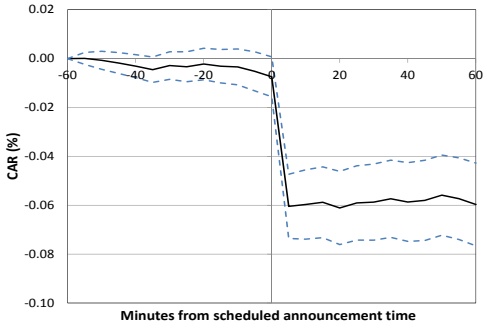
[7]This approach assumes the same coefficients for all announcements, but it provides a larger sample size.

Figure B4: Cumulative Average Returns

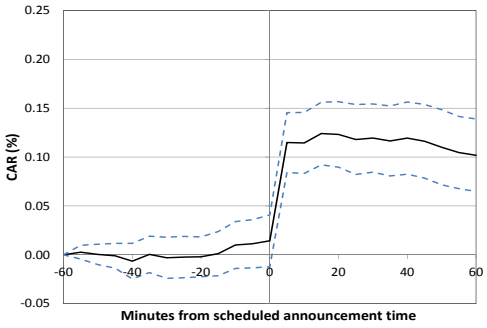
E-mini S&P 500 **10-year Treasury Note**

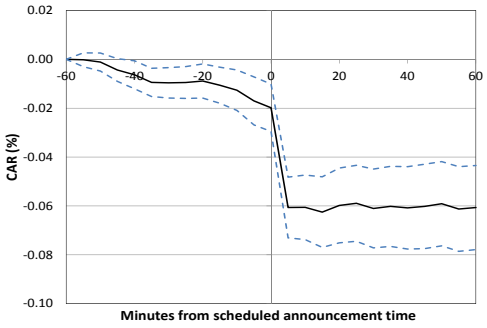
(a) Announcements with no evidence of drift



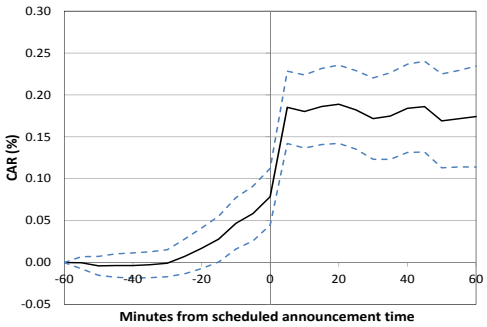


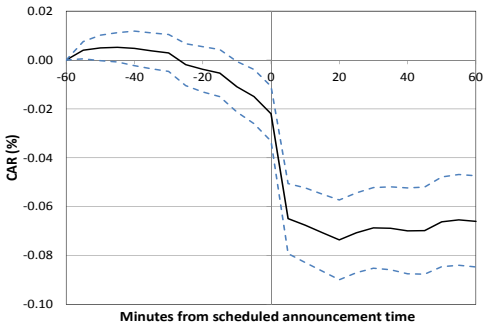
(b) Announcements with some evidence of drift





(c) Announcements with strong evidence of drift





The sample period is from January 1, 2008 through March 31, 2014. We classify each event as "good" or "bad" news based on whether the announcement surprise has a positive or negative effect on the stock and bond markets using the coefficients in Table B3. Following Bernile et al. (2016), we invert the sign of returns for negative surprises. Cumulative average returns (CARs) are then calculated in the $[t-60min, t+60min]$ window for each of the "strong drift", "some drift" and "no drift" categories defined in Table B5. For each category the solid line shows the mean CAR. Dashed lines mark two-standard-error bands (standard error of the mean).

Table B7: Announcement Surprise Impact During $[t-30min, t-5sec]$ by Decile

Surprise Size	Surprise Decile	n	E-mini S&P 500 γ	E-mini S&P 500 R^2	10-year Treasury Note γ	10-year Treasury Note R^2	Joint Test p-value
1	5 and 6	96	-0.269 (0.234)	0.01	-0.164 (0.061)***	0.06	0.015
2	4 and 7	95	0.228 (0.093)**	0.06	-0.055 (0.029)*	0.03	0.009
3	3 and 8	95	0.063 (0.051)	0.01	0.001 (0.014)	0.00	0.464
4	2 and 9	96	0.075 (0.030)**	0.06	-0.031 (0.009)***	0.11	0.000
5	1 and 10	94	0.115 (0.027)***	0.16	-0.030 (0.005)***	0.26	<0.0001
All		476	0.102 (0.020)***	0.08	-0.029 (0.004)***	0.09	<0.0001

The sample period is from January 1, 2008 through March 31, 2014. Only the announcements classified as having strong evidence of pre-announcement drift in Table B5 are included. These announcements are pooled together and split into deciles by surprise size. Since our sample includes positive and negative surprises, deciles 1 and 10 correspond to the largest surprises in absolute value, and deciles 5 and 6 correspond to the smallest surprises in absolute value. The reported response coefficients γ are the ordinary least squares estimates of equation (1) with the White (1980) heteroskedasticity consistent covariance matrix. Standard errors are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. The p-values are for the joint Wald test that the coefficients of announcement surprises for the E-mini S&P 500 and 10-year Treasury note futures are equal to zero.

The left column shows CARs for the stock market. In the no-drift announcements in Panel (a), a significant price adjustment does not occur until after the release time. In the strong-drift announcements in Panel (c), the price begins moving in the correct direction about 30 minutes before the official release time, and the move becomes significant about ten minutes later. In the intermediate group in Panel (b), there is a less pronounced price adjustment in the correct direction before the releases. The second column presents CARs for the bond market. Panel (c) shows the same pattern as the stock market with the price starting to drift about 30 minutes before the official release time and the move becoming statistically significant about 20 minutes later.[8] Overall, Figure B4 tells the same story as Figure 1 in the paper that illustrates substantial pre-announcement drift for a substantial number of announcements.

7.4 Event Window Length

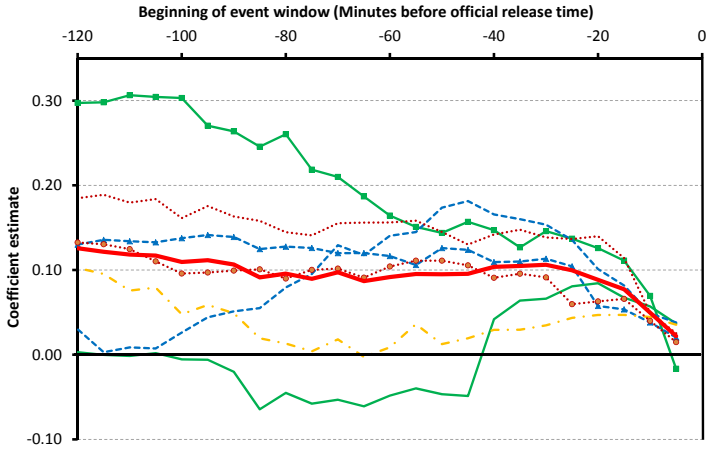
The analysis in the above Sections 7.1 and 7.2 uses a $[t-30min, t-5sec]$ event window. To show that our results are not sensitive to the choice of the window length, we re-estimate

[8]For the bond market, Panels (b) and (c) look similar. This is because the classification of announcements as "some evidence of drift" is mainly driven by the bond market results in Table B5. Panels (a) and (b) for the bond market appear to show some drift (only about one basis point) starting about 60 minutes prior to the announcement. Therefore, we estimate the regression in equation (1) for the $[t-60min, t-30min]$ window. Only the ADP Employment announcement is significant.

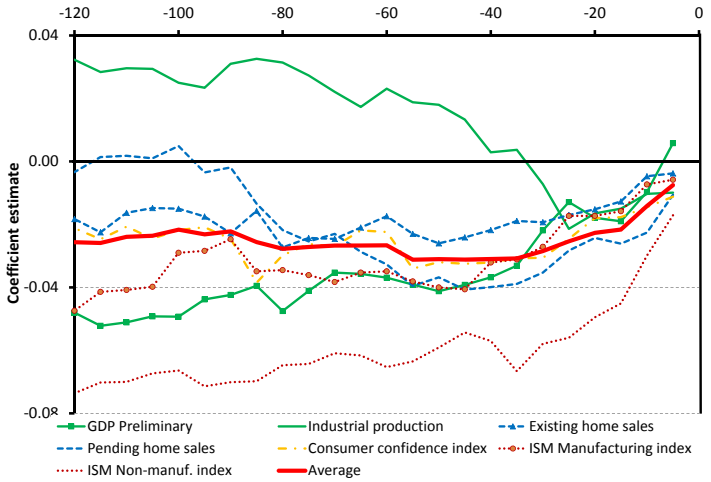
equation (1) with $[t-\underline{\tau}, t-5sec]$ for various $\underline{\tau} \in [5min, 120min]$. Figure B5 plots estimates of the corresponding γ_m coefficients for the seven drift announcements. The results confirm the conclusions from the lower panel of Figure B1: For most of the announcements, the drift starts at least 30 minutes before the release time. Shortening the pre-announcement window generally results in lower coefficients (and lower standard errors). This is typical for intraday studies where the ratio between signal (i.e., response to the news announcement) and noise increases as the event window shrinks and fewer other events affect the market.

Figure B5: Sensitivity of Coefficients to Event Window Length

(a) E-mini S&P 500 Futures



(b) 10-year Treasury Note Futures



The sample period is from January 1, 2008 through March 31, 2014. The figure plots response coefficients, γ_m, based on the ordinary least squares estimates of equation (1) against $\underline{\tau}$, the beginning of the pre-announcement window $[t-\underline{\tau}, t-5sec]$, for seven strong drift announcements identified in Table B5.

7.5 Effect of Order Flows

We verify that our results in Sections 7.1 and 7.2 of this appendix are not driven by order flows having a different impact before drift announcements than at other times. We introduce the identifier $\tilde{m}$ to distinguish the returns around m announcements and the returns during corresponding time windows on non-announcement days. $\tilde{m}$ can take on 33 different values because there are 30 announcements and three time windows for which we compute the order flow impact on non-announcement days. These non-announcement day windows are [8:30 – $30min$, 8:30 – $5sec$], [9:15 – $30min$, 9:15 – $5sec$], [10:00 – $30min$, 10:00 – $5sec$] because all of our announcements with evidence of drift are released during these windows.[9]

Let $R_{\tilde{m}t}$ be the return on day t during the $[t-30min, t-5sec]$ window around the release of announcement m or during one of the three time windows on non-announcement days. Let OF_{mt} be the corresponding order flow. Now consider the relation

$$sign\left(OF_{\tilde{m}t}\right) R_{\tilde{m}t} = c + a_{\tilde{m}} + b_0\sqrt{|OF_{\tilde{m}t}|} + b_1 \mathbb{1}_{NoDrift}\left(\tilde{m}\right)\sqrt{|OF_{\tilde{m}t}|} + b_2 \mathbb{1}_{Drift}\left(\tilde{m}\right)\sqrt{|OF_{\tilde{m}t}|} + \varepsilon_{\tilde{m}t}, \tag{3}$$

where $\mathbb{1}_{NoDrift}\left(\tilde{m}\right)$ and $\mathbb{1}_{Drift}\left(\tilde{m}\right)$ are indicator variables. $\mathbb{1}_{NoDrift}$ equals 1 only if $\tilde{m}$ stands for an announcement without strong evidence of drift, and $\mathbb{1}_{Drift}$ is 1 only if $\tilde{m}$ is an announcement with strong evidence of drift. They are zero otherwise.

By this specification, significant estimates of b_1 and/or b_2 would indicate that the impact of the order flow for those announcement types is different from the usual impact on non-announcement days captured by the coefficient b_0. To account for announcements happening at different times, we also include the fixed effects $a_{\tilde{m}}$ which depend on the announcement m and, for the non-announcement days, on the three time windows.

The square root impact of order flow on returns in the above specification reflects the concave impact of trades on returns commonly accepted in the literature (for example, Hasbrouck and Seppi (2001) and Almgren, Thum, Hauptmann, and Li (2005)). The use of absolute order flow and of $sign\left(OF_{\tilde{m}t}\right) R_{\tilde{m}t}$ as dependent variable allows us to capture the heterogeneity among announcement types using the fixed effects $a_{\tilde{m}}$. Taking the first difference Δ within each $\tilde{m}$, the fixed effects drop out, and we estimate the equation

$$\begin{aligned} \Delta sign\left(OF_{\tilde{m}t}\right) R_{\tilde{m}t} &= c_1 + b_0\Delta\sqrt{|OF_{\tilde{m}t}|} + b_1 \mathbb{1}_{NoDrift}\left(\tilde{m}\right)\Delta\sqrt{|OF_{\tilde{m}t}|} \\ &+ b_2 \mathbb{1}_{Drift}\left(\tilde{m}\right)\Delta\sqrt{|OF_{\tilde{m}t}|} + \Delta\varepsilon_{\tilde{m}t}, \end{aligned} \tag{4}$$

where we keep an intercept and test whether it equals zero. Hence, testing the hypothesis

[9] To keep comparisons meaningful, we do not include time windows around other release times, i.e., 8:15, 9:55, 14:00 and 15:00, because no drift announcements are released during these times.

that the impact of order flow on returns on announcement days with drift is the same as on other days involves a t-test on the estimated coefficient for b_2. The results in Table B8 show that this is the case because the t-statistic is insignificant. We conclude that order flow impact on announcement days with drift is no different from its impact on other days.

Table B8: Order Flow Analysis

	E-mini S&P 500 Futures	10-year Treasury Note Futures
b_0	1.282 (0.067)***	0.037 (0.002)***
b_1	0.069 (0.117)	0.004 (0.003)
b_2	-0.178 (0.137)	-0.003 (0.004)
R^2	0.321	0.219

The sample period is from January 1, 2008 through March 31, 2014. The reported response coefficients b_0, b_1 and b_2 are the ordinary least squares estimates of equation (4). Standard errors are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

7.6 Other Markets

This section presents results for two other major markets: E-mini Dow stock index futures and 30-year Treasury bond futures. Table B9 confirms the results from Table B4: Pre-announcement price drift is evident not only in the E-mini S&P 500 futures and 10-year Treasury note futures but also in E-mini Dow stock index futures and 30-year Treasury bond futures.

8 Forecasting with Proprietary Information

This section provides additional information for Section 5.1.2 in the paper about predicting the announcement surprise using proprietary data sets. As described in Section 5.1.2, we use three examples of proprietary data collection to predict surprises in announcements most related to this proprietary data. Tables B10, B11 and B12 show results for the Consumer Price Index, Conference Board (CB) Consumer Confidence Index, and housing sector announcements, respectively. We find predictive power in the PriceStats inflation indicator but no predictive power in the State Street Investor Confidence Index and the Case-Shiller Home Price Index.

Table B9: Announcement Surprise Impact During $[t-30min, t-5sec]$ for E-mini Dow and 30-year Treasury Bond Futures

Announcement	E-mini Dow γ_m	R^2	30-year Treasury Bond γ_m	R^2	Joint Test p-value
ISM Non-manufacturing index	0.105 (0.025)***	0.15	-0.079 (0.016)***	0.25	<0.0001
Pending home sales	0.148 (0.063)**	0.11	-0.073 (0.029)**	0.15	0.002
ISM Manufacturing index	0.074 (0.035)**	0.04	-0.041 (0.015)***	0.08	0.003
Existing home sales	0.092 (0.038)**	0.07	-0.043 (0.015)***	0.07	0.001
CB Consumer confidence index	0.021 (0.054)	0.00	-0.061 (0.016)***	0.17	0.001
Industrial production	0.047 (0.018)**	0.10	-0.016 (0.016)	0.01	0.023
GDP preliminary	0.135 (0.049)**	0.16	-0.037 (0.019)*	0.06	0.004
Housing starts	0.003 (0.018)	0.00	-0.026 (0.016)	0.03	0.279
Non-farm employment	0.034 (0.018)*	0.07	-0.007 (0.018)	0.00	0.164
Advance retail sales	0.004 (0.027)	0.00	-0.047 (0.019)**	0.10	0.050
Consumer credit	-0.057 (0.045)	0.02	0.014 (0.015)	0.02	0.301
ADP employment	0.029 (0.022)	0.03	-0.006 (0.012)	0.00	0.392
UM Consumer sentim. - Final	-0.064 (0.040)	0.05	0.007 (0.017)	0.00	0.247
Initial jobless claims	-0.006 (0.011)	0.00	0.014 (0.008)	0.01	0.220
New home sales	0.005 (0.030)	0.00	-0.010 (0.016)	0.01	0.808
Building permits	-0.012 (0.023)	0.01	-0.012 (0.020)	0.01	0.733
GDP advance	0.037 (0.039)	0.04	-0.043 (0.035)	0.09	0.296
GDP final	0.005 (0.021)	0.00	-0.005 (0.022)	0.00	0.950
UM Consumer sentim. - Prel	-0.025 (0.045)	0.00	-0.008 (0.017)	0.00	0.770
Durable goods orders	-0.001 (0.015)	0.00	-0.013 (0.015)	0.01	0.664
Consumer price index	-0.005 (0.031)	0.00	0.000 (0.013)	0.00	0.987

The sample period is from January 1, 2008 through March 31, 2014. Only the announcements that have a significant effect on the E-mini S&P 500 and 10-year Treasury note futures prices (based on the joint test in Table B3) are included. The reported response coefficients γ_m are the ordinary least squares estimates of equation (1) with the White (1980) heteroskedasticity consistent covariance matrix. Standard errors are shown in parentheses. *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. The p-values are for the joint Wald test that the coefficients of announcement surprises for the E-mini Dow stock index and 30-year Treasury bond futures are equal to zero. The intercept, γ_0, is significant only for the Pending Home Sales announcement in the stock market, GDP Advance and Initial Jobless Claims announcements in the bond market, and Non-Farm Employment announcement in both markets.

9 Forecasting with Individual Analyst Forecasts

This section provides additional information for Section 5.2.1 in the paper about forecasting the announcement surprise using the forecasts of individual analysts. As described in Section 5.2.1, we regress the unstandardized surprise, $\hat{S}_{mt}$, on a constant and the prediction, P_{mt}. The results for this regression are reported in Table B13 where the p-values are for a two-sided test. The intercept is significant for only one announcement (UM Consumer Sentiment - Final), indicating that our forecast for the surprise is generally unbiased. Nine announcements show significance of the slope coefficient at 10% level (Advance Retail Sales,

Table B10: Predicting CPI surprises with State Street PriceStats data

Predictor	N	Coefficient
Average daily value PriceStats for month t	68	0.157 (0.049)***
Last daily value PriceStats for month t	68	0.155 (0.048)***

The sample period is from August 1, 2008 through March 31, 2014 because the PriceStats data begins in August of 2008. N denotes the number of observations. The dependent variable is the Consumer Price Index surprise for month t. The reported response coefficients are estimated using the MM weighted least squares (Yohai, 1987). Standard errors are shown in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Table B11: Predicting CB Consumer Confidence Index surprises with State Street Investor Confidence

Predictor	N	Coefficient
Monthly State Street Investor Confidence Index	74	0.082 (0.063)

The sample period is from January 1, 2008 through March 31, 2014. N denotes the number of observations. The dependent variable is the Consumer Confidence Index surprise for month t. The reported response coefficients are estimated using the MM weighted least squares (Yohai, 1987). Standard errors are shown in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

Table B12: Predicting surprises for housing sector announcements with the Case-Shiller Home Price Index

Dependent Variable	N	Coefficient
Building permits	72	95.951 (50.65)*
Existing home sales	72	-0.074 (0.233)
Housing starts	72	-9.065 (68.13)
New home sales	71	21.925 (40.83)
Pending home sales	73	-0.113 (0.050)**

The sample period is from January 1, 2008 through March 31, 2014. N denotes the number of observations. The dependent variables are surprises in announcements related to the housing sector for month t. The reported response coefficients are estimated using the MM weighted least squares (Yohai, 1987). Standard errors are shown in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.

CB Consumer Confidence Index, CPI, Durable Goods Orders, Existing Home Sales, GDP Advance, Industrial Production, Pending Home Sales and PPI), only five of which are announcements with a pre-announcement drift.

A significant linear relation between the predictions and surprises does not necessarily

imply that the forecasts have superior predictive power for *returns*. To explore this, we estimate equation (1) using the prediction, P_{mt}, instead of the surprise, S_{mt}. Table B14 Panel (a) shows the slope coefficients for predicting the pre-announcement return during the $[t-30min, t-5sec]$ window using the surprise prediction for the E-mini S&P 500 and 10-year Treasury note futures markets. The reported p-values are for a two-sided test. Similarly, Table B14 Panel (b) reports the results for the $[t-5sec, t+5min]$ window. P_{mt} is a useful predictor of returns only for a handful of announcements.

Table B13: Regression of Unstandardized Surprise, $\hat{S}_{mt}$, on a Constant and Prediction, P_{mt}

	Slope Coefficient	s.e.	p-value	R^2
ADP employment	0.173	0.371	0.320	0.02
Advance retail sales	1.096	0.724	0.065	0.07
CB Consumer confidence index	1.188	0.586	0.021	0.06
Construction spending	-0.004	0.002	0.984	0.08
Consumer price index	0.961	0.113	<0.001	0.35
Durable goods orders	1.946	0.468	<0.001	0.17
Existing home sales	1.621	0.767	0.017	0.09
GDP advance	1.371	0.784	0.040	0.17
GDP final	-0.0005	0.0001	1.000	0.22
GDP preliminary	0.118	0.593	0.421	0.04
Housing starts	-0.039	0.453	0.466	0.01
Industrial production	1.026	0.318	0.001	0.22
Initial jobless claims	0.360	0.289	0.106	0.01
ISM Manufacturing index	0.580	0.540	0.141	0.03
ISM Non-manufacturing index	-0.149	0.782	0.575	0.01
New home sales	-0.324	1.157	0.610	0.01
Non-farm employment	-0.052	0.332	0.562	0.01
Pending home sales	0.762	0.405	0.030	0.08
Producer price index	1.206	0.397	0.001	0.15
UM Consumer sentiment - Prel	0.608	0.821	0.229	0.02

The sample period is from January 1, 2008 through March 31, 2014. The unstandardized surprise is defined as $\hat{S}_{mt} = A_{mt} - E_{t-\underline{\tau}}[A_{mt}] = \sigma_m S_{mt}$. The prediction of the unstandardized surprise is the difference between the median values of the professional forecasters ranked by Bloomberg and the whole set of forecasters in the Bloomberg survey: $P_{mt} = E^{Ranked}_{t-\underline{\tau}}[A_{mt}] - E_{t-\underline{\tau}}[A_{mt}]$. Results are from the ordinary least squares regression, where the standard errors are based on a heteroskedasticity consistent covariance matrix.

Table B14: Regression of Returns on Prediction

a) $[t-30min, t-5sec]$ **Window**

	E-mini S&P 500			10-year Treasury Note			Wald	
	γ_m	s.e.	R^2	γ_m	s.e.	R^2	Test	p-value
ADP employment	0.030	0.015	0.03	-0.019	0.007	0.09	11.108	0.004
Advance retail sales	0.002	0.019	0.01	-0.009	0.010	0.02	0.781	0.677
CB Consumer confidence idx	-0.004	0.039	0.01	-0.019	0.007	0.06	7.788	0.020
Construction spending	-0.008	0.053	0.01	-0.009	0.012	0.02	0.592	0.744
Consumer price index	0.001	0.022	0.01	-0.002	0.009	0.01	0.050	0.975
Durable goods orders	0.019	0.013	0.03	-0.007	0.007	0.03	3.334	0.189
Existing home sales	0.014	0.065	0.01	-0.021	0.018	0.05	1.424	0.491
GDP advance	0.087	0.055	0.19	-0.016	0.016	0.07	3.495	0.174
GDP preliminary	0.005	0.044	0.04	-0.007	0.013	0.05	0.278	0.870
GDP final	-0.001	0.028	0.04	-0.022	0.013	0.12	3.088	0.214
Housing starts	0.006	0.016	0.01	-0.015	0.006	0.04	6.959	0.031
Industrial production	0.012	0.020	0.02	-0.002	0.005	0.07	19.136	<0.001
Initial jobless claims	-0.025	0.010	0.02	0.006	0.005	0.01	7.340	0.025
ISM Manufacturing index	-0.010	0.070	0.01	0.004	0.014	0.02	0.113	0.945
ISM Non-manufacturing index	0.012	0.032	0.01	-0.009	0.017	0.02	0.384	0.825
New home sales	-0.015	0.030	0.02	-0.008	0.006	0.03	2.167	0.338
Non-farm employment	0.009	0.019	0.02	-0.006	0.011	0.02	0.514	0.774
Pending home sales	-0.023	0.032	0.02	-0.012	0.007	0.03	3.649	0.161
Producer price index	-0.027	0.022	0.03	0.013	0.009	0.04	3.691	0.158
UM Consumer sentim. - Prel	-0.076	0.036	0.04	0.001	0.009	0.01	4.561	0.102

b) $[t - 5sec, t + 5min]$ **Window**

	E-mini S&P 500			10-year Treasury Note			Wald	
	γ_m	s.e.	R^2	γ_m	s.e.	R^2	Test	p-value
ADP employment	-0.001	0.023	0.01	0.018	0.013	0.03	2.028	0.363
Advance retail sales	0.043	0.031	0.04	-0.020	0.014	0.03	3.947	0.139
CB Consumer confidence idx	0.016	0.037	0.02	0.001	0.010	0.01	0.214	0.899
Construction spending	-0.037	0.032	0.02	0.039	0.014	0.08	9.063	0.011
Consumer price index	-0.040	0.035	0.03	-0.006	0.012	0.02	1.541	0.463
Durable goods orders	0.046	0.020	0.07	-0.027	0.011	0.08	11.136	0.004
Existing home sales	-0.039	0.031	0.03	-0.009	0.013	0.02	2.089	0.352
GDP advance	-0.015	0.089	0.04	0.035	0.023	0.09	2.270	0.321
GDP final	0.069	0.047	0.13	0.006	0.012	0.04	2.458	0.293
GDP preliminary	-0.055	0.037	0.07	0.040	0.021	0.17	5.883	0.053
Housing starts	0.021	0.019	0.03	-0.005	0.008	0.02	1.688	0.430
Industrial production	0.000	0.014	0.01	0.003	0.004	0.02	0.595	0.743
Initial jobless claims	-0.018	0.013	0.00	0.004	0.005	0.00	0.865	0.649
ISM Manufacturing index	0.004	0.040	0.01	-0.001	0.017	0.01	0.017	0.991
ISM Non-manufacturing index	0.022	0.033	0.02	-0.005	0.008	0.02	0.892	0.640
New home sales	0.020	0.022	0.02	0.005	0.009	0.02	1.205	0.547
Non-farm employment	-0.066	0.076	0.03	0.020	0.043	0.02	0.964	0.618
Pending home sales	-0.016	0.038	0.02	0.016	0.006	0.06	8.110	0.017
Producer price index	0.010	0.023	0.02	-0.004	0.017	0.02	0.238	0.888
UM Consumer sentim. - Prel	0.019	0.020	0.02	0.002	0.006	0.01	0.945	0.623

The sample period is from January 1, 2008 through March 31, 2014. The response coefficients γ_m are the ordinary least squares estimates of equation (1) using the prediction P_{mt} of the standardised surprise S_{mt}, where $S_{mt} = \frac{A_{mt} - E_{t-\underline{\tau}}[A_{mt}]}{\sigma_m}$ and $P_{mt} = E^{Ranked}_{t-\underline{\tau}}[A_{mt}] - E_{t-\underline{\tau}}[A_{mt}]$. The standard errors are based on a heteroskedasticity consistent covariance matrix.

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