Increased market response to earnings announcements in the 21st century: An Empirical Investigation

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Research Quesion

First, is the increase in relative return variability due to more information being released to investors at earnings announcements, and if yes, what is the nature of the information
Second, how does the magnitude of investors' responses to earnings announcements over time compare to the magnitude of responses to disclosures on non-earnings announcement days, specifically management guidance and analyst forecasts?
In other word, The main dependent var is T
And we could test other var on the base of T

Motivation

This study extends prior studies by examining the role of three concurrent information releases in the increase in investor response to earning announcements after 2001: management guidance, analyst forecasts, and financial statement line items.

Ustat

For each quarterly earnings announcement for firm i (day 0), the estimation period, EP, is defined as the period from 130 to 10 days prior to the earnings announcements and days 10–130 days after the announcement. We estimate the market model with daily stock returns in EP, obtain estimates of the intercept and slope coefficient, a_i and b_i, and calculate the residual returns and variance Var μ_i. We then use a_i and b_i to calculate the residual return $\mu_{i,t}$ in TP, and construct $USTAT$ as follows:

$$USTAT_{i,t} = \frac{\mu_{i,t}^2}{\text{Var } \mu_i}$$

R^2

For each calendar year, the paper run regressions of calendar-quarter stock returns on quarterly earnings announcement-window returns, and the adjusted R2 measures the proportion of information incorporated in quarterly returns that arrives on the quarterly earnings announcement day.And also remove firm-quarter observations with fewer than 60 trading days in a calendar quarter.
Under the null hypothesis that earnings announcements do not have incremental information, the R2 is expected to be 1.67% (100%/60) for the one-day announcement window

AVOL

The numerator is the difference between shares outstanding-scaled trading volume on the earnings announcement day (day 0) and average shares-outstanding scaled trading volume in the non-announcement period (day-130 to day-10, day10 to day130). The denominator is the standard deviation of shares-outstanding scaled volume in the non-announcement period. Under the null hypothesis that earnings announcements do not have incremental information, AVOL should be zero. Similar to our price-based measures, we adjust our volume measures for after-hours earnings announcements.

Data

Table 1
Sample summary.

Compustat Observations from 1999 to 2016	407,718
Less observations for which no time stamps are available	83,733
Less Observations with fewer than 40 days in the non-announcement period	835
Number of observations for which *USTAT* can be measured	323,060
Less observations missing data on:	
Analyst forecasts	73,575
Financial statement line items	46,173
All other variables	185
Number of observations for multivariate regression analyses	203,127

Our initial sample includes all 407,718 Compustat earnings announcements (EA) issued in calendar years 1999–2016. We then intersect Compustat data with three sources that have both dates and time stamps: IBES (1999–2016), Bloomberg (hand-collected from 1999 to mid-2013) and Ravenpack (2000–2016). We require that the earnings announcement day be corroborated by each source when multiple sources of time stamps are available. For further details about the sources used to identify the time of the earnings release, see Internet Appendix Table IA.1. For earnings announcements issued after-hours, we use the next trading day as the earnings announcement day. After excluding 83,733 observations without time stamp data and 835 observations with fewer than 40 trading days in the non-announcement period, our data set includes 323,060 observations with data for *USTAT*. The final sample with data on analyst forecasts, management guidance, financial statement line items and control variables for multivariate regression analyses includes 203,127 firm-quarter observations.

Figure: stats

USTATS

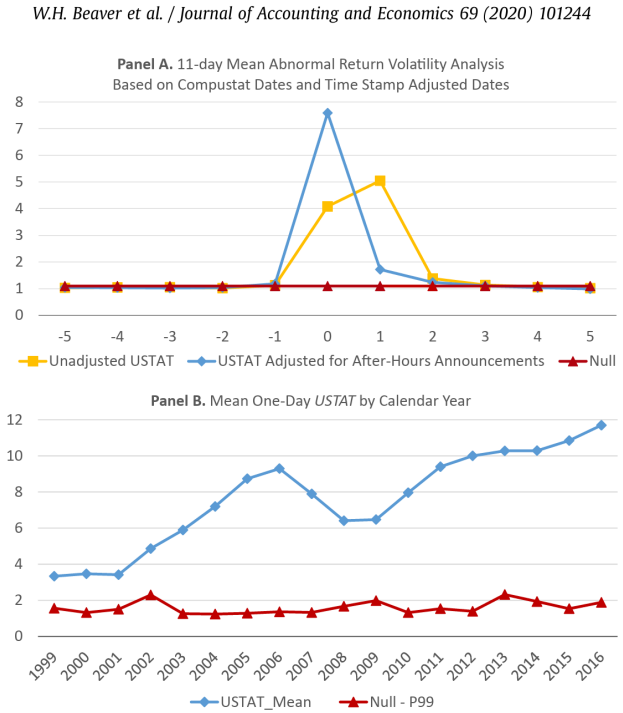

Figure: stats

Ustats & AVOL

Table 2
The information content of earnings announcements by year.

Year	*Nobs*	*USTAT*	*Null-P99*	*USTAT_NM*	*USTAT_DN*	*ADJ* R^2	*AVOL*	*AVOL_NM*	*AVOL_DN*
1999	17,304	3.33	1.56	0.0061	0.0021	4.30%	0.88	7.82	10.47
2000	19,975	3.47	1.32	0.0085	0.0031	4.58%	0.80	7.31	10.33
2001	17,962	3.42	1.50	0.0079	0.0026	4.57%	0.85	6.81	7.86
2002	17,720	4.86	2.30	0.0082	0.0021	7.97%	1.06	7.62	7.42
2003	17,349	5.89	1.26	0.0063	0.0013	8.26%	1.35	10.85	8.06
2004	17,960	7.20	1.24	0.0057	0.0009	12.01%	1.62	13.96	10.10
2005	18,063	8.73	1.28	0.0059	0.0008	15.08%	1.75	14.99	9.34
2006	18,667	9.29	1.36	0.0056	0.0007	13.81%	1.89	16.17	8.69
2007	18,981	7.89	1.33	0.0061	0.0009	15.63%	1.79	16.00	9.38
2008	19,348	6.41	1.67	0.0101	0.0030	8.33%	1.46	12.86	8.50
2009	18,212	6.47	1.98	0.0118	0.0031	7.52%	1.48	12.72	9.75
2010	18,058	7.96	1.32	0.0057	0.0010	12.06%	1.71	13.81	9.75
2011	17,575	9.40	1.54	0.0062	0.0009	12.45%	1.80	14.03	9.00
2012	17,063	10.00	1.39	0.0061	0.0009	13.92%	1.79	13.41	8.17
2013	16,809	10.28	2.32	0.0059	0.0007	14.79%	1.86	14.79	9.98
2014	16,730	10.29	1.93	0.0052	0.0008	14.13%	1.89	15.18	12.95
2015	17,794	10.85	1.53	0.0083	0.0011	13.29%	1.87	15.04	15.22
2016	17,490	11.70	1.89	0.0100	0.0012	13.01%	1.94	15.31	11.68
All Years	323,060	7.59	1.56	0.0072	0.0015	10.82%	1.54	12.68	9.80

Figure: stats

R^2

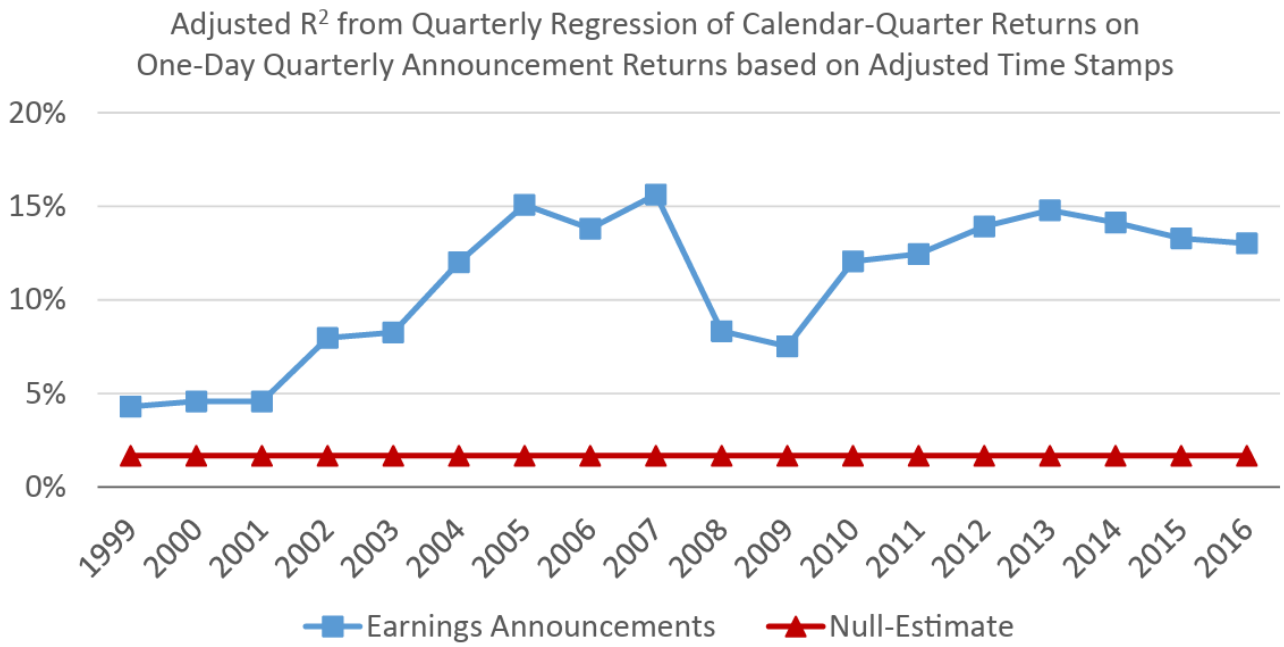

Figure: stats

AVOL

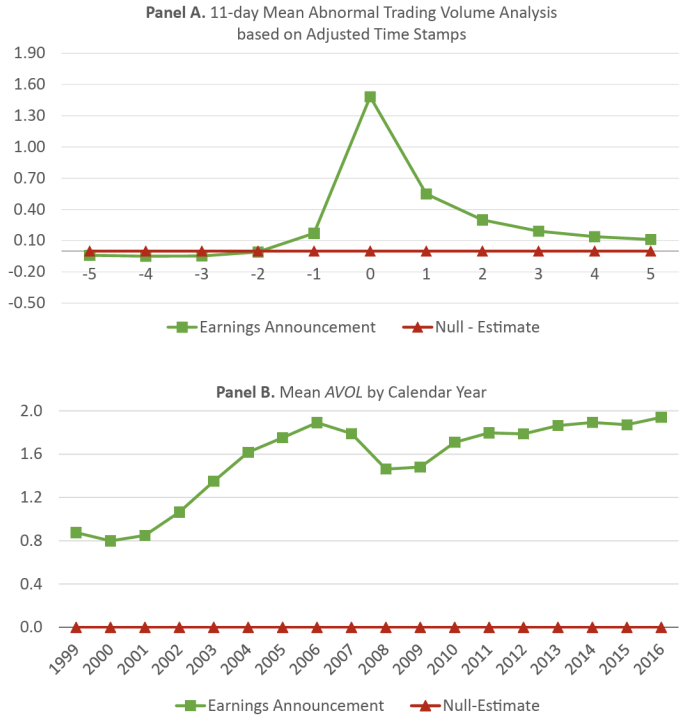

Figure: stats

Panel B: Correlation Matrix

Variable Name	*USTAT*	*USTAT_DN*	*USTAT_NM*	*AVOL*	*AVOL_DN*	*AVOL_NM*	*ADJR²*	*T*	*GUIDANCE*	*AF*	*FS*	*IS*	*BS*	*SCF*	*ABSFE_ST*
USTAT	1.000	**−0.117**	**0.666**	**0.649**	−0.003	**0.500**	**0.154**	**0.164**	**0.167**	**0.155**	**0.158**	**0.118**	**0.124**	**0.136**	**−0.029**
USTAT_DN	**−0.137**	1.000	**0.256**	**−0.134**	**0.404**	0.016	**−0.371**	**−0.295**	**−0.212**	**−0.166**	**−0.109**	**−0.049**	**−0.037**	**−0.143**	**0.424**
USTAT_NM	**0.866**	**0.334**	1.000	**0.468**	**0.186**	**0.537**	**−0.050**	−0.012	**0.033**	**0.053**	**0.072**	**0.073**	**0.089**	**0.031**	**0.151**
AVOL	**0.579**	**−0.161**	**0.456**	1.000	**−0.018**	**0.737**	**0.155**	**0.159**	**0.226**	**0.216**	**0.184**	**0.142**	**0.143**	**0.159**	**−0.049**
AVOL_DN	**0.061**	**0.447**	**0.272**	**0.080**	1.000	**0.355**	**−0.019**	**−0.020**	0.003	**0.085**	**0.047**	**0.071**	**0.072**	0.002	**0.119**
AVOL_NM	**0.539**	**−0.025**	**0.488**	**0.910**	**0.323**	1.000	**0.107**	**0.102**	**0.179**	**0.193**	**0.161**	**0.135**	**0.147**	**0.118**	−0.005
$ADJR^2$	**0.171**	**−0.424**	**−0.041**	**0.185**	**0.001**	**0.168**	1.000	**0.749**	**0.290**	**0.304**	**0.328**	**0.260**	**0.287**	**0.254**	**−0.073**
T	**0.197**	**−0.370**	0.009	**0.219**	0.008	**0.199**	**0.704**	1.000	**0.301**	**0.319**	**0.384**	**0.294**	**0.333**	**0.303**	**−0.012**
GUIDANCE	**0.207**	**−0.224**	**0.085**	**0.294**	**0.076**	**0.291**	**0.264**	**0.306**	1.000	**0.273**	**0.286**	**0.231**	**0.194**	**0.268**	**−0.106**
AF	**0.208**	**−0.172**	**0.109**	**0.295**	**0.150**	**0.306**	**0.282**	**0.323**	**0.273**	1.000	**0.246**	**0.218**	**0.204**	**0.194**	**−0.130**
FS	**0.183**	**−0.070**	**0.136**	**0.233**	**0.128**	**0.245**	**0.298**	**0.385**	**0.284**	**0.248**	1.000	**0.619**	**0.827**	**0.861**	**−0.034**
IS	**0.142**	−0.006	**0.127**	**0.187**	**0.142**	**0.204**	**0.218**	**0.278**	**0.245**	**0.196**	**0.620**	1.000	**0.512**	**0.381**	−0.010
BS	**0.151**	−0.002	**0.140**	**0.185**	**0.140**	**0.207**	**0.255**	**0.342**	**0.206**	**0.205**	**0.900**	**0.483**	1.000	**0.448**	−0.008
SCF	**0.160**	**−0.150**	**0.075**	**0.212**	**0.047**	**0.203**	**0.259**	**0.340**	**0.285**	**0.205**	**0.755**	**0.467**	**0.485**	1.000	**−0.048**
ABSFE_ST	**−0.020**	**0.332**	**0.141**	**−0.051**	**0.112**	**−0.027**	**−0.025**	**0.042**	**−0.114**	**−0.128**	−0.003	0.017	**0.023**	**−0.034**	1.000

The sample comprises 203,127 firm-quarters in the COMPUSTAT North America database with time stamps from Bloomberg, IBES, or RavenPack and variables available for our multivariate regression analysis. See Table 1 for sample summary. Panel A presents distributional statistics for the primary variables in our analyses. Panel B presents the Pearson and Spearman correlations among these variables.

Figure: stats

Rregression Result

Table 4
Regression of *USTAT* on concurrent information and additional explanatory variables.

Model	1	2	3	4	5	6	7	8
Intercept	3.414***	2.892***	3.044***	2.215***	1.197**	0.181	1.068***	0.544
	6.64	4.24	5.27	4.77	2.26	0.31	2.72	0.82
T	0.480***	0.484***	0.409***	0.416***	0.387***	0.382***	0.284***	0.282***
	12.96	14.87	16.56	13.81	12.67	11.48	10.56	10.00
GUIDANCE			2.783***				2.323***	2.320***
			9.68				8.98	8.9
AF				2.866***			2.422***	2.395***
				9.62			9.28	10.05
FS					5.225***		4.252***	
					9.70		8.19	
IS						2.469***		1.571**
						3.35		2.52
BS						2.059***		1.689***
						5.01		4.4
SCF						1.607***		1.437***
						3.67		3.65
LCV		0.095	−0.004	0.031	0.107*	0.123*	−0.032	−0.021
		1.43	−0.07	0.50	1.70	1.74	−0.54	−0.33
NUMESTQ		0.144***	0.123***	0.085***	0.126***	0.125***	0.062***	0.062***
		7.75	6.23	3.92	7.27	7.17	2.94	2.94
LOSS		−2.575***	−2.320***	−2.733***	−2.529***	−2.562***	−2.458***	−2.476***
		−8.81	−8.25	−9.92	−9.75	−9.38	−10.16	−9.72
FIN		−3.414***	−2.557***	−3.146***	−2.672***	−2.656***	−1.868***	−1.872***
		−9.55	−8.34	−9.34	−9.73	−9.49	−8.00	−7.77
LAG		−0.016**	−0.015**	−0.012	−0.015*	−0.015*	−0.01	−0.01
		−2.17	−2.12	−1.63	−1.89	−1.89	−1.45	−1.44
NONDEC31		1.707***	1.552***	1.642***	1.610***	1.612***	1.444***	1.444***
		6.55	6.27	6.30	6.40	6.38	5.97	5.96
ABSFE_ST		10.487***	11.455***	14.343***	11.176***	11.398***	15.115***	15.222***
		3.40	3.48	4.26	3.53	3.52	4.14	4.10
Adj R^2	2.69%	4.82%	5.45%	5.39%	5.35%	5.38%	6.25%	6.26%
Nobs	203,127	203,127	203,127	203,127	203,127	203,127	203,127	203,127

Figure: stats

Rregression Result

Table 6
Regression of *AVOL* and *AVOL_NM* on concurrent information and additional explanatory variables.

Model	1	2	3	4	5	6	7	8
Dependent Variable	*AVOL*	*AVOL*	*AVOL*	*AVOL*	*AVOL_NM*	*AVOL_NM*	*AVOL_NM*	*AVOL_NM*
Intercept	1.003***	0.427**	0.088	−0.089	0.139	0.674	−2.033**	−3.922***
	7.54	2.50	0.84	−0.70	0.2	0.46	−2.36	−5.42
T	0.077***	0.068***	0.027***	0.026***	0.539***	0.479***	0.131***	0.121**
	7.52	7.09	5.11	4.57	5.40	5.22	2.89	2.38
GUIDANCE			0.531***	0.531***			4.675***	4.688***
			12.27	11.98			12.14	11.85
AF			0.533***	0.521***			3.978***	3.835***
			15.65	16.54			12.19	11.80
FS			0.749***				6.780***	
			10.99				9.86	
IS				0.307***				2.325**
				2.99				2.32
BS				0.401***				4.717***
				5.61				6.90
SCF				0.146**				0.444
				2.28				0.72
LCV		0.036**	0.007	0.013		−0.625***	−0.876***	−0.787***
		2.37	0.52	0.89		−4.05	−6.22	−5.71
NUMESTQ		0.065***	0.048***	0.048***		0.757***	0.620***	0.622***
		17.02	10.79	10.77		14.83	10.98	10.95
LOSS		−0.494***	−0.468***	−0.477***		−5.213***	−4.882***	−5.000***
		−9.75	−11.09	−10.95		−7.72	−7.89	−7.89
FIN		−0.746***	−0.427***	−0.440***		−5.399***	−2.669***	−2.943***
		−12.33	−10.07	−9.92		−13.69	−10.31	−10.83
LAG		0.002	0.003**	0.003**		0.004	0.014	0.017
		1.28	2.14	2.23		0.35	1.13	1.40
NONDEC31		0.464***	0.409***	0.406***		3.817***	3.343***	3.286***
		10.99	10.39	10.31		8.94	8.19	7.98
ABSFE_ST		1.959***	2.959***	3.030***		2.009	10.246	11.525
		2.72	3.67	3.69		0.26	1.31	1.46
AVOL_DN					1.018***	0.989***	0.970***	0.965***
					11.84	12.72	12.48	12.57
Adj R^2	2.53%	9.02%	11.37%	11.42%	13.80%	18.49%	20.06%	20.16%
Nobs	203,127	203,127	203,127	203,127	203,127	203,127	203,127	203,127

Figure: stats

Conclusion

First, we find that guidance, analyst forecasts and disaggregated line items are more frequently bundled with earnings announcements and that each of these concurrent disclosures are associated with the increase in information content of earnings announcements over time. Furthermore, the extent of line item disclosure from the income statement and balance sheet has explanatory power for price and volume response at earnings dates. This explanatory power is incremental to concurrent guidance by management and forecasts by analysts, highlighting the significance of financial statement information, and especially in formation about earnings.