Trump tweets and the efficient Market Hypothesis

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Abstract. In a Semi-Strong Form (SSF) Efficient Market, asset prices should respond quickly and completely to the public release of new information. In the period from his election on 11/8/16 to his swearing in ceremony on 1/20/17, President-elect Trump posted numerous statements ('tweets') on his Twitter messaging service account that identified ten publicly traded firms. In the absence of new information, the Efficient Market Hypothesis (EMH) predicts that these announcements should have little or no price impact on the common stocks of these firms. Using standard event study methods, we find that positive (negative) content tweets elicited positive (negative) abnormal returns on the event date and virtually all of this effect is from the opening stock price to the close. Within five trading days, the CARs are no longer statistically significant. President-elect Trump's tweets were associated with increases in trading volume and Google Search activity. Taken as a whole, the price and trading volume response, combined with Google Search activity is consistent with hypothesis that it was small/noise traders who were acting on President-elect Trump's tweets and that their impacts were transitory.

Keywords: Efficient Market Hypothesis, trump, tweets, noise traders

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1. Introduction

In short, the Efficient Market Hypothesis (EMH) posits that asset prices should quickly and completely reflect the value of new information. In the Semi-Strong Form (SSF) of the EMH, the information set consists of all public (and historical) information. In the absence of frictions, the public release of new information should elicit an immediate and complete change in asset prices. If the information that is released has been partially or completely anticipated, the value of the release may be incorporated into asset prices prior to the actual announcement. However, in such a case, the confirmation of an event could elicit a small impact on pricing due to the resolution of uncertainty.[1]

Public announcements that contain no new information (e.g., repeats of a previous announcement) should be ignored by investors who are rational and informed. It is possible that irrational or uninformed investors (e.g., 'noise traders') could be induced to act on stale information. If the trading of noise traders is large, relative to the trading desires of rational/professional traders, it is possible that asset prices could behave in a manner inconsistent with the prediction of the EMH. It is also possible that noise trading could increase volume and/or volatility.[2]

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[1]For an excellent summary and review of early empirical evidence, see Fama (1970).

[2]See DeLong et al (1990) for a description of noise traders and their effects on price and volume.

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Of interest in this study is the manner in which investors seem to have responded to public announcements from President-elect Trump. We examine postings by Donald Trump from the polling on November 8, 2016 until his swearing in as President of the United States on January 20, 2017 – the seventy-three day period that he was the President-elect. This is an interesting period in its own right, one in which an individual stands on the cusp of assuming Presidential power. There is no longer (much)[3] uncertainty about the individual being officially elected President by the Electoral College, but their pronouncements do not have the full force that they will have after they are sworn in.

We searched the Twitter messaging account of (now) President Trump prior to election day, and found that as the nominee of the Republican Party, as the presumptive nominee of the Republican Party, and a candidate for the nomination by the Republican Party for President of the United States in 2016 and found there were no mentions of publicly-traded firms (US or foreign). However, beginning with a public mention of the AC Carrier division of United Technologies on November 24, President-elect Trump singled out ten firms by name – sometimes in multiple messages stretching over several days. All but two of these announcements occurred at times outside of regular trading hours on the NYSE and NASDAQ, so if they contained new information we can detect its price impact when trading opens.

While some in the news media were dismayed by the substance and frequency of the President-elect's tweets, Trump is not the first President (but perhaps the first President-elect) to mention publicly traded firms by name. For example, on April 11, 1962 in a radio broadcast press conference, President Kennedy took strong exception to the decision by U.S. Steel (and 'other leading' steel companies – not enumerated by name) to raise steel prices by 3.5% ($6 a ton).[4] This pricing announcement followed a negotiated labor agreement between representatives of the U.S. steel industry and United Steel Workers (USW) union.

Members of the Kennedy Administration had been involved in those labor negotiations, as they hoped to avoid a repeat of the long and acrimonious steel strike of 1959. The United Steel Workers (USW) Union had supported John Kennedy's quest for the White House and the now President had lobbied leaders of the USW to keep their wage and benefit demands to a minimum. In an agreement announced March 31, 1962 the USW ultimately agreed to take no increase in wages in 1962, but they did receive an increase in benefits that were estimated to have a value of $0.10 per hour. With this modest increase in hand, the Kennedy Administration let members of the steel industry know that they expected subsequent price increases (and thus inflationary pressures) to be minimal. The announcement of a 3.5% price increase in steel was attacked by President Kennedy the next day in language that was uncommonly blunt (accounts of private conversations are reported to have contained very 'salty' language).

The Kennedy Administration put on the full-court press of the steel industry. Secretary of Defense Robert McNamara, the President of Ford Motors prior to joining the Kennedy Administration, announced that the Defense Department would switch suppliers of steel for a submarine construction contract to a supplier that did not follow U.S. Steel's lead to increase prices. Inland Steel and Kaiser Steel quickly called press conferences to announce that they were not following U.S. Steel's lead. By April 13 all of the firms that had raised their prices announced a roll-back.[5]

Likewise, President Truman took what some saw as drastic steps to stop the effects of nation-wide railroad strike in 1950.[6] While these two announcements are often characterized as examples of leadership by Presidents Kennedy and Truman, the use of the bully pulpit carries risks as well as potential return. Many experts believe that the effectiveness of a President to achieve their political agenda is based on their skill of managing their political capital. Most contemporary accounts of President Kennedy's actions against U.S. Steel suggested that his political power increased after the companies quickly agreed to roll back their prices. Conversely, the railroad strike that President Truman hoped to shorten was ineffective – the Army took over the management of the rail system and Rail Unions did not agree to a labor contract for more than two years.

One can argue that the tweets of President-elect Trumps did not command the same stage as press conferences used by Presidents Truman and Kennedy.

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[3]While there was much discussion in the popular press about members of the Electoral College not voting for Trump, more votes were lost by Clinton (four) than Trump (three). See Cheney (2016).

[4]See News Conference 30 (1962).

[5]See *Toledo Blade* (1962).

[6]See Trohan in the *Chicago Daily Tribune* (1950).

Table 1
President-elect trump's firm-specific tweets November 9, 2016 through January 20, 2017

Date	Time	Firm (+/– content)	Theme of the Tweet
11/17/2016	6:01PM	Ford+	Keeping Lincoln plant in KY
11/24/2016	7:11AM	United Tech/Carrier+	Trying to keep jobs in IN
11/29/2016	7:11PM	United Tech/Carrier+	2 Tweets on negotiations
11/30/2016	7:48PM**	United Tech/Carrier+	Success in keeping jobs in IN
12/02/2016	7:06PM	Rexnord–	Closing IN factory/move to Mexico
12/06/2016	5:52AM	Boeing–	Cost of Air Force One replacement
12/06/2016	11:09AM*	Softbank+	$50B expansion/50,000 new US jobs
12/12/2016	5:26AM	Lockheed Martin–	F-35 costs are out of control
12/22/2016	5:26PM	Boeing+	Price out a F-35 comparable fighter
		Lockheed Martin–	Cost overruns on the F-35
01/03/2017	8:44AM	Ford+	Increase in Michigan jobs due to Trump
01/03/2017	4:30AM	General Motors–	Making Chevy Cruz in Mexico is wrong
01/04/2017	5:19AM**	Ford+	Scraping Mexico plant/700 new jobs US
01/05/2017	10:14AM*	Toyota–	Corollas for USA in Mexico–no way
01/09/2017	6:14AM**	Ford+	Expanding US plant/scraping Mexico
		Fiat/Chrysler+	$1B capital outlay/2000 new jobs USA
01/17/2017	9:55AM*	General Motors+	Thank you for expanding jobs in USA
		Walmart+	Thank you for expanding jobs in USA

*These announcements were made during trading hours in the United States. **These announcements have overlapping post-event windows and subsequently excluded. +Indicates a positive opinion of the firm. –Indicates a negative opinion of the firm or the announcement should negatively impact the firm.

However, the media world of 2017 is substantially different than 1950 and 1962. There is no question that candidate/nominee/President-elect Trump viewed Twitter as a way of directly communicating with the U.S. public, by-passing traditional media outlets whom he frequently characterized as biased against him.[7] Many political pundits believe that the use of Twitter by candidate Trump played a significant role in his election as President in 2016.[8] Prior studies of announcements on Twitter can elicit responses similar to those observed when new information is released to the public in the print and/or other types of media.[9]

2. Research method and empirical results

A search of President-elect Trump's tweets between November 9, 2016 and January 20, 2017 revealed a total of 15 postings regarding ten publicly traded firms (see Table 1). Three tweets contain references to two firms. Only two tweets occurred during trading hours here in the United States. Many of these tweets were preceded by an announcement by the firm, which the President-elect may have been responding to (see Table 2), but in these cases (GM and Walmart), both the original announcement by the firm and the President-elect's tweet occurred just prior to the opening of capital markets in the United States.

For each of the firms, we employ a single index model to estimate the firm's systematic risk coefficient. We estimate slope (Beta) and intercept (Alpha) terms for each common stock with 200 daily return observations beginning 230 trading days before the first tweet. Because this study is taking place so close to the actual events, we employ daily changes in the S&P 500 as our proxy for the market portfolio as CRSP returns are unavailable. We provide a summary of key regression coefficients in Table 3. All of the estimated slope coefficients (Beta) are significantly different from zero. However, the explanatory power of the single index models are rather low.

Using the slope and intercept estimates as proxies for the risk characteristics of each of the ten firms, plus the actual daily return on the S&P 500, we form an expected daily return for each of the firms in the 61 trading day event window that is centered on the original/only tweet by the President-elect. We subtract the daily expected return from the firm's actual return to form an estimate of the stock's abnormal return. In Table 4 we report the average daily unexpected return in the eleven day window centered on the original tweet. While some of the individual firm returns are large, none of the eleven event days has a mean return that is statistically different from zero.

[7]See Keith at npr.org (2016).
[8]See Henniger in the Wall Street Journal (2017).
[9]See Sprenger et al. (2014).

Table 2
Firm announcements prior to, or in response to, president-elect trump's tweet

Date of Tweet	Firm	Response/Prior Announcement
11/17/2016	Ford	Response – never plans to move jobs
11/24/2016	United Tech/Carrier	Prior – Carrier had announced move in Feb. 2016
11/29/2016	United Tech/Carrier	Prior – 4 : 54PM Tweet announcing jobs deal in IN
11/30/2016*	United Tech/Carrier	Response – none
12/02/2016	Rexnord	Prior – 11 : 52AM 11/17/16 plant closing announcement
12/06/2016	Boeing	Response – 12/09/16 focus on China, not Air Force One
12/06/2016	Softbank	Response – 2 : 44PM confirmation by CEO
12/12/2016	Lockheed Martin	Response – none
12/22/2016	Boeing	Response – none
	Lockheed Martin	Response – 12/23/16 CEO ready to cut costs on F-35
01/03/2017	Ford	Response – 11 : 07AM Ford is cancelling Mexico plant
01/03/2017	General Motors	Response – 9 : 08AM only a small # of Cruz are for USA
01/04/2017*	Ford	Prior – see 1/3/17, Response – none
01/05/2017	Toyota	Prior – Toyota had announced a Mexican plant 2015
01/09/2017*	Ford	Response – none
	Fiat/Chrysler	Prior – 1/8/17 3 : 54PM spending/employment plan
01/17/2017	General Motors	Prior – 1/16/17 7 : 53PM spending plans announced
	Walmart	Prior – 8 : 10AM 1/17/17 10,000 new US jobs announced

*excluded events.

Table 3
Market model regression coefficient estimates

Firm	α_j (t-statistic)	B_j (t-statistic)
Ford	−0.0009 (−0.97)	1.2718 (12.53)
United Technologies	0.0002 (0.33)	0.9247 (15.29)
Rexnord	0.0003 (0.26)	1.6384 (14.05)
Boeing	−0.0009 (−1.06)	1.2863 (14.09)
Softbank	0.0008 (1.22)	0.4981 (6.52)
Lockheed Martin	0.0005 (0.84)	0.4955 (8.16)
General Motors	−0.0006 (−0.70)	1.0843 (11.78)
Toyota	−0.0006 (−0.70)	1.1397 (11.96)
Fiat-Chrysler	−0.0024 (−1.41)	1.9857 (10.72)
Walmart	0.0009 (1.05)	0.5015 (5.50)

Model: $R_{j,t} = \alpha_j + B_j(Rmj_{,t}) + \varepsilon_{j,t}$, where $R_{j,t}$ is the daily return on the firm's stock, α_j is an intercept estimator, B_j is a slope (systematic risk) estimator, $Rmj_{,t}$ is the daily return on the S&P500, and $\varepsilon_{j,t}$, is an error term.

Table 4
Abnormal returns around president-elect trump's tweets

Event Date	Average Abnormal Return	Abnormal Return Standard Deviation	t-statistic ($n = 15$)
+5	0.3622%	1.3702%	0.99
+4	0.1568	1.1775	0.50
+3	−0.4754	0.8130	−2.18*
+2	0.3389	1.5667	0.89
+1	0.3232	1.8871	0.64
0	0.1852	1.7894	0.40
−1	−0.0993	2.0706	−0.19
−2	0.1099	1.4478	0.29
−3	0.1844	0.9600	0.74
−4	0.1764	1.6031	0.43
−5	0.1898	1.1353	0.64

*Significantly different from zero at the 5% confidence level.

While the group of tweets have no discernable pricing impacts, we note that it is possible to analyze the content of the tweet to determine if it is positive (expected to be value enhancing) or negative (expected to be value destroying). We determined that nine of the fifteen non-overlapping tweets can be classified as positive about the firm, the remaining six can be classified as negative. We continued our analysis of pricing impacts on the two sub-samples. The results are reported in Table 5.

We find that abnormal returns on the first trading day of the President-elect's tweet (t = 0) is positive and significantly different from zero for positive events. Furthermore, we find that abnormal return for positive tweets is positive and nearly statistically significant on event date t+1 (See Panel A). We

decompose the announcement day effect into two parts – the return from the prior day's closing to the open price and from the opening price to the closing price. We find that the reaction that takes place during NYSE/NASDAQ trading hours on the announcement day is significant, whereas the movement between the prior day's closing price and the open ('after hours trading') is not.

As reported in Panel B, the abnormal returns associated with a negative Trump tweet are negative and almost statistically significant on day 0. There is also a negative and significant abnormal return on the following day (t+1). Most of the announcement day impact is confined to trading hours. For both positive and negative tweets, we find that the cumulative abnormal return (CAR) is no longer statistically different from zero within five trading after

Table 5
Panel A: Abnormal returns around positive president-elect trump's tweets

Event Date	Average Abnormal Return	Abnormal Return Standard Deviation	t-statistic ($n = 9$)
+5	0.5025%	0.7261%	1.95
+4	−0.3411	0.6159	−1.57
+3	−0.4991	0.8735	−1.62
+2	0.4336	1.9481	0.67
+1	1.1010	1.9080	1.73
0	1.0378	1.4203	2.19**
0 open to 0 close	0.7100	0.8209	2.59*
−1 close to 0 open	0.3722	1.1620	0.96
−1	0.3127	2.2036	0.42
−2	−0.0267	0.7410	−0.11
−3	0.2743	0.7179	1.14
−4	0.7479	1.8591	1.21
−5	0.4397	1.3159	1.00

*Significantly different from zero at the 5% confidence level.**Significantly different from zero at the 10% confidence level (*p*-value 5.5%).

Panel B: Abnormal returns around negative president-elect trump's tweets

Event Date	Average Abnormal Return	Abnormal Return Standard Deviation	t-statistic ($n = 6$)
+5	0.1752	2.0174	0.21
+4	0.8207	1.4658	1.37
+3	−0.4438	0.8051	−1.35
+2	0.1686	0.5750	0.66
+1	−1.0766	0.6947	−3.47*
0	−1.0766	1.5707	−1.71
0 open to 0 close	−0.7783	1.2580	−1.52
−1 close to 0 open	−0.2883	1.4560	−0.49
−1	−0.7173	1.8631	−0.94
−2	0.3147	2.2151	0.39
−3	0.0495	1.3112	0.09
−4	−0.6808	0.4425	−3.77*
−5	−0.1850	0.7463	−0.61

*Significantly different from zero at the 5% confidence level.

the tweet.[10] In short, the announcement effects ebb in the week following the tweet.

We also examine the impact of the President-elect's tweets on trading volume. First, we find the firm's mean daily trading volume in the pre-announcement period (t = −230 to −30). Next, we subtract the pre-announcement mean from the actual trading volume of the firm, and divide by the pre-announcement, producing an 'unexpected change in daily trading volume' for each of the events. These results are reported in Table 6. We note that pre-event period is characterized by trading levels well below the 200 day average.

Table 6
Abnormal changes in trading volume around president-elect trump's tweets

Event Date	Average Abnormal Change in Volume	Standard Deviation	t-statistic ($n = 15$)
+5	29.99%	67.66%	1.44
+4	16.43	99.97	0.52
+3	26.90	116.10	0.73
+2	9.19	59.10	0.51
+1	55.96	128.43	1.38
0	87.10	208.60	1.39
−1	59.65	241.89	0.81
−2	−25.33	34.84	−2.41*
−3	−30.12	25.86	−3.86**
−4	−5.32	63.03	−0.28
−5	−17.15	59.47	−0.97

*significantly different from zero at the 5% level. **significantly different from zero at the 1% level.

Examining the eleven day window centered on the President-elect's initial tweet, we find that unexpected change in trading volume rose significantly (nearly 60%) on the day before the President-elect's

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[10]This is the case when we exclude two post-announcement returns: General Motors reported a surprising 10% surge in December 2016 sales on 1/4/17 (t+1) and its stock rose nearly 5%, whereas the EPA announced on 1/12/17 (t+3) that the Fiat-Chrysler had installed software to cheat on the measurement of diesel engine emission and its stock declined over 10%.

initial tweet. This is frequently the date on which the initial announcement was made by the firm that President-elect Trump was tweeting a response. We find that unexpected ltrading volume on the event day was approximately 87% higher on the day of the tweet and 56% higher on the following trading day. We find that trading volume returns to 'normal' levels immediately after the initial tweet.[11] There is no evidence reported in the financial press to suggest that institutional investors systematically reacted to the President-elect's tweet activity with increased trading volume. We conclude the activity was largely driven by small investors/noise traders.[12]

We employ a relatively novel approach to further explore the role of noise traders in the market's response to Trump tweets. We examine Google Search activity for the firms in the weeks surrounding the tweets. Google produces an index of search activity, where 100 indicates the maximum search activity in a particular time period. Since daily data was not consistently available, we report Google Search data on a weekly basis. The period of analysis was one year. Thus a measure of 100 means that search volume was highest during that week during the year between March 2016 and 2017.

We report in Table 7 the search activity index for each of the firms in the 4 week window that begins one week prior to the tweet (t-1), the week in which the first tweet took place (t = 0), and the two weeks that follow the initial tweet week in Table 7. We find that the average of firm index values rises from 51.7 in the week prior to the tweet, to 92.8 in the week of the tweet. Five of the eleven non-overlapping tweets are associated with an index value of 100 in the week of the tweet – meaning that search activity was at an annual high for that week. In the weeks following the tweet, the average index value drops to 68.7 and then to 57.7 in second week after the tweet. In eight of the eleven cases, search activity was slightly higher than it was prior to the tweet.

This pattern of Google Search activity generally supports the supposition that the increase in trading activity immediately around the Trump tweet was driven by small noise traders. However, once the event began to fade and other firm-related tweets by Trump were released, Google Search activity returned roughly to the level prior to the tweet. Given the spacing between the tweets, the pattern is consistent with noise trader activity shifting sequentially from one tweet-focused firm to another.

3. Summary

The response that President-elect Trump's tweets about publicly traded firms appears to have elicited significant announcement effects, conditioned on the content/tone of the tweet. The bulk of the market's reaction to Trump's tweets is from the open(ing price) to the market's close on the announcement day. Negative tweets are associated with a (negative) abnormal return the day following the tweet. Since the tweets do not appear to contain any new information, this suggests that irrational/noise traders are responsible for the pricing impacts.[13] The statistical significance of the CAR disappear within three to five trading days.[14]

Without regard to the content of the tweet (e.g. positive or negative), we find that, on average, unexpected trading volume rises about 87% on the first trading day following the tweet and that unexpected trading volume rose about 56% on the second post-tweet trading day. Examining the pattern of Google Search activity for the firms, we find a spike in searches in the week of the tweet, which falls off to more 'normal' levels in the two weeks that followed. Taken as a whole, we conclude that the transitory price impacts, the unexpected increase in trading volume, and the spike in Google Search activity

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[11]Again, we exclude the General Motors December sales announcement and the Fiat-Chrysler EPA announcement from our test statistics.

[12]See Janet Burns in *Forbes* (2017) who reports that an APP has been created which uses content analysis to classify a President Trump tweet into a positive or negative message and communicates this to users within one second of the appearance of the tweet. The article goes on to note the seemingly large impact of negative tweets on the target firm's stock price.

[13]It seems a stretch to argue that the tone of President-elect Trump's tweets could be expected to lead to a significant number of customers/suppliers/informed investors to change their future purchasing/supply intentions, and/or their perceived riskiness of the firm, such that the (true) value of the firm should change as a result of these tweets. We thank our referee for reminding us that a tweet which foreshadows a possible change in policy, once Trump was sworn in, could have valuation impacts. Changes in value that are driven by expected changes in policy are likely to last at least until his inauguration as President. Our small sample size does not allow us test this hypothesis.

[14]Based on a referee suggestion we examined the price change from the end of day t+1 to the end of day t+5 (as one observation). While the average change in value is not statistically different from zero, we do observe a rebound: positive (negative) tweets are followed on average by a retreat (increase) in price after the initial increase (decrease) due to the tweet. While not significant, the post-announcement price change is consistent with (informed?) investors taking a contrarian position after the initial response to the tweets.

Table 7
Google search activity* by firm and event week

Firm	Tweet		Event Week			
	Date	−1	0	+1	+2
Ford	11/18/16	86	99	85	87
United Technologies	11/24/16	20	100	43	22
Rexnord	12/2/16	16	97	100	26
Boeing	12/6/16	40	100	50	40
Softbank	12/6/16	45	96	47	47
Lockheed Martin	12/12/16	50	100	70	42
General Motors	1/3/17	84	94	95	99
Ford	1/3/17	79	100	92	88
Toyota	1/5/17	85	96	99	100
Fiat-Chrysler	1/9/17	23	100	36	38
Walmart	1/17/17	41	39	39	40
Average		51.7	92.8	68.7	57.7

*Normalized during the period March 2016 to March 2017, such that the week with the maximum search activity has an index value of 100.

is consistent with the hypothesis that it was primarily small retail investors/so-called 'noise traders' who responded to the Trump tweets. Given the relative high cost of trading activity for such investors and the relatively small amount of excess returns, it is unlikely these investors earned significant risk-adjusted trading profits for their efforts.

For those who hold the EMH dear, the abnormal returns associated with the tweets are somewhat disturbing as the announcements do not appear to contain new information. While not statistically significant, we note that abnormal returns associated with Trump's tweets diminish over time. Press coverage of the impacts of Trump's tweets grew as he moved closer to his inauguration. While much of that coverage might be characterized as political/partisan – a significant portion speculated on the possibility of creating trading rules to exploit this new source of information. Our results suggest that journalists were focusing on raw returns, failing to adjust for market movements and systematic risk. We note that since his swearing in, President Trump has virtually ended his tweets aimed at publically traded firms (but not his tweeting behavior), suggesting that this natural experiment may have come to an effective close.

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