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Using social media analytics: The effect of President Trump's tweets on companies' performance

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Abstract: Social media is becoming one of the main sources of unstructured data. Many financial analysts use Twitter to gather data and obtain meaningful insights. Recently, high-profile politicians like President Trump have been using Twitter to communicate with the public. The President's Tweets are used as considered to be informative signals that may influence consumers and affect investors' decisions in the stock market. The effect of these signals can be measured by coinciding changes in the stock market or changes in the share prices of certain companies targeted in the President's Tweets. The Tweets used in this research include keywords that are related to finance and economics, public policy, political considerations, and targeted companies. Event study methodology is used to determine the relationship between Trump's Tweets' content and daily changes in major indexes and targeted companies' excess returns. Although many of the recent discussions have indicated that Trump's microblogging can affect the financial markets, the results, on average, show no significant effect of Trump's Tweets on either market indexes nor on most of the targeted companies share prices.

Keywords: Unstructured-data analysis, social media, microblogging effects, president's tweets, companies performance

JEL codes: G40, D80

1. Introduction

Advancing research in Management Information System (MIS) has been influenced by psychology, economics, finance, accounting, behavioral research, and other disciplines. Accounting and financial information released through traditional reports are sources of information for managers and investors. This information is then made public for specific periods and for specific purposes. Therefore, there is a need to explore different types of non-mandatory disclosures that are useful for timely decision-making. The web pages of companies and different news agencies are examples of other sources of information used by decision makers (O'Reilly, 1982). Online social media and unstructured data available on the Internet can also be useful information (Gabrovšek *et al.*, 2017). Examples of information that can be found on online social media include customers' satisfaction and experience, quality of products and services, and social-political issues and debates. New information obtained from social media can be used to explain and predict changes in some economic and commercial indicators such as companies' performance (Bollen *et al.*, 2011; Schumaker & Chen 2009b, 2009a).

Many countries' political leaders are using social media as one of the key platforms to deliver messages to the public. Current (45th) President of the U.S.A., Donald J. Trump, has posted more than 35.9 thousand Tweets on his official account (@realDonaldTrump) and had about 39.5 million followers as of September 2017[1]. The President of the United States has political influences and executive powers; and it is often assumed that the U.S. President has access to information provided by different governmental institutions, financial agencies, and advisors. Therefore, the information shared through the President's Tweets can be used as a forecast to changes in the U.S. economy, financial markets, and targeted companies.

In the globalization era, the U.S. economy, the world's largest, influences most of the economies of the developed and developing countries. For example, the U.S. financial crisis of 2007-2008 had negative effects on the global economy (Francis *et al.*, 2015). The contractions in the U.S. financial conditions such as monetary and fiscal policies, and uncertainty in the financial markets affect global financial markets; especially emerging market and developing economies that depend on external financing (Kose *et al.*, 2017). The following citation from the Economist shows how Trump's political and economic policies affect the rest of the world.

> "Mr Trump may kick into reverse a process of globalisation which had already stalled. That will not restore to workers a golden age of prosperity and security. Instead, it will increase the extent to which the global economy feels like a zero-sum competition, increasing the risk of political conflict. It will also destroy a developmental ladder which had already been looking quite rickety. Developing

[1] https://twitter.com/realdonaldtrump (retrieved on 9/29/2017)

> economies will find themselves less able to use trade to boost their growth potential and less able to send migrants to richer countries. At the same time, the international cooperation that occasionally provided some cushion against financial or economic hardship in the developing world could break down" (Economist, 2016).

Tafti, Zotti, and Jank (2016) state that although social media is one of the sources of information about companies' financial conditions, it is hard to capture the effects of the financial information released in social media outlets such as Twitter. On the other hand, the high-frequency stock trading market does not lack the efforts to understand better the information released on social media. Through conducting an analysis of Tweets, the results can be used as indicators in predicting stock prices. One of the known examples of short stock predictions by analyzing Tweets is claimed by an advertising company in Austin, Texas[2]. A software product monitors the President's Tweets, extracts the Tweets, and when a specific company is mentioned, an algorithm decides to shorten the stocks in real time based on in the sentiment analysis of the Tweets demonstrates a negative sentiment. However, how well the algorithm performs on long-term is not disclosed. On the other hand, others' claims that the President's Tweets result in some volatility in stock prices is unquestionable, but no model or algorithm using the President's Tweets has been shown to be consistently supportive of the predictions in trading (Stewart 2017). Appendix A lists a set of selected articles, some in favor and some in contra of the idea of considering the President's Tweets as a reliable source of information in stock trading.

To explore the influence of the content of the U.S. President's Tweets on the targeted companies' financial performance, the study is organized as follows: The next section discusses the theoretical background, Section 3 describes the analysis of the President's Tweets and the statistical methods used, Section 4 presents the main results, and the last section discusses the main conclusions, limitations of the research and further research suggestions.

2. Literature review

Financial and non-financial information can influence the nature and magnitude of investors' investments in local or global financial markets. Non-financial information includes announcements by companies about their activities such as entering new markets, introducing new products or services, engagement into alliances or strategic agreements.

The financial statements and accompanying notes as mandatory information by generally accepted accounting principles (GAAP) are an important source of information for all stakeholders (EY, 2014). However, the non-mandatory

[2] https://www.t-3.com/works/the-trump-and-dump-bot/ (retrieved on 9/29/2017)

information can assist stakeholders in determining the companies' performance. The non-mandatory information includes the voluntary information released by companies in different media sources such as their official web pages, executives' personal web pages and social media, and other information released in social media such as Twitter (Alexander & Gentry, 2014). This includes any political figures that could influence stock markets globally.

The classic financial theory focuses mainly on explaining the relationship between risk and return. Kendall and Hill (1953) evaluated 19 British indexes during the period 1928-1938 and suggested the existence of a systematic effect on the changes in indexes prices. Markowitz (1952; 1959) portfolio theory assumes a relationship between risk and return. These normative theories measure risk by the standard deviation of share prices. There are two classical viewpoints in accounting and finance practices: the organizational view that relates to economic decisions of the entity and market finance that relates to aspects of markets and investments (Asquith & Weiss, 2016).

In reducing risk and maximizing profits, the analysis of mean-variance of an asset portfolio diversification is used by Markowitz (1952; 1959). This approach assumes that investors are risk-averse and prefer safe investments. The works of Markowitz (1952; 1959) contributed to the development of the Capital Asset Pricing Model (CAPM) (Sharpe, 1964; Lintner, 1965; Mossin, 1966; Jensen *et al.,* 1972). The risk-free active variable proposed by Tobin (1958) is incorporated in the CAPM, and it applies to the diversification of optimal portfolios of the market.

Classical accounting and finance theories need to consider the new era of information technology, for example, social media effects on the reporting of financial performance which can generate opportunities and challenges for companies. The Security and Exchange Commission (SEC) regulations may limit the management in using the social media (Alexander & Gentry, 2014). The social network analysis can be applied to new areas of research in accounting and information systems (Worrell *et al.,* 2013). By analyzing users' textual communications on Twitter or Facebook, companies are able to understand the sentiments of customers (Kim, 2015).

The capital structure and the relevance propositions are essential concepts in the development of accounting and finance theories and practices. The relevance assumptions are linked to equity and debt relationship, to maximize the company value considering the cost of capital (Vargas & Corredor, 2011). Finance theories and practices rely on the efficient market assumptions: capital market free operations, neutrality of the income tax on natural persons, competitive markets, uniform market access, homogeneous expectations, no bankruptcy costs and no information costs (Modigliani & Miller, 1958). Miller and Modigliani (1961)

integrated into their model the dividends policy, the growth and the share valuation of a company.

The equilibrium price of equity at a specific date in a competitive market occurs when the available supply of the equity is equal to the aggregate demand. The equity price reflects a consensus of all the participants in the stock market about the value of the equity based on all publicly available information. The assumption of a perfect capital market is that all available information is freely available to everyone, there are no transaction costs, and all market participants are price takers. Therefore, the simultaneous and complete disclosure of available information leads to consistent expectations with all information incorporated in the spot price (Fama & Miller, 1972). The real importance of the efficient market hypothesis is whether it is sufficiently valid to afford a practical basis for studying the behavior of share prices. Fama (1970) suggests three levels of market efficiency, namely the weak, the semi-strong and the strong form.

Weak form efficiency refers to the information subset consisting of past prices or returns. Weak efficiency is achieved when all information contained in past share price data is fully reflected in current prices. Semi-strong form efficiency refers to the information subset that is publicly available. It suggests new information is rapidly reflected in share prices. Therefore, current prices fully reflect all public information about the company and excess returns cannot be expected unless the investor has inside information which is not yet public. Under semi-strong efficiency, it should not be possible to make returns in excess of the market average by investing subsequent to the release of new information. Strong form efficiency refers to an information subset that contains all information whether publicly available or not and suggests that stock prices reflect all this information. This is because analysts and others involved in the stock market have rational expectations and process trade based and other information to price securities efficiently. Share prices, therefore, include all 'best guess' information and no excess returns can be made from inside information.

The stock market is influenced by macroeconomics, regulations, speculations, among many other factors. The general opinion and investors' sentiment, what they think about an event or a company, influence companies' share prices. The investors' sentiment can be understood through the content of Tweets (Corea, 2016). For example, a large number of negative comments and sentiments in Tweets that targets a specific company might predict a future decline of its revenue (Alles & Gray, 2016) and imply a negative effect of share prices.

For event study analysis, the approach involves computing returns on the common stock of companies making announcements and comparing them with the expected returns if no announcement had been made. The deduction is that differences between achieved and expected values reflect the stock market reaction to the news.

Any such difference is described in previous empirical work as the excess returns from new information, and generally, excess returns are computed for specific event date windows (Fama, 1965; Fama *et al.,* 1969). An assumption that the stock market is informationally efficient (at least in the semi-strong form) would imply that the market reflects all available information in current (pre-announcement) prices prior to the release of the new information of interest (Fama, 1970; Fama & Miller, 1972; Fama, 1972; Tucker, 1994). Also, it follows that excess returns encountered in the post-event window would be attributable to the new information.

Advances in information technology facilitate the investors' search for investments' information. Investors use Google searches (Drake *et al.,* 2012), Twitter (Blankespoor *et al.,* 2013), EDGAR (Drake *et al.,* 2015), Wikipedia (Xu & Zhang, 2013), and financial blogs (Saxton & Anker, 2013) to obtain information for investment decisions (Pennington and Kelton 2016). Implications of accelerated advancement in social media include economic, regulatory, social, and cultural pressures that may affect the utilization of accounting information (Albu & Klimczak, 2017). The social media becomes another source of accounting information for all stakeholders.

The rational behavior of investors concerning decisions under uncertainty influenced by the perceived personal benefits generated by a decision. The Theory of Expected Utility (Von Neumann & Morgenstern, 1945) is related to the expected value determined by the expected utility function of different investments. According to the Pecking Order Theory, the managerial decisions to obtain financing are associated with a hierarchy of preferences (Myers & Majluf, 1984). The lack of symmetric information allows developing a hierarchical order of external financing costs (Tong & Green, 2005). The asymmetric information and risk aversion of the manager are crucial factors in establishing an order of priorities (Vargas & Corredor, 2011).

Firm mandatory disclosures are not used by all investors; this may increase the information asymmetry among investors. This situation is applicable to firms that do not highly use traditional intermediaries. Therefore, the firms' use of social media such as Twitter may reduce information asymmetry (Blankespoor *et al.,* 2013). In general, social media use is widespread and used to communicate and retrieve information (Wong, 2017). But, more research is needed to verify how companies manage social media risk (Demek *et al.,* 2018).

The behavior accounting and finance studies the influence of psychology on the decisions made by managers and investors including the possible effect on the markets. As an interdisciplinary approach, it integrates psychological and sociological aspects to finance and accounting implications of other business activities (Ricciardi & Simon, 2000; Ashta & Otto, 2011; Kaur *et al.,* 2016). Behavioral finance seeks to explain and improve the knowledge about the emotional

factors and psychological processes of managers and investors in their decisions (Ricciardi & Simon, 2000). Because the lack of evidence in classical finance to support decision making, behavioral finance studies try to fill this gap (Kahneman, 2011; Thaler, 1994; Statman, 2014).

Because of the application of psychological concepts to accounting and finance, some emotional biases with respect to financial decision making should be considered. The theory of perspectives introduces differences in dimension when considering a loss or gain. This perspective assumes that a value function is concave for profits, convex for losses, and more pronounced for losses than for profits and assumes a non-linear relationship (Köbberling & Wakker, 2005; Tversky & Kahneman, 1991, 1992, 2016; Olsen, 2008).

The abundance of data available through the internet and particularly, social media, makes more challenges to accounting, finance, and management information system classical and behavioral theoretical assumptions. One of the non-traditional sources of information is online social media. The content newness in the social media is becoming useful for many stakeholders and especially in business. Social media is becoming a source of unstructured data that is easily obtained and analyzed (Saleh & Roberts, 2017). Gamage (2016) states that data analytics will have an impact on the future role of accounting professionals. The social media is not risk-free, there is an inherent risk in sharing accounting information in real time. Errors in accounting information can occur in mandatory and voluntary disclosures, but management can use Twitter to communicate with stakeholders and alleviate the issue (Malhotra & Malhotra, 2016).

As Twitter is a real-time tool that increases the availability of information, academics and professionals are becoming motivated to consider the online social media content in their decisions. A promising application of Tweets content is the analysis of sentiments that deals with determining the sentiment orientation (Vaitheeswaran & Arockiam, 2016). This can be realized using predictive analytics that supports the extraction of information from large data (Shmueli & Koppius, 2011). Also, the integration of the information derived from online social networks and financial markets, enable to extend accounting and finance research to the large-scale analysis of investors' behavior (Souza *et al.,* 2015).

Text mining and online text content such as Tweets enable researchers to extract opinions and sentiments to create beneficial information. Business analysis depends mainly on structured data sources. However, text mining permits management accountants to excerpt decision-related information from unstructured data from different sources such as social media (Appelbaum *et al.,* 2017; Corea, 2016; Alexander & Gentry, 2014).

3. Methodology

In this article, the market reaction to the President's Tweets is measured using a conventional event study methodology (Brown & Warner, 1980; 1985). This is by computing returns of major indexes in the U.S.A. and of companies targeted in the President's Tweets. The deduction is that differences between achieved and expected values reflect the reaction to the Tweets. Any such difference is described as the excess returns from new information, and generally, excess returns are computed for specific event date windows (Fama *et al.,* 1969). An assumption that the stock market is informationally efficient, at least in the semi-strong form, would imply that the market reflects all available information in current, pre-Tweets, prices prior to the release of the new information of interest (Fama, 1970; Tucker, 1994). Also, it follows that excess returns encountered in the post-event window would be attributable to the new information.

In the case of the President's Tweets, the precise newness of the information is less easily determined than for other more tightly controlled price sensitive information released by companies. Tweets may be a matter of record with some or all the information already known to the market and included in financial indexes in the pre-announced window. For this reason, event windows include periods prior the event as well as after the event to encompass ambiguity over when the market had access to the information.

In making the event intervals, we also need to minimize the possibility that changes in the companies' stock prices are affected by the release of other new information during the event window. For recognized price sensitive information, for example, new accounting results or acquisitions information release is strictly controlled and hence observations contaminated by such events can be dropped. However, the President's Tweets generally involve more varied types and amounts of new information, and there is no systematic way of unambiguously avoiding confounding events. Inspection of event windows for return spikes associated with other new information such as alliances, product market developments or relevant economic information should be used as a further filter. Despite the precautions, noise is unavoidable. Given the unstructured nature of Tweets, the scope for confounding events and uncertainty about the precise timing of information release, it will be difficult to determine the relationship between the companies' financial performance and the President's Tweets. The main hypotheses of this study are that:

1. The President's Tweets are a material price factor in the companies' financial performance. Therefore,
   H_0: The average of excess returns of companies ($AERt_0$) mentioned in the President's Tweets equals to zero
   H_A: $AERt_0 \neq 0$

2. The President's Tweets about specific companies are a material price factor. Therefore,
   H_0: The excess returns of a company (ERt_0) mentioned in the President's Tweets equal to zero
   H_A: ERt_0 # 0

3.1 Data collection

The sample consists of the U.S. President's Tweets from the beginning of 2016 when he dominated the GOP field in August 2017[3]. The Tweets were extracted from Donald Trump's Official Twitter Account. We found about 5,700 Tweets, from which 414 Tweets are related to the economy or finance terms. These are used to verify the relationship between the Tweets and the share prices of targeted companies. Also, we encountered 58 Tweets related to 23 public companies. The financial variables related to these companies are obtained from Mergent, Bloomberg Finance, web pages of the companies and Reuters Finance for news. The sample composition with respect to main subjects of the Tweets is given in Table 1.

Table 1: the composition of the sample

Content of Tweets	*Number*	*Percentage of sample*
Economy	30	6%
Finance	42	9%
Tax Reform	62	13%
Immigration	116	25%
Employment	164	35%
Specific companies	58	12%
Total sample	472	100%

Both single Tweets and repeated ones were considered in this study as independent events in computing event returns for the Tweets. The estimation window for the event study was 450 working days [t-452 to t-3], and we consider two days before the event and two days after the event.

3.2. Data analysis

The analysis considered the names of companies included in the Tweets, to verify if the Tweets have effects on the performance of these companies. The null hypothesis (H_0) to be tested is that the mean day 't_0' excess return (ER) is equal to zero against the alternative hypothesis (H_1), that it is significantly different from zero. The

[3] http://www.cnn.com/2016/01/26/politics/donald-trump-ted-cruz-polling/index.html (retrieved on 9/29/2017)

estimated average and standard deviation used in the t-test are calculated using the estimation window. For testing the excess return over an interval of length T-days, the test statistic is the ratio of the cumulative mean excess return to its estimated standard deviation (Brown and Warner 1985; MacKinlay 1997).

$$\sum_{t=1}^{T} MER_t / (\sum_{t=1}^{T} S^2_{MER_t})^{0.5}$$

The variance of (MER_t) for all cumulative intervals is taken from the estimation period and is adjusted for different evaluation windows as follows: $\sum_{t=1}^{T} MER_t$ / ($\sqrt{T}$ * S). The null hypothesis (H_0) is that the excess return (ER) will be jointly normally distributed with a zero-conditional mean and conditional variance $S^2_{ER_{it}}$where $S^2_{ER_{it}} = S_j^2 + (1/T)[1 + (R_{mt} - \overline{R_{mt}}))^2 / S_m^2]$. This equation depends on the estimation interval length 'T'. Where 'T' is large enough the second term (the correction term) tends to zero (Patell, 1976; Myer, 1986, 45), and therefore, is ignored in this study. The requirement that returns are jointly normal and temporally independently and identically distributed (Brown and Warner 1985) appeared to be satisfied by the data.

Consistent with event studies in similar research, the market risk-adjusted return (MRAR) is used as follows: $\text{MRA}(ER_{jt}) = R_{jt} - \beta_j * R_{mt}$, β_j is the volatility or systematic risk for the security ($\beta_j = Cov\ (R_j, R_m)/S_m^2$). Several event windows are considered around the event day (t_0) the day of the President's Tweets or the next market day. Also, the CERs are explained using multiple regression as follows: CER = $\alpha_0 + \sum \alpha_i X_i$, where X_i's are the independent variables: natural logarithms of market capitalization, the President's sentiment index in the Tweets, companies' performance measured by average return in the estimation period and company-specific risk measured by standard deviation in the estimation period, standardized replies to the Tweets measured by number of replies for each Tweets divided by the average of replies in the sample and PPI.

4. Data interpretation and results

For the first stage of the research, we completed a macro analysis that takes into consideration major financial market indexes in the U.S.A. in relation to the President's Tweets. There is no significance (α = 5%) with respect to the arithmetic indexes' returns around the day of the President's Tweets (t_0). This is an indication that the President's Tweets have no effects on the U.S. financial indexes, at least on the daily indexes prices.

For the second stage of the research, we consider the effect of the Tweets on companies' share prices. Table 2 shows descriptive statistics of the sample companies. The average beta for the sample is 1.09. The systematic risk, therefore,

is approximate to the market. The average of companies' market capitalization is 146 billion; this is an indication of the size of the companies in the market. On average, the sample companies showed a negative small return in the estimation period and positive and small return at t_0.

As expected, the uncertainty about when exactly the content of the Tweets became public and the variable importance of other news concerning to other new information in the market gives rise to limited significance in the results. The mean excess return for individual companies is generally positive on the day of the announcement (t_0), but it is not generally significant at the 5% level. Occasional intervals around the event day show marginal significance at the 10% level. Four windows were explored, and cumulative excess return (CER) for each window was calculated using MRAR model (see Table 3). The sentiment analysis is used to determine the sign of the Tweets as positive and negative. The relationship between the President's Tweets sentiment signs and excess returns signs for the significant event ($\alpha = 10\%$) is very low ($r = 8\%$) for the event day (t_0). Appendix C describes the total sample CER and corresponding significances.

Table 2: Descriptive statistics of selected financial variables of companies that were indicated in the President's Tweets

Variable	Minimum	Maximum	Mean	Std. Deviation
Beta	0.050	1.930	1.093	0.415
M Cap	927	777,770	146,436	172,007
LnMC	6.832	13.564	11.135	1.455
Sentiment	-0.997	0.994	0.252	0.710
ComPerf	-0.057	0.002	-0.001	0.008
ComStd	0.011	1.965	0.052	0.265
Ar_{t-2}	-0.031	0.021	-0.003	0.011
AR_{t-1}	-0.031	0.043	0.002	0.013
AR_{t0}	-0.075	0.064	0.003	0.021
AR_{t1}	-0.036	0.096	0.004	0.020
AR_{t2}	-0.044	0.023	-0.003	0.012
No. of Tweets:	54			

Variables: Const is the constant in the estimated model (α_0), ComPerf is the company's performance measured as the expected returns of companies in the estimation window, MCap is the market capitalization of millions U.S. dollars used as a proxy for companies' size, Stlike is the standardized number of likes in the President's Tweets (PT) (number of the likes in PT over its average), StRet is the standardized number of retweets in PT (number of the retweets in PT over its average), StRep is the standardized number of replies in PT (number of the replies in PT over its average). The sentiment is the codification by examining the sentiment in the President's Tweets.

ComStd is a company's standard deviation in the estimation window and is considered as a specific company risk indicator; Beta is a proxy for the systematic risk of a company, ($\beta_j = Cov\ (R_j, R_m)/S_m^2$), PPI is an indicator for the Tweets timing, -1 for after the inauguration, 0 for after the election day and before the inauguration, and 1 before the election day.

Table 3: Summary of the significant CERs in selected event windows

Event window	*No. Sentiment signs*		*No. of events with significant CERs*		*No. of positive significant CERs*		*No. of negative significant CERs*	
	P	N	α = 10%	α = 5%	α = 10%	α = 5%	α = 10%	α = 5%
[-2,-1]	0	1	1	0	0	0	1	0
0	12	6	18	8	12	7	6	1
[1,2]	4	1	5	3	3	2	2	1
[-2,2]	1	1	2	0	1	0	1	0

Table 4 shows the Person correlation between the variables that are used in the multiple regression. The correlation results assist in the selection of the explaining variables in the multiple regression. The multiple regression is used to explore the relationship between cumulative excess return (CER) and a company's size, performance, systematic risk, specific risks, and to differentiate between the Tweets periods before the election, after the election and before the inauguration and after the inauguration date of the president.

Table 4: Pearson correlation for selected variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Market Cap	1.000							
Sentiment	0.072	1.000						
	(0.302)							
ComPerf	0.211	-0.140	1.000					
	(0.063)	(0.157)						
ComStd	-0.200	0.137	-.998**	1.000				
	(0.073)	(0.161)	(0.000)					
StRep	-0.125	-0.211	0.018	-0.023	1.000			
	(0.184)	(0.063)	(0.448)	(0.435)				
StRet	0.146	0.168	-0.100	0.110	0.171	1.000		
	(0.145)	(0.112)	(0.236)	(0.215)	(0.108)			
Stlike	0.090	0.448**	-0.150	0.151	0.249*	0.837**	1.000	
	(0.259)	(0.000)	(0.140)	(0.139)	(0.034)	(0.000)		
PPI	-0.191	0.556**	-0.151	0.150	0.121	0.076	0.446**	1.000
	(0.084)	(0.000)	(0.138)	(0.140)	(0.191)	(0.292)	(0.000)	
AR_{t0}	-0.106	-0.016	0.504**	-0.504**	0.186	-0.034	0.029	-0.093
	(0.223)	(0.455)	(0.000)	(0.000)	(0.089)	(0.403)	(0.417)	(0.251)

**Correlation is significant at the 1% level, *. Correlation is significant at the 5% level. For variables definitions, see Table 2.

The results of the multiple regression in Model #8 suggest that the two main variables, namely, companies' performance measured by the average of returns in the event window and companies' size proxied by market capitalization, contributed most to the explanation (see Table 5). Therefore, the sentiment of the President's Tweets' content, number of likes, number of reply and number of retweets do not

add an explanation to the original model that include the main variables. This is consistent with the assumptions of the semi-strong market efficiency hypothesis (Fama 1970). Possible explanations for this are that the market already reflects all information of the content of the Tweets or do not consider them as relevant.

Table 5: Regression Summary

	Models							
Varaibles	***8***	***7***	***6***	***5***	***4***	***3***	***2***	***1***
Const	√	√	√	√	√	√	√	√
ComPerf	√	√	√	√	√	√	√	√
MCap	√	√	√	√	√	√	√	√
Stlike		√	√	√	√	√	√	√
PPI			√	√	√	√	√	√
StRet				√	√	√	√	√
StRep					√	√	√	√
Sentiment						√	√	√
ComStd							√	√
Beta								√
R	0.57	0.58	0.59	0.61	0.62	0.63	0.64	0.64
R^2	0.32	0.33	0.35	0.37	0.39	0.40	0.41	0.41
Adj R^2	0.30	0.29	0.29	0.31	0.31	0.31	0.30	0.29
F-test	12.32	8.26	6.49	5.71	4.97	4.36	3.84	3.37
Sig.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Dependent Variable: Abnormal return at t_0 (AR_{t0}); Predictors: are the variables included in Table 2.

5. Conclusions

The social media has been increasingly used in financial performance reporting; this generates opportunities and challenges for companies and stakeholders. Microblogging is becoming an important source of unstructured data available for analysis for many stakeholders in the business. It is argued that President Trump's Tweets have become a source of influence in the stock market of the U.S.A. and other international markets. Many also argue the President can highly impact the companies he mentions or targets in his Tweets. The objective of this study is to explore if there is a relationship between the U. S. President's Tweets and the companies' financial performance.

The main results of the study show that there are no significant effects of such Tweets on the stock market. Also, on average, there are no significant changes in companies'

share prices on the day of the Tweets. This is an indication that either the Tweets may only influence the companies share prices in a spontaneous moment or the information contained in the President's Tweets is already reflected in the share prices before the day of the Tweets. This is consistent with the efficient market assumptions.

The number of Tweets is not large enough to divide the sample into subgroups to reflect contextual factors such as industrial classification, companies' performance, size, or macroeconomic factors. Factors of potential interest cannot be realistically pursued with the small amount of relatively noisy data included in the Tweets. However, the work in this article can be justified in that it provides some worthwhile suggestions for future study and secondly that although it may not reflect the value relevance of Tweets' characteristics at normal levels of significance, it contributes to the use of non-financial factors as important factors in companies' valuation. This research also contributes to the existing stream of research in the area of social media and its implications for accounting and information systems practices.

For future research, we suggest that it is important to use a larger sample as more Tweets of the President become available, to do more robust analysis by clustering companies regarding their relationship to the Federal Government and by considering the trading transactions within the same day of the Tweets. According to Souza and Aste (2015; 2016), online social media and stock markets have a nonlinear causal relationship. Therefore, another avenue of research can be explored when the data becomes large. Also, it is worthwhile to further investigate this relationship by taking the spontaneous effect of the Tweets on the companies' shares prices into account.

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Appendix A

Sample of Selected Articles	Date
The articles arguing that the President's Tweets have no influence on companies' stock prices:	
"Shares up slightly, about 0.5%, on Wednesday morning following the president's tweet. The tweet is not the first from the president attacking Amazon. He has tweeted about the company 21 times dating back to 2011, according to the Trump Twitter Archive. Until April of 2015, the tweets were mostly promoting one of his books… The tweets don't seem to materially affect Amazon, as the company is up about 46% since Trump's first negative tweet. After Wednesday's tweet at 7:12 am, the stock rose $5.12, or about 0.5%."	08/16/17
Extracted from: http://markets.businessinsider.com/news/stocks/amazon-stock-price-after-trump-says-its-doing-damage-to-tax-paying-retailers-2017-8-1002262250	
"President Donald Trump's morning tweet about Amazon will likely have no impact on the company, Baron Funds Portfolio Manager Michael Lippert told CNBC on Wednesday. "To me it is honestly just noise," Lippert, whose fund owns shares of Amazon, said on "Halftime Report." The only way Trump could have an impact is if he changes regulations…."	06/28/17
Extracted from: www.cnbc.com/2017/06/28/amazon-shareholder-says-jeff-bezos-can-rest-easy-after-trump-tweet.html	
"Stocks at record highs don't care about Trump's antics, but these important markets do"	05/16/17
Extracted from: cnbc.com/2017/05/16/stocks-at-record-highs-dont-care-about-trumps-antics-but-these-important-markets-do.html	
"New analysis proves Trump's tweets attacking companies are mostly just distractions."	02/11/17
Extracted from: qz.com/907408/new-analysis-proves-trumps-tweets-attacking-companies-are-mostly-just-distractions/	
"Don't Worry About the Companies Trump Attacks on Twitter — They're Doing Just Fine"	02/08/17
Extracted from: nymag.com/daily/intelligencer/2017/02/dont-worry-about-the-companies-trump-attacks-on-twitter.html	
The articles arguing that the President's tweets influence companies' stock prices:	
"Seemingly no company is safe from the short-term pricing volatility created by a Trump tweet. While defense contractors like Lockheed and Boeing certainly depend on U.S. government contracts for revenue, most publicly traded companies do not. No matter the scope of an entity's core business, if it is publicly traded, then statements issued by Trump via Twitter can impact valuations."	10/01/17
Extracted from: fxcm.com/insights/president-trumps-twitter-impact-forex-markets-stocks/	
"Trump's unprecedented comments on individual companies can temporarily alter a stock's trendline. The affected stocks almost always return to their original trends a within a few days, however. Investors should hold through Trump's tweets and speeches, and avoid using tight stop losses."	09/06/17
Extracted from: seekingalpha.com/article/4104389-president-trumps-twitter-habit-means-portfolio	
"Take Bethesda-based Lockheed Martin, says Glassman. Last December, Trump tweeted that the "tremendous cost and cost overruns" of Lockheed's F-35 program led him to ask Boeing to price a comparable F-18 Super Hornet. Lockheed's valuation promptly decreased by $1.2 billion while Boeing saw a boost. Yet weeks prior to that, Trump had used Twitter to criticize Boeing's Air Force One program, which caused a $1.4-billion hit to the company's market value"	04/17/17
Extracted from: washingtonian.com/2017/04/17/how-trumps-tweets-affect-your-investment-portfolio/	
"There are only so many tweets by President-elect Donald Trump the Mexican peso can take. On Tuesday and Wednesday, the peso hit record lows after Trump criticized General Motors for exporting cars made in Mexico to the U.S. and claimed credit for Ford Motor's decision to cancel production of a $1.6 billion plant in Mexico. The peso dropped 3.5 % against the U.S. dollar over the two days."	01/06/17
Extracted from: forbes.com/sites/doliaestevez/2017/01/06/analysts-say-donald-trumps-tweets-are-weakening-the-mexican-peso/#19beb91e17ff	
"Former Rubio advisor: Trump's tweets have real-world consequences Former Rubio advisor: Trump's tweets have real-world consequences. President-elect Donald Trump took a swipe at Lockheed Martin's F-35 program Monday morning, saying the cost was "out of control." Shares of the aerospace company dropped more than 4 percent in early trade, but then recovered some of those losses, ending the day about 2 percent lower. After the tweet, the company's market value initially dropped $4 billion."	12/01/16
Extracted from: cnbc.com/2016/12/12/lockheed-martin-shares-drop-after-trump-says-f-35-program-too-expensive.html	

Appendix B

Company	B	M Cap	Sentiment	Keywords	Date	Likes
Amazon	1.38	450.88	-0.53	damage states cities	8/16/17 0:05	70560
Apple	1.43	777.77	-0.25	terrorist radical such products	2/19/16 16:38	10235
Apple	1.43	777.77	-0.21	not give terrorists	2/19/16 13:32	9204
Boeing	1.18	150.32	0.66	spend order	2/17/17 6:38	98190
Boeing Co	1.18	150.32	-0.20	cost out of control	12/22/16 14:26	60934
Boeing Co	1.18	150.32	-0.89	future control cancel order	12/6/16 8:52	138658
Charter Comm	1.50	105.64	0.97	thank communications years	3/24/17 12:59	88508
Exxon	0.61	343.08	0.96	hank more investment construction	3/6/17 22:50	98492
Exxon	0.61	343.08	0.77	jobs, jobs, jobs thank you	3/6/17 22:49	86344
Exxon	0.61	343.08	0.25	coast construction	3/6/17 16:22	115651
Exxon	0.61	343.08	0.86	Congratulates Job-Creating Investment	3/6/17 16:19	69989
Exxon	0.61	343.08	0.97	great world	12/13/16 3:43	74977
Exxon	0.61	343.08	-0.14	whether I choose him or not for	12/11/16 7:29	51041
Facebook	0.54	472.86	-0.25	dishonest criminal media	10/30/16 9:26	70517
Facebook	0.54	472.86	-0.89	fight fraudulent commercials	3/6/16 18:58	25881
Fiat Chrysler	1.69	26.63	0.97	thank dollar week	1/9/17 9:16	108587
Fiat Chrysler	1.69	26.63	0.65	adding jobs	1/9/17 6:14	99954
Ford Motor	1.37	47.42	0.63	major investment today	3/28/17 5:36	108333
Ford Motor	1.37	47.42	0.92	great general fields mark	1/24/17 16:46	100200
Ford Motor Co.	1.37	47.42	0.97	thank dollar week	1/9/17 9:16	108587
Ford Motor Co.	1.37	47.42	0.99	more plant beginning thank you to ford	1/4/17 5:19	85763
Ford Motor Co.	1.37	47.42	0.69	Ford to invest	1/3/17 8:44	52338
Ford Motor Co.	1.37	47.42	0.90	great confidence	11/17/16 21:15	115193
Ford Motor Co.	1.37	47.42	0.21	keep plant	11/17/16 21:01	162618
Ford Motor Co.	1.37	47.42	-1.00	weak strong need borders others	3/15/16 15:03	15761
Ford Motor Co.	1.37	47.42	-0.64	only One Who Understands	2/13/16 19:24	4643
Ford Motor Co.	1.37	47.42	-0.90	jobs being eliminated	2/13/16 15:16	5449
Ford Motor.	1.37	47.42	-0.25	totally biased others	1/18/17 4:34	47659
Foxconn	0.79	127.19	0.89	not forget will spending	8/4/17 5:21	60284
Foxconn	0.79	127.19	0.98	investing potential new jobs	7/26/17 19:01	91369
General Motors	1.64	58.51	0.92	great general fields mark	1/24/17 16:46	100200
General Motors	1.64	58.51	-0.25	totally biased others	1/18/17 4:34	47659
General Motors	1.64	58.51	0.87	thank you starting big jobs	1/17/17 9:55	103067
General Motors	1.64	58.51	-0.25	make border pay tax	1/3/17 7:30	72421
Google	0.95	641.82	-0.25	dishonest criminal media	10/30/16 9:26	70517
Griffon	1.30	0.93	0.88	jobs keep wealth	5/1/17 15:30	36970
Harley Davidson	0.86	8.28	0.21	executives remarks	2/3/17 10:26	11401
Harley Davidson	0.86	8.28	0.88	great meeting	2/2/17 9:56	44282
Intel	1.17	174.71	0.99	great investment innovation	2/8/17 14:22	96868
Lockheed Martin	0.59	88.49	-0.25	totally biased others	1/18/17 4:34	47659
Lockheed Martin	0.59	88.49	-0.20	cost out of control	12/22/16 17:26	60947
Mazda	1.93	9.10	0.98	great investment	8/4/17 5:02	117708
Nordstrom	0.72	7.87	-0.68	terrible daughter person thing	2/8/17 7:51	141209
Rexnord	1.65	2.58	-0.84	move fired employees	5/7/17 17:58	44283
Rexnord	1.65	2.58	-0.96	more firing workers country	12/2/16 22:06	62716
Toyota	0.73	178.77	0.98	great investment	8/4/17 5:02	117708
Toyota	0.73	178.77	-0.25	border pay big tax	1/5/17 13:14	106847
TransCanada	0.67	42.55	0.98	approval great day	3/24/17 12:03	66052

Company	B	M Cap	Sentiment	Keywords	Date	Likes
TransCanada	0.67	42.55	0.65	extra move signing orders access office	1/24/17 9:49	130829
Twitter	1.02	12.48	-0.25	dishonest criminal media	10/30/16 9:26	70517
Twitter	1.02	12.48	-0.89	fight fraudulent commercials	3/6/16 18:58	25881
United Tech	1.01	91.25	0.87	wonderful great carrier working	12/1/16 6:38	55814
United Tech	1.01	91.25	0.81	great sell many look tomorrow carrier	11/30/16 19:48	65923
United Tech	1.01	91.25	0.99	wonderful great keep carrier thanks	11/29/16 22:50	81898
United Tech	1.01	91.25	0.76	great make	11/29/16 19:40	68681
United Tech	1.01	91.25	0.70	know company	11/24/16 7:11	135743
United Tech	1.01	91.25	-0.64	only One Who Understands	2/13/16 11:24	4643
Walmart	0.05	236.47	0.87	thank you starting big jobs	1/17/17 9:55	103067

Appendix C

Code	Avg AR	Std AR	t_{-1}	Sig	t_0	Sig	t_1	Sig
GFF	0.001	0.015	0.007	0.450	0.013	0.860	-0.026	-1.760
AAPL	0.001	0.014	-0.011	-0.810	0.001	0.040	-0.015	-1.100
BA	0.001	0.011	0.010	0.890	0.010	0.970	0.010	0.920
BA	0.001	0.011	0.001	0.060	0.003	0.270	0.010	0.930
BA	0.001	0.011	0.004	0.400	-0.003	-0.280	-0.006	-0.550
UTX	0.000	0.008	0.006	0.760	-0.001	-0.170	-0.012	-1.550
UTX	0.000	0.008	-0.001	-0.170	-0.012	-1.550	0.003	0.350
UTX	0.000	0.008	0.003	0.430	0.002	0.290	0.010	1.200
UTX	0.000	0.008	0.010	1.220	-0.010	-1.240	-0.007	-0.900
CHTR	0.001	0.017	-0.006	-0.370	0.007	0.410	0.007	0.420
XOM	0.000	0.010	0.007	0.730	-0.015	-1.480	-0.002	-0.150
XOM	0.000	0.010	-0.015	-1.480	-0.002	-0.150	0.007	0.710
XOM	0.000	0.010	-0.002	-0.150	0.007	0.710	-0.011	-1.110
XOM	0.000	0.010	0.002	0.160	-0.014	-1.390	0.014	1.410
XOM	0.000	0.010	-0.014	-1.390	0.014	1.410	0.023	2.280
XOM	0.000	0.010	0.014	1.410	0.023	2.280	0.005	0.530
Ford	0.000	0.011	0.003	0.320	0.015	1.400	-0.001	-0.130
Ford	0.000	0.011	0.007	0.700	0.000	0.000	0.002	0.210
Ford	0.000	0.011	0.016	1.500	-0.002	-0.180	0.000	0.040
Ford	0.000	0.011	-0.031	-2.910	0.035	3.310	0.026	2.460
Ford	0.000	0.011	0.035	3.310	0.026	2.460	-0.006	-0.570
Ford	0.000	0.011	-0.008	-0.760	-0.005	-0.510	-0.016	-1.530
Ford	0.000	0.011	-0.005	-0.510	-0.016	-1.530	0.003	0.240
Ford	0.000	0.011	-0.017	-1.590	0.011	1.030	0.005	0.500
Ford	0.000	0.011	0.011	1.030	0.005	0.500	0.003	0.240
Ford	0.000	0.011	0.011	1.030	0.006	0.580	0.004	0.350
FB	0.001	0.018	-0.008	-0.440	-0.003	-0.140	0.014	0.770
FB	0.001	0.018	0.009	0.520	-0.027	-1.490	-0.014	-0.800
FCAU	0.001	0.021	0.021	1.000	0.025	1.180	0.064	3.070
FCAU	0.001	0.021	0.025	1.180	0.064	3.070	0.013	0.640
Foxcon	0.002	0.023	0.043	1.900	-0.006	-0.260	0.016	0.730
Foxcon	0.002	0.023	0.010	0.440	-0.014	-0.610	0.008	0.350
GM	0.000	0.014	-0.016	-1.190	0.022	1.580	-0.002	-0.150
GM	0.000	0.014	0.002	0.180	0.004	0.320	0.004	0.270
GM	0.000	0.014	0.004	0.320	0.004	0.270	-0.008	-0.580
GM	0.000	0.014	-0.019	-1.400	0.042	3.070	-0.006	-0.410
GOOGL	0.001	0.014	0.001	0.050	-0.012	-0.900	0.005	0.370
HOG	0.000	0.018	0.007	0.400	-0.004	-0.200	-0.007	-0.360
HOG	0.000	0.018	-0.004	-0.200	-0.007	-0.360	-0.007	-0.360
INTC	0.000	0.011	-0.009	-0.770	-0.033	-2.970	0.000	0.000
TRP	0.000	0.013	0.010	0.720	0.000	-0.030	0.002	0.130
TRP	0.000	0.013	0.005	0.370	0.031	2.320	0.007	0.530
LMT	0.001	0.009	0.000	0.040	0.014	1.560	0.000	-0.020
LMT	0.001	0.009	0.004	0.460	-0.014	-1.480	0.003	0.290
MZDAF	-0.139	3.047	0.005	0.000	-0.075	-0.020	0.096	0.030
JWN	-0.001	0.020	0.018	0.920	0.040	2.050	-0.001	-0.050
RXN	0.000	0.017	-0.008	-0.490	-0.010	-0.590	-0.012	-0.740
RXN	0.000	0.017	-0.012	-0.710	-0.022	-1.330	-0.036	-2.160
TM	0.000	0.010	0.004	0.400	0.006	0.620	-0.011	-1.110
TM	0.000	0.010	-0.002	-0.190	-0.006	-0.610	0.016	1.580
TWTR	-0.001	0.033	-0.019	-0.590	0.016	0.490	0.018	0.540
TWTR	-0.001	0.033	-0.004	-0.110	0.034	1.050	0.032	0.970
WMT	0.000	0.012	-0.005	-0.370	0.019	1.570	-0.013	-1.010