Business performance and social media: love or hate?*†

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Abstract

Social media has become a common place for communication, networking and content sharing. Many companies seek marketing and business opportunities in these platforms. However, the link between the resources generated in these sites and business performance remains largely unexploited. Both managers and financial advisors can profit from the lessons learned in this study. We conceptualize four channels by which social media impacts financial, operational and corporate social performance: social capital, customers' revealed preferences, social marketing and social corporate networking. An empirical test of our framework shows that "followers" and "likes" positively influence a firm's share value, but only after a critical mass of followers is attained. Our estimates suggest that Twitter is a more powerful tool to enhance business performance than Facebook.

Keywords: Social media; social networks; Twitter; Facebook; business performance; critical mass; user-generated content

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1 The share value of social chatter

During 2010 American Express conceived and promoted the first Small Business Saturday, an American shopping holiday held on the Saturday after Thanksgiving. The advertising campaign for Small Business Saturday involved mainly social media, generating more than one million Facebook "likes" registrations and nearly 30,000 tweets. After the campaign, 40% of the general public was aware of Small Business Saturday and revenues for small business jumped 28% (Markowitz, 2013). Three years later, Small Business Saturday drives sales of $5.5bn and has become a global initiative (Umunna, 2013). Since then, American Express share prices have surged 74%. On the other hand, in July 2012, multiple re-tweets for a user who impersonated a Russian minister, caused crude-oil futures to bounce up over $1 (The Economist, 2013). A few months later, in October 2012, Google halted trading of its shares after a leakage of their earnings report went viral (Efrati, 2012). These incidents exemplify how interactions through weak social network ties, such as social media platforms Facebook or Twitter, can indeed have a strong influence on business activities (Granovetter, 1973; Jansen, Zhang, Sobel & Chowdury, 2009). This provides a conceptual and empirical framework for the relationship between social media and business performance.

Social consumers are king and clever, willing to pay and participate. Their preferences are broadcasted and magnified by social media, with increasing connections with corporations and brands (Berthon, Pitt, McCarthy & Kates, 2007; Hanna, Rohm & Crittenden, 2011; Parent, Plangger & Bal, 2011). Thus, social media has become a high corporate priority; the vast majority of traded companies are actively present in some kind of social platform. Companies are only now starting to realize the business implications and nature of this new user generated content. Along with the challenges and opportunities that social media offers, there is a significant degree

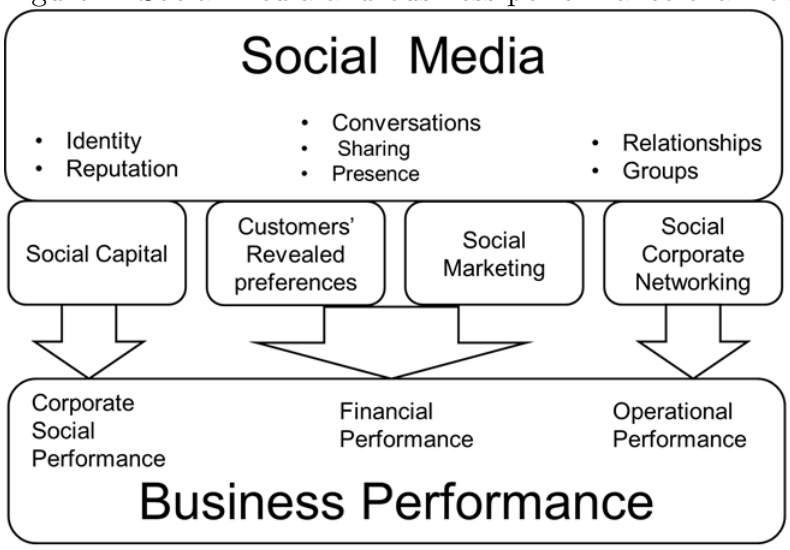
of uncertainty among managers with respect to allocating effort and budget to social media (DesAutels, 2011; Kaplan & Haenlein, 2010; Weinberg & Pehlivan, 2011). As a result, practitioners often find themselves on social media quicksand, undertaking decisions without a clear understanding of the effects of social media on business performance.

This paper contributes to reducing the social media guesswork for practitioners. First, we conceptualize the mechanisms by which social media impacts business performance. Social media has a broad impact on all spheres of business performance, such as finance, operations and corporate social performance. Drawing from the review of previous work in this subject, we identify four distinct channels: corporate social responsibility, marketing, corporate networking and customer's revealed preferences. Second, we construct an empirical model based customer's revealed preferences, to quantify the influence of social media on the share value of traded firms. We find a positive influence of social media on business performance, but only after a critical threshold of followers is reached.

2 From Social Media resources to business performance capabilities

Resource- and capability-based views argue that a firm's business performance is determined by the effectiveness at converting resources (eg. assets, knowledge, processes) into capabilities (eg. customer links; sales abilities, reputation placement) to achieve a competitive advantage (Barney, 1991; Day, 1994). The conceptual framework in Figure 1 identifies the channels by which social media resources are transformed into business performance capabilities. Social media consists of seven functional resources: identity, conversations, sharing, presence, relationships, reputation, and groups (Kietzmann, Hermkens, McCarthy & Silvestre, 2011). On the other

Figure 1: Social Media and business performance channels



hand, business performance focuses on financial, operational and corporate social performance capabilities (Carroll, 1979; Venkatraman & Ramanujam, 1986). While financial performance indicators generally include sales level and growth, profitability and stock price; operational performance focuses on share position, new product introduction, product quality, operating efficiency and customer satisfaction. Corporate social performance (CSP) depends largely on the firm's ability to establish honest relations with society with a special attention on reputation and brand.

Social media affects business performance through four channels: social capital, revealed preferences, marketing and corporate networking. Each channel funnels a set of social media resources into a business performance domain. These social media performance channels are neither mutually exclusive, nor do they all have to be simultaneously present. They are constructs that allow us to unravel the specific performance domain affected by social media and implications for firms.

2.1 Social Capital

The social capital channel represents the extent to which social media affects the firms' relationships with society. Identity and reputation resources are transformed into CSP capabilities through the social capital channel. The firm's social capital (i.e. trustworthy relations through corporate identity and reputation) is modeled through activity in platforms like Wikipedia, blogs and search engines. Although companies are now less constrained by a single social order, corporations face unrecorded public scrutiny through social media (Falck & Heblich, 2007; Fieseler, Fleck & Meckel, 2010). In today's environment, companies must not only expose, but engage socially to build trustworthy relations that impact CSP. Previous studies have shown that social media has a direct impact on CSP. Brammer and Pavelin (2006) tie corporate reputation on online platforms and CSP. Using user generated content in Trip Advisor, O'Connor (2010) demonstrates that a hotel's image can be managed by customer opinions in the web. Fielseler et al. (2010) show how the blogosphere adds value to CSP and stakeholder engagement.

The social capital channel directly affects CSP notwithstanding; it may have an indirect effect on financial or operational performance in the long run. This channel has implications on the areas of brand management and institutional relationships with stakeholders. It is a passive channel, meaning that companies generally cannot allocate specific budgets to control this channel as it depends on the perception that social media build around the company.

2.2 Customers' Revealed Preferences

The revealed preference channel represents the extent to which social media exposes customer's likings. Conversation, sharing and presence resources are conveyed into financial capabilities through the revealed preferences channel. Through sites

like Twitter or Facebook, potential customers express their "likes" or the tastes that rationalize an agent's observed actions (Beshears, Choi, Laibson & Madrian, 2008). Active social customers set social trends and agendas in a varied range of topics, from economics to environment and entertainment industry (Shirky, 2011).

The customer's revealed preferences channel impacts mostly financial performance. Financial indicators (e.g. share prices) depend largely on the market's information and expectations on the firm (Fama, 1965; Froot, 1989). Social media increases the information about the company, with implications for corporate finance. Researchers have found empirical evidence of how non-financial information is a leading indicator of financial performance (Ittner & Larcker, 1998; Puah, Wong & Liew, 2013). The "collective wisdom" from social media has been used to forecast real-world outcomes, such as the unemployment rate (Ettredge, Gerdes & Karuga, 2005); human tie strengths (Gilbert & Karahalios, 2009); disease tracking (Pelat, Turbelin, Bar-Hen, Flahault & Valleron, 2009); box-office revenues for movies (Asur & Huberman, 2010) and economic indicators such as automobile sales, unemployment claims, travel destination planning and consumer confidence (Choi & Varian, 2012). To the best of our knowledge, no previous research has explored the relationship between social media and financial performance.

This channel has implications on the areas of strategic management and new product introduction. Through "likes" and "follows" companies pulse the market and anticipate demand for product and services. This channel is especially relevant for shareholders and investment portfolio managers, as it will have a direct impact on share value. The customers' preferences channel is largely passive, meaning that management actions and budget have a limited effect on the customers' "likes".

2.3 Social Marketing

The social marketing channel represents the extent to which social marketing resources (e.g. conversations, sharing, and presence) are transformed into financial performance capabilities (e.g. sales). Through conversations, sharing, and presence in Facebook, Youtube or Twitter, firms actively market their products and services. Firms have adopted social media as an essential part of their marketing mix (Mangold & Faulds, 2009). The tactics and objectives of advertising tools of traditional media (e.g. television, radio, print, billboard) differ substantially from social media. Traditional media marketing is delivered directly from the marketer and involves awareness, knowledge and recall. On the other hand, social networks, blogs, microblogs and communities approach customers with objectives such as conversation, sharing, collaboration, and engagement (Weinberg & Pehlivan, 2011).

Despite the innovation in social marketing and its radical differences and challenges with traditional marketing, the impact on business performance does not differ significantly. The mechanisms by which the new media, as a direct marketing tool, increase revenue are basically the same as its big sister's. Both marketing tools are aimed to increase sales of the companies' products or services by increasing notoriety. In this sense, the use of social media in marketing is only innovative in its means, but not in its goals. Furthermore, the new marketing tools do not assess as clear a return on investment when applied to social media marketing as compared to traditional unicast advertising. A 20 second TV-ad in the Super Bowl has a clear, controlled and quantified business impact (Yelkur, Tomkovick, & Traczyk, 2004). Additionally, social media marketing has a greater reputational risk than traditional marketing (Aula, 2010).

Although the marketing channel impacts most on financial performance through the creation of sales related capabilities, past research shows how investing in online

marketing relates to operational performance such as customer linkage and commitment (Hulland, Wade, & Antia, 2007; Nath, Nachiappan, & Ramanathan, 2010). The marketing channel is an active channel, which requires careful budget allocation (Weinberg & Pehlivan, 2011).

2.4 Social Corporate Networking

The social corporate networking channel represents the extent to which social corporate resources (e.g. relationships, groups) are transformed into operational performance capabilities. Social corporate networking refers to the informal ties of corporate staff through social networks. This channel involves a different set of social networks such as Linkedin or ResearchGate, targeted to professional and academic networking. Online social platforms provide a low cost, highly accessible way of communication, which enables relationships with people within and outside the company as well as support task performing through online discussion, sharing knowledge and finding clients (Korzynski, 2012). Social corporate ties can be established inside or outside of the company. Inter-corporate networking increases labor mobility among firms, providing efficient ways to target the best professionals for job vacancies among the internal contacts. Intra-company networking helps to identify valuable skill sets from within the company.

Former studies examine corporate networking tools (eg. CRM or e-business) as an asset to increase operational performance (Rapp, Trainor & Agnihotri, 2010; Trainor, Andzulis, Rapp & Agnihotri, 2013). However, few researchers have specifically studied how social media enhances business performance. Trainor et al. (2013) show how social media usage relates positively to customer relationship performance through the creation of firm-level capabilities. Social corporate networking is an active channel, which impacts relationships with customers and providers. It is relevant the creation of customer and human resources related capabilities.

3 A Room for Socializing in the Stock Market

The empirical model stems directly from the conceptual framework. Focusing on the customer's revealed preferences we show how user-generated content in social media (ie. Twitter "followers" and Facebook "likes") explains stock price variations of publicly traded companies. In this section we discuss the analytical strategy and implications of our findings .

The customers' revealed preferences channel offers clear and direct means to analyze how social media impacts business performance. One of the most basic and objective indicator of financial performance is the price per share of traded firms. However, according to the efficient markets theory, stock prices reflect the all market's information on the traded firm (Malkiel, 1973). Stock prices will settle at a price given everything known by the market. In efficient markets, there is no room for socializing.

Behavioral economists have long challenged the efficient market theory. Under the interpretation of markets as a collection of individual decisions, stock prices are prone to human flaws in the interpretation of market information (Lo & MacKinlay, 2001). In this case, social connections can substitute for missing, or expensive, legal structures in facilitating financial transactions (Arrow, 1972).

One of the first signals that an average investor interprets is the demand for the goods and services that a particular company might have. Behavioral scholars have shown that stock prices can be predicted by anticipating the decisions that average investors are likely to make (Shiller, 2000). An expected growing demand for I-Phone or Windows software will increase the share of Apple and Microsoft stocks in the average investor portfolio, pushing upward the stock price. In the past, these signals were interpreted using eclectic information collected from the press, company's ratings and past trends.

Today's social media is a powerful and reliable advanced indicator of customers' preferences. For example, consider a potential investor in soft-drinks detects that the new Cola flavor has an exorbitant number of Facebook "likes". She might reason that in the short term Coca-Cola will experience higher demand for the new beverage. Therefore, with all other things considered, she will be prone to invest in Coca-Cola rather than in Pepsi. Following this reasoning the first research hypothesis is as follows:

[H1]. The number of followers in social media has an effect on stock prices of publicly traded companies.

We would expect that a positive variation in the number of social followers will positively affect share prices. However, it is a well-known fact that social media networks encounter positive network externalities (Kaplan & Haenlein, 2010). The utility of networks isn't fully reached until a critical mass of agents use the system. The fax is often the textbook example for this herd behavior. If only two persons own a fax, its utility is limited to both peers. Not until a critical mass of people own a fax, does it become useful. Previous research in the social context, has determined that the number of peers has a strong influence in the usage of social networking sites (Lin & Lu, 2011).

Furthermore, the social media's learning curve comes at a cost. The initial assets and knowledge needed to manage social media (e.g. creating content, hiring a social media manager...) represent a non-trivial cost. With relatively few followers, this cost is sunk, negatively affecting the company's financial statements. However, after a certain threshold, when a critical mass of followers is attained, this social asset is amortized over many connections. We would then expect a positive correlation between share prices and virtual followers only when enough customers have expressed their likes, as reflected in hypothesis 2:

Table 1: Companies in the IBEX Sample

Abengoa	BME	Inditex	Banco Popular	Endesa
Indra	Banco Sabadell	Gamesa	Sacyr	Bankinter
Gas Natural	Santander*	Acerinox	Enagás	ACS
Ferrovial	Repsol*	Abertis	Caixa Bank	
Acciona	DIA	Mapfre	Bankia	
Mediaset	Endesa	Bankinter	ACS	
Acciona	DIA	Mapfre	Mediaset	

* Companies without official Twitter account
**Companies without official Facebook account

[H2]. Social media followers have a positive association with share prices after a critical mass is attained.

To test both research hypotheses, we select a group of traded companies which are relatively young in their social network experience, such as the Spanish IBEX firms traded in Madrid's stock exchange. Spanish traded companies are relatively new to social media experience and constitute a suitable set of companies to test both hypotheses.

H1 is tested with the explicatory power of the number of corporate followers on social networks. To capture the effect of social media and to calculate the critical mass of followers, we use a quadratic panel with fixed effects. Our data comes from a 28 day period which started on November 29, 2012. The data were collected on a daily basis from the Spanish stock exchange, Twitter and Facebook sites for each company listed in Table 1.

3.1 Results of the empirical analysis

We find empirical evidence to support both of our research hypotheses. We have used four different estimation techniques, finding strong evidence to support H1 and H2. Social media has a significant impact on stock prices of publically-traded companies. However, the impact is only positive for a critical mass of followers. Our

Figure 2: Average IBEX Share Price vs. Twitter Followers

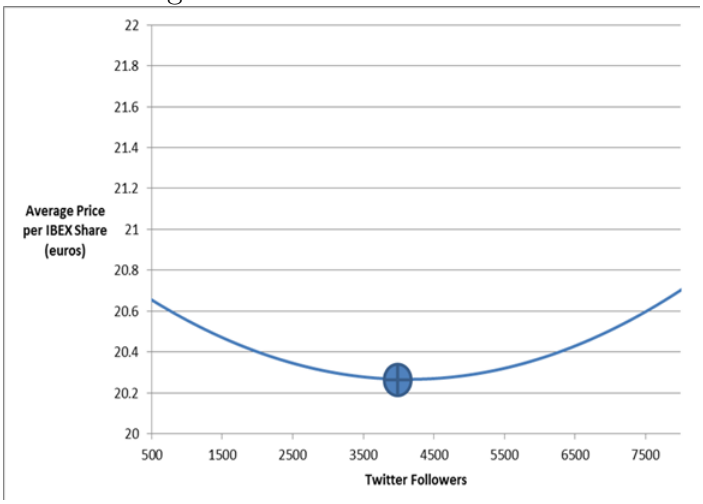
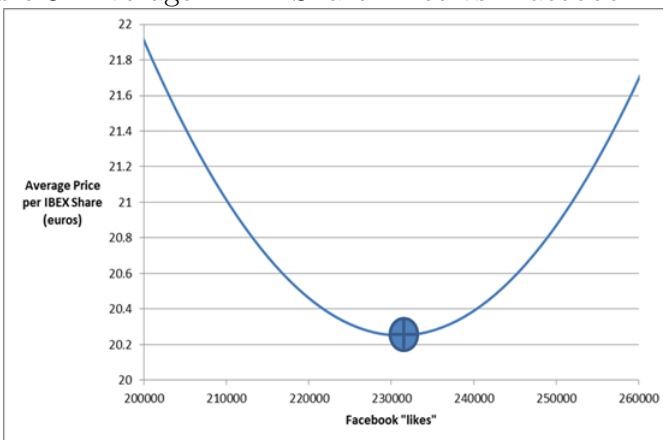


Figure 3: Average IBEX Share Price vs. Facebook Likes



model performs well, explaining more than 99% of the daily variation of stock prices of IBEX firms. The estimation results of the social media variables are statistically significant and with the expected signs. Since we control for time and company fixed effects, the estimation results of the variables of interest captures to the effect of variation of social media chatter.

The relationship between share prices and Twitter "followers" and Facebook "likes" are depicted in Figure 2 and Figure 3 respectively. The minimum point of each curve (i.e. the critical mass) is highlighted in both figures. We observe three differences:

1. Twitter has a smaller critical mass than Facebook. Using various estimation techniques, we find that critical mass estimates of Facebook "likes" vary from 178,048 to 241,865. Public traded companies in the sample must accumulate Facebook "likes" in this range to benefit from a positive impact of Facebook in their stock price performance. Focusing on Twitter "followers", the threshold ranges from 4,141 to 4,316.

2. Facebook has a steeper curve than Twitter. To increase the average share price in 1%, companies in the IBEX need in average 1000 extra daily Twitter "followers". The same increase in share price requires approximately 5000 new Facebook "likes" per day.

3. The slope of the curve for very few "followers" or "likes" is steeper for Facebook than for Twitter. This means that the initial social media cliff is higher for Facebook, implying that the initial resources allocated to increase social media awareness are higher for Facebook than for Twitter.

The result of combing effect of Twitter "followers" and Facebook "likes" is shown in Figure 4. In the social media skate-bowl, firms can slide down different paths to achieve business performance. Facebook is steeper and farther away than Twitter. Our results imply that a Twitter "follower" has a greater impact than a Facebook "like" in business performance. The difference can be explained by the nature of social media and user profiles. Twitter functions as a simple service for complex relationships and Facebook functions as complex service for simple relationships.

Twitter is a relatively simple micro-blogging service where interactions are normally based on mutual affinities. On the other hand, Facebook is a complex networking tool where relationships are constructed on friendship or acquaintance. Twitter has become an extremely popular service which generates value for business due to the specific characteristics of micro-blogging, such as ambient awareness and a push-

Figure 4: Combined Effect on IBEX Share Prices

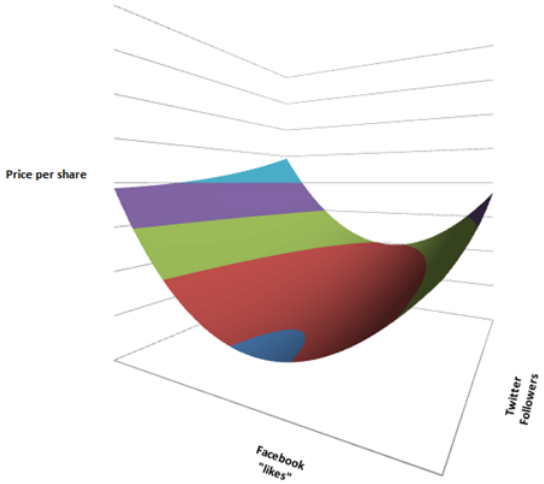


Table 2: Companies in the NASDAQ sample

Microsoft	Facebook	Apple	Yahoo!
Adobe	Nvidia	Dell	Google
Ebay			

and-pull communication format (Kaplan & Haenlein, 2011). These characteristics not only attract a different profile of users (Webster, 2010), but have a different impact on business performance.

3.1.1 A Test for Robustness using NASDAQ Firms

We perform a sensitivity analysis by replicating our regressions with a more mature social market. We choose the NASDAQ index as these firms are much more exposed to social media than firms in the Spanish IBEX. Our data come from a 28 day period which begins on November 29, 2012. The data have been taken daily from 9 random companies listed in the NASDAQ index and Twitter and Facebook sites for each company listed in Table 2.

Using NASDAQ firms, our model performs well, explaining around 99% of the stock price daily variation of the companies in the NASDAQ sample. We find few differences with respect to our original specification. However, one of the first dif-

ferences is that Facebook "likes" are only statistically significant in one specification, where we find a critical mass of more than 17,000,000 followers. As expected in a more mature market, the critical mass for NASDAQ companies is beyond the threshold. We observe a change in the critical mass from a novel (IBEX) to a mature (NASDAQ) market with higher social media penetration. As predicted by theory, network externalities erode after the critical mass has been reached. This might be the case for the NASDAQ companies, but still not for Spanish IBEX firms. Focusing on Twitter results, we find a critical mass in all four regressions. Once again, Twitter has proven to be more effective than Facebook. However, the numbers are significantly higher than in the Spanish case. American firms in our sample need 200,000 followers to impact financial performance positively. For markets with few social media exposure, a single social follower is much more valuable than in mature markets.

4 Lessons learned

After love at first sight, a main concern for practitioners today is how to make best use of social media to foster business performance. This study provides useful hints to determine the appropriate social media resources for managers to influence performance enhancing capabilities. Additionally, this research uncovers lessons that practitioners can exploit as a strategic lever for increasing corporate performance market opportunities.

The major insight gained from this research is the link between social media and business performance. Empirical evidence that suggests that financial performance is affected by user-generated content in social media. We show that Twitter "followers" are more effective than Facebook "likes" to attain a positive impact on share prices. Additionally, the effect of social media on performance depends on the penetration

Channel	Social Resource	Platforms	Capabilities	Areas	Budget
Social Capital	Identity, Reputation	Blogs Wikipedia	CSP	Brand Stakeholders	No
Revealed Preferences	Conversation Sharing Presence	Twitter Facebook	Financial Shares	Shareholders, NPI, Strategic M.	No
Marketing	Conversation Sharing Presence	Facebook Youtube	Financial Sales	Sales Marketing	Yes
Corporate Networking	Relationship Groups	Linkedin ResearchGate	Operational CRM	Customers HR	Yes

of social media in the stock market.

The key implications for management are summarized in Table 3. Both managers and financial advisors can profit from the lessons learned in our research. Managers can use our findings to identify the impact of social media on operational, corporate and financial performance as measured by stock variation. Financial advisors and brokers can build knowledgeable portfolios following the variations of user-generated content. Business development practitioners find in our results an alternative way to inspect new markets based upon social media patterns.

Finally, the main contribution of this paper is to examine the effect of Twitter and Facebook on stock prices. The comprehensive approach of our conceptual framework, however, may have other applications. Future studies could capture, for example, the effect of social corporate networking (e.g. Linkedin) on operation performance or how social marketing affects sales.

A Tecnical Appendix

The regression equation we use is the following:

$$P_{it} = \beta_0 + \beta_1 FB_{it} + \beta_2 FB_{it}^2 + \beta_3 TW_{it} + \beta_4 TW_{it}^2 + \gamma_i + \lambda_t + \varepsilon_t \tag{1}$$

where i denotes a publically-traded company in the Spanish stock exchange, IBEX, t denotes time (day); P_{it} is the daily stock price; FB_{it} are the daily Facebook "likes"; TW_{it} are the daily Twitter followers and ε_t is a stochastic error term. In order to capture endogenous firm specific variations on stock prices, we introduce company fixed effects with a dummy variable, γ_i, for each company in the dataset.

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Stock price (IBEX) P_{it}	902	15.78217	20.14845	0.55	109.3
Facebook (IBEX) FB_{it}	896	14223.1	38903.06	27	235689
Twitter (IBEX) TW_{it}	812	3186.665	3293.905	12	12154
Stock price (NASDAQ) P_{it}	171	159.6614	253.7812	10.43	741.48
Facebook (NASDAQ)FB_{it}	171	1.40E+07	2.50E+07	88147	8.48E+07
Twitter(NASDAQ) TW_{it}	171	1479841	2345943	3861	6303122

Similarly, to isolate exogenous daily shocks on stock prices, we introduce time fixed effects with a dummy variable, λ_t, for each day in the sample.

In order to sustain H.1, we would expect the estimated coefficients of the variables of interest to be jointly significantly different from zero. In order to do so, we perform standard joint Wald tests to determine if $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$. On the other hand, to test H.2 we will inspect the sign of the estimated coefficients of the social media variables. In our hypothesis, social media followers subtracts stock price until a critical mass is reached. Therefore, we would expect that $\hat{\beta}_1 < 0$ and $\hat{\beta}_2 > 0$for Facebook likes and $\hat{\beta}_3 < 0$ and $\hat{\beta}_4 > 0$ for Twitter followers. The descriptive statistics can be found in Table 4 and the estimation results are shown in Table 5.

For robustness, we have run regressions on equation (1) with various techniques. In particular, we use Ordinary Least Squares (OLS) in column 1; Random- effects Panel with Generalized Least Squares (GLS) in column 2; a non-linear Poisson Maximum Likelihood (PML) regression in column 3; and a Dynamic Panel using Generalized Method of Moment (GMM) with one lag to account for stock price persistence in column 4. We calculate this critical mass by minimizing the stock price in (1) with respect to the Facebook likes and Twitter followers respectively:

$$\partial P/\partial FB = \hat{\beta}_1 + 2\hat{\beta}_2 FB_c = 0 \rightarrow FB_c = -\hat{\beta}_1/2\hat{\beta}_2 \tag{2}$$

$$\partial P/\partial TW = \hat{\beta}_3 + 2\hat{\beta}_4 TW_c = 0 \rightarrow TW_c = -\hat{\beta}_3/2\hat{\beta}_4 \tag{3}$$

	IBEX				NASDAQ			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Stock price (lagged) P_{it-1}				0.9991735 *** (0.0018779)				1.00377 *** (0.0151106)
Facebook FB_{it}	-0.0007948 *** (0.0002148)	-0.0004252 ** (0.0001494)	-0.0000627*** (0.0000147)	-0.0000438*** (0.0000152)	-1.76e-06 (0.0000104)	0.0000165 *** (4.99e-06)	-9.59e-08 ** (4.89e-08)	-2.55e-06 (1.84e-06)
Facebook FB_{it}^2	1.72e-09 *** (4.98e-10)	8.79e-10*** (3.50e-10)	1.43e-10 *** (3.40e-11)	1.23e-10 * (7.57e-11)	-4.90e-13 *** (5.11e-14)	-4.59e-13*** (4.27e-14)	6.69e-17 (2.24e-16)	2.15e-14 (2.10e-14)
Twitter TW_{it}	-0.0002427** (0.0000981)	-0.0001943** (0.000096)	-0.0000158 *** (5.10e-06)	0.0000467 (0.0000451)	-0.000026 *** (6.99e-06)	-0.0000214 *** (7.20e-06)	-2.37e-08 * (1.44e-08)	0.0000167** (0.0000451)
Twitter TW_{it}^2	2.93e-08*** (9.27e-09)	2.33e-08*** (8.93e-09)	1.83e-09 ** (7.10e-10)	-2.20e-09 (3.89e-09)	6.80e-11 *** (9.27e-09)	5.04e-11*** (4.23e-12)	1.15e-13 ** (1.70e-14)	-2.39e-12 ** (1.21e-12)
Constant β_0	20.76938 *** (0.9821337)	18.9955*** (4.675363)	3.116736 *** (0.0666983)	.0870259 (0.1636321)	39.7742 *** (2.000259)	-49.29859 (87.01807)	3.624282 *** (0.008077)	11.36747 * (6.389094)
Wald Test [H1]	$F(3, 703) = 5.83$ {0.0006}	$\chi^2(3) = 11.95$ {0.0075}	$\chi^2(3) = 27.77$ {0.0000}	$\chi^2(3) = 11.27$ {0.0084}	$F(3, 703) = 7.14$ {0.0011}	$\chi^2(3) = 18.91$ {0.0001}	$\chi^2(3) = 5.54$ {0.0658}	$\chi^2(3) = 5.64$ {0.0596}
Facebook Critical Mass	231,046	241,865	219,230	178,048	-	17,973,856	-	-
Twitter Critical Mass	4,141	4,169	4,316	-	191,176	212,301	103,043	3,493,723
Observations	762	762	762	734	171	171	171	162
R^2	0.9977	0.0172 (overall)	.9987	-	0.9998	0.6557 (overall)	.9987	-
Time fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Company fixed effects	yes	no	yes	no	yes	no	yes	no
Estimation Method	OLS	Random- effects GLS	PML	Dynamic panel - GMM	OLS	Random-effects GLS regression	PML	System dynamic panel - GMM

Notes: Standard errors in parenthesis, p-value for Wald tests in brackets * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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