THREE ESSAYS ON CORPORATE DISCLOSURE BY SMALL AND MEDIUM ENTITIES

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List of acronyms

AIM	Alternative Investment Market
CEO	Chief Executive Officer
CMU	Capital Market Union
DTR	Disclosure and Transparency Rules
EA	Earnings Announcement
ESMA	European Securities and Market Authority
EU	European Union
FF	Fama-French
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Product
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
LSE	London Stock Exchange
OECD	Organization for Economic Cooperation and Development
NYSE	New York Stock Exchange
PLC	Public Limited Company
SEC	Securities and Exchange Commission
SFAS	Statement of Financial Accounting Standards
SME	Small and Medium Entity

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GENERAL INTRODUCTION

1. Overview

This Ph.D. thesis studies the determinants and consequences of information asymmetry between investors and financers on the one hand, and managers on the other, in an uncertain and complex environment. I focus on Small and Medium Entities (SMEs) where the links between the two and the associated agency costs are particularly significant. SMEs are concerned by a whole host of contractual issues, such as the financing of their development activities, the disclosure of business activities, and the definition of arrangements with suppliers (Holmstrom 1989; Berger and Udell 1998). The uncertainties surrounding SMEs' activities also affect investor valuations due to the risk of adverse selection (Magri 2007).

Prior literature documents that corporate reporting is useful to reduce agency costs (Healy and Palepu 2001; Kothari 2001). However, most of past research focuses on large firms and little is known about how SMEs communicate to investors and financers (Allee and Yohn 2009). SMEs are often criticized for the poor quality of their financial reporting due to the scope for opportunistic decisions by managers and poor external monitoring (Lardon and Deloof 2014). At the same time, the usefulness of accounting standards may be limited in the case of SMEs, especially where the company focus is on innovation (Dechow and Skinner 2000; Smith and Cordina 2014). Financial reports may therefore provide investors little insight into the business activities valuations of SMEs. SMEs also suffer from a poor information environment, especially because coverage by press and analysts is limited. In addition, this type of firm has limited human and financial resources to devote to investor relations in order to enhance information flow and company visibility (Bushee and Miller 2012).

Social media may represent a game changer for communication by SMEs. Firstly, social media allow users bi-directional communication. SMEs can communicate on social media with their stakeholders without the need of intermediaries. Uncertainty as to SMEs' activities arising from limited availability of information may potentially be mitigated. Secondly, the use of social

media requires very limited financial resources. Users can sign up to most social media platforms and share information for free. SMEs can increase their visibility without the need for significant start-up resources.

My study, consisting of a general introduction and three chapters representing three self-contained essays, tackles from different perspectives the central issue of information asymmetry and agency costs in SMEs. The three essays intend to address the following questions:

RQ1. What type of financial information is relevant to investors and financers in SMEs?

RQ2. Do external expectations about SMEs' disclosure influence (a) managers' investment decisions and (b) corporate communication strategy?

RQ3. How do new communication channels, e.g., social media, affect the information environment of SMEs?

In Chapter 1 'Accounting Information in Innovative Small and Medium Entities', I study investors' use of accounting information in a context of uncertainty and complexity (RQ1) and the associated managerial investment decisions (RQ2a). In Chapter 2 'Investors' Attention and Social Media: Evidence from Small and Medium Entities', I examine the impact of voluntary disclosure conveyed through social media on investors' attention in presence of high information asymmetry and limited attention (RQ3). I compare the relevance of financial and non-financial information in attracting investors' attention (RQ1). I also analyse whether managers exploit limited investor attention by strategically disclosing on social media (RQ2b). In Chapter 3 'The Effect of Voluntary Disclosure on Trade Credit Received in Small and Medium Entities: Evidence from Social Media', I investigate whether customers' social media messages enhance the relationship with suppliers (RQ3) and the amount of information suppliers can process (RQ1).

The rest of this general introduction proceeds as follows. Section 2 develops the theoretical background and explains the motivations of the Ph.D. thesis. It also provides an overview of the characteristics of SMEs and discusses the economic relevance of this type of firm. Section 3 explores the role of social media in changing the information environment of SMEs. Section 4

provides an overview of the three Chapters. The final Section discusses the contributions and implications of this Ph.D. thesis.

2. Motivation

This Section examines the reasons for studying corporate disclosure by SMEs. In the first part, I discuss the theoretical context and highlight the gaps in the literature I aim to address. In the second part, I provide evidence of the economic relevance of SMEs in today's economy and certain practical and regulatory issues surrounding SMEs' activities.

2.1 Theoretical background

Information asymmetry arises between investors and managers due to the divide between control and ownership (Berle and Means 1932). As insiders within the firm, managers hold an information advantage over investors, but also over suppliers, finance providers such as banks, and policy makers. Considering a firm as a nexus of contracts, Jensen and Meckling (1976) argue that information asymmetries between contractual parties (principal vs agent) generate agency costs, which are further exacerbated in conditions of complexity and uncertainty. To mitigate these information asymmetries, corporate disclosure proved to be useful (Healy and Palepu 2001). A level of information asymmetry still remains since company disclosure may be biased and/or manipulated by managers who could either convey useful information to the market or misrepresent and reduce the transparency of information disclosed (Watts and Zimmerman 1986). It is thus necessary to question the relationship between management incentives and disclosure, and the effectiveness of the latter in facilitating credible communication between managers, outside investors and other external parties.

Looking more specifically at the relationship between managers and investors, information asymmetry issues are acute in SMEs (Allee and Yohn 2009). Managers are able to choose how to use SMEs' resources. SMEs are often characterized by the significant presence of discretionary elements, for instance intangibles (Cañibano et al. 2000). Managers can use their power of decision

either to operate opportunistically or to use efficiently the resources available (Watts and Zimmerman 1986, 1979). The high uncertainty surrounding SMEs' activities and the difficulties in properly monitoring managers raise the risk of moral hazard (Hall 2010; Ballester et al. 1998). Investors may adapt their monitoring mechanisms to this type of firm. From a valuation perspective, investors need further insight into the disclosure characteristics of this type of firm to better forecast their performance in the long-run and to mitigate the costs due to adverse selection (Smith and Cordina 2014; Ballester et al. 1998; Magri 2007).

The presence of limited information about SMEs' activities exacerbates contractual difficulties. SMEs need to convey a sufficient flow of information to raise finance in order to support the development of their activities (Hall 2002; Beck et al. 2008). Voluntary disclosure can have positive effects, for instance by attracting investors and by improving liquidity (Verrecchia 1983; Dye 1985; Diamond and Verrecchia 1991). To achieve this, SMEs have to balance investors' need to know about their activities against the costs associated with producing additional information and the risk of disclosing proprietary information to competitors.

SMEs, especially if they focus on innovation, are usually less inclined to provide additional information due to the high proprietary costs that they could face considering that knowledge is non-rival and that they have limited resources to legally protect their innovations. Their limited human and financial resources also reduce their ability to communicate effectively to their stakeholders (Bushee and Miller 2012). Hence, they have often been criticized for their lack of transparency and the relatively low quality of their financial reporting (Dechow et al. 2010). From a regulatory perspective, policy makers aim to set an adequate level of regulation which on the one hand sufficiently protects investors and, on the other hand, does not stifle business activity.

SMEs' disclosure practices have not been widely investigated (Allee and Yohn 2009; Mkasiwa 2014). Mkasiwa (2014) reviews literature on SME reporting over the period 1985-2014 and shows that interest in SMEs is slowly increasing in academic literature. Overall though, little is

known about how SMEs operate and how they communicate to potential investors (Hoffman et al. 1998; Beck et al. 2008).

2.2 The economic importance of SMEs

The economic relevance of SMEs further motivates the study of this type of firm. According to recent data on the European economy (Airaksinen et al. 2018), SMEs account for 99% of all firms. They account for around two-thirds of total employment, i.e., from a minimum of 53% in the United Kingdom to 86% in Greece, and they contribute to 57% of total added value. Similarly, in the US, firms with fewer than 500 workers accounted for 99.7 percent of businesses and employed 47.8 percent of private sector payrolls in 2011 (Census 2016). Table 1 reports figures about firms by business size across different countries. To highlight the worldwide importance of SMEs, I report the number of firms and their relative relevance to the total number of firms. The main difficulties that the European Commission identifies for SMEs concern areas such as 'Financing', 'Access to markets' and 'Management capabilities' (European Commission 2014b). From the SMEs' perspective, major issues are the complexity of national laws and the associated costs of dealing with administrative requirements.

Business Size / Country	**0-9 employees**	**10-19 employees**	**20-49 employees**	**50-249 employees**	**250 employees or more**	**Total**
Brazil	218,056 (67%)	52,029 (16%)	36,051 (11%)	17,029 (5%)	3,830 (1%)	326,995
Canada	28,367 (55%)	8,315 (16%)	7,896 (15%)	5,496 (11%)	1,411 (3%)	51,485
France	205,876 (88%)	12,761 (5%)	9,554 (4%)	5,545 (2%)	1,357 (1%)	235,093
Germany	138,436 (65%)	37,010 (17%)	16,420 (8%)	16,484 (8%)	4,252 (2%)	212,602
Italy	328,486 (82%)	39,402 (10%)	18,988 (5%)	8,349 (2%)	1,197 (1%)	396,422
Turkey	303,580 (91%)	n.a.	18,076 (5%)	9,384 (3%)	1,784 (1%)	332,834
United Kingdom	95,804 (76%)	13,081 (10%)	9,485 (8%)	6,220 (5%)	1,377 (1%)	125,967
United States	228,477 (67%)	46,273 (14%)	37,114 (11%)	22,893 (6%)	5,543 (2%)	340,300

Table 1: Enterprises by business size in 2017
Source: OECD Data

SMEs also play a critical role in fostering the culture of innovation and they have been proven to be engines of economic growth and job creation (OECD 2011). In many industries, such as biotechnology and information technology, firms of smaller size are the primary suppliers of new technologies. They are able to exploit quickly new technologies and to respond to changing market demands (OECD 2010). In terms of gross added value, SMEs contribute more to the knowledge-intensive business services sector than large enterprises (Airaksinen et al. 2018). The U.S. Small Business Administration (SBA)'s Office of Advocacy notes that 'Small businesses represent about 96% of employer firms in high-patenting manufacturing industries, a percentage that remained constant from 2007 to 2012. However, during the same time period, small businesses' share of employment, payroll, and receipts increased. This increase was particularly notable in firms that manufactured computers and peripheral equipment, communications equipment, or semiconductors and other electronic components.'[1]

Because of the role played by SMEs in job creation and in supporting economic growth, policy makers and regulators are also increasingly paying attention to SMEs (OECD 2011; Ertimur et al. 2003). Several initiatives concerning regulation of SMEs are currently being discussed, aiming on the one hand to support the development of this type of firm and, on the other hand, to ensure an adequate level of protection for investors. For instance, the 2015 Green Paper 'Building a Capital Markets Union' (CMU) of the European Commission explicitly mentions support to SMEs as a fundamental goal for the next mandate of the Commission. In a similar fashion, the European Securities and Markets Authority (ESMA), in its commentary to the Green Paper, asks for more transparency for listed SMEs to enhance their integration at European level.[2] The ESMA supports the idea of fostering *ad hoc* stock markets for SMEs, since existing markets are still perceived as inadequate. At the same time, the EU has not adopted the IFRS for SMEs issued by the IASB,

[1] https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf. Accessed on February 1st, 2018.
[2] ESMA/2015/SMSG/017 – 12th May 2015

mostly due to concerns regarding the unfavourable cost-benefit analysis of the project (EFRAG 2010).

Regulators have adopted different definitions of SMEs in their policies. They follow criteria based on size, as does the European Union (*i.e.*, number of employees, annual turnover and balance sheet total), or on nature, as does the IASB (*i.e.*, presence on a stock market) or a mix of the two. Overall, there is no unique definition of SMEs, but this lack of strict delimitation may allow the multiple facets of this complex and multi-layered environment to be better understood.

Given the diversity of SMEs, my empirical analyses focus on SMEs listed on the AIM London stock exchange. I justify this decision by the need to have a comparable set of firms which allows me to mitigate the concern that unobserved firm characteristics drive my results. Companies listed on the AIM London are usually small fast-growing firms (Gerakos et al. 2013).[3] The AIM London, created in the U.K. in 1995, has less rigorous and less expensive listing requirements than traditional stock exchanges. In 2017, around 1,000 companies were listed on the AIM London with an average capitalization of 80 million euros each. It is the largest stock exchange in the world for SMEs as its market capitalization is almost 12 times larger than Alternext, a pan-European stock exchange for firms of smaller size.[4] The AIM London strictly regulates the content of firms' websites (Rule 26 of the Disclosure and Transparency Rules). Social media therefore represent a more flexible way for firms to communicate externally than traditional websites. In each of the following chapters I detail and demonstrate the peculiarities of SMEs related to the topic analysed.

Overall, this study aims to provide a better understanding of the disclosure practices of SMEs. The arguments above suggest that this topic is timely since there is a growing interest in this type of firm by numerous actors (investors, financers and regulators). Nevertheless, information on

[3] The London Stock Exchange describes the AIM London as follows, 'AIM is the most successful growth market in the world. Since its launch in 1995, over 3,600 companies from across the globe have chosen to join AIM. Powering the companies of tomorrow, AIM continues to help smaller and growing companies raise the capital they need for expansion.' Further information at http://www.londonstockexchange.com/companies-and-advisors/aim/. Accessed on April 5th, 2018.

[4] http://www.londonstockexchange.com/statistics/historic/aim-country-of-operation-and-incorporation/aim-companies-country-of-operation.htm

SMEs' activities is still scant and past studies have been mainly conducted in settings where agency problems are not exacerbated by the significant presence of uncertainty and complexity.

3. Is social media a game changer for SMEs' information environment?

One of the main issues SMEs face is the limited interest in their activities. In a traditional business environment, press and financial analysts influence the information environment surrounding firms (McNichols and O'Brien 1997; Miller 2006). Information providers, e.g., media, analysts, tend to focus on firms of bigger size due to the larger audience. Considering that business press has a limited amount of pages/space and human resources, articles mostly cover large listed companies which are of interest to a large audience of readers. Similarly, analysts provide reports and suggestions on those companies their investors mostly demand. As a result, SMEs suffer from low visibility.

Whereas past research shows that SMEs can attract more attention when they have large investor relation departments (Bushee and Miller 2012), this type of communication strategy is often too costly for SMEs. They do not always have the resources to hire a sufficient number of people in their investor relation department and to develop new communication activities.

New communication channels, e.g., social media, today allow SMEs to disseminate information directly without the need of intermediaries. The widespread use of social media has revolutionized the communication process. Kaplan and Haenlein (2010) define social media as platforms that publish either on a public website or on a social networking site, and which are accessible to a selected group of people. Social media provide free and immediate information to a large number of stakeholders. This information is created outside of professional routines and practices and can play a key role in filling the information gap among the different actors. Users can share messages (e.g., Twitter), pictures (e.g., Instagram), videos (e.g., YouTube), professional information (e.g., LinkedIn) or all the above (e.g., Facebook). Some of the most worldwide popular social media platforms are Facebook (2.129 billion users in January 2018), Instagram (800 million

users in January 2018), and Twitter (330 million).[5] Figure 1 provides additional figures about the trend of social media adoption. All three social media platforms analysed, i.e., Facebook, Instagram, and Twitter, have increased their number of users, with a recent significant increase in Instagram's popularity.

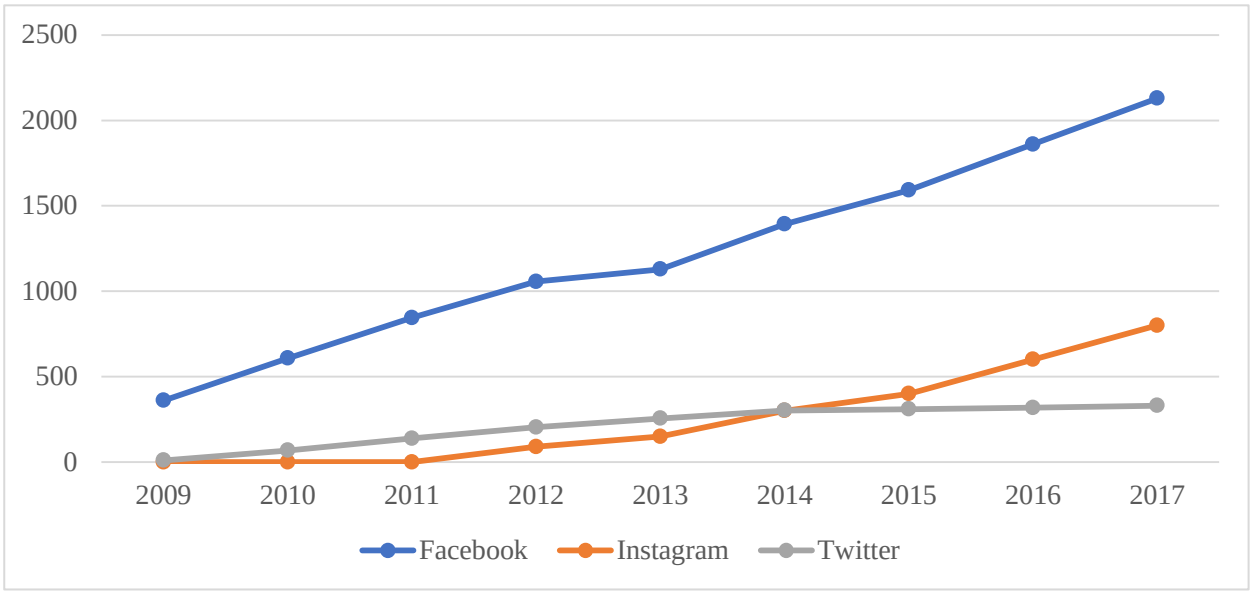


Figure 1: Number of users for Facebook, Instagram, and Twitter (Source: Statista.com)

From an international perspective, the low costs associated with the use of social media platforms facilitate their widespread use across developed and developing countries. Figure 2 shows that the United States and India are the countries with the highest number of social media users. The UK is one of the top countries at global level for number of Twitter users (18.6 million Twitter users in April 2018). With 29% of the national population using Twitter, the UK is the country with the highest proportion of its population using Twitter.

[5] Source: Statista.com. Accessed on April 2nd, 2018.

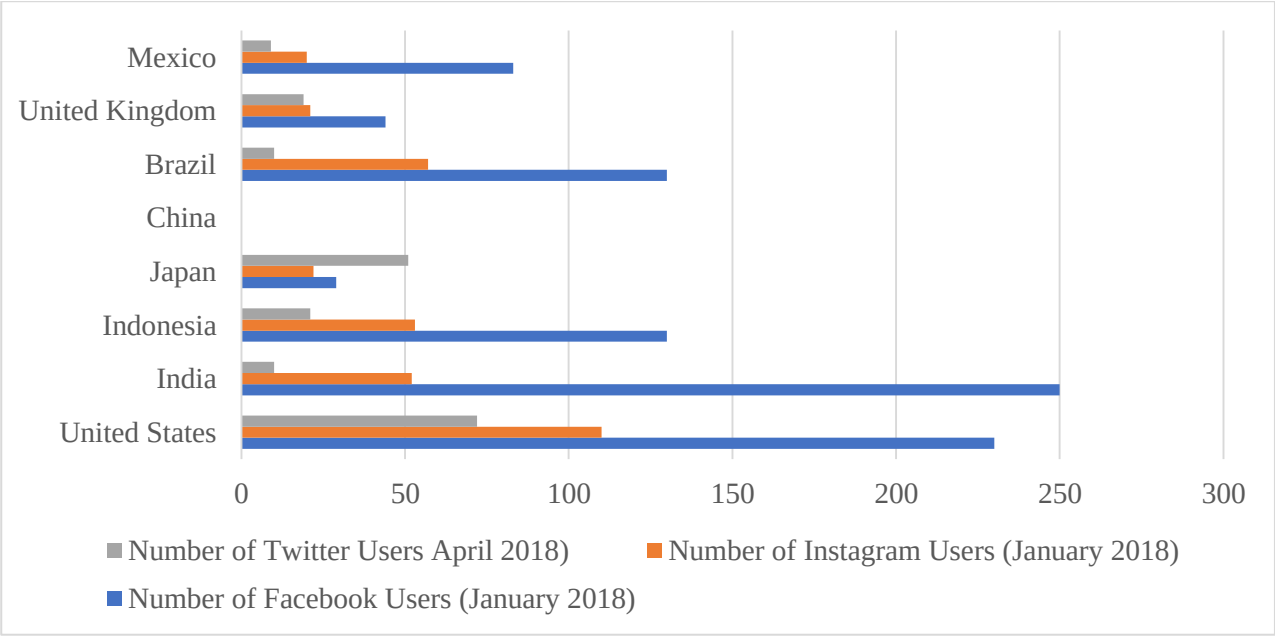


Figure 2: Social Media Adoption by Country (Source: Statista.com)

Companies can convey information to market participants through social media without the use of intermediaries. Users (and potential investors) have immediate and easy access to information in almost any country and time-zone. The decision by Bloomberg Terminal database, a major source of information for investors and analysts, to include tweets in its newsfeeds since 2013 shows that investors demand corporate social media information.

From the regulatory perspective, there is still intense debate in light of the recent widespread of these new communication channels. Regulators face difficulties in defining appropriate regulation for social media communication that balances investor protection and disclosure costs for SMEs. In Europe, no specific regulation exists for corporate social media use. Companies mostly refer to rules on voluntary disclosure. In the U.S., the Security and Exchange Commission (SEC) allows firms to use social media to disclose relevant information. The oversight body motivated the decision to allow companies to firstly announce their earnings on social media rather than solely on corporate websites as follows, *'An increasing number of public companies are using social media to communicate with their shareholders and the investing public. We appreciate the value and prevalence of social media channels in contemporary market communications, and the commission*

supports companies seeking new ways to communicate.'[6] However, the SEC has recently alerted investors to pay attention to the risk of fraud due to misleading information disclosed on social media and immediately disseminated all over the world with the intent of manipulating share prices.[7]

By examining social media data, researchers can obtain information about firms' decisions and users' comments about companies. Accounting research is still lagging behind other disciplines, e.g., marketing, computer science, to gather evidence about the role of social media as a communication channel. So far, a relatively small number of accounting studies provides evidence about the impact of social media disclosure on market participants' decisions.

Miller and Skinner (2015), in their editorial to a special issue in the Journal of Accounting Research entitled 'The Evolving Disclosure Landscape: How Changes in Technology, The Media, and Capital Markets are Affecting Disclosure', argue that 'new forces (such as social media and increased mobility) are emerging, and these forces are likely to change disclosure in important ways.' Miller and Skinner (2015) emphasize that companies, on the one hand, can use social media to disseminate new or existing information; on the other hand, firms may have partially lost control of the information environment. Users can access widespread unverified and non-verifiable information about companies. The possibility of interaction among users may foster negative reactions to firms' news.

By looking at how and why companies communicate with investors on social media, Blankespoor et al. (2013) show that high tech firms issuing tweets containing hyperlinks to press releases about earnings announcements receive higher investor attention. Yet, they do not find evidence that firms use social media opportunistically. Lee et al. (2015) document that firms engaging on social media during a product recall experience less backlash from their investors than firms not active on social media. In an experimental study, Elliott et al. (forthcoming) show that CEOs' activity on social media can mitigate investors' negative reactions to firms' bad news. Both

[6] hhttps://www.sec.gov/litigation/investreport/34-69279.htm. Accessed on April 20th, 2018.
[7] https://www.sec.gov/oiea/investor-alerts-bulletins/ia_rumors.html. Accessed on April 21st, 2018.

Lee et al. (2015) and Elliott et al. (forthcoming) support the idea that social media is a superior communication channel compared with traditional websites in establishing bonds with investors. Jung et al. (forthcoming) provide evidence of the costs associated with corporate social media activity. They find that the simultaneous tweet of bad news by a company and the retweet by a user lead to more negative articles about a firm than in traditional media.

By looking at users' opinions, Bartov et al. (2017) show that opinions on Twitter before earnings announcements predict forthcoming quarterly earnings and announcement returns. Their results are stronger for firms operating in poor information environments. Kadous et al. (2017) provide experimental evidence that social media influences investors' decisions even when it has little predictive power. These findings raise concerns about the potential side effects on market efficiency of the widespread use of social media. Twitter activity can also influence firms' actions. Gao et al. (2017) show that executives more active on social media receive higher compensation because boards are subject to limited visibility.

A central question is whether market participants find relevant information in SMEs releases on social media. For instance, every second around 6,000 tweets are issued on Twitter, which equals to around 500 million tweets per day.[8] SMEs represent a testing ground for social media. The limited presence of other media coverage reduces the potential effects of other sources of information when assessing the impact on corporate social media activity on firms' stakeholders. In the following three Chapters, I extensively rely on social media information to gather evidence about SMEs' disclosure.

4. Overview of the three Chapters

The following three chapters address from different perspectives my research questions about SMEs' corporate disclosure. First, I investigate what type of accounting information is relevant to investors (Chapter 1 and 2) and suppliers (Chapter 3). Second, I study whether managers adapt their

[8] Source: http://www.internetlivestats.com/twitter-statistics/. Accessed on April 3rd, 2018.

decisions, in terms of investment (Chapter 1) and disclosure (Chapter 2) to external expectations. Finally, I explore whether SMEs benefit from their use of social media with regards to investors' visibility (Chapter 2) and to their relationship with suppliers (Chapter 3).

4.1 Chapter 1 – Accounting Information in Innovative Small and Medium Entities

The presence of high information asymmetry due to uncertainty and complexity leaves room for managerial discretion. In this context, investors face serious difficulties when assessing managers' decisions and the future performance of firms, raising the risk of moral hazard (Dechow et al. 2010; Dechow and Skinner 2000). These conditions are particularly exacerbated in innovative SMEs, which also have to look for finance to develop their businesses and where the presence of intangibles is particularly significant (Smith and Cordina 2014). To this end, this first Chapter investigates two related research questions:

(1) What type of accounting information, i.e., earnings vs cash flows, is relevant to investors of innovative SMEs?

(2) Do managers change their investment decisions depending on investors' attention to specific accounting numbers?

My empirics show that with innovative SMEs' investors focus more on the capacity to generate cash flows, whilst in non-innovative SMEs focus is more on earnings. Next, I document that innovative SMEs incorporate this stronger interest in cash flows relative to earnings in their operating and reporting choices. Innovative SMEs focus more on cash flow maximization and less on earnings management compared with non-innovative SMEs. My analyses are based on value relevance and managerial decisions (i.e., earnings management and cash flow maximization) models.

I corroborate my findings with the analysis of communication through corporate social media. I show that innovative SMEs receive a higher number of retweets and favorites for tweets containing cash flow information compared with non-innovative SMEs. I further show that managers care relatively more about cash flows than about earnings in their financial disclosures on

Twitter. I document that innovative SMEs communicate more (number of tweets) and emphasize more (number of hashtags) cash flow information than non-innovative SMEs.

My findings suggest that reduced market pressure on earnings leads innovative SMEs to focus more on operating efficiency and cash flow maximization compared with non-innovative SMEs.

4.2 Chapter 2 – Investors' Attention and Social Media: Evidence from Small and Medium Entities

The second Chapter investigates whether the dissemination of news on social media is likely to attract investors' attention on earnings announcements for SMEs. As a follow-on to the first Chapter where I look at the impact of market expectations on SMEs investment decisions, I then explore whether SMEs adapt their communication strategy to exploit limited investors' decisions. My two research questions are:

(1) What is the impact of corporate social media information on investors' attention on earnings announcements of SMEs?

(2) Do SMEs strategically use corporate social media?

These research questions are primarily motivated by the difficulties of SMEs in attracting investor attention at earnings announcements. There is a dearth of information for this type of firm due to limited media attention/coverage associated with their size and the complexity of their business (Bushee and Miller 2012; Cassar et al. 2015). Recent communication technologies, *e.g.*, social media, make it possible to convey timely information directly to investors at low cost.

Drake et al. (2012) document that investors start searching for news in the period before earnings announcements. During the earnings announcement season, competing information is conveyed by firms aiming to attract investors' attention (Boulland and Dessaint 2017). On the one hand, corporate social media disclosure may expand knowledge about the activities and the future performance of SMEs. On the other hand, corporate social media disclosure may lead to

information overload or information being considered not relevant. In addition, given the limited presence of competing sources of information, managers may be tempted to exploit investors' limited attention by strategically disclosing information on social media (Jung et al. forthcoming).

I document that the use of Twitter before earnings announcements leads to higher investor attention at earnings announcement for SMEs. The effect is larger for firms releasing tweets containing financial information. This result is consistent with my conjecture that investors process the content of the tweets. I then show that SMEs use social media strategically to manage dissemination of news about the company by remaining silent before the announcement of bad news. Additional analyses show that Twitter activity has a greater effect on investor attention and is more opportunistic for SMEs with low media coverage and with less analyst following. Finally, empirical findings about the impact of Bloomberg Terminal's decision to include tweets in its database support my conjecture that investors care about social media disclosure.

Overall, my findings indicate that the use of social media contributes to increase SMEs' visibility. Corporate social media compensates for the limited presence of other sources of information. Finally, my results about SMEs' strategic disclosure on social media support the idea that managers aim to reduce the attention on the company and reduce the risk of decreasing a firm's value when they are about to disclose poor earnings. I thus provide insights into 'how and what' SMEs voluntarily communicate to their investors through social media.

4.3 Chapter 3 – The Effect of Voluntary Disclosure on Trade Credit Received in Small and Medium Entities: Evidence from Social Media

My third Chapter explores the influence of voluntary disclosure conveyed through social media on trade credit received by SMEs. Financing is critical to the development and growth of firms and the issue is particularly relevant for SMEs because access to finance is often difficult for them. Financers often perceive SMEs as riskier than other entities (Agostino and Trivieri 2014). Whereas the first two Chapters of this Ph.D. thesis investigate the relationship between SMEs and investors, in my third Chapter I focus on other capital providers for SMEs, such as suppliers.

Trade credit received, which reduces working capital needs, represents a key source of financing for SMEs (Ayadi 2005; Hall 2010; Hall and Lerner 2010; Robb 2002). The relationship between suppliers and customers is built on repeated business transactions and trust influences suppliers' willingness to extend trade credit (Wu et al. 2014). In this context, soft information and mutual trust play a fundamental role in evaluating customers' future performance (Berger and Udell 2006). My two research questions are:

(1) Can social media strengthen the relationship between corporate customers and their suppliers by reinforcing trust between the two parties?

(2) What is the number of tweets beneficial to customers?

I document that SMEs that are more active on Twitter report receiving a significantly higher level of trade credit compared with firms less active on Twitter. I find that a low to moderate number of tweets is positively associated with trade credit received, whereas a moderate to high number of tweets leads to decreasing marginal benefits for customers. Thirdly, I show that customers that are more active on social media adjust to a faster speed toward their stable trade credit level. Additional analyses show that suppliers value customers' tweets during negative events and when they have limited access to up to date information about their customers.

Overall, my results suggest that the use of social media allows customers to enhance the relationship with their suppliers. The latter are also more willing to renegotiate their terms, allowing customers to adjust their financing needs more rapidly. However, beyond certain point, additional tweets have a negative effect on the supplier-customer relationship, suggesting that suppliers suffer from 'social media fatigue' (Bright et al. 2015).

4. Contributions and implications

This Ph.D. thesis contributes to the understanding of the determinants and consequences of information asymmetry in the context of SMEs. Firstly, I provide additional evidence concerning

decisions by investors and managers in an uncertain and complex environment. In particular, I contribute to the understanding of which accounting information is relevant to investors. In addition to previous studies which question accounting value relevance across different types of firms (Srivastava 2014; Barth et al. 2017; Lev and Gu 2016), I provide direct evidence that investors in innovative SMEs care more about cash flows than earnings. In this way, I provide insight into the relevance of accounting in the 'New Economy'. I also contribute to the debate on the relationship between market considerations and managerial decisions (Dumontier and Raffournier 2002). My findings in the first two chapters indicate that investors' attention to SMEs' disclosures leads managers to maximize their cash flows and to strategically optimize their firms' disclosures.

Secondly, this Ph.D. thesis contributes to literature on investors' attention and voluntary disclosure (Lee et al. 2015; Boulland and Dessaint 2017) by documenting that the use of corporate social media effective in overcoming the shortage of information surrounding SMEs' activities. Investors appear to incorporate in their decisions the pieces of information conveyed through social media. In addition, the second chapter gathers evidence on managers' opportunistic use of investors' limited attention (DellaVigna and Pollet 2009; Hirshleifer et al. 2009; Hirshleifer and Teoh 2003) by considering disclosure strategies before the announcement of bad news.

Thirdly, my study contributes to the understanding of the role of voluntary disclosure in financing decisions, particularly those related to trade credit received. By showing that social media messages enhance the supplier-customer relationship, my results expand prior research on the relevance of trust in granting trade credit (Wu et al. 2014). I also contribute to the understanding of the relationship between the level of social media activity and trade credit received, in particular of the mechanisms that suppliers follow to make decisions about trade credit. My results suggest that customers suffer a reduction in trade credit received when suppliers experience 'social media fatigue'.

In addition to these contributions, my Ph.D. thesis has relevant implications for researchers interested in voluntary disclosure. In the context of SMEs, corporate social media appear to be a

communication channel able to attract investors' attention and to reinforce the trust between suppliers and customers. I show the complimentary role of corporate social media to other sources of information, e.g., traditional media and analysts, for SMEs. My thesis also presents methodological innovations to the accounting field. Given that corporate social media allow researchers to observe directly which information investors consider relevant, in my first chapter I support the traditional value relevance models by analysis of users' reactions to firms' information. Researchers can overcome the limits of value relevance research where the observation of market participants' use of accounting information is indirect (Barth et al. 2017; Dumontier and Raffournier 2002; Holthausen and Watts 2001). Finally, in my first and second chapters I adapt Lerman (2016) dictionary about accounting information to SMEs' social media use.

My work also has implications for SMEs. Given that investors differentiate their interest in accounting numbers according to the type of firm, managers may want to better tailor their disclosure to meet investors' demand for information. My results then indicate that social media are not only a marketing channel, but are also effective in attracting investors' attention and enhancing business relationships in firms of small and medium size. SMEs can save significant resources which they would otherwise use to develop investors relationship departments, as previously suggested by Bushee and Miller (2012).

Finally, my results are informative to policy makers. They illustrate mechanisms through which firms operating in contexts of complexity and uncertainty can provide relevant disclosure to investors and financers. In light of the evidence of the thesis, regulators may consider openly promoting more flexible disclosure for SMEs in terms of communication channels and their content.

CHAPTER I

Accounting Information in Innovative Small and Medium Entities

Abstract

I examine the relevance and use of accounting information in innovative Small and Medium Entities (SMEs). Using a sample of SMEs listed on the AIM London Stock Exchange between 1996 and 2014, I document that cash flows are more highly associated with stock returns than earnings for innovative SMEs than for non-innovative SMEs. Using Twitter to directly measure investors' interest in firms' financial information, I also find that investor retweet and include as favorite more frequently information about cash flows than about earnings for innovative SMEs relative to non-innovative SMEs I then show that innovative SMEs engage less intensively in earnings management, and that they focus more on operating efficiency through cash flow increasing real activities compared with non-innovative SMEs. These results are consistent with the argument that investors assign less importance to earnings of innovative SMEs, which reduces the temptation to manage earnings. My findings suggest that operating efficiency, and not earnings, constitutes the objective of investment decisions by innovative SMEs. This study extends the literature concerning firms' characteristics to the relevance of accounting information and to managerial decisions.

Keywords: Financial Reporting; Innovation; SMEs; Value Relevance; Earnings; Cash Flows; Social Media; AIM London;

1. Introduction

Electric-car maker Tesla Motors Inc. is scheduling its initial public offering to trade on June 29 […] Although Tesla has never been profitable and had sold only 1,063 of its Roadster models as of March 31, the company's offering has drawn the attention of green-energy investors and high-end car buffs alike. (Cowan 2010).

Analysts have radically cut their forecasts for how much Tesla Motors will earn this year. But so great is their faith in the company's far-off future, their views on what it is worth have hardly wavered. (Lahart 2015).[9]

I examine the relevance and use of accounting information in innovative Small and Medium Entities (SMEs). Existing literature shows that investors focus on earnings to form their expectations about the level, timing and uncertainty of future cash flows (Dechow 1994; Feltham and Ohlson 1995). Consequently, managers may be encouraged to meet market expectations to the point of managing accruals (Healy and Wahlen 1999; Ewert and Wagenhofer 2005). However, as Barth et al. (2017) point out, the value relevance of accounting numbers is likely to differ across different types of firms. Considering the importance of intangible assets in the business models of innovative SMEs and the level of uncertainty surrounding their activities (Greenhalgh and Rogers 2006; Baldwin and Gellatly 2003), I argue that market participants pay more attention to their operating efficiency than to their ability to generate earnings or to meet or beat earnings targets. The future projects and activities of innovative SMEs often depend on the level of cash available (Magri 2007). My conjecture is that cash flows provide information incrementally relevant to value innovative SMEs with regards to their operating efficiency relative to earnings. Real activities by innovative SMEs may then reflect investors' preference for cash flows over earnings to decide how to invest.

I first examine investors' interest in earnings and cash flows in innovative SMEs. I thus provide evidence concerning the importance assigned by market participants to different accounting numbers. Firstly, using value relevance models (Amir and Lev 1996; Kothari and Zimmerman 1995), I examine the association between stock returns and accounting numbers, i.e., earnings and

[9]These two articles from The Wall Street Journal demonstrate that investors of Tesla, an innovative company with small initial capitalization (ref. SEC Registration No. 333/2010), have supported the company's growth by valuing its ability to maintain innovative activities and not its ability to generate profit.

cash flows. I then examine social media as a direct measure of use of financial disclosures. Considering that social media, e.g., Twitter, allow direct interactions between the firm and users of corporate disclosures, I can directly observe whether and how users react to financial disclosures (Miller and Skinner 2015; Blankespoor et al. 2013). I thus look at users' interest towards firms' tweets containing information about either earnings or cash flows.

Secondly, I investigate whether the limited attention of market participants' to earnings reduces the incentive for innovative SMEs to manage earnings compared with non-innovative SMEs. Considering the potentially reduced managerial bias towards earnings, I expect innovative SMEs to focus more on operating efficiency than non-innovative SMEs. An alternative view is that innovative SMEs may exploit the uncertainty surrounding their activities and associated information to manage earnings more aggressively than non-innovative SMEs. Showing stable financial performance over time may help innovative SMEs in securing external financing to support their future projects. This may mitigate concerns over the risks associated with their high level of uncertainty and complexity. To support my evidence, I also look at the relative emphasis placed by innovative SMEs on earnings and cash flows disclosures in their tweets compared with non-innovative SMEs.

My study is motivated by the need to understand the information provided by accounting numbers. Barth et al. (2017) document a change in the value relevance of accounting information and the limits of the well-established association between earnings and equity market value for 'New Economy' firms. Lev and Gu (2016) argue that, on average, the value relevance of many accounting numbers, including earnings, is decreasing. However, they argue that accounting and corporate reports are resistant to change due to the lack of compelling evidence that investors' demand for information is unsatisfied. I believe that the study of innovative SMEs allows me to understand whether the possibly low attention paid to certain accounting items, i.e., earnings, is offset by increasing attention paid to others, i.e., cash flows, which would have multiple implications in terms of financial reporting incentives.

Despite the growing importance of innovative SMEs in today's economy, there is little evidence about their financial reporting. Existing literature questions the type of accounting numbers relevant to investors in innovative SMEs (Smith and Cordina 2014). Tesla illustrates how an innovative unprofitable firm with a small initial capitalization and a record of missing analysts' earnings targets has become one of the most valuable companies in the automotive industry in only seven years. In fact, the competitive advantage of innovative SMEs resides mainly in the ability to continue to innovate (Hellmann and Puri 2000). However, innovation often leads to intangible-intensive businesses with higher risks and uncertainty (Srivastava and Tse 2016; Srivastava 2014). The most recent cohort of initial public offering firms (new-list firms) have exhibited progressively higher risks than older companies (e.g., Fama and French (2004)) and business models based on physical assets are less a source of competitive advantage (Zingales 2000).

The debate surrounding the accounting information of innovative SMEs is also intense from a regulatory perspective. The European Union Commission (European Commission 2014a) has defined a plan to support the development of innovative SMEs, in particular to facilitate their access to financing through a deeper market, specific start-up funds and a wider investor base. On the one hand, it considers financial reporting as a useful source of information for potential investors. On the other hand, the requirement for financial information is hindered by limited resources and the potentially different needs of investors compared with traditional businesses. Moreover, the European Securities and Market Authority (ESMA) questions the usefulness and quality of the financial reporting of innovative SMEs (ESMA SMSG 2015, 2012).

My statistical tests are conducted on innovative SMEs (treatment group) and non-innovative SMEs (control group) listed on the Alternative Investment Market (AIM) London over the period 1996-2014. I investigate the relevance and the use of financial disclosures of innovative SMEs relative to non-innovative SMEs. Since there is not a unique definition of innovative SMEs, I

identify innovative SMEs based on the distribution of Research and Development expenditure (R&D) within industry-year groups.[10]

I first estimate the value relevance of accounting numbers, i.e., earnings and cash flows, in innovative SMEs. I find that the value relevance of earnings (cash flows) is lower (higher) for innovative SMEs compared with non-innovative SMEs. I also show that tweets of innovative SMEs about earnings (cash flows) encounter lower (higher) user interest, measured as 'Retweets' and 'Favorite/Like', compared with non-innovative SMEs. The odds of 'Retweets' and 'Favorite/Like' for tweets from innovative SMEs containing information about cash flows is 1.23 and 1.26 times the odds of 'Retweets' and 'Favorite/Like' of non-innovative SMEs. Secondly, I test whether innovative SMEs incorporate investors' stronger interest in cash flows relative to earnings in their operating and reporting choices. I document that innovative SMEs manage earnings less than non-innovative SMEs. I then find that they favor decisions maximizing cash flows to improve operating efficiency. To corroborate my findings, I examine corporate tweets. I show that innovative SMEs put more emphasis in their tweets on information about cash flows and less about earnings compared with non-innovative SMEs. Innovative SMEs, on average, issue 33% more tweets about cash flows relative to non-innovative SMEs, and the number of hashtags associated to cash flow information is, on average, 53% higher for innovative SMEs than for non-innovative SMEs. The reduced market pressure on earnings leads innovative SMEs to focus on operating efficiency.

This study makes several contributions. Firstly, I contribute to the literature on the use of accounting numbers by investors. I show that for innovative SMEs the low level of interest in earnings is offset by the high value relevance of cash flows. Secondly, I bring an addition to existing literature on the influence of capital markets on managerial decisions. Because innovative SMEs consider cash flows to be more important than earnings, my results complement Graham et al. (2005) on how managers make decisions related to performance measurement. My findings suggest that reduced market pressure on earnings leads innovative SMEs to focus more on

[10] In a sensitivity test, I also identify innovative SMEs using patents. I look at total assets (<€43million) or number of employees (<250) to define firms of small size. My results are robust to various measures of innovation and firm size.

operating efficiency and cash flow maximization. Thirdly, I also contribute to existing literature by applying a direct method to analyzing consumption of accounting information, i.e., the analysis of corporate tweets. An important implication of my findings is that the consumption of accounting information on social media is aligned with the relationship between accounting information and capital markets. Finally, this study provides further evidence to the ongoing debate on the regulation of innovative SMEs. I believe that my results are particularly informative to policy makers. I illustrate that investors and managers of innovative SMEs give little attention to earnings.

The rest of this paper is organized as follows. In Section 2 I provide a brief overview of the literature on the relevance and use of accounting information, and I develop my hypotheses. Section 3 describes the sample, and the summary statistics. Sections 4 and 5 present my empirical findings and additional tests respectively. The final section discusses the results and implications of this study.

2. Theoretical framework and hypothesis development

My study is related to existing literature that questions the importance to investors of different accounting numbers when making investment decisions (e.g., Dechow (1994), Lev and Gu (2016), and Barth et al. (2017)). Market participants may focus on certain accounting numbers, in particular earnings, to define their investment decisions and to determine firms' value (Hung 2000). Current studies on the usefulness of accounting numbers for investors question the role of firms' characteristics in investors' decisions (Srivastava 2014; Barth et al. 2017; Lev and Gu 2016). In this section, I also discuss whether and how investors' interest in certain accounting numbers may influence managerial decisions.

2.1. Investors' interest in accounting numbers of innovative SMEs

Past research provides empirical evidence that the association between earnings and stock returns is low and decreasing over time, especially for 'New Economy' firms (Barth et al. 2017). The documented decreased value relevance of accounting numbers can be explained by the focus of

past studies on 'average' effects as they implicitly assume that market participants weight accounting numbers similarly across firms. The different intrinsic characteristics of firms, e.g., business model, age of the firm, type of industry, contribute to substantial differences in the relative importance of specific accounting numbers to investors. I therefore argue that the financial information I can derive from accounting numbers depends on firms' characteristics.

I focus on innovative SMEs to estimate further investors' interest in accounting numbers. Innovative SMEs are characterized by their complexity and the uncertainty surrounding their future performance and success. Their intrinsic characteristics, i.e., the importance of intangibles and their knowledge-based business models, may reduce the informativeness of earnings (Srivastava 2014). In a similar fashion, Barth et al. (2017) argue that the rise of the New Economy may change how investors value firms. Accounting standards may not be well suited for innovative SMEs (Dechow and Skinner 2000; Smith and Cordina 2014). Financial reports may reflect poorly the underlying business activities and so investors may gain little insight in their assessment of the business value. Investors may consider reported earnings as less important than in non-innovative SMEs. Therefore, I predict that investors' interest in earnings in innovative SMEs is lower than in non-innovative SMEs.

H1a: Investors in innovative SMEs focus less on earnings than investors in non-innovative SMEs.

Given the importance for innovative SMEs to maintain their innovation and the high uncertainty surrounding their activities, investors may focus on whether innovative SMEs are able to shift resources efficiently to innovative activities. An efficient use of resources would contribute to promote innovation, providing useful information about future performance. Magri (2007) shows that future projects and activities of innovative SMEs depend on their ability to generate cash flows. Moreover, Srivastava (2014) argues that the development of intangible assets related to innovation, e.g., patents, trade names, and human capital, generates immediate expenses which are associated

with cash outflows, but not with contemporaneous positive accruals. I therefore argue that cash flows provide valuable information to investors and also provide a good measure of the events that stock prices incorporate over a reporting period. I state the following hypothesis:

H1b: Investors in innovative SMEs focus more on cash flows than investors in non-innovative SMEs.

2.2. The relationship between market considerations and managerial decisions

Dumontier and Raffournier (2002) argue that the study of the use of accounting data by market participants aims, amongst others, 'to determine whether firms favor decisions which maximize accounting measures of profit rather than cash flows, because of the importance of earnings for market participants'. Accounting standards allow managers' judgment and discretion to influence financial reporting (Healy and Wahlen 1999). In addition, firms which operate in conditions of complexity and uncertainty such as innovative SMEs, exhibit higher information asymmetry, allowing managers wider discretion in their investment decisions.

On average, managers place significant emphasis on reported earnings. Investors could perceive negatively a low level of earnings because it may signal potential poor future performance. Earnings are also often linked to managers' compensation and reputation (Healy 1985). Therefore, managers may be tempted to improve reported earnings by manipulating accruals or exploiting other accounting mechanisms.

An empirical question is whether and how managers change their decisions if investors' attention to earnings is low. Innovative SMEs may make less effort to engage in earnings management and to alter reported earnings if they tend to be disregarded by investors (Heinle and Hofmann 2011; Smith and Cordina 2014). Investors' attention on operating efficiency, which I have previously discussed, could instead lead managers to focus more on an efficient use of resources. In particular, managers of innovative SMEs may focus in their investment decisions on maximizing cash flows in order to support the development of intangible assets and innovation. Furthermore, innovative firms are also more likely to grant bonuses to managers based on performance indicators

such as innovation and operating efficiency rather than earnings (Galbraith and Merrill 1991; Baldwin and Johnson 1996). Managers would therefore have greater interest in increasing cash flows in order to maximize their remuneration.

Alternatively, innovative SMEs may exploit this flexibility to detour resources useful for their growth and development. They have greater possibility to manage earnings through accruals than non-innovative SMEs due to the intrinsic characteristics of their operational activity. For instance, they usually have more receivables and higher working capital than non-innovative firms (Himmelberg and Petersen 1994; Magri 2007). As an example of the potential desire to manage earnings, innovative SMEs have an ongoing need of financing (Hall 2002; Fang et al. 2014). Hence, they may need to artificially adjust (upwards or downwards) their earnings to show stable financial performance and mitigate the concerns arising from the uncertainty surrounding their activities. In their ongoing search of financing, innovative SMEs may tend to reduce dividend levels in order to preserve resources to invest in future projects (Hall 2002). Thus, by manipulating their earnings downwards through accruals, they can reduce shareholder pressure for dividends, without affecting the operating activity.

Overall, innovative SMEs present several contrasting interests which may influence their choice of management decisions, in particular concerning earnings management and operating efficiency. I argue that the reduced market pressure on reported earnings induces managers to change their investment decisions. In particular, innovative SMEs adjust their decisions to incorporate investors' attention to operating efficiency. Therefore, I test the following two hypotheses:

H2a: Innovative SMEs manage earnings less than non-innovative SMEs.

H2b: Innovative SMEs focus more on maximizing operating efficiency than non-innovative SMEs.

3. Research design

My main set of analyses compares innovative with non-innovative SMEs. I first describe the sample used and explain the choice of firms listed on the AIM London Stock Exchange. I present descriptive statistics, in particular by highlighting the characteristics of innovative SMEs compared with non-innovative SMEs.

3.1. Sample

My sample is composed of SMEs listed on the AIM London Stock Exchange. I choose to focus on the AIM London Stock Exchange because it is dedicated to firms of smaller size. It is the largest stock exchange in the world for SMEs as its market capitalization is almost 12 times larger than Alternext, a pan-European stock exchange for firms of smaller size.[11] Gerakos et al. (2013) note that: 'The goal [of AIM] is to provide investors with access to 'smaller growing companies', thereby increasing the pool of available capital.'[12] I use the EIKON database to gather data over the period 1996-2014 because the AIM in London was created in 1995.[13]

Panel A of Table 1 describes the sampling and data collection process. In accordance with the EU definition, I define SMEs as firms that have a balance sheet total below €43 million.[14] I exclude firms operating in the financial and insurance industries because they follow specific reporting requirements (DuCharme et al. 2001; Burgstahler et al. 2006; Ball and Shivakumar 2008). To this end, I use the Fama-French (FF) 12 industries classification, excluding firms operating in industry with FF-code 11.[15] I further delete observations with negative equity and observations with unavailable data. I define innovative SMEs as firms which exhibit above-median R&D

[11] http://www.londonstockexchange.com/statistics/historic/aim-country-of-operation-and-incorporation/aim-companies-country-of-operation.htm.

[12] To mitigate the concerns that the choice of focusing on the AIM London stock exchange does not maximize sample size, I checked the sample for NASDAQ-listed companies. If I apply the same cut-off (43€ million total assets), I obtain a sample of similar size. NASDAQ-listed firms are small, but on average larger than AIM ones.

[13] The analyses for firms listed on AIM London are also performed with data gathered from Orbis over 2006-2014. Untabulated results show qualitatively consistent results with those reported in Table 3 and Table 5. I also run the tests over the period 1996-2007 in order to exclude potential bias due to the financial crisis and the related recovery period. Untabulated results are very similar with those reported.

[14] Because the main definition of SMEs follows a European Directive, all data used and reported in the paper is expressed in Euros.

[15] All results reported in this study are qualitatively similar if I use the Industry Classification Benchmark (ICB) as industry classification (Achleitner et al. 2014).

expenditures, scaled by total assets, within a FF industry-year group. The final sample is composed of 2,404 firm-year observations out of which 903 (approximately 37.6% of the total sample) are classified as innovative SMEs.[16] I winsorize each continuous variable at two percent level in each tail to mitigate the influence of outliers.[17]

[INSERT TABLE 1 ABOUT HERE]

Panel B of Table 1 provides the distribution of the observations by year. Over time, the AIM London has expanded, with a growing number of firms being listed. The number of observations has increased and has been relatively constant over the last six years.

3.2. Descriptive statistics

Panel A Table 2 presents descriptive statistics for the main variables of the sample.[18] Innovative SMEs represent 37.6% of the final sample. Firms listed on the AIM London Stock Exchange have great potential for growth, as the median (mean) of changes of sales growth (*GROWTH*) is 8.4% (49.9%). There is large variability in terms of market performance, as the median (mean) of stock returns (*RET*) is 1.6% (16.9%).[19] The percentage of loss firms (*LOSS*) is 57.7%, showing difficulties in achieving a satisfactory level of profitability. The median (mean) leverage (*LEV*) is 32.9% (36.8%) of total assets which is close to the values reported by Gerakos et al. (2013). This result is consistent with the idea that SMEs are listed on the AIM London with the intent of obtaining considerable financing from the equity market. The median (mean) of the absolute value of discretionary accruals (|*AEM*|) is 5.9% (9.0%) of lagged total assets. By construction, the median (mean) of the four proxies of cash flows increasing (*DISC_EXP*, *DISC_PROD*, *DISC_CFO*, and *FCFM*) exhibit a mean value close to zero. The number of

[16] I consider innovative SMEs only if the level of R&D expense is strictly above the median of the industry-year group. Given that some firm-industry groups report no R&D expenses for more than the median of the observations, the number of innovative-SMEs in the final sample is smaller than 50%.
[17] Results are similar if I use other winsorization levels (1% or 5%).
[18] I explain the assumptions underlying my measures and how I estimate them in the Appendix B.
[19] Gerakos et al. (2013) report that between 1995 to 2008, the average (median; 25th percentile) 12-month return for their sample firms listed on AIM is -13% (-18.5%; -55.2%). To reconcile the different results, I compute returns only for large firms (and not at SMEs) and for the period pre-2008. I obtain results are more aligned to Gerakos et al. (2013) (median: -6.68%; mean: -0.87%; p25: -45%). In addition, Gerakos et al. (2013) focus on the post-listing period (12-, 18-, 24- months post IPO) when returns might be more volatile.

observations related to social media measures is 801 (compared with 2,404 firm-year observations of the full tested sample) due to the wide-spread use of Twitter in the U.K. only after 2011 (Arthur 2012). The means of tweets about earnings (*TWEETS_EARN*) and cash flows (*TWEETS_CASH*) are 0.832 and 3.194, respectively.

Panel B of Table 2 shows the descriptive statistics of the sample conditional on the firms' level of innovation (*INNOVATIVE_R&D*), along with t-tests for difference in means between groups. Innovative SMEs report more cash flows increasing real activities management (*DISC_EXP*, *DISC_PROD*, *DISC_CFO*, and *FCFM*), and retweets about hashtags about cash flows (*RETW_CASH, and HASHTAG_CASH*), higher number of analysts following (*COVERAGE*), higher leverage (*LEV*), and smaller size (*SIZE*) compared with other firms. I do not observe a significant difference between the two groups of firms in terms of market returns (*RET*), and accrual-based earnings management (|*AEM*|).

[INSERT TABLE 2 ABOUT HERE]

4. Empirical analysis

4.1. Accounting value relevance in innovative SMEs

My first hypothesis tests investors' interest in earnings (H1a) and cash flows (H1b) for innovative SMEs compared with non-innovative SMEs. I first estimate the relative value-relevance of accounting numbers for innovative and non-innovative SMEs by analyzing the association between accounting numbers and measures of market value (Holthausen and Watts 2001). Consistent with Alford et al. (1993), I use a return model rather than a price model to overcome the limitations of price scale. I also estimate a return model adjusted for industry-year returns to mitigate the potential concerns that the results suffer from omitted variable bias. Variables are scaled by beginning of price period to mitigate concerns about spurious correlations due to size (Christie 1987).

My first test investigates the value relevance of earnings and cash flows in innovative SMEs (Eq. (1)). Consistent with Dechow (1994), I focus on accruals to measure the informativeness of

earnings. Under the accrual basis of accounting, accruals are expected to reflect economic events in a company's financial statements independently from the receipt or payment of cash (Kieso et al. 2012).[20] Accruals play the role of smoothing out temporary timing fluctuations in cash flows in reported earnings. They ensure reported earnings clearly reflect a firm's performance and thus accruals are major element in earnings information (Dechow 1994). Standard setters, e.g., the IASB, the FASB, also believe that accruals are necessarily related to the ability of earnings to measure firms' performance.[21]

Lastly, I use changes in the values in firms' Tobin's q and market-to-book value of equity as additional dependent variables to mitigate potential econometric problems associated with model specifications in value relevance studies (Barth et al. 2001). Variables are scaled by total assets in year t-1. I examine my first hypothesis by using the following model (standard errors are clustered at the firm level):

$$\begin{aligned} MARKET\_proxy_{i,t} = {} & \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 TACC_{i,t} \\ & + \alpha_3 TACC_{i,t} \times INNOVATIVE\_R\&D_{i,t} + \alpha_4 CFO_{i,t} \\ & + \alpha_5 CFO_{i,t} \times INNOVATIVE\_R\&D_{i,t} + \text{Industry Fixed Effects} \\ & + \text{Year Fixed Effects} + \Omega_{it} \end{aligned} \quad (1)$$

where:

MARKET_proxy = one of the following variables:

RET_t = stock returns in year t, measured as $[(P_t - P_{t-1} + Dividend_t - CapitalContribution_t)/P_{t-1}]$;

[20] Earnings are earnings before extraordinary items and cash flows (*CFO*) are cash flows from operations as reported in the statement of cash flows. Consistent with Hribar and Collins (2002) and Bushman et al. (2016), I estimate total accruals (*TACC*) from the statement of cash flows to avoid the well-documented measurement errors of balance sheet-based accruals. I also re-perform my tests by using a balance sheet approach to estimate total accruals and cash flows. Results remain very similar.

[21] FASB Concept 8 (paragraph OB17) explicitly describes the essential role of accruals to represent the economic events in the financial reporting and to improve ability of earnings to measure firms' performance: 'Accrual accounting depicts the effects of transactions, and other events and circumstances on a reporting entity's economic resources and claims in the periods in which those effects occur, even if the resulting cash receipts and payments occur in a different period. ***This is important because information about a reporting entity's economic resources and claims and changes in its economic resources and claims during a period provides a better basis for assessing the entity's past and future performance than information solely about cash receipts and payments during that period***.' [emphasis added]

RET_IND_t = stock returns in year t adjusted for industry-year returns, measured as $[(P_t - P_{t-1} + Dividend_t - CapitalContribution_t)/P_{t-1}] - (Industry\_Year\_returns)$;

ΔMTB_t = change in Market-to-Book value from year t-1 to year t;

$\Delta TOBIN_t$ = change in Tobin's q value, measured as total market value of the firm divided by total assets, from year t-1 to year t;

$INNOVATIVE\_R\&D_t$ = dummy variable, equal to 1 if a firm's Research and Development expenses scaled by total assets are above industry-year median, and 0 otherwise;

$TACC_t$ = total accruals, measured as earnings before extraordinary items and discontinued operations minus operating cash flows for year t;

CFO_t = cash flows from operations in year t.

Accounting numbers, i.e., *TACC* and *CFO*, are value relevant if their regression coefficients in Eq. (1) are statistically significant. I posit under H1 that earnings (cash flows) represent a weaker (stronger) summary measure of the economic events incorporated in stock prices for innovative SMEs relative to non-innovative SMEs. According to H1a, α_3 is not different from zero. According to H1b, α_5 is positive and significant. I present the estimation results of model (1) in Table 3.

[INSERT TABLE 3 ABOUT HERE]

The estimated coefficient α_3 on *TACC* × *INNOVATIVE_R&D* is not significant. It indicates that accruals do not provide incremental information to firm value to innovative SMEs relative to non-innovative SMEs. Conversely, the estimated coefficient α_5 on *CFO* × *INNOVATIVE_R&D* is positive and significant. Cash flows have incremental value relevance for innovative SMEs compared with non-innovative SME. These results are robust to the different model specifications used. I find that my results are consistent across the different market value performances reported in columns (1) – (4) i.e., *RET* (α_5 = 0.259 and significant at less than 10%, two-tailed), *RET_IND* (α_5 = 0.405 and significant at less than 5%, two-tailed), ΔMTB (α_5 = 2.030 and significant at less than 1%, two-tailed), and $\Delta TOBIN$ (α_5 = 2.169 and significant at less than 1%, two-tailed).[22]

[22] Hayn (1995) documents that losses are less informative to shareholders than profits. To mitigate potential concerns that my results are driven by innovative loss-making firms, I run my analyses on the sub-sample of firms with positive reported income. The only difference with the results reported in Table 3 is that the impact of the variable of interest (*TACC*) on change in Tobin's q value ($\Delta TOBIN$) is positive, but not significant.

I interpret my results that cash flows represent a relative superior summary measure of innovative SMEs' performance compared with earnings. I show that cash flows overcome problems with measuring company value in innovative SMEs.

4.2 Use of accounting information: New evidence from social media

The main limit of value relevance research is that the observation of market participants' use of accounting information is indirect (Barth et al. 2017; Dumontier and Raffournier 2002). Value relevance models implicitly assume that changes in stock prices reflect and incorporate accounting information. Therefore, results derived from value relevance models may not represent a definitive indication of investors' interest in accounting numbers.

I support my findings about the value relevance of accounting numbers by also examining the interest shown in firms' tweets containing information either about earnings or cash flows. This approach allows me to directly observe the consumption of accounting numbers by investors. Social media allow multi-directional interactions, changing the dynamics of the relationship between producers of corporate information and its users (Lee et al. 2015). I focus on Twitter content because companies tend to release financial information on Twitter rather than on other social media platforms, e.g., Facebook, Google+, and Pinterest (Zhou et al. 2014; Jung et al. forthcoming). Users face very low information processing costs associated with corporate social media information.

I test the conjecture that information considered more useful for investors in innovative SMEs is disseminated ('Retweeted') and appreciated (marked as 'Favorite/Like') by using the following model (standard errors are clustered at the firm level):

$$SOCIAL\_MEDIA\_CONSUMPTION_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 BIG4_{i,t} + \alpha_8 COVERAGE_{i,t} + \alpha_9 ROA_{i,t} + \alpha_{10} TWEET\_EARN_{i,t} + \alpha_{11} TWEET\_CASH_{i,t} + \text{Industry Fixed Effects}$$

+ Year Fixed Effects + Ω_{it}

(2)

where:

SOCIAL_MEDIA_CONSUMPTION = one of the following variables:

RETW_EARN$_t$ = 1 if firms' tweets about earnings are retweeted above industry-year level, and 0 otherwise (see Appendix B);

RETW_CASH$_t$ = 1 if firms' tweets about cash flows are retweeted above industry-year level, and 0 otherwise (see Appendix B);

FAV_EARN$_t$ = 1 if firms' tweets about earnings receive a number of 'Favorite/Like' above industry-year level, and 0 otherwise (see Appendix B);

FAV_CASH$_t$ = 1 if firms' tweets about cash flows receive a number of 'Favorite/Like' above industry-year level, and 0 otherwise (see Appendix B);

SIZE$_t$ = natural logarithm of total revenues in year t;

GROWTH$_t$ = change in revenues from year t-1 to year t divided by revenues in year t-1;

MTB$_t$ = Market-to-book value in year t;

INTANG$_t$ = total intangibles in year t divided by total assets in year t-1;

LEV$_t$ = total liabilities in year t divided by total assets in year t-1;

BIG4$_t$ = dummy variable equal to 1 if a firms' auditor is one of the Big N in year t, and 0 otherwise;

COVERAGE$_t$ = natural logarithm of one plus the number of analysts following the firm in year t;

ROA$_t$ = Return on Assets, measured as net income divided by total assets;

TWEETS_EARN$_t$ = number of tweets in year t containing information about earnings (see Appendix B);

TWEETS_CASH$_t$ = number of tweets in year t containing information about cash flows (see Appendix B).

All other variables are as defined above.

The variable of interest is *INNOVATIVE_R&D* and I examine α_1 to test H1. Coefficient α_1 captures users' interest in tweets about earnings and cash flows in innovative SMEs compared with non-innovative SMEs. A significant positive coefficient on *INNOVATIVE_R&D* indicates that tweets containing a certain type of information are highly appreciated by investors. I then test the

difference in the coefficients of interest (α_1) between tweets about earnings and cash flows to determine the importance to users of specific accounting numbers.

I include different control variables which have been shown in past studies to be related to attention given to firms' disclosures. I control for firms' size (*SIZE*), growth opportunities (*GROWTH,* and *MTB),* level of intangibles (*INTANG*), firm-specific risk of bankruptcy (*LEV*), audit quality and audit scrutiny (*BIG4*), external monitoring by analysts (*COVERAGE*), and operating performance (*ROA*). I also control for the supply of tweets, differentiating between tweets containing tweets about earnings (*TWEET_EARN*), and tweets about cash flows (*TWEET_CASH*)

[INSERT TABLE 4 ABOUT HERE]

Table 4 shows that users do not disseminate (*RETW_EARN*) or value more (*FAV_EARN*) information from innovative SMEs about earnings. The estimated coefficient α_1 on *INNOVATIVE_R&D* in columns (1) and (3) is not significant. Conversely, users consider as relevant information from innovative SMEs about cash flows. In terms of dissemination (*RETW_CASH*), innovative SMEs have 1.23 times the odds of retweets then their non-innovative counterparts (significant at less than 10% level, two-tailed). In terms of appreciation (*FAV_CASH*), innovative SMEs have 1.28 times the odds of 'Favorite/Like' than their non-innovative counterparts (significant at less than 5% level, two-tailed). The tests of the differences in the coefficients of interest (α_1) confirm that users focus on tweets about cash flows, and not about earnings, in innovative SMEs.

These results support H1a and H1b and demonstrate that disclosures about cash flows in innovative SMEs are used and valued more than in non-innovative SMEs. My findings on corporate social media consumption also contribute to mitigate the concerns that stock prices may not be a reliable benchmark by which to investigate value relevance (Barth et al. 2001).

I believe that, taken together, the traditional market value approach and the use of corporate social media information allow me to describe sufficiently and accurately the relevance of accounting numbers for investors and the use they make of them. In the next section, I examine

whether innovative SMEs adjust their reporting and operating decisions according to investors' preferences concerning earnings and cash flows.

4.3. Managerial decisions in innovative SMEs

I have documented that investors in innovative SMEs show a greater predilection for cash flows and less for earnings than in non-innovative SMEs' investors. In order to understand my conjecture that managers of innovative SMEs incorporate investors' preferences into their decisions, I investigate earnings management (H2a) and operating efficiency maximization (H2b) separately.

I first examine whether managers of innovative SMEs care more about earnings, i.e., whether they manage earnings more or less than managers of non-innovative SMEs (H2a). Following on previous studies, I initially focus on the magnitude of abnormal discretionary accruals by managers wanting to adjust earnings upwards or downwards depending on specific circumstances (Bergstresser and Philippon 2006; Ramanna and Roychowdhury 2010; Sohn 2016). For instance, innovative SMEs may prefer to smooth financial performance over time to mitigate concerns over the uncertainty surrounding their activities. Therefore, in this study, I initially look at unsigned measures of earnings management. Larger values indicate more earnings management.

Innovative SMEs may also need to improve artificially their current financial reporting through income-increasing earnings management to obtain funds and to avoid debt covenant violation (Acharya and Xu 2017). Accordingly, I look separately at income-increasing and income-decreasing earnings management. Finally, I look at two other potential indicators of earnings management, i.e., earnings smoothing, and small profit avoidance (Barth et al. 2008). In all models, standard errors are clustered at the firm level. I test whether innovative SMEs manage their earnings by using the following model:

$$EM\_proxy_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 BIG4_{i,t} + \alpha_6 LOSS_{i,t-1} + \alpha_7 LEV_{i,t} + \alpha_8 INTANG_{i,t} + \alpha_9 COVERAGE_{i,t} + \text{Industry Fixed Effects}$$

+ Year Fixed Effects + Ω_{it}

(3)

where:

EM_proxy = one of the following variables:

$|AEM_t|$ = absolute value of discretionary accruals computed using the Modified Jones Model (see Appendix B);

pos_AEM_t = value of positive discretionary accruals computed using the Modified Jones Model (see Appendix B);

$|neg\_AEM_t|$ = absolute value of negative discretionary accruals computed using the Modified Jones Model (see Appendix B);

$SMOOTH_t$ = smoothness of earnings, measured as the ratio of the standard deviation of earnings before extraordinary items divided by the standard deviation of cash flows from operation over rolling 3-year windows (see Appendix B);

$SMALL\_PROFIT_t$ = dummy variable, equal to 1 if EBIT divided by total assets is within [0,0.025] in year t, and 0 otherwise (see Appendix B);

$LOSS_{t-1}$ = dummy variable equal to 1 if net income is less than zero in year t-1, and 0 otherwise;

All other variables are as defined above.

The variable of interest is *INNOVATIVE_R&D* and, to test H2, I examine α_1. Coefficient α_1 captures differences between innovative and non-innovative SMEs with regard to earnings management. I expect a negative relationship between *INNOVATIVE_R&D* and two proxies of *EM* (|*AEM*| and *SMALL_PROFIT*), showing that innovative SMEs have less incentive to manage their earnings than non-innovative SMEs. Because smaller values of *SMOOTH* indicate more earnings management, I expect a positive significant relationship between *INNOVATIVE_R&D* and *SMOOTH*, showing that innovative SMEs have less incentive to smooth their earnings than non-innovative SMEs.

I include different control variables which have been shown in past studies to be related to earnings management decisions. I include firm size (*SIZE*) (Achleitner et al. 2014), *GROWTH* and *MTB* to account for systematic variation in accruals related to growth opportunities (Zang 2012),

BIG4 for audit quality and audit scrutiny (Teoh and Wong 1993; Francis and Wang 2008; Achleitner et al. 2014), *LOSS* and *LEV* for firm-specific risk of bankruptcy (Roychowdhury 2006; Dyreng et al. 2011), and *INTANG* for intangible investments (Brown and Kimbrough 2011). Finally, I include *COVERAGE* to control for the level of analysts' monitoring and scrutiny performed (Sohn 2016).

[INSERT TABLE 5 ABOUT HERE]

The results of my tests on the earnings management of innovative SMEs are reported in Panel A of Table 5. I show that innovative SMEs exhibit lower levels of |*AEM*| relative to non-innovative SMEs. The estimated coefficient α_1 on *INNOVATIVE_R&D* (column (1)) is negative and significant which indicates that innovative SMEs manage their earnings less through accruals than non-innovative SMEs (significant at less than 5% level, two-tailed). The magnitude of the differences in levels of accruals-based earnings management between innovative SMEs and non-innovative SMEs is economically significant as it represents -0.1% of lagged total assets. Furthermore, if I decompose *AEM* into positive (*pos_AEM*) and negative (|*neg_AEM*|), I find that this negative relationship is mainly driven by observations from firms with income-increasing earnings management. I argue that in a high-growth market, such as the AIM London, innovative SMEs have less incentive to show increasingly high operating performance compared with non-innovative SMEs. In column (2) I show that the coefficient estimate on *INNOVATIVE_R&D* for income-increasing accruals-based earnings management is equal to -0.010 and significant at less than 1% level, two-tailed.

Turning to earnings smoothing, I find that the estimated coefficient α_1 on *INNOVATIVE_R&D* (column (4)) is positive and significant (at less than 1%, two-tailed). My finding indicates that innovative SMEs tend to smooth their earnings less than non-innovative SMEs.

The final set of findings in Table 5 relates to reporting of small profits. The estimated coefficient α_1 on *INNOVATIVE_R&D* (column (5)) is negative and significant (at less than 5%,

two-tailed), which suggests that innovative SMEs report small profits with less frequency than non-innovative SMEs. Innovative SMEs have 0.76 times the odds of reporting small profits as their non-innovative counterparts.

Despite the wide possibilities open to innovative SMEs to manage earnings, due to the intrinsic characteristics of their operational activities, I show that, overall, innovative SMEs engage less in earnings management than non-innovative SMEs. The system of incentives leads innovative SMEs to focus less on adjusting reported earnings relative to non-innovative SMEs.

Secondly, I investigate whether innovative SMEs focus on operating efficiency by using real activities with the intent of generating larger cash flows (H2b). I test if innovative SMEs operate to increase their cash flows by using the following model (standard errors are clustered at the firm level):

$$OPERATING\_EFFICIENCY_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 BIG4_{i,t} + \alpha_6 LOSS_{i,t-1} + \alpha_7 LEV_{i,t} + \alpha_8 INTANG_{i,t} + \alpha_9 COVERAGE_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (4)$$

where:

OPERATING_EFFICIENCY = one of the following variables:

- $DISC\_EXP_t$ = cash flow management through real activities management for year *t* measured as the inverse of the abnormal level of discretionary expenditure (see Appendix B);
- $DISC\_PROD_t$ = cash flow management through real activities management for year *t* measured as the inverse of the abnormal level of production (see Appendix B);
- $DISC\_CFO_t$ = operating cash flow management for year t measured as the residuals of model (b3) (see Appendix B);

$FCFM_t$ = free cash flow management for year t measured as the difference between $DISC\_CFO_t$ and $CAPEXM_t$ (see Appendix B)*;*

All other variables are as defined above.

I use model (4) to test H2b. In model (4), the main coefficient of interest is α_1, which captures the level of management of cash flows increasing real activities for innovative SMEs compared with non-innovative SMEs. I posit a positive and significant coefficient α_1 as innovative SMEs are expected to maximize their operating efficiency by showing high levels of cash flows.

I control for several factors which prior literature shows to affect cash flows increasing real activities (Roychowdhury 2006; Zang 2012). I include firm size (*SIZE*), *GROWTH* and *MTB* to account for systematic variation in abnormal production costs, and discretionary expenditure related to growth opportunities, previously reported losses (*LOSS*), leverage (*LEV*), firm-specific audit quality (*BIG4*), level of intangible assets (*INTANG*), and analyst coverage (*COVERAGE*).

Panel B of Table 5 presents the estimation results of model (4). I show that innovative SMEs (*INNOVATIVE_R&D*) exhibit positive abnormal cash flows compared with non-innovative SMEs for all four cash flow management proxies adopted. The estimated coefficient α_1 on *INNOVATIVE_R&D* for *DISC_EXP*, *DISC_PROD*, *DISC_CFO*, and *FCFM* is positive and significant (at less than 1%, two-tailed). These results support my conjecture that innovative SMEs actively operate to increase cash flows and that managerial decisions incorporate market considerations about accounting numbers.

Overall, the findings in Table 5 indicate that innovative SMEs manage their earnings less than non-innovative SMEs due to lower incentives but they operate to increase their cash flows. Innovative SMEs favour decisions which aim to maximise cash flows rather than earnings because priorities of market participants are different.

4.4 Accounting information disclosure: What do innovative SMEs communicate and emphasize?

To corroborate my core evidence that managers care relatively more about cash flows than about earnings, I investigate their financial disclosures on Twitter. This approach is based on the argument that firms will communicate and emphasize the accounting information they consider most relevant to external parties. I test which type of accounting information innovative SMEs communicate more (number of tweets) and emphasize more (number of hashtags) by using the following model (standard errors are clustered at the firm level):

$$SOCIAL\_MEDIA\_COMMUNICATION_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 BIG4_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (5)$$

where:

SOCIAL_MEDIA_COMMUNICATION = one of the following variables:

- $TWEETS\_EARN_t$ = number of tweets in year t containing information about earnings;
- $TWEETS\_CASH_t$ = number of tweets in year t containing information about cash flow;
- $TWEETS\_EARN\_HIGH_t$ = 1 if the number of firms' tweets in year t about earnings are retweeted above industry-year level, and 0 otherwise;
- $TWEETS\_CASH\_HIGH_t$ = 1 if the number of firms' tweets in year t about cash flow are retweeted above industry-year level, and 0 otherwise;
- $HASHTAG\_EARN_t$ = number of tweet hashtags in year t containing information about earnings;
- $HASHTAG\_CASH_t$ = number of tweet hashtags in year t containing information about cash flow;

All other variables are as defined above.

The coefficient of interest is α_1 and captures differences between innovative and non-innovative SMEs with regards to communication and emphasis about accounting information on Twitter. A significant relationship between *INNOVATIVE_R&D* and *SOCIAL_MEDIA_COMMUNCATION* shows that innovative SMEs follow different communication strategies from non-innovative SMEs. I expect innovative SMEs to communicate more and with stronger emphasis on information about cash flows, but not about earnings.

[INSERT TABLE 6 ABOUT HERE]

Results reported in Table 6 indicate that innovative SMEs communicate more about cash flows in their corporate tweets than non-innovative SMEs. The estimated coefficient α_1 on *INNOVATIVE_R&D* for *TWEETS_CASH* and for *TWEETS_CASH_HIGH* is positive and significant at less than 5% (two-sided). On average, innovative SMEs tweet 33% more tweets about cash flows than non-innovative SMEs. I also find that innovative SMEs place strong emphasis in their tweets on information about cash flows. The estimated coefficient α_1 on *INNOVATIVE_R&D* for *HASHTAG_CASH* is positive and significant at less than 10% (two-sided). Innovative SMEs issue on average 53% more hashtags associated to cash flows information than non-innovative SMEs. Conversely, results reported in Columns (1), (3), and (5) show that innovative SMEs do not show a different communication strategy about earnings than non-innovative SMEs. The estimated coefficients α_1 on *INNOVATIVE_R&D* for *TWEETS_EARN*, *TWEETS_EARN_HIGH*, and *HASHTAG_EARN* are not significant. Tests on the difference in the coefficients of interest (α_1) confirm that innovative SMEs focus on cash flows, and not on earnings, in their corporate social media disclosure.

To summarize, I show that innovative SMEs communicate and place more emphasis on tweets containing information about cash flows than about earnings compared with non-innovative SMEs. My findings suggest that the relative low communication costs of corporate tweets leads firms to disclose relevant information to users.

5. Sensitivity tests

In this section, I perform a number of sensitivity tests using alternative measures for innovation and firms' size to address the potential measurement errors of each individual proxy. Both measures are fundamental in the definition of the sample and I conduct additional tests to confirm that my results are not driven by my choice of proxies. Overall, the evidence I gathered about the relevance and use of accounting information in innovative SMEs is robust as to the definition of innovation and SMEs.

5.1. Proxy to measure innovation

Firstly, I look at patents as an alternative identification of innovative SMEs (Acharya and Xu 2017; Nanda and Rhodes-Kropf 2013). Patents represent observable outputs of a process of innovation (He and Tian 2013). I gather data from Orbis database over the period 2006-2014 since data is available starting from 2006. I construct my measure of innovation as a dummy variable (*INNOVATIVE_PAT*). This measure is equal to 1 in the year in which, and the year before, at least one patent is granted, and 0 otherwise. I re-estimate models (1) - (5) with the new variable of interest *INNOVATIVE_PAT*.

Untabulated results are similar to my core findings. As with my core evidence, I find that investors in innovative SMEs focus more on cash flows, and less on earnings than investors in non-innovative SME. I also find that innovative SMEs manage their earnings less than non-innovative SMEs[23], and that they operate to increase cash flows[24].

5.2. Definition of SMEs

To assess the sensitivity of my results to the definition of SMEs, I use an alternative proxy to define small and medium firms. Following Beck et al. (2008), I define SMEs according to the

[23] The only difference with the results reported in Table 5 is that the impact of the variable of interest (*INNOVATIVE_PAT*) on earnings smoothing (*SMOOTH*) is positive, but not significant.

[24] The only difference with the results reported in Table 6 is that the impact of the variable of interest (*INNOVATIVE_PAT*) on cash flows increase due to abnormal production costs (*DISC_PROD*) is positive, but not significant.

number of employees. I re-estimate models (1) - (5) for firms with less than 250 employees. The results are consistent with my previous findings.

6. Conclusions

Interest in innovative SMEs is growing, both on the part of investors searching for new investment opportunities in the current low return environment (Beck et al. 2008; Allee and Yohn 2009; Cheng et al. 2013) and on the part of policy makers, who are interested in defining an adequate level of regulation for SMEs (e.g., IASB, ESMA, and EU Commission). Innovative SMEs show strong needs for financing to support their development, and investors and lenders are closely monitoring their financial results and operational choices (Hall 2002; Magri 2007).

This paper first hypothesizes that investors in innovative SMEs focus on operating efficiency, measured as the capacity to generate cash flows, rather than on earnings. My empirical results support this prediction. By analyzing cash flows and earnings as competing measures to explain stock returns, I show that cash flows are more highly associated with stock returns than earnings for innovative SMEs than for non-innovative SMEs. I base my deductions both on value-relevance market models and on the analysis of the interest around corporate social media communication. This is important because much literature suggests that the measures of value relevance of accounting information only detect indirectly investors' use of accounting information.

This paper also posits that managers' investment decisions incorporate investors' preferences for valuing innovative SMEs on the basis of cash flows. I provide evidence that innovative SMEs are aware of investors' focus on operating efficiency; as a result they use less earnings management and focus on improving cash flows. Using corporate social media disclosures of financial reporting, I provide additional evidence that innovative SMEs communicate more and place more emphasis on information concerning cash flows than concerning earnings than non-innovative SMEs.

My paper provides insights into the relevance of accounting in the 'New Economy'. In the current fast-evolving economy, investors are increasingly turning their attention towards small innovative companies, so-called start-ups. They are looking for opportunities to invest in innovative SMEs due to their potential for disruptive innovation and hence, attractive returns. My paper identifies which accounting information investors use in identifying the value of innovative SMEs. This study provides timely evidence on an issue which requires further review having regard to the effectiveness of regulation. In a period of growing interest in SMEs and innovation from a regulatory perspective (e.g., EU with the 'Green Paper' (European Commission 2015), ESMA, IASB), there is a demand to understand the characteristics of innovative SMEs. Despite the role that innovative SMEs play in the economy, most existing studies examine large listed firms.

Although I perform several sensitivity tests to identify innovative SMEs and obtain similar results, this study is limited by my ability to identify innovative SMEs. Because the majority of SMEs are not listed, future studies could broaden the spectrum of analysis by investigating private innovative firms. Another potential area of interest is the analysis of the long-term consequences of managerial decisions. The study of future operating and market performance would complement the results of this study.

Appendix A – Definition of variables

Variable	Definition	Source
$INNOVATIVE\_R\&D_t$	Innovation dummy; equal to 1 if a firm's Research and Development expenses scaled by total assets are above industry-year median, and 0 otherwise in year t.	EIKON
$INNOVATIVE\_PAT_t$	Innovation dummy; equal to 1 in the year, and the year before, in which at least one patent is granted, and 0 otherwise.	Orbis
RET_t	Stock returns in year t, measured as $[(P_t - P_{t-1} + Dividend_t - CapitalContribution_t)/P_{t-1}]$.	EIKON
RET_IND_t	Stock returns in year t adjusted for industry-year returns, measured as $[(P_t - P_{t-1} + Dividend_t - CapitalContribution_t)/P_{t-1}]$ – (*Industry_Year_returns*).	EIKON
P_{t-1}	Share price at the end of year t-1.	EIKON
$TACC_t$	Total accruals, measured as earnings before extraordinary items and discontinued operations minus operating cash flows for year t.	EIKON
CFO_t	Cash flows from operations in year t.	EIKON
A_{t-1}	Total assets at the end of year t-1.	EIKON
REV_t	Total revenues for year t.	EIKON
AR_t	Accounts receivable scaled for year t.	EIKON
ROA_t	Return on Assets, measured as net income divided by total assets in year t.	EIKON
$DISX_t$	Discretionary expenditure, measured as the sum of advertising and SG&A expenditures in year t.	EIKON
$PROD_t$	The sum of cost of goods sold in year t and of the change in inventory from year t-1 to year t.	EIKON
$CAPEX_t$	Capital expenditure in year t.	EIKON
MTB_t	Market-to-Book value in year t.	EIKON
$TOBIN_t$	Tobin's q value in year t, measured as total market value of the firm divided by total assets.	EIKON
$SIZE_t$	Firm's size, measured as the natural logarithm of total revenues in year t.	EIKON
$GROWTH_t$	Firm's growth, measured as the change in revenues from year t-1 to year t divided by revenues in year t-1.	EIKON
$BIG4_t$	Audit dummy; equal to 1 if a firms' auditor is one of the Big N in year t, and 0 otherwise.	EIKON
$LOSS_{t-1}$	Loss dummy; equal to 1 if net income is less than zero in year t-1, and 0 otherwise.	EIKON
LEV_t	Leverage, measured as total liabilities in year t divided by total assets in year t-1.	EIKON
$INTANG_t$	Intangibles, measured as total intangibles in year t divided by total assets in year t-1.	EIKON
$COVERAGE_t$	Analysts' coverage, natural logarithm of one plus the number of analysts following the firm in year t.	EIKON
PPE	Gross plant, property and equipment in year t.	EIKON
$\|AEM\|_t$	Absolute value of discretionary accruals computed using the Modified Jones Model.	EIKON
pos_AEM_t	Value of positive discretionary accruals computed using the Modified Jones Model.	EIKON
$\|neg\_AEM\|_t$	Absolute value of negative discretionary accruals computed using the Modified Jones Model.	EIKON
$SMOOTH_t$	Smoothness of earnings, measured as the ratios of the standard deviation of earnings before extraordinary items divided by the standard deviation of cash flows from operations over rolling 3-year windows.	EIKON
$SMALL\_PROFIT_t$	Small profit dummy, equal to 1 if EBIT divided by total assets is	EIKON

	within [0,0.025] in year t, and 0 otherwise.	
$DISC\_EXP_t$	Cash flows management through real activities management for year t, measured as the inverse of the abnormal level of discretionary expenditure.	EIKON
$DISC\_PROD_t$	Cash flows management through real activities management for year t, measured as the inverse of the abnormal level of production.	EIKON
$DISC\_CFO_t$	Operating cash flows management for year t, measured as the residual of model (b3).	EIKON
$FCFM_t$	Free cash flows management for year t, measured as the difference between $DISC\_CFO_t$ and $CAPEXM_t$.	EIKON
$RETW\_EARN_t$	Earnings retweet dummy; equal to 1 if firms' tweets about earnings are retweeted above industry-year level, and 0 otherwise.	Python script
$RETW\_CASH_t$	Cash flows retweet dummy; equal to 1 if firms' tweets about cash flows are retweeted above industry-year level, and 0 otherwise.	Python script
FAV_EARN_t	Earnings tweet favorite dummy; equal to 1 if firms' tweets about earnings receive a number of 'Favorite/Like' above industry-year level, and 0 otherwise.	Python script
FAV_CASH_t	Cash flows tweet favorite dummy; equal to 1 if firms' tweets about cash flows receive a number of 'Favorite/Like' above industry-year level, and 0 otherwise.	Python script
$TWEETS\_EARN_t$	Number of tweets in year t containing information about earnings.	Python script
$TWEETS\_CASH_t$	Number of tweets in year t containing information about cash flows.	Python script
$TWEETS\_EARN\_HIGH_t$	High number of earnings dummy; equal to 1 if the number of firms' tweets in year t about earnings are above industry-year level, and 0 otherwise.	Python script
$TWEETS\_CASH\_HIGH_t$	High number of cash flows dummy; equal to 1 if the number of firms' tweets in year t about cash flows are above industry-year level, and 0 otherwise.	Python script
$HASHTAG\_EARN_t$	Number of tweet hashtags in year t containing information about earnings.	Python script
$HASHTAG\_CASH_t$	Number of tweet hashtags in year t containing information about cash flows.	Python script

Appendix B – Measurement of variables

B.1. Consumption of corporate social media information

My measure of accounting information consumption is based on users' reaction to corporate tweets containing information either about earnings or about cash flows. I argue that users 'Retweet' and/or 'Like/Favorite' [25] corporate tweets they consider more relevant to their decisions. I have hand-collected the Twitter account names of the firms included in my sample and I have then developed an *ad hoc* Python script which has retrieved Twitter-related information over the period 2011-2015. I adapt the vocabulary defined by Lerman (2016) to classify the content of the tweets into earnings-related or cash flows-related as follows:

- Earnings: Earnings, net income, revenues, accrual, book value, carrying value, historical value, balance sheet, COGS, EBITDA, EBIT;
- Cash flows: Cash, liquidity, current ratio, cash flows, CF, funds, dividend.

I then calculate the relative proportion at industry-year level of 'Retweets' and 'Favorite/Likes' of tweets containing earnings-related or cash flow-related information.

B.2. Earnings management

I study managerial decisions associated to earnings by using three different proxies: (1) accruals-based earnings management, (2) earnings smoothing, and (3) reported small profits.

Consistently with past studies, in order to capture accruals-based manipulations, I adopt the following modified Jones model (Jones 1991; Dechow et al. 1995; Kothari et al. 2005; Cohen et al. 2008):

$$TACC_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2[(\Delta REV_{i,t} - \Delta AR_{i,t})/A_{i,t-1}] + \alpha_3(PPE_{i,t}/A_{i,t-1}) + ROA_{i,t} + \Omega_{it} \quad \text{(b1)}$$

where:

A_{t-1} = total assets at the end of year t-1;

ΔREV_t = change in revenues from year t-1 to year t;

ΔAR_t = change in accounts receivables from year t-1 to year t;

PPE_t = gross plant, property and equipment at the end of year t;

[25] Twitter changed the name from 'Favorite' to 'Like' in November, 2015 to indicate an appreciation of a certain tweet (Source: https://blog.twitter.com/official/en_us/a/2015/hearts-on-twitter.html).

All other variables are as defined above.

I estimate model (b1) cross-sectionally for industry-years with at least ten observations. The estimated residuals, capturing discretionary accruals, represent my proxy for accruals-based earnings management (*AEM*).

Secondly, I compute earnings smoothness as the ratio of the standard deviation of earnings before extraordinary items divided by the standard deviation of cash flows from operation over rolling 3-year windows (Leuz et al. 2003). Smaller values indicate that managers smooth their earnings and so, more earnings management.

Finally, I examine the frequency of small profit as evidence of earnings management (Barth et al. 2008; Burgstahler and Dichev 1997). I define small profit (*SMALL_PROFIT*) as a dummy variable, equal to 1 if EBIT divided by total assets is within [0, 0.025], and 0 otherwise.

B.3. Operating efficiency

I measure operating efficiency to improve cash flows by looking at the use of real activities. I use three proxies, i.e., (1) real activities which impact cash flows (*DISC_EXP* and *DISC_PROX*) (Roychowdhury 2006; Cohen et al. 2008), (2) operating cash flow management (*DISC_CFO*), and (3) free cash flow management (*FCFM*). Despite the overlap among the three proxies (e.g., cutting SG&A increases *DISC_EXP* and *DISC_CFO*), I believe that the use of multiple measures allows me to capture the different dimensions of cash flow management.

For estimating real activities-based management, I follow Roychowdhury (2006) and Cohen et al. (2008). I thus study the abnormal levels of production costs, and abnormal levels of discretionary expenses. Firstly, I investigate the cutting of discretionary expenditure, including advertising, and selling, general and administrative (SG&A) expenditure to increase cash flow. Importantly, unlike Roychowdhury (2006), I exclude R&D expenses as discretionary expenses because my main measure of innovation is based on the distribution of R&D expenses. Normal levels of discretionary expenses are estimated in each industry-year with at least ten observations using the following OLS regression:

$DISX_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2(REV_{i,t-1}/A_{i,t-1}) + \Omega_{i,t}$ (b2)

where:

$DISX_t$ = discretionary expenditure, measured as the sum of advertising and SG&A expenditure in year t.

All other variables are consistent with the previous explanations.

Equation (b2) estimates the normal level of discretionary expenditure. Therefore, the residuals represent the abnormal level of discretionary expenditure. They are multiplied by (-1) so that higher values correspond with cash flows increase (*DISC_EXP*).

Second, I investigate the generation of cash flows through the decrease of production to sell off inventory. Normal production costs are estimated in each industry-year with at least ten observations using the following OLS regression:

$PROD_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2(REV_{i,t}/A_{i,t-1}) + \alpha_3(\Delta REV_{i,t}/A_{i,t-1}) + \alpha_4(\Delta REV_{i,t-1}/A_{i,t-1}) + \Omega_{i,t}$ (b3)

where:

$PROD_t$ = the sum of cost of goods sold in year t and of the change in inventory from year t-1 to year t;

All other variables are consistent with the previous explanations.

Equation (b3) estimates the normal level of production costs. The residuals represent the abnormal level of production. They are multiplied by (-1) in order to indicate higher cash flow (*DISC_PROD)*. A higher level of *DISC_PROD* implies inventory underproduction on which to spread production and inventory overheads, which leads to the increase of cash flow.

I then look at abnormal levels of cash flow from operations. Normal levels of cash flow from operations are estimated in each industry-year with at least ten observations using the following OLS regression:

$CFO_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2 (REV_{i,t}/A_{i,t-1}) + \alpha_3(\Delta REV_{i,t}/A_{i,t-1}) + \Omega_{i,t}$ (b4)

All variables are as defined above.

Equation (b4) estimates the normal level of cash flow from operations. Therefore, the residuals represent the abnormal level of cash flow from operations (*DISC_CFO*).

Finally, I attempt to compute abnormal levels of current free cash flow. I aim to gather insights into firms' ability to pursue new opportunities. Consistent with Penman (2006), I define free cash flow as the difference between cash flow and capital expenditure. I compute abnormal free cash flow (*FCFM*) as the difference between abnormal cash flow (Eq. (b4)) and abnormal levels of capital expenditure. I estimate the following regression in each industry-year with at least ten observations to measure the normal level of capital expenditure:

$$CAPEX_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2 (REV_{i,t}/A_{i,t-1}) + \alpha_3(\Delta REV_{i,t}/A_{i,t-1}) + \alpha_4(PPE_{i,t-1}/A_{i,t-1}) + \Omega_{i,t} \quad \text{(b5)}$$

where:

$CAPEX_t$ = capital expenditure in year t;

All other variables are consistent with the previous explanations.

Equation (b5) estimates the normal level of capital expenditure. The residuals represent the abnormal level of capital expenditure (*CAPEXM*). I then compute $FCFM_t$ as the difference between $DISC\_CFO_t$ and $CAPEXM_t$.

B.4. Production of corporate social media information

To obtain a more complete picture of managerial decisions, I use corporate social media, i.e., corporate Twitter accounts, i.e., to measure firms' voluntary disclosure – corporate tweets. I believe that managers are inclined to disseminate and emphasize information that they consider most relevant to external parties, primarily to investors. Firms can emphasize a certain word in their tweets (limited to 140 characteristics) by typing a hashtag ('#') before the targeted word. In this way, 'hashtag words' will appear in a different color (blue) from the rest of the text (black), and they will represent key words to identify a message in the search engine. I classify the content of the tweets into earnings-related or cash flows-related as reported in Section B1 of this Appendix. I then calculate both the number and the relative proportion at industry-year level of 'Tweets' and the number of 'Hashtags' containing earnings-related or cash flows-related information.

TABLE 1: Sample definition

Table 1 provides the sample definition. Panel A presents the procedures I followed to define my final sample. Panel B describes the distribution of the sample by year.

Panel A: Sampling

This table shows the criteria used to define my final sample. The sample period is 1996-2014. I obtained data from EIKON. I excluded financial and insurance institutions using the Fama-French 12 industries classification.

Table 1 Panel A - Sampling	
Firm-year observations on the AIM London market from 1996 to 2014	10,216
Less firm-year observations with balance-sheet total more than €43 million	(3,078)
Less firm-year observations from the financial and insurance industry	(1,017)
Less firm-year observations with negative equity	(587)
Less firm-year observations with unavailable data	(3,130)
Final total number of firm-year observations	***2,404***
Observations of innovative SMEs	*903*
Observations of non-innovative SMEs	*1,501*

Panel B: Distribution of the sample by year

Year	Frequency	*Percent*	*Cumulate*
1996	14	0.58	0.58
1997	25	1.04	1.62
1998	30	1.25	2.87
1999	40	1.66	4.53
2000	39	1.62	6.16
2001	44	1.83	7.99
2002	67	2.79	10.77
2003	82	3.41	14.18
2004	101	4.20	18.39
2005	109	4.53	22.92
2006	117	4.87	27.79
2007	154	6.41	34.19
2008	187	7.78	41.97
2009	224	9.32	51.29
2010	240	9.98	61.27
2011	230	9.57	70.84
2012	234	9.73	80.57
2013	234	9.73	90.31
2014	233	9.68	100.00
Total	2,404	100.00	

TABLE 2: Descriptive Statistics

This table displays the summary statistics for the main variables used in this study. The sample selection procedures are summarized in Table 1, and the variables are defined in Appendix A. All continuous variables are winsorized at 2%.

Panel A: Descriptive statistics

Panel A provides the summary statistics for the full sample included in the main test.

Variables	N	Mean	P25	Median	P75	StDev
Dependent Variables						
RET_t	2,404	0.169	-0.314	0.016	0.447	0.673
RET_IND_t	2,404	0.168	-0.436	-0.022	0.490	0.916
$TOBIN\_CH_t$	2,404	-0.210	-0.726	0.016	0.802	3.065
MTB_CH_t	2,404	0.101	-0.655	0.036	0.836	2.608
$\|AEM\|_t$	2,404	0.090	0.028	0.059	0.106	0.105
$SMALL\_PROFIT_t$	2,404	0.060	0	0	0	0.239
$SMOOTH_t$	2,404	1.214	0.551	0.860	1.158	11.37
$DISC\_EXP_t$	2,404	-0.002	-0.217	-0.040	0.167	0.373
$DISC\_CFO_t$	2,404	-0.006	-0.151	-0.040	0.091	0.239
$DISC\_PROD_t$	2,404	0.015	-0.111	0.015	0.154	0.280
$FCFM_t$	2,404	-0.005	-0.159	-0.040	0.111	0.265
$RETW\_EARN_t$	801	0.208	0	0	0	0.406
$RETW\_CASH_t$	801	0.444	0	0	1	0.497
FAV_EARN_t	801	0.170	0	0	0	0.275
FAV_CASH_t	801	0.250	0	0	1	0.433
$TWEETS\_EARN_t$	801	0.832	0	0	0	1.842
$TWEETS\_CASH_t$	801	3.194	0	1	3	6.463
$TWEETS\_EARN\_HIGH_t$	801	0.297	0	0	1	0.457
$TWEETS\_CASH\_HIGH_t$	801	0.365	0	0	1	0.481
$HASHTAG\_EARN_t$	801	0.064	0	0	0	0.321
$HASHTAG\_CASH_t$	801	0.395	0	0	0	1.483
Independent Variables						
$INNOVATIVE\_R\&D_t$	2,404	0.376	0	0	1	0.484
CFO_t	2,404	0.004	-0.094	0.007	0.130	0.641
$TACC_t$	2,404	-0.096	-0.113	-0.043	-0.011	0.204
Control Variables						
$SIZE_t$	2,404	0.582	0.251	0.582	0.872	0.388
$GROWTH_t$	2,404	0.499	-0.118	0.084	0.354	1.985
MTB_t	2,404	3.642	0.936	1.748	3.625	5.739
$INTANG_t$	2,404	0.282	0.006	0.149	0.452	0.352
$LOSS_{t-1}$	2,404	0.577	0	1	1	0.494
LEV_t	2,404	0.368	0.188	0.329	0.524	0.225
$BIG4_t$	2,404	0.354	0	0	1	0.478
$COVERAGE_t$	2,404	0.584	0	0.693	1.099	0.579

Panel B - Comparison of variables split based on social media presence

Panel B provides the summary statistics for the sample split based on the type of firms, i.e., innovative vs non-innovative SMEs. The significance of the difference in means is based on two-sided t-tests and is indicated as follows: *** p-value<0.01; ** p-value<0.05; * p-value<0.1. See variables definitions in Appendix A.

	INNOVATIVE_R&D = 1						*INNOVATIVE_R&D* = 0						
Variables	N	Mean	P25	Median	P75	StDev	N	Mean	P25	Median	P75	StDev	Diff in means (1-0)
RET_t	903	0.170	-0.333	0.004	0.466	0.685	1,501	0.169	-0.304	0.023	0.438	0.665	0.001
RET_IND_t	903	0.215	-0.438	0.008	0.602	0.958	1,501	0.140	-0.435	-0.049	0.446	0.890	0.075*
$TOBIN\_CH_t$	903	-0.369	-1.185	-0.026	1.179	3.634	1,501	-0.114	-0.555	0.039	0.691	2.660	0.255*
MTB_CH_t	903	0.056	-1.098	0.002	1.249	3.134	1,501	0.128	-0.486	0.054	0.721	2.232	-0.072
$\|AEM\|_t$	903	0.087	0.0281	0.057	0.101	0.101	1,501	0.092	0.028	0.059	0.109	0.107	0.005
$SMALL\_PROFIT_t$	903	0.037	0	0	0	0.190	1,501	0.074	0	0	0	0.263	0.037***
$SMOOTH_t$	903	1.010	0.681	0.930	1.210	0.574	1,501	1.341	0.494	0.801	1.124	14.47	-0.331***
$DISC\_EXP_t$	903	0.127	-0.121	0.076	0.323	0.423	1,501	-0.079	-0.246	-0.092	0.064	0.315	0.206***
$DISC\_PROD_t$	903	0.075	-0.0546	0.056	0.220	0.266	1,501	-0.019	-0.143	-0.006	0.116	0.283	0.094***
$DISC\_CFO_t$	903	0.041	-0.136	-0.012	0.168	0.272	1,501	-0.035	-0.161	-0.053	0.060	0.212	0.076***
$FCFM_t$	903	0.047	-0.133	0.001	0.173	0.288	1,501	-0.037	-0.175	-0.061	0.076	0.245	0.084***
$RETW\_EARN_t$	331	0.218	0	0	0	0.414	470	0.201	0	0	0	0.401	0.017
$RETW\_CASH_t$	331	0.485	0	0	1	0.500	470	0.416	0	0	1	0.493	0.069**
FAV_EARN_t	331	0.210	0	0	0	0.407	470	0.143	0	0	0	0.350	0.067**
FAV_CASH_t	331	0.269	0	0	1	0.444	470	0.237	0	0	1	0.425	0.032
$TWEETS\_EARN_t$	331	0.949	0	0	1	2.051	470	0.752	0	0	1	1.685	0.197
$TWEETS\_CASH_t$	331	3.458	0	1	3	6.737	470	3.015	0	1	3	6.272	0.443
$TWEETS\_EARN\_HIGH_t$	331	0.325	0	0	1	0.469	470	0.278	0	0	1	0.448	0.047
$TWEETS\_CASH\_HIGH_t$	331	0.402	0	0	1	0.491	470	0.340	0	0	1	0.474	0.062
$HASHTAG\_EARN_t$	331	0.073	0	0	0	0.332	470	0.057	0	0	0	0.313	0.016*
$HASHTAG\_CASH_t$	331	0.473	0	0	0	1.673	470	0.342	0	0	0	1.339	0.062
CFO_t	903	-0.015	-0.114	-0.022	0.095	0.905	1,501	0.015	-0.078	0.030	0.153	0.407	0.030
$TACC_t$	903	-0.078	-0.081	-0.031	-0.009	0.172	1,501	-0.108	-0.134	-0.053	-0.013	0.221	-0.030
$SIZE_t$	903	0.540	0.264	0.541	0.786	0.340	1,501	0.608	0.248	0.611	0.927	0.412	-0.068***
$GROWTH_t$	903	0.562	-0.106	0.101	0.330	2.161	1,501	0.461	-0.125	0.080	0.366	1.872	0.101
MTB_t	903	4.793	1.301	2.534	5.165	6.393	1,501	2.950	0.806	1.462	2.806	5.187	1.843***
$INTANG_t$	903	0.264	0.007	0.151	0.419	0.318	1,501	0.293	0.005	0.146	0.463	0.371	-0.029*
$LOSS_{t-1}$	903	0.648	0	1	1	0.478	1,501	0.534	0	1	1	0.499	0.114***
LEV_t	903	0.340	0.164	0.296	0.485	0.219	1,501	0.384	0.206	0.354	0.547	0.227	-0.044***
$BIG4_t$	903	0.415	0	0	1	0.493	1,501	0.318	0	0	1	0.466	0.097***
$COVERAGE_t$	903	0.696	0	0.693	1.099	0.600	1,501	0.516	0	0	1.099	0.555	0.180***

TABLE 3: Value Relevance and Innovative SMEs

Table 3 reports the results of the test of the relation between value relevance of accounting numbers, i.e., earnings and cash flows, and innovative SMEs. The sample selection procedures are summarized in Table 1 Panel A, and variables are defined in the Appendix A. All continuous variables are winsorized at 2%. Models are estimated using a pooled regression specification over the period 1996-2014. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for firm-level clustering in parentheses. I estimated Eq. (1):

$$MARKET\_proxy_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 TACC_{i,t} + \alpha_3 TACC_{i,t} \times INNOVATIVE\_R\&D_{i,t} + \alpha_4 CFO_{i,t} + \alpha_5 CFO_{i,t} \times INNOVATIVE\_R\&D_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (1)$$

Variable	(1) *RET*	(2) *RET_IND*	(3) *MTB_CH*	(4) *TOBIN_CH*
INNOVATIVE_R&D	0.005	0.009	-0.069	-0.245*
	(0.025)	(0.022)	(0.095)	(0.139)
TACC	0.048*	0.048**	1.355***	1.382***
	(0.025)	(0.020)	(0.277)	(0.344)
TACC x INNOVATIVE_R&D	-0.218	-0.158	0.108	0.002
	(0.159)	(0.129)	(0.593)	(0.720)
CFO	0.074**	0.066**	0.145	0.212
	(0.033)	(0.027)	(0.130)	(0.176)
CFO x INNOVATIVE_R&D	0.259*	0.405**	2.030***	2.169***
	(0.157)	(0.157)	(0.519)	(0.605)
Constant	0.370***	0.266**	0.019	-0.166
	(0.136)	(0.122)	(0.602)	(0.690)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	2,404	2,404	2,404	2,404
Adj. R-squared	0.199	0.172	0.080	0.075

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

TABLE 4: Consumption of Accounting Information and Innovative SMEs

Table 4 reports the results of the test of the relation between consumption of accounting information on social media (Twitter) and innovative SMEs. Variables are defined in the Appendix A. All continuous variables are winsorized at 2%. Models are estimated using a pooled regression specification over the period 2011-2015. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for firm-level clustering in parentheses. I estimated Eq. (2):

$$SOCIAL\_MEDIA\_CONSUMPTION_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 BIG4_{i,t} + \alpha_8 COVERAGE_{i,t} + \alpha_9 ROA_{i,t} + \alpha_{10} TWEET\_EARN_{i,t} + \alpha_{11} TWEET\_CASH_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (2)$$

Variable	(1) *RETW_EARN*	(2) *RETW_CASH*	(3) *FAV_EARN*	(4) *FAV_CASH*
INNOVATIVE_R&D	-0.013	0.206*	0.164	0.245**
	(0.120)	(0.114)	(0.122)	(0.121)
SIZE	0.219	-0.567***	-0.331*	-0.591***
	(0.163)	(0.183)	(0.192)	(0.184)
GROWTH	-0.122	0.506	-0.407	-0.199
	(0.286)	(0.408)	(0.327)	(0.350)
MTB	-0.007	0.010**	0.005	0.002
	(0.005)	(0.005)	(0.004)	(0.004)
INTANG	0.157	-0.055	0.070	-0.155
	(0.154)	(0.170)	(0.158)	(0.166)
LEV	0.202	-0.238	0.251	0.362*
	(0.162)	(0.173)	(0.187)	(0.189)
BIG4	0.196*	-0.048	-0.050	-0.040
	(0.119)	(0.117)	(0.121)	(0.122)
COVERAGE	-0.006	-0.002	-0.007	-0.042**
	(0.017)	(0.020)	(0.019)	(0.020)
ROA	-0.005	0.118**	0.025	0.061
	(0.060)	(0.059)	(0.051)	(0.063)
TWEETS_EARN	0.413***	-0.009	0.254***	0.005
	(0.052)	(0.026)	(0.030)	(0.028)
TWEETS_CASH	0.023***	0.244***	0.067***	0.165***
	(0.008)	(0.044)	(0.010)	(0.028)
Constant	-1.556***	-1.135***	-1.595***	-0.663***
	(0.177)	(0.194)	(0.240)	(0.160)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Diff *INNOVATIVE_R&D* (2) – (1)	0.219***			
Diff *INNOVATIVE_R&D* (4) – (3)	0.081***			
Number of Observations	801	801	801	801
Pseudo R-squared	0.256	0.415	0.213	0.330

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

TABLE 5: Managerial Decisions and Innovative SMEs

Table 5 reports the results of the test of the relation between managerial decisions and innovative SMEs. The sample selection procedures are summarized in Table 1 Panel A, and variables are defined in the Appendix A. All continuous variables are winsorized at 2%. Models are estimated using a pooled regression specification over the period 1996-2014. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for firm-level clustering in parentheses.

Panel A – Earnings Management and Innovative SMEs

Panel A reports the results of the relation between three proxies of earnings management, i.e., accrual earnings management, earnings smoothing, and report of small profits, and innovative SMEs. I estimated Eq. (3):

$$EM\_proxy_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 BIG4_{i,t} + \alpha_6 LOSS_{i,t-1} + \alpha_7 LEV_{i,t} + \alpha_8 INTANG_{i,t} + \alpha_9 COVERAGE_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (3)$$

Variable	(1) |*AEM*|	(2) *Positive_AEM*	(3) |*Negative_AEM*|	(4) *SMOOTH*	(5) *SMALL_PROFIT*
INNOVATIVE_R&D	-0.009**	-0.010***	-0.004	0.135***	-0.272**
	(0.004)	(0.004)	(0.010)	(0.020)	(0.110)
SIZE	-0.025***	-0.019***	-0.022	0.133*	-0.055
	(0.007)	(0.007)	(0.021)	(0.074)	(0.149)
GROWTH	0.006***	-0.001	0.011***	-0.008	-0.037*
	(0.002)	(0.001)	(0.001)	(0.006)	(0.022)
MTB	0.002***	0.001***	0.002***	0.002*	-0.051**
	(0.001)	(0.000)	(0.001)	(0.001)	(0.025)
BIG4	0.005**	-0.001	0.018***	-0.076***	-0.116
	(0.003)	(0.004)	(0.007)	(0.012)	(0.101)
LOSS	0.018***	0.011***	0.029***	-0.219***	-0.118
	(0.003)	(0.003)	(0.006)	(0.034)	(0.102)
LEV	0.027*	-0.008	0.040	-0.154	0.290
	(0.014)	(0.008)	(0.033)	(0.094)	(0.236)
INTANG	0.009	-0.007	0.014	0.010	0.223*
	(0.009)	(0.005)	(0.016)	(0.015)	(0.120)
COVERAGE	-0.014***	-0.010***	-0.020**	-0.004	0.011
	(0.004)	(0.002)	(0.010)	(0.055)	(0.076)
Constant	0.050***	0.031***	0.016	1.064***	-1.360***
	(0.012)	(0.008)	(0.012)	(0.063)	(0.213)
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Observations	2,404	1,548	856	2,404	2,404
Adj. R-squared	0.122	0.111	0.185	0.110	0.066

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Panel B: Operating Efficiency Maximization and Innovative SMEs

Panel B reports the results of the relation between operating efficiency maximization, measured as cash flows increasing, and innovative SMEs. I estimated Eq. (4):

$$OPERATING\_EFFICIENCY_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 BIG4_{i,t} + \alpha_6 LOSS_{i,t-1} + \alpha_7 LEV_{i,t} + \alpha_8 INTANG_{i,t} + \alpha_9 COVERAGE_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (4)$$

Variable	(1) *DISC_EXP*	(2) *DISC_PROD*	(3) *DISC_CFO*	(4) *FCFM*
INNOVATIVE_R&D	0.193***	0.094***	0.052***	0.058***
	(0.032)	(0.009)	(0.016)	(0.020)
SIZE	0.090	-0.088	0.059**	0.083**
	(0.066)	(0.071)	(0.025)	(0.035)
GROWTH	0.020***	-0.011***	0.005*	0.006*
	(0.002)	(0.004)	(0.003)	(0.003)
MTB	0.009***	0.003***	0.005***	0.007***
	(0.002)	(0.001)	(0.001)	(0.001)
BIG4	0.002	-0.022***	0.035**	0.039**
	(0.033)	(0.008)	(0.015)	(0.017)
LOSS	0.072**	-0.038**	0.140***	0.143***
	(0.035)	(0.017)	(0.014)	(0.013)
LEV	-0.130***	-0.049	0.046	0.014
	(0.034)	(0.055)	(0.053)	(0.051)
INTANG	0.150***	0.097***	-0.038	-0.000
	(0.045)	(0.022)	(0.035)	(0.030)
COVERAGE	0.029*	0.009	0.007	0.015*
	(0.015)	(0.006)	(0.011)	(0.008)
Constant	-0.037	0.082**	-0.096***	-0.090***
	(0.073)	(0.035)	(0.017)	(0.021)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	2,404	2,404	2,404	2,404
Adj. R-squared	0.146	0.072	0.151	0.138

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 6: Accounting information disclosure on corporate social media

Table 6 reports the results of the test of the relation between accounting disclosure on corporate social media (Twitter) and innovative SMEs. Variables are defined in the Appendix A. All continuous variables are winsorized at 2%. Models are estimated using a pooled regression specification over the period 2011-2015. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for firm-level clustering in parentheses. I estimated Eq. (5):

$$SOCIAL\_MEDIA\_COMUNICATION_{i,t} = \alpha_0 + \alpha_1 INNOVATIVE\_R\&D_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 BIG4_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{it} \quad (5)$$

Variable	(1) *TWEETS_ EARN*	(2) *TWEETS_ CASH*	(3) *TWEETS_ EARN_HIGH*	(4) *TWEETS_ CASH_HIGH*	(5) *HASHTAG_ EARN*	(6) *HASHTAG_ CASH*
INNOVATIVE_R&D	0.214	1.054**	0.129	0.220**	0.027	0.210*
	(0.146)	(0.457)	(0.099)	(0.095)	(0.024)	(0.113)
SIZE	0.169	0.299	0.248*	0.025	0.009	0.123
	(0.169)	(0.655)	(0.144)	(0.144)	(0.019)	(0.144)
GROWTH	-0.027	2.647*	0.011	0.328	0.064	0.484
	(0.297)	(1.580)	(0.246)	(0.261)	(0.061)	(0.455)
MTB	0.001	-0.009	-0.003	-0.007*	-0.013	-0.019
	(0.005)	(0.014)	(0.004)	(0.004)	(0.024)	(0.107)
INTANG	0.130	0.626	0.055	0.044	-0.001**	-0.002
	(0.173)	(0.620)	(0.129)	(0.132)	(0.001)	(0.002)
LEV	-0.110	1.110*	-0.032	-0.057	0.008	0.142
	(0.162)	(0.615)	(0.149)	(0.142)	(0.022)	(0.134)
BIG4	0.171	-0.005	0.128	0.045	0.039	0.258*
	(0.143)	(0.435)	(0.100)	(0.097)	(0.028)	(0.144)
Constant	0.327	-0.444	-0.759***	-0.627***	-0.093***	-0.405*
	(0.443)	(1.133)	(0.144)	(0.143)	(0.028)	(0.231)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Diff *INNOVATIVE_R&D* (2) – (1)		0.840*				
Diff *INNOVATIVE_R&D* (4) – (3)		0.091**				
Diff *INNOVATIVE_R&D* (6) – (5)		0.183*				
Observations	801	801	801	801	801	801
Adj. R-squared	0.019	0.058			0.029	0.046
Pseudo R-squared			0.025	0.026		
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.10						

CHAPTER II

Investors' Attention and Social Media: Evidence from Small and Medium Entities

Abstract

I investigate the relevance and use of corporate social media, i.e., Twitter, in small and medium entities (SMEs) during the period around earnings announcements (EA). Given that investors' attention is limited, social media may increase the saliency of a firm during EA. Social media is particularly relevant to SMEs as they operate in an uncertain environment and are subject to limited media coverage. I show that firms sending more tweets containing financial information before EA exhibit higher investors' attention at EA. I then document that SMEs communicate strategically on social media. Firms tend to send fewer tweets before disclosing bad news at EA. Cross-sectional analyses indicate that Twitter activity has a large effect on investors' attention and may be used strategically by SMEs with low media coverage and with less analyst following. This paper contributes to the discussion on the use of new channels of communication by showing their relevance to SMEs and the uses to which they may be put. It has also implications with regards to the need for additional information on firms of smaller size.

Keywords: Investors' Attention; SMEs; Social Media; Earnings Announcement; AIM London.

1. Introduction

I examine the relevance and use of corporate social media in the period around earnings announcements (EA) for Small and Medium Entities (SMEs). Whereas SMEs represent 95% of total enterprises and account for around 60% of GDP in the OECD area (OECD 2016), prior literature shows that SMEs face difficulties overcoming the low interest shown in them and attracting investors' attention. Today, social media allow SMEs to provide information directly at low cost. Considering that EA are seasonal events and investors have to process competing information to make their investment decisions (Boulland and Dessaint 2017), I argue that the use of social media in the period before EA increases the visibility of SMEs. In addition, the limited presence of other sources of information on SMEs may encourage managers to exploit investors' limited attention in their communication strategy on social media. My conjecture is that SMEs disclose strategically on social media before EA depending on the type of news communicated at EA.

I firstly investigate the relationship between the use of corporate social media (i.e. Twitter) in the three-day period before EA and investors' attention at EA. From a theoretical perspective, the Merton's Investor Recognition Hypothesis (Merton 1987) argues that broader dissemination of firms' disclosure increases its recognition among investors. I consider that activity on Twitter and the content of the tweets issued by SMEs in the period immediately before EA increase SMEs' visibility in proximity of their EA. Twitter activity may increase the visibility of SMEs among existing investors who are likely to obtain information from the profile that they follow/like, but also to potential new investors by use of the Twitter search function or the automatic Twitter alert that a user can set about a certain topic or account. I focus on Twitter because companies tend to release financial information on Twitter rather than on Facebook or other social media platforms (Zhou et al. 2014; Jung et al. forthcoming). My data also shows that more companies have adopted Twitter than Facebook, despite the fact that Facebook has more users.

Secondly, I examine whether SMEs exploit investors' limited attention by communicating opportunistically on social media. Because dissemination of news by firms influences investor recognition of the firm itself and consequently the firm's value (Merton 1987), SMEs have the motivation and possibility to directly control the dissemination of news. Kothari et al. (2009b) document that managers, on average, delay the release of bad news to investors. Considering the limited presence of other sources of information, SMEs may remain silent on Twitter before disclosing bad news at EA, i.e., a significant decrease in the earnings per share (EPS) compared with the previous year, to avoid a decrease in the firm's value.

My study extends Blankespoor et al. (2013) who finds that high-tech firms tweeting a hyperlink to an EA press release increase their visibility. Firstly, my study focuses on the period before EA. Prior literature (Drake et al. 2012; Boulland and Dessaint 2017) shows that investors search for information in the period before EA and not only at EA. My study therefore explores whether the response by SMEs to investors' demand for information in the pre-EA period affects the level of attention at EA. Secondly, I investigate whether information other than hyperlinks to press releases about EA matters to investors. The objective is to determine whether investors process the content of tweets. Thirdly, I focus on SMEs to further investigate the impact of social media on firms with low visibility. Whereas Blankespoor et al. (2013) do not find evidence that high-tech firms opportunistically tweet about the press release of EA, my conjecture is that SMEs may exploit their poor information environment to disclose strategically on social media. Low media coverage and analyst following would reduce the potential penalties associated with such opportunistic behaviour. Finally, I examine changes in the context, such as the introduction of tweets within the Bloomberg Terminal database, to provide direct evidence that investors use information from social media.

Turning to the empirical design, my analyses focus on SMEs[26] listed on the Alternative Investment Market (AIM) London stock exchange over the period 2008-2015. I look at the AIM London because it is dedicated to smaller growing companies (Gerakos et al. 2013). The AIM London represents an ideal setting since it requires all listed companies to have a website of which it regulates the content, [27] enhancing the role of social media as a source of voluntary disclosure to convey information to investors. Following prior literature (Boulland and Dessaint 2017; Drake et al. 2016), I use two measures to define investors' attention in a firm at EA, such as (1) abnormal trading volumes and, (2) absolute value of cumulative abnormal returns.

I first show that Twitter activity in the period before EA is positively associated with investors' attention at EA day. The effect is even larger for firms tweeting financial information. These results confirm the conjecture that social media activity helps to attract investors' attention at EA by increasing SMEs' visibility. The findings about the impact of financial information suggest that investors process the content of the messages released.

Next, I document that SMEs exploit investors' limited attention by opportunistically releasing information on social media. Firms tend to stay silent on social media and in particular about financial information on social media in the period before the disclosure of poor earnings (i.e., bad news). Firms releasing bad news at EA have 2% less probability of tweeting and 4% less probability of tweeting financial information than firms without bad news to announce at EA. My results imply that SMEs understand the impact of social media activity on investors' attention. By sending fewer tweets before bad news, they intend to avoid unnecessary attention.

I corroborate my findings by examining firms with low external coverage, i.e., low traditional media coverage and analyst following. I document that SMEs with low external coverage benefit more

[26] In my tests, I define an SME as firms having less than 250 employees. I also re-perform my analyses by defining SMEs as firms having less than €100 total assets. Untabulated tests show that the results are not sensitive to my measure of firm size.
[27] Rule 26, AIM Rules for Companies, London Stock Exchange, January 2016.

from social media activity than SMEs with high external coverage. These findings are consistent with my conjecture that social media allows SMEs to overcome the limits of low traditional external coverage by improving firms' visibility to investors. I also show that SMEs send fewer tweets before the release of bad news when the presence of other sources of information is limited. These results suggest that SMEs exploit the limited coverage by communicating opportunistically on Twitter.

I further show that SMEs' tweets containing financial information matter to investors by examining the impact of the dissemination of tweets through Bloomberg Terminal, an online database used by professionals interested in financial information. I argue that Bloomberg Terminal discloses information targeted towards investors, potentially enhancing the positive effect of Twitter activity on investors' attention. I document that after Bloomberg Terminal integrated Twitter in its newsfeeds in 2013, tweets containing financial information have become more effective in attracting investors' attention. SMEs also appear to have stronger incentives to strategically tweet about financial information when tweets are disseminated to an audience interested in financial information. My results show that SMEs decrease the release of tweets containing financial information before the disclosure of bad news at EA after the integration of Twitter in Bloomberg Terminal. These results provide direct evidence as to the effects of social media disclosure on investors.

A potential limitation of my study is that firms may self-select to use Twitter and that such a decision may be influenced by factors which also drive investors' attention. I address this potential concern by using the determinants of the presence on Twitter in my propensity score matching analysis to compare SMEs active on Twitter to non-active ones. In additional tests, I compare the pre- and post-social media period for firms which adopt social media at a certain time in the period analysed. My results confirm the conclusion that Twitter activity before EA leads to higher investors' attention at EA. I then conduct a series of placebo tests in which I re-define the event date at 30 days before EA. I find no evidence that firms active on Twitter before EA constantly exhibit higher investor attention than

other firms. Finally, I focus on innovative companies, which may be major players on social media and whose investors may be more familiar with social media information (Blankespoor et al. 2013). The main results across innovative, non-innovative and non-high-tech SMEs are very similar to my core findings and I mitigate the concerns that my results are driven by only a certain type of firm.

This study makes several contributions. Firstly, it contributes to the literature on voluntary disclosure by looking at the relationship between corporate social media and capital market (Blankespoor et al. 2013; Jung et al. forthcoming; Lee et al. 2015). This study helps to develop the burgeoning debate on the relevance of social media (Miller and Skinner 2015) by showing that their use in the pre-EA period triggers investors' attention at EA for SMEs. An important implication of my findings is that investors are attracted by firms' activity on social media and by the content of information provided, assigning particular emphasis to financial information. By documenting the impact of social media messages on stock market activity at EA and the impact of Twitter dissemination by Bloomberg Terminal, I support the idea that social media matters to investors and it is not only a marketing channel.

Secondly, my findings add to Investor Recognition Hypothesis research. I show that social media increases the recognition of SMEs that operate in a poor information environment, e.g., low traditional media coverage or analyst following. I show that disclosure on social media increases SMEs' visibility to investors. I demonstrate the impact of social media activity before EA, and not only at EA, on investors' attention. My focus on firms of small and medium size operating in multiple industries contributes to generalize previous results on large firms in the high-tech industry (Blankespoor et al. 2013) about social media and investors' decisions.

Thirdly, I contribute to the literature on investors' limited attention by looking at SMEs' social media disclosure. Previous research provides mixed evidence on managers' strategies to manipulate investor attention (Hirshleifer and Teoh 2003; DellaVigna and Pollet 2009; Doyle and Magilke 2009).

Differently from Blankespoor et al. (2013), I observe an opportunistic use of corporate social media. I document that SMEs tend to avoid attracting attention on social media before disclosing bad news at EA by remaining silent, especially in the absence of other sources of information covering their activities.

Finally, this study improves the understanding of the impact of SMEs' voluntary disclosure on social media.[28] These results are useful to SMEs to improve their visibility on the stock market. I show that social media increases attention around SMEs, especially in the context of a poor information environment. My results also offer useful insights for investors into SMEs' social media communication strategy around EA and the role of other sources of information in mitigating the risk of opportunistic Twitter disclosure.

The rest of the paper proceeds as follows. Section 2 reviews the literature concerning voluntary disclosure and investors' attention and develops my hypotheses. Section 3 describes the data and methodology I use. Section 4 presents my empirical findings. Section 5 and Section 6 describe additional and robustness tests respectively. The final Section discusses the results of this study and proposes potential avenues for future research.

2. Background literature and hypothesis development

Investors' attention on companies is broadly discussed in finance and accounting literature. This topic is particularly relevant for SMEs which are subject to limited media attention and information asymmetry. In this section, I first discuss the challenges of influencing investors' attention, with a particular focus on the period before EA. Next, I introduce the role that social media plays in the relationship between SMEs' voluntary disclosure and investors' attention.

[28] I am wary to conclude from my findings that SMEs should be very active on Twitter before EA. The current study does not include a full cost-benefit analysis. The use of social media may encourage disgruntled customers to complain about the company. Social media may also spin negative sentiment towards the company. In addition, Lee et al. (2015) document that the benefits of corporate social media activity vary with the level of control over social media content.

2.1. The challenge of attracting investors' attention

Literature on investors' attention generally considers attention a scarce resource because investors have limited time and resource to search and process information (Hirshleifer and Teoh 2003; DellaVigna and Pollet 2009; Hirshleifer et al. 2009). Indeed, companies compete to attract investors' attention, in particular around EAs when the majority of firms announce their earnings in a short period of time (Boulland and Dessaint 2017). Hirshleifer et al. (2009) test the so-called 'distraction' hypothesis and find that investors tend to react less to EA when there are several other announcements the same day.

Voluntary information can play a significant role in triggering investors' attention by increasing investors recognition (Boulland and Dessaint 2017; Bhagwat and Burch 2016). Barber and Odean (2008) show that individual investors are more likely to buy attention-grabbing stocks, whereas professional investors are less easily influenced. To supplement the limited availability of information, Blankespoor et al. (2013) find that the dissemination of press releases related to EAs through Twitter reduces information asymmetry, and increases market liquidity. Moreover, information disclosed before EA can influence investors' attention at EA day. Boulland and Dessaint (2017) show that investors are more attentive when firms disclose in advance the date and time of EA.

SMEs operate in conditions of uncertainty (Freel 2005) and their activities are usually poorly covered by external media (Miller 2006), leading to high information asymmetry. Past research shows that SMEs benefit from producing additional information and that investors value SMEs' efforts to improve their visibility. Allee and Yohn (2009) find that small private firms benefit from voluntarily producing financial statements in terms of access to and cost of credit. Bushee and Miller (2012) document that the presence of large investor relation departments contributes to improving SMEs' visibility, resulting in more investors being attracted. However, this type of communication strategy is

often costly. SMEs do not always have the resources to hire a sufficient number of people in their investor relation department and to support new communication activities.

2.2. The emergence of social media as a game changer

Given the limited presence of concurrent sources of information, the use of social media may increase SMEs' visibility and attract investors' attention. Prior literature shows that the channel through which information reaches investors is relevant when disseminating news to investors (Blankespoor et al. 2013; Drake et al. 2016). From the supply side, the press for a long time controlled dissemination of information through its discretionary power to decide what to report (Tetlock 2007; Kothari et al. 2009a; Cahan et al. 2015). Business press and analysts tend to cover firms of larger size given the potentially larger audience interested in this set of information, limiting investors' recognition of SMEs (McNichols and O'Brien 1997; Miller 2006). More recently however, the communication is no longer monopolized by a small group of actors consisting mainly of analysts and business press. Companies can directly convey information to investors through social media without the use of intermediaries (Kaplan and Haenlein 2010).

Anecdotal evidence shows that SMEs use Twitter to disseminate information relevant to investors. For instance, Metal Tiger PLC, a medium-sized listed company, describes itself on its Twitter account as 'London AIM listed (LON:MTR) resource investor with high impact projects in Botswana, Spain & Thailand. Focused on precious & strategic metals. #MetalTiger'. Abzena, another medium-sized company listed on the AIM London, tweets '#Abzena expects revenue flows as humanised antibodies enter clinical development - @AbzenaGroup tinyurl.com/l42eo2b via @proactive_uk'[29] Despite large use of social media and the potential implications of different communication strategies, there are still few insights into the use and the effects of corporate social

[29] Information retrieved on November, 11th 2017 at 3.50 pm.

media, especially for SMEs (Blankespoor et al. 2013; Lee et al. 2015; Miller and Skinner 2015; Jung et al. forthcoming).[30]

From a regulatory perspective, the increased use of social media poses new challenges. Regulators still face difficulties in defining the appropriate regulation for social media communication that will balance investor protection and disclosure costs for SMEs. In Europe, there is no specific regulation concerning corporate social media use. Companies mostly refer to rules about voluntary disclosure. In the U.S., the Security and Exchange Commission (SEC) allows firms to use social media to disclose relevant information. The SEC justified the decision to allow companies to firstly announce their earnings on social media rather than solely on corporate websites as follows, *'An increasing number of public companies are using social media to communicate with their shareholders and the investing public. We appreciate the value and prevalence of social media channels in contemporary market communications, and the commission supports companies seeking new ways to communicate.*'[31] However, in November 2015, the SEC alerted investors to the risk of fraud due to misleading information being disclosed on social media and immediately disseminated worldwide with the sole objective of manipulating share prices.[32]

The use of social media can benefit SMEs because they can independently disseminate information. Social media may offset the low presence of external coverage at a low cost. Prior studies show that users expand their analysis to additional sources and elements under conditions of uncertainty (Newcomb 1953; Francis and Schipper 1999; Hope 2003). SMEs could increase their visibility by releasing information relevant to investors looking for opportunities during the EA season. Firms releasing information on Twitter may increase their visibility because investors would notice the tweet(s) in their newsfeed or during their search activity. In this light, Blankespoor et al. (2013)

[30] See Appendix 1 for further examples of Tweets released by firms listed on the AIM London stock exchange prior to EA.
[31] http://online.wsj.com/news/articles/SB10001424127887323611604578398862292997352.
[32] http://www.sec.gov/oiea/investor-alerts-bulletins/ia_rumors.html.

document that information dissemination at EA through Twitter is particularly significant for high-tech firms with low visibility. Finally, social media activity may also facilitate the dialogue between firms and investors, reducing investors' doubts about SMEs' business.

Nonetheless, corporate social media may not be effective in attracting investors' attention due to the potential overload of information to process. Unsophisticated investors, who are supposedly the main users of information released on corporate social media, are more sensitive to the costs of acquiring information (Bloomfield 2002). Investors may potentially follow multiple firms and may miss the tweet(s) certain firms release. In addition, if an investor does not follow the Twitter account of a specific firm or does not search for specific tweets of a company, he or she will have to single out the tweet(s) among the 500 million tweets issued daily.[33] The large flow of information available may explain the lack of impact of corporate tweets on investors' attention. In addition, companies may release information not pertinent to the forthcoming EA. Tweets containing information about firms' products may not contribute to increase investors recognition. Information disclosed through social media may be considered not credible due to the limited presence of alternative sources, especially in the high-risk environment which characterizes SMEs. Investors value information which is considered credible, in particular in situations of uncertainty (Bushee and Leuz 2005). Several recent cases of misleading information on social media may have negatively affected how investors perceive the reliability of social media (Kaplan et al. 2010 Finally, investors may prefer to communicate with SMEs through private channels to gather better insights into their real performance rather than on social media where potentially millions of other investors can obtain the same information.

Overall, the net effect of the use of social media on investors' attention to SMEs is an empirical question. Considering the conflicting arguments, I state my hypothesis in the null form:

H1a. Corporate social media activity has no effect on investors' attention.

[33] http://www.internetlivestats.com/Twitter-statistics/ Accessed on March 19, 2017.

Next, I analyse the content of tweets in order to understand whether investors read the messages. Dietrich et al. (2001) show that more explicit disclosure of accounting information leads to higher market efficiency, mitigating information processing biases that may be caused by uninformed investors. I focus on tweets containing financial information because they may be meaningful in attracting potential investors. Investors may keep track of keywords disclosed on social media, in particular regarding financial information, or set defined Twitter search alerts around certain financial keywords. In addition, during EA season, investors may search on Twitter for specific financial-related key words with the objective of detecting new market opportunities. By releasing tweets containing financial information, companies can be in the spotlight of investors' newsfeed.

Nevertheless, investors may consider that searching and/or processing the content of the tweets is excessively costly. In addition, the lack of third-party assessment of corporate social media information may also call into question the reliability of certain tweets. Therefore, I test the following hypothesis:

H1b. Corporate tweets containing financial information have no effect on investors' attention.

2.3 Strategic disclosure on social media

SMEs can exploit investors' limited attention when they define their communication strategy on Twitter before EA. The release of news affects recognition of firms, and may influence firms' values (Merton 1987). The use of social media allows SMEs to directly control the level of dissemination of news, especially in the absence of other sources of information, e.g., traditional media coverage and analyst following.

In a scenario of future bad news, SMEs may use social media strategically to manage the dissemination of news about the company. SMEs may remain silent in order to attenuate the attention on the company and reduce the risk of decreasing firms' values. SMEs may also be very active on social media and lead discussion away from their forthcoming EA. In this way, they may distract

investors and prevent backlash on social media after releasing the bad news. Finally, SMEs may pre-empt the future bad news by talking intensively about financial-related topics. Alexander and Gentry (2014) argue that social media represent a unique opportunity to talk directly with shareholders and stakeholders. For instance, during an investor relations crisis, firms may want to manage items of information released and tackle the emerging problem in a timely fashion. Moreover, the direct costs of manipulating social media content are negligible. SMEs can thus preserve useful resources for their development.

Conversely, SMEs may decide not to communicate opportunistically on social media due to the risk of being penalized by investors. Opportunistic disclosure may increase the risk of damaging the trustworthiness and reputation of SMEs, which may adversely affect their future access to finance.

Overall, SMEs have contrasting motives which may influence their choices in terms of social media disclosure strategy if news is bad. I argue that the potential to influence firms' values through information dissemination induces SMEs to adapt their disclosure on social media before bad news. I specify my hypothesis in the alternative, but not directional, form:

H2. SMEs strategically convey information through social media.

3. Research design

My main set of analyses compares SMEs active on Twitter to non-active ones before EA. In this section, I describe the sample used, presenting the reasons for focusing on firms listed on the AIM London stock exchange. Next, I discuss the research design. I first present the tests on the impact of social media use, i.e., intensity and content, on investors' attention. I then discuss the tests on the relationship between type of news and Twitter use.

3.1. Data

My sample includes SMEs listed on the AIM London stock exchange during the period 2008-2015. I chose this sample period because Twitter introduced major changes in its use, e.g., hashtags, in the year 2007, and significantly increased in popularity after the 2007 South by Southwest Interactive conference (Meyers 2011). AIM London is a stock exchange especially designed for smaller firms which presents greater flexibility and lower listing costs than the main stock exchanges, e.g., NYSE or LSE Main Market (Gerakos et al. 2013). Gerakos et al. (2013) state that: 'The goal [of AIM] is to provide investors with access to 'smaller growing companies', thereby increasing the pool of available capital.'

Companies listed in the UK have to follow the Disclosure and Transparency Rules (DTR) which require firms to disclose inside information via a Regulatory Information Service prior to, or simultaneously with, disclosure on their website (DTR 2.3). In addition, companies have to respond to press speculation or market rumours, included those on social media (DTR 2.7). AIM London presents additional specific requirements concerning web disclosure. Companies must have a corporate website, and its content is strictly regulated (Rule 26), but no specific rule applies to social media. Given the lack of stringent rules, social media represents a more flexible channel than corporate websites for managers to communicate to investors.

To test my hypotheses, I investigate corporate social media use shortly before EA. My approach follows Drake et al. (2012) who show that investors start searching for news in the days just before EA. I obtain financial information and data about auditors and analysts from EIKON, EA dates from I/B/E/S, and business press articles from RavenPack. For social media data, I partially use collected data about SMEs' presence on Twitter and I developed an *ad hoc* Python script to retrieve tweets around EA.

Table 1 describes the sampling and data collection process. Following the Fama-French 12 industries classification, I exclude firms operating in industries with FF-code 11 (i.e., financial and insurance industry) because they adopt specific disclosure rules (DuCharme et al. 2001; Burgstahler et al. 2006; Ball and Shivakumar 2008). I also delete observations with negative equity. I define SMEs as firms that have total assets lower than €100 million. Next, I exclude observations with unavailable data. The final sample is composed of 2,530 firm-year observations. All continuous variables are scaled by total assets and winsorized at a one per cent level to mitigate the influence of outliers.

[INSERT TABLE 1 ABOUT HERE]

3.2. Empirical models

3.2.1 Attracting investors' attention (H1)

To test my first hypotheses, I look at the relationship between investors' attention (*INV_ATT*) and Twitter use, i.e., (1) firms' Twitter activity (*TWEETS),* and (2) the content of the tweets *(FINANCIAL_TW).*

Past research has used multiple proxies to define investors' attention, such as extreme returns, trading volume, news and headlines, advertising expense, Google searches and participation in conference calls (Gervais et al. 2001; Barber and Odean 2008; Hou et al. 2009; Da et al. 2011; Yuan 2015). Because there is no clear definition of investors' attention, I employ two widely used measures, i.e., abnormal trading volume, and absolute value of cumulative abnormal returns (Drake et al. 2016; Barber and Odean 2008; Boulland and Dessaint 2017).

By looking at the activity on Twitter, Eq. (1) is estimated using an ordinary least squares (OLS) method (standard errors are double-clustered at industry and year level):

$$INV\_ATT_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 ADV_{i,t} + \alpha_7 ANALYSTS_{i,t} + \alpha_8 BIG4_{i,t} + \alpha_9 LIT\_RISK_{i,t} + \alpha_{10} BAD\_NEWS_{i,t} + \alpha_{11} ROA_{i,t} + \alpha_{12} UE_{i,t} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \Omega_{i,t} \quad (1)$$

where:

INV_ATT_t = investors' attention at EA, measured as one of the following variables:

TR_VOL_t = abnormal trading volume during the two days [0,1] around EA in year t (see Appendix B);

CAR_t = absolute value of cumulative abnormal returns during the two days [0,1] around EA in year t (see Appendix B);

$TWEETS_t$ = activity on Twitter, dummy variable equal to 1 if the firm releases at least one tweet during the three days [-3, -1] before EA in year t, and 0 otherwise (see Appendix B);

$SIZE_t$ = firm's size, measured as the natural logarithm of total revenues in year t;

MTB_t = Market-to-Book value in year t;

LEV_t = leverage, measured as total liabilities in year t divided by total assets in year t-1;

$INTANG_t$ = intangible assets, measured as total intangible assets in year t scaled by total assets in year t-1;

$ANALYSTS_t$ = analysts' coverage, measured as number of analyst following the firm in year t;

ADV_t = advertising expenses, measured as advertising expenses in year t scaled by total assets in year t-1;

LIT_RISK_t = litigation risk, dummy variable equal to 1 if a firm' industry is considered of high litigation risk (Ali and Kallapur 2001), and 0 otherwise;

BAD_NEWS_t = bad news, dummy variable equal to 1 if the change in Earnings per Share (EPS) from year t to year t-1 divided by lagged EPS is negative and smaller than -0.01, and 0 otherwise.

$BIG4_t$ = auditor, dummy variable equal to 1 if a firm's auditor is one of the Big-4 in year t, and 0 otherwise;

ROA_t = Return on Assets, measured as net income in year t scaled by total assets in year t-1;

UE_t = unexpected earnings, dummy variable equal to 1 if the absolute value of the change in net income from t-1 to t, scaled by net income in t-1 is above industry-year median, 0 otherwise.

Coefficient α_1 captures differences concerning investors' attention with regards to Twitter activity (*TWEETS*). A significantly positive coefficient on *TWEETS* indicates that tweeting increases investors' attention at EA. The lack of significant results would indicate that social media activity is irrelevant to investors in SMEs.

I include different control variables which have been shown in past studies to be related to investors' attention (Gervais et al. 2001; Jung et al. forthcoming; Drake et al. 2016). I control for firms' size (*SIZE*), growth opportunities (*MTB)*, firm-specific risk of bankruptcy (*LEV*), level of intangibles (*INTANG*), external monitoring by analysts (*ANALYSTS*), expenses in advertising (*ADV*), litigation risk (*LIT_RISK*), audit quality and audit scrutiny (*BIG4*), and operating performance (*ROA*). I include unexpected earnings to take into account investors' surprise (*UE*). Since year and industry could represent unobservable sources of heterogeneity across firms for my measures of investors' attention (*INV_ATT*), I include year and industry fixed effects.

I then turn my attention to the content of the tweets. Eq. (2) is estimated using an ordinary least squares (OLS) method (standard errors are double-clustered at industry and year level):

$$\begin{aligned} INV\_ATT_{i,t} = {} & \alpha_0 + \alpha_1 FINANCIAL\_TW_{i,t} + \alpha_2 NON\_FINANCIAL\_TW_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MTB_{i,t} \\ & + \alpha_5 LEV_{i,t} + \alpha_6 INTANG_{i,t} + \alpha_7 ADV_{i,t} + \alpha_8 ANALYSTS_{i,t} + \alpha_9 BIG4_{i,t} + \alpha_{10} LIT\_RISK_{i,t} \\ & + \alpha_{11} BAD\_NEWS_{i,t} + \alpha_{12} ROA_{i,t} + {}_{13} UE_{i,t} + Industry\ Fixed\ Effects \\ & + Year\ Fixed\ Effects + \Omega_{i,t} \end{aligned} \qquad (2)$$

where:

FINANCIAL_TW$_t$ = financial tweet, dummy variable equal to 1 if the firm releases at least one tweet containing financial information during the three days [-3, -1] before EA in year t, and 0 otherwise (see Appendix B);

NON_FINANCIAL_TW$_t$ = Non-Financial tweet, 1 if the firm releases at least one tweet containing non-financial information when it releases tweets containing financial information during the three days [-3, -1] before EA in year t, and 0 otherwise (See Appendix B).

All other variables are consistent with the previous definition.

The coefficient of interest is α_1 and captures the impact of tweets containing financial information (*FINANCIAL_TWEETS*). A significantly positive coefficient indicates that releasing financial information on Twitter increases investors' attention at EA. I control for the simultaneous release of tweets containing financial and non-financial tweets over the three-day period before EA.

My statistical tests are conducted on SMEs active on Twitter before EA (treatment group) and SMEs non-active on Twitter before EA (control group). Consistent with Jung et al. (forthcoming), I first run Eq. (1) and (2) for the whole sample of firm-year observations. I then re-perform my analyses on Twitter activity on the subsample of firms with a Twitter account. I motivate this decision because the analysis of the subsample of firms with a Twitter account may raise concerns in terms of control sample. Firstly, certain firms could use Twitter only as a marketing tool and not to communicate to investors. This type of firm is no more likely to use Twitter before EA than firms without a Twitter account. Secondly, firms without a Twitter account yet may open one in a very short time and with low set-up costs. They may consider using Twitter to communicate to their investors, and not only for marketing purposes. They would therefore represent a suitable control sample of firms (Jung et al. forthcoming).

3.2.2 Managers' strategies on social media (H2)

In my second hypothesis, I investigate whether SMEs exploit investors' limited attention when defining their social media communication strategy. I analyse corporate social media disclosure before the release of bad news at EA. I use the following probit model (standard errors are double-clustered at industry and year level):

$$SOC\_MEDIA\_USE_{i,t} = \alpha_0 + \alpha_1 BAD\_NEWS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 ANALYSTS_{i,t} + \alpha_7 ADV_{i,t} + \alpha_8 LIT\_RISK_{i,t} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \Omega_{i,t} \quad (3)$$

$SOC\_MEDIA\_USE_t$ = one of the following variables

$TWEETS_t$ = activity on Twitter, dummy variable equal to 1 if the firm releases at least one tweet during the three days [-3, -1] before EA in year t, and 0 otherwise (see Appendix B);

$FINANCIAL\_TW_t$ = financial tweet, dummy variable equal to 1 if the firm releases at least one tweet containing financial information during the three days [-3, -1] before EA in year t, and 0 otherwise (see Appendix B);

All other variables are consistent with the previous definition.

To understand whether SMEs behave opportunistically before releasing bad news, I focus on the variable *BAD_NEWS*, and the examined dependent variable, i.e., *SOC_MEDIA_USE*. If SMEs attempt to avoid attracting attention to poor financial results, they will decrease their communication on social media. In this scenario, I expect to observe a negative and significant relationship between bad news and activity on social media.

Managers may also try to pre-empt future bad news and engage with their investors. They would exhibit higher level of communication on social media compared with firms releasing good news, especially concerning financial news. In this case, I would observe a positive and significant association between *SOC_MEDIA_USE*, in particular the variable *FINANCIAL_TW*, and the variable *BAD_NEWS*.

SMEs may also be very active on social media, but with the intent of distracting investors from the incoming EA. In this case, I would observe a positive and significant relationship between *BAD_NEWS* and *TWEETS*, and a negative or insignificant relationship between *BAD_NEWS* and *FINANCIAL_TW*. Finally, if SMEs do not undertake any specific disclosure strategy on social media with regards to bad news, I would observe no significant relationship between bad news and social media activity.

I control for factors which could affect firms' decisions to be active on Twitter. Control variables include firms size (*SIZE*), growth opportunities (*MTB)*, firm-specific risk of bankruptcy

(*LEV*), level of intangibles (*INTANG*), external analysts' monitoring (*ANALYSTS*), expenses in advertising (*ADV*), and litigation risk (*LIT_RISK*). Since year and industry could represent unobservable sources of heterogeneity across firms for my measures of investors' attention (*INV_ATT*), I include year and industry fixed effects.

4. Results

4.1. Descriptive statistics

Panel A of Table 2 presents the descriptive statistics for the main variables of the full sample. The mean presence on Twitter (*PRESENCE_TW*) is 50.5%. The mean of firms tweeting before EA (*TWEET*) is 28.5%. The mean of firms reporting lower EPS compared with the previous year (*BAD_NEWS*) is 54.1%. The median (mean) of leverage (*LEV*) is 26.6% (30.5%) of total assets. Similarly, Gerakos et al. (2013) document that the median (mean) leverage for firms listed on the AIM London is 25.1% (31.4%) of total assets. The median (mean) of *CAR* is 7.9% (6.42%). The median (mean) of intangible assets is 23.6% (30.8%), supporting the idea that this type of asset plays a major role in SMEs listed on the AIM London. The median (mean) of profitability, measured as ROA, is -6.6% (-19.9%), with a standard deviation of 44.9%. It emerges that firms listed on the AIM London exhibit a large variability in terms of profitability.

Panel B of Table 2 shows the descriptive statistics of the sample conditional on the firms' presence on Twitter (*PRESENCE_TW*), along with t-tests for difference in means between groups. Firms with a social media account report less bad news (*BAD_NEWS*), exhibit higher investors attention (*TR_VOL,* and *CAR*), have higher leverage (*LEV*), report lower profitability (*ROA*), but have higher growth opportunities (*MTB*), and are less followed by analysts (*ANALYSTS*) compared with other firms. I do not observe significant differences between the two groups of firms in terms of

operating in industries with high litigation risks (*LIT_RISK*), type of auditors (*BIG4*), and earnings surprise (*UE*).

[INSERT TABLE 2 ABOUT HERE]

Panel C of Table 2 presents the correlation matrix of the main variables used in this study. By looking at the correlation coefficients, investors' attention measures (*TR_VOL,* and *CAR*) are positively correlated with social media activity (*TWEET*, and *FINANCIAL_TW*). By examining the determinants of investors' attention, the variables *TR_VOL* and *CAR* are positively correlated with growth opportunities (*MTB*), advertising expenses (*ADV*), and unexpected earnings (*UE*), and negatively correlated with analyst following (*ANALYSTS*), and the release of bad news (*BAD_NEWS*). The latter is also negatively correlated with the variables indicating social media activity (*TWEET* and *FINANCIAL_TW*), suggesting that SMEs are less active on Twitter before announcing poor earnings.

4.2. Attracting investors' attention

Panel A of Table 3 presents estimation results of model (1), testing the association between Twitter activity (*TWEETS*) and investors' attention (*INV_ATT*). I show that tweeting before EA leads to higher investor attention, after controlling for factors which could affect the dependent variable. The coefficient α_1 of the variable *TWEETS* is positive and significant, at less than 1% two-tailed, across the two measures of investors' attention (columns (1) – (2)). I further test this relationship only among the subsample of firms with a Twitter account (columns (3) – (4)). These tests contribute to rule out the possibility that the results are driven by an endogenous difference between firms adopting/non-adopting Twitter. The results confirm the positive association (significant, respectively, at less than 5% and 1%, two-tailed) between corporate social media activity and investors' attention.

The control variables indicate that larger firms (*SIZE*), with more growth opportunities (*MTB*), more innovative (*INTANG*), and with higher advertising expenses (*ADV*) attract more investors attention at EA. These results are consistent with the Investor Recognition Hypothesis (Merton 1987)

which argues that investors focus on 'attention-grabbing' stocks. SMEs with a large analyst following (*ANALYST*) tend to be negatively associated with investors' reaction at EA. Analysts may pre-empt the content of future news, leading to lower attention at EA.

Overall, these findings are consistent with the conjecture that SMEs' disclosure on social media increases visibility and attracts investors' attention. Investors consider SMEs' social media information despite the costs associated with processing the large amount of information disclosed on social media.

[INSERT TABLE 3 ABOUT HERE]

Panel B Table 3 presents estimation results of model (2), testing the association between the content of the tweets (*FINANCIAL_TW*) and investors' attention (*INV_ATT*). I find that firms issuing tweets containing financial information before EA exhibit a higher level of investors' attention at EA than firms that do not. The estimated coefficients α_1 of the variable *FINANCIAL_TW* reported in columns (1) – (2) are positive and significant at less than 1%, two-tailed. Columns (3) – (4) report the results for the subsample of firms with a social media account. The coefficients α_1 are still positive and significant at less than 1%, two-tailed. Overall, the results are similar to the findings reported in columns (1) – (2) relative to the full sample.

These analyses support the conjecture that tweets containing financial information attract investors' attention at EA. The activity of SMEs on social media is effective in increasing their visibility and the saliency of their stock. In addition, I test whether the simultaneous release of tweets containing non-financial information drive my results. The tests of differences in the coefficients between *FINANCIAL_TW* and *NON_FINANCIAL_TW* indicate that the coefficients are significantly different. Finally, I use a Chow test to compare the effect of *TWEETS* and *FINANCIAL_TW* on investors' attention. Untabulated results show that the use of tweets containing financial information leads to higher investors' attention at EA compared with general Twitter activity.

In summary, my study of the relation between corporate social media use and my two measures of investors' attention documents that social media information attracts investors' attention. I find that activity on Twitter and the financial content of tweets before EA positively contribute to increase SMEs' visibility and increase investors' attention at EA.

4.3 Managers' strategies on social media (H2)

Table 4 reports the results of regressing social media disclosure (i.e., *SOC_MEDIA_USE*) on the type of news (i.e., *BAD_NEWS*) and control variables using model (3). The results reported in column (1) document that SMEs are less likely to tweet before an EA when they are about to disclose bad news at EA. The estimated coefficient α_1 is -0.053, and significant at less than 1% level, two-tailed. The probability of tweeting (*TWEETS*) for SMEs about to disclose bad news at EA (*BAD_NEWS*) is 2% lower than for SMEs without bad news to announce at EA.

Column (2) shows that firms tend to avoid releasing tweets containing financial information when they are about to disclose bad news at EA. The coefficient α_1 of the variable *FINANCIAL_TW* is negative (α_1 = -0.069) and significant at less than 1% level, two-tailed. The probability of releasing tweets containing financial information (*FINANCIAL_TW*) for SMEs about to disclose bad news at EA (*BAD_NEWS*) is 4% lower than for SMEs without bad news to announce at EA.

These findings support the conjecture that SMEs exploit investors' limited attention by opportunistically disclosing information on social media. They avoid attracting investors' attention when they are about to release bad news by decreasing their activity on Twitter, especially about financial topics.

[INSERT TABLE 4 ABOUT HERE]

5. Additional tests on information environment

5.1. Information environment

I examine whether social media communication is more effective for SMEs with low external coverage. I analyze firms with low media coverage and with low analyst following. I expect that the impact of the Twitter activity on investors' attention is stronger for firms with limited coverage than other sources of information. Because of the limited presence of other sources of information and the low risk of being discovered and penalized, I expect that SMEs are more likely to opportunistically use Twitter when there is a shortage of information about their activities.

Firstly, I analyze media coverage by counting the number of business press articles mentioning the company in the three days before EA. I assume that a higher number of references to a firm in business press articles in the three-day window before EA reflects a richer information environment. I obtain data from RavenPack Full Edition, a database which includes information from Dow Jones Financial Wires, Wall Street Journal, Barron's, MarketWatch, business publishers, national and local news, and blog sites. I split my sample between firms covered and not covered by media press and I then re-perform my analyses (Eq. (1) – (3)).

[INSERT TABLE 5 ABOUT HERE]

Panel A of Table 5 reports the results of regressing social media activity (i.e., *SOC_MEDIA_USE*) on investors' attention, conditional to media coverage. Columns (1) and (3) show that SMEs not covered by traditional media benefit from social media activity in terms of investors' attention. The coefficient α_1 of the variable *TWEETS* is positive and significant at less than 1% level, two-tailed. Column (2) shows that the estimated coefficient α_1 for firms with high media coverage is negative (α_1 = -0.044), and insignificant. The test of differences between coefficients show that SMEs with low media coverage exhibit significantly higher (at less than 5% level, two-tailed) investors' attention when they tweet before EA relative to SMEs with high media coverage.

Similarly, SMEs with low media coverage benefit from releasing tweets containing financial information in terms of investors' attention. The coefficient of the variable *FINANCIAL_TW* is positive and significant (at less than 1% level, two-tailed) when media coverage (*MEDIA*) is low (columns (5) and (7)). The tests of the differences across columns (5) - (6) and (7) - (8) indicate that the coefficients between SMEs with low and media coverage are significant different (at less than 10% level, two-tailed) for the dependent variable *TR_VOL*.

Secondly, I examine whether there are cross-sectional differences based on analyst following. I split the sample using the variable *COVERAGE*, which is equal to one if the number of analyst following is above the industry-year median level, and zero otherwise. I report the results in Panel B of Table 5. The variables *TWEETS* and *FINANCIAL_TW* are always significantly positive associated with investors' attention proxies (*TR_VOL* and *CAR*) for firms with low analyst following (columns (1), (3), (5), and (7)). The tests of the differences in the coefficients across groups of SMEs with low and high analyst following indicate that the coefficients are significantly different, with the exception of columns (7) – (8). Overall, the findings in Table 5 show that social media activity offsets low external coverage, i.e., low media coverage and analyst following, by increasing SMEs' visibility around EA.

Finally, Panel C of Table 5 reports the results about communication strategy on Twitter, conditional to external coverage, i.e., traditional media coverage and analyst following. The variable *BAD_NEWS* is significant and negative for the variables *TWEETS* and *FINANCIAL_TW* for SMEs with low external coverage (columns (1), (3), (5), and (7)). Conversely, firms with high external coverage appear to be less likely to manage their communication strategy before bad news. The coefficient *BAD_NEWS* is significantly different between firms with low and high external coverage. This evidence supports my conjecture that SMEs exploit the limited presence of other sources of information to strategically disclose on Twitter.

5.2. Bloomberg Terminal on Twitter

To further test the hypotheses that SMEs increase their visibility among investors through social media and have incentives to strategically disclose information, I look at the impact of Bloomberg's decision to include tweets in its database. Bloomberg is an online database which provides current and historical financial quotes, business newswires, and descriptive information, research and statistics on over 52,000 companies worldwide.[34] Bloomberg Terminal, used by over 325,000 subscribers, also reports 'Up-to-the-minute access to the news that matters'.[35] Since 2013, it shows real-time tweets as part of its news feeds. Bloomberg Terminal classifies tweets by company, asset class, person and topic to support investors to keep track of updates by a specific portfolio of companies. It also allows users to create alerts about specific companies' tweets and topics.

I argue that the dissemination of companies' tweets through Bloomberg Terminal contributes to increase firms' visibility among investors. Tweets on Bloomberg Terminal are targeted to a specific audience which is interested in news on companies, especially financial information. I expect a positive effect on investors' attention from the dissemination of news through integration of tweets in Bloomberg Terminal. Furthermore, firms may have stronger incentives to strategically disclose on Twitter before bad news at EA due to larger effects on the investor community. I posit that SMEs have reduced their communication on Twitter prior to the disclosure of bad news since Bloomberg Terminal started disseminating tweets.

[INSERT TABLE 6 ABOUT HERE]

Table 6 provides the results pre- and post- tweets dissemination on Bloomberg Terminal. The results in columns (1) – (4) show that the variable *TWEETS* is positive and statistically significant (at less than 1%, two-tailed), but the coefficients are not significantly different in the pre- and post- tweets dissemination through Bloomberg Terminal (*BLOOM*). The results in columns (5) and (6) show that

[34] https://www.bloomberg.com/professional/. Accessed on November 28, 2017.
[35] https://www.bloomberg.com/professional/solution/bloomberg-terminal/. Accessed on November 28, 2017.

the variable *FINANCIAL_TW* is positive and significant (at less than 1%, two-tailed). In the period before the dissemination of tweets through Bloomberg Terminal, the coefficient α_1 is equal to 0.263 (significant at less than 5%, two-tailed), whereas in the post- period α_1 is equal to 0.363 (significant at less than 1%, two-tailed). The test of difference of the coefficients is significant (at less than 5%, two-tailed). These results suggest that the dissemination of tweets containing financial information by Bloomberg Terminal enhances Twitter's positive effect on firms' visibility.

With respect to disclosure on social media before bad news at EA, columns (1) – (2) show the results for the variable *TWEETS*, while columns (3) – (4) show results for the variable *FINANCIAL_TW*. The coefficient is negative and significant (at less than 10%, two-tailed) for the variable *TWEETS* in the period following the start of dissemination of tweets on Bloomberg Terminal. The test of differences between the coefficients is significant (at less than 5%, two-tailed), suggesting that firms release more strategically after the start of dissemination of their tweets on Bloomberg Terminal. Similarly, columns (3) and (4) show that the strategic dissemination of tweets containing financial information is significantly higher (at less than 1%, two-tailed) after Bloomberg included Twitter in its newsfeeds. SMEs tend to disclose less on Twitter before bad news at EA since tweets started being disseminated through Bloomberg Terminal to investors.

Overall, these results provide supportive evidence that a larger and targeted dissemination of financial tweets contributes to increase SMEs' visibility. In addition, SMEs adjust their disclosure by being more opportunistic on Twitter after Bloomberg Terminal started disseminating tweets.

5.3. Innovation, investors' attention, and social media use

I next consider whether the level of innovation affects the relation between Twitter activity and investors' attention. Blankespoor et al. (2013) show that high-tech firms tweeting a hyperlink to the EA reduces their information asymmetry. My study includes both innovative and non-innovative firms. Because innovative firms are usually early adopters of technology (Blankespoor et al. 2013), investors

in innovative firms may be more familiar with new technologies and more sensitive to information released on social media.

To test whether my results are driven by a particular type of firm, I re-perform my analyses according to the level of innovation. Specifically, I split my sample on firms with high (low) research and development expenses and with a high (low) level of intangibles assets to define innovative (non-innovative) SMEs. I also re-perform my analyses by excluding high-tech firms from my sample. Untabulated results are similar to my core findings. These findings support the conjecture that Twitter is effective in increasing SMEs' visibility, irrespective of the level of firms' innovation. In addition, SMEs with different levels of innovation have similar opportunistic disclosure strategies on Twitter before releasing bad news at EA. I therefore address the concerns of Blakespoor et al. (2013) that Twitter is effective only for firms operating in innovative and high technology industries.

6. Robustness tests

6.1. Firms' characteristics and investors' attention: an endogenous relationship?

The relationship between investors' attention and companies' activity on social media may be endogenous to firms' decisions to use and be active on social media. Certain firms' characteristics may lead SMEs to have the same level of investor attention, irrespective of their Twitter use. To address this potential endogeneity concern and corroborate my findings on the positive association between corporate social media use and investors' attention, I run three additional analyses.

First, I use a Propensity Matching Score procedure (PSM) based on a two-stage model. In the first stage, I calculate propensity score based on the predictive probability of being active on Twitter before EA. For each SMEs active on Twitter, I find a matched control company (no replacement) choosing among SMEs non-active on Twitter and that have closest propensity score 0.001 level. I match companies on firms' characteristics associated with media activity. Smaller size companies

(*SIZE*) could decide to be more active on social media than large firms to compensate their limited alternative media coverage. However, social media may be more widespread among bigger companies given the larger availability of resources for communication departments. The market-to-book ratio (*MTB*) is representative of firm's growth. High-growth firms may want to increase their visibility by using social media to attract new investors and support their growth. Firms with higher leverage (*LEV*) may want to engage on social media in order to mitigate creditors' and stakeholders' concerns about their activities. High presence of intangible assets (*INTANG*) may indicate firms with more complex and uncertain activities. This type of firm would engage on social media to explain their business, and reduce the agency costs associated with information asymmetry. I then turn my attention to the information environment. Firms may compensate lower analyst following (*ANALYSTS*) with more intense use of social media. Firms operating in high litigation risk industries (*LIT_RISK*) may be more prudent in using social media to reduce their risk of potential lawsuits or class actions that may result from their social media communication. I include level of advertising expenses to account for firms using Twitter for marketing purposes, e.g., retail firms. Finally, I include *BAD_NEWS* to account for the idea that companies adapt their social media communication to the content of EA.

In the second stage, I test the impact of social media activity on investors' attention by using the matched sample from the first stage. The results are reported in Panel A of Table 7 and are very similar to my core results. I thus mitigate concerns that the findings reflect firms' characteristics associated with the decision to use social media rather than the influence of SMEs' social media activity on investors' attention.

Secondly, I focus on the set of firms that adopt social media at a certain time in the period analyzed. In this way, I provide evidence at firm level of the incremental effect of social media on firms by comparing the period prior to adoption of social media with the period afterwards. I re-examine the association between the activity on Twitter before EA and investors' attention at EA.

The results are reported in Panel B of Table 7 and they are very similar to the findings previously reported in Tables 4. I find that activity on Twitter and tweets containing financial information before EA are positively associated with investors' attention at EA. These results are robust to the different measures of investors' attention.

Third, I conduct a placebo test in which I re-define the event date. I re-estimate Eq. (1) and (2) by computing investors' attention 30 days prior the EA for both the treatment firms, i.e., firms active on Twitter before EA, and the control firms, i.e., other firms. This analysis attempts to mitigate the concern that the treatment firms constantly have higher investors' attention compared with control firms due to firm characteristics.

Panel C of Table 7 shows no significant difference with regards to investors' attention between treatment and control firms in the new event date. My findings indicate that the activity on social media before EA leads firms to increase their investors' attention at EA.

[INSERT TABLE 7 ABOUT HERE]

6.2. Definition of SMEs

To assess the sensitivity of my analysis to the definition of SMEs, I also use an alternative proxy to define small and medium firms. I re-perform Eq. (1) – (3) for firms with less than 250 employees. Untabulated results are very similar to my main findings.

7. Conclusion

This study documents the relevance and use of corporate social media by SMEs around EA. SMEs are usually distinguished by high uncertainty low external media and analyst coverage. Social media allow SMEs to communicate directly to investors at a low cost, without intermediaries, and in real time. However, the use of Twitter may simply lead to information overload. SMEs' tweets may have little visibility due to the millions of tweets daily released.

I investigate SMEs listed on the AIM London during the period 2008-2015. I document the positive impact of Twitter use before EA on investors' attention towards SMEs. I find that the activity on Twitter and the financial content of the tweets before EA are positively associated with various measures of investors' attention at EA. I then show that managers exploit investors' limited attention by adopting opportunistic disclosure strategies on social media. SMEs appear to understand the benefits of being active on Twitter with regards to investors' recognition. They tend to remain silent on Twitter, especially about financial information, when they are about to disclose bad news, i.e., poor financial results, at EA.

I then document that SMEs with low external coverage, i.e., low traditional media coverage and analyst following, particularly benefit from Twitter use in terms of investor attention. They are also more likely to disclose opportunistically on Twitter before bad news compared with SMEs with a higher external coverage. Finally, the dissemination of tweets on Bloomberg Terminal increases both firms' visibility and the incentives to SMEs to communicate strategically.

This paper is informative about the role of social media in broadcasting information to investors. Despite the large spread of these media and the advanced level of research in other fields (e.g., computer science and marketing), accounting research still lags behind (Miller and Skinner 2015). My results provide insights into SMEs. They suggest that use of corporate social media in the period before EA contributes to increase SMEs' visibility, in particular in the presence of limited external coverage. They also indicate that investors are sensitive to both the quantity and the content of messages released on social media. Finally, my results are informative to investors in understanding SMEs' communication strategies on social media. I show that SMEs act strategically when they are about to disclose bad news by remaining silent, especially about financial information.

Future research could extend these results by looking at the adoption of other social media platforms, e.g., YouTube and Instagram. The use of videos and pictures could provide further insight

into firms' potential to attract investors' attention. Future studies could also focus on the use of corporate social media around other corporate events, such as mergers and acquisitions, restatements or regulatory investigations. Social media may bring additional value to mergers and acquisitions that may not necessarily be reflected in the fundamentals.

Appendix A – Examples of Twitter messages disclosing material information


Brady Plc
@Bradyplc
Segui
Hwange earnings up, sees strong domestic #coal demand http://reut.rs/flu7Jq
Visualizza traduzione
04:45 - 31 mar 2011


Akers Biosciences
@AkersBio
Segui
We're holding a conference call at 10:30am ET Mon 23 March to discuss 2014 earnings. See bit.ly/1ExHAKu for dial-in info. $AKER $AKR
Traduci dalla lingua originale: inglese
07:22 - 19 mar 2015
1 Retweet 1 Mi piace
1
1

Appendix B – Measurement of variables

B.1. Measures of investors' attention

Abnormal trading volume is defined as the difference between the average log number of shares traded from [0,1] day following the EA and the log of the trading volume over the preceding [40, 15] days (Boulland and Dessaint 2017).

$$TR\_VOL_{k,d} = [\sum_{(0,1)}\log(VOL_{k,d+1})]/2 - [\sum_{(40,15)}\log(VOL_{k,d-1})]/26 \quad \text{(b1)}$$

where:

TR_VOL_t = abnormal trading volume during the two days [0,1] around EA in year t;

$VOL_{k,d}$ = number of shares traded on day d for company k;

My second measure of investors' attention, absolute values of abnormal returns, is based on stock price reaction at EA. I compute abnormal returns as the difference between the absolute market-adjusted return during the two days [0,1] around EA date and the mean absolute market-adjusted return in the estimation period, divided by the standard deviation of the mean absolute market-adjusted return in the estimation period (Cready and Hurtt 2002; Bushee et al. 2011; Jung et al. forthcoming). My estimation period is based on 35 calendar days. It begins 60 days before EA date and it ends 16 days prior to that date. Higher absolute values of abnormal returns reflect high investors' attention.

B.2. Measures of corporate social media use

Consistent with Blankespoor et al. (2013), I focus on Twitter to analyze corporate social media activity and the content of the messages. Twitter is considered the channel most used by investor relation departments to release financial information. I consider that a firm is active on social media if it releases at least one tweet in the period just before EA. I then look at the content of the tweets, focusing on financial information. The latter has been defined adapting the vocabulary defined by Lerman (2016). A Tweet is classified as related to financial information if it contains at least one of the words reported Table B1.

TABLE B1: Accounting word list

Term	Word
Accounting	Accountant Accounting CPA
Accrue	Accrual Accrue
AFS	AFS Available for sale
Analysts	Analyst estimate Earnings estimate
Asset	Asset
Audit	Audit Auditor
Bad debt	Bad debt Doubtful account Loan loss Uncollectible
Book value	Book value Carrying value Historical cost
BS	Balance sheet Position statement
Buyback	Buyback Repurchase
cash	Cash
Cash flow	Cash flow Cash flow statement
CI	Comprehensive income OCI
COGS	COGS Cost of goods Costs of sales
Contingent	Contingent gain Contingent liability Contingent loss
Control	Board Corporate governance Error Fraud Internal control Weakness
Covenant	Covenant
Current	Current ratio Quick ratio Working capital

Current report	Conference call Current report EA Earnings release
Defer	Defer, deferred Deferral
Depreciate	Amortization Amortize Depreciate Depreciation
Discontinue	Discontinue operations
Dividend	Dividend
Earnings	Earnings
EBIT	EBIT EBITDA
EPS	Earnings per share EPS Income per share, profit per share
Equity	Owners/shareholders/stockholders equity Paid in capital
Expense	Expense Expensed
Fair value	Fair market value, fmv Fair value Market-to-market Market
Financial instrument	Derivative Financial instruments
GAAP	Accounting IAS IFRS GAAP
Going concern	Going concern
Goodwill	Goodwill
Guidance	Earnings per share guidance Forward guidance Manager guidance Negative guidance Period guidance Positive guidance Revenue guidance
HTM	Held to maturity HTM
Impair	Charge off Impair Impairment Write down

	Write off
Income	Income from continuing Gross income Net income Operating income
Intangible	Intangible
Inventory	Inventory
IS	Income statement Operations statement PL statement
Lease	Lease Leaseback Leasehold
Leverage	Capital ratio Debt assets Debt equity Deleverage Leverage
Liability	Liability
MT	MTB Market book Times book
Marketable securities	Marketable securities
MDA	Management discussion MD&A
Minority interest	Minority interest Non controlling interest
OBS	OBS SPE Special purpose Variable interest
PE	Earnings multiple PE Price earnings
Payable	Accounts payable Notes payable Taxes payable
Pension	Pension expense Pension liability Pension obligation
Periodic report	Annual report Financial report Financial results Financial statement Footnotes Periodic report Quarterly report

PPE	Fixed assets Long lived assets PPE Property
Pro forma	Non gaap Pro forma
Profit	Gross profit Net profit Operating profit Profit margin
RD	R&D Research and development
Receivable	Receivable
Restate	Restate Restatement
Return on	Return on assets Return on equity ROA ROE
Revenue	Revenue Sales Top line
Securitize	Securitize
SGA	Selling general SG&A
Stock option	Backdating ESO Stock option
Unusual	Extraordinary gains Non recurring One time gain/loss/charge/item Special charge/item

Appendix C – Definition of variables

Variable	Definition	Source
Investors' attention variables		
VOL_d	Share trading, measured as number of shares traded on day d for company k.	EIKON
TR_VOL_t	Abnormal trading volume during the two days [0,1] around EA in year t (see Appendix B).	EIKON
CAR_t	Absolute value of cumulative abnormal returns during the two days [0,1] around EA in year t (see Appendix B).	EIKON
Social media variables		
$PRESENCE\_TW_t$	Twitter presence, dummy variable equal to 1 if the firm has a Twitter account at least two weeks before EA in year t, and 0 otherwise.	Hand-collected
$TWEETS_t$	Activity on Twitter, 1 if the firm releases at least one tweet during the three days [-3, -1] before EA in year t, and 0 otherwise (see Appendix B).	Python script
$FINANCIAL\_TW_t$	Financial tweet, 1 if the firm releases at least one tweet containing financial information during the three days [-3, -1] before EA in year t, and 0 otherwise (See Appendix B).	Python script
$NON\_FINANCIAL\_TW_t$	Non-Financial tweet, 1 if the firm releases at least one tweet containing non-financial information when it releases tweets containing financial information during the three days [-3, -1] before EA in year t, and 0 otherwise (See Appendix B).	Python script
Firm characteristics variables		
$SIZE_t$	Firm's size, measured as the natural logarithm of total revenues in year t.	EIKON
$ASSETS_t$	Total assets in year t (in thousand €).	EIKON
MTB_t	Market-to-book value in year t.	EIKON
ROA_t	Return on Assets, measured as net income in year t divided by total assets in year t-1.	
LEV_t	Leverage, measured by total liabilities in year t divided by total assets in year t-1.	EIKON
$R\&D_t$	Research and development expense, dummy variable equal to 1 if a firm's R&D expenses in year t scaled by total assets in year t-1 are above industry-year median, and 0 otherwise	EIKON
$INTANG_t$	Intangible assets, measured as total intangible assets in year t scaled by total assets in year t-1.	EIKON

ADV_t	Advertising expenses, measured as total advertising expenses in year t scaled by total assets, and 0 otherwise.	EIKON
LIT_RISK_t	Llitigation risk, dummy variable equal to 1 if a firm' industry is considered of high litigation risk (Ali and Kallapur 2001), and 0 otherwise.	EIKON
$ANALYSTS_t$	Analysts' coverage, measured as number of analyst following the firm in year t.	EIKON
$COVERAGE_t$	Analysts' coverage intensity, dummy variable equal to 1 if the number of analyst following the firm in year t is above industry-year median, and 0 otherwise in year t.	EIKON
$BIG4_t$	Audit, dummy variable equal to 1 if a firm's auditor is one of the Big-4 in year t, and 0 otherwise.	EIKON
$MEDIA_t$	Media press coverage, dummy variable equal to 1 if at least one business press article mentions a firm during the three days [-3, -1] before EA in year t, and 0 otherwise.	RavenPack
$BLOOM_t$	Bloomberg Terminal coverage, dummy variable equal to 1 if Bloomberg Terminal disseminate tweets in year t, and 0 otherwise.	
BAD_NEWS_t	Bad news, dummy variable equal to 1 if the change in Earnings Per Share (EPS) from year t to year t-1 divided by EPS in year t-1 is negative and smaller than -0.01, and 0 otherwise.	EIKON
UE_t	Unexpected earnings, dummy variable equal to 1 if the absolute value of the change in net income from year t-1 to year t, scaled by net income in year t-1 is above industry-year median, 0 otherwise.	EIKON

TABLE 1: Sample definition

Table 1 provides the sample definition. It shows the criteria used to define the final sample. The sample period is 2008-2015. I obtained data from EIKON, I/B/E/S, and RavenPack. I excluded financial institutions using the Fama-French 12 industries classification.

Firm-year observations on the AIM London market from 2008 to 2015	8,794
Less firm-year observations from the financial and insurance industry	(1,411)
Less firm-year observations with negative equity	(994)
Less firm-year observations with total assets higher than €100 million	(1,714)
Less firm-year observations with unavailable data	(1,845)
Final total number of firm-year observations	***2,530***

TABLE 2: Descriptive Statistics

This table displays the summary statistics for the main variables used in this study. The sample selection procedures are summarized in Table 1, and the variables are defined in Appendix C. All continuous variables are winsorized at 1%.

Panel A: Full sample

Panel A provides the summary statistics for the full sample included in the main test.

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
VARIABLES	N	Mean	P25	Median	P75	StDev
TR_VOL	2,530	0.709	0.305	0.900	0.912	0.600
CAR	2,530	0.064	0.022	0.079	0.080	0.052
TWEETS	2,530	0.367	0	0	1	0.469
FINANCIAL_TW	2,530	0.285	0	0	1	0.451
NON_FINANCIAL_TW	2,530	0.051	0	0	0	0.228
PRESENCE_TW	2,530	0.505	0	1	1	0.500
SIZE	2,530	6.971	5.043	8.533	9.784	3.839
MTB	2,530	0.319	0.049	0.133	0.384	0.431
LEV	2,530	0.305	0.122	0.266	0.450	0.222
INTANG	2,530	0.308	0.023	0.236	0.542	0.293
ANALYSTS	2,530	0.744	0	0	1	0.982
ADV	2,530	0.033	0.003	0.020	0.047	0.042
BAD_NEWS	2,530	0.541	0	1	1	0.498
LIT_RIS	2,530	0.157	0	0	0	0.364
BIG4	2,530	0.170	0	0	0	0.376
ROA	2,530	-0.199	-0.272	-0.066	0.037	0.449
UE	2,530	1.446	0.256	0.646	1.491	2.075

Panel B - Comparison of variables split based on social media presence

Panel B provides the summary statistics for the sample split based on social media presence. The significance of the difference in means is based on two-sided t-tests and is indicated as follows: *** p-value<0.01; ** p-value<0.05; * p-value<0.1. See variable definitions in Appendix C.

	PRESENCE_TW=1						*PRESENCE_TW=0*						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Variables	N	Mean	P25	Median	P75	StDev	N	Mean	P25	Median	P75	StDev	Diff in means (1-0)
TR_VOL	1,287	0.789	0.713	0.900	0.916	0.470	1,243	0.625	0.062	0.599	1.083	0.701	0.164***
CAR	1,287	0.070	0.045	0.080	0.086	0.045	1,243	0.057	0.013	0.043	0.080	0.058	0.013***
SIZE	1,287	6.894	4.920	8.383	9.698	3.815	1,243	7.052	5.165	8.603	9.887	3.864	-0.158
MTB	1,287	0.366	0.0612	0.168	0.456	0.461	1,243	0.269	0.041	0.104	0.319	0.391	0.097***
LEV	1,287	0.325	0.128	0.287	0.484	0.234	1,243	0.284	0.112	0.251	0.413	0.206	0.041***
INTANG	1,287	0.313	0.018	0.244	0.555	0.303	1,243	0.303	0.029	0.230	0.530	0.281	0.010
ANALYSTS	1,287	0.529	0	0	1	0.864	1,243	0.966	0	1	1	1.045	-0.437***
ADV	1,287	0.036	0.002	0.020	0.052	0.047	1,243	0.030	0.004	0.019	0.044	0.035	0.006***
BAD_NEWS	1,287	0.493	0	0	1	0.500	1,243	0.590	0	1	1	0.492	-0.127***
LIT_RIS	1,287	0.158	0	0	0	0.365	1,243	0.156	0	0	0	0.363	0.002
BIG4	1,287	0.164	0	0	0	0.370	1,243	0.176	0	0	0	0.381	-0.012
ROA	1,287	-0.224	-0.296	-0.082	0.033	0.493	1,243	-0.173	-0.250	-0.055	0.043	0.396	-0.051**
UE	1,287	1.468	0.265	0.675	1.546	2.045	1,243	1.423	0.242	0.614	1.410	2.105	0.045

Panel C: Correlation Matrix

Panel C reports Pearson's correlation coefficients for the full sample.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) TR_VOL	1															
(2) CAR	0.313	1														
(3) TWEETS	0.167	0.169	1													
(4) FINANCIAL_TW	0.184	0.178	0.844	1												
(5) NON_FINANCIAL_TW	-0.017	-0.011	0.347	-0.152	1											
(6) SIZE	0.108	-0.012	-0.118	-0.172	0.110	1										
() MTB	0.077	0.094	0.119	0.116	0.017	-0.096	1									
(8) LEV	0.111	0.045	0.024	-0.012	0.081	0.470	0.278	1								
(9) INTANG	0.010	-0.009	0.009	0.008	0.009	-0.094	-0.082	-0.042	1							
(10) ANALYSTS	-0.011	-0.120	-0.316	-0.365	0.064	0.191	-0.202	-0.009	0.003	1						
(11) ADV	0.141	0.052	-0.015	-0.055	0.079	0.090	0.312	0.165	-0.106	0.032	1					
(12) BAD_NEWS	-0.020	-0.027	-0.075	-0.079	-0.002	-0.011	0.016	0.006	0.015	-0.036	0.022	1				
(13) LIT_RISK	-0.003	-0.019	-0.032	-0.043	0.019	0.029	0.024	-0.081	-0.116	0.083	0.054	0.033	1			
(14) BIG4	-0.031	-0.027	-0.010	-0.031	0.033	0.068	-0.063	0.055	-0.035	0.055	-0.058	-0.007	-0.004	1		
(15) ROA	0.041	-0.089	-0.097	-0.124	0.052	0.329	-0.330	-0.006	0.087	0.147	-0.063	0.056	-0.046	-0.003	1	
(16) UE	0.011	0.008	-0.007	-0.003	-0.006	0.083	-0.036	0.078	-0.016	-0.000	-0.040	-0.147	-0.052	0.016	-0.087	1

TABLE 3: Social Media Disclosure and Investors' Attention

Table 3 reports the results of the test of the relation between social media use before EA (*TWEETS* and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and C*AR*) measured at EA. Variables are defined in Appendix C. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2008-2015. The test is performed on the full sample. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses.

Panel A – Social Media Use and Investors' Attention

Panel A reports the results of the test of the relation between Twitter use before EA (*TWEETS)* and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA. I used model (1):

$$INV\_ATT_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 ADV_{i,t} + \alpha_7 ANALYSTS_{i,t} + \alpha_8 BIG4_{i,t} + \alpha_9 LIT\_RISK_{i,t} + \alpha_{10} BAD\_NEWS_{i,t} + \alpha_{11} ROA_{i,t} + {}_{12} UE_{i,t} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \Omega_{i,t} \quad (1)$$

	Full sample		*Only firms on Twitter*	
	(1)	(2)	(3)	(4)
Variables	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*
TWEETS	0.246***	0.016***	0.215**	0.014***
	(0.063)	(0.002)	(0.095)	(0.003)
SIZE	0.013*	0.000	0.004	0.000
	(0.007)	(0.000)	(0.004)	(0.000)
MTB	0.041	0.004***	-0.008	0.003
	(0.040)	(0.001)	(0.031)	(0.003)
LEV	0.080	0.000	-0.014	-0.001
	(0.050)	(0.006)	(0.001)	(0.007)
INTANG	0.067**	0.001	-0.013	-0.003
	(0.033)	(0.004)	(0.020)	(0.004)
ANALYSTS	-0.006	-0.003***	0.003	-0.005**
	(0.015)	(0.001)	(0.029)	(0.002)
ADV	0.080***	0.005	0.043*	0.002
	(0.020)	(0.005)	(0.026)	(0.004)
BAD_NEWS	-0.022	-0.001	-0.020	-0.001
	(0.031)	(0.003)	(0.022)	(0.002)
LIT_RISK	-0.030*	-0.010***	-0.106***	-0.013***
	(0.017)	(0.001)	(0.000)	(0.004)
BIG4	0.024	-0.003**	-0.015	-0.003
	(0.046)	(0.001)	(0.024)	(0.004)
ROA	0.041**	-0.007**	0.034	-0.003
	(0.020)	(0.004)	(0.026)	(0.003)
UE	0.004	0.000	0.002	0.001
	(0.006)	(0.001)	(0.005)	(0.001)
Constant	0.653	0.059	0.827***	0.079***
	(0.001)	(0.002)	(0.022)	(0.007)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	2,530	2,530	1,287	1,287
Adj. R-squared	0.118	0.061	0.147	0.073

Panel B - Social Media Content and Investors' Attention

Panel B reports the results of the test of the relation between tweets containing financial information before EA (*FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA. I used model (2):

$$INV\_ATT_{i,t} = \alpha_0 + \alpha_1 FINANCIAL\_TW_{i,t} + \alpha_2 NON\_FINANCIAL\_TW_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 INTANG_{i,t} + \alpha_7 ADV_{i,t} + \alpha_8 ANALYSTS_{i,t} + \alpha_9 BIG4_{i,t} + \alpha_{10} LIT\_RISK_{i,t} + \alpha_{11} BAD\_NEWS_{i,t} + \alpha_{12} ROA_{i,t} + {}_{13} UE_{i,t} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \Omega_{i,t} \quad (2)$$

	Full sample		*Only firms on Twitter*	
	(1)	(2)	(3)	(4)
Variables	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*
FINANCIAL_TW	0.305***	0.018***	0.301***	0.018***
	(0.064)	(0.002)	(0.088)	(0.003)
NON_FINANCIAL_TW	-0.014	0.002*	-0.003	0.001
	(0.074)	(0.004)	(0.067)	(0.005)
SIZE	0.014*	0.000	0.006*	0.001
	(0.007)	(0.000)	(0.003)	(0.000)
MTB	0.042	0.004***	-0.004	0.003
	(0.039)	(0.001)	(0.030)	(0.002)
LEV	0.082	0.000	-0.001	0.000
	(0.055)	(0.006)	(0.043)	(0.008)
INTANG	0.071**	0.001	-0.007	-0.003
	(0.035)	(0.004)	(0.026)	(0.004)
ANALYSTS	0.007	-0.002***	0.037	-0.003
	(0.017)	(0.001)	(0.029)	(0.002)
ADV	0.094***	0.006	0.063**	0.003
	(0.018)	(0.005)	(0.025)	(0.004)
BAD_NEWS	-0.016	-0.001	-0.009	-0.000
	(0.027)	(0.003)	(0.020)	(0.002)
LIT_RISK	-0.019	-0.009***	-0.090	-0.012***
	(0.018)	(0.001)	(0.021)	(0.003)
BIG4	0.030	-0.003**	-0.002	-0.003
	(0.045)	(0.001)	(0.026)	(0.004)
ROA	0.046**	-0.007*	0.039*	-0.003
	(0.019)	(0.004)	(0.020)	(0.003)
UE	0.004	0.000	0.002	0.001
	(0.006)	(0.001)	(0.004)	(0.001)
Constant	0.654	0.060	0.750***	0.076***
	(0.032)	(0.006)	(0.014)	(0.006)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	2,530	2,530	1,287	1,287
Adj. R-squared	0.130	0.064	0.178	0.080
F-test (*FINANCIAL_TW – NON_FINANCIAL_TW*=0)	0.319***	0.016***	0.304***	0.017***
f-statistics	(8.63)	(24.00)	(8.88)	(24.84)

TABLE 4: Social Media Disclosure Strategy

Table 4 reports the results of the test of the relation between social media use (*TWEETS* and *FINANCIAL_TW*) and bad news (*BAD_NEWS*). The sample selection procedures are summarized in Table 1, and the variables are defined in Appendix C. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2008-2015. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I use model (3):

$$SOC\_MEDIA\_USE_{i,t} = \alpha_0 + \alpha_1 BAD\_NEWS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 INTANG_{i,t} + \alpha_6 ANALYSTS_{i,t} + \alpha_7 ADV_{i,t} + \alpha_8 LIT\_RISK_{i,t} + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \Omega_{i,t} \quad (3)$$

Variables	(1) *TWEETS*	(2) *FINANCIAL_TW*	*Test of difference [chi2]*
BAD_NEWS	-0.053***	-0.069***	-0.016***
	(0.016)	(0.019)	[18.12]
SIZE	-0.010***	-0.018***	
	(0.002)	(0.004)	
MTB	0.012*	0.008	
	(0.009)	(0.005)	
LEV	-0.062	-0.086	
	(0.091)	(0.165)	
INTANG	-0.017	-0.031	
	(0.016)	(0.032)	
ANALYSTS	-0.188***	-0.247***	
	(0.018)	(0.013)	
ADV	-0.001	-0.001*	
	(0.001)	(0.001)	
LIT_RISK	-0.021	-0.049	
	(0.019)	(0.040)	
Constant	1.076	1.180	
	(0.022)	(0.001)	
Industry FE	YES	YES	
Year FE	YES	YES	
Observations	1,287	1,287	
Pseudo R-squared	0.219	0.348	

TABLE 5: Information Environment, Social media content and Investors' Attention

Table 5 reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA, conditional to the information environment. It also includes the test of Twitter communication strategy (*TWEETS* and *FINANCIAL_TW*) before the announcement of a bad news *(BAD_NEWS*) at EA. Variables are defined in Appendix C. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2008-2015. The test is performed on the full sample. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I used models (1) - (3).

Panel A – Media Coverage and Investors' Attention

Panel A reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA when firms are partioned into media covered firms and not covered ones (*MEDIA*). I used models (1) and (2). I report p-values from χ^2-test of the difference in the coefficients for *TWEETS* and *FINANCIAL_TW* across the two groups for each portioning variables.

Variables	(1) *TR_VOL*	(2) *TR_VOL*	(3) *CAR*	(4) *CAR*	(5) *TR_VOL*	(6) *TR_VOL*	(7) *CAR*	(8) *CAR*
	MEDIA		*MEDIA*		*MEDIA*		*MEDIA*	
	Not Covered	*Covered*	*Not Covered*	*Covered*	*Not Covered*	*Covered*	*Not Covered*	*Covered*
TWEETS	0.255***	-0.044	0.019***	0.016**				
	(0.062)	(0.136)	(0.002)	(0.007)				
Not Covered = Covered [p-value]	*[0.004]*		*[0.023]*					
FINANCIAL_TW					0.294***	0.172	0.019***	-0.009
					(0.062)	(0.129)	(0.002)	(0.010)
Low = High [p-value]					*[0.088]*		*[0.306]*	
Constant	0.505***	0.057***	0.467***	0.055***	0.555	0.101***	0.570	0.092***
	(0.049)	(0.005)	(0.033)	(0.005)	(0.023)	(0.024)	(0.001)	(0.024)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,029	501	2,029	501	2,029	501	2,029	501
Adj. R-squared	0.111	0.208	0.065	0.068	0.120	0.209	0.071	0.061

Panel B – Analysts' Coverage and Investors' Attention

Panel B reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA when firms are split between low and high analysts' coverage (*COVERAGE*). I used models (1) – (2). I report p-values from χ^2-test of the difference in the coefficients for *TWEETS* and *FINANCIAL_TW* across the two groups for each portioning variables.

Variables	(1) *TR_VOL* *COVERAGE* *Low*	(2) *TR_VOL* *High*	(3) *CAR* *COVERAGE* *Low*	(4) *CAR* *High*	(5) *TR_VOL* *COVERAGE* *Low*	(6) *TR_VOL* *High*	(7) *CAR* *COVERAGE* *Low*	(8) *CAR* *High*
TWEETS	0.285***	0.062	0.019***	0.007				
	(0.064)	(0.078)	(0.002)	(0.005)				
Low = High [p-value]	*[0.000]*		*[0.006]*					
FINANCIAL_TW					0.324***	0.189***	0.019***	0.017***
					(0.066)	(0.035)	(0.001)	(0.003)
Low= High [p-value]					*[0.000]*		*[0.157]*	
Constant	0.413***	0.045***	0.380***	0.041***	-0.253**	0.023**	-0.233***	0.054***
	(0.034)	(0.003)	(0.016)	(0.004)	(0.118)	(0.010)	(0.063)	(0.016)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,795	735	1,795	735	1,795	735	1,795	735
Adj. R-squared	0.142	0.123	0.060	0.072	0.156	0.127	0.059	0.077

Panel C – External Coverage and Social Media Strategy

Panel C reports the results of the test of the relationship between social media use (*TWEETS* and *FINANCIAL_TW*) and bad news (*BAD_NEWS*) when firms are split into media covered firms and not covered ones (*MEDIA*), and low and high analyst following (*COVERAGE*). I used model (3). I report p-values from χ^2-test of the difference in the coefficients for *BAD_NEWS* across the two groups for each portioning variables.

Variables	(1) *TWEETS*	(2) *TWEETS*	(3) *FINANCIAL_TW*	(4) *FINACIANL_TW*	(5) *TWEETS*	(6) *TWEETS*	(7) *FINANCIAL_TW*	(8) *FINANCIAL_TW*
	MEDIA		*MEDIA*		*COVERAGE*		*COVERAGE*	
	Not Covered	*Covered*	*Not Covered*	*Covered*	*Low*	*High*	*Low*	*High*
BAD_NEWS	-0.217**	-0.022	-0.322***	-0.161	-0.415***	-0.107	-0.612***	-0.210**
	(0.096)	(0.247)	(0.110)	(0.259)	(0.175)	(0.106)	(0.205)	(0.103)
Not Covered = Covered [p-value]	*[0.081]*		*[0.000]*					
Low = High [p-value]					*[0.035]*		*[0.000]*	
Constant	1.275***	-0.330	1.306***	-2.455**	0.079	1.240***	-0.372	1.211***
	(0.203)	(0.599)	(0.146)	(0.930)	(0.364)	(0.198)	(0.439)	(0.192)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,109	165	1,109	165	359	928	359	928
Pseudo R-squared	0.154	0.175	0.246	0.140	0.071	0.106	0.136	0.134

TABLE 6: Information Dissemination, Social media content and Investors' Attention

Table 6 reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA, conditional to Bloomberg Terminal initial coverage of tweets (*BLOOM*). It also includes the test of Twitter communication strategy (*TWEETS* and *FINANCIAL_TW*) before the announcement of a bad news *(BAD_NEWS*) at EA. Variables are defined in Appendix C. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2008-2015. The test is performed on the full sample. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I used models (1) - (3).

Panel A – Tweets Dissemination on Bloomberg Terminal and Investors' Attention

Panel A reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA when firms are split into before and after Bloomberg Terminal started including Tweets in their broadcast (*BLOOM*). I report p-values from χ^2-test of the difference in the coefficients for *TWEETS* and *FINANCIAL_TW* before and after integration of tweets into Bloomberg Database.

Variables	(1) *TR_VOL*	(2) *TR_VOL*	(3) *CAR*	(4) *CAR*	(5) *TR_VOL*	(6) *TR_VOL*	(7) *CAR*	(8) *CAR*
	BLOOM		*BLOOM*		*BLOOM*		*BLOOM*	
	Before	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
TWEETS	0.242***	0.262***	0.018***	0.015***				
	(0.049)	(0.043)	(0.004)	(0.005)				
Before = After [p-value]	*[0.623]*		*[0.582]*					
FINANCIAL_TW					0.263***	0.363***	0.021***	0.016***
					(0.051)	(0.037)	(0.003)	(0.004)
Before = After [p-value]					*[0.040]*		*[0.224]*	
Constant	0.419***	0.179	0.060***	0.067***	0.401***	0.156**	0.058***	0.068***
	(0.119)	(0.240)	(0.024)	(0.026)	(0.118)	(0.217)	(0.024)	(0.004)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,623	907	1,623	907	1,623	907	1,623	907
Adj. R-squared	0.077	0.167	0.051	0.050	0.081	0.200	0.054	0.074

Panel B – Tweets Dissemination on Bloomberg Terminal and Social Media Strategy

Panel B reports the results of the test of the relationship between social media use (*TWEETS* and *FINANCIAL_TW*) and bad news (*BAD_NEWS*) when firms are split into before and after Bloomberg Terminal started including Tweets in their broadcast (*BLOOM*). I used model (3). I report p-values from χ^2-test of the difference in the coefficients for *BAD_NEWS* before and after integration of tweets into Bloomberg Database.

Variables	(1) *TWEETS*		(2) *TWEETS*	(3) *FINANCIAL_TW*		(4) *FINANCIAL_TW*
		BLOOM			*BLOOM*	
	Before		*After*	*Before*		*After*
BAD_NEWS	-0.209		-0.116*	-0.268**		-0.297***
	(0.131)		(0.111)	(0.099)		(0.097)
Before = After [p-value]		*[0.065]*			*[0.000]*	
Constant	1.450***		1.066***	1.444		1.212
	(0.153)		(0.086)	(0.088)		0.216
Controls	YES		YES	YES		YES
Industry FE	YES		YES	YES		YES
Year FE	YES		YES	YES		YES
Observations	696		591	696		591
Pseudo R-squared	0.214		0.098	0.301		0.206

TABLE 7: Identification Analysis

Table 7 reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA. Variables are defined in Appendix C. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2008-2015. The test is performed on the full sample. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I used models (1) and (2).

Panel A – Propensity Score Matching

Panel A reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA using a one-to-one matching sample based on firms' characteristics using the nearest neighbor algorithm without replacement of propensity score matching.

	(1)	(2)	(3)	(4)
Variables	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*
TWEETS	0.290***	0.017***		
	(0.038)	(0.002)		
FINANCIAL_TW			0.296***	0.017***
			(0.044)	(0.003)
Constant	0.782***	0.047***	0.598***	0.047***
	(0.049)	(0.004)	(0.052)	(0.007)
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,318	1,318	1,092	1,092
Adj. R-squared	0.171	0.091	0.187	0.092

Panel B – Pre- and Post- Social Media Adoption

Panel B reports the results of the test of the relation between Twitter use before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at EA for the sub-sample of firms opening a Twitter accounting during the period analyzed (2008-2015).

Variables	(1) *TR_VOL*	(2) *CAR*	(3) *TR_VOL*	(4) *CAR*
TWEETS	0.259***	0.017***		
	(0.065)	(0.003)		
FINANCIAL_TW			0.325***	0.020***
			(0.069)	(0.003)
Constant	0.398	0.069***	0.398***	0.070***
	(0.001)	(0.006)	(0.001)	(0.005)
Controls	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	1,703	1,703	1,703	1,703
Adj. R-squared	0.130	0.068	0.151	0.074

Panel C – Placebo Test

Panel C reports the results of the test of the relation between firms using Twitter before EA (*TWEETS*, and *FINANCIAL_TW*) and two measures of investors' attention (*TR_VOL*, and *CAR*) measured at 30 days before EA.

	Full Sample				*Only firms on Twitter*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*	*TR_VOL*	*CAR*
TWEETS	-0.004	0.002			0.017	0.002		
	(0.015)	(0.001)			(0.003)	(0.002)		
FINANCIAL_TW			0.017	0.002			0.052	0.004
			(0.044)	(0.002)			(0.058)	(0.003)
Constant	0.148	0.041*	-0.158	0.041***	-0.065	0.042	-0.098	0.040
	(0.003)	(0.001)	(0.012)	(0.001)	(0.113)	(0.002)	(0.105)	(0.001)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,530	2,530	2,530	2,530	1,287	1,287	1,287	1,287
Adj. R-squared	0.009	0.040	0.009	0.039	0.015	0.045	0.016	0.046

CHAPTER III

The Effect of Voluntary Disclosure on Trade Credit Received in Small and Medium Entities: Evidence from Social Media

Abstract

I examine whether the level of activity on social media by Small and Medium Entities (SMEs) impacts trade credit received from suppliers. First, I show that the number of customers' tweets is positively associated with trade credit received. Second, I document that a low-to-moderate number of tweets leads to higher trade credit received; a moderate-to-high number of tweets has decreasing marginal benefits to customers with regards to trade credit received. Third, I find that the level of activity on Twitter is positively associated with the speed of adjustment towards a stable trade credit level. Cross-sectional analyses show that customers experiencing a negative event exhibit lower trade credit received, but this effect is less pronounced among those firms which are more active on social media. Finally, tweeting has a larger impact on trade credit received when suppliers' access to up to date information is limited. Taken together, these findings indicate that social media strengthens the business relationship between suppliers and customers. Suppliers appear to trust more customers who communicate on social media. This paper contributes to the discussion around the use of social media for firms and the associated relevance in building trust between suppliers and customers of small size.

Keywords: Trade Credit; SMEs; Social Media; Trust; Social Media Fatigue; Financing.

1. Introduction

This study investigates the relationship between voluntary disclosure through social media and trade credit received in Small and Medium Entities (SMEs). Trade credit received, defined as a delayed payment to suppliers, represents a financing source of primary importance for SMEs (Carbó-Valverde et al. 2016; Petersen and Rajan 1997; Martínez-Sola et al. 2014; McGuinness et al. 2018). High growing SMEs are characterized by a continuous demand for credit to support their development. Past research documents that granting trade credit depends not only on the legal enforceability of the contract, but also on the level of suppliers' trust into customers' activities (Guiso et al. 2004; Wu et al. 2014). A higher degree of trust leads to lower transaction costs due to a reduced need of self-protection from opportunistic behaviors (Zimmer et al. 2010). In this paper, I argue that the use of social media strengthens the relationship between corporate customers and their suppliers, thereby reinforcing the trust between the two parties.

Through direct public communication, corporate social media improves information flow and interactions (Lee et al. 2015). A growing body of research shows that social media affects the relationships between firms on the one side, and investors or individual customers on the other side. Huy and Shipilov (2012) argue that the use of social media may enhance the customer-supplier relationship. Social media allows customers to intensify social interactions and to strengthen the bonds with suppliers. The latter may assign higher trust levels to firms which share information on social media. Considering that social media information is non-binding and not externally verified, the question becomes whether suppliers find customers' corporate social media information relevant and credible.

I first examine whether customers more active on social media have an advantage with regards to trade credit received relative to firms with a lower number of messages on social media. Firms releasing more tweets may appear trustworthy and they would receive more trade credit from

their suppliers compared with SMEs less active on social media. I focus on SMEs because they usually exhibit little bargain power with suppliers. Their trade credit received mostly depends on suppliers' credit assessment and trust in their activities (Fabbri and Klapper 2016; Klapper et al. 2011)

I next question the amount of information is beneficial for customers to transmit through social media. In the context of social media, prior literature provides evidence that users may suffer from 'social media fatigue', which relies on the idea that 'too much information from social media can lead to feelings of being overwhelmed' (Bright et al. 2015). Drawing upon the limited capacity model (Lang 1992; Lang 1995), I argue that suppliers may not allocate sufficient cognitive resources to process a high number of messages. They may also consider that the costs associated with processing a large number of tweets exceed the associated benefits, especially when customers are of small size. In addition, when a firm sends too many tweets, it might be perceived as opportunistic or annoying, bringing down the trust level. I expect that the benefits of using corporate social media with regards to the supplier-customer relationship decrease or vanish after the release of a certain number of tweets.

Finally, following prior research investigating the optimality and dynamics of trade credit decisions (Nadiri 1969; Emery 1984; Abdulla et al. 2017), I examine whether the level of social media activity affects the speed of adjustment toward stable trade credit. The trust that social media generates in the relationship between suppliers and customers may reduce the adjustment costs to reach a stable trade credit level. Suppliers may be more likely to meet customers' demands to renegotiate the payments terms with trustworthy customers. SMEs more active on social media would make adjustments towards a level of trade credit they feel satisfying more rapidly compared with firms less active on social media.

I test my three hypotheses on a sample of SMEs listed on the AIM London Stock Exchange between 2009 and 2016. The AIM London Stock Exchange is a stock exchange dedicated to small growing companies (Gerakos et al. 2013). The high appetite for growth of AIM London-listed firms motivates their constant search of external financing, including trade credit received. In addition, social media may operate as game changer in the external communication for this type of firms. Companies listed on the AIM London must have a corporate website, and its content is strictly regulated (Rule 26) [36], but no specific rule applies to social media. Given the lack of stringent rules, social media represents a more flexible channel for managers to voluntary communicate to their suppliers compared with corporate websites. I focus on the UK due to the importance of trade credit in the business relationships. Wilson and Summers (2002) document that in the UK credit terms are used in about 80% of trading transactions of SMEs.

I use multiple proxies based on accounts payable to measure trade credit received. I focus on Twitter as measure of social media because my data shows that the corporate adoption of Twitter is larger than the corporate adoption of Facebook, despite its larger number of users. In addition, prior research documents that firms tend to disseminate their news on Twitter rather than other social media platforms (Jung et al. forthcoming; Zhou et al. 2014).

My findings show that corporate social media operates as determinant of trade credit received. An increase of one standard deviation in the number of tweets leads to a 4.17% increase in trade credit received. Next, I document that a low-to-moderate number of tweets is associated with higher trade credit received. Beyond a certain number of tweets, on average around 242 tweets per year, firms experience decreasing marginal benefits from tweeting with regards to trade credit received. Finally, I document that the release of tweets positively contributes to the speed of adjustment towards the stable trade credit level. Overall, these results support my conjecture that

[36] Rule 26, AIM Rules for Companies, London Stock Exchange, January 2016.

social media activity influences the dynamics of trade credit policy. These findings suggest that the release of tweets contributes to gain trust from suppliers. However, tweeting a high number of messages generates 'social media fatigue' and reduces the initial positive effect of tweeting on the supplier-customer relationship.

In additional tests, I look at the impact of tweeting on trade credit received following a negative event. I document that customers reporting a financial loss experience lower trade credit compared with other firms. The release of social media messages moderates the negative relationship between the financial loss and trade credit received. These findings are consistent with my conjecture that social media enhances the trust between suppliers and customers. Finally, I show that customers' level of activity on Twitter has a larger effect when suppliers have limited access to up to date information through other channels, i.e., no analysts following. These results suggest that social media information facilitates the access to finance for SMEs operating in poor information environment.

My results are robust to additional analyses. I re-perform my tests focusing only on firms active on Twitter. This test mitigates the concerns that differences in firms' characteristics between firms active and non-active on Twitter drive my results. Another potential concern is that a customer may obtain the same level of trade credit irrespective to the activity on social media. I use a propensity score matching procedure to control for a number of observable firm's characteristics. Finally, my main tests include firm fixed effects to capture unobserved firm-specific factors.

This study makes several contributions. First, it extends the trade credit literature by showing that suppliers value customers' voluntary information disseminated on social media in the credit assessment. My results indicate that social media enhances the relationship between customers and suppliers in a business to business context by reinforcing the trust between the two parties.

Second, my findings add to the debate surrounding the relevance of social media (Miller and Skinner 2015) by showing that corporate social media matters not only to investors (Blankespoor et al. 2013; Jung et al. forthcoming; Lee et al. 2015) and individual customers (Laroche et al. 2013), but also to suppliers. Social media facilitates business transactions. Customers benefit from releasing corporate news on social media with regards to trade credit received. My results also corroborate the notion of 'social media fatigue' within the supplier-customer relationship. An excessively high number of customers' messages reduces the initial positive effect of tweeting on trade credit received.

Third, my results contribute to the growing literature on the optimality and dynamics in firms' working capital (Brav 2009; Gao et al. 2013). I provide evidence that the trust built through social media activity increases the speed of adjustment toward a stable trade credit level.

Finally, my findings complement previous studies about trade credit in SMEs (García-Teruel and Martínez-Solano 2010; Berger and Udell 1998; McGuinness et al. 2018). Past research mainly focuses on the impact of the listing status on trade credit received or analyzes a limited period of time.[37] My findings suggest a positive impact of social media activity on trade credit received and on the speed of adjustment toward the stable trade credit level for SMEs. Social media appears to partially offset the little bargaining power of SMEs with their suppliers.

The rest of the paper proceeds as follows. Section 2 reviews the literature concerning the use of trade credit in SMEs and develops my hypotheses. Section 3 describes the data and methodology that I use. Section 4 presents my empirical findings. Section 5 reports additional and robustness tests. The final Section discusses potential alternative explanations to my findings and presents avenues for developing this study.

[37] Prior studies mainly use data of the National Survey of Small Business Finance which refers only to firms with less than 500 employees and it gathers data only in certain years, i.e., 1987, 1993, 1998, and 2003 (Abdulla et al. 2017).

2. Literature review and hypothesis development

2.1 The use of trade credit received in SMEs

The access to finance is a fundamental condition to SMEs' development. I focus on trade credit received, as a form of short-debt, because it represents a key source of financing for companies of small and medium size (Agostino and Trivieri 2014; Hall and Lerner 2010). In their survey, Baldwin et al. (2002) show that trade credit received accounts, on average, for 11% of the capital structure of SMEs. Ayadi (2005) documents that a large number of SMEs uses more trade credit than bank credit. The relatively easy conditions of access, especially in recession or slow growth periods, justifies the large use of trade credit in SMEs. For instance, Barrot (2016) shows that the restriction imposed on the late payment in the trucking industry mostly impacted trade credit granted to firms of small size or operating in growing industries. Figure 1 shows the significant role of trade credit received as a source of financing for SMEs compared with firms of larger size.

[INSERT FIGURE 1 ABOUT HERE]

Trade credit represents a delayed payment to the supplier, resulting in a situation close to the loan. Customers are often under pressure to generate sufficient cash to pay back their debts and they have interest in obtaining longer payment terms from their suppliers. By obtaining more time to pay their suppliers, they will benefit of higher free cash flows.

Suppliers and customers often have a close relationship and both parties tend to work to build a mutually beneficial long-term relationship. Suppliers usually benefit from inside information through private channels, for instance through product market transactions or from other suppliers (Petersen and Rajan 1997). They thus reduce the level of uncertainty related to the future customers' output (Barrot 2016; Hall and Lerner 2010) and the risk of adverse selection (Petersen and Rajan 1997; Wilson and Summers 2002; Mian and Smith 1992). Prior studies show that suppliers are more willing to renegotiate their debt than banks to support their supplier-customer relationship (Wilner

2000). They also have less incentives in defaulting their clients once a specific investment has been made (Cunat 2007; Smith 1987). Wu et al. (2014) provide empirical evidence that trust plays a key role in determining suppliers' decision to extend trade credit.

2.2 The use of social media in the supplier-customer relationship

Past literature documents an increasing shift from transactional exchange between suppliers and customers towards collaborative exchange (Araujo et al. 1999; Day 2000). The latter is built on long-term relationship between the customer and the supplier with the goal of maximizing the common value added. Timely and frequent communication may enhance an efficient and less conflictive relationship between two parties (Large 2005).

I expect that social media activity facilitates the communication between suppliers and customers, with positive consequences on trust. The release of news on social media is immediate and it does not require any intermediary. More timely information leads suppliers to better understand how (fast) customers respond to changes, enhancing the credibility of their strategy and dissipating potential misinformation or rumors (Lee et al. 2015). Frequent customers' information on social media could be perceived as a form of commitment to their financer.

In addition, the possibility to provide feedback in the communication process is considered a key element in defining a successful supplier relationship (Mohr and Nevin 1990). Given that social media allows users bi-directional communication with no direct costs, a high level of activity on social media may lead customers to be considered more trustworthy, and thus receive more trade credit.

Nonetheless, suppliers may assign little value to information disclosed on social media. First, they often have access to customers' private information (Petersen and Rajan 1997), and social media could only contribute to generate redundant information. Second, social media may not contribute to reinforce the trust towards customers compared with traditional websites or other

communication channels. Considered the divergent arguments, I state my hypothesis in the null form:

H1. Customers' number of tweets has no effect on trade credit received.

2.3 Quantity of tweets and trade credit received: The more, the better?

The provision of a higher number of tweets may improve communication and supply chain coordination, reinforcing suppliers' trust in customers' activities. However, the limited costs of social media activity, the non-binding, and non-directly verifiable information may incentivize customers to increase their tweets almost without any limit. The limited capacity model questions users' ability to allocate sufficient cognitive resources to analyze a large number of messages (Lang 1992; Lang 1995). Bright et al. (2015) argue that the Limited Capacity Model can also be applied to social media. The number of messages may overwhelm users, who would experience 'social media fatigue'. Users would not allocate a sufficient amount of cognitive resources to assimilate the high number of social media messages. They would experience a sense of confusion or frustration induced by the level of disclosure exceeding their ability to process information. They could also consider that the benefits of the analysis of a large number of messages would not compensate the resources needed for such activity.

In addition, past research shows the potential negative consequences associated with an excessive level of disclosure (Eppler and Mengis 2004; Schick et al. 1990; Shields 1983). Suppliers may not be able to process all customers' social media information. Beyond a certain point, additional tweets would have no effect or would exhibit decreasing marginal benefits to customers with regards to trade credit received. Because the relevance of customers' social media disclosure to suppliers is an empirical question, I state my hypothesis in the null form as follows:

H2. There is no difference between the release of a low-to-moderate number of tweets and a moderate-to-high number of tweets concerning the relationship between customers' number of tweets and trade credit received.

2.4 Influence of social media on the speed of adjustment toward stable trade credit level

The activity on social media may help customers to reach a satisfying level of trade credit. Prior studies (Nadiri 1969; Abdulla et al. 2017; Emery 1984) show that firms seek for a stable trade credit level by simultaneously balancing costs and benefits and maximizing firms' values. On the one hand, trade credit is an alternative source of financing to bank credit for firms with credit constraints, such as SMEs. Trade credit reduces the transaction costs between suppliers and customers by separating the moment between payment and delivery. It also reduces the need to hold financial resources to obtain goods (Ferris 1981; Emery 1984). On the other hand, it is often considered an expensive source of financing (Petersen and Rajan 1997; Ng et al. 1999; Burkart and Ellingsen 2004), and may expose customers to refinancing risks.

Nadiri (1969) shows that the reported trade credit often differs to the stable trade credit level due to opportunity costs associated with trade credit and disequilibrium between sales and purchases. Firms operate to adjust trade credit towards the satisfactory level, for instance by increasing (decreasing) the demand for trade credit when they are below (above) the stable level.

The process to adjust towards a stable trade credit level depends on the associated costs. SMEs often have low bargaining power with their suppliers, who determine the trade credit policies. I argue that suppliers are more likely to meet customers' demand to renegotiate their payment terms if they have trust in customers' businesses. The level of activity on social media may influence the trust between suppliers and customers. More social media communication would provide suppliers timely and frequent information about customers' activity. Suppliers would also have the possibility to engage in bi-directional conversations with their customers. My conjecture is that the trust built

through social media contributes to reinforce the suppliers-customers relationship and the speed to which customers can reach their stable trade credit level.

However, suppliers may read tweets, but not feeling engaged with customers. Suppliers' renegotiation terms of credit may only depend on information obtained through private channels. In addition, suppliers may not gather sufficient relevant information for their production planning due to the short content and the discretionary timing of customers' corporate social media activity. I predict that the activity on social media has no influence on the speed of adjustment toward a stable trade credit level:

H3: Customers' number of tweets has no effect on the speed to adjust toward stable trade credit level.

3. Sample and empirical models

In this section, I present the main methodological choices. I first describe the sample used and motivate the decision to investigate SMEs listed on the AIM London Stock Exchange. I then discuss the measures adopted to test my hypotheses.

3.1 Sample

My sample contains SMEs listed on the Alternative Investment Market (AIM) London Stock Exchange. The latter is an exchange dedicated to firms of smaller size with appetite for financing. This setting facilitates the identification of SMEs seeking external financing to support their growth. Gerakos et al. (2013) note that: 'The goal [of AIM] is to provide investors with access to 'smaller growing companies', thereby increasing the pool of available capital.' In terms of market capitalization, the AIM London is almost 12 times larger than Alternext, a pan-European stock exchange dedicated to firms of smaller size. I use EIKON database to gather data over the period 2009-2016. I use a *Python* script to retrieve social media data.

Table 1 describes the sampling and data collection process. Consistently with the objective of this study, I focus on listed SMEs. In accordance with the EU definition, I define SMEs as firms that have a balance sheet total below €43 million. I exclude firms operating in the financial and insurance industry because they follow specific reporting rules (Burgstahler and Eames 2006; Ball and Shivakumar 2006). To this end, I use the Fama-French (FF) 12 industries classification, excluding firms operating in industry with FF-code 11. I further delete observations with negative equity and observations with unavailable data. The final sample is composed of 2,475 firm-year observations. I winsorize each continuous variable at its first and ninety-ninth percentiles to mitigate the influence of the outliers.

[INSERT TABLE 1 ABOUT HERE]

3.2 Empirical models

3.2.1 Social media disclosure and trade credit received

To test my first hypothesis, I look at the impact of the number of tweets on trade credit received. I use three proxies for trade credit received. First, I use the total amount of accounts payable reported in the balance sheet divided by lagged total assets. Second, I determine the abnormal trade credit using a trade credit model. Third, I measure accounts receivables as a dummy variable adjusted at industry-year level.

To measure my second proxy, I regress trade credit received on the determinants identified by prior literature (Petersen and Rajan 1997; Abdulla et al. 2017). Standard errors are clustered at firm-level. The trade credit model is:

$$TR\_CRED\_AMOUNT_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 GROWTH_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 CAPEX_{i,t} + \alpha_6 LTDebt_{i,t} + \alpha_7 LEV_{i,t} + \alpha_8 LOSS_{i,t-1} + \alpha_9 COVERAGE_{i,t} + \alpha_{10} BIG4_{i,t} + Firm\ Fixed\ Effects + \Omega_{i,t} \quad (1)$$

where:

$TR\_CRED\_AMOUNT_t$ = amount of trade credit received, measured as accounts payable in year t divided by total assets in year t-1;

$SIZE_t$ = natural logarithm of total assets in year t;

$GROWTH_t$ = change in revenues from year t-1 to year t divided by revenues in year t-1;

MTB_t = Market-to-book value in year t;

ROA = Return on Assets, measured as net income in year t divided by total assets in year t-1;

$CAPEX_t$ = capital expenditures in year t divided by total assets in year t-1;

$LTDebt_t$ = long term debt in year t divided by total assets in year t-1;

LEV_t = total liabilities in year t divided by total assets in year t-1;

$LOSS_{t-1}$ = dummy variable equal to 1 if net income is less than zero in year t-1, and 0 otherwise;

$COVERAGE_t$ = natural logarithm of one plus the number of analysts following the firm in year t.

$BIG4_t$ = dummy variable equal to 1 if a firm's auditor is one of the Big-4 audit firm in year t, and 0 otherwise.

I estimate Eq. (1) cross-sectionally for industry-years with at least ten observations. The estimated residuals represent my proxy for abnormal trade credit received (*TR_CRED_ABN*).

I computed my third measure as a dummy variable equal to 1 if accounts payable divided by lagged total assets are above the industry-year median level, and 0 otherwise. In this way, I control for differences in the use of trade credit across industries and time.

Similar to previous studies (Lee et al. 2015; Blankespoor et al. 2013; Jung et al. forthcoming), I focus on Twitter to measure the level of social media activity. Differently from other widely spread social media platforms, e.g., Pinterest, Youtube and Google+, and Facebook, Twitter is commonly used to release corporate social media news and financial information. To obtain information, suppliers can either 'follow' a certain account or they can search for a particular keyword with a function similar to Google Search. I ensure that a customer's account is sufficiently

visible by considering social media accounts open at least three months before year-end. I measure the intensity of the activity on social media by looking at the number of tweets released during a calendar year.

To examine my first hypothesis, Eq. (2) is estimated using the following model (standard errors are double-clustered at industry and year level):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 ROA_{i,t} + \alpha_6 CAPEX_{i,t} + \alpha_7 LTDebt_{i,t} + \alpha_8 LEV_{i,t} + \alpha_9 LOSS_{i,t-1} + \alpha_{10} COVERAGE_{i,t} + \alpha_{11} BIG4_{i,t} + Firm\ Fixed\ Effects + \Omega_{i,t} \quad (2)$$

where:

TR_CRED_t = one of the following variables:

$TR\_CRED\_AMOUNT_t$ = amount of trade credit received, measured as accounts payable in year t divided by total assets in year t-1;

$TR\_CRED\_ABN_t$ = Abnormal trade credit, measured as the unscaled residuals from the trade credit model, Equation (1) above.

$TR\_CRED\_ADJ\_D_t$ = adjusted trade credit received, equal to 1 if accounts payable in year t divided by total assets in year t-1 are above the industry and year median, and 0 otherwise;

$TWEETS_t$ = number of tweets, divided by 1,000, released in year t.

All other variables are as defined above.

The variable of interest is *TWEETS* and I examine α_1 to test H1. Coefficient α_1 captures the impact of the number of tweets on trade credit received. A significant positive coefficient on *TWEETS* indicates that tweeting increases trade credit received. The lack of significant results would indicate that social media activity is irrelevant to suppliers' credit assessment.

I control for variables which have been shown in prior studies (García-Teruel and Martínez-Solano 2010; Petersen and Rajan 1997; Love et al. 2007) to influence trade credit received, such as size (*SIZE*), growth (*GROWTH*), growth opportunities (*MTB*), operating performance (*ROA*), financing needs (*CAPEX*), other liabilities (*LTDebt*), capital structure (*LEV*), financial distress

(*LOSS*), analysts' following (*COVERAGE*), and type of auditors (*BIG4*). I add firm fixed effects to control for unobserved firm-level and time-invariant characteristics that may affect trade credit policies (McGuinness et al. 2018).

3.2.2 Quantity of information and trade credit received

To test the type of relationship between the number of tweets and trade credit received at firm level (H2), I include the squared term of the variable of interest, i.e., number of tweets (*TWEETS*), in Eq. (3) (standard errors are double-clustered at industry and year level):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 TWEETS^2_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 GROWTH_{i,t} + \alpha_5 MTB_{i,t} + \alpha_6 ROA_{i,t} + \alpha_7 CAPEX_{i,t} + \alpha_8 LTDebt_{i,t} + \alpha_9 LEV_{i,t} + \alpha_{10} LOSS_{i,t-1} + \alpha_{11} COVERAGE_{i,t} + \alpha_{12} BIG4_{i,t} + Firm\ Fixed\ Effects + \Omega_{i,t} \quad (3)$$

where:

$TWEETS^2_t$ = Quadratic value of the variable *TWEETS* in year t.
All other variables are as defined above.

Coefficient α_1 captures the impact of the number of tweets on trade credit received. A significant positive coefficient on *TWEETS* indicates that the release of a higher number of tweets is associated with more trade credit received. I further examine the type of relationship between the number of tweets and trade credit received by including the squared number of tweets ($TWEETS^2$). A significant negative coefficient α_2 indicates decreasing marginal benefits with regards to trade credit received when a customer releases a high number of tweets.

3.2.3 Adjustment toward stable trade credit level

To test my third hypothesis, I look at the speed to adjust toward stable trade credit level, conditional to the use of social media. Following prior research (Abdulla et al. 2017; García-Teruel and Martínez-Solano 2010), I adopt a partial adjustment model (Flannery and Rangan 2006) for SMEs releasing different amounts of tweets. This approach is consistent with other studies on capital structure adjustments (Gao et al. 2013; Byoun 2008; Faulkender and Petersen 2005). I first estimate

the stable trade credit level (*TR_CRED*)* by using two different measures. In the first model, I compute the stable trade credit level separately for firms with low and high activity on social media (*TR_CRED_SM**). I classify a firm as very (little) active on social media if the number of tweets released in year t is above (below) the industry and year median. This approach takes into consideration that the two sets of firms may have different trade credit targets. In the second model, an OLS model estimated in each industry-year with at least 10 observations (*TR_CRED_IY**). This approach assumes that firms may have different stable trade credit levels across industries and time. Eq. (4) reports the first stage of the partial adjustment model:

$$TR\_CRED\_AMOUNT_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 GROWTH_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 CAPEX_{i,t} + \alpha_6 LTDebt_{i,t} + \alpha_7 LEV_{i,t} + \alpha_8 LOSS_{i,t-1} + \alpha_9 COVERAGE_{i,t} + \alpha_{10} BIG4_{i,t} + \Omega_{i,t} \quad (4)$$

All variables are as defined above.

I take the estimated values of Eq. (4) for the variable *TR_CRED_AMOUNT* to define the stable trade credit level (*TR_CRED*)*. In the second stage of this model, I measure the speed of adjustment to the stable trade credit level by using the following OLS model (standard errors are double-clustered at industry and year level):

$$\Delta TR\_CRED\_AMOUNT_{i,t} = \alpha_0 + \alpha_1 SPEED_{i,t} + \alpha_2 TWEETS_{i,t} + \alpha_3 SPEED_{i,t} \times TWEETS_{i,t} + Firm\ Fixed\ Effects + \Omega_{i,t} \quad (5)$$

where:

$SPEED_t$ = one of the following variables:

$SPEED\_SM_t$ = speed toward stable trade credit level, measured as the difference between the stable trade credit level in year t estimated for firms with low and high activity on social media ($TR\_CRED\_SM^*_t$) and trade credit at year t-1 ($TR\_CRED\_AMOUNT_{t-1}$).

$SPEED\_IY_t$ = speed toward stable trade credit level, measured as the difference between the stable trade credit level in year t model estimated in each industry-year with at least 10 observations($TR\_CRED\_IY^*_t$) and trade credit at year t-1 ($TR\_CRED\_AMOUNT_{t-1}$)*;*

All other variables are as defined above.

The coefficient of the variable *SPEED* (α_1) captures the speed of adjustment to the stable trade credit level. It takes values between zero and one (Abdulla et al. 2017). Greater values indicate higher speed of adjustment. The interaction between *SPEED* × *TWEETS* provides evidence about the speed of adjustment of firms releasing tweets.

4. Empirical findings

4.1 Descriptive statistics

Panel A of Table 2 reports the descriptive statistics for the main variables of the full sample. The median (mean) of trade credit received (*TR_CRED_AMOUNT*) is 5.8% (9.4%) of lagged total assets. The median (mean) of trade credit received of non-SMEs listed on the AIM London Stock Exchange is 4.5% (8.3%) of lagged total assets.[38] Looking at the overall external financing, the median (mean) of leverage (*LEV*) is 26.6% (36.8%) of lagged total assets. The median (mean) of leverage of non-SMEs listed on the AIM London Stock Exchange is 33.4% (41.5%) of lagged total assets.[39] Taken together, these results show the significant relevance of trade credit received on the external financing of SMEs compared with non-SMEs. More than half of the firms (68%) report a loss in the previous year and the median (mean) growth, measured as changes in sales, is 0.001% (7.5%), with a standard deviation of 39.3%.

Panel B of Table 2 presents the correlation matrix of the main variables used in this study. Looking at the correlation coefficients, the three proxies for trade credit terms (*TR_CRED_AMOUNT, TR_CRED_ABN,* and *TR_CRED_ADJ_D*) are positively correlated with the number of tweets (*TWEETS*). They are also positively correlated with growth (*GROWTH*) and

[38] The median (mean) of trade credit received of firms included in Compustat North America over the period 2009-2016 is 1.7% (3.5%) of lagged total assets.
[39] The median (mean) of leverage of firms included in Compustat North America over the period 2009-2016 is 59.5% (57.36%) of lagged total assets.

growth opportunities (*MTB*), long term debt (*LTDebt*), and leverage (*LEV*); and negatively correlated with size (*SIZE*), default-risk (*LOSS*), and analysts following (*COVERAGE*).

[INSERT TABLE 2 ABOUT HERE]

4.2 Social media and trade credit received

Table 3 presents estimation results of model (2), testing the association between the number of tweets and trade credit received (H1). The estimated coefficient α_1 on *TWEETS* (column (1)) is positive and significant (at less than 10% level, two-tailed) which indicates that SMEs releasing a higher number of tweets receive more trade credit compared with SMEs less active on Twitter. This coefficient translates into an economically significant 4.17% increase in trade credit received. In column (2), I show that the number of tweets is positively and significantly associated (at less than 10% level, two-tailed) with abnormal trade credit received ($\alpha_1 = 0.021$). In column (3), I show that the results are not sensitive to the type of industry and period analysed. The estimated coefficient on *TWEETS* is positive ($\alpha_1 = 0.097$) and significant at less than 5% level, two-tailed. Overall, these findings suggest that suppliers assign value to customers' social media messages. I show that tweeting contributes to strengthen the relationship between customers and suppliers.

[INSERT TABLE 3 ABOUT HERE]

4.3 Amount of information on social media and trade credit received

Table 4 presents the results of estimating the type of relationship between numbers of tweets and trade credit terms. The coefficient α_1 on *TWEETS* is positive and significant at less than 1% level (two-sided) in columns (1) and (3), and positive and significant at less than 5% level (two-sided) in column (2). The squared number of the tweets term ($TWEETS^2$) is negative and significant at less than 1% level (two-sided) in columns (1) - (3). The inversion point is equal to 170, 276 and 279 tweets for the variables *TR_CRED_AMOUNT*, *TR_CRED_ABN*, and *TR_CRED_ADJ_D*. These values are within the range of tweets per year the firms observed release. Taken together, these

results suggest that the release of a high number of tweets exhibit decreasing marginal benefits for customers with regards to trade credit received. Overall, these findings are consistent with the conjecture that the impact of tweeting on trade credit received depends on the level of tweets. At firm-level, a low-to-moderate number of tweets is beneficial to customers with regards to trade credit received. A moderate-to-high number of tweets overwhelms suppliers, generating 'social media fatigue'.

[INSERT TABLE 4 ABOUT HERE]

4.4 Social media and the speed of adjustment to stable trade credit level

In my third hypothesis, I test the association between customers' number of tweets and the speed of adjustment toward stable trade credit level. I first estimate the stable trade credit level for SMEs by using Model (4). Table 5 reports the results of the partial adjustment model of trade credit (Eq. (5)). The coefficient α_1 on the variable *SPEED* is positive and significant at less than 1% level (two-sided) in columns (1) and (2). The speeds reported (77% for *SPEED_IY* and 59% for *SPEED_SM*) have very similar magnitude to those reported by García-Teruel and Martínez-Solano (2010) on a sample of UK private SMEs.

The estimated coefficient α_3 on *SPEED* × *TWEETS* is positive and significant (at less than 1% level, two-tailed) for both models specifications (columns (1) and (2)). These results support the idea that the release of tweets contributes to adjust to the stable trade credit level at a faster rate. Overall, my results show that tweeting is beneficial to customers because they succeed obtaining trade credit more aligned to their satisfactory level. Customers' activity on social media enhances the trust between customers and suppliers, leading suppliers to meet more easily customers' demands.

[INSERT TABLE 5 ABOUT HERE]

5. Additional tests

5.1 The role of social media in building trust: the case of a negative event

To corroborate my core evidence that tweeting enhances trust between suppliers and customers, I look at the relation between trade credit received and level of activity on Twitter, conditional to the release of bad news. I assume that after a customer's bad news due to a firm negative event, suppliers become stricter in their credit assessment. I expect a negative association between a bad news and trade credit received. The use of social media may mitigate this negative association. In the presence of a bad news, suppliers would have higher trust towards those customers more active on social media compared with firms releasing little or no information on social media.

To test my conjecture, I look at a situation in which customers' financial performance worsen, such as the report of a financial loss. I expect that a financial loss constrains customers in receiving trade credit. I then assume that social media activity moderates the negative association between reported loss and trade credit received. I focus on a financial loss of an amount significant to represent a situation of potential deterioration of customers' solvency, but not to lead to an immediate default. This approach is also consistent with the diminishing sensitivity notion of the Prospect Theory (Barberis 2013). Losses of moderate amounts have a larger impact on peoples' utility function than very large losses. Eq. (6) is estimated using an OLS method (standard errors are double-clustered at industry and year level):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 NEG\_EVENT\_D_{i,t} + \alpha_3 TWEETS_{i,t} \times NEG\_EVENT\_D_{i,t} + Controls + \text{Firm Fixed Effects} + \Omega_{it} \quad (6)$$

where:

$NEG\_EVENT\_D_{i,t}$ = negative event, dummy variable equal to 1 if net income divided by total assets is within [-0.10,-0.40] in year t and greater than zero in year t-1, and 0 otherwise.

All other variables are consistent with the previous definitions.

The coefficient of interest is α_3 and captures the impact of tweeting for customers reporting a negative event on their trade credit received. I include control variables as in Eq. (2).

[INSERT TABLE 6 HERE]

Results reported in Table 6 indicate that SMEs reporting a negative event receive less trade credit compared with SMEs without a negative event. Consistent with my expectations, the estimated coefficient α_1 on *NEG_EVENT_D* is negative and significant at less than 1% level (two-sided) in column (1), and significant at less than 10% level (two-sided) in columns (2) – (3). On average, firms experiencing a negative event receive 1.24% less trade credit than firms without negative event. The level of activity on social media mitigates this negative association. The estimated coefficient α_3 on *TWEETS* × *NEG_EVENT_D* is positive and significant (at less than 1%, two-sided) in columns (1) and (2). These results indicate that tweeting enhances suppliers' trust into customers' activities. In the presence of a negative event, customers more active on social media exhibit more trade credit received compared with customers releasing fewer tweets.

Overall, these results support the argument that social media plays a role in building trust between suppliers and customers. I find that customers who engage in social media by tweeting benefit in terms of trade credit received, even in a situation of financial distress.

5.2 Information environment

My results suggest that customers benefit from social media disclosure because suppliers find it relevant during credit assessment. As such, in this section, I explore whether tweeting offsets the limited access to customers' up to date information through other channels. I differentiate customers by counting the number of analysts following. I assume that firms not covered by analysts have a poorer information environment. I expect the impact of the tweets on trade credit received being stronger for customers not covered by analysts. This analysis helps ensuring that corporate social

media improves the access to information around customers' activity, reinforcing the trust between the two parties.

[INSERT TABLE 7 ABOUT HERE]

Table 7 reports the results of regressing the number of tweets (*TWEETS*) on my three measures of trade credit received, conditional to analysts following. The variable *TWEETS* is significantly positive associated with trade credit received for firms with no analyst following (columns (1), (3), and (5)). The tests of the differences in the coefficients across groups of SMEs covered and not-covered by analysts (*ANALYSTS_D*) indicate that the coefficients are significantly different, with the exception for the variable *TR_CRED_ADJ_D*. Overall, the findings in Table 7 indicate that social media messages offset the lack of analysts' coverage. My results suggest that the impact of social media information on trade credit received is greater in the presence of limited up to date information from other channels.

5.3 Identification strategy: Sub-sample of firms active on Twitter

The relationship between corporate social media activity and trade credit received may be endogenous to firms' decision to tweet. Firm self-selection to tweet may be determined by factors which also define trade credit decisions. To mitigate this potential endogeneity concern due to sample selection, I re-examine the association between the level of activity on Twitter and trade credit received (H1), the type of relationship between number of tweets and trade credit received (H2), and the impact of tweeting on the speed of adjustment towards stable trade credit level (H3) for the sub-sample of firms active on Twitter.

[INSERT TABLE 8 ABOUT HERE]

Table 8 shows that firms with a higher number of tweets exhibit higher trade credit received (Panel A). The results are significant only for column (1). Panel B of Table 8 relaxes the assumption of linearity between number of tweets and trade credit received. I document that a low-to-moderate

number of tweets is positively associated with trade credit received. After the turning point, additional tweets negatively affect the relationship between number of tweets and trade credit received. Finally, I find support that tweeting positively impacts the speed of adjustment towards stable trade credit level. Overall, my results hold when I focus on firms active on Twitter.

5.4 Identification strategy: propensity score matching

To mitigate the concerns that unobserved characteristics between firms active and non-active on Twitter drive my results, I use a Propensity Score Matching procedure. I adopt a two-stage model procedure where in the first stage I compute the predictive probability on tweeting in a certain year. I use a one-to-one matching to the nearest neighborhood (propensity score at 0.001 level), without replacement. The matching is based on factors that may affect trade credit policies, i.e., size, growth, leverage, and type of industry. In the second stage, I test whether the activity on social media influences the trade credit received by using the matched sample from first stage.

Untabulated results confirm the positive association between number of tweets and trade credit received. As before, I observe decreasing marginal benefits with regards of trade credit received when customers release a high number of tweets. Finally, I find that tweeting positively contributes to the speed of adjustment towards stable trade credit level. Overall, these results validate my main inferences on the relationship between level of activity on Twitter and trade credit received.

5.5 Additional tests on the speed toward stable trade credit level

I conduct additional analyses to examine whether the speed of adjustment to stable trade credit level depends on firms' deviation from the stable trade credit level (Abdulla et al. 2017). I split my sample in firms being above (below) the stable trade credit level. Untabulated results show that firms more active on social media exhibit significant faster speed of adjustment to the stable trade credit level compared with firms less active on social media for both sets of firms above and below the stable trade credit level. For firms above the stable level, the results suggest that social media

contributes to revert towards the stable level, mitigating the costs of distress. For firms below the stable level, social media appears to avoid the risk of a shortage of trade credit received.

5.6 Definition of SMEs

To assess the sensitivity of my analysis to the definition of SMEs, I also use an alternative proxy to define small and medium firms. Following Beck et al. (2008), I define SMEs according to the number of employees. I re-estimate models (1) - (5) for firms with less than 250 employees. Untabulated results are very similar to my main findings.

6. Conclusions and future development

This study examines the impact of customers' level of activity on social media on trade credit received. I posit that tweeting strengthens the bonds between customers and their suppliers, with the result of enhancing trust. I also question the amount of social media information is beneficial to customers to increase their trade credit received.

Using a sample of SMEs listed on the AIM London over the period 2009-2016, I first find that customers' level of activity on Twitter is positively associated with trade credit received. Second, I show that the relationship between tweeting and trade credit received is positive from low-to-moderate number of tweets. A moderate-to-high number of tweets is associated with decreasing marginal benefits to customers with regards to trade credit received. Third, I document that the level of activity on Twitter is positively associated with the speed of adjustment towards stable trade credit level. Additional analyses shows that Twitter messages mitigate the decrease in trade credit received when customers disclose a negative event. Finally, tweeting has a larger effect when suppliers have limited access to up to date customers' information through other channels, i.e., no analysts following. Overall, these findings confirm my conjecture that messages on Twitter are beneficial to customers to enhance the relationship with their suppliers. My results also show that a high number

of tweets is associated with decreasing marginal benefits for customers because suppliers can only process a limited amount of messages.

This study is informative about the supplier-customer relationship literature by documenting the impact of voluntary disclosure through social media on trade credit received. My findings are also relevant to explain the role of corporate social media in enhancing business relationships, in particular for SMEs. This topic is relevant for this type of firm since policy makers have identified the access to financing as a major issue to work on in the next future (European Commission 2014b). My results are consistent with the idea that SMEs benefit from more open communication through social media with regards to trade credit financing. However, I caution to generalize my results. First, the turning point when tweets start generating 'social media fatigue' may differ across companies and type of activities. Second, my study does not include a full cost-benefit analyses of the use of social media for SMEs.

This current study presents two limitations which I aim to address in the future. First, my archival analysis use social media data from the customer-side. A potential feasible development of the paper is to validate my conjecture about the impact of social media activity on the relationship between suppliers and customers with experimental evidence. I would examine the role of social media in creating trust by studying how suppliers react to bad news communicated via Twitter by their customers. I expect that a supplier decreases a customer's payment terms (dependent variable) *less* when the customer communicates a firm's negative event via a Twitter account as opposed to a corporate website (first manipulation). I argue that Twitter is a more direct and transparent communication channel compared with traditional websites. It represents a signal of customers' willingness to openly communicate to their stakeholders. Customers communicating on Twitter would appear more trustworthy and suppliers would decrease less the original payment terms compared with firms using traditional websites. I also expect the effect to be *stronger* for bad news

that are of strategic nature (e.g., CEO departure and lawsuit) than for bad news that are of financial nature (e.g., financial loss and product recall) because strategic news is associated with higher future uncertainty (second manipulation). My study would draw on Elliott et al. (forthcoming) and Elliott et al. (2011) to investigate the role of trust in mediating the influence of disclosure medium on suppliers' willingness to extend shorter payment terms to customers.

The second issue of this study concerns the theoretical explanations of the results. I rely on the idea that social media messages enhance bonds among users and reinforce trust between two parties (Elliott et al. forthcoming). I draw on prior literature which shows the role of trust as a determinant in trade credit assessment (Guiso et al. 2004; Wu et al. 2014) to connect social media disclosure and trade credit received. Next, I use the notion of 'social media fatigue' to explain the decreasing marginal benefits of customers' high number of tweets on trade credit received. By building on the Limited Capacity Model, I argue that suppliers have limited cognitive capacity to process a high number of messages and/or the costs to analyze a large number of tweets exceed the benefits. I recognize that the current set of tests do not completely rule out the possibility that information economics explains my results.

The alternative view follows the conjecture that the release of messages on social media may produce relevant information to suppliers. Traditional voluntary disclosure literature (e.g., Healy and Palepu (2001) and Verrecchia (2001)) argues that voluntary disclosure is associated with lower transaction costs and better access to financing. In my context, voluntary disclosure on social media could contribute to support the well-documented suppliers' ability in acquiring information during their normal course of business. Suppliers would face less uncertainty and could better forecast future customers' performance and solvency. The reduced information asymmetry between suppliers and customers would lead to more trade credit received.

A potential avenue to test the information economics perspective is to explore the impact of social media communication for customers with high uncertainty surrounding their activities. I expect that corporate social media messages have a stronger effect on trade credit received when uncertainty surrounding customers' businesses is higher. Below I list and explain a number of cross-sectional tests to support the information perspective:

- Solvency Risk. I expect information released on social media to have a larger effect for distressed customers. Suppliers may fear that their customers will not be able to pay back the credit granted and may prefer to ask for shorter payment terms or more cash payments. Corporate social media information about their underlying customers' business may mitigate suppliers' concerns about customers' future performances and solvency ability.
- Litigation risk. Firms operating in certain industries, i.e., biotechnology, computers, electronics, and retail industries (Matsumoto 2002; Kim and Skinner 2012), are more likely to face lawsuits by their shareholders and stakeholders (Francis et al. 1994). Suppliers may consider business relationships with customers operating in these industries more risky. They may not know the number or the outcomes of the lawsuits their customers may face. Corporate social media information may (partially) offset the risk associated with the limited amount of information surrounding the legal risks of their customers.
- Level of innovation. The level of complexity and constant changes of innovative SMEs as well as the difficulties of accounting standards to reflect the underlying business activities (Smith and Cordina 2014) lead to high uncertainty surrounding the real activities of innovative SMEs. By issuing voluntary disclosure, innovative SMEs could reduce the high agency costs surrounding their activities and to support their constant search for financing. The release of information on social media would mitigate suppliers' concerns about customers' current business operations

and future performance. I expect that innovative customers would benefit more from corporate social media disclosure with regards to trade credit received compared with other types of firms.

- Risk of Misreporting. My conjecture is that social media activity has a stronger effect for those customers who appear to have a high risk of misreporting. Suppliers would complement their information about clients by processing both financial and strategic social media disclosure. By receiving more information from clients on social media, they may be able to trust more their suppliers and to mitigate the risk of misleading information. I could use the Beneish M-Score (Beneish 1999) to differentiate firms with low and high risk of earnings manipulation.
- Firm tenure. Young firms are usually associated with higher uncertainty compared with more established firms (McGee and Sawyerr 2003; Lewis and Churchill 1983). In addition, younger firm may have less established trading relationships with suppliers compared with mature firms, leading to higher information asymmetry and transaction costs (Wilner 2000). I expect that the age of a firm is negatively associated with the relevance assigned by suppliers to social media disclosure. I motivate this idea by suppliers' possibility to accumulate information over time.

Finally, by looking at the information dimension, a critical question is the amount of information suppliers can process and incorporate in their decisions. Past research shows the potential negative consequences associated with an excessive level of disclosure (Eppler and Mengis 2004; Schick et al. 1990; Shields 1983). Suppliers may not be able to process all customers' social media information. In the context of voluntary disclosure, several studies provide evidence that users may suffer from information overload (Shields 1983; Casey Jr 1980). Information may become noisy and the costs to process it may overcome the benefits. Information could also no more relevant to the business relations. Hwang and Lin (1999) document that repeated or diverse information negatively affects prediction accuracy. To assess the presence of information overload, I could use the change of policy in terms of words restriction per tweet. Starting from 7th November 2017, the limit of

characters per tweet has increased from 140 to 280. Firms can now disclose a significantly larger amount of information which suppliers would need to process. Consistent with the information overload perspective, I would expect that firms issuing longer messages experience decreasing marginal benefits after a smaller number of tweets compared with firms issuing shorter messages.[40]

Finally, future research could extend my results by looking at the different impact of social media activity between private and public firms. The listing status represents a major driver in terms of financing structure. Private firms usually exhibit high demand for trade credit (Abdulla et al. 2017), but also higher uncertainty and risk associated with their business. Social media may bring additional value for private firms in enhancing their relationship with suppliers.

[40] The recent date of policy change implies the need of few more months to have a sufficient amount of data to test the effects of this new policy on the supplier-customer relationship.

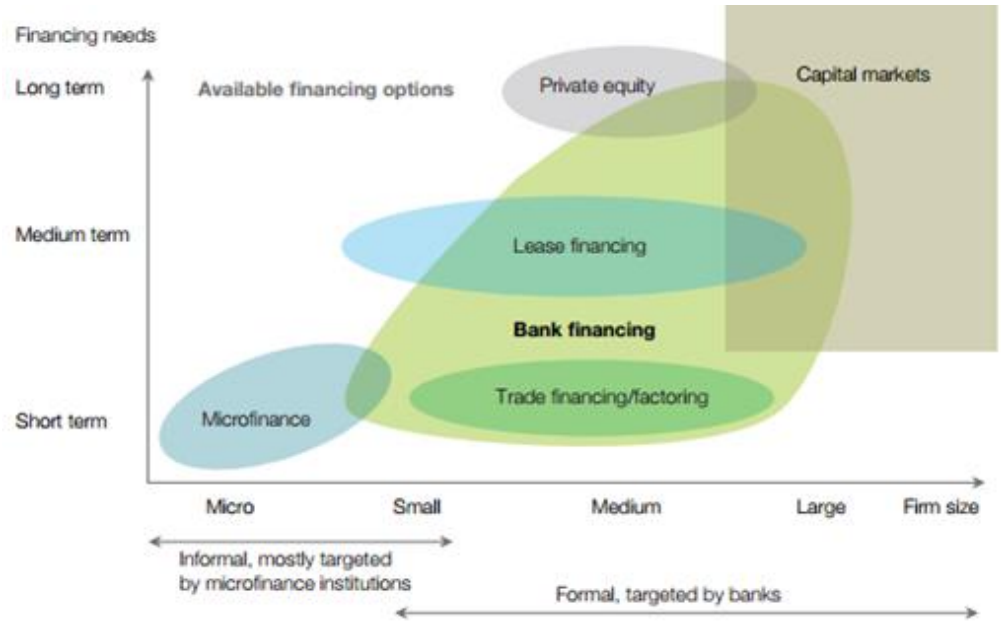
Appendix A – Definition of variables

Variable	Definition	Source
Trade credit received variables		
$TR\_CRED\_AMOUNT_t$	Trade credit received, measured as accounts payable in year t divided by total assets in year t-1.	EIKON
$TR\_CRED\_ABN_t$	Abnormal trade credit, measured as the unscaled residuals from the trade credit model in Equation (1).	EIKON
$TR\_CRED\_ADJ\_D_t$	Adjusted trade credit received, equal to 1 if accounts payable in year t divided by total assets in year t-1 are above the industry and year median, and 0 otherwise.	EIKON
$TR\_CRED^*_t$	Stable trade credit level, measured as the estimated values of Eq. (3).	
$SPEED\_SM_t$	Speed toward stable trade credit level, measured as the difference between the stable trade credit level in year t estimated for firms with low and high activity on social media ($TR\_CRED\_SM^*_t$) and trade credit at year t-1 ($TR\_CRED\_AMOUNT_{t-1}$).	
$SPEED\_IY_t$	Speed toward stable trade credit level, measured as the difference between the stable trade credit level in year t model estimated in each industry-year with at least 10 observations ($TR\_CRED\_IY^*_t$) and trade credit at year t-1 ($TR\_CRED\_AMOUNT_{t-1}$).	
Social media variable		
$TWEETS_t$	Twitter activity, measured as the number of tweets, divided by 1,000, released in year t.	Python script
Firm characteristics variables		
$SIZE_t$	Firm's size, measured as natural logarithm of total assets in year t.	EIKON
$GROWTH_t$	Firm's growth, measured as change in revenues from year t-1 to year t divided by revenues in year t-1.	EIKON
$ASSETS_t$	Total assets in year t (in thousand €).	EIKON
MTB_t	Market-to-book value in year t.	EIKON
ROA_t	Return on Assets, measured as net income in year t divided by total assets in year t-1.	
$LOSS_{t-1}$	Loss, dummy variable equal to 1 if net income is less than zero in year t-1, and 0 otherwise.	
LEV_t	Leverage, measured as total liabilities in year t divided by total	EIKON

	assets in year t-1.	
$LTDebt_t$	Long term debt, measured as long term debt in year t divided by total assets in year t-1.	EIKON
$CAPEX_t$	Capital expenditures, measured as capital expenditures in year t divided by total assets in year t-1.	EIKON
$COVERAGE_t$	Analysts' coverage, measured as natural logarithm of one plus the number of analysts following the firm in year t.	EIKON
$BIG4_t$	Audit, dummy variable equal to 1 if a firm's auditor is one of the Big-4 in year t, and 0 otherwise.	EIKON
$ANALYSTS\_D_t$	Analysts' coverage, equal to 1 if at least one analyst is following firm i in year t, and 0 otherwise.	EIKON
$NEG\_EVENT\_D_t$	Negative event, dummy variable equal to 1 if net income divided by total assets is within [-0.10, -0.40] in year t and greater than zero in year t-1, and 0 otherwise.	

FIGURE 1: Map of Financing Options

This figure shows the capital structure of firms according to their size. Trade credit received, classified as short-term debt, is a relevant financing source for firms of small and medium size.



Source: International Finance Corporation (World Bank)

TABLE 1: Sample definition

Table 1 shows the criteria used to define my final sample. The sample period is 2009-2016. I obtained data from EIKON. I excluded financial and insurance institutions using the Fama-French 12 industries classification.

Firm-year observations on the AIM London market between 2009 and 2016	7,032
Less firm-year observations from the financial and insurance industry	(1,085)
Less firm-year observations with negative equity	(468)
Less firm-year observations with balance-sheet total more than €43 million	(1,585)
Less firm-year observations with unavailable data	(1,419)
Final total number of firm-year observations	***2,475***

TABLE 2: Summary Statistics

This table displays the summary statistics for the main variables used in this study. The sample selection procedures are summarized in Table 1, and the variables are defined in Appendix A. All continuous variables are winsorized at 1%.

Panel A: Descriptive statistics

Panel A provides the descriptive statistics for the full sample included in the main test.

	(1) N	(2) Mean	(3) P25	(4) Median	(5) P75	(6) StDev
$TR\_CRED\_AMOUNT_t$	2,475	0.094	0.022	0.058	0.131	0.106
$TR\_CRED\_ABN_t$	2,475	0.093	0.051	0.080	0.122	0.059
$TR\_CRED\_ADJ\_D_t$	2,475	0.198	0	0	0	0.399
$TWEETS_t$	2,475	0.045	0	0	0.003	0.150
$SIZE_t$	2,475	9.223	8.597	9.416	10.04	1.037
$GROWTH_t$	2,475	0.075	-0.016	0.001	0.137	0.393
MTB_t	2,475	3.605	0.783	1.602	3.240	7.025
ROA_t	2,475	-0.446	-0.351	-0.107	0.035	4.972
LEV_t	2,475	0.368	0.116	0.266	0.492	0.427
$LTDebt_t$	2,475	0.041	0	0	0.025	0.104
$CAPEX_t$	2,475	0.037	0.002	0.011	0.037	0.071
$LOSS_{t-\backslash}$	2,475	0.680	0	1	1	0.466
$COVERAGE_t$	2,475	0.356	0	0	0.693	0.452
$BIG4_t$	2,475	0.138	0	0	0	0.345

Panel B: Correlation Matrix

Panel B reports Pearson's correlation coefficients for the full sample.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) TR_CRED_AMOUNT	1													
(2) TR_CRED_ABN	0.596	1												
(3) TR_CRED_ADJ_D	0.776	0.422	1											
(4) TWEETS	0.036	0.035	0.002	1										
(5) SIZE	-0.149	-0.252	-0.128	0.066	1									
(6) GROWTH	0.070	0.120	0.069	0.043	0.061	1								
(7) MTB	0.203	0.335	0.170	0.064	-0.338	-0.013	1							
(8) ROA	0.007	0.015	-0.001	0.010	0.076	-0.078	-0.066	1						
(9) CAPEX	0.005	0.014	-0.001	-0.026	0.059	0.017	-0.011	-0.053	1					
(10) LTDebt	0.037	0.069	0.030	0.018	0.100	0.098	0.033	0.013	0.166	1				
(11) LEV	0.287	0.203	0.225	0.057	0.012	0.409	0.077	-0.265	0.095	0.440	1			
(12) LOSS	-0.081	-0.149	-0.011	-0.024	-0.248	-0.053	0.136	-0.064	0.007	-0.036	-0.079	1		
(13) COVERAGE	-0.072	-0.126	-0.103	0.100	0.283	0.062	0.031	0.040	-0.017	0.005	0.004	-0.174	1	
(14) BIG4	-0.008	-0.016	0.030	-0.026	0.035	0.001	0.070	-0.007	0.091	0.052	0.067	0.001	0.052	1

TABLE 3: The Effect of Tweeting on Trade Credit

Table 3 reports the results of the test of the relation between the number of tweets (*TWEETS*) and my measures of trade credit received (*TR_CRED_AMOUNT*, *TR_CRED_ABN*, and *TR_CRED_ADJ_D*). Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I estimated Eq. (2):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 MTB_{i,t} + \alpha_5 ROA_{i,t} + \alpha_6 CAPEX_{i,t} + \alpha_7 LTDebt_{i,t} + \alpha_8 LEV_{i,t} + \alpha_9 LOSS_{i,t-1} + \alpha_{10} COVERAGE_{i,t} + \alpha_{11} BIG4_{i,t} + \text{Firm Fixed Effects} + \Omega_{i,t} \quad (2)$$

	(1) *TR_CRED_AMOUNT*	(2) *TR_CRED_ABN*	(3) *TR_CRED_ADJ_D*
TWEETS	0.037*	0.021*	0.097**
	(0.021)	(0.011)	(0.044)
SIZE	-0.024***	-0.007*	-0.089***
	(0.004)	(0.004)	(0.016)
GROWTH	0.008*	0.017**	0.065***
	(0.004)	(0.007)	(0.004)
MTB	0.003***	0.003***	0.009
	(0.000)	(0.000)	(0.001)
ROA	0.002**	0.002*	0.004
	(0.001)	(0.001)	(0.003)
CAPEX	0.031	0.021	-0.012
	(0.051)	(0.020)	(0.205)
LTDebt	-0.054	0.012	0.023
	(0.039)	(0.031)	(0.163)
LEV	0.040**	0.012	0.096*
	(0.017)	(0.012)	(0.050)
LOSS	0.006	-0.012***	0.034
	(0.004)	(0.003)	(0.022)
ANALYSTS	0.002	-0.013**	-0.006
	(0.003)	(0.005)	(0.020)
BIG4	-0.004	-0.003	0.006
	(0.003)	(0.004)	(0.016)
Constant	0.198**	0.099**	0.312
	(0.098)	(0.037)	(0.313)
Firm FE	YES	YES	YES
Observations	2,475	2,475	2,475
Adj. R-squared	0.652	0.601	
Pseudo R-squared			0.532

TABLE 4: Type of Relationship between Number of Tweets and Trade Credit Terms

Table 4 reports the results of the test on the type of relationship between the number of tweets (*TWEETS* and $TWEETS^2$) and trade credit received (*TR_CRED_AMOUNT*, *TR_CRED_ABN*, and *TR_CRED_ADJ_D*). Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I estimate Eq. (3):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS\_AMOUNT_{i,t} + \alpha_2 TWEETS\_AMOUNT^2_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 GROWTH_{i,t} + \alpha_5 MTB_{i,t} + \alpha_6 ROA_{i,t} + \alpha_7 CAPEX_{i,t} + \alpha_8 LTDebt_{i,t} + \alpha_9 LEV_{i,t} + \alpha_{10} LOSS_{i,t-1} + \alpha_{11} COVERAGE_{i,t} + \alpha_{12} BIG4_{i,t} + \text{Firm Fixed Effects} + \Omega_{i,t} \quad (3)$$

	(1) *TR_CRED_AMOUNT*	(2) *TR_CRED_ABN*	(3) *TR_CRED_ADJ_D*
TWEETS	0.125***	0.090**	0.061***
	(0.050)	(0.033)	(0.063)
$TWEETS^2$	-0.096***	-0.073***	-0.053***
	(0.029)	(0.026)	(0.039)
SIZE	-0.032***	-0.013***	-0.105***
	(0.005)	(0.004)	(0.017)
GROWTH	0.006	0.015*	0.062***
	(0.006)	(0.007)	(0.013)
MTB	0.000***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)
ROA	0.002**	0.002*	0.005
	(0.001)	(0.001)	(0.004)
CAPEX	0.019	0.011	-0.044
	(0.054)	(0.020)	(0.217)
LTDebt	-0.047	0.019	0.037
	(0.036)	(0.028)	(0.154)
LEV	0.040**	0.012	0.093*
	(0.017)	(0.012)	(0.050)
LOSS	0.006	-0.012***	0.035
	(0.004)	(0.003)	(0.021)
ANALYSTS	0.005	-0.011**	0.003
	(0.003)	(0.005)	(0.028)
BIG4	-0.006*	-0.005	-0.002
	(0.003)	(0.004)	(0.014)
Constant	0.275**	0.160***	0.490
	(0.117)	(0.054)	(0.362)
Firm FE	YES	YES	YES
Observations	2,475	2,475	2,475
Adj. R-squared	0.636	0.571	
Pseudo R-squared			0.520

TABLE 5: Social Media Activity and the Speed to Adjustment to Stable Trade Credit Level

Table 5 reports the results of the test of the relation between the level of social media activity and the speed of adjustment to stable trade credit level. Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a partial adjustment method over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. I first estimate Eq. (4):

$$TR\_CRED\_AMOUNT_{i,t} = \alpha_0 + \alpha_1 SIZE_{i,t} + \alpha_2 GROWTH_{i,t} + \alpha_3 MTB_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 CAPEX_{i,t} + \alpha_6 LTDebt_{i,t} + \alpha_7 LEV_{i,t} + \alpha_8 LOSS_{i,t-1} + \alpha_9 COVERAGE_{i,t} + \alpha_{10} BIG4_{i,t} + \Omega_{i,t} \quad (4)$$

Next, I estimate Eq. (5) in sequence to Eq. (4)

$$\Delta TR\_CRED\_AMOUNT_{i,t} = \alpha_0 + \alpha_1 SPEED_{i,t} + \alpha_2 TWEETS_{i,t} + \alpha_3 SPEED_{i,t} \times TWEETS_{i,t} + \text{Firm Fixed Effects} + \Omega_{i,t} \quad (5)$$

	(1) *ΔTR_CRED_AMOUNT*	(2) *ΔTR_CRED_AMOUNT*
SPEED_IY	0.772***	
	(0.019)	
TWEETS	0.027**	0.237**
	(0.018)	(0.017)
SPEED_IY × TWEETS	0.624***	
	(0.117)	
SPEED_SM		0.593***
		(0.020)
SPEED_SM × TWEETS		0.273***
		(0.071)
Constant	-0.354***	0.670***
	(0.069)	(0.068)
Firm FE	YES	YES
Observations	2,475	2,475
Adj. R-squared	0.598	0.409

TABLE 6: The Effect of Social Media Activity on Trade Credit in the Presence of a Negative Event

Table 6 reports the results of the test of the relation between trade credit received and the level of activity on social media, conditional to the release of a bad news due to a firm negative event. Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses. I estimated Eq. (6):

$$TR\_CRED_{i,t} = \alpha_0 + \alpha_1 TWEETS_{i,t} + \alpha_2 NEG\_EVENT\_D_{i,t} + \alpha_3 TWEETS_{i,t} \times NEG\_EVENT\_D_{i,t} + Controls + \text{Firm Fixed Effects} + \Omega_{it} \quad (6)$$

	(1) *TR_CRED_AMOUNT*	(2) *TR_CRED_ABN*	(3) *TR_CRED_ADJ_D*
TWEETS	0.029*	0.002*	0.090**
	(0.012)	(0.001)	(0.005)
NEG_EVENT_D	-0.012***	-0.007*	-0.026*
	(0.002)	(0.004)	(0.016)
TWEETS × NEG_EVENT_D	0.058***	0.024***	0.027
	(0.030)	(0.008)	(0.151)
SIZE	-0.043***	-0.017***	-0.154***
	(0.005)	(0.005)	(0.017)
GROWTH	0.012	0.016*	0.073***
	(0.008)	(0.009)	(0.027)
MTB	0.000***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)
ROA	0.001*	0.002**	0.003
	(0.001)	(0.001)	(0.003)
CAPEX	0.003	0.006	0.027
	(0.013)	(0.001)	(0.063)
LTDebt	-0.061***	-0.001	-0.103
	(0.020)	(0.028)	(0.125)
LEV	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
ANALYSTS	0.003	-0.010**	-0.002
	(0.005)	(0.005)	(0.028)
BIG4	-0.009	-0.006*	-0.014
	(0.002)	(0.003)	(0.014)
Constant	0.686***	0.337***	2.202***
	(0.047)	(0.051)	(0.204)
Firm FE	YES	YES	YES
Observations	2,475	2,475	2,475
Adj. R-squared	0.659	0.576	
Pseudo R-squared			0.536

TABLE 7: Information Environment, Social media activity and Trade Credit Received

Table 7 reports the results of the test of the relationship between number of tweets (*TWEETS*) and trade credit received, conditional to the information environment. Firms are split into not-covered and covered by analysts (*ANALYSTS_D*). I used model (2). I report p-values from χ^2-test of the difference in the coefficients for *TWEETS* across the two groups. Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses.

	TR_CRED_AMOUNT	*TR_CRED_AMOUNT*	*TR_CRED_ABN*	*TR_CRED_ABN*	*TR_CRED_ADJ_D*	*TR_CRED_ADJ_D*
	ANALYSTS_D		*ANALYSTS_D*		*ANALYSTS_D*	
	Not Covered	*Covered*	*Not Covered*	*Covered*	*Not Covered*	*Covered*
TWEETS	0.061**	0.004*	0.030*	0.005*	0.031*	-0.218
	(0.027)	(0.011)	(0.015)	(0.009)	(0.018)	(0.212)
Not Covered = Covered [p-value]	*[0.092]*		*[0.052]*		*[0.205]*	
Constant	0.568***	-0.488***	0.239***	-0.032	0.325	0.310
	(0.100)	(0.072)	(0.053)	(0.043)	(0.360)	(1.524)
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Observations	1,402	1,073	1,402	1,073	1,402	1,073
Adj. R-squared	0.561	0.731	0.508	0.612		
Pseudo R-squared					0.392	0.471

TABLE 8: Firms Active on Social Media

Table 8 reports the results of the tests of re-estimating Eq. (2), (3) and (5) for the sub-sample of firms active on Twitter. Variables are defined in the Appendix A. All continuous variables are winsorized at 1%. Models are estimated using a pooled regression specification over the period 2009-2016. ***, **, and * indicate significance level at the 1%, 5%, and 10% level, respectively. Standard errors corrected for industry- and year-level clustering in parentheses.

Panel A – Trade Credit Received

	(1) *TR_CRED_AMOUNT*	(2) *TR_CRED_ABN*	(3) *TR_CRED_ADJ_D*
TWEETS	0.027*	0.001	0.114
	(0.015)	(0.006)	(0.312)
Constant	0.511***	0.363***	5.365***
	(0.057)	(0.036)	(1.086)
Controls	YES	YES	YES
Industry × Year FE	YES	YES	YES
Observations	747	747	747
Adj. R-squared	0.267	0.542	
Pseudo R-squared			0.221

Panel B – Type of Relationship

	(1) *TR_CRED_AMOUNT*	(2) *TR_CRED_ABN*	(3) *TR_CRED_ADJ_D*
TWEETS	0.046**	0.046***	0.064**
	(0.038)	(0.016)	(0.375)
$TWEETS^2$	-0.036*	-0.006***	-0.006***
	(0.054)	(0.020)	(0.645)
Constant	0.224***	0.268***	0.860
	(0.064)	(0.028)	(0.858)
Controls	YES	YES	YES
Industry × Year FE	YES	YES	YES
Observations	747	747	747
Adj. R-squared	0.301	0.577	
Pseudo R-squared			0.216

Panel C – Speed of Adjustment

	(1) *ΔTR_CRED_AMOUNT*	(2) *ΔTR_CRED_AMOUNT*
SPEED_IY	0.302***	
	(0.074)	
TWEETS	0.033**	0.030***
	(0.014)	(0.021)
SPEED_IY x TWEETS	0.371*	
	(0.204)	
SPEED_SM		0.279***
		(0.080)
SPEED_SM x TWEETS		0.293*
		(0.091)
Constant	-0.024***	0.016
	(0.003)	(0.010)
Firm FE	YES	YES
Observations	747	747
Adj. R-squared	0.164	0.123

GENERAL CONCLUSION

1. Summary of main findings and practical implications

This thesis examines disclosure practices of SMEs with three stand-alone essays. The aim of each essay is to improve the understanding of the determinants and consequences of information asymmetry in an uncertain and complex environment. Disclosure by SMEs is important to market participants to reduce the uncertainty surrounding SMEs' activities.

To address my first research question about the type of financial information relevant to SMEs' investors and financers, I document in Chapter 1 that investors in innovative SMEs focus on operating efficiency, measured as the capacity to generate cash flows, rather than on earnings. In Chapter 2, I find that the release of information on Twitter before earnings announcements leads to higher investor attention when earnings are announced. The impact is larger for firms disseminating tweets containing financial information. In Chapter 3, I show that a low-to-moderate number of tweets is beneficial to customers with regards to trade credit received. A high number of tweets is negatively associated with trade credit. Finally, I document that social media messages contribute to faster adjustments towards a stable trade credit level.

Overall, my first set of findings confirms investors' and financers' interest in information on SMEs. Consistent with the current burgeoning research into the impact of firms' characteristics on accounting value relevance (Srivastava 2014; Barth et al. 2017), I show that investors look for information about the ability of SMEs to generate cash flows rather than profitability. In addition, investors value financial information released on social media by SMEs. The relevance of financial information about SMEs on social media is stronger in the absence of other sources of information, meaning that investors turn their attention to social media when they face difficulties in gathering financial information from elsewhere. Suppliers also value information released by SMEs on their social media by granting more credit. My findings suggest that suppliers consider customers active on social media to be more trustworthy.

From a managers' perspective, understanding which accounting information is relevant to investors and suppliers contributes to making business decisions more aligned with external expectations. They can provide information useful to investors and financers and improve their access to finance. My findings about the impact of financial information on firms' visibility suggest ways in which firms can overcome the limited visibility of activities arising from limited media and analyst coverage. By communicating financial information in the period before earnings announcements, they will attract higher investors' attention when earnings are announced. SMEs which are more active on social media also receive more trade credit.

Voluntary disclosure of financial information may therefore trigger a virtuous cycle for SMEs. The use of social media makes SMEs appear more trustworthy to their suppliers. SMEs thus obtain more trade credit. In this way, they improve their cash flows which I show to be highly valued by investors. Finally, these results may also help managers in being successful with new types of access to finance, e.g., crowdfunding. Small investors would have easy access to company information.

My second research question focuses on how market expectations impact on SMEs' decisions. In Chapter 1, I document that managers' investment decisions take account of investors' preference for valuing innovative SMEs on the basis of cash flows. Managers maximize their cash flows and manage earnings less than non-innovative SMEs. I complement these results in Chapter 2 by showing that SMEs exploit investors' limited attention by opportunistically disclosing information on social media. SMEs that are about to disclose bad news at earnings announcement will reduce the number of messages on social media, especially concerning financial news. The effect is even stronger where media coverage is limited.

These results show that SMEs incorporate market expectations into their decisions. Given that innovative SMEs consider cash flows to be more important than earnings, I extend Graham et al. (2005) on how managers make decisions related to performance measurement. My findings confirm that the Investor Recognition Hypothesis (Merton 1987) is also valid for SMEs. The latter

have the incentives, and possibility, to directly control the dissemination of news to avoid negative consequences on firms' values. Thus, when they are about to disclose bad news which may have negative effects on their firms' value, they will operate to reduce the attention around the company.

These results have also implications for regulators. SMEs appear to opportunistically exploit the limited external monitoring to which they are subject by selectively disclosing information on social media. Given the limited presence of other monitoring systems, regulators are expected to ensure that information on social media is sufficiently reliable to investors and financers.

My third research question investigates whether social media operate as a game changer for SMEs. One of the main issues SMEs face is limited external visibility. Business press and analysts tend to focus on large firms due to the broader audience interested in their news. In Chapter 2, I document that the release of information on Twitter before earnings announcements leads to higher investors' attention when earnings are announced. Additional analyses show that my core results are stronger for SMEs with no media coverage and no analyst following. These results are consistent with my conjecture that social media contribute to offset the limited sources of information for SME investors. Finally, the effect of Twitter activity is more significant after the decision of Bloomberg Database to include Twitter in its interface. This result indicates that investors care about corporate social media messages around earnings announcement time.

Social media also enhance the relationship between SMEs and one of their key financers, i.e., suppliers. In Chapter 3, I show that a low-to-moderate number of tweets is beneficial to customers with regards to trade credit received. A high number of tweets is negatively associated with trade credit. Finally, I document that social media messages contribute to faster adjustments towards a stable trade credit level. Overall, my findings suggest that tweeting contributes to reinforcing the trust between customers and suppliers, facilitating business negotiations between the two parties. Nonetheless, beyond a certain point, additional tweets appear to have a negative effect on trade credit received.

Taken together, my findings add to the growing literature on social media and accounting (Miller and Skinner 2015). I show that SMEs benefit from disclosing financial information on social media. SMEs that are more active on social media increase their visibility by attracting more investor attention at earnings announcements. In addition to Blankespoor et al. (2013), I show that social media messages before earnings announcement also matter to investors and that social media are beneficial to firms other than those operating in the high-tech industry. At the same time, I document that SMEs opportunistically disclose information on social media. I explain these results by the limited presence of other sources of information which may deter large firms from adopting opportunistic decisions. Finally, I show that social media plays a key role in enhancing the relationship with suppliers. My findings show that the number of messages influences the relationship between suppliers and customers. Consistent with the Limited Capacity Model (Bright et al. 2015), suppliers experience 'social media fatigue' when they receive an excessively high number of messages from their customers.

My findings on social media also have implications for accounting research from a methodology perspective. I show that the analysis of social media disclosure allows researchers to directly observe firms' and investors' decisions. In Chapter 1, I document that the textual analysis of social media messages supports traditional value relevance models based on the controversial association between accounting information and stock market prices (Barth et al. 2001; Holthausen and Watts 2001).

Finally, regulators have every interest in implementing disclosure rules adequate to SMEs' needs. Their aim is to set rules that both protect and stimulate investors in SMEs. My results show that investors and financers require information about SMEs, but in a different way compared with large firms. In addition, the limited presence of actors who disseminate and create information about firms, e.g., media press and analysts, require regulators to provide information channels and sites, e.g., websites or stock exchanges, that would enhance visibility of SMEs. In this way, regulators would actively contribute to reduce information asymmetry concerning SMEs' activities.

2. Limitations

My empirical study uses archival analyses to study the disclosure practices of SMEs. Despite efforts to mitigate the limits of this method, my thesis presents certain caveats which deserve discussion.

Firstly, in my study I use a homogenous definition of SMEs in order to provide reliable benchmarks. I focus on SMEs listed on the AIM London Stock Exchange which exhibit certain quantitative criteria. However, the term SME includes a whole range of firms, e.g., micro-firms, private firms, firms not listed on the AIM London Stock Exchange, which may present significant differences with the sample used in this thesis and my findings may not be applicable to other types of SMEs.

Secondly, my study is limited in its understanding of who are the investors in SMEs. My choice to focus only on SMEs listed on a single stock exchange partially mitigates the risk of significant differences in the ownership structure across firms. The lack of reliable databases makes it impossible to detect potential patterns according to type of ownership.

Thirdly, the analysis of the use of social media may raise concerns about the presence of endogeneity. Due to certain unobserved characteristics, firms may still reach the documented economic consequences (i.e., higher investors attention and trade credit received), regardless of their activity on social media. I included several tests widely used in the literature to mitigate this type of concern, including propensity score matching, firm fixed effects, and placebo tests. Another issue is that firms could self-select to be active on social media due to firm characteristics which would also explain the economic consequences reported. In the light of this, I re-performed my analyses on the sub-sample of firms active on social media or by looking at the pre- and post- social media adoption within the sub-sample of firms active on social media over the time period analysed.

Finally, the analysis of the effects of social media disclosure on the supplier-customer relationship relies on customers' social media activity. As discussed at the end of Chapter 3, I deduce my results from customers' reported trade credit received and social media activity, but I do not have direct evidence of suppliers' decisions and use of social media. A potential concern is that suppliers may not be active on social media, meaning that they grant trade credit as a result of unobservable private communication. I argue that the hypothetical scenario in which suppliers do not have a social media account does not invalidate my main findings. Suppliers have still full access to customers' social media information on the web or through financial databases. The experimental analysis discussed at the end of Chapter 3 on suppliers' decisions on payment terms following customers' bad news will contribute to validate my results that social media information enhances suppliers' trust in customers' activities.

3. Future research

Research on SMEs' disclosure is still scant and there are plenty of interesting avenues for future research. In this final section of my thesis, I discuss some potential research opportunities in this area.

First, the mechanisms behind SMEs' production of information are still a black box. It is unclear whether the top executives, i.e., CEO and CFO, directly manage the flow of financial information or whether SMEs delegate to an internal communication department or whether they prefer to externalize the communication system. The study of the decision-making process would help to address questions about (1) who influences disclosure content, and (2) what are the incentives driving the disclosure process. Availability of data represents a major difficulty for this type of study. The use of surveys and interviews may contribute to gather additional insights into how SMEs produce information.

Secondly, this thesis mainly focuses on voluntary disclosure conveyed through Twitter. Considering the evolving disclosure landscape (Miller and Skinner 2015), changes in technology

and media are likely to affect the type of disclosure and the associated impact on capital markets. Whereas the number of Twitter users has been stable over the last few years, I observe that the number of users of other social media platforms is substantially increasing.[41] Future studies could consider that firms increasingly release social media content other than text, e.g., images on Instagram, and videos on YouTube. In addition, my thesis focuses on two particular corporate situations, i.e., investors' attention at earnings announcement (Chapter 2) and financing through trade credit (Chapter 3). The use of corporate social media may influence firms' value which might not be captured in fundamentals. In this light, it would be interesting to examine whether social media plays a role in creating (or destroying) value in mergers and acquisitions.

Thirdly, future research could further explore how users react to information conveyed by SMEs. In my first chapter, I provide some preliminary evidence by using both market-based and social media reactions, e.g., number of retweets and favourites on Twitter. Social media also allows researchers to directly observe investors' talk. Prior studies on the impact of social media on capital markets mostly adopt a firm perspective (Jung et al. forthcoming; Blankespoor et al. 2013) or look at users' talks on specialized blogs, e.g., Seeking Alpha (Acharya et al. 2016). Research into this area would also allow SMEs to better understand which type of information investors demand and how SMEs can be more effective in decreasing information asymmetry.

Finally, I encourage the analysis of a larger *spectrum* of SMEs. Although disclosure is an important issue for growing SMEs, e.g., SMEs listed on the AIM London stock exchange, its relevance may differ across types of SMEs. Private SMEs may still prefer to communicate to their potential investors through private channels. It might be rewarding to examine whether different regulations, e.g., SMEs listed on Nasdaq NYSE, influence the information asymmetry between SMEs and their stakeholders and the incentives to disclose publicly available information. Considering the relevance of culture in corporate disclosure (Nobes 2013; Nobes 1983), the study

[41] For instance, the number of Instagram users increased from 600 to 800 million between December 2016 and September 2017 (+33%). Over the same period, the number of Twitter users increased from 318 to 330 million (+3.8%). Source: Statista 2018.

and comparison of different contexts, e.g., companies listed in civil laws or non-Anglo-Saxon countries, may help to provide a more complete picture of SMEs' disclosure practices.

General Abstract

This Ph.D. thesis studies the determinants and consequences of information asymmetry between investors and financers on the one hand, and managers on the other, in an uncertain and complex environment. I focus on Small and Medium Entities (SMEs) where the links between the two and the associated agency costs are particularly significant. SMEs are concerned by a whole host of contractual issues. The uncertainties surrounding SMEs' activities also affect investor valuations due to the risk of adverse selection. SMEs' disclosure may play an important part in reducing for market participants the uncertainty surrounding SMEs' activities.

My Ph.D. thesis, consisting of a general introduction and three chapters representing three self-contained essays, explores (1) the type of financial information relevant to SMEs' investors and financers; (2) managerial decisions following market expectations about SMEs' disclosure; and (3) the impact of social media on SMEs' disclosure.

In Chapter 1 'Accounting Information in Innovative Small and Medium Entities', I examine the relevance and use of accounting information in innovative SMEs. I document that cash flows are more highly associated with stock returns than earnings for innovative SMEs than for non-innovative SMEs. Using Twitter to directly measure investors' interest in firms' financial information, I also find that investors retweet and include as favorite more frequently information about cash flows than about earnings for innovative SMEs compared with non-innovative SMEs. I then show that innovative SMEs engage less intensively in earnings management, and that they focus more on operating efficiency through cash flow compared with non-innovative SMEs. These results are consistent with the argument that investors assign less importance to earnings in innovative SMEs, which reduces the temptation to manage earnings. My findings suggest that operating efficiency, and not earnings, constitutes the objective of investment decisions by innovative SMEs. In Chapter 2 'Investors' Attention and Social Media: Evidence from Small and Medium Entities', I investigate the relevance and use of corporate social media, i.e., Twitter, in SMEs around earnings announcements (EA). Given that investors' attention is limited, social media

may increase the saliency of a firm during EA. Social media is particularly relevant for SMEs as they operate in an uncertain environment and have limited media coverage. I show that firms sending more tweets and containing financial information before EA exhibit higher investors' attention at EA. I then document that SMEs communicate strategically on social media. Firms tend to send fewer tweets before disclosing bad news at EA. Cross-sectional analyses indicate that Twitter activity has a larger effect on investors' attention and is more opportunistic for SMEs with low media coverage and with less analyst following. In Chapter 3 'The Effect of Voluntary Disclosure on Trade Credit Received in Small and Medium Entities: Evidence from Social Media', I examine whether the level of activity on social media by SMEs impacts trade credit received from suppliers. Firstly, I show that the number of customers' tweets is positively associated with trade credit received. Secondly, I document that a low-to-moderate number of tweets leads to higher trade credit received; a moderate-to-high number of tweets has decreasing marginal benefits to customers with regards to trade credit received. Thirdly, I find that the level of activity on Twitter is positively associated with the speed at which a stable trade credit level is reached. Cross-sectional analyses show that customers experiencing a negative event exhibit lower trade credit received, but this effect is less pronounced among those firms which are more active on social media. Finally, tweeting has a larger impact on trade credit received when suppliers' access to up to date information is limited.

Résumé

Résumé étendu en français

Cette thèse s'intéresse à la communication financière des PME cotées et se compose de trois chapitres distincts. L'objectif de chacun de ces chapitres vise à analyser les déterminants et les conséquences de l'asymétrie informationnelle dans un environnement incertain et complexe. Les coûts d'agence sont élevés pour les PME cotées. Par exemple, ces PME doivent fréquemment avoir recours à des financements afin de poursuivre et développer leurs activités. En outre, les PME cotées expliquent fréquemment leur performance financière et opérationnelle aux investisseurs. Ces sociétés revoient leurs contrats en négociant avec des fournisseurs dans le cadre d'un rapport de force moins favorable que celui des grandes sociétés (Holmstrom 1989; Berger and Udell 1998). Les incertitudes concernant les activités des PME peuvent aussi influencer le risque de 'sélection adverse' pour les investisseurs (Magri 2007).

La communication financière des PME cotées est donc critique pour les investisseurs et pour les autres parties prenantes, comme par exemple les fournisseurs, car elle permet de réduire l'incertitude entourant les activités de ce type d'entreprise (Healy and Palepu 2001; Kothari 2001).

Une grande partie de la littérature académique se concentre sur les grandes sociétés cotées. Par conséquent, la façon dont les PME communiquent avec leurs investisseurs ou avec d'autres parties prenantes est peu connue (Allee and Yohn 2009). Les PME sont souvent critiquées pour la qualité médiocre de leurs rapports financiers. Les dirigeants ont la possibilité de prendre des décisions opportunistes et ces sociétés sont peu suivies par les analystes financiers ou les journalistes de presse économique (Lardon and Deloof 2014). Les normes comptables ont potentiellement une efficacité limitée pour les PME, en particulier pour les PME innovantes (Dechow and Skinner 2000; Smith and Cordina 2014). Les rapports financiers fournissent donc aux investisseurs peu d'informations utiles dans les évaluations des activités commerciales des PME. Les PME cotées présentent des difficultés dans l'amélioration de leur environnement informationnel car leurs ressources humaines et financières sont limitées (Bushee and Miller 2012).

Les médias sociaux sont un facteur de changement pour la communication des PME. Ils permettent aux utilisateurs une communication bidirectionnelle. De plus, les PME peuvent communiquer dans les médias sociaux avec leurs parties prenantes sans avoir besoin d'intermédiaires, comme par exemple des journalistes. L'incertitude concernant les activités des PME causée par une information limitée pourrait être réduite par l'utilisation des média sociaux. Enfin, l'utilisation des médias sociaux nécessite peu de ressources financières. Les utilisateurs peuvent s'inscrire sur les réseaux sociaux et partager des informations gratuitement. Les PME peuvent donc augmenter leur visibilité sans avoir besoin de ressources financières et humaines très élevées.

Cette étude, composée d'une introduction générale et de trois chapitres, analyse sous différents angles la question centrale de l'asymétrie informationnelle et des coûts d'agence dans les PME cotées. Les trois chapitres visent à répondre aux questions de recherche suivantes:

Première question de recherche: Quel type d'information financière concernant les PME est pertinent pour les investisseurs?

Deuxième question de recherche: Est-ce que les attentes externes concernant la divulgation d'informations par les PME influencent (a) les décisions d'investissement des dirigeants et (b) la stratégie de communication des PME?

Troisième question de recherche: Comment les nouvelles formes de communication, par exemple les médias sociaux, influencent l'environnement informationnel des PME cotées?

Le Chapitre 1, *'Accounting Information in Innovative Small and Medium Entities'*, étudie l'utilisation des informations financières des PME innovantes par les investisseurs.

La présence d'une forte asymétrie informationnelle générée par l'incertitude et la complexité des activités d'entreprise permet aux dirigeants une discrétion dans les choix de gestion très marquée. Dans ce contexte, les investisseurs doivent viser de sérieuses difficultés lorsqu'ils évaluent les décisions des dirigeants et les performances futures des entreprises, ce qui augmente le risque 'd'aléa moral' (Dechow et al. 2010; Dechow and Skinner 2000). Ces conditions sont

particulièrement marquées dans les PME innovantes, qui doivent également rechercher des financements pour développer leurs activités et où la présence d'actifs immatériels est particulièrement élevée (Smith and Cordina 2014). Suite à ces problématiques liées à la pertinence et l'utilisation des informations comptables pour les PME innovantes, ce premier chapitre examine deux questions de recherche:

(1) Quel type d'informations comptables du profit ou du flux de trésorerie est plus pertinent pour les investisseurs dans l'évaluation des PME innovantes?

(2) Est-ce que les dirigeants changent leurs décisions d'investissement en fonction de l'attention des investisseurs sur le type d'information comptable?

Les résultats des analyses montrent que les investisseurs se concentrent davantage sur la capacité des PME innovantes à générer des flux de trésorerie plutôt que du profit par rapport aux PME non innovantes. Ensuite, ce premier chapitre montre que les décisions des dirigeants sont influencées par les attentes du marché. Les dirigeants des entreprises innovantes se concentrent davantage sur l'amélioration de l'efficacité opérationnelle à travers l'augmentation du flux de trésorerie que sur la gestion du profit par rapport aux entreprises non-innovantes. L'analyse de la communication des entreprises dans les médias sociaux soutient les résultats de la recherche. Le nombre de retweets et de favoris pour les tweets contenant des informations sur les flux de trésorerie sont plus élevés pour les PME innovantes que pour les PME non innovantes. De plus, lorsqu'ils communiquent sur Twitter les dirigeants fournissent plus d'informations sur les flux de trésorerie que sur le profit. Les PME innovantes communiquent davantage, en nombre de tweets, et mettent l'accent sur les flux de trésorerie, en nombre de hashtags, que les PME non innovantes.

Dans ce premier chapitre, il est possible de remarquer que les PME innovantes intègrent dans leurs choix opérationnels et de communication financière le fait que les investisseurs soient plus intéressés par les flux de trésorerie que par le profit en matière d'information comptable.

Le Chapitre 2, *'Investors' Attention and Social Media: Evidence from Small and Medium Entities'* étudie l'impact de la publication volontaire d'information dans les médias sociaux, tel que

Twitter, par les PME cotées sur l'attention des investisseurs en présence d'une forte asymétrie informationnelle et d'une attention des investisseurs limitée.

En représentant une continuation du premier chapitre, dans lequel les attentes des investisseurs influencent les décisions d'investissement des PME cotées, ce chapitre analyse si les PME cotées adaptent leur stratégie de communication pour exploiter le fait que l'attention des investisseurs est limitée. Les deux questions de recherche examinées dans ce chapitre sont les suivantes:

(1) Quel est l'impact de l'information communiquée par les PME cotées dans les médias sociaux sur l'attention des investisseurs dans la période autour de l'annonce des résultats financiers?

(2) Est-ce que les PME cotées communiquent de façon stratégique dans les médias sociaux?

Ces deux questions de recherche sont principalement motivées par les difficultés des PME cotées à attirer l'attention des investisseurs lors des annonces des résultats financiers. Ce type d'entreprise n'arrive pas à attirer une attention suffisante à cause de leur taille et de la complexité de leurs activités (Bushee and Miller 2012; Cassar et al. 2015). Les innovations récentes en matière de communication, comme par exemple les médias sociaux, permettent aux PME cotées de transmettre des informations directement aux investisseurs en visant des coûts très limités.

Drake et al. (2012) montrent que les investisseurs commencent à chercher des informations dans la période précédant l'annonce des résultats financiers. Au cours de la saison des annonces de résultats financiers, des informations concurrentes sont véhiculées par les entreprises visant à attirer l'attention des investisseurs (Boulland and Dessaint 2017). La divulgation des informations dans les médias sociaux par les entreprises peut contribuer à augmenter les connaissances sur leurs activités et leurs performances futures. En même temps, la divulgation des informations dans les médias sociaux par une entreprise peut conduire à générer des informations en quantité trop élevée pour être analysée ou bien considérées comme non pertinentes. De plus, en considérant la présence limitée d'autre sources d'information, les dirigeants des PME cotées pourraient être tentés

d'exploiter l'attention limitée des investisseurs en divulguant de façon stratégique de l'information dans les médias sociaux (Jung et al. forthcoming).

Ce chapitre montre que l'utilisation de Twitter avant l'annonce des résultats financiers permet aux PME cotées d'attirer l'attention des investisseurs autour de l'annonce des résultats financiers. La magnitude de l'effet documenté est plus élevée pour les entreprises qui publient des tweets contenant des informations financières. La deuxième partie de ce chapitre met en évidence que les dirigeants exploitent l'attention limitée des investisseurs en communiquant de façon stratégique dans les médias sociaux. Leur but est de gérer la diffusion des nouvelles autour de l'entreprise en restant silencieux et en limitant leurs communiqués avant l'annonce de mauvaises nouvelles.

Enfin, les résultats empiriques sur l'impact de la décision de Bloomberg Terminal d'afficher les tweets dans sa base de données sont cohérents avec le fait que les investisseurs montrent de l'intérêt autour l'activité des entreprises dans les médias sociaux.

Dans l'ensemble, le deuxième chapitre montre que l'utilisation des médias sociaux contribue à augmenter la visibilité des PME cotées. L'utilisation des médias sociaux par les PME cotées compense la présence limitée d'autres sources d'information. Enfin, les résultats concernant la divulgation stratégique dans les médias sociaux par les PME cotées confirment l'idée que les dirigeants visent à réduire l'attention autour de l'entreprise et à réduire le risque de diminution de la valeur de leur entreprise lorsqu'ils sont sur le point de divulguer des résultats financiers pas assez satisfaisants. Ce chapitre donne un aperçu de ce que les PME cotées communiquent volontairement à leurs investisseurs à travers les médias sociaux et de comment elles le font.

Le Chapitre 3, *'The Effect of Voluntary Disclosure on Trade Credit Received in Small and Medium Entities: Evidence from Social Media'* étudie si utilisation des messages des médias sociaux par les clients améliore la relation avec les fournisseurs.

Le financement est un élément essentiel pour le développement et la croissance des entreprises et la question est particulièrement pertinente pour les PME cotées, car l'accès au

financement leur est fréquemment difficile. Les financeurs perçoivent souvent les PME cotées comme sujets sensibles au risque de mauvaise conduite et de faillite (Agostino and Trivieri 2014). Alors que les deux premiers chapitres de cette thèse se concentrent davantage sur la relation entre les PME cotées et les investisseurs, le troisième chapitre se concentre sur un autre type de fournisseurs de capitaux, c'est-à-dire les fournisseurs.

Le crédit commercial reçu, qui réduit les besoins de fonds de fonctionnement, représente une source fondamentale pour le financement des PME cotées (Hall 2010; Robb 2002). La relation entre les fournisseurs et les clients est souvent basée sur des transactions commerciales répétées et sur la volonté des fournisseurs d'étendre le crédit commercial (Wu et al. 2014). Dans ce contexte, la disponibilité d'information et la confiance mutuelle jouent un rôle fondamental dans l'évaluation des performances futures des clients (Berger and Udell 2006). Les deux questions de recherche analysées dans ce chapitre sont les suivantes:

(1) Est-ce que les médias sociaux peuvent renforcer la relation entre les clients et leurs fournisseurs en améliorant la confiance parmi les deux parties?

(2) Quel est le nombre de messages sur les médias sociaux dont les clients peuvent bénéficier afin d'améliorer leur rapport commercial avec les fournisseurs?

Ce chapitre montre que les PME cotées qui sont plus actives sur Twitter ont un niveau de crédit commercial plus élevé que les entreprises moins actives sur Twitter. Les résultats montrent qu'une quantité modérée de tweets est positivement associée au crédit commercial reçu, alors qu'une quantité élevée de tweets entraîne des avantages marginaux décroissants pour les clients. Enfin, ce chapitre montre que les clients les plus actifs sur les médias sociaux arrivent plus rapidement à atteindre leur niveau cible en termes de crédit commercial. Des analyses supplémentaires montrent que les fournisseurs apprécient les tweets des clients lors d'événements négatifs et lorsqu'ils ont un accès limité à des informations à jour à propos de leurs clients.

Dans l'ensemble, les résultats suggèrent que l'utilisation des médias sociaux permet aux PME cotées d'améliorer la relation avec leurs fournisseurs. Ces derniers sont également plus ouverts

à renégocier leurs conditions contractuelles, permettant aux clients d'ajuster leurs besoins de financement plus rapidement. Cependant, au-delà d'un certain nombre de tweets, des messages sur Twitter supplémentaires ont un effet négatif sur la relation fournisseur-client, suggérant que les fournisseurs peuvent souffrir de la ‘fatigue des médias sociaux’ (Bright et al. 2015).

Cette thèse contribue à la compréhension des déterminants et des conséquences de l'asymétrie informationnelle dans le contexte des PME cotés. D’abord, les résultats fournissent des éléments de preuve supplémentaires concernant les décisions des investisseurs et des dirigeants dans un environnement incertain et complexe, en particulier celles concernant la compréhension de l'information comptable pertinente pour les investisseurs. Au-delà des études existantes qui posent la question de la pertinence de la valeur comptable entre différents types d'entreprises (Srivastava 2014; Barth et al. 2017; Lev and Gu 2016), cette thèse utilise des preuves directes que les investisseurs des PME innovantes s'intéressent davantage aux flux de trésorerie qu’au profit. De cette façon, ces résultats fournissent un aperçu de l’importance de la comptabilité dans la ‘nouvelle économie’. Ces résultats contribuent au débat sur la relation entre les décisions des investisseurs sur le marché financier et celles managériales (Dumontier and Raffournier 2002). Les deux premiers chapitres indiquent que l'attention des investisseurs focalisée sur certaines informations comptables des PME cotés pousse les dirigeants à maximiser leurs flux de trésorerie et à optimiser stratégiquement les divulgations des informations.

Deuxièmement, cette thèse contribue aux études qui analysent l'attention des investisseurs et la divulgation volontaire des informations par les entreprises (Boulland and Dessaint 2017; Lee et al. 2015) en documentant que l'utilisation des médias sociaux par les entreprises permet de surmonter la pénurie d'informations à propos des activités des PME cotées. Les investisseurs paraissent intégrer dans leurs activités décisionnaires les informations véhiculées dans les médias sociaux par les entreprises. En outre, le deuxième chapitre montre que les dirigeants des PME cotées utilise en manière opportuniste l'attention limitée des investisseurs (DellaVigna and Pollet

2009; Hirshleifer and Teoh 2003; Hirshleifer et al. 2009) en mettant en place des stratégies de divulgation opportunistes avant l'annonce de mauvaises nouvelles.

Troisièmement, cette étude contribue à la compréhension du rôle de la divulgation volontaire par les entreprises dans les décisions de financement, en particulier celles liées au crédit commercial reçu. En montrant que les messages par les PME cotées dans les médias sociaux améliorent la relation fournisseur-client, ces résultats contribuent à la recherche existante à propos de l'importance de la confiance dans la concession du crédit commercial (Wu et al. 2014). Les résultats contribuent également à la compréhension de la relation entre le niveau d'activité des médias sociaux et le crédit commercial reçu, en particulier en expliquant les mécanismes que les fournisseurs suivent pour prendre des décisions à propos du crédit commercial.

En plus de ces contributions, cette thèse a des implications pertinentes pour les chercheurs intéressés par la divulgation volontaire des informations par les entreprises. Dans le contexte des PME cotés, les médias sociaux d'entreprise apparaissent comme un canal de communication capable d'attirer l'attention des investisseurs et de renforcer la confiance entre fournisseurs et clients. Les résultats montrent le rôle complémentaire pour les PME cotées des médias sociaux par rapport à d'autres sources d'information, comme par exemple les médias traditionnels et les analystes financiers. Cette thèse présente également des innovations méthodologiques dans le domaine de la comptabilité, étant donné que les médias sociaux permettent aux chercheurs d'observer directement quel type d'informations les investisseurs jugent pertinentes. En utilisant les médias sociaux, les chercheurs peuvent donc dépasser les limites de la recherche sur la pertinence de la valeur lorsque l'observation de l'utilisation de l'information comptable par les acteurs du marché est indirecte (Barth et al. 2017; Dumontier and Raffournier 2002; Holthausen and Watts 2001). Cependant, le premier chapitre soutient avec des évidences empiriques la validité des modèles traditionnels de pertinence de valeur par l'analyse des réactions des investisseurs sur le marché financier à l'information comptable divulguée par entreprises. Enfin, le premier et deuxième

chapitre utilisent et adaptent le dictionnaire Lerman (2016) sur l'information comptable pour l’analyse des informations dans les médias sociaux par les PME cotées.

Ce travail a également des implications pour les PME cotées. Étant donné que les investisseurs différencient leur intérêt dans les informations comptables selon le type d'entreprise, les dirigeants peuvent vouloir mieux adapter leur façon de communiquer pour mieux répondre à la demande d'information des investisseurs. Les résultats indiquent ensuite que les médias sociaux ne représentent pas seulement un canal de marketing, mais qu'ils sont également efficaces pour attirer l'attention des investisseurs et améliorer les relations commerciales et de financement pour les entreprises de petite et moyenne taille. En utilisant les média sociaux, les PME cotées peuvent économiser des ressources importantes qu'elles utiliseraient autrement pour développer des services de relations avec les investisseurs comme précédemment suggérée par l’étude de Bushee and Miller (2012).

Enfin, les résultats de cette thèse peuvent être intéressants pour les régulateurs. Ils illustrent les mécanismes que les entreprises suivent dans des contextes de complexité et d'incertitude. À la suite de ces résultats, les régulateurs pourraient envisager de promouvoir des politiques qui facilitent une divulgation plus flexible pour les PME cotées en termes de canaux de communication et de contenu de l’information.

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