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The consequences of being on the agenda: The effect of media and public attention on firms' stock market performance

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Abstract: This study applies agenda setting theory to understand how firms' financial performance is affected by both the news media and the public agenda. Using content and time-series analysis for the data of five Dutch firms (period 2009–2013), we demonstrate that media attention (newspaper coverage) and public attention (GoogleTrends search) for a firm affect stock market ratings. As hypothesized, the effect of media attention was found to be negative whereas the effect of public attention was positive.

Keywords: Agenda setting, stock market, news media, public, attention

1 Introduction

Agenda setting has become one of the key theories used to investigate the interaction between businesses and media. Focus is on the extent to which issue attention in the media influences the corporate agenda and reputation (Boyer, 2006; Carroll and McCombs, 2003; Panico, Raithel, and Michel, 2014), and on how firms try to affect the media agenda (Kioussis, Popescu, and Mitrook, 2007). While previous studies in the corporate realm have provided a lot of insights into the role of media in general and issue attention specifically, several questions remain unanswered.

In this study, we try to contribute to the existing body of knowledge in three ways. First of all, we bring the (financial) performance of a firm as reflected in fluctuations in its stock market ratings into the equation. The focus on the stock market renders it possible to test the cumulative effects of information produced or the attention given by different media to companies (Saxton and

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Anker, 2013). In this way, the current study contributes to the rising demand for greater integration of the fields of communication and financial and economics (Lee, 2014; Saxton and Anker, 2013; Wildman, 2008) and the need to include business-relevant outcome factors (Kleinnijenhuis, Schultz, Oegema, and van Atteveldt, 2013). Second, the study relies on (pooled) time series analysis to assess the effects of attention given to a firm on fluctuations in the firm's stock market rating. The chosen approach enables us to sustain claims on temporal ordering of the variables and thus brings us a step closer to assessing causality. It moves beyond descriptive and correlational analyses that have populated the corporate communication field to a large extent in the past decades. Third, our study considers both mass media content and public attention reflected in search behavior on Google.

Agenda setting offers a very powerful and straightforward approach for understanding one of the basic content characteristics of media coverage and its effects. In most instances, the focus is on the attention certain issues receive in the media and how this issue attention translates to other arenas such as parliaments or the general public. It has been widely applied, mainly in the institutional realm of politics (political agenda setting, Walgrave and Van Aelst, 2006) and public opinion research – where the public's concerns with problems are often taken as a dependent variable (e.g., Soroka, 2002). The last years have witnessed a wide variety of extensions of the agenda setting approach – relating to second-order agenda setting that deals with issue attributes (Carroll and McCombs, 2003), discussing the salience of actors instead of issues (Hopmann and Shehata, 2011), and considering public attention as an explanatory variable for other agendas (e.g., Baumgartner, De Boef, and Boydston, 2008). Furthermore, assessing the multi-directional relationships that exist between media, the public, and societal actors in their issue attention has become a key concern of many scholars (e.g., Walgrave and Vliegenthart, 2012).

Since our main interest is in corporate performance, we focus on the attention devoted to firms in the media coverage, but also among the public in terms of its search behavior on the internet (GoogleTrends data). In general, agenda setting theory discusses the reciprocal effects between the media and public agendas. However, both agendas are assumed to be capable of affecting firms' stock market ratings. We focus our study on a variety of large Dutch firms that are rated in the Dutch stock market index AEX for the period 2009–2013. Our pooled time-series analysis reveals that the observed effects on stock returns of both the media agenda and the public agenda are statistically significant. While media attention has a negative effect (i.e., if a company is mentioned more often it results in decreases in stock market performance), the effects of public attention are positive. We explain these differential effects by pointing at the

tendency for journalists to use a negative tone in news coverage and the notion that this type of negative information has a larger impact than positive information. These findings provide an insight into the pivotal societal role and the agenda setting power of both the news media and the public. In their attention, the news media and the public are found to be capable of shaping the performance of prominent businesses.

2 Theory

2.1 Agenda setting and stock market

Communication science has widely examined the agenda setting effects of news coverage about the economy (e.g., Behr and Iyengar, 1985; Wu, McCracken, and Saito, 2004). Agenda setting refers to the idea that the importance that individuals attribute to an issue is influenced to a considerable extent by the attention that media devote to this specific issue (McCombs and Shaw, 1972). Agenda setting theory asserts that media can determine what individuals think about. For example, a high level of media coverage about certain economic issues makes this an important issue in the eye of individuals as well. In particular, this attention might have an impact on investors, as they are generally interested in this specific type of economics-related issue. Therefore, the amount of attention devoted to certain aspects of the economy or business might result in increased awareness of these economic aspects among the public, and investors and might in turn affect stock market ratings (Jang, 2007). In general, agenda setting studies have explored the effects of media coverage of the economy (e.g., recession news) on overall stock market ratings.

Thus, public perception is often seen as an outcome variable. However, the public agenda can also be considered as an explanatory variable in the context of the stock market (Bollen, Mao, and Zeng, 2010). Therefore, we emphasize both media and public agendas to explain stock market ratings of firms. Generally speaking, public and media attention given to a firm is crucial for the corporate reputation (DiStaso, 2012), given the fact that information that is transmitted via the media and among the public is considered more reliable and credible than direct corporate communications (Gandy, 1982). Accordingly, corporate reputation is found to be formed in the interplay between the firm, news media, and the general public (Kleinnijenhuis, Schultz, Utz, and Oegema, 2013; Schultz, Kleinnijenhuis, Oegema, Utz, and van Atteveldt, 2012; van der Meer, Verhoeven, Beentjes, and Vliegenthart, 2014). As only a few studies have

investigated aspects of the complex relationships among news media attention, public attention, and stock market ratings (e.g., Hester and Gibson, 2003; Wu et al., 2004), we aim to provide a starting point in investigating the effects of attention on ratings. In this study we ask ourselves to what extent the actual real-life stock market performance of a specific firm can be explained by media attention and public attention, and how the media and public affect corporate performance in terms of effect direction.

2.2 Media agenda and stock market

Newspapers, as mass media outlets, play a crucial role in the dissemination of information to a broad audience of individual investors (Fang and Peress, 2009). Given the media's reach, media coverage is generally assumed to have a serious impact on stock market ratings and the economy in general. Hence, growing interest in the relation between media and the market exists among scholars and practitioners (Fang and Peress, 2009). However, only a few studies actually explore this relation, and the literature may advance more empirical evidence, especially on the macro level (Scheufele, Haas, and Brosius, 2011).

Media coverage, including rumors and gossip, are found to be an important source for investors to rely on (e.g., Fang and Peress, 2009). Both professional investors and financial journalists indeed indicate that news-media coverage is an important source for stock market traders (Davis, 2005; Oberlechner and Hocking, 2004). Especially small or private investors rely largely on news media when searching for information about firms, industries, or stocks (Barber and Odean, 2008). Since professional traders often receive their information from other sources they may not be influenced directly (Davis, 2005; Oberlechner and Hocking, 2004). Newspaper information already seems to be outdated when published, at least for the more experienced investors (Scheufele et al., 2011). Nevertheless, they might anticipate media coverage in order to bet on a trend caused by movements of small investors, which can be seen as a kind of a third-person effect (Fang and Peress, 2009; Scheufele et al., 2011). Accordingly, several empirical studies observed the causal relationship between media coverage and general stock market ratings (e.g., Akhtar, Faff, Oliver, and Subrahmanyam, 2011; Birz and Lott, 2011; Engelberg and Parsons, 2011; Fang and Peress, 2009; Tetlock, 2007). Therefore, agenda setting influences are considered relevant, also on the level of individual firms. Indeed, research points to the fact that more attention media pay to a stock increases movement in that specific stock price (Alanyali, Moat, and Preis, 2013; Griffin, Hirschey, and Kelly, 2011). Thus, the most basic characteristic of the coverage of an individu-

al's firm – the amount of attention it receives in the media – may predetermine investors' decisions, and hence firms' specific stock market ratings.

2.3 News media effect direction

The direction of the effect of a firm's attention is not straightforward. In the literature that examines the connection between news coverage of the economy and real-world economic indicators, it is often suggested that media tend to overemphasize negative economic news (Harrington, 1989; Hester and Gibson, 2003; Wattenberg, 1985). Accordingly, research has consistently found that negativity is a content characteristic with substantial influence on journalistic selection processes (Eilders, 2006; Harcup and O'Neill, 2001; Shoemaker and Cohen, 2006). In the context of economic news, several studies investigated the effect of negative frames on the stock market (Akhtar et al., 2011; Fang and Peress, 2009; Tetlock, 2007; Tetlock, Saar-Tsechansky, and Macskassy, 2008). In general, these studies show the downward pressure of negatively framed news on the stock market. So, based on the notions that (a) economic news is often negative, (b) a negative tone in the news has a negative effect on the stock market, and (c) this size of this effect exceeds that of the effect of positive news (Soroka, 2006), we argue that when a firm is simply mentioned in the media, this will negatively affect their stock market ratings. In other words, due to journalists' and the general media's emphasis on negative news, firms' media coverage might decrease their performance on the stock market (Fang and Peress, 2009). This negative effect is expected to be even stronger, knowing that negative information carries more value compared to positive information – both for journalists and the general public – and in turn has a more pronounced effect, therewith overshadowing or outweighing the potential positive effect of positive coverage. Soroka (2006) confirmed this negativity bias as he found that negative economic news had a stronger effect on public economic pessimism than positive economic information.

On the level of individual companies, the negativity bias might imply that media attention to a firm equals a negative association or contextualization for the firm, which in turn might negatively affect corporate performance. Indeed, it is documented that stocks with higher dispersion or attention in analysts' earnings forecasts earn relatively lower future returns than otherwise similar stocks (Diether, Malloy, and Scherbina, 2002). Additionally, in line with the negativity bias, (highly regarded) listed analyst coverage decreases firm's stock return synchronicity in China (Xu, Chan, Jiang, and Yi, 2013). Hence, this underlines the notion that stocks with high media coverage earn a lower return

than stocks in oblivion. In sum, a negative effect is expected due to the media's tendency to report in a negative manner. Hence, the first hypothesis reads as follows:

[H1] The more news media attention a certain firm receives, the lower its stock market ratings will be.

2.4 Public agenda and stock market

Compared to the media agenda, the power of the public to set agenda was often regarded as limited due to unequally distributed resources in a competitive environment (Pan and Kosicki, 2001). However, the internet has empowered the ordinary citizen and the public in general by providing a platform to engage in mass-to-mass communication (Castells, 2007), thereby considerably leveling the playing field and enabling the public to set the agenda. Accordingly, the emergence of social media has generated renewed attention to the idea of reversed agenda setting (Neuman, Guggenheim, Jang, and Bae, 2014). The so-called reversed pattern considers the possibility that the correlation between the agenda (and framing) of news media and publics could also represent causation in a reversed direction (McCombs and Shaw, 1972). Indeed, some empirical studies demonstrated that online public agendas can have an impact on the media agendas (Neuman et al., 2014; Zhou and Moy, 2007). Thus, public attention can precede media coverage and therefore impact the broader public opinion and the overall attention given to a specific issue (McCombs, 2004). Thus, the public agenda is not only a dependent variable in the interaction with other agendas, but can also be considered an explanatory variable. News media and journalists may be responding to the public agenda, but arguably investors might also rely on how salient certain organizations are in the public sphere.

The anecdotal evidence is growing that online communication by the public affects stock prices. The public might be influential as their widespread communication contains new information or it might even represent successful attempts to manipulate stock prices (Tumarkin and Whitelaw, 2001). Investors can benefit from a wide assortment of general and financial information available online. Hence, via the use of the internet, personal investors learn from others through open discussion facilitated by, for example, financial forums. Large numbers of investors may follow the buy-and-sell recommendations posted online, or day traders may recognize and anticipate the momentum generated by investors who follow certain messages (Tumarkin and Whitelaw, 2001).

Previous studies have drawn comparisons between the public's online communication and stock market ratings. In general, it is documented that the public's online communication correlates considerably with stock market movement (Antweiler and Frank, 2004; Bollen et al., 2010; De Choudhury, Sundaram, John, and Seligmann, 2008). In sum, the online public might play a substantial role in the movement in stocks.

2.5 Effect direction public

Recent research found that the sentiment in public communication plays an important role in influencing stock market ratings. As financial and investment decisions are significantly driven by peoples' emotions and their mood (Lerner and Keltner, 2001; Lerner, Small, and Loewenstein, 2004; Loewenstein, Weber, Hsee, and Welch, 2001; Shiv, Loewenstein, Bechara, Damasio, and Damasio, 2005), it is reasonable to assume that the public mood and sentiment can indeed drive stock market ratings. Empirical research confirmed this hypothesis by documenting a clear (Granger-causal) link between mood communicated in web-based social data and stock market indicators (Bollen et al., 2010; Gilbert and Karahalios, 2010).

Previous studies observed that only the public's positive attention (i.e., calmness and happiness as sentiment) correlated with stock market ratings (Bollen et al., 2010). This might be an indication that, as opposed to the assumed negative effect of general media attention, overall public attention has a positive effect on the considerable stock market ratings of a firm. Public attention might be an expression of public awareness, which in turn indicates interest and support for the firm concerned. Therefore, the increase in public awareness might be considered (in the eye of investors) an indication of the firm's economic strength or growth, or it might (partly) reflect the search behavior of (smaller) investors themselves. At a certain point, the public might search for new information regarding a firm rather than follow the news. Arguably, the public's online expression of its awareness regarding a firm might be a predictor of positive stock market returns. Therefore, our second hypothesis is:

[H2] The more public attention a certain firm receives, the higher its stock market ratings will be.

3 Methods

The purpose of the current study is to capture the short-term effects on firms' stock market ratings of being on the general news media agenda and the public

agenda. In order to grasp the general agenda setting effect of the media, this study focuses on the salience of the firms on the first five pages of the national newspapers rather than including economic or business sections. Additionally, to measure public awareness, Google search queries of the firm's name are used as these have previously been shown to provide early indicators of, for example, disease infection rates and consumer spending (Choi and Lin, 2009). Using weekly time-series analyses for the periods from 2009 until 2013, the effect of media and public salience on stock market ratings will be determined.

3.1 Data collection

In order to determine to what extent being on the agenda has an effect on firms' individual stock market ratings, five Dutch firms were selected. The selected firms are amongst the Dutch firms with the highest cap weighting, and differ in terms of the sector they operate in to avoid exposing patterns that are too context or industry-specific: (1) Ahold, an international retailer, (2) AEGON, a multinational life insurance, pensions, and asset management company, (3) ING, a bank, (4) KLM, the flag carrying airline of the Netherlands, and (5) Royal Dutch Shell, a multinational oil and gas company. Moreover, these companies were selected as they are well-known firms among the Dutch public. To analyze how the salience of the firms influences their stock market performance over time, the time period between January 2009 and the end of 2013 was selected.

First, to see how often the five firms were salient in the news media, all national Dutch news articles in which the name of the firm was mentioned in the headline or the text were incorporated for analysis. Only the articles that appeared on the first five pages of the newspapers (i.e., *Algemeen Dagblad*, *De Telegraaf*, *Het Financieele Dagblad*, *Het Parool*, *Metro*, *Nederlands Dagblad*, and *Reformatorisch Dagblad*) were selected in order to look at the general news media agenda and to avoid incorporating, for example, economics-specific news sections. The search strings (firm names) were entered in LexisNexis; subsequently, the frequency of appearance on the media agenda was documented for each week between January 2009 and the end of 2013. The weekly numbers of articles that mention the firm are used as the independent variable.

Second, public awareness of the firms was measured by the number of daily Google searches for the name of the firm in the Netherlands. Weekly variations in GoogleTrends searches for the firms were used to measure changes in public awareness of the firm of involved internet users who wanted to find out more about a firm than what is presented in the media. This score

is standardized in comparison to the week in which a firm was most often mentioned, which gets a score of 100. This kind of behavioral measurement deviates from traditional ways of measuring public salience, for example, by using variants of the ‘most important problem’ question (Wlezien, 2005). Obviously, it automatically excludes citizens who do not use the internet, or do not use the internet to obtain news (Kleinnijenhuis, Schultz, Utz, and Oegema, 2013), and there might be a lot of people who have a company ‘top-of-mind’ but do not act upon that in their internet search behavior. However, no other instruments to tap public awareness (e.g., survey studies about corporate salience) were available, and we think it is more than reasonable to assume that, at the aggregate level, increases in search behavior reflect increases in public awareness about the firm.

Third, to include the financial performance of the five individual firms, the averages of the weekly stock exchange rates of the five firms were extracted from the website AEX.nl. We log-transform this stock market rating variable, as is commonly done in economics to account for the non-normal distribution of the variable (e.g., Hollanders and Vliegenthart, 2011). Our combined dataset contains a total of 1,300 observations, 260 weeks for each of the firms.

3.2 Salience and tone

The objective of this study is to explore the effect of salience or awareness on stock market ratings rather than the effect of tone. Hence, we are interested in the average or aggregate effect where it is possible that there are instances in which there is positive media attention (or negative public attention), and stocks are positively (or negatively) affected, but that these instances are outweighed by the bad news (or positive public attention). However, as the hypotheses formulate expectations about the directionality of the effect of media and public agendas, several underlying assumptions are made regarding the overall tone of both agendas. While a full test of directionality is beyond the scope of this paper, we conducted two validation tests that are described below.

To obtain an indication whether media coverage is on average more negative, both authors coded a stratified sub-sample of the news articles ($N = 200$); stratified this is in that an equal number of news articles for all five firms was included. The articles were coded for general tone in relation to the firm mentioned in the article, ranging from -2 to 2 (Krippendorff’s $\alpha = .88$). To see if negative news on average outweighs or overshadows positive news, we selected an equal number of articles from both periods of heightened attention and periods of low attention, assuming that in times of heightened attention

for a firm in the news media the tone is significantly more negative. As expected, on average the tone in the articles about the firms was negative ($M = -.74$, $SD = 1.13$), and in times of heightened attention ($M = -1.13$, $SD = .94$) the tone was significantly more negative ($F(1, 198) = 7.14$, $p < .001$) as compared to low attention ($M = -.35$, $SD = 1.17$).

The question of whether public attention for firms on average is more positive is harder to answer as the data only provide the frequency of search behavior and not any specifics regarding the content of what the public actually searched for. To gain some indirect indications that positive considerations drive search behavior, a more qualitative exploration was conducted. The peaks in GoogleTrends search behavior were identified and subsequently media coverage, the organization's website, and Google in general were explored for that period, aiming to understand what caused the increase in the public's attention for the firm. This resulted in the expected conclusion that, on average, high public salience was driven by positive considerations. For example, it was observed that the highest peaks in salience were caused by positive annual results (Aegon and Ahold), a merger with another company (Shell), the expansion of licenses (Shell), and sponsored events (KLM). There was one clear exception to this pattern: In the case of KLM, the other largest peak was about limited air traffic due to the eruption of a volcano.

4 Analysis

Since we are interested in general patterns of influence that occur across different firms, we rely on a pooled time series analysis. Our dependent variable is the stock rating of firm i at time t . Pooled time series analyses require a careful consideration of various statistical properties of the data series that inform the most appropriate analysis to address the hypotheses. Figure 1 provides a graphical representation of the average of the three key variables stock market prices, media attention, and public attention for all the firms included in the analysis.

4.1 Stationarity

A first important question that needs to be addressed is whether the dependent variable is stationary. A series is non-stationary if its mean changes over time. This non-stationarity can seriously bias the estimation. Dickey-Fuller tests for both the separate series as well as the combined Fisher test suggest that the

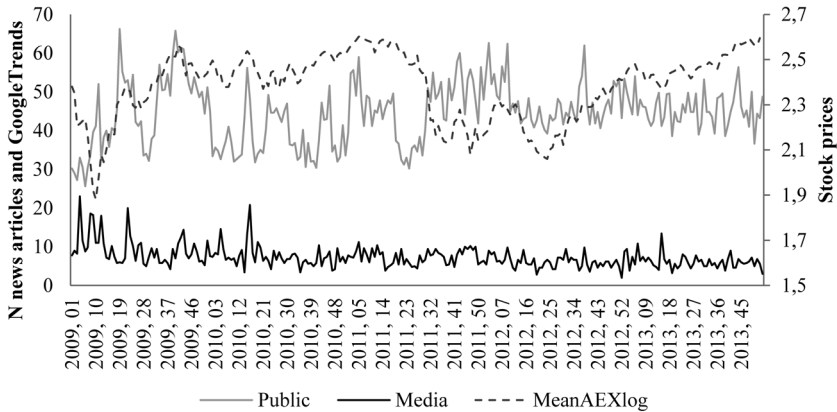


Figure 1: Mean time series of firms' AEX stock market rating (log-transformed), media attention, and public attention.

series are non-stationary.¹ We resolve that issue by differencing the dependent variable. This means that we also need to difference the independent variables.

4.2 Autocorrelation

A second issue that needs to be considered is autocorrelation. Here, the question is whether (a) previous value(s) of the dependent variable influence(s) the current value and need to be included in the equation. The Wooldridge test for serial correlation suggests that the differenced dependent variable still contains some first-order autocorrelation ($F(1,4) = 76.1, p = .01$). Consequently, we will add a lagged dependent variable to the models.

4.3 Heterogeneity

A third characteristic that is of importance is the potential presence of heterogeneity. This entails differences in the scores of the dependent variables across firms that are not captured by the independent variables in the model. In that case, it is necessary to include dummy variables for all firms minus one – that

¹ DF-tests for separate firms: -1.851 (Aegon), -2.137 (ING), -1.822 (Shell), -0.462 (Ahold), -1.149 (KLM), in all instances not rejecting the null-hypothesis of non-stationarity (5% critical value -2.570). Combined test for all firms: $P = 14.05$, not rejecting the null-hypothesis that all panels contain a unit root ($p = .17$).

is, to use fixed-effects analyses. A simple fixed-effects model with the differenced stock rating as a dependent variable and the differenced lagged stock market rating and firm-dummies as independent variables suggests that the firm-dummies are (jointly) not significant. This makes sense, since firms might differ in the absolute levels of their stock ratings, but less probably in the mean change in those ratings when considering a longer period in time. So, there is no need to account for heterogeneity in our models.

4.4 Contemporaneous correlation

A fourth issue to consider is contemporaneous correlation in the residuals. This means that the residuals for the different firms correlate over time. This is likely to be the case, since the original series also correlate to a substantial degree, as they are likely to be affected by a set of macro-level variables, such as general mood in the financial markets or events that make investors more or less likely to buy or sell. A Breusch-Pagan LM test conducted after a fixed-effects version of the final model indeed suggests contemporaneous correlation to be present ($\chi^2(10) = 503.34, p < .001$). So, we need a model that accounts for this.

4.5 Heteroscedasticity

Finally, group-level heteroscedasticity deals with differing variability in the error terms across firms – in other words, it indicates whether our model differs in its explanatory power across firms. A modified Wald test conducted after a fixed-effects model suggests group-level heteroscedasticity to be present ($\chi^2(5) = 2174.67, p < .001$).

Taking all these properties into account, an ordinary least-squares model with heteroscedastic panel-corrected standard errors (OLS-PCSE) and with a lagged dependent variable (Beck and Katz, 1995) is the most viable option. The standard errors account for both heteroscedasticity as well as contemporaneous correlation.

In order to meet one of the important requirements of causality – the cause has to precede the consequence –, we use lagged values for our independent variables. We allow both the media and public variable to have a maximum lag of two weeks. Cross-correlation functions suggest lag 1 to be the most appropriate for the media variable and lag 2 for the public variable. As an alternative, we also considered an Error Correction Model, where not only change values but also absolute levels of the independent variables are included in the equa-

tion, making it possible to disentangle short- and long-term effects (De Boef and Keele, 2008). However, since both for media attention as well as public attention the absolute levels did not affect changes in stock market ratings, we excluded them from the final model.

5 Results

Table 1 presents the results from our analyses. The first model is the baseline model that includes the lagged dependent variable. It exerts a positive and significant influence on the differenced stock ratings variable. This suggests that changes in a certain direction in one week are likely to be followed by changes in the same direction in the following week – thus indicating patterns of longer-term increases and decreases.

In Model 2, the two variables of substantial interest are added. First, we look at the effect of the media agenda on stock market ratings. In line with Hypothesis 1, we find that more attention for the firm decreases the stock market rating. The effect is only marginally significant ($p = .08$). Substantially, it is relatively small: A change of, for example, one standard deviation (7.32) of articles in this variable results in a .0027 point decrease in the log-transformed stock market rating. We tentatively confirm Hypothesis 1.

The second hypothesis deals with the influence of public attention on stock market ratings. The results confirm Hypothesis 2: If more people search on

Table 1: Results of pooled time series analysis explaining stock market ratings.

Variables	Model 1			Model 2		
	Coef. (SE)	z-value	p-value	Coef. (SE)	z-value	p-value
Constant	.001 (.001)	.61	.54	.001 (.001)	1.06	.29
Stock rating (t-1)	.200 (.032)	6.17	.000***	.194 (.031)	6.17	.000***
Media attention (t-1)				-.0004 (.0002)	-1.76	.079*
Public attention (t-2)				.0002 (.000)	2.98	.003**
Variance explained	$R^2 = .04$ $N = 1285$ $N \text{ groups} = 5$			$R^2 = .05$ $N = 1285$ $N \text{ groups} = 5$		

Note: *** $p < .001$; ** $p < .05$; * $p < .10$, variables are differenced

Google for a firm, the stock market rating goes up. The effect is significant and considerably larger than the media effect: A one-standard-deviation increase (23.6 points) results in a .0057 point increase in the log-transformed stock market ratings. The two attention variables jointly add almost one percent to the explained variance – this is a small, yet meaningful improvement of the model. That the effects of public attention are not only larger but also more robust is confirmed by analyses conducted per firm. Here we repeat the model as presented in Table 1 but rely on OLS regressions, since we only consider one firm at a time. For media attention, it shows a negative effect for four out of the five organizations (in the fifth case, it is virtually zero), but only in one instance this effect reaches significance (Ahold). For public attention, we find that the effect is positive four out of the five times, and for two firms (Shell and KLM) it reaches significance. The results per firm are presented in Table A1 (Appendix).

6 Conclusion and discussion

The purpose of this study was to explore the relationship between firms, news media, and the public. The focus was on predicting and explaining firms' financial performance on the stock market based on media and public attention. Inspired by agenda setting theory, it was hypothesized that attention devoted to a firm in media coverage and in public online search behavior has its influence on that firm's performance. To test these assumptions, this study focused for the period from 2009 to 2013 on a variety of large Dutch companies that are rated in the Dutch stock market index AEX. The finding of the weekly level time series analyses provide support for the agenda setting assumptions in the context of corporate performance. The results showed that both media attention as well as public attention given to a firm significantly influenced the firm's stock market ratings. Being only marginally significant and limited in size, the effect of media attention was indeed found to be negative. On the contrary, and in line with the expectations, the effect of public attention turned out to be positive. The findings provide some first insights regarding the actual existence of the interactions between corporate performance, media attention, and public attention. In conclusion, on the one hand, being on the news-media agenda might have its disadvantages for firms' financial performance, while, on the other hand, being on the public agenda might be a positive thing for firms. We can understand this from the idea that negativity is prevalent in media coverage and that 'any news' means 'bad news' most of the time. For public attention, it often seems to be positive incentives that stimulate individuals to search for more information on a firm.

In the end, this study has advanced existent literature by exploring the relevance of firms' salience on their financial performance. The finding that media attention is negatively related to stock market performance directly relates to agenda setting theory and negativity bias. On the one hand, the results provide support for the notion that media attention for firms is reflected in public opinion and its evaluation of firms (Carroll and McCombs, 2003), where the effects of negative news seem to outweigh positive news (Soroka, 2006), thus leading investors to buy fewer shares or even to sell their current shares. Increased media coverage of these firms might arouse some skepticism among investors or increase perceptions of financial riskiness. On the other hand, when these firms are more present on the public agenda, investors might perceive the firms' situation as less risky. The notion that the public is more interested in the firms, and that the firms seem to be enjoying a period of popularity, might encourage investors to evaluate the firms' situations as less insecure.

It is important to emphasize the explorative nature of this study; we intended to provide a first exploration of the effect on firms' stock market ratings as a result of news media and public attention. Although the effects identified are relatively small and did not hold for all firms included in the data, this study might provide a starting point for understanding the interaction between corporate performance, media attention, and public attention. However, future research should further delve into the mechanism behind this effect. Upcoming studies should look beyond the mere attention devoted to a firm and look at, for example, the effect of sentiment or frames related to a firm communicated by the news media and the public in order to more fully capture the relationship between attention and stock market movement. In this context, it is important to emphasize that we were not able to thoroughly test whether the valence of the coverage and the search behavior drive the negative and positive effects we found. A sample of coded newspaper articles indeed suggested the presence of negativity bias in media coverage to be particularly present in instances of high salience, but for the public agenda, we have only indirect indications that positive considerations drive search behavior. This is definitely an issue that needs to be addressed in future research. Moreover, this study was limited to analyses on weekly aggregation levels in order to avoid missing values that appeared on a daily level and to obtain precise analysis. We hope that this study will guide future studies to investigate this triangular relationship using daily or hourly data (e.g., online news media updates or social media messages like Tweets from the public, (financial) media outlets, or investors) to understand the effects on stock market ratings on a lower time aggregation level.

The current study was limited in several ways. First, the time-series analyses were based on a weekly level. While this is a common aggregation level

for agenda setting studies (e.g., Vliegenthart and Mena Montes, 2014), in our specific case a lower aggregation level might have been appropriate. Due to the dynamic character of media, online search behavior, and stock market ratings, time series based on days, hours, or even minutes would have been necessary to answer the causality question more convincingly (Scheufele et al., 2011). However, we were constrained by data availability, especially when it came to newspapers. While being available on a daily level, an analysis on that level would have resulted in many zero values, making estimations more problematic. Future research should consider using online news data to gain more daily and hourly data. Second, we only included five firms in our analyses, which did not allow for an elaborate exploration of cross-firm differences, for example, based on the sector the firm belongs to. Therefore, follow-up research should incorporate a larger number and wider range of companies from different sectors to gain insights into sector differences. For example, it can be argued that for certain firms or industries private investors should have a measurable influence on the stock prices while for other firms private investors might be relatively irrelevant because institutional investors hold and trade most of the shares. Still, this study fulfilled its task by providing a first understanding of how firms' financial performances are affected by both the news-media agenda and public agenda and provides a fertile starting ground for future research.

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Appendix

Table A1: Results of firm-level time series analysis explaining stock market ratings.

Variables	Aegon	ING	Shell	Ahold	KLM
Constant	.002	.002	.001	.001	.000
Stock rating (t–1)	.118*	.224***	.166***	.194***	.248***
Media attention (t–1)	.000	–.000	–.000	–.001*	–.000
Public attention (t–2)	.000	.001	.000*	–.000	.000**
Explained variance	.021	.063	.051	.056	.074

Note: *** $p < .01$; ** $p < .05$; * $p < .10$; variables are differenced, unstandardized coefficients from OLS regressions are displayed. $N = 257$ for each analysis.