Do Chinese Social Media Correct the Optimistic Bias of Traditional Media?

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January 3, 2019

Preliminary draft. Please do not cite or circulate without the authors' permission

Abstract

This paper examines whether, in an autocratic regime such as China, social media that rely on the wisdom of crowds correct the bias of state-controlled traditional media by supplying less optimistically biased information to the market. Using a comprehensive sample of Chinese newsppaper corporate news articles and posts of an online stock forum, East Guba, from 2009 to 2016, we find that the positive association of the tone of newspapers and East Guba of the same firm on the same day is significantly reduced when newspapers are expected to exhibit more optimistic bias, consistent with our conjecture that social media plays a role in correcting the bias of traditional media. Further analyses show that political factors such as state ownership of the firms being covered and the political sensitivity of the periods during which the articles are posted shape East Guba's monitoring role in correcting the newspapers' bias. Finally, the stock return results also support the conjecture that social media supplies information that serves as a benchmark to delineate the bias of traditional media. When the tone of traditional media deviates positively from that of social media, the stock return response to traditional media's articles is significantly attenuated, but we do not find any significant change in stock return response to social media's posts when their tone deviates from that of traditional media.

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1. Introduction

Traditional media in autocratic regimes are optimistically biased. The autocrats control the media and bias the news they report as a way to strengthen their political power (Noelle-Neumann, 1984; Djankov et al., 2003; Enikolopov et al., 2011). This optimistic bias in reporting is found in corporate news as well since negative news can destabilize the economy and even weaken the perceived competency of the autocratic government (Stockmann, 2013; Piotroski et al., 2017). However, in these autocratic regimes, many newly developed social media such as online stock platforms have started to supply information to the markets. In contrast with traditional media that typically have state-controlled editorial teams, social media rely on wisdom of crowds, with user generated content and user anonymity, to supply information and many of these platforms are privately owned. Thus, users that contribute corporate information to these online platforms are expected to be more independent, as they are more likely to be free from direct censorship by the state (Foucault, 1977; Spears and Lea, 1992).

The objective of the paper is to examine if Chinese social media correct the bias of traditional media by providing less optimistically biased corporate information to the market.[1] First, we examine if social media will remain less biased when traditional media is expected to be *more* optimistically biased. We use the association of the tone of traditional media articles and social media posts of the same firm on the same day to examine if social media can play such a monitoring role. We posit that, for the same given underlying set of events covered by social media and traditional media, the positive association between the tone of corporate news of traditional and social media will be attenuated when the tone of traditional media is *positive* than

[1] Correction here means when traditional media is optimistically biased, social media supplies less optimistic information to the market. As a result, the overall information perceived by the market is "corrected" to reflect a more neutral and value relevant description of the underlying economic events.

when it is *neutral or negative*. Since the state-controlled traditional media is more concerned about creating a crisis and investors' attention is generally heightened when the market or firms experience bad news than good news, we expect that traditional media is more likely to optimistically bias the news when the tone of the news is positive (good news) but it is more restrained from biasing the news when the tone of the news is neutral or negative (bad news).[2]

Second, we examine if social media are indeed supplying less biased information that serves as a benchmark to delineate traditional media's optimistic bias using the stock return response to the tone of the two types of media. If social media plays such a benchmarking role, the positive deviation in tone of traditional media from social media will indicate that traditional media are positively biased. Specifically, we predict that the stock return response to the tone of traditional media will be significantly reduced when such deviation in tone occurs. We do not expect that any deviation in tone between traditional and social media is associated with the stock return response to social media since the deviation in tone is unlikely to be capturing social media's bias.

We expect that social media in an autocratic regime can serve this monitoring role in correcting the bias of traditional media. The contributors of analyses and opinions to these online stock forums are individuals, not state employees. They share their views of the stock and are unlikely to be controlled or even influenced by the state. Also, the business model of these online platforms relies on the wisdom of the crowd to provide valuable information to the community (Chen et al., 2014; Bartov et al., 2018). It is easier for the regime to control the editors and a small set of journalists in the traditional media under their direct control, but it is much harder to control the crowd on social media. Thus, as the social media users post their opinions online,

[2] We provide three possible explanations why traditional media is more likely to positive biased when their tone is positive than negative in subsection 2.3.

they are providing an independent interpretation of the news that will serve as a check against the bias of the traditional media. Though social media sites can be censored by the autocratic regime, the government tends not to police the social media as much because they regard it as a source of grass root information (Qin et al., 2017) and it is unlikely that they find stock opinions threatening since they are mainly concerned about instigation of collective actions (King et al., 2013, 2014).

On the other hand, despite social media being free from positive bias, their posts may simply be noise and have no significant information content since the contributors are not professionals. As a result, the tone of social media is not positively associated with that of traditional media even when the latter are not biased. Thus, comparing the tone of the two types of media does not allow us to identify the positive bias of traditional media. It is also possible that social media sites are subject to heavy censorship. The government may delete highly critical posts from the sites. Likewise, social media contributors may refrain from negative posts due to self-censorship. This could be particularly true in politically sensitive periods and after the 2015 stock market intervention, during which the government is concerned about stability and is extremely sensitive to negative news.[3]

China offers a great setting to study whether the wisdom of crowds of social media can correct the optimistic bias of traditional media in an autocratic regime. Although the equity market was only established in the early 1990s, it has grown to have more than 3,000 firms listed in its two domestic stock exchanges. The newspaper coverage of these listed firms is vast, with more than 70 state-owned traditional newspapers spanning across most of the provinces in the country in our sample from the Wisenews database. The rich dataset offers us a comprehensive

[3] The government intervened the 2015 market crash in China by requesting state-owned brokerage firms and fund companies to prop up the market (http://www.xinhuanet.com/fortune/2015-08/06/c_128100347.htm).

sample to study the reporting bias of corporate news by traditional media. For social media of stock opinions and analyses, we use East Guba internet platform, which is an online stock forum allowing contributors to post their analyses and opinions of stocks and share their views with other users. During our sample period from 2009 to 2016, users of East Guba have posted about 146 million posts (about 83,000 posts per trading day), covering over 3,000 listed firms in China. Our final sample comprises more than 970 thousand firm-days with at least one news article from traditional newspapers and three postings from Guba for each firm on the same day.

Following the machine learning method in Piotroski et al. (2017), we compute the tone of each traditional media article and social media post. We then aggregate the tone of each type of media for each firm on each day for comparison. Our evidence shows that the tone of traditional media is generally positive (77.9% positive) with a mean of 0.3704, while the tone of social media is negative (13% positive) with a mean of -0.2028. The observed tone difference confirms prior research that traditional media is likely to be positively biased, while social media is less positively biased.

Next, we test whether social media provide less optimistically biased information to the market than traditional media in China. To examine this, we regress the tone of social media posts on the tone of traditional media's articles of the same firm on the same day. We find that the coefficient on the tone of the traditional media is significantly positive at 1% level, suggesting that the tone of the two sources of corporate news is positively correlated. We also find that the coefficient on the tone of traditional media is significantly reduced by 0.0235 when the tone of traditional media is positive, which is 55% of the coefficient when the tone of the traditional media is zero or negative. This is consistent with our prediction that when traditional

media has a positive tone, which suggests that the articles are likely to be positively biased, their tone will have a greater deviation from the more neutral tone of the social media posts.

Further analyses show that the traditional media bias and the role of social media as a check to correct the traditional media bias are affected by political incentives. First, we find that in the period *after* the government intervened the market during the 2015 stock market crash, there is a more significant drop in the positive association of the tone between traditional and social media when the traditional media tone is positive. This is consistent with the conjecture that the government has put more pressure on the state-controlled traditional media to remain optimistic even *after* the market intervention.[4] Second, *prior to* the 2015 government intervention in the stock market, the deviation in tone between the two types of media when the tone of the traditional media is positive is significantly stronger for news about SOEs than non-SOEs. This suggests that the traditional media is more positively biased for their coverage of SOEs than non-SOEs, which is consistent with Piotroski et al. (2017). However, we only find it in the pre-intervention period and not in the years after the intervention. This is likely because during the post-intervention period, the traditional media is under more pressure to bias the corporate news upward for *all* firms, and thus there is no difference in the reduction in correlation between SOEs and non-SOEs in the post-intervention years.

Third, we find that social media fails to play the monitoring role during the period around the National Congress Meetings. However, during the non-National Congress period, social media does have a less optimistic tone when the traditional media tone is positive. Additional analysis shows that during the National Congress Meetings, the number of posts drops

[4] There is anecdotal evidence that the government pressures the traditional media to be optimistic in its reporting during the stock market intervention (http://www.chinadaily.com.cn/micro-reading/interface_yidian/2015-06-26/13895012.html), see figure 4 for an example.

significantly while the number of traditional media articles increases significantly. One possible interpretation is that during politically sensitive periods, even the social media refrains from posting critical messages, while the traditional media is pressured to report more positive news.[5]

Finally, we study whether media bias as indicated by the deviation of the tone of the two types of media can also be reflected in the differences in stock return response to the information the media supplies. First, we find a significantly positive stock return response to the tone of the traditional media articles at a five and ten-day CAR.[6] This suggests that although the traditional media are biased, it still has information value to the market. Second, our evidence shows that when the traditional media are more positively biased as indicated by the divergence in tone between traditional and social media, the stock return response to the traditional media decreases significantly, suggesting that the market could see through at least partially the bias and discount the information contained in the positive tone of the traditional media. We find this result in the five, ten and twenty-day CAR. However, we do not find that when social media tone deviates from that of traditional media, either positively or negatively, there is any change in the stock return response to the tones of social media. This confirms our prior belief that social media is less biased (more neutral) and the market credulity does not change even when its tone deviates from that of traditional media.

Our study contributes to the literature in the following ways. First, prior research focuses mainly on the information generation and dissemination roles of social media in democratic regimes (e.g. Blankespoor et al., 2013; Chen et al., 2014; Bartov et al., 2018). This is the first

[5] This is consistent with the finding in Piotroski et al. (2015) that Chinese firms suppress the release of bad news in the year around the National Congress meetings.

[6] We cumulate the stock returns from the day after (day +1) the news/opinions dissemination by the traditional or social media (day 0) to ensure that our result is not capturing the media's reaction to the stock price movement on day 0 due to reversal causality.

paper we know of that studies whether, in an autocratic government, social media correct the biased corporate news of traditional media by supplying less biased information to the market. Our results show that in China, social media's reliance on its wisdom of crowds can shelter themselves from government's direct intervention and provide corporate news that can serve as a check against the positive bias of traditional media.

Second, we provide new evidence that in China the market can discount at least partially the positive bias of traditional media and will discount the information when the deviation in tone of the two types of media indicates that traditional media are positively biased. This extends prior research that newspapers can be optimistically biased for economic or political reasons, in either democratic or autocratic countries (Gurun and Butler, 2012; Solomon, 2012; Stockmann, 2013; Piotroski et al., 2015). Our paper provides evidence that the market will make adjustments to the bias when responding to the news of traditional media.

Third, we are one of the few studies that find that social media posts have information content (see also Tumarkin and Whitelaw, 2001; Antweiler and Frank, 2004; Tetlock et al.2008, Chen et al., 2014). Different from the results in Chen et al. (2014) that are based on U.S. data, we find that the social media posts have strong positive stock return response in both the shorter (five-day) as well as the longer (twenty-day) windows. Another new evidence we find in the paper is that the stock return response to the posts does not change even when their tone deviates from that of traditional media. This is consistent with our conjecture that social media posts are less biased relative to the traditional media and the market response to their posts is not affected by the tone of the traditional media.

The rest of the paper is organized as follows. Section two provides the discussion of the institutional background and hypothesis development. Data and sample are presented in section

three and our results are presented in section four. We provide a number of additional tests in section five and conclude the paper in section six.

2. Institutional Background and Hypothesis Development

2.1 Development of the newspaper industry in China

Ever since the beginning of the economic reforms in 1978, China has to balance between two somewhat conflicting objectives for its newspapers. On the one hand, the newspaper industry plays the role of an important information institution to support its market reforms. On the other hand, it continues to serve as the mouthpiece of the government to maintain the political stability of the regime.

In the pre-reform period, China's newspapers were primarily a propaganda machine with the goal of conveying the government's political narrative to its constituents. To support the market liberalization reforms since 1978, the government began to set up a new category of newspapers called commercialized newspapers. The government began cutting subsidies, forcing certain newspapers to rely solely on advertising and subscription revenues, thus creating a new set of market-based incentives for these newspapers. As a result of these changes, commercialized newspapers are more responsive to market demands for news in order to maximize advertising and subscription revenue. Together, these commercialization reforms increased the number of newspapers from 186 to 1,943 between 1978 and 2009 (Stockmann, 2012).

Another significant reform in the newspaper industry is the formation of news conglomerates, which combine the Party newspapers that serve primarily as the mouthpiece of the government and the newly established commercialized newspapers that respond to the need

of the economic reforms. This reform leads to the formation of newsgroups that are under state control with a common set of senior editors for each newsgroup. Piotroski et al. (2017) document that by combining the two types of newspapers within the same group, the conglomeration reform allows the rich advertising revenues from the commercialized newspapers to be channeled to the Party newspapers. They also find that after the conglomeration, both types of papers continue to perform their distinct roles. More importantly, they find that the commercialized newspapers continue to serve its information role by remaining to be less political and more critical than the Party newspapers in reporting corporate news.

One impetus to the media reforms in China is the establishment of the domestic stock markets in the early 1990's. This has created a strong demand for corporate news of the listed companies in China. Between 2000 to 2010, the sample period of Piotroski et al. (2017), they have collected more than 1.7 million corporate news articles of listed companies from 110 distinct newspapers in China. The number of articles grew from more than 67 thousand articles in 2000 to 270 thousand articles in 2010 in the sample.

Despite these largescale news media reforms, the government retains tight control of the newspapers. None of the newspapers or news groups can be majority owned by non-state entities. With this concentration of state ownership and control, there is no press freedom in China. The government continues to control the country's newspapers through the appointment and dismissal of senior editorial staff. The Propaganda Departments of the Chinese Communist Party (CCP) committees (at every level of government) also exerts influence on the reporting behavior of newspapers to ensure that their reports are consistent with the government's narratives. Finally, the government elevated the news media's regulatory and licensing agency, formerly the Publication Bureau under the Ministry of Culture to ministerial-level status and was

renamed the General Administration of Press and Publication (GAPP). These elevations signaled that the government's commitment to retain strict control of the news media in China.

2.2 Development of social media in China

The population of netizens in China surpassed 700 million, among which 92.5% are mobile netizens, by June 2016 (All-China Journalists Association, 2017). The deep internet penetration facilitates the development of social media in China, making the social platform, such as microblog, WeChat, and client app, as main channels to access information by netizens. Most of these social media platforms are privately owned, keeping the sites from the direct control of the state. Also, these platforms allow users to generate their own content, which grant netizens more freedom to express their own opinions, especially when their identity is anonymous. The anonymity enables users to reveal their true position in the computer-mediated communication without the fear of being chastised or targeted. However, anonymity also allows users to release information or express opinions without sufficient responsibilities, making the information on social platforms lacking credibility. Thus, it is still debatable whether social media is enhancing information efficiency, especially when it is used for disseminating news and expressing opinions for stock investment purposes.

A number of financial service firms have set up social media platforms to provide financial and investment information as part of the overall services they provide to clients. Quite many of these social media platforms are in the form of bulletin board system (BBS), engaging their clients in providing user-generated content (UGC) information and interacting with each other. The main new media players with a focus on financial information include Hexun (http://www.hexun.com/index.htm), Jinrongjia (http://www.jrj.com.cn), and StockStar (http://www.stockstar.com). EastMoney (www.eastmoney.com) was a newcomer into the market

when it was founded in 2005. However, it has become the most successful stock social media platform with a rank of 41 among all China's websites globally and No. 1 among all China's financial websites by 2017 according to ALEXA and iResearch data. East Guba, which is a BBS style platform launched by EastMoney in 2006, becomes the hottest online stock platform in China. For example, the total number of posts on Wanke, a real estate company listed in Shenzhen Stock Exchange, has reached more than 360,000 on East Guba , more than 10 times higher than the second most-popular stock-dedicated social media Hexun.

East Guba operated as a discussion board, which is arranged according to the identity of each firm. Thus, the discussion related to a listed company is posted on the board specifically for the company. The interaction among users is like that on Twitter, but they can voluntarily make a post on the board of a listed company without length limitation. The difference between Guba and Seeking Alpha, a popular social media platform with a focus on U.S. capital market, is that the post of Guba does not involve any management by an editor as in Seeking Alpha. However, the post is subject to the regulation or censorship by the Chinese government. For example, a company operating the social media platform must install surveillance software, which will monitor the information flow on the platform with algorithmic filtering. The regulatory agents also manually monitor the information on social media by deleting the posts that may cause political stability. Thus, this raises questions on whether social media can serve as the monitoring role in correcting the positive bias of corporate news provided by state-owned traditional media.

2.3 Hypothesis Development

The Chinese government has the ability and incentives to bias the corporate news of traditional newspapers. As an autocratic regime, the government has never granted press freedom to the newspapers. Through regulations, GAPP continues to exert tight control of the press. The

government also maintains direct control of the press through majority ownership of all the newspapers and newsgroups. The Party organizations and GAPP can wield their influence through the appointments of senior editors of all the newspapers in China.

There are strong political incentives to influence corporate news in China because local government leaders' performance is evaluated based on the economic performance of the regions under their control (Li and Zhou, 2005). Piotroski et al. (2015) find that listed firms suppress the release the bad news in the year leading up to the promotion of the political leaders of the province in which the firms operate. Likewise, they find that listed firms refrain from reporting bad news around the National Congress Meetings in order avoid any embarrassment to the central government during this important political event. This bias in corporate information is also found in the news media by Piotroski et al. (2017). They document that the corporate news of the Party newspapers, which serve more as a mouthpiece for the government, have a stronger optimistic bias in tone than that of the commercialized newspapers that are more incentivized to meet the needs of the market.

It is unclear the corporate information being produced and disseminated in social media such as online stock forums share the optimistic bias of traditional newspapers in China. On the one hand, the government cannot exert nearly as much influence on social media because all the large social media platforms in China are privately owned. One key feature that makes the control of social media difficult is that the production of information is not guided by an editorial board, but through the wisdom of crowds. To bias the information production, the government will need to influence the crowds rather than a small group of editors, which is much more difficult. Though there is evidence that the Chinese government censors social media messages, primarily those that are associated with collective actions which can destabilize the government's

power (King et al., 2013, 2014), the government even allows political sensitive information to be disseminated through social media because it wants to gather more grass root information that can enhance its ability to control the citizens (Qin et al., 2017).

On the other hand, these online posts of stock opinions and analyses are made by non-professionals. China is famous for its stock market being dominated by unsophisticated retail investors. The information produced by amateur investors in these platforms can simply be noise and will not be able to serve as a benchmark against the reporting bias of the traditional media. In addition, there is an increase in the level of control over the internet by the government in recent years.[7] The 2015 stock market intervention by the government has led to a tight control against public release of negative information that will destabilize the market. The government's tightening of censorship of the social media may lead to an increase in optimistic bias in the corporate information shared in the online stock forums.

Thus, it remains an empirical issue if social media can serve as a check in correcting the optimistic bias of traditional media in China. To test this, we first examine if social media will provide less biased information to the market when traditional media is expected to be more optimistic. Specifically, we examine the correlation of the tone of corporate articles of the Chinese newspapers and that of the posts in East Guba, the online stock forum. We posit that when traditional media is more likely to be positively biased, the positive correlation of the tone of the two types of media will attenuate significantly. Our first hypothesis is as follows:

[7] Two recent news articles provide discussion on how the government has increased its control of the internet: "The great firewall of China: Xi Jingping's crackdown," The Guardian, June 29, 2018 (https://www.theguardian.com/news/2018/jun/29/the-great-firewall-of-china-xi-jinpings-internet-shutdown); "China has launched another crackdown on the internet – but it's different this time," CNBC, October 26, 2017 (https://www.cnbc.com/2017/10/26/china-internet-censorship-new-crackdowns-and-rules-are-here-to-stay.html).

H1: The correlation between the tone of the articles of traditional media and social media of the same firm on the same day is less positive when the tone of traditional media is positive than when it is neutral or negative.

In this hypothesis, we assume that there is a stronger positive bias in tone when the tone of traditional media is positive (reporting positive news) rather than negative (reporting negative news). There are three possible reasons to support this assumption. First, the cost of positive bias for the government is higher when reporting bad news than good news because the government wants to avoid creating a crisis (Watts, 2003a, b). That is, shareholders are less likely to protest when the underlying news is good while the actual positive return turns out to be smaller than expected. However, if the underlying news is bad, introducing a positive bias could create a stock crash, leading to a bigger loss to the investors and the risk of investor protests.

Second, literature in psychology suggests that in many contexts, people pay much greater attention to negative or unfavorable information than to positive or favorable information (e.g. Cacioppo and Gardner 1999; Baumeister et al. 2001). In economics literature, prospect theory in Kahneman (1979) suggests a stronger investors' attention to negative information because their decision-making processes are influenced by loss aversion and endowment effects. Recent studies on human behaviors show that bad news spreads faster and wider than good news over the internet (e.g. Hornik et al., 2015). Due to investors' heightened attention to the bad news in the market, any unraveling of the government's attempt to cover up the underlying bad news by introducing positive bias to news could cause an even bigger panic or even crisis, compared with the discovery of the government's upward bias of good news.

Third, like earnings management, media would introduce more positive bias when their reported tone is just below zero (neutral) in order to increase the probability of reporting an article with positive tone, in line with the propaganda needs of the government. This additional

bias causes a discontinuity around the breakpoint, just like the discontinuity in reported earnings per share well-documented in earnings management literature (e.g. Burgstahler and Dichev, 1997). As a result, when the reported tone is positive, it has more positive bias than when the reported tone is negative. Despite these explanations, it remains a joint hypothesis that traditional media is more positively biased when its tone is positive and social media plays a monitoring role in correcting traditional media's bias.

Next, we examine if social media's role to correct traditional media's optimistic bias is reflected in its ability to provide a benchmark that delineates the optimistic bias of traditional media. To test this, we test if the market's response to the tone of traditional and social media when the tone of the two types of media deviates. We posit that the market's response will be attenuated if the deviation in tone suggests that the traditional media is positively biased. This is a joint hypothesis that social media can serve as a benchmark to identify tone bias of the traditional media, and the market discounts its response to the tone of the traditional media articles when there is a positive bias. Our second hypothesis is as follows:

H2: The stock return response to the tone of traditional media is significantly reduced when it deviates positively from the tone of social media.

3. Data and Sample

3.1 Data from traditional media

The traditional media data is an updated version of that used in Piotroski et al. (2017) with extended years covered, ambiguity in firm name cleansed, and improved definition for the tone. The original news article covering listed companies are crawled from Newswire with an automatic crawler by searching the stock name throughout the database. We first clean the data to avoid the articles crawled due to the ambiguity of the stock name. For example, we get

tremendous articles for a company named Laobaixing (老百姓), which is a prevalent term in Chinese referring to ordinary people. We identify a list of companies with ambiguous names and then manually read a set of articles as a training set for whether the article is mentioning the listed company. In the end, we apply the machine learning technology to identify the articles covering the firm.

To build up measurements of the tone, we apply machine learning technology. First, we hired two batches of research assistants to label the tone of each sentence of 50,000 articles randomly picked from our sample as negative, positive, and neutral. Then, we optimize the model within this training sample and extend the model to the full sample. The out-of-sample validation using 10,000 randomly selected sentences shows that the accuracy rate of our model is above 90% in labeling the tone of sentences.

Next, we aggregate sentence-level tone to form measures of article-level tone. The tone of the article is measured by the relative weight of positive sentences to negative sentences in the article. In addition, we also consider the importance of sentences from different positions within an article. Thus, we weight the sentences from first and last paragraph as 2, the first and last sentence from first and last paragraph as 3, and other sentences from the article as 1. The tone of the body of the article equals (#of positive sentences-# of negative sentences)/(#of positive sentences+# of negative sentences+1). The overall tone of the article in the end is defined as (tone of text body*0.7+tone of title*0.3).

Our final traditional media news dataset includes about 3.7 million news articles published over the period of 2009 to 2016, by 74 unique newspapers. These newspapers are located in 23 provinces. Among the newspapers, 42 (57%) is party-affiliated and 32 (43%) is

non-party-affiliated (commercialized). Party media published about 1.11 million (30%) news articles, while non-party-media published about 2.59 million (70%) news articles.

3.2 Data from Social Media

The Guba platform on East Money (http://guba.eastmoney.com) provides a separate discussion board for each listed company. East Guba is one of the oldest and most influential social media platformss with a focus on the capital market.[8] The user can enter and post on the board by searching the stock code or the name of the company. The user can also build up a self-defined list of companies by following them and entering the discussion board of the companies on the list by a direct click. Thus, the posts on this platform are well matched with the related companies. We develop a web crawler to download all the main posts on the discussion board of each company[9]. Because the post on the social media is usually short, we thus label the tone at post level rather than sentence level. Because the writing style is different from that in the traditional media, we use a different training set in the machine learning model for the tone of social media posts. Emoji is often used by the social media user to express their opinions. In our model, we also consider the role emoji in defining the tone.

The tone of social media for a firm is defined as the relative weight of the number of positive posts and negative posts, (# of positive posts-# of negative post)/ (# of positive posts+# of negative post+1), which is analogous to using the tone of sentences in the body of the text to compute the tone of traditional media articles. Our final social media dataset includes about 38.4 million posts, covering 3,011 firms from 2009 to 2016.

3.3 Sample Selection Process and Descriptive Analyses

[8] Weibo is the most influential social media platform but it lacks a focus on capital market. Snowball, another social media platform, was established much later than East Guba and is likely to have more active professionals such as analysts and institutional investors on it.

[9] We ignore the reply comments on the platform.

We start by obtaining all available firm-day daily stock price observations from 2009 to 2016, for companies listed on China's Shanghai and Shenzhen Stock exchanges from the China Stock Market & Accounting Research (CSMAR) database. We first match firm-day stock price observations with firm fundamentals in their last year's annual reports. Next, we match the firm-day sample with our traditional media tone and social media tone as discussed in subsection 3.2. Because our empirical analyses focus on the relationship between social media and traditional media on a firm-day level, we include only firm-day observations with at least one traditional media news articles and at least three social media posts.[10] We require to have at least three social media posts because we want to avoid measurement errors of the social media tone caused by insufficient posts per day. After merging our social media and traditional media file with CSMAR dataset, our final sample includes 970,982 firm-day observations, covering 3,011 unique firms. Detailed sample selection process is reported in Table 1, Panel A.

Table 1, Panel B provides descriptive statistics of traditional media tone and social media tone. On average, a firm in our sample is covered by 3.89 traditional media news articles and 39.49 social media posts per day. The tone of traditional media has a mean (median) of 0.3704 (0.4658), and the tone of social media has a mean (median) of -0.2028 (-0.1778). Also, traditional media tone is positive in 77.9% of the sample, while social media tone is positive in only 12.7% of the sample.[11] Taken together, the descriptive evidence suggests that on average traditional media is more positively biased than social media. When disentangling traditional media based on their affiliation to the CCP as "party media" and "non-party (commercialized)

[10] Results are robust when we increase the threshold to five posts per day and ten posts per day, despite a reduced sample size due to increased requirement.

[11] Our measurement of social media tone using the Chinese "Guba" is comparable to the measurements using US social media the "StockTwits". For example, Byard and Wang (2018) reports a mean(median) tone of -0.326 (-0.405) when applying similar textual analysis method to StockTwits dataset. Consistent with sample distribution of Byard and Wang (2018), we also show that the average tone of Chinese social media is negative.

media", we show that the mean (median) tone of party media is 0.5115 (0.7000) and mean (median) tone of non-party media is 0.1602 (0.0000), this descriptive evidence is consistent with Piotroski et al. (2017) that the positive bias in traditional media is more pronounced in party-media than non-party media.

The correlation between the tone of traditional and social media is shown in Table 2. The tone of traditional and social media is positively correlated at 0.0523, significant at the 5% level. When the traditional media tone is positive, the correlation drops to 0.0459, consistent with our conjecture that social media is maintaining its independence when traditional media becomes more positively biased. The correlation between the tone of the two types of media and CARs is also significantly positive. The magnitude of the social media correlation is three times larger than that of the traditional media, suggesting that the former has more information content and is likely to be less biased. The sample distribution of the firm-day observations by year is reported in Table 3 Panel A. The number of firm-days are slightly smaller in 2015 and 2016, but the distribution is generally quite even over the sample period. The sample distribution by industry is presented in Table 3 Panel B. Most of the industries are well represented in our sample.

Figure 1 Panel A provides descriptive evidence on the relationship between the tone of social media and the tones of traditional media, the slope coefficient between social media and traditional media is higher when traditional media is negative and the slope has decreased when traditional media is positive.

4. Empirical Analyses

4.1 Traditional Media Bias and Social Media's Deviation from Traditional Media

Our primary empirical analyses examine the relationship between the tone of social media and the tone of traditional media covering the same firm on the same day, and how this relationship varies when traditional media is more positively biased. We estimate the following model with OLS regression using firm-day data:

(1) $$Social\ Media\ Tone_{it} = \alpha + \beta_1 Traditional\ Media\ Tone_{it} + \beta_2 Traditional\ Media\ Tone_{it} \times TM\ Positive_{it} + \beta_3 TM\ Positive_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Market\ to\ Book_{it} + \beta_7 LeverageA_{it} + Firm\ Dummy + Year\ Month\ Dummy + \varepsilon_{it}$$

In these estimations, $TM\ Positive_{it}$ is a dummy variable equal to one (and zero otherwise) if $Traditional\ Media\ Tone_{it}$ is greater than zero, indicating that the average tone of all social media articles covering a firm is positive. Coefficient β_1 captures the unconditional association between the tone of social media and the tone of traditional media. Coefficient β_2 of the interaction term $Traditional\ Media\ Tone_{it} \times TM\ Positive_{it}$ captures the reduction in the association between tone of social media and tone of traditional media (i.e., social media's tone deviation from traditional media) when the tone of traditional media is positive. Because social media and traditional media overall provides related information regarding a company's fundamentals (Bartov et al. 2017), we expect β_1 to be positive and significant. We expect β_2 to be negative and significant because when traditional media is more positive, it is likely to positively biased and the tone of social media will deviate from it.

We estimate the model with a group of firm-level control variables including *Size, ROA, Market to Book* and *Leverage* to capture the variation in firm characteristics that could affect the bias in traditional media, and the relationship between the tone of social media and the tone of traditional media. However, even with these control variables, there is still concern that our

results could be driven by correlated omitted variables. To alleviate this concern, we include firm fixed effect and year-month fixed effect to absorb further unobservable firm characteristics and time-variant characteristics that potentially affect both social media tone and traditional media tone. In all regressions, we report in parentheses t-statistics with robust standard errors two-way clustered at the firm level and year-month level.

The regression results of model 1 are reported in Table 4. In columns 1 and 2, we show a positive association between the tone of traditional media and social media, indicating that on average traditional media tone is positively associated with social media tone. In columns 3 to 5, the coefficient estimates on traditional media tone continue to be positive and significant, and the coefficient estimates on $Traditional\ Media\ Tone_{it} \times TM\ Positive_{it}$ are negative and significant across all model specifications. The negative coeffcients on the interaction term suggest that the positive association between traditional media tone and social media tone is reduced when traditional media is positive.[12] In terms of economic significance, in column 5 the coefficient on the tone of traditional media is significantly reduced by 0.0235 when the tone of the traditional media is positive, which is 55% of the coefficient when the tone of the traditional media is zero or negative.

Overall, our baseline regression results show a positive association between traditional tone and social media tone of the same firm on the same day, and this association is attenuated when traditional media tone is positive, consistent with our first hypothesis that social media has a correction effect on traditional media when the latter is more biased.

4.2 Influences of Political Incentives on Social Media's Correction Effect

[12] Table A1 in the Appendix shows that when we rank the tone of traditional media into deciles, the positive (optimistic) tone bias of traditional media, measured by the deviation in tone between traditional and social media, is monotonically increasing in the tone of traditional media, which supports our assumption that positive traditional media tone is more optimistically biased.

Prior literature shows that traditional media bias varies with political incentives of the government (Piotroski et al. 2015; Gentzkow et al. 2006). In this subsection, we explore whether the correction effects of Chinese social media are influenced by political incentives.

4.2.1 Media Intervention in 2015 Stock Market Crash

The Chinese stock market experienced a historical crash during the second half of 2015, with a third of the value of the firms listed on Shanghai Stock Exchange being lost in the month of June, followed by 1,400 companies (more than half of all the listed firms) filed for a trading halt in early July in an attempt to avoid further losses. To stabilize the turbulence in the stock market, the National Bureau of Television, Broadcast, and Newspaper (a bureau under GAPP) issued an authoritative order to all press in China, demanding them to decrease the coverage of stock market-related news, and stop using negative words such as "tumble" or "crash" in the news. The Chinese press responded to this authoritative order by reducing the coverage of negative corporate news, resulting in an increased level of bias. Tables A3-A and A3-B in the Appendix provide descriptive evidence for the effect of this directive. From both tables, we can see that the average tone of the newspapers remained the same or even become more positive despite the falling market after the media intervention directive was effective on July 23rd, 2015.

We first examine whether social media will maintain its independence despite the additional bias in the tone of traditional media introduced by this media intervention. We partition the full sample into the pre-intervention period which includes all the sample data before or on July 23rd, 2015, and the post-intervention period after this date. We estimate the main regression model separately in these two sub-samples and test for the difference between regression coefficients using a Chow test. Results are reported in Table 5. The association between traditional media tone and social media tone is not statistically different in the pre-

intervention period and post-intervention period, however the reduction in the association when traditional media is positive has significantly increased in the post-intervention period. Specifically, in the pre-intervention period, the reduction in association between traditional media tone and social media tone is about 49% (0.0209/0.0425) when traditional media tone is positive, compared to a reduction of about 97% （0.0352/0.0360） in the post-intervention period. Taken together, the results suggest that the media intervention has increased the positive bias in traditional media's coverage of company news and strengthened social media's correction effect over traditional media bias.

4.2.2 State-owned Firms Versus Non-State-Owned Firms

In this subsection, we focus on whether state ownership of a listed firm influences the degree of social media's correction effect over traditional media bias. Piotroski et al. (2015) document that traditional media is more likely to suppress negative news if the company is state-owned because negative news of state-owned enterprises (SOE) will impose a higher cost for the politicians than non-SOE. If social media maintains its independence and not bias one type of firms more than the other, we expect the correction effect to be stronger for SOEs than for non-SOEs. We use the following cross-sectional model to examine the difference in social media's correction effect between SOE and non-SOEs:

(2) $$Social\ Media\ Tone_{it} = \alpha + \beta_1 Traditional\ Media\ Tone_{it} \times TM\ Positive_{it} \times SOE_{it} + \beta_2 TM\ Positive_{it} \times SOE_{it} + \beta_3 Traditional\ Media\ Tone_{it} \times TM\ Positive_{it} + \beta_4 Traditional\ Media\ Tone_{it} \times SOE_{it} + \beta_5 TM\ Positive_{it} + \beta_6 SOE_{it} + \beta_7 Traditional\ Media\ Tone_{it} + \gamma' Control\ Variables_{it} + Industry\ Dummy + Year\ Month\ Dummy + \varepsilon_{it}$$

Table 6 presents the result of OLS regression with industry and year-month fixed effects to control for unobservable correlated omitted variables. The results in column 1 suggest that social media impose a stronger correction effect for SOEs than non-SOEs, but only in the pre-intervention period. In such a period, the reduction in the association between traditional media tone and social media tone when traditional media tone is positive is about 69% for SOEs and 40% for non-SOEs.[13] We do not find similar results in the post-intervention sample or the full-sample. This is likely because as a response to the strict media intervention order from the government, traditional media increased the bias in corporate news upward for *all* firms regardless of their state ownership in the post-intervention period. The results suggest that the traditional media bias for SOE and non-SOE has been leveled following the intervention.[14]

4.2.3 National Congress Meeting Period Versus Non-National Congress Meeting Period

The CCP National Congress Meeting is an important political event held every five years in Beijing. During this period, the government intensifies its monitoring over traditional media to maintain a stable social environment. A summary of traditional media tone and social media tone around the 18th CCP National Congress Meeting[15] (Appendix -Table A3-C) shows that the mean tone of traditional media became more positive from about 3 months prior to the meeting, during the month of the meeting, and remained more positive for about 3 months after the meeting. Given the heightened bias in traditional media during this politically sensitive period, we are

[13] The reduction in association between traditional media tone and social media tone when traditional media tone is positive (i.e. Social media's correction effect) is calculated as follow: for SOEs $(\beta\_1 + \beta\_3)/(\beta\_7 + \beta\_4)$, for non-SOEs β_3/β_7

[14] We provide empirical evidence to support this conjecture in the Appendix – Table A1: In the pre-intervention period, tone of traditional media is significantly more positive for SOEs than for no-SOEs, but this difference has disappeared in the post-intervention period. The results are robust when controlling for firm characteristics and including industry fixed effect and year-month fixed effect.

[15] The 18th CCP National Congress Meeting was held during November 8 to November 14th, 2012

interested in whether social media, given it is under more loosed control and monitoring from the regulator than traditional media, demonstrate a correction effect on traditional media's bias.

We estimate the same regression model in our baseline analysis (Model 1) separately in the two sample partitions: congress meeting sample which includes a window of -45 to +45 days relative to the opening day of the 18th CCP National Congress Meeting, and non-congress meeting sample which includes the rest of the firm-day observations. Column 1 of Table 7 shows that there is no significant association between the tone of social media and the tone of traditional media around the congress meeting sample. In addition, the social media's correction effect on traditional media bias also disappeared during this same period. However, column 2 shows similar results to our main finding in Table 4, suggesting the relationships we have documented mainly concentrate in the non-congress meeting period. These results provide evidence that social media fails to correct the bias in traditional media during the congress meeting period.

We explore potential causes for the loss of social media' correction on traditional media bias during congress meeting period, in Figure 3 we show univariate evidence that the number of social media posts experienced a gradual decrease starting from about 6 months ahead of the congress meeting, reached the lowest level during the meeting and started a slow recovery to reach its normal level in about three months following the meeting. However, during the entire time the number of news articles published by traditional media for a firm-day remains largely unchanged.

Table 8 provides results of additional analysis on the level of activities for traditional media and social media during the Congress Meeting period. We estimate a pooled OLS regression model to determine the impact of Congress Meeting on the level of activities proxied

by the number of social media posts and the number of new articles. The model controls for firm characteristics (*Size, ROA, Market to Book, Leverage*), daily returns (stock return and index return), news from other channels (number of news, and number of social media posts as control variables) and a firm dummy to capture observed firm-level characteristics. Results show that the number of corporate news covering on a firm-day by traditional media increases by an average of 0.3 (7.7% increase) articles during Congress Meeting period, while the number of social media posts decrease by an average of 12.35 posts (31.3% decrease) during the same period. This finding provides possible explanations for the disappearance of the correction effect for social media – during politically sensitive periods such as the National Congress Meetings, even social media users refrain from posting critical (mainly negative) messages while the traditional media is pressured to report even more positive news.

4.3 The Tone of Social Media and Traditional Media and Stock Returns

Prior studies have investigated the stock return responses to traditional media tone and social media tone: Tetlock et al. (2008) focus on traditional media and find that the fraction of negative words in firm-specific news articles is associated with the same day and following day abnormal returns. Chen et al. (2014) find that opinion transmitted through seeking alpha is associated with abnormal stock returns from 3 to 60 days after the post. Bartov et al. (2018) show that Twitter contains original information that is useful in predicting announcement period returns. However, to the best of our knowledge, there is little evidence on whether there are significant stock return responses to traditional media and social media in China. Given China's unique media system (Piotroski et al. 2017, Qin et al. 2018) and institutions, empirical findings using U.S. data may not be generalizable to the Chinese setting.

In addition, existing literature examines the information content of social media and traditional media *independently*. We add to existing literature by jointly analyzing the relative association between the tone of the articles of social media and traditional media and the corresponding future abnormal stock returns. More specifically, we want to use the relative stock return response to traditional and social media as a way to gauge if social media can serve as a benchmark against the positive tone bias of traditional media. We expect that the stock return will discount its response to the tone of traditional media when it deviates positively in tone from that of social media, which provides support to our conjecture that social media can serve as a benchmarking delineating the positive bias of traditional media.

4.3.1 Descriptive Evidence

To study the information content of social media and traditional media in predicting returns, we first adopt a portfolio analysis method. Each week, stocks are ranked based on their average tone of traditional media (social media) in the previous week (from last Monday to last Friday) into ten deciles. Equal-weighted portfolios are formed by buying stocks that fall into the 10^{th} and the 1^{st} deciles of last week's traditional media tone (social media tone), these two portfolios are labeled TM10 (SM10) and TM1 (SM1), respectively.[16] Portfolios are adjusted weekly, and we impose a hypothetical transaction cost of 5 bps on each weekly adjustment.

Figure 2 presents the net value of these weekly-adjusted portfolios from 2009 to 2016, with a beginning value of 100, in comparison with China Stock Index 300 (CS300). Both TM10 and SM10 outperform the index, and both TM1 and SM1 underperform the index, suggesting traditional media and social media both provide information useful in predicting stock returns.

[16] Short-selling is strictly controlled by the China Security Regulation Committee (CSRC), and it is banned for the majority time in our sample. To approximate the reality, we only calculate returns on the long side during our sample period.

When looking at positive news and negative news separately, we show that SM10 yields a raw return of 446% over the course of eight years, almost doubling TM10's return for the same period; however, TM1 yield a more negative return than SM1 (-51% vs. -31%). Taken together, this descriptive evidence suggests that 1) overall tone of social media is useful in predicting returns than tone of traditional media, and 2) tone of traditional media is less useful than tone of social media in predicting returns when the news is positive (i.e. more biased), but traditional media is more useful than social media in predicting returns when the news is negative (i.e. less biased). However, these descriptive findings should be interpreted with caution, because they have not considered many factors that limit the ability to form the portfolio, such as liquidity, restriction to buy/sell and price impact.

4.3.2 Regression Analyses

In this subsection, we explore whether Chinese social media and traditional media contains information that is useful to predict future stock returns using a more rigorous regression analysis, controlling for other factors. Specifically, we test 1) whether the tone of traditional media and tone of social media are associated with future abnormal returns at the firm level, 2) whether the association between the tone of traditional media and future abnormal returns is attenuated when it deviates from the tone of social media (i.e., more positively biased).

We estimate the following regressions models with firm fixed effect and year-month fixed effect. CAR is the value-weighted market-adjusted cumulative abnormal return; we use three different measurement windows to capture the short-term and longer-term impact news and social media. To reduce the likelihood of reverse causality that news or social media is reacting to extreme abnormal returns, all three CAR windows start from day +1 relative to day 0, where traditional media and social media are measured. *TM Bias* is a dummy variable that equals to one

if the difference between traditional media tone and social media tone for the same firm on the same day falls in the 5th quintile, representing the highest level of bias in traditional media.[17] Following Tetlock et al. (2008), we include CAR of the last week to control for momentum in price movement, and standard errors are double clustered at the firm and year-month level. Our model is as follows:

$$(3) \quad CAR_{it} = \alpha + \beta_1 Traditional\ Media\ Tone_{it} + \beta_2 Trditional\ Media\ Tone_{it} \times TM\ Bias_{it} + \beta_3 TM\ Bias_{it} + \beta_4 Social\ Media\ Tone_{it} + \beta_5 CAR[-5,-1]_{it} + \gamma' Control\ Variables_{it} + Firm\ Dummy + Year\ Month\ Dummy + \varepsilon_{it}$$

Table 9 presents the regression results. In all three CAR measurement windows, the tone of social media is positively associated with CAR, and the coefficients are both statistically and economically significant. An increase in the tone of social media from zero (neutral) to one (most positive) is associated with an increase of 56 basis points in cumulative abnormal returns over the following five trading days. Moreover, this association does not reverse in the 10-day or 20-day windows. Consistent with findings of Tetlock et al. (2008) and Chen et al. (2014), our results suggest that traditional media also have positive associations with the subsequent CARs in the 5-day and 10-day windows, but the associations are significantly attenuated when the tone of traditional media deviates from the tone of social media. Comparing the coefficients of traditional media and social media, the results suggest that the tone of social media has much stronger predictivity of future abnormal returns than traditional media.

In summary, the regression analysis provides evidence that social media and traditional media both provide useful information to predict future abnormal returns, and traditional media's

[17] We calculate the difference between the tone of traditional media and the tone of social media as follows: $Diff_{tm-sm} = Traditional\ Media\ Tone_{it} - Social\ Media\ Tone_{it}$, we avoid using a continuous measure of the difference between TM and SM to alleviate the concern of multi-collinearity. In robustness check, we define *TM Bias* as top quartile and top tercile, and the results remains unchanged.

information content is reduced when its tone deviates from the tone of social media. These findings support our conjecture that social media serves as a check in correcting the positive bias in traditional media.[18]

5. Additional Analysis and Robustness Tests

5.1 Social Media's Correction Effect for Party Papers versus Non-Party Papers

Piotroski et al. (2017) show that party papers in China are more positively biased than non-party papers for political reasons. Consistent with this finding, the mean tone of party media is 0.5115, notably more positive compared to mean tone of non-party (commercialized) media of 0.1602, in our sample. We explore whether social media differentiate the degree of positive bias in party papers and in non-party papers. We estimate our baseline model separately by first replacing *Traditional Media Tone* with *Party Media Tone* and then with *Non-Party Media Tone*. Because party papers publish less frequently about corporate news than non-party media, a large number of firm-day observations are missing due to the lack of party media coverage.

Results are reported in Table 10. The association between the tone of social media and tone of party media is significantly smaller (Chi-square statistics =8.57), accounting for only about 33% (0.0192/0.0586) of the association between the tone of social media and the tone of non-party media. However, the coefficients on the interaction term which are to capture the extent to which social media corrects traditional media's positive bias are not statistically different across the two specifications. This is likely due to the already weak association between

[18] We conclude that the stock price results support our conjecture that social media supplies less biased information that serves as a benchmark for delineating the traditional media's optimistic bias. However, we do not claim that it is the social media information that *causes* the market to discount its response to the biased information reported by the traditional media. The price discount could simply be reflecting the market's response to the unbiased underlying information that is captured by the social media.

the tone of social media and the tone of party media. In general, the tone of social media exhibits significantly lower association with the tone of party media than with tone of the non-party media, due to the relatively high positive bias in party media.

5.2 The Information Content of Social Media and Traditional Media during the National Congress Meeting Period

In the previous subsection we find that social media fails to correct bias in traditional media in the presence strong political incentive from the government to curb negative news, we extend this finding by investigating whether social media and traditional media provide useful information in predicting future abnormal returns.

We estimate model 3 separately for congress meeting period and non-congress meeting period and report results in Table 11. Neither traditional media tone nor social media tone is associated with future abnormal returns during the congress meeting period. The results suggest that the intensified monitoring over both traditional media and social media during the political sensitive period has diminished the information content of both media. However, both traditional and social media tone are significantly associated with future abnormal returns in the non-congress meeting period, except for the twenty-day CAR and the traditional media tone.

5.3 The Information Content of Social Media and Traditional Media: SOEs Versus Non-SOEs

Our findings in 4.2.2 suggest that traditional media bias and social media's correction effect are different across SOEs and non-SOEs (see Appendix – Table 1 for detail). In this section we explore whether the information content of traditional media tone and social media tone varies across SOEs and non-SOEs. We estimate model 3 separately in the SOE subsample and non-SOE subsample with firm fixed effect and year-month fixed effect, and compare the coefficients across-sample using Chow test.

Results are reported in Table 12. In all three measurement windows, the tone of social media is positively associated with future abnormal returns for both SOE and non-SOE subsamples, and the coefficients are significantly higher than coefficients of traditional media tone, suggesting that social media has better information content in predicting future returns in both SOE and non-SOE subsamples. The tone of traditional media fails to predict future abnormal returns in two out of three measurement windows for SOE but still exhibit an ability to predict future abnormal returns for non-SOEs. Even in the [1,5] days window where traditional media are able to predict abnormal returns for both types of companies, the coefficient on *Traditional Media Tone* is significantly greater for non-SOE than for SOE (difference is significant at 0.01 level). This evidence suggests that the bias in the tone of traditional media associated with SOEs has damaged its information content. Result also suggests that social media – due to its correction effect over traditional media bias – serves as a substitute in providing more useful information to the market when the bias in traditional media is more prominent.

5.4 Robustness Tests

5.4.1 Alternative Measures of Traditional Media Bias

Our results of social media's correction effect primarily rely on using an indicator variable whether traditional media tone is positive (i.e., tone of traditional media > 0). From the descriptive statistics, we show that traditional media is positive in about 77.9% of the firm-day observations, one may be concerned that this indicator variable has insufficient variation in capturing the bias in tone. As a robustness check, we replace the *TM Positive* indicator variable with *TM Above Median*, which is an indicator variable set to one if tone of traditional media is above the median tone of all firms on a given day. We repeat our baseline regressions and find

that our results are statistically and economically robust to this alternative measure, which are reported in Appendix – Table A4.

5.4.2 Alternative Measures of the Dependent Variable - Social Media Tone

In our sample, we require at least three social media posts about the same company for a firm-day to be included in our sample, in order to avoid measurement errors due to a few extreme and unrepresented posts. One may be concerned that limiting the sample to three posts minimum would be insufficient in addressing this issue. As a robustness check, we tried the following restrictions in constructing our dependent variable – social media tone: 1) include only samples with a minimum of five posts per day 2) include only samples with a minimum of ten posts per day 3) winsorize the most positive and most negative social media posts in 1) & 2). Our existing results largely remain unchanged in both sign and significance after applying these three alternative measures of social media tone to our main results.

6. Conclusions

This paper examines whether China's social media supplies less positively biased information to the market than traditional media. Using a comprehensive sample from 2009 to 2016 of corporate news of newspapers and the opinions shared by investors in East Guba, an online stock forum, we document that there is a positive correlation in the tone of the traditional and social media of the same firm on the same day. However, we find that this positive correlation is significantly attenudated when the tone of the newspapers is positive. Consistent with the conjecture that East Guba plays the monitoring role in correcting the bias of state-owned media, these results suggest that the tone of Guba's posts is less optimistic than that of the newspapers when the latter are more likely to be positively biased.

Further analyses show that political incentives of the Chinese media shape the bias correction effects of social media. That is, political factors such as state ownership of the firms being covered and the political sensitivity of the time periods during which the articles are posted shape East Guba's monitoring role in correcting the newspapers' bias. Finally, the positive stock return response to the tone of the traditional media's articles is significantly attenuated when it deviates positively from that of the social media, but there is no any significant change in stock return response to the tone of social media when it deviates from that of the traditional media.

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Table 1: Sample Selection Process

Panel A

	Firms	Firm-day
CSMAR-Financial Statement File Merged with Stock Price File	3,171	4,421,222
Less firm-days with less than 3 posts	*(132)*	*(136,019)*
Social Media with no less than 3 posts/day	3,039	4,285,203
Less firm-days with no news articles	-	*(3,273,687)*
Traditional Media with no less than 1 news/day	3,039	1,011,516
Less firm-days with missing control variables	*(28)*	*(40,534)*
Final Sample	3,011	970,982

Table 1: Descriptive Statistics

Panel B

	Variable	*N*	*Mean*	*SD*	*P25*	*Median*	*P75*
Traditional Media	***Number of news***	970,982	3.8953	9.2842	1.0000	1.0000	3.0000
	Traditional media tone	970,982	0.3704	0.4947	0.0742	0.4658	0.7958
	Party media tone	124,616	0.5115	0.4998	0.2682	0.7000	0.9182
	Non-party media tone	970,982	0.1602	0.4021	0.0000	0.0000	0.3979
	Traditional media positive	970,982	0.7790	0.4149	1.0000	1.0000	1.0000
Social Media	***Social media tone***	970,982	-0.2028	0.3145	-0.4118	-0.1778	0.0000
	Number of posts	970,982	39.4893	94.8157	3.0000	16.0000	43.0000
Stock Return	***Raw return***	970,982	0.0014	0.0339	-0.0157	0.0007	0.0169
	Abnormal return	970,982	0.0012	0.0275	-0.0130	-0.0017	0.0115
	CAR[1,5]	970,982	0.0006	0.0600	-0.0301	-0.0041	0.0253
	CAR[1,10]	970,982	0.0016	0.0821	-0.0416	-0.0054	0.0368
	CAR[1,20]	970,982	0.0036	0.1122	-0.0587	-0.0062	0.0551
Firm Fundamentals	***SOE***	18,499	0.4278	0.4948	0.0000	0.0000	1.0000
	Size	18,499	21.9302	1.3771	20.9622	21.7418	22.6726
	ROA	18,499	0.0539	0.0809	0.0142	0.0422	0.0834
	Market to Book	18,499	3.8148	3.8706	1.7172	2.7480	4.5508
	Leverage	18,499	0.2125	0.3827	-0.0000	0.0342	0.2606

Table 2: Correlation Table

		1	2	3	4	5	6	7	8	9	10	11
1	***number of news***											
2	***traditional media tone***	-0.0184*										
3	***party media tone***	-0.0048*	0.2826*									
4	***non-party media tone***	-0.0199*	0.5905*	-0.1036*								
5	***traditional media positive***	0.0699*	0.8217*	0.2093*	0.4903*							
6	***social media tone***	-0.0113*	0.0523*	0.0042*	0.0446*	0.0459*						
7	***number of posts***	0.1523*	-0.0470*	-0.0301*	-0.0155*	-0.0221*	-0.0382*					
8	***raw return***	-0.0029*	0.0460*	-0.0009	0.0492*	0.0408*	0.2115*	-0.0125*				
9	***abnormal return***	-0.0028*	0.0524*	-0.0025	0.0582*	0.0474*	0.2183*	-0.0089*	0.8226*			
10	***CAR[1,5]***	-0.0059*	0.0109*	0.0041*	0.0067*	0.0087*	0.0324*	-0.0439*	0.0593*	0.0639*		
11	***CAR[1,10]***	-0.0083*	0.0098*	0.0044*	0.0049*	0.0084*	0.0305*	-0.0505*	0.0468*	0.0530*	0.7280*	
12	***CAR[1,20]***	-0.0109*	0.0079*	0.0051*	0.0043*	0.0052*	0.0274*	-0.0602*	0.0311*	0.0357*	0.5338*	0.7257*

*Indicates correlation coefficient significant at 0.05 level

Table 3: Sample Distribution by Year

Panel A

Sample Distribution - By Year			
Year	Freq.	Percent	Cum.
2009	121,729	12.54%	12.54%
2010	127,999	13.18%	25.72%
2011	129,894	13.38%	39.10%
2012	135,332	13.94%	53.03%
2013	135,203	13.92%	66.96%
2014	117,543	12.11%	79.06%
2015	101,934	10.50%	89.56%
2016	101,347	10.44%	100.00%
Total	970,982	100%	100%

Table 3: Sample Distribution - by Industry

Panel B

Industry	Frequency	Percentage	Cumulative
Computer and Communications	66,710	6.87	6.87
Real Estate	64,572	6.65	13.52
Pharmaceutical	51,478	5.30	18.82
Electrical Manufacture	45,168	4.65	23.47
Automotive	36,948	3.81	27.28
Chemical Products	36,397	3.75	31.03
Retails	36,032	3.71	34.74
Financial Service	32,730	3.37	38.11
Specialized Equipment Manufacture	32,630	3.36	41.47
Business Service	31,977	3.29	44.76
Software and Information Technology	29,581	3.05	47.81
Alcoholic Beverage, Non-alcoholic Beverage and Tea	27,605	2.84	50.65
Wholesale	24,947	2.57	53.22
Construction	24,101	2.48	55.70
Electricity and Heat Supply	24,088	2.48	58.18
Non-metallic Mineral	23,029	2.37	60.56
General Equipment Manufacture	20,766	2.14	62.70
Ferrous Metal Smelting	20,560	2.12	64.81
Non-Ferrous Metal Smelting	19,740	2.03	66.85
Water Transportation	17,568	1.81	68.65
Aero Transportation	17,493	1.80	70.46
Transportation Equipment Manufacture	16,846	1.73	72.19
Business Service	15,746	1.62	73.81
Road Transportation	14,345	1.48	75.29
Coal Mining and Washing	13,477	1.39	76.68
Internet Service	12,649	1.30	77.98
Food Manufacture	10,856	1.12	79.10
Metallic Product Manufacture	10,286	1.06	80.16
Agriculture	9,859	1.02	81.17
Others	182,798	18.82	100
Total	970,982	100	

Table 4: Social Media's Correction Effect on Traditional Media Bias

Dependent Variable: Social Media Tone

Independent Variables	1	2	3	4	5
Traditional Media Tone	0.0331***	0.0306***	0.0711***	0.0415***	0.0426***
	51.43	43.68	23.62	16.67	17.11
Traditional Media Tone x TM_Positive			**-0.0676***	**-0.0224***	**-0.0235***
			-19.99	**-7.84**	**-8.23**
TM_Positive			0.0145***	0.0056***	0.0056***
			8.32	3.97	3.95
Size					-0.0327***
					-24.78
ROA					0.0429***
					5.84
Market to Book					-0.0025***
					-13.64
Leverage					0.0262***
					12.52
Adj-R2	0.003	0.092	0.005	0.092	0.093
N	970,982	970,982	970.982	970,982	970,982
Firm-Fixed Effect	NO	YES	NO	YES	YES
Year-Month-Fixed Effect	NO	YES	NO	YES	YES

*** P<0.01 ** P<0.05 * P<0.1

Table 5: Social Media's Correction Effect on Traditional Media Bias: Pre and Post Media Intervention

Dependent Variable: Social Media Tone

	(1)	(2)	Difference
Independent Variables	Pre-Intervention	Post-Intervention	(2)-(1)
Traditional Media Tone	0.0425***	0.0360***	-0.0065
	16.26	5.99	1.02
Traditional Media Tone x TM_Positive	**-0.0209*** **	**-0.0352*** **	**-0.0143** **
	-7.00	**-5.15**	**3.96**
TM_Positive	0.0052***	0.0098***	
	3.44	2.75	
Size	-0.0204***	-0.0805***	
	-16.96	-14.61	
ROA	0.0096	0.0404	
	1.55	1.49	
Market to Book	-0.0010***	-0.0059***	
	-6.09	-14.13	
Leverage	0.0227***	0.0516***	
	12.62	7.99	
Adj-R2	0.084	0.095	
N	802,523	168,459	
Firm-Fixed Effect	YES	YES	
Year-Month-Fixed Effect	YES	YES	

We use Chow Test and report Chi-square Statistics to test the equality of two coefficients across sample.

*** P<0.01 ** P<0.05 * P<0.1

Table 6: Social Media's Correction Effect on Traditional Media Bias- SOE and Non-SOE

Dependent Variable: Social Media Tone

Independent Variables	Pre-Intervention	Post -Intervention	Full Sample
Traditional Media x	**-0.0114****	**0.0186**	**0.0022**
TM_Positive x SOE	**-2.12**	**0.95**	**0.47**
TM_Positive x SOE	0.0076***	-0.0120**	0.0021
	2.76	-2.08	0.83
TM_Positive x Traditional Media	-0.0222***	-0.0538***	-0.0327***
	-5.65	-7.36	-9.44
SOE x Traditional Media	-0.0067	-0.0098	-0.0090**
	-1.40	-1.00	-2.09
TM_Positive	0.0027	0.0231***	0.0076***
	1.30	5.78	4.11
SOE	-0.0343***	0.0016	-0.0280***
	-14.91	0.34	13.48
Traditional Media	0.0552***	0.0500***	0.0548***
	16.11	7.72	18.07
Firm-Level Control Variables	YES	YES	YES
Adj-R2	0.051	0.019	0.077
N	802,523	168,459	970,982
Industry-Fixed Effect	YES	YES	YES
Year-Month-Fixed Effect	YES	YES	YES

We use Chow Test and report Chi-square Statistics to test the equality of two coefficients across sample. Pre-Intervention sample = Observations on or before July 23rd 2015, effective date of the media intervention.

*** P<0.01 ** P<0.05 * P<0.1

Table 7: Social Media's Correction Effect on Traditional Media Bias: National Congress Meeting Period vs Non-National Congress Meeting Period

Dependent Variable: Social Media Tone Day 0

	1	2
Independent Variables	Congress Meeting	Non-Congress Meeting
Traditional Media Tone	**0.0206**	**0.0431*** **
	1.55	**17.02**
Traditional Media Tone x TM_Positive	**0.0094**	**-0.0248*** **
	0.62	**-8.51**
TM_Positive	0.0021	0.0058***
	0.29	4.03
Size	-0.0436	-0.0331***
	-1.48	-14.86
ROA	-0.0252	0.0468***
	-0.01	6.26
Market to Book	-0.0738	-0.0025***
	-1.11	-13.41
Leverage	0.3566***	0.0266***
	3.29	12.59
Adj-R2	0.196	0.092
N	41,110	929,872
Firm-Fixed Effect	YES	YES
Year-Month-Fixed Effect	YES	YES

*** P<0.01 ** P<0.05 * P<0.1

Table 8: Number of Social Media Post/ Traditional Media News Articles during Congress Meeting Period

	1	2
	Dependent Variables	
Independent Variables	Number of Social Media Posts	Number of News Articles
Congress Meeting	**-12.3525*** **	**0.3003*** **
	-7.87	**4.09**
Number of News	1.5869***	
	-4.19	
Number of Social Media Posts		0.0150***
		7.21
Social Media Tone	-0.168	-0.1510***
	-0.31	-2.66
Traditional Media Tone	-3.2516***	-0.3299***
	-5.20	-6.13
Stock Return	-27.0297	1.7709**
	-1.50	2.48
Index Return	32.4363	2.1961
	-1.31	0.97
Size	-17.2684*	0.1506
	-1.89	0.52
ROA	17.7713	1.8110**
	-0.41	1.99
Market to Book	-2.1499*	0.0292
	-1.88	1.59
Leverage	8.6415*	0.0605
	-1.67	0.26
Adj-R2	0.412	0.791
N	970,982	970,982
Firm-Fixed Effect	YES	YES

*** P<0.01 ** P<0.05 * P<0.1

Table 9: The Informativeness of Traditional Media and Social Media in Predicting Abnormal Returns: The Impact of Traditional Media Bias

	1	2	3
	CAR(1,5)	CAR(1,10)	CAR(1,20)
Independent Variables			
Traditional Media Tone	0.0009***	0.0007***	-0.0001
	5.23	2.82	-0.21
Traditional Media Tone x TM Bias	**-0.0042*** **	**-0.0047*** **	**-0.0067*** **
	-5.47	**-4.41**	**-4.43**
TM Bias	0.0035***	0.0045***	0.0075***
	5.58	5.14	5.99
Social Media Tone	0.0056***	0.0069***	0.0080***
	21.24	18.47	15.13
Size	-0.0052***	-0.0099***	-0.0189***
	-14.17	-16.05	-19.44
ROA	-0.0026	-0.0042	-0.0124**
	-1.25	-1.21	-2.21
Market to Book	-0.0006***	-0.0011***	-0.0022***
	-10.63	-12.42	-15.11
Leverage	0.0033***	0.0062***	0.0126***
	6.03	6.76	8.46
CAR [-5,-1]	0.0031*	0.0044**	-0.0024***
	1.91	2.13	3.79
Adj- R2	0.0143	0.0223	0.0345
N	970,982	970,982	970,982
Firm Fixed Effect	Yes	Yes	Yes
Year-Month Fixed Effect	Yes	Yes	Yes

*** P<0.01 ** P<0.05 * P<0.1

Table 10: Social Media's Correction Effect on Traditional Media Bias: Party Media and Non-Party Media

Dependent Variable: Social Media Tone Day 0

	1	2	Diff.
Independent Variables	Party Media	Non-Party Media	(2) – (1)
Traditional Media Tone	**0.0192****	**0.0586*****	**0.0394*****
	2.50	**17.70**	**8.57**
Traditional Media Tone x TM_Positive	**-0.0145***	**-0.0392*****	**-0.0247**
	-1.70	**-11.33**	**0.974**
TM_Positive	0.0038	0.0054***	
	0.82	3.19	
Size	-0.0443***	-0.0326***	
	-14.08	-24.65	
ROA	0.0623***	0.0443***	
	3.39	6.03	
Market to Book	-0.0036***	-0.0025***	
	-7.84	-13.55	
Leverage	0.0318***	0.0261***	
	6.49	12.49	
Adj-R2	0.115	0.093	
N	124,616	970,982	
Firm-Fixed Effect	YES	YES	
Year-Month-Fixed Effect	YES	YES	

We use Chow Test and report Chi-square Statistics to test the equality of two coefficients across sample.

*** P<0.01 ** P<0.05 * P<0.1

Table 11: The Informativeness of Traditional Media and Social Media in Predicting Abnormal Returns: During Congress Meeting Period

	1	2	3	4	5	6
	CAR(1,5)	CAR(1,5)	CAR(1,10)	CAR(1,10)	CAR(1,20)	CAR(1,20)
Independent Variables	Congress Meeting	Non-Congress Meeting	Congress Meeting	Non-Congress Meeting	Congress Meeting	Non-Congress Meeting
Traditional Media Tone	**-0.0001**	**0.0010*** **	**-0.0004**	**0.0012*** **	**-0.0007**	**0.0005**
	-0.12	**6.02**	**-0.51**	**4.77**	**0.24**	**1.34**
Social Media Tone	**0.0009**	**0.0057*** **	**0.0022***	**0.0069*** **	**0.0008**	**0.0065*** **
	1.13	**20.33**	**1.92**	**16.90**	**1.05**	**5.51**
Size	0.0015***	-0.0007***	0.0028***	-0.0014***	0.0003**	-0.0007***
	3.15	-5.43	3.59	-6.09	2.19	-7.63
ROA	-0.029	-0.0011	0.0023	-0.0021	-0.0012**	-0.0019
	-0.43	-0.56	0.21	-0.62	-2.12	-1.01
Market to Book	0.0006**	-0.0003***	0.0011**	-0.0005***	-0.0001	-0.000
	1.99	-5.91	2.54	-6.49	-1.29	-0.66
Leverage	0.0014	0.0009***	0.0022	0.0016**	0.0005	0.0007
	1.02	2.45	0.90	2.47	1.45	1.73
Adj-R2	0.023	0.017	0.041	0.013	0.034	0.022
N	41,110	929,872	41,110	929,872	41,110	929,872
Firm Fixed Effect	YES	YES	YES	YES	YES	YES
Year-Month Fixed Effect	NO	YES	NO	YES	NO	YES

*** P<0.01 ** P<0.05 * P<0.1

Table 12: The Informativeness of Traditional Media and Social Media in Predicting Abnormal Returns: SOE and Non-SOE

	1	2		3	4		5	6	
	CAR(1,5)	CAR(1,5)		CAR(1,10)	CAR(1,10)		CAR(1,20)	CAR(1,20)	
Independent Variables	SOE	Non-SOE		SOE	Non-SOE		SOE	Non-SOE	
Traditional Media Tone	**0.0004****	**0.0012*****	**0.0008*****	**0.0004**	**0.0012*****	**0.0008****	**-0.0004**	**0.0013*****	**0.0017*****
	2.2	**6.3**	**10.44**	**1.51**	**4.47**	**5.44**	**-1.30**	**3.61**	**12.49**
Social Media Tone	**0.0042*****	**0.0063*****	**0.0021*****	**0.0050*****	**0.0074*****	**0.0024*****	**0.0050*****	**0.0077*****	**0.0027*****
	16.55	**19.5**	**26.50**	**14.36**	**16.83**	**19.61**	**10.64**	**13.00**	**13.29**
Size	-0.0053***	-0.0059***		-0.0105***	-0.0106***		-0.0194***	-0.0204***	
	-18.71	-19.46		-27.42	-25.71		-37.24	-36.71	
ROA	-0.0018	-0.0038**		-0.0044*	-0.0059***		-0.0181***	-0.0119***	
	-1.03	-2.46		-1.90	-2.77		-5.68	-4.17	
Market to Book	-0.0007***	-0.0007***		-0.0013***	-0.0013***		-0.0024***	-0.0024***	
	-16.25	-17.27		-22.96	-23.67		-31.59	-33.38	
Leverage	0.0041***	0.0027***		0.0080***	0.0045***		0.0155***	0.0096***	
	11.12	4.66		16.19	5.79		23.01	9.16	
Adj-R2	0.0114	0.0218		0.0205	0.0309		0.0335	0.0469	
N	528,234	442,748		528,234	442,748		528,234	442,748	
Firm Fixed Effect	YES	YES		YES	YES		YES	YES	
Year-Month Fixed Effect	YES	YES		YES	YES		YES	YES	

*** P<0.01 ** P<0.05 * P<0.1

Appendix
Variable Definitions

Traditional Media Tone = Mean of all traditional media news articles covering a firm on a given day. For measurement of article tone, please see section 3.1 for detail.

Number of News = Number of traditional media news articles covering a firm on a given day

Party Media Tone = Mean of all news articles published by a traditional media that is under direct control of the CCP party, for a complete list of party-affiliated media, please see Piotroski (2017) for detail.

Non-Party Media Tone = Mean of all news articles published by a traditional media that is not under direct control of the CCP party.

Traditional Media Positive = A dummy variable set to 1 if Traditional Media Tone is greater than 0; set to 0 otherwise.

Social Media Tone = for a firm day, social media tone is calculated as (Number of positive social media posts – Number of negative social media posts) / Total Number of social media posts.

Number of Posts = The total number of social media articles related to a firm posted on a given day

Abnormal Return = Index adjusted return, equals to the raw return, which equals to (closing price – opening price)/opening price, of a firm minus index return (Shanghai, Shenzhen, Small Cap, GEM)

CAR[i,j] = Cumulated abnormal returns of the equal weighted market-adjusted abnormal return from day i to day j.

SOE = Indicator variable equal to one if the company is ultimately controlled by either the central or local government; a firm is considered state controlled if the state owns more than 20 percent of its equity in year t

SIZE = Log of the firm's total market value of equity at the end of fiscal year t

ROA = Firm's return on assets, measured as net income in year t scaled by total assets at the end of fiscal year t

Market to Book = Ratio of the firm's market value of equity to book value of equity at the end of year t

Leverage = Ratio of the firm's long-term debt to shareholders' equity at the end of year t

Congress Meeting = Indicator variable set to 1 if a firm day is within a window of -45 to +45 days relative to the opening day of the 18th CCP National Congress Meeting

Stock Return = The raw return of a stock calculated as (closing price – opening price)/ opening price

Index Return = The raw return of Shanghai Stock Exchange daily Index

TM_Bias = Indicator variable set to 1 if the distance between traditional media and social media calculated as (Traditional Media Tone – Social Media Tone) is in the 1st quintile of all firms on the same day

Table A1: Traditional Media Tone and Traditional Media – Social Media Tone Difference

Traditional Media Tone Decile	Mean of TM Bias (Traditional Media Tone-Social Media Tone)	Standard Deviation	Frequency	
1	-0.3794	0.3760	98,421	▲
2	0.0287	0.3535	97,206	Negative
3	0.2889	0.3410	97,943	Positive
4	0.4654	0.3279	94,736	▼
5	0.6061	0.3314	96,345	
6	0.7229	0.3316	97,796	
7	0.8421	0.3340	97,993	
8	0.9648	0.3337	98,644	
9	1.0683	0.3323	97,264	
10	1.1415	0.3294	94,634	
Total	0.5732	0.5722	970,982	

Table A2: Traditional Media Tone for SOE vs Non-SOE: The Impact of Media Intervention

Dependent Variable: Traditional Media Tone

Independent Variables	Pre-Intervention	Post-Intervention	Full-Sample
SOE	**0.0158***** **13.54**	**0.0009** **0.30**	**0.0137***** **12.66**
Size	0.0074*** 19.01	0.0058*** 5.16	0.0073*** 19.71
ROA	0.468*** 23.44	0.439*** 23.23	0.464*** 27.66
Market to Book	-0.0057*** -29.86	-0.0058*** -16.31	-0.0058*** -33.82
Leverage	-0.0161*** -10.91	-0.0213*** -6.01	-0.0173*** -12.75
Adj-R2	0.018	0.014	0.018
N	802,523	168,459	970,982
Year-Month Fixed Effect	YES	YES	YES
Industry Fixed Effect	YES	YES	YES

Table A3-A: Traditional Media Tone and Social Media Tone Around Media Intervention in 2015

Year-Month	Mean Tone of Social Media	Mean Tone of Traditional Media	Difference TM-SM
2015-01	0.4283	-0.2494	0.6777***
2015-02	0.4027	-0.2495	0.6522***
2015-03	0.4552	-0.2141	0.6693***
2015-04	0.4515	-0.2807	0.7323***
2015-05	0.4332	-0.2939	0.7271***
2015-06	0.4221	-0.3325	0.7546***
2015-07	0.4224	-0.3688	0.7912***
2015-08	0.4021	-0.3344	0.7365***
2015-09	0.4062	-0.3245	0.7308***
2015-10	0.4426	-0.2821	0.7247***
2015-11	0.4491	-0.3290	0.7781***
2015-12	0.4653	-0.3053	0.7706***
Total	0.4317	-0.2970	0.7287

Table A3-B: Traditional Media Tone and Social Media Tone by Year

Year	Mean Tone of Social Media	Mean Tone of Traditional Media	Difference TM-SM
2009	0.3503	-0.2081	0.5584***
2010	0.3766	-0.1972	0.5738***
2011	0.3497	-0.2122	0.5618***
2012	0.3460	-0.1534	0.4994***
2013	0.3674	-0.1729	0.5403***
2014	0.4116	-0.1813	0.5928***
2015(Pre-Intervention)	0.4343	-0.2698	0.7041***
2015(Post-Intervention)	0.4282	-0.3256	0.7538***
2016	0.3964	-0.2846	0.6810***
Total	0.3704	-0.2028	0.5732

Table A3-C: Traditional Media Tone and Social Media Tone Around 18th CCP National Congress Meeting

Year-Month	Mean Tone of Social Media	Mean Tone of Traditional Media	Difference TM-SM
2012-07	0.2923	-0.1760	0.4683***
2012-08	0.3018	-0.1638	0.4656***
2012-09	0.3483	-0.1470	0.4952***
2012-10	0.3591	-0.1068	0.4659***
2012-11	0.3893	-0.1331	0.5224***
2012-12	0.4042	-0.1274	0.5316***
2013-01	0.3481	-0.1480	0.4961***
2013-02	0.3071	-0.1384	0.4455***
2013-03	0.3271	-0.1762	0.5033***
Total	0.3419	-0.1463	0.4882

Table A4: Robustness Check of Social Media's Correction Effect on Traditional Media Bias: Alternative Measurement of Traditional Media Bias

Dependent Variable: Social Media Tone

Independent Variables	
Traditional Media Tone	0.0414*** 33.60
Traditional Media Tone x TM Above Median	**-0.0463***** **-14.34**
TM Above Median	0.0254*** 11.12
Size	-0.0326*** -24.72
ROA	0.0426*** 5.82
Market to Book	-0.0025*** -13.64
Leverage	0.0262*** 12.50
Adj-R2	0.093
N	970,982
Firm-Fixed Effect	YES
Year-Month-Fixed Effect	YES

Figure 1

Linear Prediction Plot of Association Between the Tone of Social Media and the Tone of Traditional Media

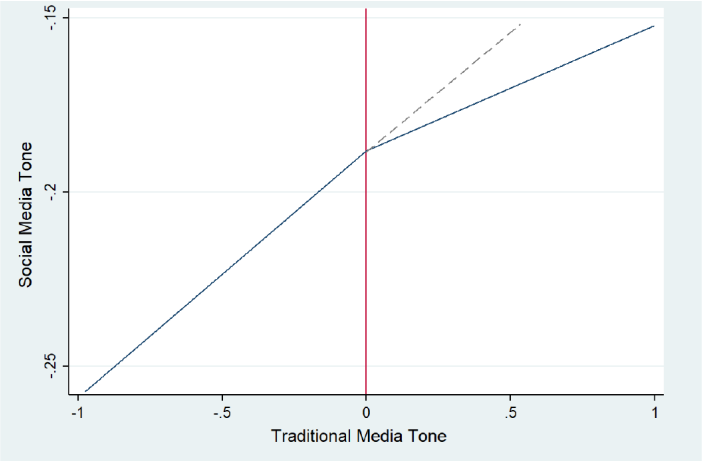


Figure 2: Net Value of Weekly-Adjusted Stock Portfolios Formed Based on Tone of Traditional Media and Tone of Social Media

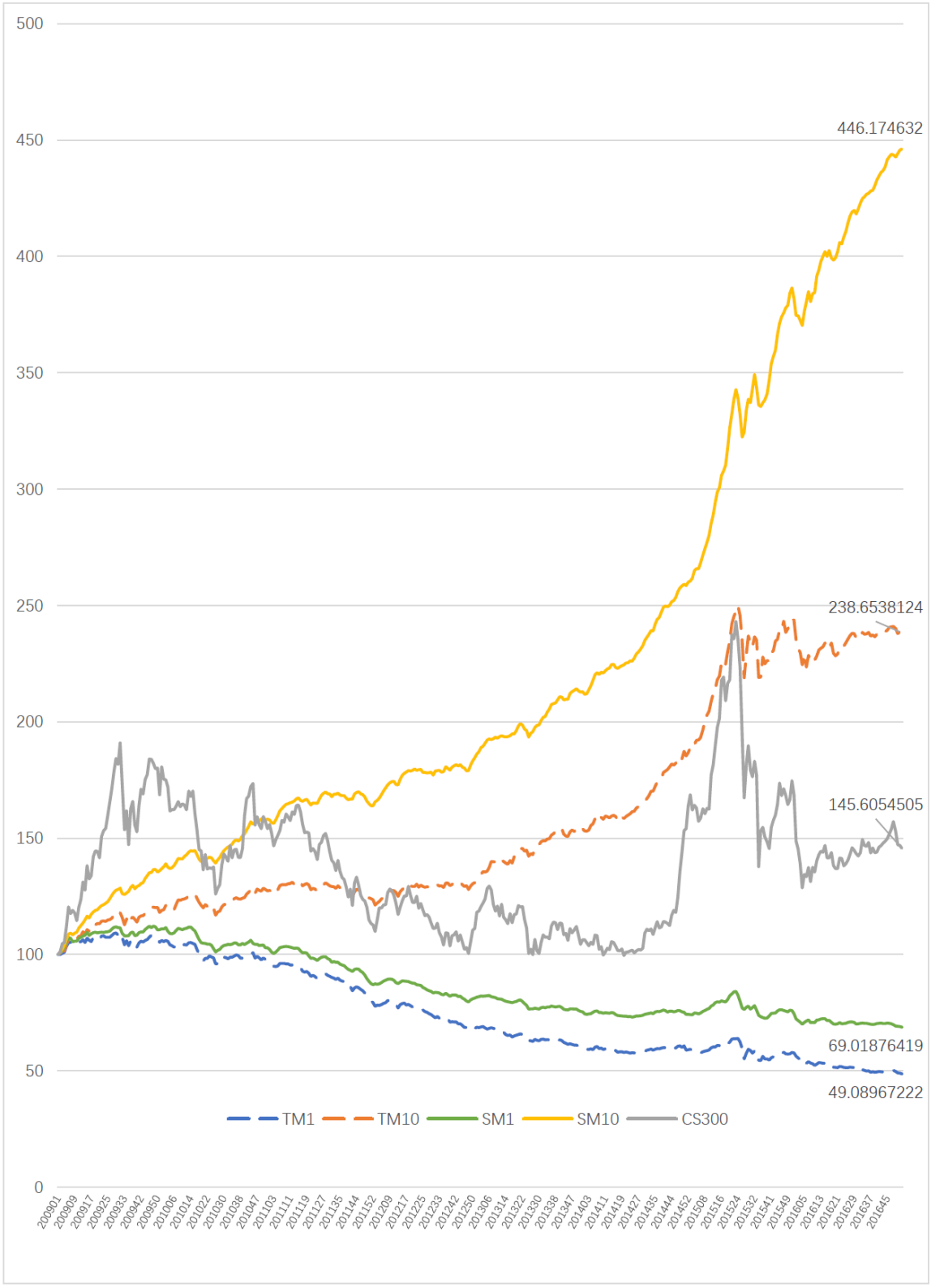
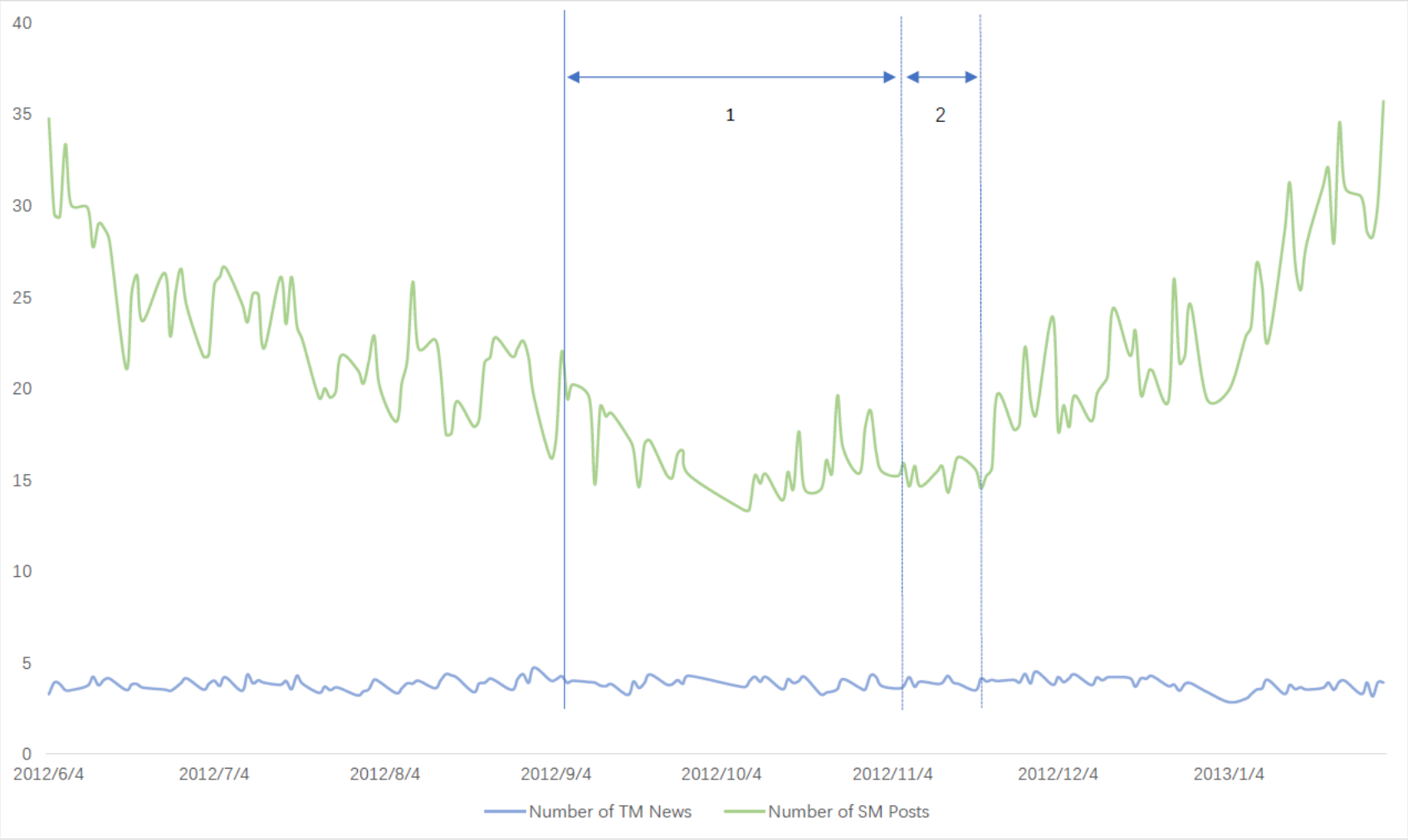


Figure 3: The Daily Number of News Articles and Social Media Posted Around 18th CCP National Congress Meeting



1: Preparation Period of the CPC 18th National Congress Meeting.
2: Meeting Period of the CPC 18th National Congress Meeting

Figure 4
Screenshots of the Reports on the Media Intervention Order

CHINADAILY.COM.CN

广电总局：少量报道股市 不得使用暴跌崩盘等词

环球时报-环球网　2015-06-26 17:57:00

广电总局要求广播电视台等媒体，要少量报道股市。

广电总局要求广播电视台等媒体，要少量报道股市。（资料图）

环球时报-环球网6月26日报道广电总局要求广播电视台等媒体，要少量报道股市，而在必要的报道中要做到全面平衡、客观理性，不集中唱多，不合力唱空，合理引导市场预期，防止因报道不当引起股市大涨大跌。

此外，广电总局还强调，一律不再组织评论言论、专家访谈、现场连线，不做深度解读，不猜测、评价股市走向，不渲染恐慌、悲情气氛，不使用'暴跌''暴涨''崩盘'等煽情用语。

股市大跌：中国广电总局下令减少股市报道

2015年 6月 23日

分享

到了上周，中国股市又出现自从2008年以来的最大跌幅，一周内中国股市就持续下跌了超过13%（新华社漫画图表）。

BBC中文网获悉，中国广电总局最近发出宣传提示，要求广播电视台要大幅减少关于股市的报道，防止因报道不当引起股市大涨大跌。

据了解，有关宣传提示已经陆续下达至各广播电视台，一些广播电视机构早在上周五已收到通知，而有些在周二（23日）收到。

中国广电总局的有关宣传提示还要求各广播电视台，“在必要的报道中要做到全面平衡、客观理性，不集中唱多，不合力唱空，合理引导市场预期，防止因报道不当引起股市大涨大跌。”

宣传提示共有4点，其中包括对股市波动情况“一律不再组织评论言论、专家访谈、现场连线，不做深度解读，不猜测、评价股市走向，不渲染恐慌、悲情气氛，不使用‘暴跌’‘暴涨’‘崩盘’等煽情用语”。

提示还要求，“要严格以监管部门正式发布的信息为依据进行报道，坚决避免传播虚假不实信息”，而且“所办证券节目须为播出机构自制自播，不得出租转让时段，不得播出咨询机构提供的节目，不得与咨询机构进行商业合作”等。

中国股市“过山车”