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Analyzing Online Fake Business News Communication and the Influence on Stock Price: A Real Case in Taiwan

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Abstract

On the Internet age, the news is generated and distributed not only by traditional news media, but also by a variety of online news media, news platforms, content websites/content farms, and social media. Since it is an easy task to create and distribute news, some of these news reports may contain fake or false facts. In the end, the cyberspace is full of fake or false messages. People may wonder if these fake news actually influence our decision making. In this paper, we discussed a real case of fake news. In this case, a Taiwanese company used some fake news, advertorial news, and news placement to manipulate or influence its stock price and trade volume. We collected all news for the case company during a period of four years and five months (from January 2013 to May 2017). We analyzed the relationship between published news and stock price. Based on the analysis results, we conclude that we should not ignore the influence of news placement and fake business news on the stock price.

Keywords : Fake News, News Placement, Stock Trading, Business News, Case Study, Taiwan

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1. Introduction

Fake news refers to news reports or news stories based on misinformation, disinformation, and fake (or false) facts. After the 2016 presidential election of the United States, people around the world are aware of the power and impact of fake news. Due to the popularity of the internet and mobile technology, people now receive news and messages not only from traditional news media, but also from the online news media, content websites/content farms, and social media. The rapid distribution of news and messages has changed the industry practice of the news industry. Most news media no longer hold a rigorous editorial screening mechanism for the accuracy of the news report. By contrast, some news media request their news reporters to provide an increasing number of news reports as quickly as they can to attract attention from the audience. Some of these news reports contain fake or false facts. These incorrect news articles are distributed in the cyberspace. In the end, the cyberspace is full of fake or false messages.

The raising of fake news should be attributed to the blooming of social media. Spammers and fake news spreaders use social media to distribute fake news. It is easy to register multiple accounts using fake demographic information on social media. Thus, some of these social media are full of fake accounts. Fake news is distributed to the public by the fake social media account.

For example, Facebook admitted there were a lot of Russian fake accounts that had bought more than 3000 advertisements on their platform in the 2016 US presidential election [Abramson, 2016]. Mark Elliot Zuckerberg, the founder of Facebook, promised that Facebook would fight against fake news by checking the source of each post [Statista, 2018; Breland Ali. 2018; Castillo Michelle, 2018].

People are aware of the fake political news since the fake news may influence the election results. Nevertheless, fake political news is not the only kind of fake news that appears in the cyberspace. Business fake news is another type of fake news that exists in cyberspace, that might be used to manipulate the stock price and market order.

In almost all counties, it is illegal when manipulating the stock price for individuals' benefits. Nevertheless, for self-interest, it is occasionally found that these are some stock price manipulation cases. The stock market administrator may monitor daily transactions and warned investors for the unusual transaction. However, the warning is made to the public only in a severe condition.

Fake news is widely disseminated in cyberspace, which influences our daily decision making. Nevertheless, much previous literature focused only on fake political news. Few literatures, if any, focused on the influence of business fake news on the stock transaction in the securities market. In this paper, we focus on the relationship between business fake news and manipulation of security prices. We used a real case study in Taiwan to investigate the generation, distribution, and impact of fake news. We used the case study to explore the following three research questions:

(1) Would companies indeed release positive advertorial news and fake news?
(2) How were this advertorial news and fake news generated and distributed?
(3) What is the impact on the securities transaction of the publication of advertorial news and fake news in the case study?

2. Literature Review

2.1 The Definition of Fake News

Allcott and Gentzkow〔2018〕 argued in the articles of fake news that there was false information that was deliberately set. However, there is plenty of types of fake news, and no well-accepted definition for fake news is available. The literature revealed that fake news is composed of several categories reports, including satirical news, imitation news, misleading news, and propaganda 〔Edson et al., 2008〕. Wardle 〔2017〕 classifies fake news to seven types: Satire or parody, false connection, misleading content, false context, imposter content, manipulated content, and fabricated content. Satire or parody misleads readers and disseminates the false news. The false connection is the situation that there is a contradiction among articles, pictures' introduction, and/or content. Misleading content is the news that contains a lot of false messages, which is wrapped in a plausible logic. There is no false in the content of false context, but the article and the pictures of the news describe different news. Imposter content is the situation that the website pretends to be a popular and credible news website. Manipulated content is the condition that the picture in the news is edited before publishing. Fabricated content contains the most of false messages; it even reports nonexistent news sometimes. Stockmann 〔Stockmann, 2018〕 promoted the classification of Wardle 〔2017〕 and advocated that it was appropriate to define fake news. Stockmann 〔2018〕 also revealed that the seven categories of fake news could be summary into two types. The first three categories are unintentional behavior, and the last four categories are deliberate.

Nevertheless, the scope of fake news is quiet board in the definitions by Wardle 〔2017〕 and Edson, Zheng and Ling 〔2008〕. For example, satirical news contains false information. Nevertheless, satirical news is created to entertain audiences. Satirical news is not a news report but a part of the entertainment.

In the stock market, fake news used to disseminate rumors and misinformation to influence the price of listed securities. Most stock markets prohibit this kind of manipulation behavior. However, this kind of stock price manipulation is still happening occasionally. Satirical news is not relative to the stock price manipulation behavior. The fake news definition that contains satirical news is not applicated for the current study.

2.2 Propaganda News

Fake news is a concept to discuss the misinformation distribution in cyberspace. Nevertheless, it is not easy to make sure if the news is fake or not. We need strong evidence when we try to accuse the news as fake. In business news, outside observers do not have enough information to verify the truth of the news. Financial reports and public information are only resources that can be used to check the truth of the news reports in business news. Also, business news usually attracts attention from their stakeholders rather than the general public. Thus, a few follow-up news reports are made after a news report is published. Since no follow-up news report, outside observers cannot make sure if the news is fake or not.

Edson et al. 〔2008〕 considered the news which combines propaganda with the article was a kind of fake news. Propaganda news, news placement, paid news, or advertorial

news is related to stock price manipulation since investors may be influenced by the positive news. The positive news may contain false information in some situations. To influence the stock market, companies may pay money to news media for publishing positive news. Thus, news placement, paid news, or advertorial news should be included in the definition of fake news when discussing the influence of fake news on stock price manipulation.

2.3 Dissemination of Fake News on Social Media

In social media, users can easily share the news to others, that foster the dissemination of fake news. Previous research advocated that fake news communication is relative to the usage of social media [Allcott and Gentzkow, 2018]. People usually trust the messages distributed by the source that they have a social connection with. In social media, people have a social relationship with others. Thus, previous research advocated that people who read the news on social media had lower awareness of fake news [Silverman and Singer-Vine, 2016]. Social networks are critical to the distribution of fake news.

2.4 The Effect of News to Investors

There is plenty of listed stock in the securities market. Since there are too many choices of stocks, individual investors have to spread too much search cost to make their investment decision. Previous research revealed that individual investors might choose the impressive one to invest in. The more news reports, the more opportunities the stock being bought [Barber and Odean, 2017]. Thus, news reports may be relative to the stock transaction.

3. Method

In the study, we use a qualitative method to find out the relationship between fake news (including propagandas and paid news) and stock price manipulation. We also tried to explain the communication and distribution of fake news, propagandas news, and paid news.

3.1 Case Selection

The study selected a Taiwanese company (Company P) as a case, which is a famous financial scandal. It is a crime that broke out in the middle of 2017. The founder of the company P manipulated the stock price and stock transaction of the company P. We used the pseudo name of company P instead of the real company name, since that the major purpose of this study is not to accuse the company P of fake news generation and distribution.

3.2 News Collection

The study collected all news about the company P on the internet and from a news database Taiwan News Smart Web (http://www.tbmc.com.tw/en-us/product/30), which is a paid database. The study recorded all the news articles, publish date, reporters, and newspaper names. There were four major newspaper groups in Taiwan: China Times (including Commercial Times), Liberty Times, Apple Daily, and United Daily News (including Economic Daily News). The primary purpose of this paper is not to accuse any newspaper publishers is a fake news generator. Thus, we used pseudo names (codes A, B, C, and D) to present these four news media. The order of code is not the order of the

newspaper group mentioned above.

Besides, we used news' titles and content to search on the Google search engine, to record the websites that reprint the news reports. The search results are useful to explore the influence of the news reports.

3.3 Financial Statement Collection

We also collected the financial statement information from the Market Observation System (MOPS) of Taiwan Stock Exchange Market to compare the description on the news report with the real performance of Company P.

3.4 Visit Times of News Report

To discuss the news distribution and spreading, we estimated the visit times of each news and summary the websites which shared news reports about Company P.

Not all newspaper websites provide detailed visit time or traffic data for the news report. We adopted three approaches to estimate the number of visits to the news reports on the publishers' web pages. In the first approach, we adopted the self-reported visit number of each news article that was provided by some newspaper's websites. This approach is easy since the only thing we need to do is to record the data. However, it is valid only when the websites provide self-reported visit times of each news article. Not all newspaper websites provide this kind of traffic data.

The second approach is for the newspaper websites, which provide the total visit times of all news articles written by each reporter, but do not provide the number of visit times of each news article. We collected the visit number and divided it by the number of the reporters' articles. The average visit number of each article of the reporter will be used as the estimated number of visits.

Some newspapers do not provide any details about the visit number. Thus, in the third approach, we estimated the visit times of the whole newspaper websites by Similar Web Rank (https://www.similarweb.com/), which is a website traffic detection tool estimating the visits of the past six months. We use Similar Web Rank to collect the visit times of all newspaper websites. Since some newspaper website provides the actual visit times of each news articles, we compare the visit times of the newspaper websites calculated by Similar Web Rank and use it to estimate the approximate visit times that do not provide self-report visit times.

〈Table 1〉 Approach to Estimate News ViewTimes

Approach	Description
1. Self-report actual visit times	The total amount of visits was recorded on websites
2. Use the total visit times to estimating the visit times of each news report	Dividing the total amount of visits by the total amount of reporters' articles
3. Using third party website traffic report to estimate the visit times	Using Similar Web Rank to estimate visits of the website through recent six month

4. Research Results

4.1 News Publish Date and Frequency Analysis

We collected all news reported during the period from January 1, 2014, to May 17, 2017. There was 143 news published in the research period. We separated all the collected news of company P into three periods: Before the stock price manipulation, during the stock price manipulation, and after the stock price manipulation. The first period of "before the

manipulation" is from January 1, 2013, to May 1, 2014. The second period of "during the manipulation" is from May 2, 2014, to December 30, 2016, which is set by Taiwan Securities and Futures Investors Protection Center (SFIPC, 2018) for class action lawsuit. The last period, "after the manipulation," is from December 31, 2016, to May 17, 2017. Most of the news (95 news) was published at the period of "during the manipulation."

4.2 Number of News Events

We analyzed the topic and narration of the collected 143 news. The news can be divided into 16 news events; seven news events were in "before the manipulation" period, eight events in "during the manipulation" period, and one event in "after the manipulation" period. Besides, we found that some news was published again and again for several times.

4.3 Fake News Reporters and Publishers

Based on the analysis results, we found that most of the 143 news reports were published by Newspaper D and A; newspaper D published most of the news (75 news), and newspaper A is the second (59 news). The other nine news were published by companies B and C. Newspaper D is the major news media to publish news about Company P. Reporter A-1, one of the newspapers A's reporters, had written 36 news through the research period, and 25 of his articles were with similar content with previous news (republished news). Reporter D-1, one reporter of the newspaper D, had 14 republished news. These two reporters trend to write similar news reports to company P again and again. Thus, we can conclude that most news about Company P was published by Newspaper D and A, and written by Reporter D-1 and A-1.

4.4 The Authenticity of News Reports

Most business news about Company P revealed the company's order or financial performance. We confirmed the authenticity of each news event with Company P's quarterly financial reports and information on the Market Observation Post system, in which all companies should make public of their financial information.

We find at least four events were with the question in the authenticity of the news report, as mentioned below.

4.4.1 Increasing Order

The first one was about the increasing order. There were always with news about increasing order of Company P, such as "Company P would have a significant increase of orders," "Recommending Company P's stock share," and "With the developments of long-term care and biotechnology industry, Company P will gain some benefits." In these events, the reporters positively report the future of Company P. These news reports may belong to advertorial news or news placement.

In "Company P's orders are significantly increasing" news reports, it was said that Company P would have a significant increase in customer order in the second or third quarter of 2013. Nevertheless, it is unreal when we checked the number of sales revenue and the net sales in Company P's quarterly financial reports. The number of net sales in the first quarter of 2013 was 273,610 thousand NTD, and the second quarter was 231,330 thousand NTD, and then the third quarter was 223,911 thousand NTD. It is evident that there is no significant difference between the number

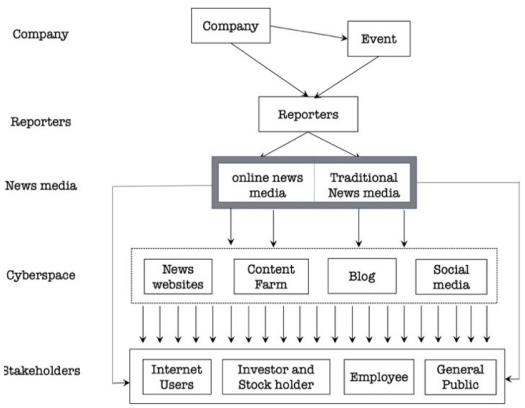
of these three quarters, and the number of net sales even decreased in the second quarter. In contrast, we compared this number with the sales number in 2012. In the first quarter of 2012, the number of net sales was 311,896 thousand NTD. Furthermore, the net sales for the second quarter were 515,369 thousand NTD. The number of sales in 2013 decreased, so the description in the news report was not wholly neutral and correct.

The news of "Recommending Company P's stock shares" summarized the recent information of Company P's stock shares, and recommended it. The content of all the following news reports is similar to each other. All the news looks like a reprint of previous news reports, except with some minor revision. To clarify this argument, we calculated the cosine similarity and Jaccard similarity between all of our news database. After the analysis, we concluded that the similarity of the articles in these events is higher than the other news articles. The highest number of similarities between the two articles is over 0.85 in both cosine similarity and Jaccard similarity. The high similarity coefficient reveals that the content of these news reports was almost the same.

The news report about "With the developments of long-term care and biotechnology industry, Company P will gain some benefits" also had the same phenomenon of repeated news. The content of this serial news reports was similar.

4.5 Estimating the Number of Audiences

The news distribution in cyberspace can be illustrated in 〈Figure 1〉. Firstly, the company releases a news announcement to reporters, or the news reporters found the news event. Then, reporters write their news reports based on the news event and the news announcement. These news reports ware then published in online news media as well as traditional news media. The news is published, reprinted, and share in the cyberspace. Stakeholders, including but not limited to internet users, investors and stockholders, employees, and the general public, get the news from a variety of online websites/platforms.



〈Figure 1〉 News Distribution in Cyberspace

To reveal the influence of fake news, we have to investigate the number of the potential audience of the fake news. We estimated the visits of all of the collected news reports by using the method mentioned above. We applied the appropriate method to estimate the visits of each news report. This study used "the total visits to the news articles written by the reporters" to estimate the visit of the news report in Newspaper A. Self-report visit times was used to estimate the number of audience of news story in newspaper D. For the newspaper B and C, we estimated the visit times of each news reports by using website traffic detection tools. We multiply the monthly traffic to the ratio of 0.054% to estimating the visit times of a news report. This ratio was calculated using the data of Newspaper

D. Newspaper provide self-report visit times of each news article. We divided the self-report visit times to the monthly traffic of Newspaper D to get an average ratio of 0.054%.

The following are total visit times of each newspaper, which was useful to estimate the influence of the news. Based on the results, we estimated that this news was viewed by 213,699 times.

〈Table 2〉 Estimated Amount of View Times

Newspaper	Total Visits
A	133,767
B	3,689
C	794
D	75,449
Total	213,699

Although newspaper D published most number of news for Company P, newspaper A has the most substantial visit numbers because of its vast audience.

4.6 News Reprint on Websites

People get news not only from official websites of the newspaper but also from websites that reprint or share the news. We searched all collected news in search engines to check if the news were reprinted or shared on other websites.

Based on the search results, we found six categories of websites which shared 172 times the news, including blog, online news website, financial agent website, some personal or official website, Internet forum, and Facebook. Among the six categories, the blog played the highest proportion (98 times, 56.98%). The second one is an online news website (31 times, 18.02%).

4.7 Relationship between Positive News and Share Performance

4.7.1 On the Day of Publishing

We did statistical tests to analyze the transaction performance of Company P's stock shares. We found that when there was positive news, both day range of stock price and turnover in value were significantly higher than the day, which did not have any positive news. The rate of return was also significantly different between the days with and without positive news.

4.7.2 The Day Before Publishing

We also tested the day before the publishing of positive news. When there was positive news in the next day, the day stock price range and turnover in value were significantly higher than the day which had not published any positive news in the next day, and so was the rate of return.

4.7.3 Comparing with other Companies

There are enormous factors that will influence the stock transaction. To confirm if the published news would influence the stock transaction of Company P, we compare the stock price of Company P and Taiex (Taiwan Capitalization Weighted Stock Index). We also compare the stock price of Company P with two companies in the same industry segment (Company X and Company Y). Taiex represents Taiwan's security market at that time. Company X was a company that produces a similar product with Company P. Besides, the capital of Company Y was with the closest to Company P's capital. All Company P, X, and Y were in the same industry segment.

〈Table 3〉 The Relationship between Positive News and Stock Transaction

Variables	Mean (SD)		T value
	The day with news report (n=113)	The day without a news report (n=955)	
Closing Price	54.16 (SD=16.38)	52.69 (SD=16.85)	0.879
Price Range	0.22 (SD=1.16)	-0.04 (SD=1.00)	3.766*
Turn Over in value	79,575,391.01 (SD=88,327,298.28)	46,177,616.13 (SD=56,173,649.51)	3.927***
Rate of return	0.46 (SD=2.18)	-0.11 (SD=2.08)	2.724**

Variables	News published in the next day (n=113)	No news published in the next day (n=954)	T value
Closing Price	53.93 (SD=16.39)	52.75 (SD=16.82)	0.708
Price Range	0.55 (SD=1.36)	-0.08 (SD=0.95)	4.841***
Turn Over in value	88,228,675.33 (SD=96,980,253.74)	45,168,830.99 (SD=53,777,040)	4.636***
Rate of return	1.18 (SD=2.59)	-0.18 (SD=1.96)	5.384***

*, **, *** respectively mean statistically significantly different from zero with 90%, 95%, and 99% confidence.

We compared the rate of return of each target in a different period after the publishing of Company P's positive news. There are four kinds of the period: on the same day of news publishing, three days after news publishing, five days after publishing, and ten days after news publishing. We computed the rate of return in these periods and tested whether there was a significant difference between each company.

On the day of publishing, the rate of return of Company P was significantly higher than the rate of return of Taiex. The rate of return of Company P was also significantly higher than both Company X and Y in three days after news publishing. Since there was no significant difference between Company P and the other two target company X and Y in five days and ten days after news publishing, we found out that Company P only had a short term benefit in stock price after the news publishing of its positive news.

To understand how much the benefit was, we also computed the abnormal stock return of Company P and tested whether there was a significant difference in abnormal return. We compared the abnormal stock return of Company P at different timing. When there was positive news of Company P, the abnormal return, which was calculated by comparing Taiex with Company X, was significantly higher than the day, which did not have any positive news. We also tested the day before publishing positive new. If there was positive news in the next day, abnormal return, computed by Taiex, Company X and Y, were significantly higher than the day which had no positive news in the next day.

5. Conclusion

In this paper, we discussed a real case of fake business news distribution in Taiwan. In this case, a Taiwanese company used news placement to manipulate its stock price and trade volume. We collected all the news about the case company for four years (from January 2013 to May 2017). We analyzed the relationship between published news and stock price. We found that the published positive news of

the company was relative to the stock price. When the news media published positive news to the public, the trade volume and price change might be increased due to the positive messages to the company. We introduce this case of fake business news to show the board the influence of fake news (and news placement).

Based on the analysis of this real case, we argue that fake political news is not the only kind of fake news we should keep attention on. We should also keep attention on business news placement (and fake business news) and other kinds of fake news that will influence our daily life.

We got three major conclusions in the study. When checking the authenticity of each news, we found out at least several news events are unreal. For example, there was a lot of repeated "fake news" that distribute misinformation of "Company P will have a significant increase of orders." However, the news cannot match the information on Company P's quarterly financial reports. So we conclude the first research question that the company may indeed release positive advertorial news and/or fake news. There existed some fake news (and paid news, advertorial news, and news place) in the case company's news. We also found that most of the news was published by specific newspapers and specific news reporters. We consider these newspapers and news reporters had a collaborative relationship with the case company.

The second conclusion refers to the communication and distribution of the fake news (and paid news, advertorial news, and news place). We calculated the view times on the web page of each collected news. We estimated that the collected fake news (and paid news, advertorial news, and news place) was viewed 213,699 times on the newspaper websites. Besides, this collected news was shared or reprinted in other websites. We estimated that this shared and reprinted news on other websites were viewed 178,434 times. The view times were underestimated since it is not easy to estimate view times of individual blogs. We believe the actual view times are much higher than our estimate. Besides, when comparing the ratio of each kind of website, we found that many blogs sharing fake news in their blog pages. We believe that it is because of the bloggers did not have enough knowledge about fake news.

The last conclusion of the study is that fake news would indeed influence the stock price. We found that there was a significant difference between days with and without news reports in stock price, turnover, return rate, and abnormal return ratio between the day. However, we also found that the influence of fake news on stock price was a short-term effect. When considering five days or longer, the stock price back to normal. Thus, fake news can be used to stock speculation in short term. Nevertheless, the stock price would back to normal if the company is not as good as mentioned in the fake news.

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