Network Attention and Earnings Drift

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ABSTRACT

For the first time, this article uses the search volume index of Google Trends to measure investor attention and observe stock market. Empirical results show that the higher the attention to individual stocks, the lower the cumulative abnormal returns. If stocks had positive (negative) abnormal returns, the cumulative abnormal returns would decline, thereby weakening (strengthening) earnings drift. Only the stocks with earnings that weren't as good as expected encountered an increase in cumulative abnormal returns. Regarding stocks that attract investor attention, having a positive (negative) earnings surprise brings more positive (negative) cumulative abnormal returns and strengthens (weakens) earnings drift.

Keywords: Earnings drift, Search Volume Index, Investor Attention
JEL Classifications: G1, J3

1. INTRODUCTION

The difference between a company's actual and expected earnings is referred to as earnings surprise. When a company makes a post-earnings announcement, earnings surprise continues to accumulate abnormal returns for a period of time. This is a phenomenon known as earnings drift. Past literature has suggested that the higher the earnings surprise, the more likely it attracts investor attention. When investor attention is high, it raises investment costs, and positive cumulative abnormal returns are less likely to occur, thereby weakening earnings drift. Today, the Internet has matured, and the public relies heavily on it. The use of communication software has rendered it possible to buy and sell stocks online; thus, the attention of general investors to the financial aspects of a company on the Internet may affect earnings drift in the stock market. Therefore, this study attempts to explore whether network attention brings about significant earnings drift.

The measurement of attention in past studies is mostly based on indirect and passive methods, such as extreme compensation, trading volume, and news quantity (Barber and Odean, 2008; Gervais et al., 2001; Yuan, 2015). In 2011, Da et al. found that the

search volume index (SVI) has good predictive power of earnings drift. By using "Google Trends," an index that is constantly updated and through which the volume of online searches can be directly observed, this study measures and observes investor attention in a network development environment.

Empirical results show that attention has an impact on the changes in earnings drift. Stocks that receive a lot of attention have lower cumulative abnormal returns, weakening earnings drift. Under the mutual influence of attention and earnings surprise, stocks that had positive (negative) earnings surprise encounter increases (decreases) in cumulative abnormal returns, which produces more positive (negative) cumulative abnormal returns, thereby strengthening (weakening) earnings drift. This is a phenomenon that has not been found in past studies.

2. LITERATURE REVIEW AND HYPOTHESIS FORMATION

The difference between actual and expected earnings and the cumulative abnormal returns generated over a period of time

is known as earnings drift. This trend represents the extent and direction of cumulative abnormal returns from stocks. Researchers have different interpretations for earnings drift, but they unanimously support the argument that it exists.

Fang and Peress (2009) observed that the more attention a given stock receives in the media, the higher its circulation. Such stocks are reported widely by the media, including information disseminated by electronic media. As the cost of information asymmetry is reduced, investor attention is quickly aroused. Moreover, stocks that have an increasing number of keyword searches increase in liquidity, which possibly leads to high future returns (Bank et al., 2011). Therefore, the more attention stocks receive, the higher the abnormal returns.

The cumulative abnormal returns generated during an earnings announcement are predictable (Joy et al., 1977; Foster et al., 1984). Empirical results have shown that if a company has announced positive (negative) expected earnings, the market tends to have a positive (negative) response before the next announcement (Bernard and Thomas, 1989; 1990; Freeman and Tse, 1989). If the earnings announcement period is divided into long- and short-term for analysis, it is observed that an earnings announcement on a Friday yields a short-term compensation 20% lower than if the announcement is made on other days. Based on the attention dispersion hypothesis, irrelevant news causes a delayed response to a company's stock price, and the cumulative abnormal returns produced over an extended period of time increase by about 70% over other days (DellaVigna and Pollet, 2005; 2009; Hirshleifer et al., 2009). Delayed investor attention causes cumulative abnormal returns to be maintained for a period of time, leading to the phenomenon of earnings drift. There may be differences in the cumulative abnormal returns of stocks, which may strengthen or weaken earnings drift. Therefore, this study proposes hypothesis H_1.

H_1: Stocks that receive high attention tend to have a strengthened (weakened) earnings drift.

3. RESEARCH METHOD

This study focuses on stocks listed in Taiwan. As investor attention may be related to liquidity (Merton, 1987), relatively liquid top-100 listed companies in terms of market capitalization were taken as an observation sample. The sample period was from 2010 to 2013, with a total of 1600 samples covering 16 quarters. Attention was measured using Google Trends (http://www.google.com/trends/) provided by Google, and the remaining variables were sourced from the Taiwan Economic Journal (TEJ) database.

This study aimed to observe the changes in stock trading after a post-earnings announcement. In investment theory, the general market return rate is the comparison of risks and rewards of individual stocks. Therefore, in this study, the difference between the actual return rate of stocks and the market return rate is considered as an abnormal return.

First, the abnormal return rate of the stocks on five particular days (60, 50, 40, 30 days before a financial announcement date,

as well as the announcement date) were measured and taken to be dependent variables.

$$CAR(k,0)_{i,t} = \prod_{q=t+k}^{t}(1+R_{i,t}) - \prod_{q=t+k}^{t}(1+R_{p,t}),$$
$$k = -60, -50, -40, -30, 1 \qquad (1)$$

Where $R_{i,t}$ is the return rate of stock i in the tth season. $R_{p,t}$ represents the market return rate in the tth quarter and t the actual financial announcement date of each quarter.

Dzielinski (2012) used network search frequency as a basis for constructing a measurement method for economic uncertainty. This study measured network attention, using frequency of web searches. Since the SVI provided by Google is a relative value, the measurement of attention is as follows to avoid zero values occurring in any period from a lack of searches:

$$LOG(SVE_{i,t}+1) \qquad (2)$$

Where $SVE_{i,t}$ is the Google Trends SVI of stock i in the tth quarter.

The measurement of earnings surprise was based on the Livnat and Mendenhall (2006) model.

$$SUE_{i,t} = \frac{EPS_{i,t} - EPS_{i,t-4}}{P_{i,t-4}} \qquad (3)$$

Where $EPS_{i,t}$ represents the earnings per share (EPS) of stock i in the tth quarter, $EPS_{i,t-4}$ the EPS of stock i in the same quarter in the prior year, and $P_{i,t-4}$ the stock price of stock i in the same quarter in the prior year.

Finally, the relationship between attention and earnings drift is explored using a multiple regression model. Chen et al. (2017) proposed that the transactions made by institutional investors affect stock price changes, which in turn impacts the stock return rate. They also suggested that stock price ratio and company size are variables that describe a company's characteristics. Thus, the above variables are included in the model as control variables, as stated below:

$$CAR(k,0)_{i,t} = \alpha_0 + \beta_1 SUE_{i,t} + \beta_2 \left[LOG(SVI_{i,t}) \right] +$$
$$\beta_3 \left[SUE_{i,t} \times LOG(SVI_{i,t}) \right] + \beta_4 IO_{i,t} +$$
$$\beta_5 PBR_{i,t} + \beta_6 \left[LOG(SIZE_{i,t}) \right] + \varepsilon \qquad (4)$$

Where $IO_{i,t}$ represents the holding ratio of foreign investment of stock i in the tth quarter, $PBR_{i,t}$ the stock price ratio of stock i in the tth quarter, and $LOG(SIZE_{i,t})$ the company size of stock i in the tth quarter.

4. EMPIRICAL RESULTS AND ANALYSIS

In the correlation coefficient analysis, it is initially apparent that the cumulative abnormal returns are significantly positive and that an earnings drift has occurred. The appearance of an earnings surprise is also consistent with past literature. The correlation coefficient between attention and earnings surprise (−0.046) is lower than 0.8,

Table 1: Regression analysis of cumulative abnormal returns

Variable	CAR (−60.0)	CAR (−50.0)	CAR (−40.0)	CAR (−30.0)	CAR (0.1)
C	13.337***	11.020**	10.084***	7.445**	−1.760
	(2.60)	(2.27)	(2.34)	(2.05)	(−1.59)
Log (SVI)	−1.037**	−1.162***	−0.760*	−0.645*	−0.012
	(−2.01)	(−2.38)	(−1.75)	(−1.77)	(−0.10)
SUE	−15.182	−31.221*	−29.039*	−20.032	0.730
	(−0.75)	(−1.63)	(−1.71)	(−1.40)	(0.17)
Log (SVI) SUE×SUE	11.671	16.556**	13.890**	10.804*	2.856
	(1.37)	(2.05)	(1.93)	(1.79)	(1.56)
IO	−0.009	−0.008	−0.007	−0.000	0.012***
	(−0.44)	(−0.39)	(−0.37)	(−0.01)	(2.62)
PBR	0.349***	0.303***	0.178*	0.058	0.035
	(2.63)	(2.42)	(1.60)	(0.62)	(1.22)
Log (SIZE)	−1.344**	−1.045**	−1.046**	−0.795**	0.155
	(−2.28)	(−1.88)	(−2.12)	(−1.92)	(1.23)
Adjusted R^2	0.019	0.016	0.0107	0.0076	0.024

This table is a regression analysis of all samples. Log (SVI (T)) represents the search frequency of the Tth quarter, SUE (T) the quarterly earnings surprise in the Tth quarter, IO the shareholding ratio of institutional investors (i.e., the proportion of foreign investment and the shareholding of the three major institutional shareholders of a certain stock), PBR the stock price ratio (i.e., the share price divided by the par value per share), and Log (SIZE) the company size. Logarithms were taken for total assets. The values in parentheses are t values. ***, ** and *indicate the significance level at 1%, 5%, and 10%, respectively

which shows that the two are not strongly correlated and that there is no collinearity issue. In addition, the higher the investor attention (earnings surprise) of a stock, the lower its cumulative returns.

The regression model is used to further investigate the relationship between attention and earnings drift. The regression analysis of cumulative abnormal returns is shown in Table 1. Overall, attention (earnings surprise) is significantly negative before the announcement date, indicating that the higher the investor attention (earnings surprise), the lower the cumulative abnormal returns. If the stock originally had positive abnormal returns, the cumulative abnormal returns will drift downward, weakening the earnings drift. If the stock originally had negative abnormal returns, the cumulative abnormal returns will drift downward, strengthening the earnings drift. This finding supports H_1. Under the influence of factors such as attention or earnings surprise, only the stocks with negative earnings surprise will have increased cumulative abnormal returns before an earnings announcement.

The interactive term between attention and earnings surprise is significantly positive. This shows that, before the earnings announcement date, if a stock that attracts wide investor attention originally had a positive (negative) earnings surprise, the cumulative abnormal returns will continue to drift upward (downward). As such, the stock generates more positive (negative) cumulative abnormal returns, strengthening (weakening) the earnings drift. Hence, H_1 is supported. The higher the abnormal returns, the more likely it is to attract investor attention. In the context of a network development environment, whether high investor input increases the investment cost of the investor requires clarification in further research.

Finally, a line chart is used to display a trend analysis of the full sample from the 60th day before the earnings announcement date to the announcement date. The horizontal axis represents time and the vertical axis attention, earnings surprise, and the regression coefficient of the interactive term between the two. Cumulative abnormal returns showed a gradual increase (decrease) around 50 days before the announcement date until the announcement date. Trend diagram showing the influence of attention and

Figure 1: The influence of attention and earnings surprise on cumulative abnormal returns
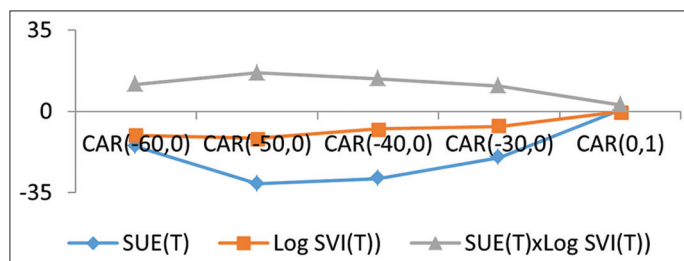
earnings surprise on cumulative abnormal returns is presented in Figure 1.

5. CONCLUSION

Studies in the past have found that the higher the attention, the lower the cumulative abnormal returns, thereby weakening earnings drift. This study examined the phenomenon of earnings drift with "network attention" as a variable. Empirical results show that stocks have an earnings drift before an earnings announcement. Under the influence of attention and earnings surprise, the higher the investor attention, the lower the cumulative abnormal returns, thereby weakening the earnings drift. Only the stocks with earnings that were not as good as expected encountered an increase in cumulative abnormal returns. Before an earnings announcement, stocks that attract investor attention and originally have a positive (negative) earnings surprise will encounter a drift upward (downward) in cumulative abnormal returns. This brings more positive (negative) cumulative abnormal returns and strengthens the earnings drift. Earnings drift was gradually strengthened (weakened) from around 50 days before the announcement date until the announcement date.

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