

An Empirical Study of PEAD Phenomenon in China's A-share Market

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Abstract

The post-earnings announcement drift (PEAD) is one of the important market anomalies in the capital market. This paper selects A-share stocks in Shanghai and Shenzhen Stock Exchanges of China from January 2012 to March 2021 as the research object, adopts the event research method, and takes the publication date of quarterly report, semi-annual report and annual report as the event date. This paper makes an empirical study on the PEAD phenomenon in China's A-share market. The results show that although investors can make immediate response to earnings announcements, in different windows after the announcement, the regression coefficients of abnormal returns on buy and hold to unexpected earnings are significantly positive. It means that stocks with larger standardized unexpected earnings continue to have higher abnormal returns after earnings announcement, that is, investors' immediate response to earnings information is insufficient, which confirms the existence of stock price drift after earnings announcement in China.

Keywords

PEAD; Unexpected Earnings; China's Stock Market.

1. Introduction

Post-Earnings Announcement Drift (PEAD) refers to the phenomenon that the stock price will continue to move along the reaction direction on the day of the announcement within a period of time after the announcement. In 1968, Ball and Brown, American economists and accountants, published an article "empirical evaluation of accounting data" in the Journal of accounting research, which first proposed the phenomenon of stock price drift after earnings announcement. Subsequently, scholars did a lot of empirical research on this anomaly, using different market data, different test methods and different periods, and reached basically similar conclusions.

At present, there is still a lack of research on the phenomenon of stock price drift after earnings announcement in China. As an emerging market, China has characteristics different from the mature capital market in the West. At the same time, the history of China's securities market is not long, the sample period of data is short, and the disclosure of accounting data is not standardized, which makes domestic scholars more limited in studying the phenomenon of drift. In the past decade, some domestic scholars have made some tentative studies. For example, Yu Lisheng and Wang Yanyan (2006) used the quality of accounting information to represent the uncertainty of enterprise information, and studied the phenomenon of stock price drift after earnings announcement in China from the perspective of information uncertainty. They found that the relationship between information uncertainty and absolute unexpected earnings was U-shaped, and the greater the information uncertainty, the greater the cumulative abnormal earnings after earnings announcement; Ruan Yi, Zhang Hanjiang and Machaoqun (2003) used standardized unexpected earnings to rank A-share samples of

Shenzhen stock market and tested the mid-term report and annual report of 2000. The results did not support the drift phenomenon after earnings announcement in China's stock market.

Through the above research, we find that there is still debate on whether there is a phenomenon of stock price drift in the Chinese market. With the continuous standardization of China's financial market and the continuous integrity of the legal system of information disclosure, does the drift phenomenon of earnings announcement exist and what characteristics does it have? The above issues are the core of our focus.

2. Literature Review

2.1. Review of Relevant Foreign Research Literature

The phenomenon of stock price drift after earnings announcement first appeared in ball and brown (1968)'s research on the relationship between unexpected earnings and stock abnormal returns. They found the existence of stock price drift after annual report announcement by using the company's annual report and monthly stock trading data, that is, the announcement of positive unexpected earnings will bring positive cumulative abnormal returns, while the announcement of negative unexpected earnings will bring negative cumulative abnormal returns. Beaver, Clark and Wright (1979) analyzed the relevant yield data of the New York Stock Exchange. The empirical results not only proved that the cumulative excess return drifted in the same direction with the unexpected earnings, but also found that the size of the cumulative excess return was also positively correlated with the size of the unexpected earnings. Rendleman, Jones and latane (1987) sorted the unexpected earnings, divided all sample stocks into 10 groups, and then calculated and compared the abnormal returns of each group. The results showed that there was a significant positive correlation between the abnormal returns and the unexpected earnings. Ball and brown (2019) reproduced the phenomenon of stock price drift after earnings announcement proposed by them in 1968 in an article commemorating the 50th anniversary of the phenomenon of stock price drift after earnings announcement. The results show that the phenomenon of stock price drift after earnings announcement still exists, and it also exists in Australia, Japan, South Korea and Malaysia.

2.2. Review of Relevant Domestic Research Literature

Domestic scholars have also carried out relevant research on the abnormal phenomenon of stock price drift after earnings announcement. Wushinong and Huang Zhigong (1997) studied the impact of investor behavior on Shanghai stock market with 30 companies on the Shanghai Stock Exchange as samples, providing evidence of stock price drift after earnings announcement in China's stock market. Kongdongmin (2008) verified the existence of stock price drift after earnings announcement from the perspective of arbitrage risk, transaction cost and investor maturity, and found that the former two were positively correlated with stock price drift after earnings announcement, while the latter was negatively correlated with stock price drift after earnings announcement. Wang Lei, yezhiqiang and kongdongmin (2012) concluded that there is a phenomenon of post Earnings Announcement Drift in China, and this phenomenon is different from other working days. The earnings announcement issued on Monday is less drift due to more attention. Zhangshengping, Yu Lifeng and liyizong (2014) analyzed the quarterly data of A-share in Shanghai and Shenzhen stock exchanges, ranked the unexpected earnings and empirically concluded that the negative and positive groups had the phenomenon of stock price drift after earnings announcement. Xiang Cheng and Lu Jing (2020) studied the inertia of earnings announcement with A-share listed companies from 2003 to 2015 as samples, and verified the existence of stock price drift after earnings announcement in China from the perspective of stock price and trading volume. China's stock market started late, so

the research on the phenomenon of stock price drift after earnings announcement is mostly based on behavioral finance theory.

3. Data Selection and Model Construction

3.1. Data Sources

This paper selects A-share stocks in Shanghai and Shenzhen stock exchanges from January 2012 to December 2021 for research, and uses the event research method to take the quarterly report, semi annual report and annual report release date as the event occurrence date. The data of earnings announcement date, earnings per share, individual stock yield, market yield and various control variables of listed companies are from CSMAR database and Ruisi database. In order to ensure the validity of the results, the required sample data are screened according to the following criteria to obtain the final valid samples:

- (1) Eliminate the financial industry sample;
- (2) Eliminate samples with transaction status of St, *st and Pt. Because the trading rules of these stocks are different from those of other stocks;
- (3) The samples newly listed in that year are excluded. It is generally believed that the price of newly listed stocks fluctuates greatly, which will have an impact on the research results;
- (4) Eliminate samples with annual trading days less than 200 days;
- (5) Eliminate samples with missing or abnormal data.

Finally, 61546 observation samples were obtained. In order to eliminate the influence of extreme values on the empirical results, 1% winsorize tailing was applied to all continuous variables. The data processing and model statistical test in this paper are completed by Excel and stata16.0.

3.2. Variable Definition

3.2.1. Buy and Hold Abnormal Rate of Return (BHAR)

This paper refers to Wang Lei, yezhiqiang, kongdongmin(2012), Kottimukkalur (2019), and defines the buy and hold yield as the proxy variable of the stock price drift (PEAD) after earnings announcement. The specific calculation method is as follows: $BHAR_{i,(t_1,t_2)}$

$$BHAR_{i,(t_1,t_2)} = \prod_{t_1}^{t_2} (1 + R_{i,t}) - 1 - \beta_i [\prod_{t_1}^{t_2} (1 + R_{m,t}) - 1] \quad (1)$$

Where, $R_{i,t}$ is the return rate of stock i on day t, $R_{m,t}$ is the market return rate on day t, and β_i is the return rate of stock i relative to the market day in the previous year.

$BHAR_{i,(t_1,t_2)}$ It refers to the buying and holding abnormal rate of return of stock i from the day t_1 to the day t_2 after the earnings announcement on day t. To test the earnings announcement effect of different windows, select [0, 1] for the event window and [2, 5], [2, 20], [2, 30] for the drift window. The [0, 1] window represents the date of earnings announcement and the next trading day, and so on. In this paper, the drift window is selected [2, 20] during the main regression, and the remaining drift windows will be analyzed in the robustness test.

3.2.2. Standardized Unexpected Earnings (SUE)

In this paper, the random walk model is used to calculate the unexpected earnings. At the same time, in order to eliminate the differences between individual stocks, the unexpected earnings are standardized to get the standardized unexpected earnings

$$UE_{i,t} = EPS_{i,q} - EPS_{i,q-4} \quad (2)$$

$$SUE_{i,t} = \frac{EPS_{i,q} - EPS_{i,q-4}}{P_{i,t-1}} \quad (3)$$

Among them, $UE_{i,t}$ is the unexpected earnings of the stock I on the announcement date T, $SUE_{i,t}$ is the standardized unexpected earnings of the stock I on the announcement date T, $EPS_{i,q}$ is the earnings per share of the Q quarter announced on the announcement date t of the stock I, $EPS_{i,q-4}$ is the earnings per share of the stock I in the same quarter of the previous year, and $P_{i,t-1}$ is the closing price of the day before the announcement.

3.2.3. Control Variables

Referring to Wang Lei and Kong Dongmin (2014), this paper selects the following indicators as control variables:

(1) Company size: This paper uses the total assets of the company as the measurement index of the company size, specifically using the logarithm of the total assets. It is generally believed that the larger the size of the enterprise, the higher the degree of impact of economic policy uncertainty.

(2) Book to market ratio (BM): divide the total assets of the company by the total market value. The ratio of book value to market value reflects investors' evaluation of enterprises and measures the growth of enterprises. It is generally believed that enterprises with high book value will receive more attention from investors.

(3) Financial leverage ratio (Lev): divide total liabilities of the company by total assets. Higher financial leverage means higher financial risk of enterprises, which makes them more sensitive to economic policy uncertainty.

(4) Turnover rate: measured by the average turnover rate of stocks in the 30 trading days before the earnings announcement.

(5) ILLIQ: according to Amihud's measurement, it is measured by the ratio of the absolute value of the stock's daily return to the daily turnover, specifically measured by the average illiquidity of the 30 trading days before the earnings announcement. In addition, in order to control the possible "Friday effect", the dummy variable Friday was introduced in the process of regression analysis of samples.

3.3. Grouping and Sorting Method

Considering that the original earnings contingency is often difficult to apply to the setting of linear regression models, the relevant literature on earnings announcements generally uses the grouping quantile of earnings contingency rather than the original value of earnings contingency (Bernard and Thomas, 1989). Therefore, this paper uses the classic literature method (della Vigna and Pollet, 2009, kottimukkalur, 2019) to group the stock samples. Specifically, the standardized unexpected surplus sue is divided into 10 groups according to the sue value from small to large every quarter, and is recorded as. Similarly, Sue is regrouped quarterly according to the breakpoints of the previous quarter, which can reduce the impact of extreme values of individual companies, and measure the relative size of sue published by company I on the t day in this quarter.

3.4. Model Construction

In order to study the impact of standardized unexpected earnings on stock price drift, this paper constructs the following model:

$$BHAR_{i,(t1,t2)} = \beta_0 + \beta_1 R_SUE_{i,t} + \sum \alpha * Controls + \varepsilon_{i,t} \quad (4)$$

Wherein, $BHAR_{i,(t_1,t_2)}$ it refers to the abnormal rate of return bought and held by stock I from day t_1 to day t_2 after the earnings announcement on day t . The event window selects $[0,1]$, and the drift window after the announcement selects $[2,20]$, where $[0,1]$ window represents the day of earnings announcement and the first trading day after it, $[2,20]$ represents the 2nd to 20th trading day after the earnings announcement. $R_SUE_{i,t}$ is the value sorted according to the above ranking method, $R_SUE_{i,t} = 1$ indicating that the unexpected surplus of stock I on day t is the smallest, $R_SUE_{i,t} = 10$ indicating that the unexpected surplus of stock I on day t is the largest, which *Controls* is the control variable selected above and α the corresponding coefficient vector.

When studying the phenomenon of stock price drift after earnings announcement, different scholars adopt different variable settings, sample selection, interval settings, etc., so the existence and characteristics of the drift are different. Based on this, under a series of settings in this paper, whether there is stock price drift after earnings announcement needs to be analyzed.

4. Analysis of Empirical Results

4.1. Intuitive Analysis of PEAD Phenomenon in China's A-share Market

Although the domestic research on the stock price drift after earnings announcement has accumulated some achievements, it has not yet formed a system. Due to the differences in sample selection, research methods, research design and other aspects, the test results of the stock price drift after earnings announcement in China have not yet reached an agreement. Therefore, we need to first test the existence of the stock price drift after earnings announcement under the research design of this paper.

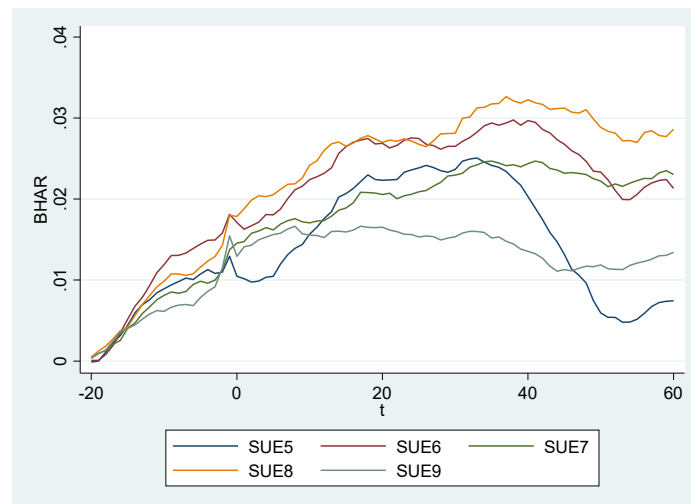


Figure 1. PEAD under good news group

According to the above, the relevant literature on earnings announcement generally uses the earnings contingency grouping quantile instead of the original value of earnings contingency. Specifically, the standardized unexpected earnings sue is divided into 10 groups according to the sue value from small to large every quarter, and is recorded as. Similarly, Sue is regrouped quarterly according to the breakpoints of the previous quarter, which can reduce the impact of extreme values of individual companies, and measure the relative size of sue published by company I on the t day in this quarter. This paper will standardize the unexpected surplus R_Sue is divided into 0-9 groups according to the order from small to large. Groups 0 to 4 are classified as bad news group, and groups 5 to 9 are classified as good news group. This paper

studies the phenomenon of stock price drift under different news shocks by calculating the BHAR value from 20 days before the earnings announcement to 60 days after the announcement.

From figure 1, we can find that the abnormal rate of return on buy and hold (BHAR) of the good news group is greater than 0. After the earnings announcement (t=0), the BHAR showed a short downward trend, but it continued to drift in the positive direction after only 2-3 days of decline. With the increase of time, the abnormal rate of return on buy and hold became larger and larger and gradually stabilized. From Figure 2, we can find that the buy and hold abnormal return (BHAR) of most sue in the bad news group is less than 0. After the earnings announcement (t=0), the BHAR showed a short downward trend, indicating that the release of bad news had an impact on stock returns, but it began to rise slowly after only 2-3 days of decline, indicating that the market gradually absorbed the impact of these bad news, and with the increase of time, The abnormal rate of return of buying and holding is getting smaller and smaller, showing a decreasing trend. At the same time, it can be found that the stock price drift of both the good news group and the bad news group does not have a significant upward or downward trend after the earnings announcement, but reacts about 20 days before the earnings announcement, that is, the bad news group has shown a downward trend before the announcement, while the good news group has shown an upward trend before the announcement. The reason for this phenomenon may be due to the early disclosure of the news, Before the company issued its earnings announcement, whether it was the early disclosure of internal information or the bad news and good news conveyed by analysts' forecast reports, the market had keenly captured them and reflected them on BHAR.

To sum up, through the BHAR calculation of the good news group and the bad news group, we can preliminarily qualitatively judge that there is a phenomenon of stock price drift after earnings announcement in China's A-share market.

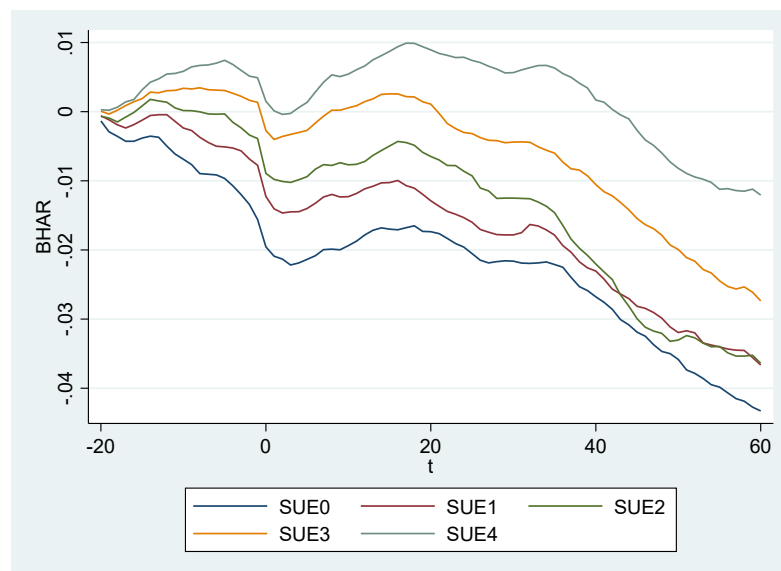


Figure 2. PEAD under bad message group

4.2. PEAD Phenomenon in China's A-share Market: Regression Results

Table 1 shows the regression results of abnormal return rate of buy and hold on the standardized unexpected earnings of enterprises. First, let's look at column (1). On the day of the earnings announcement and the day after, R_ The coefficient of sue is 0.0186, and it is significant at the level of 1%, which indicates that the immediate stock price response brought by the earnings announcement changes in the same direction as the unexpected earnings announced by the earnings announcement, that is, good news (positive unexpected earnings)

will promote the increase of abnormal earnings in buying and holding at the moment, while bad news (negative unexpected earnings) will promote the decrease of abnormal earnings in buying and holding at the moment, It shows that investors can make immediate response to earnings announcements, and earnings information is absorbed in stock prices. Let's look at columns (2) to (5). From the 2nd day to the 5th, 20th, 30th and 60th days after the earnings announcement, R_ The coefficient of sue increases gradually, and is significant at the level of 1%, which means that stocks with larger standardized unexpected earnings continue to have higher abnormal returns after the earnings announcement, and investors' immediate response to earnings information is insufficient, which confirms the existence of stock price drift after the earnings announcement in China.

Table 1. Proof of the existence of stock price drift after earnings announcement

Variables	Bhar [0,1]	Bhar [2,5]	Bhar [2,20]	Bhar [2,30]	Bhar [2,60]
	(1)	(2)	(3)	(4)	(5)
R_ Sue	0.0186***	0.0347***	0.0412***	0.0783***	0.2015***
	(3.35)	(4.84)	(2.76)	(4.13)	(7.20)
Size	0.0358**	-0.0399**	-0.5562***	-0.5773***	-0.2350***
	(2.31)	(-1.99)	(-13.31)	(-10.89)	(-3.00)
BM	-0.0446	-0.0070	2.3651***	2.5419***	1.1793**
	(-0.38)	(-0.05)	(7.56)	(6.41)	(2.01)
ILLIQ	0.3711	1.7945**	2.1567	-1.5475	-0.8406
	(0.65)	(2.44)	(1.41)	(-0.80)	(-0.29)
Turn over	-0.0685***	-0.0691***	-0.2868***	-0.3472***	-0.5723***
	(-7.76)	(-6.07)	(-12.07)	(-11.51)	(-12.85)
Lev	-0.2670***	0.0645	1.9121***	1.6755***	0.1254
	(-2.63)	(0.49)	(6.99)	(4.83)	(0.24)
Friday	0.0297	-0.0485	-0.3568***	-0.1577	-0.0918
	(0.81)	(-1.02)	(-3.61)	(-1.26)	(-0.50)
_It is necessary to Cons	-0.9585***	0.7892**	11.6483***	12.2216***	4.0890**
	(-2.85)	(1.81)	(12.85)	(10.62)	(2.41)
N	61546	61546	61546	61546	61546
industry	control	control	control	control	control
quarter	control	control	control	control	control
R-squared	0.0076	0.0103	0.0292	0.0436	0.0551

Note: *, **, *** respectively represent significant at 10%, 5% and 1% levels; T value in parentheses.

5. Conclusion

As one of the important market anomalies in the capital market, the phenomenon of earnings drift after announcement (PEAD) has been attracting academic attention. This paper selects A-share stocks in Shanghai and Shenzhen stock exchanges from January 2012 to March 2021 for research, and uses the event research method to take the quarterly report, semi annual report and annual report release date as the event occurrence date. This paper studies whether there is the same drift phenomenon as that in developed countries' markets after the earnings

announcement, and what are the characteristics of this phenomenon, and makes a preliminary analysis of the relevant factors affecting this phenomenon. In this paper, the event window is selected as $[0,1]$, and the drift window after the announcement is selected as $[2,20]$, where $[0,1]$ window represents the date of earnings announcement and the first trading day after it, $[2,20]$ represents the 2nd to 20th trading day after the date of earnings announcement. This paper studies the impact of earnings announcement on stock price and the phenomenon of stock price drift in different time windows. The main conclusions of our empirical study are as follows:

There is an obvious PEAD phenomenon in the domestic stock market. The immediate stock price response brought by the earnings announcement and the unexpected earnings announced by the earnings announcement change in the same direction, indicating that investors can make an immediate response to the earnings announcement, and the earnings information is absorbed in the stock price. In the following days, the coefficient of unexpected earnings on the return of buying and holding abnormal returns is increasing, It means that stocks with larger standardized unexpected earnings continue to have higher abnormal returns after the earnings announcement, and investors' immediate response to earnings information is insufficient, which confirms the existence of stock price drift after earnings announcement in China.

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