

Empirical Test of Post Earning Announcement Drift (PEAD) in China's A-share markets: 2015-2022

Introduction

PEAD, or Post-Earnings Announcement Drift, is a financial phenomenon that refers to the tendency of a stock's cumulative abnormal returns to drift in the direction of an earnings surprise for several weeks (even several months) following an earnings announcement.

This phenomenon is widely recognized as a market anomaly, meaning it goes against the efficient market hypothesis, which posits that stock prices fully reflect all available information. According to the EMH, once new information is released, the price should adjust immediately to reflect that new information. However, in the case of PEAD, the stock price continues to drift in the direction of the surprise, suggesting that the market may not be entirely efficient.

The foundational research conducted by Bernard and Thomas demonstrates that subsequent to the announcement of earnings, there is a continuous drift of cumulative abnormal returns – a surge for positive earnings surprises and a decline for negative ones. This phenomenon, often referred to as Post-Earnings Announcement Drift (PEAD), or alternatively as the Standardized Unexpected Earnings (SUE) effect, is consistently present in stock returns, especially with reference to empirical evidence from the United States securities markets. Three primary hypotheses are proposed to elucidate this drift:

(1) The drift could be a result of methodological deficiencies in the studies that identified this occurrence.

(2) Companies that experience extreme earnings surprises may face heightened risk, and thus the drift could be a justifiable return premium in equilibrium.

(3) Investors may exhibit delayed or insufficient reactions to earnings announcements containing value-relevant information.

This research gap is addressed by investigating the behavior of security returns following earnings announcements in China, a rapidly growing and vibrant player in the Asia-Pacific securities markets. Such scrutiny is long overdue, considering the increasing focus of financial research on China's burgeoning markets. China's economy and capital markets have been expanding rapidly, and in terms of capital market significance to the economy, China surpasses several European nations. The impressive scale and growth potential of Chinese security markets have drawn substantial interest and involvement from global investors in recent years. Additionally, the progressive liberalization of the Chinese capital markets has led to a significant portion of China's economy being represented in worldwide portfolio allocations. In contrast to the United States, the Chinese capital market possesses unique characteristics. It lacks an extensive array of short-selling mechanisms, and private investors hold a significant amount of capital. These factors may have a pronounced influence on the PEAD anomaly in China. Thus, the increasing prominence of the Chinese capital markets necessitates in-depth investigations into their informational efficiency – a central focus of PEAD research in China.

Method

2.1 Earning surprise

An earnings surprise, or unanticipated earnings, denotes the divergence between an entity's disclosed earnings and its anticipated earnings. The anticipation of a firm's earnings can be established through various measures, encompassing profit forecasts by analysts and predictive mathematical models premised on earnings from prior accounting periods. The quantification of earnings surprises can be achieved through the utilization of historical earnings data or analysts' prognostications. In the present study, we employ historical earnings data sourced from CSMAR, and compute Unexpected Earnings (UE) based on the quarter-over-quarter discrepancy:

$$UE_{i,t} = EPS_{i,t} - EPS_{i,t-2}$$

Where $EPS_{i,t}$ stands for earning per share for firm i at time t . Since we are using half year report for calculating unexpected earning, $EPS_{i,t-2}$ stands for last year earning per share with same half year time.

2.2 Standardized unexpected earnings

Standardized Unexpected Earnings (SUE) quantifies the degree of earnings surprise by representing it as a number of standard deviations that exceed or fall below the consensus earnings estimate. The absolute magnitude of the SUE delineates the extent of unanticipated earnings, whereas the sign of the SUE signifies whether the unexpected earnings surpass or are inferior to the consensus forecast. Within the context of our quarterly data, the computation of SUE is achieved through the subsequent equation:

$$SUE_{i,t} = \frac{UE_{i,t}}{\sigma_{i,t}}$$

Where $\sigma_{i,t}$ is the standard deviation for the last two years' unexpected earnings.

2.3 Abnormal returns

An abnormal return characterizes the exceptional profits or losses yielded by a specific investment or portfolio within a defined timeframe. For the simplification of abnormal return computation, we employ the daily actual return of each firm, subtracting the market return from it. The market return is derived from the indices of the Shanghai and Shenzhen stock exchanges:

$$AR_{i,t} = r_{i,t} - r_{m,t}$$

Where r_m stands for market return and r_i stands for individual return.

2.3 Cumulative abnormal return

Cumulative abnormal return (CAR) is the total of all abnormal returns. The calculation of cumulative abnormal return happens over a small window of time. In this research, we specifically focus on ± 120 days for the announcement days.

$$CAR_{i,[t_1,t_n]} = \sum_{j=1}^n AR_{i,t_j}$$

This equation demonstrated the cumulative return in a certain window, specifically cumulative abnormal return for the announcement day,

$$CAR_{i,announcement} = CAR_{i,121} = \sum_{j=1}^{121} AR_{i,t_{120}}$$

Data

3.1 Individual stock return

We source daily stock returns and trading volume data from the CSMAR database. Indices from the Shanghai and Shenzhen stock exchanges are employed to calculate market returns for each respective market, which are subsequently utilized for the process of risk adjustment. The dataset furnishes quarterly earnings per share for China's principal board market spanning from the first quarter of 2013 through the fourth quarter of 2022. It also provides the announcement dates for all individual stocks from January 1, 2013, to December 31, 2022. To circumvent potential inaccuracies instigated by trading restrictions during our PEAD anomaly screening process, we omitted stocks labeled with "ST" and "PT".

3.2 Market return

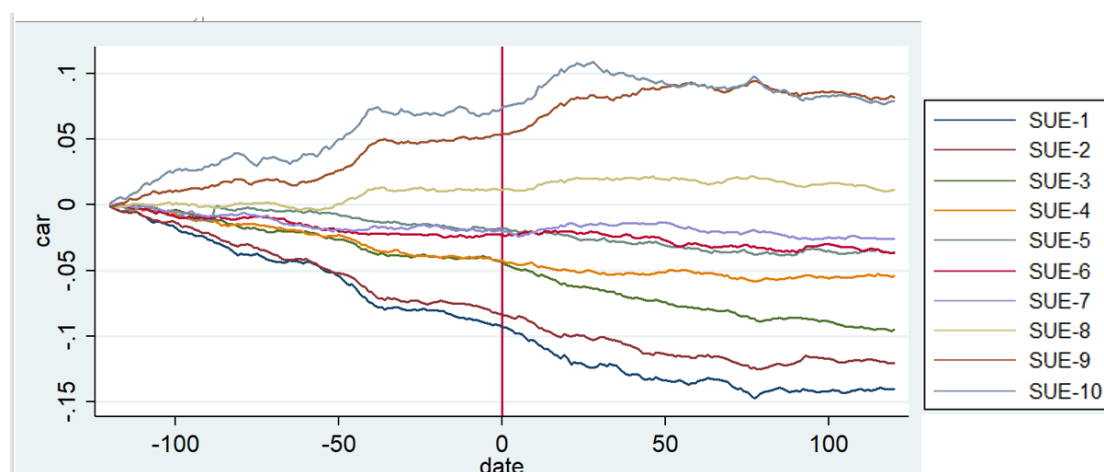
Since all A-share stock markets are used, we choose the CSI 300 Index as the market return rate, which has a higher coverage than the SSE 180 Index and is more appropriate to the actual market return rate.

Result

Cumulative abnormal returns (CARs) are determined by assigning earnings announcements to deciles according to the relative standing of Standardized Unexpected Earnings (SUE) compared to the distribution of SUE in the previous quarter. Portfolio 10 encompasses firms with the highest ranking. Utilizing data from 2013 to 2022, CARs are computed as the sum over 241 trading days, with the base time set on the announcement day and a 120-day period both preceding and following the announcement. SUE represents the forecasting effort from a first-order auto-regressive earnings expectations model, adjusted by its estimation-period standard deviation.

SUE decile	SUE (MEAN)
1	-3.58
2	-1.33
3	-.86
4	-.49
5	-.17
6	.13
7	.45
8	.82
9	1.29
10	5.53

from the table we can see that the top5 and bottom 5 portfolio each have negative and positive SUE, and portfolio 10 is significantly possesses higher SUE compared with others.



As depicted in Figure 1, the post-earnings-announcement abnormal returns estimated exhibit a significant monotonic variation relative to the Standardized Unexpected Earnings (SUE) deciles. This variation indicates a consistent trend in the abnormal returns associated with these SUE deciles, underscoring the potential predictive power of SUE in estimating post-announcement returns.

One key observation made in this analysis is the relatively high estimated abnormal return of 7.3% realized over 120 trading days following the earnings announcement, achieved through the strategic positioning of a long position in portfolio 10 balanced by a short position in portfolio 1. This intriguing outcome prompts us to delve deeper into the implications of such a return. The central question that arises is whether this high estimated abnormal return represents an incomplete adjustment for risk, suggesting an inefficiency in the market, or if it is simply a manifestation of a lagged price response, indicating sluggish market reactions to new information.

The present research applies rigorous scrutiny to the cumulative abnormal returns in the Chinese stock markets, specifically around the date of earnings announcement. Utilizing a time series model back test as a methodological approach, we amass statistics on semi-annual returns and semi-annual statement announcements spanning the period from 2015 to 2022. This robust dataset offers a comprehensive view of market trends and patterns during this period.

In conjunction with the back test, we employ SUE as a parameter to categorize stocks, allowing us to group stocks based on the size and direction of their earnings surprises. We then utilize the average return of these groups to calculate the portfolio's abnormal return. This innovative approach allows us to uncover intricate relationships between earnings surprises and subsequent stock returns.

Our predictive modeling reveals that earnings surprises act as predictors of abnormal stock returns following earnings announcements, suggesting that market participants do not fully incorporate the surprise element into the stock prices immediately. This is further supported by the observation that the top two portfolios, known for their strong return statements, both exhibit returns exceeding 5%. However, the study's results also highlight a notable delay in the reaction of the Chinese market to earnings news, indicating a degree of inefficiency in how quickly new information is assimilated into stock prices. This lag is evident from the figure, which shows that only the first three investment

portfolio groups have positive excess returns. In contrast, the remaining investment portfolios exhibit significant negative cumulative abnormal returns, leading to a larger drift in prices. This pattern suggests that in China's stock market, investment participants may demonstrate heightened sensitivity to negative earnings announcements. This, in turn, could lead to an overreaction in the price adjustment process, resulting in these pronounced negative cumulative abnormal returns. This finding underscores the unique characteristics of the Chinese market and its participants, offering a fresh perspective on the dynamics of earnings announcements and subsequent stock price movements.

Limitation

This investigation, while making a significant contribution to our understanding of the Post-Earnings Announcement Drift (PEAD), exhibits certain limitations in its demonstration and application of the phenomenon.

Primarily, the method adopted for calculating abnormal returns in this study may oversimplify the complex realities of stock market behavior. The study uses the individual stock's return rate, from which it subtracts the market return rate, thus deriving the abnormal return. However, this approach potentially overlooks the influence of idiosyncratic risk factors associated with individual stocks on their return rates. In financial theory and practice, different stocks come with different risk profiles, which can significantly influence their returns. By not factoring in these risks when calculating abnormal returns, the study could inadvertently overstate or understate the true abnormal returns associated with these stocks. To address this potential methodological shortcoming, a more nuanced approach could involve applying the three-factor or five-factor model to calculate the abnormal return rate of individual stocks. These models, which account for market risk, size, value, profitability, and investment factors, offer a more comprehensive and realistic estimation of a stock's expected returns. Neglecting these aspects could lead to an overestimation of the abnormal return rate of high-risk stocks and induce substantial fluctuations in the cumulative abnormal return rate.

Another limitation of the study is its reliance on a historical return panel without making predictions under unknown future announcement scenarios. The robustness and practical applicability of any financial model or study should ideally be tested not just on historical data, but also on how well it can predict future scenarios. However, this study appears to fall short on this count. The results of this study primarily establish the presence of PEAD anomalies. While this is valuable in and of itself, it does not translate into an actionable strategy for market participants. The absence of a predictive element means that these findings cannot be readily used to anticipate future market behavior or to devise investment strategies that could take advantage of the PEAD.

Overall, while the study has made important strides in exploring the PEAD, these limitations suggest that there may be further room for refining the methodology and enhancing the applicability of the findings. Future research could focus on addressing these issues to provide more robust and actionable insights into the PEAD.