Post earnings announcement drift: earnings surprise measuring, the medium effect of investor attention and investing strategy

Qiujun Lan[1], Yuxuan Xie[1], Xianhua Mi*[1], Chunyu Zhang[1]
（1: Business School, Hunan University, Changsha 410082, China.）

Abstract: Drifting in the direction of earnings surprises for a prolonged period is a decades-puzzling financial anomaly, i.e., the "post-earnings-announcement drift" (PEAD). This paper provided a new simple measure of earnings surprise called ORJ. Based on ORJ, not only is the medium effect of investors' attention on the relationship between earnings surprises and PEAD analyzed, but a tractable and profitable investing strategy is provided. Through comprehensive empirical analysis of the Chinese stock market, we found that i) both earnings surprises and investor attention can increase the degree of PEAD; ii) "good" (bad) earnings surprises strengthen (weaken) the degree of drift by attracting (decreasing) investor attention; it is asymmetric that the positive effects of "good" earnings surprises are stronger than that of "bad" earnings surprises on PEAD; and iii) the strategy obtains an average 6.78% return per quarter in excess of the market and only longs dozens of stocks . iv) Typical pricing factors such as the Fama-French three factors, illiquidity and company characteristics have little explanatory power for the returns of the strategy. This paper strongly shows the importance of monitoring overnight returns of earnings announcements to digging the unexpected information, reveals one mechanism of earnings surprises on PEAD and demonstrates the potential profitability of PEAD in the Chinese market.

Keywords: Post-earnings-announcement drift; Earnings surprise; Investor attention; Investing strategy; Chinese stock market.

Author Information:
Qiujun Lan: Business School, Hunan University, Changsha, China 410082.
E-mail: lanqiujun@hnu.edu.cn

Yuxuan Xie: Business School, Hunan University, Changsha, China 410082.
E-mail: 893431280@qq.com

Xianhua Mi: **Corresponding author**; Business School, Hunan University, Changsha, China 410082.
E-mail: 939435824@qq.com

Chunyu Zhang: Business School, Hunan University, Changsha, China 410082.
E-mail: 18607318097@163.com

Post earnings announcement drift: earnings surprise measuring, the medium effect of investor attention and investing strategy

Abstract: Drifting in the direction of earnings surprises for a prolonged period is a decades-puzzling financial anomaly, i.e., the "post-earnings-announcement drift" (PEAD). This paper provided a new simple measure of earnings surprise called ORJ. Based on ORJ, not only is the medium effect of investors' attention on the relationship between earnings surprises and PEAD analyzed, but a tractable and profitable investing strategy is provided. Through comprehensive empirical analysis of the Chinese stock market, we found that i) both earnings surprises and investor attention can increase the degree of PEAD; ii) "good" (bad) earnings surprises strengthen (weaken) the degree of drift by attracting (decreasing) investor attention; it is asymmetric that the positive effects of "good" earnings surprises are stronger than that of "bad" earnings surprises on PEAD; and iii) the strategy obtains an average 6.78% return per quarter in excess of the market and only longs dozens of stocks . iv) Typical pricing factors such as the Fama-French three factors, illiquidity and company characteristics have little explanatory power for the returns of the strategy. This paper strongly shows the importance of monitoring overnight returns of earnings announcements to digging the unexpected information, reveals one mechanism of earnings surprises on PEAD and demonstrates the potential profitability of PEAD in the Chinese market.

Keywords: Post-earnings-announcement drift; Earnings surprise; Investor attention; Investing strategy; Chinese stock market.

1 Introduction

The "post-earnings-announcement drift" (PEAD), which describes the phenomenon that a firm's stock price continues to drift in the direction of earnings surprises for an extended period after quarterly earnings announcements, is one of the most puzzling financial anomalies. Numerous studies exist on this anomaly; see the review by Fink (2021). However, even though PEAD was discovered more than three decades ago (Bernard and Thomas, 1989; Bernard and Thomas, 1990), it still exists, which obviously contradicts the efficient market hypothesis and remains a popular research topic in finance and accounting, with an increasing number of top papers having been published on this subject (Martineau, 2021), trying to determine the origins and properties of PEAD. Many studies have paid much attention to potential drivers and features of PEAD, such as earnings surprises, long persistence, limited investor attention, and profitability. Intellectually, as a very easily detected trading signal, an earnings surprise could attract enough investor attention, which would eliminate PEAD in a relatively short time according to the market efficiency hypothesis. Realizing its history and persistence features of PEAD, the most popular explanation of inattention is reluctant to be accepted. However, the influencing mechanism of investor attention on the relationship between earnings surprises and PEAD has not received enough attention.

On the other hand, the characteristics of PEAD and its profitability in China's A-share market are much less studied by researchers. PEAD exists globally (Griffin and Kelly et al., 2010; Hung and Li et al., 2015); however, in developed markets especially in the US market, the magnitude of the PEAD has been declining from the annualized abnormal returns of 18% in (Bernard and Thomas, 1989) to the point of insignificance in some cases (see Chordia and Subrahmanyam et al., 2014; Auer and Rottmann, 2019; Martineau, 2021). Some very recent studies confirm the PEAD (Ali and Chen et al., 2020; Cox, 2020) and whether this declining trend is permanent remains a prevalent topic, especially in developing markets. China's stock market has become the largest emerging and rapidly developing financial market and becomes

the second-largest in the world. Moreover, China's A-share market has many unique properties and policies, such as restricted access to foreign investors, limiting mechanisms, the "T+1" policy, state owned enterprises, limited short sale possibilities, trading dominated by retail investors, frequent stock suspension, and a large shell value for listed firms. These properties may cause more market friction and inefficiency. Thus, there is further consensus on the existence and pervasiveness of anomalies in the Chinese A-share market (Fernald and Rogers, 2002; Jansen and Swinkels et al., 2021).

In this paper, we mainly focus on three points about this anomaly in China's A-share market: i) measuring the earnings surprise based on overnight returns; ii) the influence of investor attention on the relationship between earnings surprise and PEAD; and ii) the profitability of PEAD in China's A-share market. We performed the following main innovative works:

First, we provided and validated a very simple measure of earnings surprise called ORJ that is based only on the overnight return (OR), i.e., the return between the closing price of the last trading day and the opening price of the next trading day after earnings announcement. Accurately measuring the earnings surprise is the determinant of capturing PEAD. Most of the previous literature measures earnings surprises by testing the abnormal changes in daily returns based on closing prices. Rarely do they consider the OR separately. To capture the surprise information of PEAD, developing new measurement methods is crucial. Recently, Meursault and Liang et al. (2021) developed SUE.txt based on the text information around earnings announcements and captured a stronger PEAD when the classic PEAD has gradually decreased in recent years. Our measure does not involve any complex model design or parameter estimation but is perfectly valid and performs well in China's A-share stock.

Second, we revealed the mediation effect of investor attention between earnings surprises and PEAD. The more attention earnings surprise attracts, the larger PEAD is. Earnings surprise has not only a direct effect on PEAD but also an indirect effect through investor attention. Most previous studies either used earnings surprises as

trading signals for PEAD or only analyzed the impact of attention on PEAD, rarely exploring the interaction of earnings surprises and investor attention on PEAD. In this paper, we examine the relationships among individual investor attention, earnings surprise, and PEAD. We found that unexpected surpluses could affect PEAD by impacting (attracting or decreasing) the attention of investors. At the same time, the effects of positive surprises and negative surprises are asymmetric.

Third, we provide a simple and easily managed investing strategy based on ORJ and strongly demonstrate the high profitability of PEAD in China's A-share market through comprehensive empirical studies. Although there are some typical strategies developed by previous studies, they are often complex and have to manage (long and short) hundreds or even thousands of stocks, which is very difficult to manage and unsuitable for China's market (short-selling limitation). Our strategies only need to long dozens of stocks and quarterly frequency operations but obtain more than 6% quarterly return. These strategies provide good guidance for investors, especially for the large-scale retailers in China's market who lack sufficient professional knowledge.

This paper is related to three branches of literature on PEAD, i.e., those measuring earnings surprises, those explaining PEAD and those developing strategies to chase PEAD.

First, according to the literature, PEAD is usually measured by abnormal returns based on its essential idea that stock prices sluggishly respond to a firm's unexpected earnings news for a subsequently long period (Brown and Han, 2000; Chung and Hrazdil, 2011). Thus, earnings surprises can be measured by the differences between the actual (announced) earnings and the investors' earnings expectations, e.g., analysts' forecasts and random-walk-based earnings announcements or simply the end-of-quarter price of the stock per share; see Livnat and Mendenhall (2006); Doyle and Lundholm et al. (2006); Ayers and Li et al. (2011). SUE (Chen and Diao et al., 2022) is the most representative one of this aspect. There are also specific measures such as investor underreaction (Chung and Kim et al., 2019), drift ratio (Clement and Lee et al., 2019), and abnormal announcement window returns, i.e., cumulative abnormal return (CARs) (Brown and Han, 2000) and jumps (Zhou and Zhu, 2012).

The above signals mainly extract unexpected information from stock financial information or price fluctuations. Recently, Meursault and Liang et al. (2021) constructed a new signal named SUE.txt based on the text of earnings calls and produce a stronger PEAD. SUE.txt also indicates that investor underreaction to earnings surprises contained in earnings announcements text probably goes far beyond the intuitive financial number because the text is much noisier and more difficult to understand. In this paper, we provided a new simple measure of earnings surprise called ORJ based on the overnight return (OR), to reflect unexpected information.

Second, the literature on explanations of PEAD varies and is far from conclusive. On the one hand, PEAD is a separate anomaly, not subsumed by others (Fink, 2021), e.g., both in the U.S. and international markets, PEAD carries exclusive unpriced information content from price momentum (Chen and Chen et al., 2014); PEAD is not only distinct from the accrual pricing anomaly (Collins and Hribar, 2000) but also incremental to those anomalies based on fundamentals such as earnings levels and earnings sign and profitability measures (Balakrishnan and Bartov et al., 2010). Instead, PEAD captures all 12 short-term (less than one year) anomalies (Daniel and Hirshleifer et al., 2020). On the other hand, the potential drivers of PEAD vary widely. Across the board, the explanations can be divided into two categories. From the perspective of risk and information uncertainty, some studies have proven that trading frictions, such as transaction costs, arbitrage risk, and liquidity in trading activities, may hinder the adjustment of stock prices, thus leading to price drift, see, Sadka (2006); Chordia and Subrahmanyam et al. (2014); Porras Prado and Saffi et al. (2016). The noisier the information on a company is, the higher the uncertainty. In this situation, investors would be more cautious, resulting in underreaction. The stock price will be adjusted after the uncertainty is resolved. As a result, the presence of voluntary disclosure (Hann and Kim et al., 2019; Cho and Kim et al., 2020); information consistency (Liang and Zhang, 2020) and divergence of opinion (Garfinkel and Sokobin, 2006); Giannini and Irvine et al., 2019)) can measure these uncertainties and explain PEAD; Other studies confirm the explanations of liquidity

risk (Sadka, 2006), unexpected cash flows (Shivakumar, 2006), firm reputation and celebrities (Pfarrer and Pollock et al., 2010) and so on. From the perspective of behavioral finance theory, more scholars evidence that PEAD is an irrational risk premium and derives from limited investor attention, see, Hirshleifer and Lim et al. (2009), Hung and Li et al. (2015), and Wang and Yan et al. (2018). The investors' attention distribution and their trading behavior have a significant impact on stock prices. However, too much information appearing would reduce the attention of investors, and investors need a certain amount of time and money to deal with it. The concentrated release of earnings announcements would lead to the delayed reaction of the many stock prices. Even if many studies have shown that market information could be incorporated into price immediately when there are high investor attention levels (Loh, 2010), investors carry out some unreasonable trading activities because investors are limited ration and their own investment experiences and abilities are insufficient. Such unreasonable behavior may also further strengthen the PEAD (Chen and Diao et al., 2022). In our paper, we examine the relationships among individual investor attention, unexpected information, and PEAD to explore an explanation of PEAD.

Third, those studies of strategies or portfolios for the PEAD are typically developed by sorting all stocks into quantiles based on the values of their earnings surprises. Then, a portfolio is often constructed by longing the higher surprise decile and shorting the lower decile over a relatively long period, e.g., SUE-sorted portfolios (Bernard and Seyhun, 1997). Classical signals, e.g., SUE, CAR, and Jumps, have historically provided valuable information to investors and have been used to develop strategies that generate excess returns. In addition, some scholars constructed strategies combined with some factors of PEAD. For example, Chordia and Goyal et al. (2009) found that the PEAD mainly occurs in highly liquid stocks, so implementing traditional hedging strategies in these stocks. Similarly, Yan and Zhao (2011) construct PEAD trading strategies in value stocks. However, these strategies usually have thousands of stocks in positions, which makes actual management complex. On the other hand, the size of these signals usually depends on the overall

performance of the market, making it difficult to immediately judge their magnitude or establish a reasonable threshold through experience. As a result, the construction of a strategy can only be ranked based on the previous quarter, which lacks timeliness.

In the following sections, we first provide a measure for earnings surprise in section 2. Then in section 3, we briefly introduce the data set and statistical descriptions. Section 4 validates ORJ and demonstrates the interaction between earnings surprise and investor attention changes on PEAD. Section 5 provides several strategies based on ORJ and their empirical results. Section 6 presents robustness tests of the findings from two aspects. Finally, the conclusion is briefly summarized.

2 A new measure for earnings surprise

When unexpected news shocks to a stock, its price generally undergoes discontinuous changes, namely, jumps. As one of the most important and influential information releasing events on the underlying fundamental value of stocks, earnings announcements often contain unexpected information about the company's performance and are very likely to cause stock price jumps. Zhou and Zhu (2012) found that the realized jumps around earnings announcements imply unobserved "extremely good news" or "extremely bad news" and are profitable trading signals. In addition, according to our observations and experiences on this anomaly of PEAD in China's A-share stock market, we found that those earnings (pre)announcements followed by PEAD often have large overnight returns after the release. Figure 1 shows one typical case. When there is a large jump after earnings announcement, a strong PEAD subsequently appears. Specifically, stocks with a much higher opening price on the day after the earnings announcement than the closing price of the previous day tend to move dramatically up in the next few months. The new measure attempts to capture this phenomenon based on the overnights returns.

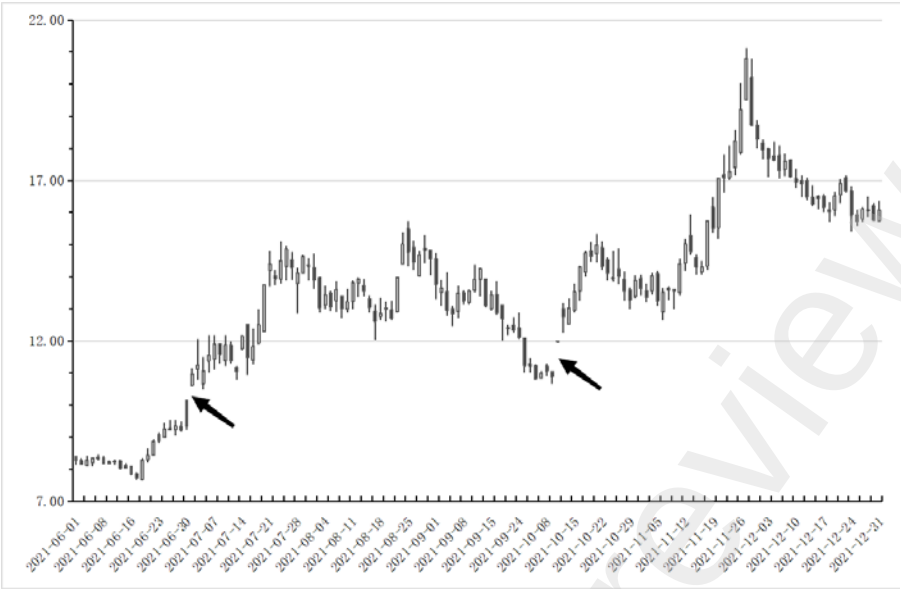

Figure 1. A case of PEAD with a big overnight return after earnings announcement releasing. Stock code: 000657; Releasing dates: July 14, 2021 and October 12, 2021.

Unlike the previous jump measures that usually test the returns of the closing price over a window around the earnings announcement by statistical methods such as the jump test, we monitor the overnight return, namely, the changing percent of the price between the opening price of the first trading day and the last closing price after the earnings information release. Actually, the vast majority of earnings announcements are released during market closure or on weekends. Therefore, if the announcement is released during overnight of trading days, the opening price is the price on the next day. If the announcement is released on a weekend or holiday, the opening price is the price of the next trading day. We argue that the overnight return is more sensitive to reflecting the unexpected information about the announcement. In contrast, the daily returns based on closing prices are insufficient because they have already reflected more quickly the reactions of sensitive investors to unexpected information during the trading day, which greatly reduces the "surprise". Thus, we measure the earnings surprise of the i-th stock in the k-th quarter by those overnight returns being larger than a given threshold and denote it as ORJ.

$$OR_{k,i} = \frac{op_{t_k,i} - cp_{t_k-1,i}}{cp_{t_k-1,i}}$$

$$ORJ_{k,i} = OR_{k,i} I(OR_{k,i} \geq R_0)$$

where t_k is the earnings announcement release day, $OR_{k,i}$ is the overnight return, $op_{t_k,i}$ is the opening price of stock i on the first trading day after the announcement release day, $cp_{t_k,i}$ is the closing price of the previous trading day, $I(\cdot)$ is a symbolic

function and R_0 is a given threshold value. ORJ is a very intuitive indicator. We argue that the larger the absolute value of $OR_{k,i}$ is, the more unexpected (bad or good) information it contains. The choice of threshold R_0 can be adjusted according to the actual situation. Intuitively, if R_0 is too small, ORJ may contain too much noise and little unexpected information. Conversely, if R_0 is large, ORJ cannot catch many stocks with earnings surprises. In theory, R_0 can be optimized by some statistical methods or optimization algorithms. However, in this paper, we recommend some empirical values, such as 3%, the two-thirds quantile of the last quarter or the two-thirds quantile of a relatively long historical sample data. These three values will be empirically studied in the following sections. In the following sections, we will demonstrate the rationality of measuring earnings surprises based on OR and the ability of ORJ to capture the anomaly of PEAD by empirically in China's A-share market.

3 Data and Statistical description

3.1 Data

The sample stock pool includes all A-share stocks listed on the Shenzhen Stock Exchange and Shanghai Stock Exchange. The sample period ranges from Jan 2011 to Apr. 2023, for a total of 48 quarters. All identifying information of stocks, trading data, and earnings preannouncement and announcement information are obtained from the Wind Database. The related data of the Fama-French factors are from the CSMAR database. We apply the following two filters.

a. Eliminate special treatment stocks, i.e., ST or *ST stocks, and newly initiated stocks that were listed for less than 180 days at the announcement date.

b. Exclude stocks of the finance industry because of their unique high debt ratios and strong regulations. In addition, those stocks that do not issue earnings announcements within the specified time are also excluded from the analyses during that quarter.

To measure the performances of ORJ strategies and competing strategies, we use the cumulative excess return over the holding period. The excess return is defined as

the difference in returns between the strategy and the CSI 500 index, which is one of the most popular representative stock indices in the Chinese market. PEAD is measured by the excess return over sixty trading days after the announcement.

3.2 Statistical description of ORJ

After filtering, the sample contains 4755 stocks, 63684 earnings preannouncements and 134027 earnings announcements. Table 1 shows the statistical descriptions of the number of stocks with ORJ per quarter for the whole sample period. The average number of ORJ per quarter is 91.29, which accounts for 7.46% of all stocks (1326.75) that release earnings preannouncements. However, an average of only 3.51% (106.98) of earnings announcement stocks (2792.23) have ORJ. The reasons may be that i) the number of companies with earnings announcements is almost twice that of companies with earnings preannouncements (2792.23 vs. 1326.75), greatly increasing the denominator; ii) when earnings announcements are released, the uncertainties on a company's earnings are resolved and much less than when preannouncements are released, resulting in fewer earnings surprises compared to announcements; and iii) the earnings information is already partially reflected in the price during the period between the preannouncement and the announcement. Regardless, the number of stocks with ORJ that can be used to construct a portfolio is practical and appropriate.

Table 1. Descriptions of ORJ per quarter

	Earnings Preannouncement			Earnings Announcement		
	ORJ	Total	ratio	ORJ	Total	ratio
mean	91.29	1326.75	7.46%	106.98	2792.23	3.51%
std	57.64	462.91	4.96%	83.30	774.07	2.05%
min	12.00	216.00	1.23%	21.00	1688.00	0.92%
25%	47.75	1082.00	4.12%	37.75	2166.75	1.69%
50%	74.50	1338.00	6.46%	84.50	2567.50	3.10%
75%	123.00	1570.00	9.20%	162.50	3270.00	4.75%
max	276.00	2276.00	26.39%	339.00	4261.00	8.11%

Note: the threshold R_0=3%. The Total column is the total number of stocks releasing preannouncements or announcements per quarter. The ratio column is the proportion of stocks with ORJ in the total column.

In addition, we performed a brief analysis on the characteristics of the quantities of ORJ. As Figure 2 shows, the numbers of ORJ stocks with both earnings preannouncements and announcements vary over time, such as i) dramatic increases in 2015 when China's market fluctuated substantially over time and in 2021 during the COVID-19 pandemic; ii) obvious seasonal cycles for earnings preannouncements; and iii) an increasing trend in recent years for both types of releases.

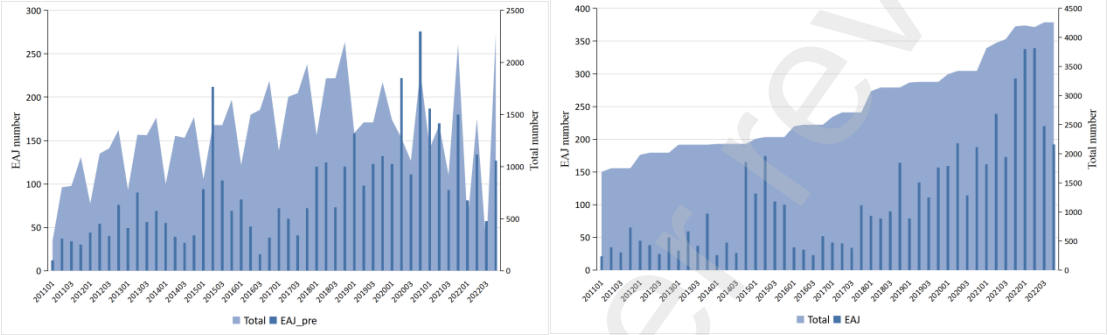

Figure 2 The number of ORJ stocks per quarter.
The left subfigure is for preannouncements, and the right is for announcements.

Figure 3 shows that the ratio also obviously increased in 2015 and displayed an increasing trend in recent years for both earnings preannouncements and announcements. The ratio also shows seasonal cycles. The average ratios of the 1st to 4th quarters are shown in Figure 4. For earnings preannouncements, the first quarter has the highest ratio (9.35%), and the fourth has the lowest ratio (5.56%). For earnings announcements, the fourth and third quarters have the highest (4.58%) and lowest ratios (2.63%), respectively. On the whole, the numbers of stocks with ORJ are relatively stable for analysis, although there are some fluctuations with changes in the macro environments and seasons.

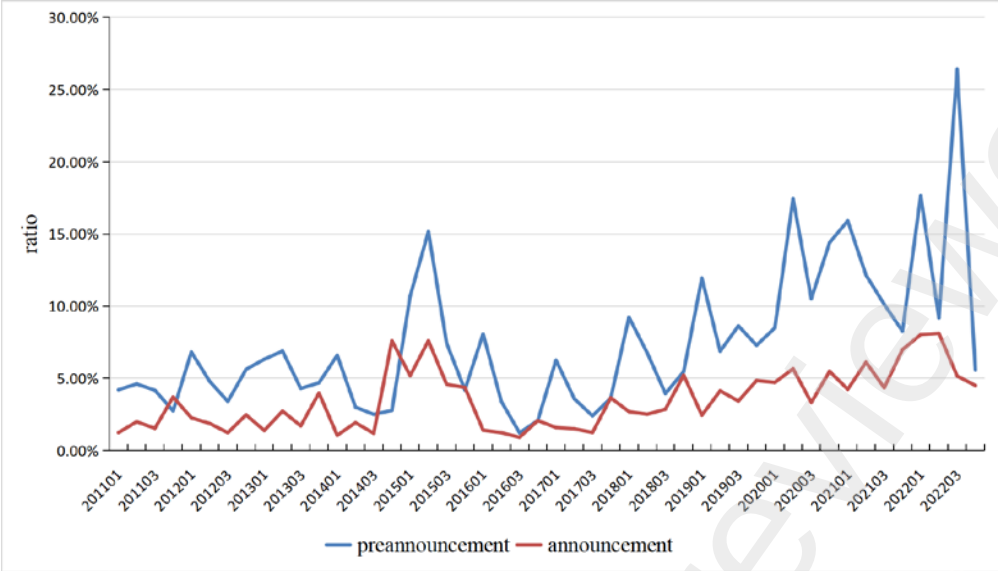

Figure 3 The ratio of ORJ stocks in preannouncement and announcement stocks per quarter

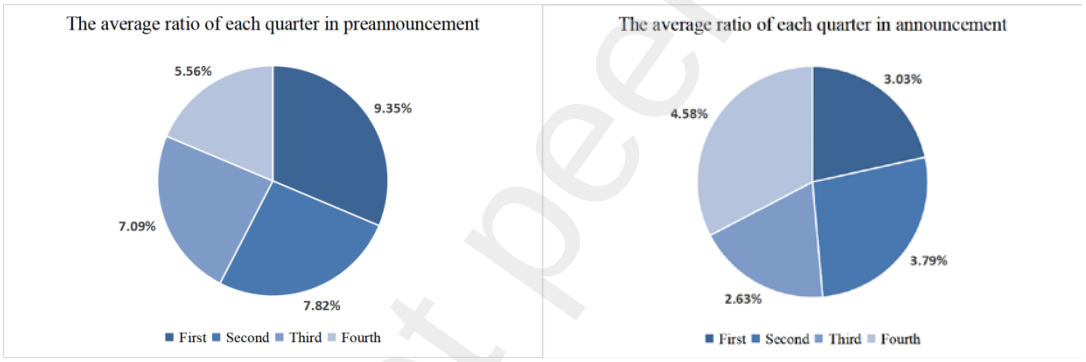

Figure 4 The quarter average ratio of ORJ stocks in preannouncement and announcement stocks

4 Validity of ORJ and Mediation Analysis

In this section, we will analyze the relationships among OR, attention changes and excess returns by performing a series of double-sorted exercises and regressions to analyze the validity of ORJ, i.e., the unexpected information contained by OR, as well as the mediation of investor attention. Based on the results of the statistical description, we consider that ORJ is more representative in preannouncements. Therefore, this section concentrates the analysis on the samples with earnings preannouncements.

4.1 The relationship between OR and classical measures of earnings surprise

We first studied the correlations of OR (ORJ) with three other commonly used

measures of earnings surprises, namely, SUE, EAR, and Jump. Standardized unexpected earnings (SUE) is an old but popular measure in the study of earnings announcement drift, which is measured by the difference between actual earnings numbers (EPS) and expected earnings counterparts and intuitively reflects the unexpected value of investors about the information of financial statements. We calculate SUE based on the random walk model (Bernard and Thomas, 1990). The other two measures, cumulative abnormal return (EAR) (Brandt and Kishore et al., 2008) and Jump (Zhou and Zhu, 2012), estimate unexpected earnings from the market reaction. They assume that prices reflect all information and that unexpected earnings information can be measured by observing the stock price. Compared with SUE that only considers the financial statement information, EAR and Jump also reflect some indirect nonfinancial information. Furthermore, Zhou and Zhu (2012) showed that Jump provides unique information for the subsequent prediction of the degree of drift.

Table 2 gives the correlation matrixes between OR (ORJ) and the three measures. Overall, the results indicate that OR does contain unexpected earnings information. First, OR (ORJ) is significantly and positively correlated with the other three measures, among which the correlations with EAR and Jump are larger. Second, the correlations of SUE with other measures are smaller, which we think is because SUE only reflects unexpected information on financial statement. Third, the correlation between ORJ (OR>3%) and SUE is only 0.027 at the significance level of 10%. Fourth, all values of the positive OR group are larger than those of the negative group, and all values of negative OR group are larger than those of the ORJ (3%) group; At the same time, correlations of ORJ with EAR and Jump do not have much reduction compared to the corresponding values of OR, while, the correlation of SUE decreases dramatically. Combining these results of the second to fourth, it is reasoned that ORJ, EAR and Jump contain other unexpected information except unexpected information on financial statements that is mainly reflected by SUE.

Table 2 the correlation matrixes between OR (ORJ) and classical earnings surprise measures.

	OR (ORJ)	SUE	EAR	Jump
positive overnight returns				
OR	1			
SUE	0.152***	1		
EAR	0.479***	0.114***	1	
Jump	0.419***	0.100***	0.555***	1
negative overnight returns				
OR	1			
SUE	0.132***	1		
EAR	0.344***	0.063***	1	
Jump	0.385***	0.084***	0.542***	1
overnight returns being larger than 3%				
ORJ	1			
SUE	0.027*	1		
EAR	0.413***	0.050***	1	
Jump	0.281***	0.044***	0.434***	1

Note: ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

4.2 The relationship between the size of OR and investor attention

Previous studies on the effect of earnings announcements show that PEAD is caused by investors' reaction to unexpected earnings information. Earnings announcements can attract investors' attention, and transactions are much more active during this period (Garfinkel and Sokobin, 2006). Due to their limited attention and energy constraints, investors may not be able to receive or handle new information in a timely manner and engage in corresponding trading behaviors, causing the new information to not be fully reflected in the price in a timely manner.

Nevertheless, we argue that the size of OR can intuitively reflect the size of investors' unexpected or new information, which is first sniffed by those sensitive investors. A larger OR caused by those sensitive investors indicates more unexpected information and would be much more attractive to investors' attention. However, as investors are heterogeneous, the changing process of investor attention is relatively

slow, which gradually pushes the stock price up or down. Therefore, we measure the investor attention changes over an extended period instead of the attention state at the time point of earnings announcement.

We used the Web Search Volume Index (WSVI) to proxy investor attention. WSVI reflects the frequency of keywords about a stock being searched. When someone uses a search engine to obtain information about listed companies, it means that investors will pay attention to the company. Compared with other indirect indicators for investors' attention, such as abnormal trading volume and turnover rate, WSVI can be more intuitive (Vozlyublennaia, 2014; Ben-Rephael and Da et al., 2017). In this paper, we used WSVI with keywords of the stock name and the stock code from the CNRDS database. For simplicity, in the following sections, pre_att represents the average WSVI level over 30 days before the release of the preannouncement, and change_att represents the changing ratio of WSVI between 30 days after and 30 days before the preannouncement. Note: since we found that PEAD from preannouncements is more evident than that of announcements, we mainly present the analysis results from preannouncements in the following analysis. Considering that there may be some asymmetric effect of positive and negative earnings surprises on PEAD, we analyze both positive and negative ORs in the corresponding subsections.

To analyze the mutual influence relationship between OR and investors' attention level, we construct double-sorted portfolios by pre_att and OR. Panel A of Table 2 presents the average OR sizes of earnings preannouncements grouped by pre_att. Among those stocks with positive ORs, the attention level before the preannouncements does not have a significant impact on the average OR size of each portfolio (see 1.82/1.78/1.86). However, stocks with negative ORs are significantly impacted by pre_att (see -1.18/-1.28/-1.55), indicating that investors tend to be more sensitive to unexpected negative information on earnings preannouncement. Panel B of Table 2 shows the change_att of each group. The results are shown as follows:

i) Earnings preannouncements release can increase investor attention except for those stocks with both a large attention level before preannouncements and negative

earnings or a small positive OR (see the negative values in the last row of Panel B of Table 2). This means that highly watched stocks lose their investor attention when there are negative earnings surprises.

ii) Stocks with lower attention levels tend to have greater attention percentage increases after preannouncements. There is an increasing pattern from bottom to top in each column. Among the positive stock groups, for example, the increasing ratio of attention in the group with lower pre_att increases the most, with an average of 12.49%, and the group with higher pre_att also increases 2.14%.

iii) Overall, there are opposite increasing trends for positive earnings surprises and negative earnings surprises. The larger the positive earnings surprise is, the greater the increase percentage of investor attention. As shown in the last row, the least positive group has a 3.15% increase in investor attention, while the third group has a 15.19% increase. The opposite is true for the negative groups, with 5.94% for the first group and 3.20% for the third group.

iv) Positive earnings surprises tend to cause a larger percentage increase in investor attention than negative surprises. In the first row, we can see that the increasing percentage of the Pre_att_L group for positive groups is larger than that of the Pre_att_L group for negative OR by 2.99% (12.49%-9.50%). The same is true for the second and third groups of investor attention, with 4.63% and 3.76%, respectively.

Based on the findings above, we conclude that positive earnings surprises are more inclined to increase investor attention. The larger the positive earnings surprises are, the more investor attention is attracted. For the stocks with negative surprises, investors may reduce their attention, i.e., unexpected bad earnings news would lose investor attention.

Table 3 The average size of earnings overnight returns and attention changes sorted by Pre_att and OR.

	Positive overnight returns				Negative overnight returns			
	OR_L	OR_M	OR_H	mean	OR_L	OR_M	OR_H	mean
Panel A: average size of overnight returns								
Pre_att_L	0.30	1.08	4.07	1.82	-0.08	-0.68	-2.79	-1.18
Pre_att_M	0.32	1.11	3.90	1.78	-0.11	-0.82	-2.91	-1.28
Pre_att_H	0.38	1.28	3.94	1.86	-0.17	-1.05	-3.42	-1.55
mean	0.33	1.16	3.97	1.82	-0.12	-0.85	-3.04	-1.34
Panel B: average changing percent of investor attention								
Pre_att_L	8.45%	8.83%	20.18%	12.49%	12.48%	7.91%	8.10%	9.50%
Pre_att_M	3.65%	5.53%	16.51%	8.56%	5.93%	2.68%	3.18%	3.93%
Pre_att_H	-2.65%	0.19%	8.87%	2.14%	-0.58%	-2.62%	-1.67%	-1.62%
mean	3.15%	4.85%	15.19%	7.73%	5.94%	2.66%	3.20%	3.93%

Note: OR_L, OR_M and OR_H denote the three groups of overnight returns in ascending order. Pre_att_L, Pre_att_M and Pre_att_H are three groups sorted by investor attention level before earnings announcement. The column and row of mean is the corresponding average values of each group. Panel A is the average size of overnight returns after earnings preannouncements. Panel B is the average increase or decrease percentage of investor attention after 30 days later of earnings preannouncement. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

4.3 Interaction effects of earnings surprise and investor attention on PEAD

In this section, we attempt to reveal not only the effects of earnings surprises on PEAD but also the interaction effects of investor attention and earnings surprises on PEAD by analyzing the returns of the double-sorted portfolios over sixty trading days. Table 3 presents the average excess returns of each group. On the one hand, the larger positive earnings surprises are, the higher PEAD is, which is less affected by Pre_att. For positive overnight returns, there is an obvious increasing pattern from the left lower corner to the top right-hand corner. Regardless of whether investor attention before preannouncements is high or low, they have positive impacts on excess returns. The average excess return spread (H-L) of the three Pre_att groups is 3.66%, 2.90%, 3.25%, respectively (1% significance level). In contrast, on the other hand, larger negative earnings overnight returns lead to less excess returns of the portfolio, which is consistent with findings from the previous section. The overnight returns, to some

extent, contain investors' unexpected information on earnings preannouncements. A higher value indicates a larger unexpected shock (good or bad), resulting in an investor's larger behavior bias and generating higher subsequent abnormal returns.

However, for the negative groups, there is a tendency of decreasing pattern from the left top corner to the right-hand lower corner. Regardless of whether the negative overnight returns are large or small, the portfolio with less attention level before the preannouncements will have higher positive excess returns later.

Table 4 The excess return of portfolios double-sorted by OR and Pre_att.

	OR_L	OR_M	OR_H	H-L
Positive overnight returns				
Pre_att_L	3.41%	4.74%	7.07%	3.66%***
Pre_att_M	2.86%	4.12%	5.76%	2.90%***
Pre_att_H	0.49%	1.77%	3.74%	3.25%***
H-L	-2.92%***	-2.98%***	-3.33%***	
Negative overnight returns				
Pre_att_L	4.82%	3.09%	2.27%	-2.55%***
Pre_att_M	2.22%	1.98%	0.33%	-1.89%**
Pre_att_H	0.43%	-1.63%	-1.35%	-1.78%**
H-L	-4.39%***	-4.72%***	-3.62%***	

Note: the notations of OR_L, OR_M, OR_H, Pre_att_L, Pre_att_M and Pre_att_H are same with Table 2. The H-L of column or row denotes the values by corresponding high group minus low group. The holding period is sixty trading days. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

Furthermore, to analyze the interaction of investor attention changes with earnings surprises on PEAD, we perform another double-sorted exercise, first by OR and then by investor attention percentage changes. The left side of Table 5 presents the excess returns of each group. The right side of Table 5 shows the corresponding attention changes of each group. From Table 5, the following conclusions can be drawn:

First, for the positive OR groups, on the one hand, increase of both OR and investor attention can increase PEAD because there is an increasing trend from the

top left-hand corner to the right bottom corner. The group with a greater attention change obtains a greater excess return at the same earnings surprise level. On the other hand, the larger the earnings surprises are, the larger the attention changes are. The upper right section also has an increasing pattern similar to the upper left section. We can see that the attention change of the group with the highest OR and the highest chang_att_H is 48.43%. In addition, for stocks with positive ORs, the difference in excess return between the higher attention changing group and the lower attention changing reaches up to 5.45%, 7.93%, and 6.94%, respectively.

Second, for the negative earnings surprise groups, the increasing trend pattern is from the top right-hand corner to the left bottom corner. On the one hand, the larger attention increasing groups have higher returns. On the other hand, the less negative earnings surprise group has higher returns. The differences in excess returns between the larger attention-changing group and the smaller attention-changing group are 7.24%, 5.94%, and 5.37%, respectively. Note that the third group of change_att_H is positive.

Overall, from Table 5, we can conclude that the increase in both earnings surprises and investor attention after earnings announcement release will increase PEAD. Here are sufficient reasons to speculate that one of the influential mechanisms by which the earnings surprises strengthen the degree of drift is attracting investor attention. To demonstrate this point more clearly, we will use regression models to analyze the mediating effect of investor attention in the next subsection.

Table 5 The excess return of portfolios double-sorted by OR and attention percentage changes after announcement.

	Excess returns					Attention changes		
	OR_L	OR_M	OR_H	H-L		OR_L	OR_M	OR_H
				positive overnight returns				
change_att_L	-0.17%	0.30%	2.17%	2.34%***		-17.87%	-17.30%	-13.78%
change_att_M	1.61%	2.75%	4.66%	3.04%***		-0.33%	0.64%	6.93%
change_att_H	5.28%	8.23%	9.11%	3.83%***		27.95%	30.81%	48.43%
H-L	5.45%***	7.93%***	6.94%***		mean	3.25%	4.72%	13.86%
				Negative overnight returns				
change_att_L	-0.77%	-1.35%	-2.24%	-1.47%**		-19.01%	-19.10%	-20.15%
change_att_M	2.43%	0.22%	-0.38%	-2.80%***		-0.01%	-0.83%	-1.48%
change_att_H	6.47%	4.59%	3.13%	-3.34%***		38.25%	27.82%	28.04%
H-L	7.24%***	5.94%***	5.37%***		mean	6.41%	2.63%	2.14%

Note: the notations of OR_L, OR_M, OR_H and H-L are same with Table 2. change_att_L, change_att_M and change_att_H are the three groups of investor attention changes from low to high. Column 2 to column 5 record the excess returns of each group. Column 6 to column 8 record the attention change of each group. The holding period is sixty trading days. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

4.4 Mediating effect of investor attention

According to the conclusions from the above subsections, we declaim that a positive earnings surprise increases the excess return not only by itself but also by attracting more investor attention. In this section, we test the mediating effect of investor attention changing the ratio between earnings surprises and PEAD by a causal stepwise regression test, where the control variables are market value, illiquidity and the growth factors (book-to-market ratio, PB) and PE. To make the regression results more robust, we eliminate the abnormal points with stock returns above 300% and the change ratio of investor attention beyond the upper or lower 1%.

First, we analyze the direct impact of earnings surprises on excess returns without considering the mediating effect of investor attention. As shown in Table 6, earnings surprises have significant impacts on PEAD overall, regardless of whether OR is positive or negative with coefficients being of 0.6290 and 0.6262 (1% significance level), respectively. This result indicates that larger earnings surprises lead to a higher degree of drift and vice versa. However, for those positive ORs, only the high group

has significant regression coefficients, which means that it is necessary that the positive surprise must be large enough to produce PEAD.

Second, from Table 7, we can see that the attention changes have significant positive coefficients in all the regression models. Namely, the increase (decrease) in investor attention is an important factor in pushing PEAD.

Table 6 The regression results of excess returns on overnight returns.

	All	OR_L	OR_M	OR_H
Positive earnings surprises				
α	0.0305	-0.0116	-0.0034	0.0562*
OR	0.6214***	2.2036	1.4492**	0.3312***
Ln_size	-0.0068	-0.0015	-0.0022	-0.0095
ILLIQ	0.0377	0.1549**	0.4703***	0.0366
Ln_pb	0.0119***	0.0104	0.0188**	0.0071
Ln_pe	0.0024*	0.0029*	-0.0006	0.0044*
Negative earnings surprises				
α	0.0253	0.0489	-0.0115	-0.0176
OR	0.5826***	6.8239**	1.5289***	0.0172
Ln_size	-0.0084	-0.0096	-0.0020	-0.0037
ILLIQ	0.1875***	0.1418**	0.4733**	0.2116
Ln_pb	0.0079*	0.0014	0.0112**	0.0114**
Ln_pe	0.0031***	0.0046***	0.0030	0.0028*

Note: r=α+β1*OR, the second column is the regression of all samples. The third to five column is results of overnight returns groups from low to high respectively. ***, **, * denotes the significant level of 1%, 5% and 10% respectively.

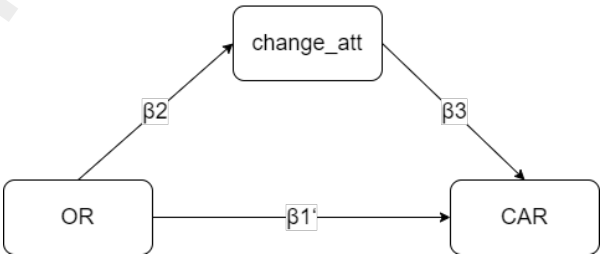

Figure 5 The relationship between OR, CAR and change_att. OR is the overnight returns. CAR is the excess returns over the 60 trading days. The change_att is investor attention changes.

Table 7 The regression results of excess returns on investor attention changes grouped by overnight returns.

	All	OR_L	OR_M	OR_H
Positive earnings surprises				
α	0.0244	-0.0079	-0.0031	0.0468
change_att	0.1164***	0.1048***	0.1426***	0.102***
Ln_size	-0.0054	-0.0014	-0.0012	-0.0067
ILLIQ	0.0386	0.1120	0.4953**	0.0415
Ln_pb	0.0131**	0.0116	0.0205**	0.0086
Ln_pe	0.0025*	0.0030*	-0.0011	0.0028
Negative earnings surprises				
α	0.0236	0.0544	-0.0262	-0.0105
change_att	0.1135***	0.1019***	0.1372***	0.1082***
Ln_size	-0.0101	-0.013	-0.0021	-0.0054
ILLIQ	0.1630**	0.0850	0.4437***	0.1693
Ln_pb	0.0071*	0.0015	0.0102	0.0109**
Ln_pe	0.0030***	0.0043***	0.0030*	0.0026**

Note: r=α+β3*change_att, the second column is the regression of all samples. The third to five column is results of overnight returns groups from low to high, respectively. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

Now, we regress investor attention changes on OR. Table 8 shows the regression results. Positive OR has a significant positive impact on the changes in investor attention, with a coefficient of 4.3033 overall. This effect mainly comes from the group with higher OR because the coefficients of smaller OR are not significant, which indicates that stocks with larger earnings surprises may attract more investor attention and smaller ones may not. The negative OR has no significant linear relationship with investors' attention changes over the full sample. However, as we can see from the regression results on subsamples, the coefficient of the subsample with the smaller negative OR is significantly positive, while the coefficient of the

subsample with the larger negative OR is significantly negative, which indicates that small negative earnings surprises caused by bad news will lead to the reduction of investor attention to some extent, but large negative earnings surprises from bad news are still likely to increase investor attention.

Table 8 The regression results of investor attention changes on overnight returns.

	All	OR_L	OR_M	OR_H
Positive earnings surprises				
α	0.0605***	0.0745**	0.0382**	0.0147
OR	4.1721***	-0.5211	3.0701**	4.9216***
Ln_size	-0.0127***	-0.0042	-0.0068*	-0.0162**
ILLIQ	0.0652	0.1191	0.1555	0.2044
Ln_pb	-0.0046	-0.0046	-0.0081	-0.0136
Ln_pe	0.0011	-0.0057***	0.0056*	0.0073
Negative earnings surprises				
α	0.0070	0.0303	-0.0061	-0.0639
OR	0.1568	23.478***	-0.4614	-1.2068***
Ln_size	0.0052**	0.0073***	0.0028	0.0105**
ILLIQ	0.1558	0.3507	0.2247	0.3984
Ln_pb	0.0052	0.0138	0.0056	-0.0030
Ln_pe	-0.0003	-0.0026	0.0009	0.0019

Note: change_att=α+β2*OR, the second column is the regression of all samples. The third to five column is results of overnight returns groups from low to high respectively. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

Finally, we regress excess returns on both OR and attention changes. From Table 9, we can see that the coefficients of positive OR become insignificant. All coefficients of attention changes are still significant. Combining the results from Table 6 to Table 8, we can conclude that the impacts of earnings surprises on PEAD are transmitted by attention changes. In other words, PEAD is strengthened by the attention changes caused by earnings surprises. As the time interval of attention

changes measured by this paper is 30 trading days, the process of attention change is a gradual and long-term process. Compared to its significant mediating effects on positive earnings surprises, investor attention has no significant mediating effect on PEAD for negative surprises, due to the coefficient of OR decreasing from 0.6262 to 0.5637.

Table 9 The regression results of investor attention changes and overnight returns on PEAD grouped by overnight returns.

	All	OR_L	OR_M	OR_H
Positive earnings surprises				
α	0.0223	-0.0162	-0.0127	0.0537
OR	0.1543	2.1683	1.0574	-0.1399
change_att	0.1159***	0.1048***	0.143***	0.1086***
Ln_size	-0.0054	-0.0011	-0.0014	-0.0070
ILLIQ	0.0399	0.1131	0.4905**	0.0311
Ln_pb	0.0128**	0.0120	0.0200**	0.0080
Ln_pe	0.0024*	0.0030*	-0.0011	0.0029
Negative earnings surprises				
α	0.0258	0.0549	-0.0117	-0.0080
OR	0.5384***	4.5385	1.6507***	0.1727
change_att	0.1148***	0.1015***	0.1386***	0.1111***
Ln_size	-0.0093	-0.0124	-0.0021	-0.0051
ILLIQ	0.1631**	0.0885	0.4434***	0.1501
Ln_pb	0.0075*	0.0011	0.0097	0.0113**
Ln_pe	0.0031***	0.0045***	0.0029*	0.0027***

Note: r=α+β1'*OR+β3'*change_att. the second column is the regression of all samples. The third to five column is results of overnight returns groups from low to high, respectively. ***, **, * denotes the significant level of 1%, 5% and 10%, respectively.

The above regression results can confirm our speculation about the potential mechanism of earnings surprises causing PEAD anomalies. In general, the announcements may attract investor attention or investors are highly concerned with the earnings announcements releasing, and the investors will react to the "good" or

"bad" news of announcements in a relatively long time. When "good news" released by the company exceeds the expectation of investors, the stock price of the company will jump significantly and positively and subsequently produce a larger OR, which can continually attract more heterogeneous investors' attention and push the return further up. Thus, the stock price continues to rise in a relatively long period following the announcements. Conversely, the release of "bad news" may decrease investor attention slightly, which leads to a decrease in stock prices.

Therefore, it is reasonable to argue that the earnings surprises are contained in those high overnight returns, especially those in the group of positive OR_H. In return, we can proxy earnings surprises by high overnight returns defined in subsection 2. In the following subsection, we will give three investing strategies to further demonstrate the sense of ORJ.

5 Investment strategy based on ORJ

5.1 Strategy construction framework

Scholars have found that price adjustments for the PEAD are relatively constant and can take multiple months or even quarters, e.g., Li and Nekrasov et al. (2020); Ali and Chen et al. (2020). Based on the well-evidenced PEAD phenomenon and our findings above, we try to construct a very efficient investing strategy using ORJ as trading signals. Considering the short-sales constraints in the Chinese stock market, we only construct a strategy based on positive ORJ. The construction framework of the portfolio is as follows.

First, monitor the overnight returns (OR) of earnings preannouncements or announcements.

Second, select those stocks with ORs being greater than a given threshold and hold them for a relatively long period beginning on the third day after the announcement.

Third, repeat the above two steps every quarter.

To show the efficiency of this strategy, we first choose a threshold of 3% for ORJ as an example in the second step as in the following empirical study, which is slightly

smaller than the sample period two-thirds quantile of OR (4.07), whose performance is also given in subsection 5.5. The holding period is sixty trading days, which is nearly a quarter. For simplicity, we call these stocks with ORJ values larger than 3% the ORJ-3 stocks in the following and the strategies as the ORJ strategy.

To assess the performance of the ORJ strategy, we also select three very popular competing strategies related to the PEAD, i.e., the jump strategy, earnings announcement return (EAR) strategy and standardized unexpected earning (SUE) strategy. Earnings preannouncements and announcements are the two releases regarding a company's profitability that receive the most attention from investors. Considering that there may be some differences between earnings preannouncements and announcements, strategies based on these two types of releases are shown in this empirical section.

5.2 Competing strategies

5.2.1 Jump strategy

The first competing strategy is the jump strategy provided by Zhou and Zhu (2012), which mainly uses the nonparametric jump detection method of Lee and Mykland (2008) to measure the information shocks of earnings announcements over the three-day window and then goes long on positive-jump stocks and short on negative-jump stocks by holding for 60 days[1].

5.2.2 EAR strategy

The EAR (Brandt and Kishore et al., 2008) is the cumulative abnormal return defined by the difference between cumulative and expected returns over a three-day window centered around the announcement date to capture the market's reaction to unexpected information. Here, the expected return used in this paper is the return of the China Securities 500 index. Following Brandt and Kishore et al. (2008) and Zhou and Zhu (2012), the percentiles method is used, and the top 10% of stocks are selected. The EAR ranking is based on the previous quarter, and the holding period is also 60

[1] Considering the curb on short selling in China's stock market, we do not short the negative-jump stocks in the empirical study

trading days.

5.2.3 SUE strategy

SUE (Latane and Jones, 1979) represents a common trading signal in the study of the earnings announcement effect. Many scholars have constructed strategies using SUE; see Alexander and Goff et al. (1989); Chudek and Truong et al. (2011). We calculate SUE based on the random walk model (Bernard and Thomas, 1990). Here, we also use the EPS of the same period last year as the expected earnings. However, since not every company release earnings forecasts each quarter, we adopt only an SUE strategy based on announcements. Similar to the EAR strategy, rank screening and portfolio construction are carried out according to the previous quarter. Following Zhou and Zhu (2012), we constructed portfolios with different sizes of stocks. We found that the strategy with the top 5% stocks of SUE perform best. Therefore, only the top 5% of stocks in the SUE ranking is used in this paper.

5.3 Performance of the ORJ strategy

In this paper, the customary value-weighted and equal-weighted portfolio strategy is applied to both earnings preannouncements and announcements. Table 9 shows the performances of the four strategies during the sample period. Obviously, the ORJ strategy has good performance. Ignoring the small trading cost percentage, the ORJ strategy has average excess returns of 6.06% and 4.60% per quarter for equal-weighted and value-weighted strategies based on earnings preannouncements, respectively. However, there are 5.01% and 4.56% excess returns per quarter in the equal- and value-weighted strategies for earnings announcements, respectively. Furthermore, from Table 10, the following results can be summarized.

First, ORJ strategies outperform the other three classical strategies. The average excess returns of ORJ strategies are correspondingly larger than those of other strategies for both earnings preannouncements and announcements. The most competitive strategy for ORJ is JUMP, with a Sharpe ratio and a max loss higher than those of the ORJ value-weighted strategy for earnings preannouncements.

Second, the performances of all earnings preannouncement strategies are better than that for earnings announcements. For example, the average excess return of the

ORJ strategy with equal weights from earnings preannouncements is approximately 1.46% higher per quarter than that from earnings announcements.

Third, the returns of the equally weighted strategies are better than those of the value weighted strategies, indicating that small scale stocks may have greater impacts on strategies related to PEAD.

Figure 6 and Figure 7 plot the accumulated return lines for the fourteen investing strategies. We can clearly see that ORJ strategies outperform other strategies. At the same time, strategies for earnings preannouncements have better performance than those for earnings announcements. Equal weighted ORJ strategies are more profitable and stable than value weighted ones.

In words, the ORJ strategy obtains higher returns and outperforms the competing strategies.

Table 10 Performances of ORJ strategies and competitive strategies from the first quarter of 2011 to the fourth quarter of 2021.

	num	equal-weighting				value-weighting			
		max_return	max_loss	return	Sharpe	max_return	max_loss	return	Sharpe
ORJ									
Pre_EA	91	16.36%	-3.42%	**6.06%*****	**1.234**	29.20%	-9.71%	4.60%***	0.653
EA	107	14.21%	-3.62%	5.01%***	1.213	22.84%	-11.63%	4.56%***	0.614
Jump									
Pre_EA	155	12.96%	-5.78%	3.82%***	0.951	10.82%	-6.85%	2.72%***	0.732
EA	310	11.87%	-3.57%	2.96%***	0.936	9.95%	-11.12%	2.38%***	0.541
EAR 0.1									
Pre_EA	135	16.74%	-10.24%	2.15%***	0.402	12.67%	-14.34%	1.90%**	0.337
EA	284	12.46%	-8.23%	2.70%***	0.611	12.20%	-8.72%	2.76%***	0.619
SUE 0.05									
EA	138	12.25%	-3.54%	1.51%***	0.445	18.79%	-9.86%	2.07%**	0.375

NOTE: Pre_EA denotes preannouncement, EA denotes announcement. The num column represents the average number of stocks in the portfolios, and the bold texts denote that they are better than that of the corresponding ORJ whose threshold for ORJ is 3%. EAR_10% denotes the top ten percentage of stocks used in the EAR ranking. SUE_5% denotes the top five percentage of stocks used in the EAR ranking.

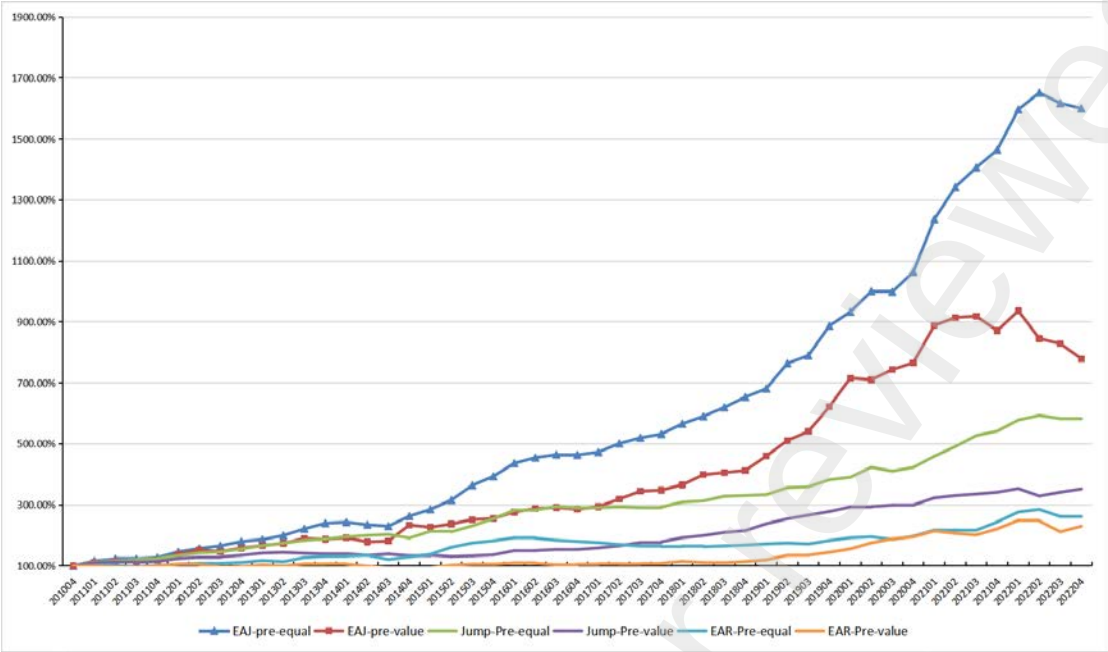

Figure 6 Accumulated return curves of the ORJ, Jump and EAR strategies for earnings preannouncement

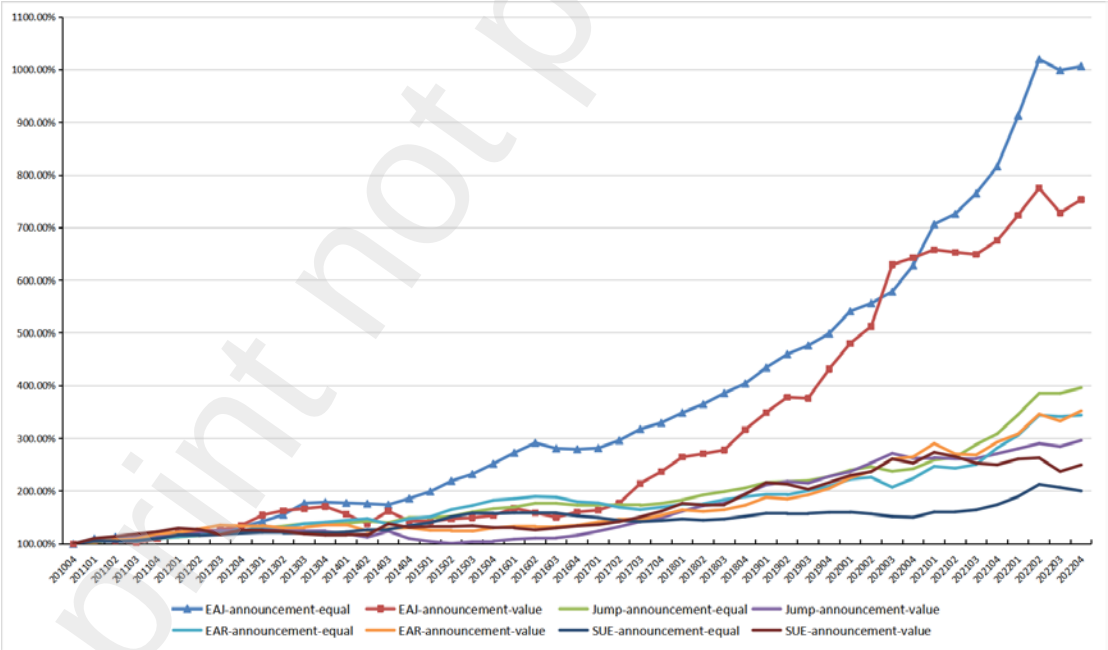

Figure 7 Accumulated return curves of the ORJ, Jump, EAR and SUE strategies

5.4 Characteristic of the ORJ Strategy

To investigate additional characteristics of our strategies, we analyze the impacts

of stylized pricing factors, i.e., the Fama-French three factors by regression model, illiquidity and basic fundamental factors by the double sorted-group method. The following two tables show the empirical results.

Table 11 Regression results of excess returns from the ORJ Strategy by Fama-French three factors.

	ORJ		Jump		EAR		SUE
	Pre_EA	EA	Pre_EA	EA	Pre_EA	EA	EA
α	6.03%***	5.15%***	3.62%***	2.90%***	2.06%***	2.58%***	1.41%***
Rm	-0.115 *	-0.113 **	-0.067	-0.061	-0.207 ***	-0.183 ***	-0.058
SMB	0.110	0.013	0.143 *	0.074	0.195 **	0.184 **	0.092
HML	-0.258 **	-0.173	0.009	-0.087	-0.167	-0.065	-0.039
R^2	0.284	0.144	0.124	0.152	0.350	0.344	0.112

Note: Pre denotes preannouncement, announce denotes announcement. ***, ** and * denote the significant level at 1%, 5% and 10%, respectively

Obviously, as shown in Table 11, the Fama-French three factors explain little of the returns of the ORJ and the other three strategies. Only market returns (Rm) have significant negative effects on the performance of the EAR strategy (1% significance level). The Fama-French factors tend to underestimate the returns of all strategies because all alphas are significantly positive (significant at the 1% level). More importantly, the alpha of ORJ for earnings preannouncements is the largest (6.03%), indicating that its anomaly is much larger.

To explore whether company characteristics impact the performance of the ORJ strategy, we study the scale factor by market value, the liquidity factor by illiquidity and the growth factor by the book-to-market ratio (PB) and PE. We divide all A-share stocks into five equal groups by ranking one of these four factors in each quarter. Then, we select the stocks with ORJ in each of the five groups and average their excess returns by each group. From Table 12, we obtain the following findings.

First, except for PB, the number of ORJ stocks is almost equally distributed in each group. The number has a slightly increasing trend with increasing PB. This means that the likelihood of ORJ occurring in each group of the four factors is almost equal, while PB has an increasing trend.

Second, illiquidity seems to have negative effects on the performance of the ORJ

strategy because group 5 has 4.44% and 4.77% higher excess returns per quarter than group 1, which indicates that the drift after preannouncements in less liquid stocks may be stronger. PB has positive impacts in announcements i.e., 5-1 return rows are positive in preannouncements.

Third, these four factors did not have a general within-group pattern on the performances of the ORJ strategies from preannouncements and announcements.

In short, although they may have some impact on the performance of ORJ, these factors are not the determinants of ORJ strategy.

Table 12 The impacts of market value, illiquidity, PB and PE on ORJ

	Earnings preannouncement				Earnings announcement			
	Num	mean	Equal_weight	Value_weight	Num	mean	Equal_weight	Value_weight
				market value				
1(L)	14	23.80	7.89%***	7.92%***	17	23.54	6.55%***	7.14%***
2	17	37.15	6.13%***	5.88%***	21	37.03	5.36%***	5.45%***
3	21	56.07	6.07%***	5.70%***	21	56.18	4.12%***	3.71%***
4	20	95.68	7.02%***	7.09%***	23	96.67	4.12%***	3.77%***
5(H)	20	360.39	5.50%***	4.55%***	25	440.13	4.44%***	4.38%**
5-1			-2.39%	-3.37%			-2.11%	-2.76%
				illiquidity				
1(L)	22	0.01	4.20%***	3.47%**	24	0.01	4.59%***	4.79%***
2	19	0.02	4.64%***	3.77%***	21	0.02	5.09%***	5.21%***
3	19	0.04	6.84%***	6.08%***	22	0.04	5.99%***	4.98%***
4	16	0.06	5.13%***	4.96%***	21	0.06	4.78%***	3.49%***
5(H)	15	0.63	8.64%***	8.24%***	18	0.17	5.86%***	5.61%***
5-1			4.44%**	4.77%**			1.26%	0.83%
				PB				
1(L)	12	-4.60	4.89%***	2.64%***	16	0.54	2.95%**	2.00%
2	16	2.20	5.88%***	5.02%***	19	2.21	3.17%***	2.48%
3	18	3.04	4.00%***	2.91%***	21	3.06	5.37%***	5.70%***
4	21	4.36	6.63%***	6.38%***	22	4.35	7.24%***	6.05%***
5(H)	24	13.30	7.15%***	5.16%***	29	19.55	6.34%***	6.60%***
5-1			2.26%	2.52%			3.40%*	4.60%*
				PE				
1(L)	15	-143.78	6.50%***	5.24%***	18	-364.20	4.06%***	2.09%

2	17	22.44	5.42%***	3.91%***	23	22.08	3.16%***	4.85%***
3	20	36.93	4.63%***	3.45%*	24	37.05	6.42%***	5.61%***
4	21	60.49	6.83%***	5.50%***	22	59.97	5.68%***	5.51%***
5(H)	18	650.21	6.82%***	5.17%***	21	896.53	6.91%***	5.31%***
5-1			0.32%	-0.07%			2.85%	3.23%

Note: a. The first five columns in the above table are the results obtained based on earnings preannouncements, and the last five columns are the results obtained based on earnings announcements. num is the average number of ORJ stocks in each group. Mean is the average value of ORJ stocks for corresponding factors in each group. Equal weight and value weight are, respectively, the excess returns of equal weighted and valued weighted ORJ stock portfolios in each group. diff_e and diff_v are the corresponding differences in equal weight and value weight between earnings preannouncements and announcements. Market value is the price multiplied by the outstanding shares. illiquidity is the average daily illiquidity of Amihud (2002) over 60 days before the earnings announcement date. The book-to-market ratio is the ratio of book net assets to their market value. PE is the stock price divided by its earnings. Groups 1 to 5 of each factor are in increasing order, i.e., group 1 is the smallest and group 5 is the largest. The 5-1 rows denote the value of group 5 minus group 1 in the corresponding column. b. ***, ** and * denotes significance at 1%, 5% and 10%, respectively. Significance for the differences is tested using t tests and Wilcoxon tests, including one-sided, two-sided and paired testing.

5.5 Two other ORJ strategies with different threshold choices

In this section, we construct two alternative practicable investment strategies based on the findings of the previous sections by choosing different thresholds for ORJ. From Table 5, we find that the portfolio with the largest OR and the highest change ratio of investor attention has the highest excess return, reaching 9.11%, but obviously, this is an ideal strategy. Since the change ratio of investor attention is an ex post indicator, we cannot use it directly in strategy construction. Fortunately, from the results in Panel B of Table 3, it seems that stocks with lower attention levels before announcements are more likely to have larger attention increases. This suggests that we could proxy stocks with larger attention increases by selecting stocks with lower-level investor attention before preannouncements. That is, select the stocks with lower investor attention (pre_att) before the preannouncements and larger earnings overnight returns. If true, the optimal excess return of the portfolio could reach as high as 7.07%, as shown in Table 4. As a result, here we construct strategies in two ways, hoping to select the stocks with PEAD most likely to be included in the optimal portfolio each quarter.

Strategy 1: Build a quarterly rolling strategy according to attention pre_att and

ORJ. Specifically, at the beginning of each quarter, select stocks whose pre_att of the previous quarter is below the 33% quantile and OR above the 66% quantile.

Strategy 2: Take the whole sample historical two-thirds quantile of OR as the threshold, i.e., the value 4.07 in panel A of Table 3. We believe that stocks with ORs being greater than this threshold will have a greater probability of being included in the optimal portfolio.

The performance of the two strategies is shown in Table 13. The average excess returns with equal weights are 6.75% and 6.35% respectively, and there is no significant difference between them. However, relatively speaking, strategy 2 outperforms strategy 1 because of the lower number of stocks and higher Sharpe ratio. At the same time, strategy 2 is simpler with a constant threshold. The threshold of strategy 1 is determined by the quantile of the last quarter. However, the fact is that the previous quantiles of pre_att and OR in the last quarter may have little forecasting ability to that of the next quarter, resulting in the returns of strategy 1 fluctuating more i.e., large volatility. In other words, it is evident that ORJ is a very profitable trading indicator and that our strategies have excellent performance.

Table 13 Performances of two alternative ORJ strategies from the first quarter of 2011 to the third quarter of 2022

	num	equal-weighting				value-weighting			
		max	min	mean	Sharpe	max	min	mean	Sharpe
Strategy 1	82	34.09%	-5.19%	6.75%***	0.941	26.69%	-5.61%	5.53%***	0.851
Strategy 2	58	23.11%	-6.27%	6.35%***	1.108	46.85%	-10.84%	5.92%***	0.660

NOTE: The num column represents the average number of stocks in the portfolios. The columns of max, min and mean denote the maximum, minimum and average quarter returns of the strategy. Sharpe column is the Sharpe ratio.

6 Robustness

To test the robustness of our findings, on the one hand, we use EAR to measure earnings surprises and test the validity of our findings. On the other hand, we exclude the shell value contamination stocks to test the robustness of our strategy.

6.1 Empirical results from other unexpected earnings surprise measures

Brandt and Kishore et al. (2008) put forward earnings announcement return (EAR) to reflect the market reaction to the unexpected information contained in a company's earnings announcement. We perform the empirical study with the same methods as the fourth section.

Thus, we test our findings about the interaction effect of investor attention on PEAD by replacing ORJ with EAR in double-sorted empirical studies. The results are shown in Table 14 to Table 16. Now, we briefly state the results of these tables. Panel A of Table 14 shows the average EAR of each group, and Panel B shows the change ratio of average attention after preannouncements. Obviously, the increasing patterns of both average EAR size and the changing ratio of attention are the same as Table 2.

Table 14. The average size of EAR and attention changes sorted by Pre_att and EAR.

	Positive EAR				Negative EAR			
	L	M	H	mean	L	M	H	mean
Panel A: average size of EAR								
Pre_att_L	0.85%	2.93%	8.94%	4.24%	-0.83%	-2.63%	-6.82%	-3.43%
Pre_att_M	0.84%	2.99%	8.86%	4.23%	-0.87%	-2.72%	-6.82%	-3.47%
Pre_att_H	0.92%	3.19%	9.36%	4.49%	-0.93%	-2.94%	-7.36%	-3.74%
mean	0.87%	3.04%	9.05%	4.32%	-0.88%	-2.76%	-7.00%	-3.55%
Panel B: average changing percent of investor attention								
Pre_att_L	9.72%	11.71%	22.66%	14.69%	7.88%	6.82%	6.23%	6.98%
Pre_att_M	5.50%	7.12%	21.21%	11.28%	2.17%	0.71%	1.23%	1.37%
Pre_att_H	-0.64%	1.23%	14.30%	4.96%	-3.05%	-4.57%	-4.76%	-4.13%
mean	4.86%	6.69%	19.39%	10.31%	2.34%	0.99%	0.90%	1.41%

Note: the double-sorted variables are the attention level before preannouncements (pre_att) and EAR. The columns of L, M, H, mean are the low group, middle group, high group and average group, respectively. Similarly, the rows of pre_att_L to mean are sorted groups of attention levels before announcement. Panel A is the average size of EAR in each groups. Panel B is the changing ratio of investor attention after earnings announcement.

Table 15 presents the average excess returns for each group constructed by the double-sorted method with EAR and attention level before earnings announcement. Similar to Table 4, for positive EAR, the lower attention level before EA and higher EAR will result in higher excess returns. However, a lower attention level before EA and lower EAR will result in higher excess returns in negative EAR groups. The

optimal portfolio is the one with lower pre_att and higher EAR.

Table 15. The excess return of portfolios double-sorted by EAR and Pre_att.

	L	M	H	H-L
Panel A: positive EAR				
Pre_att_L	4.74%	4.90%	**6.08%**	1.34%*
Pre_att_M	2.61%	4.07%	5.62%	3.01%***
Pre_att_H	0.79%	1.77%	3.03%	2.24%***
H-L	-3.95%***	-3.12%***	-3.05%***	
Panel B: negative EAR				
Pre_att_L	3.63%	3.63%	2.00%	-1.63%**
Pre_att_M	2.74%	1.76%	0.04%	-2.70%***
Pre_att_H	0.04%	-0.92%	-1.56%	-1.60%**
H-L	-3.59%***	-4.55%***	-3.56%***	

Note: The H-L of column or row denotes the values by corresponding high group minus low group.

Table 16 shows the interaction of EAR and the changing ratio of attention. In panel A, the increasing trend is from the left top corner to the right bottom corner. In panel B, the increasing trend is from the right top corner to the left bottom. These results are similar to the results of Table 4.

Table 16 Excess returns of portfolios double sorted by EAR and attention changing ratio

	L	M	H	H-L
Panel A: positive EAR				
change_att_L	0.16%	0.53%	1.39%	1.23%*
change_att_M	2.03%	2.81%	4.35%	2.32%***
change_att_H	5.65%	7.36%	9.30%	3.65%***
H-L	5.49%***	6.84%***	7.91%***	
Panel B: negative EAR				
change_att_L	-0.20%	-1.21%	-2.36%	-2.15%***
change_att_M	1.24%	0.71%	0.09%	-1.15%**
change_att_H	5.63%	4.91%	2.56%	-3.07%***
H-L	5.83%***	6.12%***	4.92%***	

Note: the columns of L to M are the EAR sorted groups.

Finally, the robustness of the mediating effect of attention found in subsection 4.3 is also tested by replacing ORJ with EAR. Table 17 shows the regression results of the

four models. The signal and significance of the regression coefficients are similar to those of Table 6 to Table 9, which further provides evidence to support the conclusion that investors are more likely to pay attention to stocks with earnings surprises and that earnings surprises generate significant excess returns by attracting investor attention.

Table 17 The robustness test of mediating effect of investor attention on EAR.

	positive EAR				negative EAR			
	All	L	M	H	all	L	M	H
Panel A: $r = \alpha + \beta_1 * EAR$								
α	0.0254***	0.0200**	0.0322***	0.0264***	0.0249**	0.0216**	0.0292**	0.0178*
EAR	0.2649***	0.6045	0.1053	0.2562***	0.3682***	0.3078	0.3911	0.2839***
Panel B $change\_att = \alpha + \beta_2 * EAR$								
α	0.0014	0.0329**	0.044***	-0.1042***	0.0111	0.0349***	0.0175	-0.0672***
EAR	2.4887***	1.822**	0.7782**	3.4998***	-0.0582	1.1697**	0.3269	-1.0724***
Panel C: $r = \alpha + \beta_3 * change\_att$								
α	0.0241***	0.0181***	0.0273***	0.0288***	0.0096	0.0146*	0.0174*	-0.0031
change_att	0.1191***	0.1265***	0.1408***	0.1014***	0.1167***	0.1274***	0.1658***	0.0759***
Panel D: $r = \alpha + \beta_1' * EAR + \beta_3' * change\_att$								
α	0.0251***	0.0172**	0.0288***	0.0364***	0.0221*	0.0153*	0.0263**	0.0235**
EAR	-0.0296	0.1283	-0.0489	-0.1046	0.3607***	0.1099	0.3415	0.3782***
change_att	0.1199***	0.1275***	0.1406***	0.1059***	0.1191***	0.1279***	0.167***	0.084***

Note: the equations in each panel table are the corresponding regression model, where r is the accumulated excess return, change_att is the changing ratio of investor attention after earnings announcement. The column All shows the results of the model over the whole sample. The column L to column H means the regression model is conducted in the stock group sorted by EAR

6.2 Excluding shell-value contamination stocks

To test the robustness of the ORJ strategy, we exclude stocks in the bottom 30% of firm size. According to the research of (Liu and Stambaugh et al., 2019), the bottom 30% are "shell-value contamination" because of the tight IPO constraints in China's market, which causes them to be affected by reverse mergers and acquisitions and have greater value fluctuations. To avoid this problem, we delete these

“contaminated” stocks based on the market value of the stock at the end of last year. The result is shown in Table 18 . Although the performance of the ORJ strategy slightly declines compared with Table 10, it still has appreciable average excess returns as high as 5.28% to 4.48%.

Table 18 Performances of the ORJ strategy with shell-value contamination stocks excluded from the first quarter of 2011 to the fourth quarter of 2021

	Num	Equal weighting				Value weighting			
		max	min	mean	Sharpe	max	min	mean	Sharpe
Pre_EA	65	17.57%	-6.64%	5.28%***	1.043	31.13%	-10.27%	4.36%***	0.578
EA	78	12.89%	-6.32%	4.48%***	0.961	24.19%	-13.64%	4.43%***	0.543

Conclusion

Although an all-encompassing explanation about the origins and properties of the PEAD remains out of sight, it is very possible and always attractive to make a profitable investing decision by taking full advantage of this puzzling phenomenon. In this paper, we not only explore the potential formation mechanism of PEAD by studying the interaction effect between earnings surprises and investor attention but also try to construct a practical investing strategy. To this end, we provide a much simpler measure for earnings surprises (ORJ) based on the overnight returns of earnings announcements and conduct a comprehensive empirical study with Chinese stock market data. Our results show that the overnight returns of earnings announcements are significantly related to classical earnings surprise measures and that changes in investors' attention have a significant mediating effect on the relationship between unexpected earnings and excess returns after the announcement, that is, unexpected earnings information can attract investors' attention and gradually drives stock prices. The ORJ strategy provided by us is very simple but perform well. In China’s A-share stock market, its excess returns (compared with the CSI 500 index) reach as high as an average of 6.78% per quarter (ignoring minimal trade costs), which outperforms several popular PEAD strategies. We also find that earnings preannouncements are prone to induce a more profitable ORJ strategy. The

Fama-French three factors have little explanatory power related to the ORJ strategy, and fundamental factors seem to have no significant effect on the ORJ strategy. Of course, the defect of this strategy is that it does not consider capital constraints. The optimal threshold for ORJ is not studied in this paper.

References:

Alexander, J. and D. Goff, et al. (1989). "Profitability of a trading strategy based on Unexpected Earnings." Financial Analysts Journal **45**(4): 65--71.

Ali, A. and X. Chen, et al. (2020). "Can mutual funds profit from post earnings announcement drift? The role of competition." Journal of Banking & Finance **114**: 105774.

Auer, B. R. and H. Rottmann(2019). "Have capital market anomalies worldwide attenuated in the recent era of high liquidity and trading activity?" Journal of Economics and Business **103**: 61--79.

Ayers, B. C. and O. Z. Li, et al. (2011). "Investor trading and the post-earnings-announcement drift." The Accounting Review **86**(2): 385--416.

Balakrishnan, K. and E. Bartov, et al. (2010). "Post loss/profit announcement drift." Journal of Accounting and Economics **50**(1): 20--41.

Ben-Rephael, A. and Z. Da, et al. (2017). "It depends on where you search: Institutional investor attention and underreaction to news." The Review of Financial Studies **30**(9): 3009--3047.

Bernard, V. L. and J. K. Thomas(1989). "Post-earnings-announcement drift: delayed price response or risk premium?" Journal of Accounting Research **27**: 1--36.

Bernard, V. L. and J. K. Thomas(1990). "Evidence that stock prices do not fully reflect the implications of current earnings for future earnings." Journal of Accounting and Economics **13**(4): 305--340.

Bernard, V. and H. N. Seyhun(1997). "Does post-earnings-announcement drift in stock prices reflect a market inefficiency? A stochastic dominance approach." Review of Quantitative Finance and Accounting **9**(1): 17--34.

Brandt, M. W. and R. Kishore, et al. (2008). "Earnings announcements are full of surprises." SSRN eLibrary.

Brown, L. D. and J. C. Han(2000). "Do stock prices fully reflect the implications of current earnings for future earnings for AR1 firms?" Journal of Accounting Research: 149--164.

Chen, H. and S. Chen, et al. (2014). "Does revenue momentum drive or ride earnings or price momentum?" Journal of Banking & Finance **38**: 166--185.

Chen, X. and X. Diao, et al. (2022). "Heterogeneous investor attention and post earnings announcement drift: Evidence from China." Economic Modelling **110**: 105796.

Cho, Y. J. and Y. Kim, et al. (2020). "Information externalities and voluntary disclosure: Evidence from a major customer's earnings announcement." The Accounting Review **95**(6): 73--96.

Chordia, T. and A. Goyal, et al. (2009). "Liquidity and the post-earnings-announcement drift." Financial Analysts Journal **65**(4): 18--32.

Chordia, T. and A. Subrahmanyam, et al. (2014). "Have capital market anomalies attenuated in the recent era of high liquidity and trading activity?" Journal of Accounting and Economics **58**(1): 41--58.

Chordia, T. and A. Subrahmanyam, et al. (2014). "Have capital market anomalies attenuated in the recent era of high liquidity and trading activity?" Journal of Accounting and Economics **58**(1): 41--58.

Chudek, M. and C. Truong, et al. (2011). "Is trading on earnings surprises a profitable strategy? Canadian evidence." Journal of International Financial Markets, Institutions and Money **21**(5): 832--850.

Chung, D. Y. and K. Hrazdil(2011). "Market efficiency and the post-earnings announcement drift." Contemporary Accounting Research **28**(3): 926--956.

Chung, K. H. and O. Kim, et al. (2019). "An analytical measure of market underreaction to earnings news." International Review of Economics & Finance **64**: 612--624.

Clement, M. and J. Lee, et al. (2019). "A new perspective on post-earnings-announcement-drift: Using a relative drift measure." Journal of Business Finance \& Accounting **46**(9-10): 1123--1143.

Collins, D. W. and P. Hribar(2000). "Earnings-based and accrual-based market anomalies: one effect or two?" Journal of Accounting and Economics **29**(1): 101--123.

Cox, J.(2020). "Market fragmentation and post-earnings announcement drift." Journal of Economics and Finance **44**(3): 587--610.

Daniel, K. and D. Hirshleifer, et al. (2020). "Short-and long-horizon behavioral factors." The Review of Financial Studies **33**(4): 1673--1736.

Doyle, J. T. and R. J. Lundholm, et al. (2006). "The extreme future stock returns following I/B/E/S earnings surprises." Journal of Accounting Research **44**(5): 849--887.

Fernald, J. and J. H. Rogers(2002). "Puzzles in the Chinese stock market." Review of Economics and Statistics **84**(3): 416--432.

Fink, J.(2021). "A review of the post-earnings-announcement drift." Journal of Behavioral and Experimental Finance **29**: 100446.

Garfinkel, J. A. and J. Sokobin(2006). "Volume, opinion divergence, and returns: A study of post--earnings announcement drift." Journal of Accounting Research **44**(1): 85--112.

Garfinkel, J. A. and J. Sokobin(2006). "Volume, opinion divergence, and returns: A study of post--earnings announcement drift." Journal of Accounting Research **44**(1): 85--112.

Giannini, R. and P. Irvine, et al. (2019). "The convergence and divergence of investors' opinions around earnings news: Evidence from a social network." Journal of Financial Markets **42**: 94--120.

Griffin, J. M. and P. J. Kelly, et al. (2010). "Do market efficiency measures yield correct inferences? A comparison of developed and emerging markets." The Review of Financial Studies **23**(8): 3225--3277.

Hann, R. N. and H. Kim, et al. (2019). "Intra-industry information transfers: evidence from changes in implied volatility around earnings announcements." Review of Accounting Studies **24**: 927--971.

Hirshleifer, D. and S. S. Lim, et al. (2009). "Driven to distraction: Extraneous events and underreaction to earnings news." the Journal of Finance **64**(5): 2289--2325.

Hung, M. and X. Li, et al. (2015). "Post-earnings-announcement drift in global markets: Evidence from an information shock." The Review of Financial Studies **28**(4): 1242--1283.

Jansen, M. and L. Swinkels, et al. (2021). "Anomalies in the China A-share market." Pacific-Basin Finance Journal **68**: 101607.

Latane, H. A. and C. P. Jones(1979). "Standardized unexpected earnings--1971-77." The Journal of Finance **34**(3): 717--724.

Lee, S. S. and P. A. Mykland(2008). "Jumps in financial markets: A new nonparametric test and jump dynamics." The Review of Financial Studies **21**(6): 2535--2563.

Li, Y. and A. Nekrasov, et al. (2020). "Opportunity knocks but once: delayed disclosure of financial items in earnings announcements and neglect of earnings news." Review of Accounting Studies **25**(1): 159--200.

Liang, C. Y. and R. Zhang(2020). "Post-earnings announcement drift and parameter uncertainty: evidence from industry and market news." Review of Quantitative Finance and Accounting **55**(2): 695--738.

Liu, J. and R. F. Stambaugh, et al. (2019). "Size and value in China." Journal of Financial Economics **134**(1): 48--69.

Livnat, J. and R. R. Mendenhall(2006). "Comparing the post--earnings announcement drift for surprises calculated from analyst and time series forecasts." Journal of Accounting Research **44**(1): 177--205.

Loh, R. K.(2010). "Investor inattention and the underreaction to stock recommendations." Financial Management **39**(3): 1223--1252.

Martineau, C.(2021). "Rest in peace post-earnings announcement drift." Critical Finance Review, Forthcoming.

Meursault, V. and P. J. Liang, et al. (2021). "PEAD. txt: Post-Earnings-Announcement Drift Using Text." Journal of Financial and Quantitative Analysis: 1--28.

Pfarrer, M. D. and T. G. Pollock, et al. (2010). "A tale of two assets: The effects of firm reputation and celebrity on earnings surprises and investors' reactions." Academy of Management Journal **53**(5): 1131--1152.

Porras Prado, M. and P. A. Saffi, et al. (2016). "Ownership structure, limits to arbitrage, and stock returns: Evidence from equity lending markets." The Review of Financial Studies **29**(12): 3211--3244.

Sadka, R.(2006). "Momentum and post-earnings-announcement drift anomalies: The role of liquidity risk." Journal of Financial Economics **80**(2): 309--349.

Sadka, R.(2006). "Momentum and post-earnings-announcement drift anomalies: The role of liquidity risk." Journal of Financial Economics **80**(2): 309--349.

Shivakumar, L.(2006). "Accruals, cash flows and the post-earnings-announcement drift." Journal of Business Finance & Accounting **33**(1-2): 1--25.

Vozlyublennaia, N.(2014). "Investor attention, index performance, and return predictability." Journal of Banking & Finance **41**: 17--35.

Wang, X. W. and Z. Yan, et al. (2018). "Investor attention and stock market under-reaction to earnings announcements: Evidence from the options market." Journal of Futures Markets **38**(4): 478--492.

Yan, Z. and Y. Zhao(2011). "When two anomalies meet: The post--earnings announcement drift and the value--glamour anomaly." Financial Analysts Journal **67**(6): 46--60.

Zhou, H. and J. Q. Zhu(2012). "Jump on the post--earnings announcement drift (corrected)." Financial Analysts Journal **68**(3): 63--80.