Limited Investor Attention and Capital Market Reaction to Analyst Reports

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ABSTRACT

With the rapid development of the Chinese securities industry, the field of securities analysis and analyst reports have experienced significant growth. The abundant information derived from the surge in analyst reports raises the question of whether there is a post-announcement drift similar to the market reaction to earnings announcements, given the limited attention of investors, and whether the stock market's short-term and long-term response to analyst reports change as a result. In the paper, I select analyst ratings reports from the Chinese capital market during the period of 2016-2018 as the research sample. Then I conduct univariate analysis based on competitive information and market reactions to analyst reports, as well as multivariate regression analysis. The findings reveal that the more analyst reports released on the same day, indicating a higher level of competitive information, the less sensitive the stock market's immediate response to the analyst reports becomes. Moreover, post-report drift and delayed reactions are exacerbated. Furthermore, I conduct further research on the heterogeneous market reactions between own holdings and other stocks, and the results indicate that investors exhibit stronger sensitivity to analyst reports of the stocks they hold, leading to a reduction in post-report drift.

Keywords: *investor limited attention, analyst report, market reaction, cumulative abnormal return*

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1. INTRODUCTION

In the late 20th century, the efficient market hypothesis (EMH) based on the assumption of rational individuals dominated the field of finance. The semi-strong form of the EMH posited that markets quickly respond to publicly available information about companies, implying that no investor can achieve excess returns through fundamental analysis because public information is rapidly incorporated into market strategies. However, as scholars delved deeper into research, they discovered that many anomalies observed in financial practices could not be explained by traditional financial theories. The rise of behavioral finance led more researchers to question the assumption of rational investors and seek explanations for these anomalies, gradually gaining recognition in the academic community.

One classic anomaly that contradicts the efficient market hypothesis is the post-earnings announcement drift (PEAD), initially identified by Ball and Brown (1968). This phenomenon suggests that stocks with earnings exceeding (or falling short of) expectations exhibit continued upward (or downward) drift and generate excess returns following the announcement. This finding clearly contradicts the predictions of the efficient market hypothesis.

With the emergence of behavioral economics, an increasing number of scholars began to question the assumptions underlying the efficient market hypothesis and sought to explain the phenomena observed in the market. One crucial factor considered was the limited attention of investors. Attention is a scarce resource in processing market information, and investors' choices represent a vast and complex set. Only those successfully captured by investors' attention can be included in their portfolios, leading to attention-driven trading behavior. When investors lack attention to earnings announcements, they may fail to immediately focus on and analyze the financial reports

of listed companies, resulting in a lagged effect of stock prices in response to market information. Over time, as more investors begin to pay attention to a company's earnings report and carefully analyze it for trading purposes, this behavior will eventually be reflected in the stock price.

Securities analysts, with their professional analytical skills and informational advantages, analyze and interpret public data such as prospectuses, financial reports, and macroeconomic information. They also communicate with company management and conduct on-site visits, ultimately providing value assessments through profit forecasts and rating reports. Analysts' profit forecasts and rating reports are widely recognized to contain significant information content. With the rapid development of the Chinese securities industry, the number of securities analysts and the volume of research reports have been growing rapidly. According to a report on the Chinese securities research industry in 2017, a total of 153,793 research reports were written by 88 domestic securities research institutions from September 2016 to October 2017. When faced with such a vast amount of information (excluding other investment-related information such as annual reports and statistical data), the information overload resulting from the explosive growth of analyst reports, combined with the limitations of investor attention, raises questions about the realization of the value of research reports and how does the stock market's short-term and long-term reaction to analyst reports?

This paper, from the perspective of limited investor attention, selects securities analysts' rating reports in the Chinese capital market from 2016 to 2018 as the research sample and investigates the phenomenon of attention dispersion in the securities analyst industry resulting from competitive information. First, I calculate the dependent variables in subsequent analysis, cumulative abnormal returns in the short-term window after the release of analyst rating reports (CAR [0, 1]) and cumulative abnormal returns in the long-term window (CAR[2, 61]). Then, I conduct univariate

and multivariate regression analyses based on the competitive information and market reactions to analyst reports. The results indicate that the more analyst reports are released on the same day, reflecting a greater amount of competitive information, the weaker the immediate market reaction to analyst rating reports, leading to insufficient market response. Moreover, the degree of lagged reaction and post-report drift becomes more severe. This suggests that the presence of competitive information indeed disperses investors' attention to analyst research reports. I further investigate the heterogeneous market reactions between own holdings and other stocks to examine whether investors prioritize their own holdings. The results show that investors exhibit stronger sensitivity to analyst reports of the stocks they hold, resulting in a more comprehensive and immediate market reaction. Furthermore, this immediate market reaction to held stocks weakens the subsequent drift and long-term market response.

This study contributes in several ways: Firstly, it applies the limited attention theory from behavioral finance to investigate the influence of limited investor attention and competitive information on market reactions to changes in analyst rating reports in the Chinese stock market, expanding our research perspective. Secondly, it validates the existence of attention dispersion phenomenon from the perspective of securities analysts, who are important information providers in the capital market. This provides complementary evidence to existing studies based on company earnings announcements. Thirdly, the findings of this research have practical implications for investors and securities analysts. Analysts should consider the potential negative impact of attention dispersion when issuing rating reports, providing guidance and inspiration for decisions regarding the disclosure of analyst reports and the formulation of industry regulations.

The following is the proposed structure of the subsequent sections: Part 2 provides an overview of relevant literature. Part 3 elucidates the research questions and expectations. Part 4 describes the

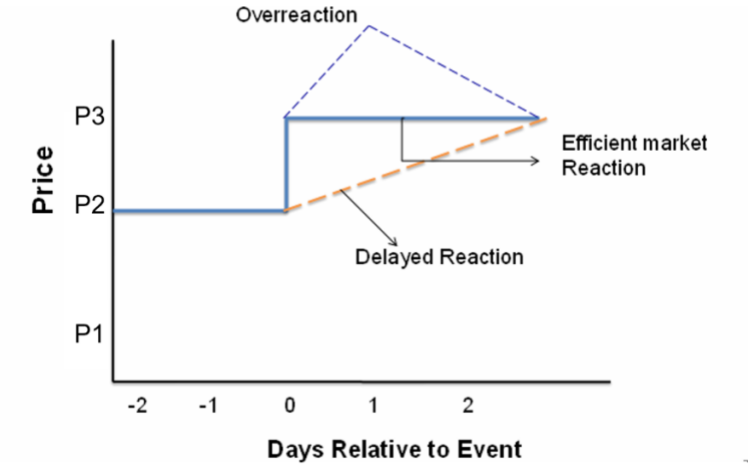
sample selection process, the calculation of cumulative abnormal returns using the event study method, and the descriptive statistics of variables. Part 5 presents the empirical analysis, including univariate analysis and multivariate regression analysis. Finally, Part 6 concludes the study.

2. LITERATURE REVIEW

2.1 Post-earnings announcement drift and limited attention

Post-earnings announcement drift (PEAD) was first introduced by Ball and Brown (1968) as a phenomenon in which stocks with earnings that exceed (under) expectations continue to drift upward (downward) after the announcement date, gaining excess returns. According to the efficient market hypothesis, when new information similar to an earnings announcement appears in the market, the market price should react quickly to that information. However, such price reaction in real life is not done in an instant, but it takes quite a long time to adjust in place, i.e., a longer drift occurs. Figure 1 explains the PEAD anomaly quite visually. When the earnings announcement is positive, the stock price will continue to rise for a period of time after the announcement date. Since the first discovery of this anomaly, scholars have carefully investigated its existence and the mechanism of its occurrence.

Figure 1. Post-earnings announcement drift



Source: The author (2023)

Foster (1977), Patell and Wolfson (1984) conducted separate studies using weekly data, daily data, and intraday high-frequency data, respectively, confirming the existence of the PEAD phenomenon.

Their findings strengthened the reliability of Ball and Brown's research. Even Fama (1998), one of the creators of the Efficient Market Hypothesis, acknowledged the presence of abnormal returns through the PEAD phenomenon.

With a large number of studies confirming the existence of PEAD, scholars have begun to focus on resolving the underlying mechanisms that lead to the phenomenon. The explanations for PEAD can be divided into two main schools of thought:

1) Scholars who support the first theory argue that investors are rational and that the phenomenon of PEAD is mainly caused by external factors. For example, Foster et al. (1984) argued that the observed stock price fluctuations may be the result of biases in earnings forecasting models and therefore do not override the validity of capital markets. Alternatively, some scholars have suggested that the appearance of drift may be due to risk compensation. Fama (1998) noted that many of the PEAD anomalies disappeared after additional risk factors were taken into account. In addition, other scholars have argued that this phenomenon stems from transaction costs. For instance, Bhushan (1994) found that the extent of PEAD is closely related to the direct and indirect costs of trading; Bernard and Thomas (1990) discovered that the payoffs of trading strategies based on post-announcement drift are significantly lower when transaction costs are considered.

2) With the rise of behavioral economics, more and more scholars are questioning the assumptions set by the efficient market hypothesis and trying to explain PEAD phenomena from the perspective of investor behavior. One of the important aspects to consider is the limited attention of investors. Attention is a scarce resource in the processing of market information, which has been suggested earlier by Kahneman (1973). People need to process information in numerous input dimensions when making behavioral decisions. However, the individual's thinking capacity is limited and therefore attention must be allocated and information processed selectively. DellaVigna and Pollet

(2009) found that PEAD is greater for firms that make earnings announcements on Fridays when investors pay less attention to the announcement information. Hirshleifer et al. (2009) found that the earnings drift effect is stronger for each firm when multiple firms make earnings announcements at the same time. Kottimukkalur (2019) showed that the degree of drift is significantly stronger when the market moves more, as investors shift their attention to the interpretation of market information, which is consistent with the results obtained from the theory of categorical thinking. At the level of imperfectly rational decision preferences, Grinblatt and Han (2005) and Frazzini (2006) argued that the disposition effect, i.e., the tendency to sell profitable stocks immediately and not to sell losing stocks, can explain this anomaly.

2.2 Market reaction to analyst reports

As an important information intermediary in the securities market, securities analysts, with their professional analysis and information advantages, analyze and interpret public data such as prospectuses, financial reports and macro information of listed companies, supplemented by communication with company management and on-site visits, and finally publish value analysis reports on companies in the form of earnings forecasts and rating reports. Whether analysts' value analysis activities improve the information environment of the capital market and its investment value, thus enhancing the efficiency of the capital market, has long been a continuing concern of regulators, practitioners, and academics (Barron et al., 2002; Chen et al., 2010; Francis and Philbrick 1993). Empirical studies with large samples have generally found significant information content in earnings forecasts and rating reports issued by securities analysts (Francis and Soffer 1997; Ivković and Jegadeesh 2004; Jegadeesh et al. 2004). With the development of the Chinese capital market and the securities analyst industry, studies based on earnings forecasts and rating reports of Chinese securities analysts have also found significant information content in Chinese

securities analyst research reports (Sheng and Hongjun 2011; Yue et al. 2011). At the same time, researchers have found that there is an ex-post drift in investor reaction to equity analyst reports similar to the market reaction to earnings announcements, suggesting that the market underreacts to securities analyst research reports (Bernard and Thomas 1989, 1990; Womack 1996).

The reasons for the lack of market response to securities analyst reports can be divided into two aspects: 1) First is the quality of securities analyst reports. The reputation of the analyst's firm and the analyst himself affects the value of the research report, and large firms and star analysts are more likely to provide more informative investment ratings under equal conditions because they have larger teams of analysts, better research conditions, and better access to company management for more personal information, while large firms and star analysts are more likely to be able to withstand the negative effects of financial conflicts of interest (Stickel, 1992). Zhihong and Xuanyu (2013) further found that the ultra-high value of Chinese star analysts mainly comes from their analysis and mining of company-specific information and that analysts' field access and mining of private information about listed companies can also significantly enhance the value of analysts' research reports (Cheng et al. 2016).

2) The second is the number of securities analyst reports. As noted above, investors' attention is a finite and scarce resource, and competing information can cause a diversion in their attention allocation, and when investors are multitasking at the same time, concentrated disclosure can distract them from the information and cause them to allocate some of their attention to irrelevant information, resulting in an inadequate response to the information in question. When faced with rating reports issued by analysts, investors will not only pay attention to the analyst rating reports of the companies whose stocks they hold but also to the analyst rating reports of other companies in the market. On the one hand, since stocks in the market, especially those in the same industry,

are somewhat comparable, investors can use them as a reference to evaluate the rating adjustment of their own holdings. On the other hand, for investors, portfolios are not static, and all stocks in the market are potential investment targets, so they will naturally pay attention to the market performance and analysts' rating reports of other stocks while investing in their own stocks to make portfolio adjustments.

3. RESEARCH QUESTIONS AND EXPECTATIONS

Analyst rating reports have an impact on market trading behavior, primarily in the decisions of shareholders and potential investors. Shareholders decide whether to hold or sell stocks based on rating reports, while potential investors consider rating reports to decide whether to buy. When rating reports of other companies are released on the same day, these reports can have a competitive effect. The rating reports of other companies may influence shareholders' understanding of a particular company's rating report and reduce the likelihood of a sell-off. At the same time, the rating reports of other companies may also influence potential investors' evaluation of a particular company's rating report, reducing the likelihood that they will make a purchase decision. Thus, competitive effects can reduce the market's short-term response to rating reports and may lead to ex-post reversals.

In the Chinese capital market, retail investors dominate. Compared to professional institutional investors, retail investors have limited ability to analyze and interpret information. Therefore, I expect that the concentrated disclosure of rating reports will affect the immediacy and adequacy of the Chinese capital market and lead to an insufficient market response from investors. There is information competition among rating reports released on the same day, and rating reports from other companies may distract investors from specific companies, thereby reducing short-term market reactions and generating ex-post reversals.

However, if investors can allocate their attention appropriately, or if competitive information transfer and spillover effects allow other rating reports to validate each other and thus enhance cognitive efficiency, then the presence of competing rating reports not only does not impair investors' responses to rating reports but may enhance the adequacy of responses. It is found that

the greater the number of analysts following a particular industry, the stronger the spillover effect generated by competition and the higher the overall accuracy of analysts' surplus forecast reports for that industry.

Therefore, if distraction exists in the Chinese securities analyst market, then the more analyst rating reports published on the same day, the weaker the immediate market reaction to that rating report, while possibly being more prone to post-hoc reversals. Conversely, if there is no distraction in the Chinese equity analyst industry, we would not observe a significant impact of the number of rating reports released on the same day on investor reaction.

4. DATA

4.1 Data source and pre-processing

The data in this paper are obtained from the CSMAR database, which mainly uses securities analyst reports, company financial statements, and stock exchange market data. I select all A-share market stock analyst rating reports (daily) for the period 2016-2018 as the base sample, and then follow the following process to filter the sample:

1) Eliminate ST stocks

ST (special treatment) stocks are stocks listed in China that have been listed on the exchange with a delisting risk warning due to two consecutive years of losses. These stocks often face financial distress, operational instability, and debt risk. Excluding ST stocks from the study helps to exclude the effects of special circumstances such as operational instability and financial risks, and improves the accuracy and reliability of the study.

2) Exclude stocks belonging to financial companies

Financial companies in China have different financial reporting systems and norms than general enterprises due to the special nature of their industry. First, financial companies do not follow the General Principles of Corporate Finance but have special Financial Rules for Financial Enterprises for guidance. Second, financial companies have unique statement formats and the meanings of statement items may differ from those of general companies. For example, fair value change gains and losses and investment income are usually classified as non-recurring gains and losses in general companies, but for financial companies, these items are part of their normal operating income because financial companies generally earn income from their own operations. Therefore, to ensure consistency and interpretability of the results, I choose to exclude financial companies from the study.

3) Remove analyst reports disclosed on weekend (non-trading days)

In order to observe the immediate market reaction to analyst rating reports, I choose to exclude rating reports that are disclosed on weekends (non-trading days). This is because reports disclosed on weekends give investors more time to interpret the content of the reports in detail, thus allowing the market to react more fully. Eliminating rating reports disclosed on weekends allows for more accurate capture of market reactions to rating reports in the short term (two days), thereby improving the reliability and interpretation of the research.

4) Drop other samples with missing financial and market transaction data

After completing the above filtering, I get a total of 32,332 rating change observations (analyst rating reports) from 76 brokerage firms for 1735 listed companies.

4.2 Independent Variable: Cumulative Abnormal Return

CAR is the cumulative abnormal return of a stock over the period of an event. It is used to measure the degree of impact of a specific event on the stock price, where the abnormal return is the difference between the actual and expected return of the stock. The event studied in this paper is the release of a security analyst rating report. The steps to calculate CAR through the event study method are shown below:

1) Determine the date (event date) T0 and the event window period [T1, T2] for the release of the security analyst rating report;

2) 252 days to 21 days before the release date of the stock analyst rating report T0 is the estimation period, and then using daily stock returns and market return data during the estimation period, α_i and β_i of the stock are estimated from the following regression:

$$R_{i,\,t} = \alpha_i + \beta_i R_{m,\,t} + \varepsilon_{i,\,t} \qquad (1)$$

3) The expected return is calculated using the above regression coefficients α_i and β_i of the stock with the market return during the event window through equation (1);

4) The actual return minus the expected return during the event window is used to obtain the abnormal return (AR) for that trading day;

5) Accumulate the abnormal returns of trading days within the event window to obtain CAR[T1-T0, T2-T0].

In this paper, I focus on windows [0, 1] and [2, 61] in trading days relative to the analyst report release date, CAR[0, 1] (%) and CAR[2, 61] (%), where CAR[0, 1] corresponds to the short-term window of analyst rating report release, while CAR[2, 61] corresponds to the long-term window after analyst rating report release. For the long-term window, I choose 60 trading dates because Bernard and Thomas (1989) reported that most of the drift occurs in the first 60 trading days (about 3 calendar months) after the announcement.

4.3 Dependent variables

The main independent variables in this paper are Rank Change and Number, where Rank Change represents the ranking adjustment in rating reports, with a value of 1 indicating an upgrade, -1 indicating a downgrade, and 0 indicating an unchanged rating, and Rank Change is an important indicator for investors to make decisions based on analyst rating reports. And Number represents the decile of the number of all analyst rating reports issued on a given day, with a value range of 1-10. A higher number value means more analyst ratings reports were issued that day.

By examining the relationship between the two independent variables, Rank Change and Number, and CAR, we can gain insight into whether the competing information created by analyst rating reports and the limited attention of investors has an impact on market reactions.

4.4 Control variables

In order to obtain a more accurate causal interpretation, I introduce some control variables in the subsequent regression analysis. Among them, Size is the natural logarithm of the assets of the

reporting firm at the end of the previous year. reputation measures the reputation of the reporting security institution and takes the value of 1 if the security firm is ranked in the top 10 in terms of business revenue according to the 2017 ranking of the China Securities Association. Star measures the reputation of the analyst who issued the rating report, and based on analyst ranking data, I classify analysts into four levels, taking a value of 0-3, with higher values indicating higher analyst reputation. Disclosure is given a value of 1 if the difference between a company's rating change report and its earnings announcement or release date is within five days. In order to facilitate understanding, I adjust the original recommendation scores of the rating report in reverse order, with higher scores indicating stronger buy recommendations, where 1-5 indicate five levels of sell, less hold, neutral, more hold and buy, respectively. Strong measures the strength and direction of the rating. If the rating report of the current year is 1, StrongSell takes the value of 1. If the rating report of the current year is 5, StrongBuy takes the value of 1. Skip measures whether there is a skip in the current rating. If the difference between the rating scores of the previous and next period is more than 1, then Skip takes the value of 1.

At the same time, I note that analyst report releases are grouped by week and show a clear seasonal pattern. Specifically, I observe a higher number of reports on Tuesdays, Wednesdays and Thursdays, and a lower number of reports on Mondays and Fridays. In addition, when grouped by month, April, August, and October had the highest number of reports. This pattern reflects the fact that most analysts prepare their rating reports on a company's stock after the release of the company's quarterly or annual report, which is then published approximately one month later. To eliminate these effects associated with the weekly, monthly, and annual calendars, I introduce fixed effects for these time dimensions in subsequent regression analyses to ensure that we can more accurately assess the impact of analyst rating reports on market reactions.

4.5 Descriptive statistics

Table 2 reports descriptive statistics for the above variables, including sample size, mean, standard deviation, maximum value, minimum value, and median. The mean value of CAR [0, 1] is 0.255 with a standard deviation of 3.214, and the mean value of CAR [2, 61] is -1.277 with a standard deviation of 16.866.

Table 3 shows the Pearson correlation coefficient matrix for the dependent and independent variables. CAR [0, 1] is significantly and positively correlated with CAR [2, 61], indicating that there is some persistence in the market response. Number is significantly negatively correlated with CAR [0, 1] and significantly positively correlated with CAR [2, 61], indicating that when the number of analyst reports is larger, it takes longer for the reported information to be reflected by CAR.

Table 1. Descriptive statistics

Variable	N	Mean	SD	Min	Max	p50
CAR[0, 1]	32322	0.255	3.214	-20.690	22.039	-0.009
CAR[2, 61]	32322	-1.277	16.866	-87.137	101.120	-1.048
Rank Change	32322	0.006	0.202	-1.000	1.000	0.000
Number	32322	5.770	2.897	1.000	10.000	6.000
Size	32322	23.075	1.485	18.468	28.509	22.799
Reputation	32322	0.217	0.412	0.000	1.000	0.000
Star	32322	0.389	0.833	0.000	3.000	0.000
Disclosure	32322	0.421	0.494	0.000	1.000	0.000
StrongSell	32322	0.001	0.029	0.000	1.000	0.000
StrongBuy	32322	0.548	0.498	0.000	1.000	1.000
Skip	32322	0.015	0.122	0.000	1.000	0.000

Source: CSMAR Database (2016-2018)

Table 2. Pearson correlation coefficient matrix

Variable	CAR[0, 1]	CAR[2, 61]	Rank Change	Number
CAR[0, 1]	1.000			
CAR[2, 61]	0.043*	1.000		
Rank Change	0.043*	0.008	1.000	
Number	-0.049*	0.022*	-0.078*	1.000

Note: *p<0.01

5. EMPIRICAL ANALYSIS

5.1 Univariate fundamental analysis

To investigate the effect of competitive information on the market response to security analyst reports, I first conduct a univariate foundational analysis. I group each analyst report by decile (Number) and calculate the mean of CAR[0,1] and CAR[2,61] at Rank Change of -1 and 1, respectively. In addition, I fix Rank Change and calculate the difference between CAR[0,1] or CAR[2,61] for the two extreme analyst report number groupings, respectively, and the difference between CAR[0,1] or CAR[2,61] at Rank Change of -1 and 1 when Number is fixed.

For CAR[0, 1], when fixing the number of analyst reports (Number), the spread of CAR[0, 1] introduced by Rank Change measures the market's reaction to analyst reports in the short term and immediately after their release. A larger variance indicates that the market is more sensitive and responsive to the report. For CAR [2, 61], again with a fixed number of analyst reports (Number), the difference in CAR [2, 61] from Rank Change measures a long-term and lagged market response to the release of analyst reports, which usually manifests as a persistent post-report effect or drift. If the market is efficient, stock prices should react quickly to the reported information, so there should be no significant difference in post-report abnormal returns in good news and bad news analyst reports. Thus, when the number of analyst reports is higher, a smaller spread in CAR [0, 1] implies a weaker market reaction, while a larger spread in CAR [2, 61] indicates a stronger lagged market reaction and drift effect. These metrics help us understand the market reaction to analyst reports in different time dimensions and reveal the different ways in which the market processes information.

In Table 3, for the lowest decile of analyst report quantity (Number = 1, low-reports days), the difference in CAR[0, 1] between Rank Changes of -1 and 1 is 1.18%. However, for the highest

decile (Number = 10, high-reports days), the difference in CAR[0, 1] is 0.51%. This indicates that the market's immediate response to analyst reports is stronger on days with fewer reports compared to days with more reports. Additionally, for the low-reports days, the difference in CAR[2, 61] between Rank Changes of -1 and 1 is -1.44%, whereas on high-reports days, this difference becomes 3.629, suggesting that the long-term stock market price response to analyst reports becomes more sensitive and exhibits greater drift when there are more reports published on the same day. However, the spread in CAR between Rank Changes does not exhibit a clear upward or downward trend for both CAR[0, 1] and CAR[2, 61], indicating the presence of non-monotonicity due to other influencing factors. Therefore, in subsequent regression analysis, I include some control variables to account for the characteristics of analyst reports and company-specific factors. The final row in Table 3 represents the difference in CAR between Number deciles 10 and 1, accounting for various Rank Change scenarios. It measures the variation in CAR between companies with a high number of analyst reports and those with a low number, while holding Rank Change constant. For CAR[0, 1], regardless of whether Rank Change is -1 or 1, the spread in CAR between Number deciles 10 and 1 is consistently negative. However, for CAR60, when Rank Change is 1, the spread in CAR between Number deciles 10 and 1 amounts to 1.472. This finding suggests that when there is a greater quantity of analyst reports, it takes a longer time for the information contained in these reports to be fully incorporated and reflected in the CAR.

Table 3. CAR of Rank Change by Number Deciles

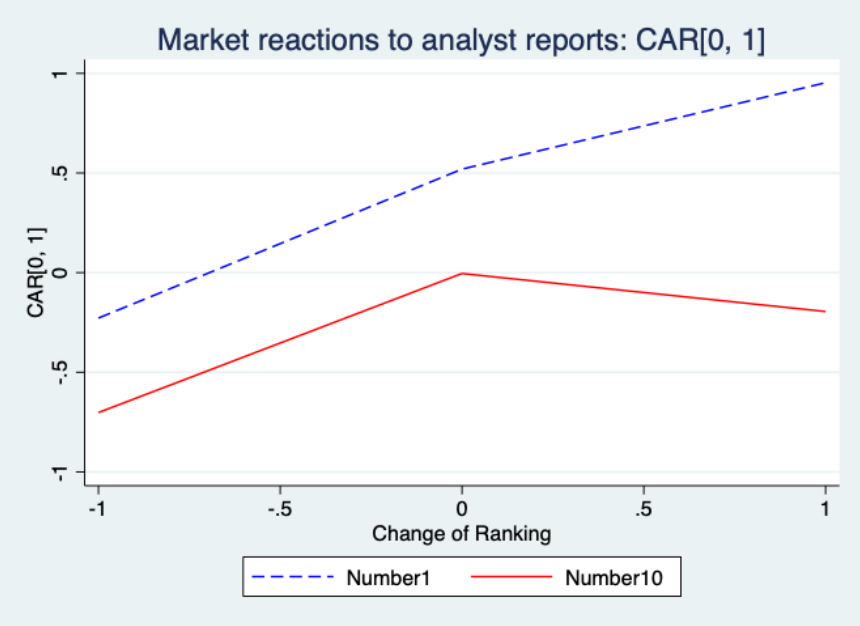
Number	Average CAR[0, 1] (%)			Average CAR[2, 61] (%)		
	Rank Change = -1	Rank Change = 1	Difference	Rank Change = -1	Rank Change = 1	Difference
1	-0.228	0.953	1.181	2.159	0.717	-1.442
2	-1.613	0.914	2.527	-2.804	1.346	4.150
3	-0.567	0.736	1.303	2.985	-1.028	-4.013
4	-1.200	0.329	1.530	2.661	1.756	-0.905
5	-0.227	0.725	0.953	-0.137	-0.925	-0.787
6	-1.551	0.989	2.540	-4.491	0.684	5.175
7	-0.453	1.921	2.374	0.548	6.858	6.310
8	-0.449	0.664	1.113	1.523	1.511	-0.011
9	0.099	0.420	0.321	2.035	0.138	-1.897
10	-0.702	-0.195	0.507	-1.441	2.188	3.629
Difference (10-1)	-0.474	-1.148	-0.674	-3.600	1.472	5.072

Source: Author's calculations

Figures 2 and 3 below provide additional graphical evidence, plotting CAR[0, 1] and CAR[2, 61] against Rank Change separately for high-report days (Number = 10) and low-report days (Number = 1). When analyst reports are released on high-report days, the market's immediate response to the reports is less sensitive. However, subsequent market reactions and post-report drift become more pronounced, indicating increased sensitivity to the analyst reports. This conclusion is supported by the observation of a flatter slope for CAR[0, 1] on high-report days and a steeper slope for CAR[2, 61] on high-report days.

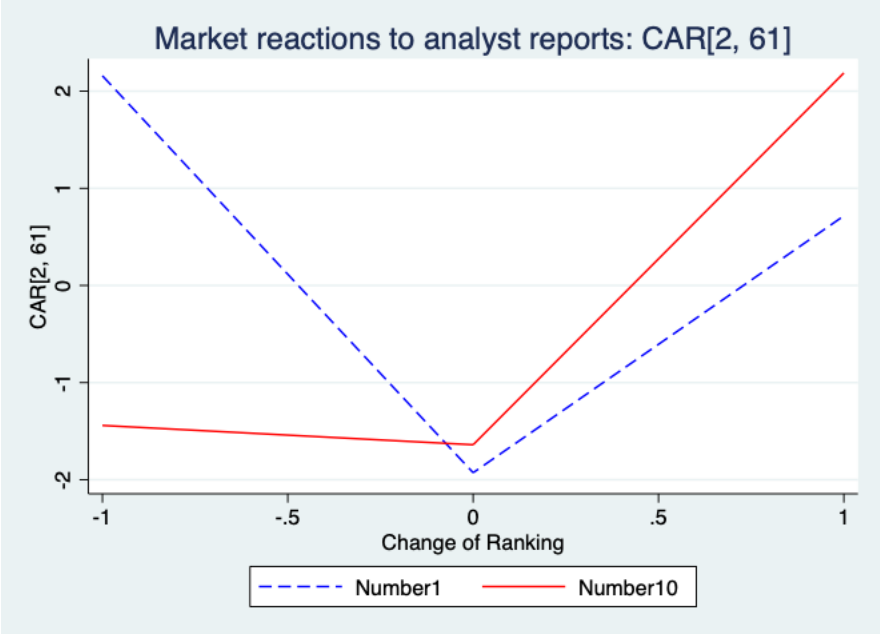
Therefore, the preliminary analysis suggests that when there is an excessive number of analyst reports being published, the concentration of disclosed information can lead to a dispersion of investors' attention. Consequently, investors require more time to process the information from the analyst reports, resulting in a reduced initial reaction to the reports and a stronger post-report drift.

Figure 2. Market reactions to analyst reports: CAR [0, 1]



Source: The author's estimates (2023)

Figure 3. Market reactions to analyst reports: CAR [2, 61]



Source: The author's estimates (2023)

5.2 Multivariate regression analysis

In the following analysis, I aim to supplement the initial univariate analysis by conducting a multivariate regression. The first part of the study investigates whether the competitiveness of analyst reports and limited attention have an impact on the market reaction to analyst reports. The second part focuses on the assumption that, in the case where investors have invested in a particular stock, the market reaction to analyst reports is heterogeneous and influenced by both the reports on the target stock and reports on other stocks (indicating whether investors prioritize their own holdings).

A. Competitive information and market reaction to analyst reports

To account for confounding factors and provide more accurate causal explanations, I conduct regressions of 2-day cumulative abnormal returns (CAR[0, 1]) following the release of analyst reports and the 60-day post-report cumulative abnormal returns (CAR[2, 61]) on the ranking adjustment in rating reports (Rank Change), the deciles of the number of all analyst rating reports issued on a given day (Number), and control variables (Size, Reputation, Star, Disclosure, StrongBuy, StrongSell, and Skip mentioned in the Data part). Additionally, I incorporate fixed effects for year, month, and week to account for the potential effects of calendar patterns and annual trends. I also cluster the standard errors at the company level to address potential heteroscedasticity issues:

$$CAR[0,1]_i = a_0 + a_1 Rank_i + a_2 Number_i + a_3 (Rank_i * Number_i) + \sum_{i=1}^{n} c_i X_i + \varepsilon \quad (2)$$

$$CAR[2,61]_i = a_0 + a_1 Rank_i + a_2 Number_i + a_3 (Rank_i * Number_i) + \sum_{i=1}^{n} c_i X_i + \varepsilon \quad (3)$$

Where i corresponds to each analyst rating report, and X_i are those control variables. a_3 is the coefficient we need to pay most attention to, which tests whether there is an significant difference of CAR spreads when variable Rank Change changes on high-reports days versus low-reports days.

Investor attention constraints and distractions suggest that investors need additional time to assimilate the information contained in analyst reports. As a consequence, this leads to a dampened initial market response to the reports and a more pronounced post-report drift phenomenon. Therefore, I expect $a_3 < 0$ when using CAR[0, 1] as the dependent variable and $a_3 > 0$ when treating CAR[2, 61] as the dependent variable.

Table 4. Competitive information and market reaction to analyst reports

VARIABLES	(1) CAR[0, 1]	(2) CAR[0, 1]	(3) CAR[2, 61]	(4) CAR[2, 61]
Rank Change	0.5147***	0.6007***	0.8420*	2.0404**
	(0.0985)	(0.2016)	(0.4931)	(1.0011)
Number		-0.0167		-0.2121
		(0.0311)		(0.1614)
Rank Change * Number		-0.0270**		0.1427**
		(0.0107)		(0.0612)
Size	-0.0384***	-0.0377***	-0.0436	-0.0454
	(0.0128)	(0.0127)	(0.1260)	(0.1259)
Reputation	-0.0509	-0.0545	0.7663***	0.7887***
	(0.0393)	(0.0392)	(0.2543)	(0.2532)
Star	0.0758***	0.0761***	0.1364	0.1339
	(0.0217)	(0.0217)	(0.1266)	(0.1265)
Disclosure	-0.0804	-0.0103	0.9240***	0.5478*
	(0.0553)	(0.0604)	(0.2517)	(0.2916)
StrongSell	0.4660	0.4560	1.7386	1.7831
	(0.3825)	(0.3838)	(2.6273)	(2.6223)
StrongBuy	0.1978***	0.1950***	-1.3611***	-1.3415***
	(0.0371)	(0.0370)	(0.2178)	(0.2186)
Skip	-0.2144	-0.2144	3.1434***	3.1217***
	(0.1403)	(0.1403)	(0.9312)	(0.9315)
Constant	1.0476***	1.1601***	-0.1376	-0.7852
	(0.2974)	(0.2984)	(2.9188)	(2.9241)
Observations	32,322	32,322	32,322	32,322
R-squared	0.0112	0.0115	0.0779	0.0782
Time fixed effects	Yes	Yes	Yes	Yes
Clustered by companies	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The regression results are displayed in Table 4. Firstly, we observe that the regression coefficients of Rank Change in columns (1) and (3) are both statistically significant and positive. This finding suggests that Chinese investors appropriately respond to rating adjustments. Moreover, we find that the coefficient of Rank Change in CAR[2,61] is significantly larger than that in CAR[0,1], suggesting that as the window period increases, investors are able to absorb the information from analyst reports more comprehensively, and the value realization of analyst reports is also improved. Subsequently, I investigate whether the market response to analyst reports is adversely affected when there is competitive information, implying a phenomenon of attention diversion. The result from Table 4 (2) reveals a significant negative coefficient (-0.03) for the interaction term (Rank Change * Number) in the short-term window [0, 1]. This finding suggests that the simultaneous release of analyst reports on the same day diverts investors' attention, leading to a reduction in their market reaction to analyst ratings. Additionally, in the column (4), the interaction term (Rank Change * Number) exhibits a significantly positive coefficient (0.142) in the long-term window [2, 61], indicating that a higher concentration of analyst reports enhances the delayed response of investors to analyst ratings and reinforces post-report drift.

So, these results align with our previous discussion that competitive information can have contrasting effects on the immediacy of market reactions to analyst reports and the delayed market reactions. Due to the limited attention span of investors, the sensitivity of market reactions immediately after the release of analyst reports can be influenced by competitive information. On the other hand, the sensitivity of market reactions after a certain lag period can be influenced in the opposite direction.

While this regression analysis does not rule out potential biases from omitted variables and the small R-squared due to the difficulty in predicting abnormal returns, it is reassuring to note that the

contrasting effects between immediate market reaction and lagged market reaction appear to be relatively common. When examining the effects of control variables, it can be observed that out of the seven control variables, four also exhibit similar opposing effects. Therefore, when a variable has an impact on immediate market reaction, we would expect it to have a corresponding opposing effect on post-event drift.

B. Heterogeneous market reactions between own holding and others

In the previous analysis, all analyst reports were treated as homogeneous observations without considering potential investor preferences. However, in reality, investors may have preferences for certain analyst reports, such as those related to their own holdings or reports from analysts affiliated with larger firms. Therefore, in this part, I aim to investigate whether investors prioritize their own holdings, which may lead to heterogeneous market reactions to analyst reports based on whether the reports are about their own holdings or other stocks. To capture this aspect, slight modifications are made to the regression equations (3) and (4):

$$CAR[0,1]_i = a_0 + a_1 Rank_i + a_2 Holding\ Number_i + a_3 Other\ Number_i + a_4(Rank_i * Holding\ Number_i) + a_5(Rank_i * Other\ Number_i) + \sum_{i=1}^{n} c_i X_i + \varepsilon \quad (4)$$

$$CAR[2,61]_i = a_0 + a_1 Rank_i + a_2 Holding\ Number_i + a_3 Other\ Number_i + a_4(Rank_i * Holding\ Number_i) + a_5(Rank_i * Other\ Number_i) + \sum_{i=1}^{n} c_i X_i + \varepsilon \quad (5)$$

Where Holding Number represents the quantity of analyst reports for stocks held by an individual, while Other Number represents the quantity of analyst reports for other stocks. Unlike the variable Number, there are two distinct characteristics: 1) both Holding Number and Other Number are continuous variables, providing a range of values; 2) to facilitate a more meaningful comparison, I standardize both variables given their substantial difference in numerical magnitudes.

In the context of limited attention, investors tend to allocate their attention primarily to the analyst rating reports of the stocks they hold, influencing their buy or sell decisions. Consequently, relative to the analyst rating reports of other stocks, investors dedicate more time and attention to processing the information contained in the analyst rating reports of their own holdings. This implies that in the presence of limited attention, competitive information has a heightened influence on the prompt market response to analyst rating reports of the held stocks, resulting in increased sensitivity. Consequently, the subsequent post-report drift is anticipated to exhibit a diminished effect. Therefore, I expect $a_5 < a_4$ when using CAR[0, 1] as the dependent variable and $a_5 > a_4$ when treating CAR[2, 61] as the dependent variable.

Table 5. Heterogeneous market reactions between own holding and others

VARIABLES	(1) CAR[0, 1]	(2) CAR[2, 61]
Rank Change	0.9153***	0.4087
	(0.1664)	(0.7088)
Holding Number	1.1177***	-0.9635
	(0.3439)	(1.5818)
Other Number	-0.1979*	-0.6055
	(0.1011)	(0.4882)
Rank Change * Holding Number	0.1038***	-0.5602***
	(0.0249)	(0.1072)
Rank Change * Other Number	0.0178	0.4315***
	(0.0299)	(0.1623)
Size	-0.0440***	-0.0187
	(0.0127)	(0.1262)
Reputation	-0.0263	0.6523**
	(0.0397)	(0.2547)
Star	0.0874***	0.0712
	(0.0220)	(0.1264)
Disclosure	-0.1526**	0.8559***
	(0.0596)	(0.2927)
StrongSell	0.4783	1.6044
	(0.3759)	(2.6149)
StrongBuy	0.1799***	-1.2523***
	(0.0365)	(0.2183)
Skip	-0.1887	2.9651***
	(0.1406)	(0.9287)

Constant	1.2090***	-0.7024
	(0.2962)	(2.9347)
Observations	32,322	32,322
R-squared	0.0126	0.0793
Time fixed effects	Yes	Yes
Clustered by companies	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The regression results are presented in Table 5. First, regarding CAR[0,1] (column 1), the coefficient of Rank Change*Holding Number is significantly positive at 0.104, which is significantly larger than the non-significant coefficient of 0.018 for Rank Change*Other Number. This indicates that investors pay more attention to the analyst reports of the stocks they hold after their release. Consequently, the market reaction is more sensitive and immediate compared to the release of analyst reports for other stocks. In other words, the market reacts more promptly to the analyst reports of held stocks, leading to a more comprehensive short-term market response.

Moving on to CAR[2, 61] (column 2), the coefficient of Rank Change*Holding Number is significantly negative at -0.560, which is smaller in magnitude compared to the significant positive coefficient of 0.4315 for Rank Change*Other Number. This finding confirms that after the prompt market response to the analyst reports of held stocks, the subsequent drift and long-term lagged market reaction weaken.

In summary, these findings highlight that investors exhibit stronger sensitivity to analyst reports of the stocks they hold, resulting in a more comprehensive and immediate market reaction. Furthermore, this immediate market reaction to held stocks weakens the subsequent drift and long-term market response.

CONCLUSION

The focus of this research is to investigate the impact of analyst reports on both immediate and delayed market reactions, with particular emphasis on the role of competitive information under investors' limited attention. The study reveals that when multiple analyst reports are released simultaneously, the market response to rating changes is influenced. Additionally, due to the time lag in market reactions, different phenomena occur in the short-term and long-term, characterized by fewer immediate reactions and more subsequent drift. Furthermore, further investigation suggests that investors, constrained by limited attention, pay greater attention to analyst reports for the stocks they hold. This affects their decisions to buy or sell the stocks, leading to more pronounced immediate market reactions for the held stocks, while the post-report drift and long-term market reactions weaken.

The research also presents several potential avenues for future studies, such as examining whether investors pay more attention to analyst reports for stocks in their related industries, or investigating whether retail investors, who may possess stronger individual skills and more resources compared to institutional investors, are more likely to exhibit limited attention characteristics. Thus, not only does the concentration of corporate financial reports create information competition, but the securities analyst industry also experiences attention diffusion due to competitive information. This research has practical implications for investors, securities analysts, and other market participants, offering insights and directions for understanding the issue of concentrated disclosure in the analyst industry.

However, this study has certain limitations: 1) While the regression analysis discusses the potential contrasting effects of other control variables on immediate and delayed market reactions, the

inclusion of fixed effects in the multivariate linear regression cannot eliminate potential biases caused by other omitted variables, thus the results do not establish causality; 2) The lack of robustness tests diminishes the reliability of the findings. For example, conducting a comparison with studies based on market trading volume could enhance the credibility of the results.

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