EFFECT OF RETAIL INVESTOR ATTENTION ON CHINA'S A-SHARE MARKET UNDER A STRENGTHENING FINANCIAL REGULATORY POLICY

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ABSTRACT

The influence of retail investor attention on the stock market has been examined widely in recent years. Prior studies confirm that retail investor attention has a significant effect on stock price or liquidity, and that the former can predict the latter. However, whether the stability of this correlation is affected by the change of external factors has not been studied in depth. Given that China's stock market has distinct policy-oriented characteristics, the gradual strengthening of regulatory policies is likely to affect retail investors and thus affect the stock market. Therefore, based on the progressive reinforcement of financial regulatory policy, this paper first classifies retail investor attention and then examines the effect of such attention on the Shanghai Stock Exchange (SSE) 50 Index and the China Securities Index (CSI) 1000 Index. We also investigate the unusual closing price trends of the two major indices that emerged at the end of 2016. We find that using retail investor attention to explain the fluctuations in the variances of the indexes is more effective for the CSI 1000 Index than the SSE 50 Index. The influence of the various categories of retail investor attention on the two indexes changes significantly before and after the implementation of a strict regulatory policy. Specifically, attention paid to regulatory policies, Internet financial products that focus on currency funds, and the macro situation have markedly different effects on the stock market quotation. During the implementation of a stringent regulatory policy, retail investor attention can explain the fluctuation in the variance of 70% of the contrary trends of the closing prices on the two indexes.

Contribution/ Originality: This study is one of very few studies which have investigated the impact of financial regulatory policy on the stability of the correlation between retail investor attention and stock market indices.

1. INTRODUCTION

Extensive research shows a clear correlation between retail investor attention and the stock market. Retail investor attention not only affects the volatility and liquidity of the stock market (Da et al., 2011; Ding and Hou, 2015) but can also forecast stock prices (Liu et al., 2011). Retail investors usually consider many aspects of information when investing in the stock market. When studying the impact of retail investor attention on the stock market, previous studies typically assume that the external environment of the stock market is constant within a certain period. However, changes in the external environment maybe alter the relationship between investor

attention and the stock market. For example, when a country's financial regulatory policy changes, the investors and the stock market are generally affected by such change (Cumming *et al.*, 2011; Amiri and Talbi, 2014; DBa, 2014; Christensen *et al.*, 2016; Owusu-Antwi *et al.*, 2017; Le *et al.*, 2018) and the correlation between them is likely to be unstable. China's stock market has policy-oriented market characteristics. To the best of our knowledge, if and how the influence of retail investor attention on the stock market changes when the financial regulatory policy gradually becomes stronger has not been studied previously.

Among the keywords in the capital market from 2016 to the present, the term "regulatory" has been active. Since Shiyu Liu became chairman of the China Securities Regulatory Commission (CSRC) in 2016, a strict regulatory policy slowly became integrated into the market participants' vision. The CSRC established an internal audit department to supervise itself and externally began to implement a comprehensive and strengthened regulatory policy on listed companies and agencies with regard to IPOs, mergers and acquisitions (M&As), and reduction of major shareholders. In particular, the CSRC revises the regulation of the major asset restructuring of listed companies. The CSRC also undertakes stringent regulatory actions to improve investor protection, control M&As, crack down on speculation and shelling, and prevent the occurrence of "off real to virtual" funds. At the same time, the Chinese government's economic efforts prioritize the deepening of the reform of the financial regulatory system, effective prevention of systemic risks, and enabling financial services to better serve the real economy.

For a long time, China's A-share market was dominated by retail funds. The investment behavior of professional institutional investors has always been significantly affected by market trends, making it difficult for institutional investors to play the role of "market stabilizer." However, changes have transpired in China's A-share market since 2017. The investment behavior of retail investors seems to have been some changes, and thus has caused changes in the impact of their investment behavior on the stock market. In addition, the SSE 50 Index and the CSI 1000 Index, which have always had the same overall trend, have begun to differ. Blue chips, represented by the Shanghai Stock Exchange (SSE) 50 Index, showed a slow growth trend and increased by more than 20% in 2017. Conversely, small-cap stocks with weak valuations, represented by the China Securities Index (CSI) 1000 Index, exhibited a slow bear trend and decreased by more than 15% in 2017 (Figures 1 and 2). We aim to understand the reasons behind the heteromorphism. Therefore, this paper primarily examines the impact of retail investor attention on these two indices under the increasingly stronger regulatory policy and explores whether such attention explains the difference between the closing prices of them.
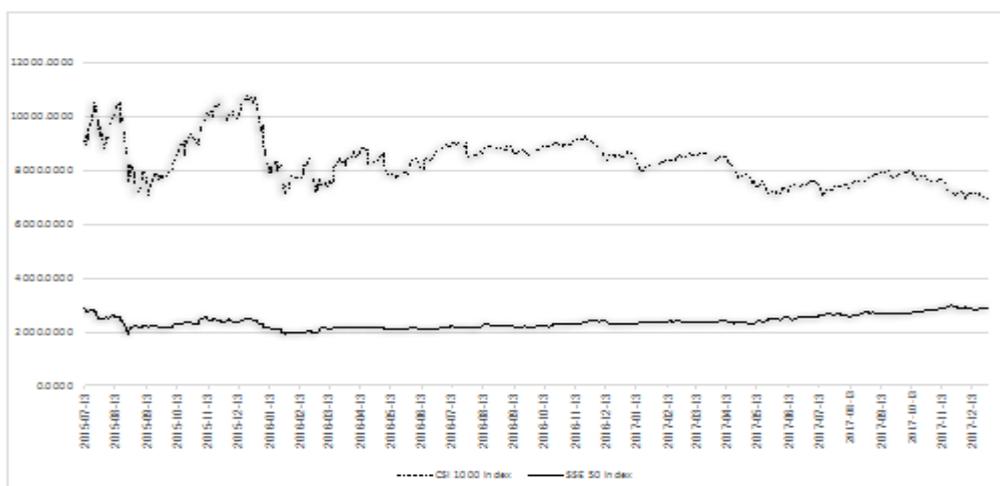

Figure-1. Closing price of stock market indicators from July 13, 2015 to December 29, 2017
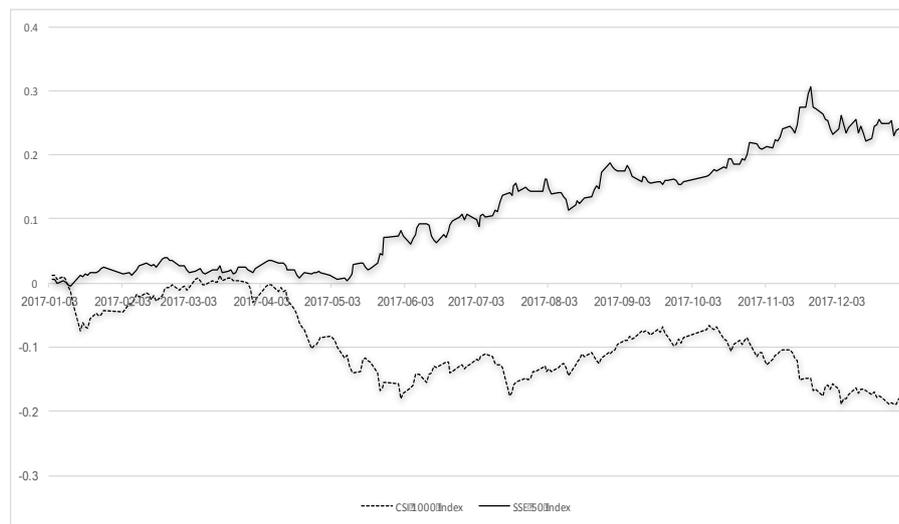
Figure-2. Change rate of closing prices of stock market indicators in 2017

The dotted line represents the change rate of the closing price of the CSI 1000 Index based on its closing price for January 3, 2017. The solid line represents the change rate of the closing price of the SSE 50 Index based on its closing price for January 3, 2017.

2. THEEORY AND EXTANT LITERATURE

2.1. Financial Regulatory Policy

As we all know, financial market supervision could be summarized into two aspects with intimate connections: the supervision of the capital market which promotes the development of the real economy, and the supervision of the currency market which provides short-term liquidity. As an important part of the modern financial market, the capital market not only offers long-term financing for the real economy but also plays an important role in the process of corporate property rights reorganization, thereby optimizing the allocation of resources. However, numerous problems in the capital market damage the interests of minority shareholders and creditors. Examples include fraudulent asset reorganization, insider trading, manipulation of stock prices, false information disclosure, major shareholder reduction, lack of dividends for several years, and other market problems. The financial market is fragile, and the free market does not circumvent the issues of inefficiency and unfairness in the market. The government should intervene appropriately to supervise the financial market, and the main purpose of its supervision is to maintain the stability of this market and protect the legitimate interests of investors. By supervising the securities market and punishing its misuse, the government helps to consolidate fair market operation and increases investor participation in the stock market (Giannetti and Koskinen, 2010). Christensen *et al.* (2017) investigate the effect of the European Union (EU) financial market strengthening regulation on equity investment of retail investors and find that the implementation of reinforcing regulatory policies significantly increases households' willingness to invest in equity and compensates for the lack of trust in the stock market. Cumming *et al.* (2011) and Christensen *et al.* (2016) propose that EU capital market regulations improve liquidity. Xunmin (2011) examine the Chinese investors' understanding of regulatory policies aimed at maintaining stability and the market reaction. The authors suggest that frequently promulgated regulation policies in 2008 to maintain stability offered opportunities for institutional investors to sell short in the short term, resulting in the continuous decline of the Shanghai Composite Index[1] (SCI) and affecting investor psychology and expectations. Since the second half of 2016, the regulation of the capital market has become increasingly strict. Especially at the end of 2016, strict supervision was almost a household name. The Chinese financial market, especially the capital market,

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[1] The Shanghai Composite Index is calculated by weighting all the stocks listed on the SSE, thereby reflecting the changes in the stock prices.

could be said to have entered a period of strict supervision in history. This would inevitably affect the investors' investment behaviors. In particular, how retail investors' investment behaviors respond to increasingly strong regulatory policies are what we are concerned about.

The rapid development and popularization of Internet finance bred excessive innovation of financial products in the currency market. Coupled with insufficient supervision of the currency market, such innovation promotes the extreme expansion of economic financialization, thus leading to a shift in focus of economic activities from the industrial to the financial sector and from the real to the virtual economy. In China, high pursuit of financial capital profitability has intensified swiftly. A larger amount of funds is flowing to short-term financial products that are subordinate to the currency market, such as Yu Ebao and other types of currency funds. This situation causes the expansion of the currency market and the shrinkage of the capital market. For example, in recent years, the annual capital flow in the stock market has been a net outflow. The overpursuit of financial capital profitability has led to serious term mismatching that has to use short-term financing to support long-term investments. The capital market has been unable to meet the needs of the real economy. One of the reasons for this phenomenon is that regulatory authorities fail to fully supervise financial innovation products. We use our data to verify whether such a serious profit-seeking behavior exists among retail investors. And we examine the changes of this phenomenon before and after this strict supervision of the capital market, conduct a preliminary exploration of the regulatory adequacy of the currency market.

2.2. Related Research on Factors Affecting the Stock Market

The influencing factors of the stock market could be summarized into three levels: macro, meso, and micro. Specific examples include economic cycle, monetary policy, and fiscal policy (macro level); industrial policy (meso level); and financial status of listed companies and investment decisions of investors (micro level). Various factors exert different effects on the stock market.

The economic cycle is a type of cyclical fluctuation in the overall economic activity that expands and contracts along the overall trend of economic development. Atje and Jovanovic (1993) verify the significant correlation between the stock price cycle and the economic cycle using empirical methods. Colacito and Croce (2011) study the relationship between policy changes and the stock market using the cash flow discount model and find that changes in macroeconomic policies alter the discount rate and dividend growth rate of the stock market, which in turn affect the trading price of company stocks in the secondary market.

The stock market is affected by monetary policy, and it plays a conductive role in the monetary policy's influence on how the macroeconomy operates. Monetary policy influences economic operation through diversities mechanisms. The most typical factors affecting the stock market are money supply and interest rates. Lax monetary policies play a positive role in stock market returns and liquidity, whereas their strict counterparts exert the opposite effect (Alexandros and Zivile, 2018). Among the influencing factors of fiscal policy on the stock market, the tax policy is relatively common because of the close relationship between taxes and business costs. Industrial policy involves government efforts to consciously adopt policy interventions to shape and develop industries for achieving economic goals. Examples include tariff and trade protection policies, tax incentives, and market access restrictions. In industries supported by the government, the enterprises readily break through the bottleneck and directly benefit, which is consequently reflected in stock prices.

Micro-level factors can be analyzed from the supply and demand sides. The supply side mainly includes the fundamentals of the listed company, such as financial status, earning performance, dividend distribution policy, financing strategy, and development prospects of its industry. The efficient market hypothesis of Malkiel and Fama (1970) illustrates the importance of investors in mastering all public and undisclosed information that reflect the historical earnings and forecast the future earnings of a company. The influencing factors on the demand side primarily involve institutional investors and retail investors. Institutional investors affect the volatility of the stock

market, may play a role in stabilizing the market in China , and may influence the long-term stability of the market through their herding effects (Lakonishok *et al.*, 1994). The mood and attention of retail investors affect the stock market. Behavioral finance holds that such mood may influence the retail investor's own investment decision-making behavior. Malcolm and Jeffrey (2007) propose that investors' emotions could be fully quantified, and that the fluctuation of emotions has a clearly identifiable and important influence on the company and even on the entire stock market, especially for stocks that are difficult to arbitrage. The attention of retail investors is also quantifiable, and it may increase the volatility of the stock market (Andrei and Hasler, 2014; Hamid and Heiden, 2015) and influence the market's liquidity (Dhrifi, 2014; Krah *et al.*, 2014; Ding and Hou, 2015; Hye and Lau, 2018).

Numerous and complex factors affect the stock market. As the stock market increasingly matures, acquiring prompt information becomes highly significant to the public. The widespread popularity of the Internet has diversified the channels for information dissemination. In China, web searches, online news media, social networking sites, and forums have become common avenues for accessing public information in all aspects. Among them, web search is the third largest application used by netizens following instant messaging and online news. According to the latest data released by the China Internet Network Information Center, at the end of 2017, the Internet search usage was as high as 83.8%. The integrated search engine market was still highly concentrated, with the Baidu search engine as the leading factor whose brand penetration rate was approximately 82.9% at the end of 2016. Search data also constitute an important information source for investigating investor behavior.

2.3. Research on Application of Web Search Data

The earliest applications of search data involve epidemics. Eysenbach (2006), Polgreen *et al.* (2008) and Ginsberg *et al.* (2009) conduct research on the correlation between epidemics and search times of certain keywords in search data. Search data also gradually gained attention in academic circles, such as for the real estate market (Lynn and Erik, 2009) unemployment rate (Askitas and Zimmermann, 2009) consumer spending (Vosen and Schmidt, 2011) and the stock market.

Using search data to examine issues in the stock market has obvious advantages, especially in quantifying the market concerns of investors. Quantifiable approaches to investor attention in the existing literature consist of two major categories: indirect and direct proxies. Indirect proxies for investor attention involve trading volume (Barber and Odean, 2007) extreme returns (Barber and Odean, 2007) news and headlines (Barber and Odean, 2007) advertising expense (Chemmanur and Yan, 2009) and price limits (Seasholes and Wu, 2007). Conversely, direct proxies for investor attention include the Google search index (Da *et al.*, 2011; Ding and Hou, 2015) and Baidu search index (Liu *et al.*, 2011). Direct proxies have more advantages relative to their indirect counterparts. Liu *et al.* (2011) synthesizes the search data of investors in the Baidu index into three types of search indexes and find that search data explains the SCI better than the turnover and trading volume. Da *et al.* (2011) use the Google search volume index to measure investor attention and examine the correlation between the said index and indirect proxies (which contain extreme returns, turnover, and news). The authors find a low level of correlation and establish that the Google search volume index not only captures investor attention promptly but also measures the attention of retail investors. Ding and Hou (2015) also employ the Google search volume index and its variation as the direct measures of investor attention and investigate the relationship between the direct and indirect measures, including advertising, turnover, and return volatility in a set of regressions. They find that more than 90% of the direct measures cannot be explained by the indirect measures.

2.4. Relationship between the Stock Market and Investor Attention

The influence of investor attention on the stock market is a major aspect of the existing literature. Scholars have always been concerned about the specific impact of retail investor attention on this market. Retail and institutional investors have extremely different investment behaviors. Barber and Odean (2007) empirically confirm

this difference using various data sources to quantify such behavior by retail and institutional investors; they find that retail investors are more vulnerable to attention than institutional investors. Given the search problem, retail investors only buy stocks that have grabbed their attention when they select stocks from the thousands available. When selling stocks, retail investors only consider those they have owned and thus avoid search difficulties. Thus, Barber and Odean (2007) contend that retail investors are net buyers who are driven by attention. Engelberg *et al.* (2012) conduct further empirical tests and reach the same conclusion. However, the attention of individuals is limited (Kahneman, 1973). When retail investors deal with information, because of the increasing market volatility, the limitation of their attention causes category-learning behavior such that the investor focuses their limited attention more on market- and sector-wide information than on firm-specific information (Peng and Xiong, 2006). In view of these findings, we study the influence of retail investor attention on the stock market, and we categorize attention to accurately examine the real impact of different aspects of information that may concern retail investors about the stock market.

Retail investor attention could affect stock price and liquidity. Barber and Odean (2007) use abnormal daily trading volume, stock return, and news as the three proxies to measure investor attention and find that the variation of stock price in the short term is positively correlated with retail investor attention. Da *et al.* (2011) employ the search volume of Russell 3000 stock tickers on Google Trends as a proxy for retail investor attention and confirm that in the short term, retail investor attention is positively correlated with stock price and turnover. Ding and Hou (2015) utilize the search volume of the S&P 500 stock tickers on Google Trends as a measure of retail investor attention and verify a significantly positive correlation between investor attention and stock liquidity. Liu *et al.* (2011) applied direct measures of investor attention, including stock tickers, market conditions, fundamentals, and the macro situation; the author finds that all these measures have significantly positive correlation with the closing price and turnover of the SCI in the short term. However, none of these studies consider an external factor, namely, financial regulatory policy. When considering investor attention on such policy, the correlation between investor attention and the stock market may differ. In addition, the effects of investor attention on the SSE 50 Index (which represents large-cap stocks) and the CSI 1000 Index (which represents small-cap stocks) may also vary. According to literature research, as far as we know, scholars have not been involved in this, especially for the Chinese stork market.

Accordingly, the features of this article include the following: first, this work uses the Baidu search index as a direct measure of retail attention and categorizes the information considered by retail investors. Second, this study examines the impact of retail investor attention on the SSE 50 and CSI 1000 indexes before and after the implementation of the strict regulatory financial policies. Third, this investigation attempts to provide reasons for the disparity of the closing price trends of the SSE 50 index and the CSI 1000 index that began to appear in the second half of 2016.

3. EMPIRICAL ANALYSIS

This part has six subsections. In 3.1, we introduce the proxies for retail investor attention and discuss the selection of stock market index variables. In 3.2, we describe the categorization and synthesis of the keywords that measure retail investor attention. In 3.3, we calculate the correlation between all variables and draw preliminary judgments on the relationships between variables. In 3.4, we test and deal with the problem of collinearity between independent variables and construct the global linear regression model of retail investor attention and stock market indicators. In 3.5, we perform Chow's stability test on the global linear law. We will construct models with the subsamples if the test is successful and report the estimation results. In 3.6, we create models and explain the disparity in the closing price trends of the SSE 50 and CSI 1000 indexes that began to appear in the second half of 2016.

3.1. Selection and Screening of Variables

This work uses the Baidu search index to measure retail investor attention. Data collected represent the users' search behavior as recorded by the Internet when searching for information resources through the Baidu search engine. As a measure indicator, timely and effective search data have been fully verified in many previous studies. The keywords used in this paper are based on those used by Liu *et al.* (2011). We updated them which involve the aspects of macroeconomic situation, industry development status, company operations, opening accounts, and stock trading strategy, and supplemented keywords on Internet financial products and financial supervision policies. Therefore, there are a total of 1,500 keywords. We employ the SSE 50 and CSI 1000 indexes as indicators of the stock market because 1) the constituent stocks of the SSE 50 index include outstanding representatives of blue-chip stocks and large-cap stocks, and such index comprehensively reflects the overall situation of a group of high quality companies in the Shanghai securities market, while 2) the CSI 1000 Index consists of 1000 small-scale and liquid stocks, which broadly indicate the performance of a group of small-cap companies in China's A share market. Using the two types of indexes enables the adequate comparison of the impact of retail investors on stock market indicators and generates representative results. The data interval utilized in this study is from July 13, 2015 to December 29, 2017. Moreover, time granularity involves the daily data totaling 605 days.

This article uses the time difference relevance method for the first screening of the initial keywords and categorizing the antecedent words, the consistent words, and the lagged words. We retain the antecedent and consistent words. The time difference relevance method is a common technique that utilizes the correlation coefficient to test the prior, consistent, or late relationship between the economic time series and reference time series. The time difference correlation coefficient is calculated as follows:

$$r_l = \frac{\sum_{t=1}^{n}(x_{t+l}-\bar{x})(y_t-\bar{y})}{\sqrt{\sum_{t=1}^{n}(x_{t+l}-\bar{x})^2 \sum_{t=1}^{n}(y_t-\bar{y})^2}}, l = 0, \pm 1, \pm 2, \cdots, \pm L.$$

In the preceding formula, r_l represents the correlation when the time difference is equal to l, y represents the closing price of the SSE 50 and CSI 1000 indexes, $\bar{y}$ denotes the average of y, x indicates the search volume of keywords, $\bar{x}$ is the average of x, and l indicates the leading order of x. The maximum correlation coefficient is the time difference correlation coefficient of the two sequences, and the corresponding order is the leading order.

First, we perform time difference correlation analysis between 1500 keywords and the closing price of the SSE 50 Index. We acquire the maximum correlation coefficient between each keyword and the said closing price, totaling 1500 correlation coefficients. According to the size of 1500 correlation coefficients, we obtain a keyword dataset. Then, we perform the same operation for the CSI 1000 Index and acquire another keyword dataset. Finally, based on those two datasets, keywords are screened comprehensively and 171 keywords are acquired.

3.2. Synthesis of Attention Index

To better fit the closing prices of the SSE 50 and CSI 1000 indexes, further synthesizing the keywords is necessary. Such synthesis first requires categorizing the keywords. We draw on the keyword categorization method (Liu *et al.*, 2011) which divides keywords into three categories (fundamentals, market conditions, and action tendencies) that cover the aspects of macroeconomic situation, industry development status, company operations, opening accounts, and stock trading strategy. Considering the addition of the aspects of Internet financial products and financial supervision policies, a slight change in the keyword categorization was needed. We divide these keywords into six categories and then synthesize six attention indexes: attention to pre-investment in stock market (APIS), attention to stock trading strategy (ASTS), attention to stock market trends (AST), attention to Internet

financial products (AIFP), attention to macroeconomic situation (AMES), and attention to financial regulation policy (AFRP). APIS reflects the trading demand of potential retail investors. ASTS indicates the retail investors who entered the stock market and pay attention to trading strategies, such as trading skills and selection strategies. AST represents the concern of retail investors about the stock market trends. AIFP implies the concern of retail investors about Internet financial products. As keywords in this area mainly focus on currency funds, AIFP also reflects the attention of retail investors to currency funds. AMES signifies the retail investors' concerns regarding the macroeconomic situation. Finally, AFRP suggests the retail investors' concerns about the financial regulatory policies in China.

Regarding the synthesis of the keywords, a set of standard methods is lacking in the existing literature. Methods widely used by scholars could be roughly divided into four categories: direct quotes or simple aggregation method (Askitas and Zimmermann, 2009), correlation synthesis methods (Ginsberg *et al.*, 2009) and stepwise synthesis methods (Liu *et al.*, 2011). Considering the research questions in this paper comprehensively, we apply a direct additive method to synthesize the keywords in each category. Consequently, we acquire the aforementioned six attention indexes. Some keywords of each synthetic attention index are shown in Table 1.

Table-1. Some Keywords of Various Attention Indexes and Their Correlation with Stock Market Indicators

Attention	Keywords	Correlation with SSE 50 Index closing price	Correlation with CSI 1000 Index closing price
APIS	The new investors know how to get a quick start for stock trading	0.76	0.84
	Getting start for stock trading	0.75	0.54
ASTS	Skills in stock trading	0.83	−0.69
	Bargain-hunting	−0.91	0.78
AST	SSE 50 Index	0.76	−0.78
	Real-time quotes of stocks	0.56	0.46
AIFP	Return rate of Y Ebao	−0.57	−0.32
	Interest of Y Ebao	0.92	−0 84
AME	Value investment	0.65	−0.81
	19th Session	0.80	−0.53
AFRP	Financial supervision.	0.43	−0.62
	One line and three meetings	0.20	−0.43

This table shows some keywords of each synthetic attention index, and their correlation with stock market indicators. We can see that the keywords are different from the different indicators, even in the opposite direction. In addition, "19th Session" is the abbreviation of the 19th session of the National Congress of the Chinese Communist Party. "one line and three meetings" is the abbreviation of the four financial regulators of the Chinese financial sector over the People's Bank of China, the China Banking Regulatory Commission, the China Securities Regulatory Commission, and the China Insurance Regulatory Commission.

3.3. Preliminary Determination of Correlation

We logarithmically transform all the variables and then calculate the correlations among them. Table 2 summarizes the correlation coefficients. From Table 2, three preliminary judgments can be made. First, for the SSE 50 and CSI 1000 indexes, the correlation coefficient between turnover and each attention index is almost equal to the correlation coefficient between volume and the corresponding attention index. This outcome is consistent with the meaning of the turnover and volume. Note that turnover also reflects the liquidity of the stock market (Haugen and Baker, 1996). Accordingly, we abandon the volume variables and apply the closing price and turnover of the two indexes as the indicator variables of the stock market. Second, the correlation between the closing price and the turnover of the CSI 1000 Index is greater than the correlation between the closing price and the turnover of the SSE 50 Index. As the CSI 1000 and SSE 50 Indexes correspond to the small-cap and large-cap stocks, respectively,

the disparity in relevance may lead to potential variation in the influence of retail investor attention on the two types of indexes. Third, the attention variables are related not only to the stock market indicators but also to one another. Specifically, high correlations exist between APIS and AST (0.83) and between APIS and AIFP (0.75). This finding shows that when the retail investor chooses a financial management method, he/she understands the benefits of investing in stocks and other financial products, and weigh the pros and cons of various financial methods. However, this outcome also indicates the likelihood of multiple collinearity problems from the regression equation that we are about to construct.

3.4. Co-integration Analysis

The stock market indicators applied in this study include the closing prices and turnovers of the CSI 1000 and SSE 50 indexes. The dependent variables are the logarithmic form of these four indicators. The independent variables are the logarithmic form of APIS, ASTS, AST, AIFP, AMES and AFRP. Before conducting co-integration analysis, we first test the stationarity of these variables using the Augmented Dickey–Fuller (ADF) test. The null hypothesis is that if the time series has at least one-unit root, then it is unstable. Test results are shown in Table 3. Most variables cannot reject the null hypothesis at a significant level of 5%, indicating that the original series are not stationary. However, under the first-order difference, all variables reject the null hypothesis at a significant level of 1%, suggesting that they are integrated of order 1.

Then, we perform multicollinearity testing of these independent variables. If multicollinearity exists among these independent variables, then the estimators of the regression equation become ineffective and the significance test of the variables lose significance. Therefore, multicollinearity testing on the independent variables is crucial. The test method employed is the Variance Inflation Factor (VIF) test. Test results show multicollinearity of $lnAPIS$ with other independent variables (Table 4). To solve the problem of collinearity, we consider the meaning behind the independent variables and synthesize APIS, ASTS, and AST directly into a new variable: attention to stock investment (*ASI*). After taking the logarithm of *ASI*, we obtain the new independent variable $lnASI$. We examine the stationarity of this variable and its collinearity with other independent variables. The unit root test of $lnASI$ shows that this variable is a first-order single-integer sequence at a significant level of 1%. Table 5 lists the results of the VIF test. Obviously, the problem of collinearity has been weakened considerably, so the impact on the least square regression is negligible.

Table-2. Correlations of Variables

	$\ln P^{CSI1000}$	$\ln P^{SSE50}$	$\ln T^{CSI1000}$	$\ln T^{SSE50}$	$\ln V^{CSI1000}$	$\ln V^{SSE50}$	lnAPIS	lnASTS	lnAST	lnAIFP	lnAMES	lnAFRP
$\ln P^{CSI1000}$	1.00	−0.20	0.64	0.24	0.61	0.26	0.61	0.53	0.44	0.56	−0.34	−0.31
$\ln P^{SSE50}$	−0.20	1.00	−0.30	0.28	−0.18	0.26	−0.25	−0.47	−0.21	−0.50	0.45	0.20
$\ln T^{CSI1000}$	0.64	−0.30	1.00	0.56	0.98	0.57	0.82	0.39	0.82	0.65	−0.32	−0.32
$\ln T^{SSE50}$	0.24	0.28	0.56	1.00	0.57	1.00	0.63	0.12	0.57	0.29	0.03	−0.18
$\ln V^{CSI1000}$	0.61	−0.18	0.98	0.57	1.00	0.59	0.74	0.33	0.76	0.57	−0.26	−0.27
$\ln V^{SSE50}$	0.26	0.26	0.57	1.00	0.59	1.00	0.65	0.14	0.58	0.30	0.02	−0.18
lnAPIS	0.61	−0.25	0.82	0.63	0.74	0.65	1.00	0.44	0.83	0.75	−0.30	−0.39
lnASTS	0.53	−0.47	0.39	0.12	0.33	0.14	0.44	1.00	0.38	0.50	−0.27	−0.13
lnAST	0.44	−0.21	0.82	0.57	0.76	0.58	0.83	0.38	1.00	0.57	−0.21	−0.23
lnAIFP	0.56	−0.50	0.65	0.29	0.57	0.30	0.75	0.50	0.57	1.00	−0.47	−0.39
lnAMES	−0.34	0.45	−0.32	0.03	−0.26	0.02	−0.30	−0.27	−0.21	−0.47	1.00	0.29
lnAFRP	−0.31	0.20	−0.32	−0.18	−0.27	−0.18	−0.39	−0.13	−0.23	−0.39	0.29	1.00

Table. 2 shows the correlations of all the variables. $P^{CSI1000}$ represents the closing price of the CSI 1000 Index. P^{SSE50} denotes the closing price of the SSE 50 Index. $T^{CSI1000}$ indicates the turnover of the CSI 1000 Index. T^{SSE50} signifies the turnover of the SSE 50 Index. $V^{CSI1000}$ implies the volume of the CSI 1000 Index. V^{SSE50} refers to the volume of the SSE 50 Index. APIS, ASTS, AST, AIFP, AMES, and AFRP are the aspects of retail investor attention. We logarithmically change these variables before utilizing them. The sample period is from July 13, 2015 to December 29, 2017.

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Table-3. Unit Root Test for Variables

Variable	ADF test	MacKinnon critical values			ADF test results
	t-Statistic	1%	5%	10%	
$lnP^{CSI1000}$	−2.31	−3.44	−2.87	−2.57	I(1)
lnP^{SSE50}	−1.76	−3.44	−2.87	−2.57	I(1)
$lnT^{CSI1000}$	−3.00	−3.44	−2.87	−2.57	I(1)
lnT^{SSE50}	−5.40	−3.44	−2.87	−2.57	I(0)
$lnAPIS$	−3.13	−3.44	−2.87	−2.57	I(1)
$lnASTS$	−3.87	−3.44	−2.87	−2.57	I(0)
$lnAST$	−3.00	−3.44	−2.87	−2.57	I(1)
$lnAIFP$	−2.47	−3.44	−2.87	−2.57	I(1)
$lnAMES$	−6.07	−3.44	−2.87	−2.57	I(0)
$lnAFRF$	−4.23	−3.44	−2.87	−2.57	I(0)

The dependent variables, $lnP^{CSI1000}$, lnP^{SSE50}, $lnT^{CSI1000}$, and lnT^{SSE50}, represent the closing prices and turnovers of the CSI 1000 and the SSE 50 Indexes. The independent variables, $lnAPIS$, $lnASTS$, $lnAST$, $lnAIFP$, $lnAMES$, and $lnAFRP$, signify retail investor attention. The ADF test adopts the MacKinnon critical values. 1%, 5%, and 10% respectively indicate that the null hypothesis is rejected at significant levels of 1%, 5%, and 10%. The sample period is from July 13, 2015 to December 29, 2017.

Table-4. Collinearity Test

Variance Inflation Factors Sample: July 13, 2015 to December 29, 2017 Included observations: 605			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
$lnAPIS$	0.000378	4588.346	5.408612
$lnASTS$	0.000106	1291.500	1.373197
$lnAST$	0.000193	2368.393	3.371031
$lnAIFP$	0.000352	4580.325	2.996294
$lnAMES$	6.19E-05	969.6120	1.333890
$lnAFRP$	0.000227	1241.681	1.282389
C	0.053197	6206.795	NA

Table.4 shows the result of multicollinearity testing of these independent variables. The test method employed is the Variance Inflation Factor (VIF) test. Test results show multicollinearity of $lnAPIS$ with other independent variables.

Subsequently, we examine the co-integration relationship between the dependent and independent variables. We use the two-step co-integration test method proposed by Engle and Granger (1987). First, we construct the least square regressions (1), (2), (3), and (4). Then, the unit root tests are performed on the residuals of the four regression equations. If a co-integration relationship exists between the dependent variable and the independent variables, then the residual sequence of the regression equation should be stationary. As shown in Table 6, for each equation, an equilibrium relationship is found between the dependent variable and the independent variables during our sample period.

$$lnP_t^{CSI1000} = \alpha_0 + \alpha_1 * lnASI_t + \alpha_2 * lnAIFP_t + \alpha_3 * lnAMES_t + \alpha_4 * lnAFRP_t + \varepsilon1_t \qquad (1)$$

$$\ln P_t^{SSE50} = \beta_0 + \beta_1 * \ln ASI_t + \beta_2 * \ln AIFP_t + \beta_3 * \ln AMES_t + \beta_4 * \ln AFRP_t + \varepsilon2_t \qquad (2)$$

$$\ln T_t^{CSI1000} = \gamma_0 + \gamma_1 * \ln ASI_t + \gamma_2 * \ln AIFP_t + \gamma_3 * \ln AMES_t + \gamma_4 * \ln AFRP_t + \varepsilon3_t \qquad (3)$$

$$\ln T_t^{SSE50} = \delta_0 + \delta_1 * \ln ASI_t + \delta_2 * \ln AIFP_t + \delta_3 * \ln AMES_t + \delta_4 * \ln AFRP_t + \varepsilon4_t \qquad (4)$$

Table-5. Collinearity Test

Variance Inflation Factors Sample: July 13, 2015 to December 29, 2017 Included observations: 605			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
$lnASI$	0.000209	2797.298	2.134171
$lnAIFP$	0.000338	3920.038	2.564357
$lnAMES$	6.83E-05	953.2756	1.311416
$lnAFRP$	0.000238	1162.191	1.200293
C	0.059446	6184.480	NA

Table.5 shows the result of multicollinearity testing of these independent variables. The test method employed is the Variance Inflation Factor (VIF) test. Test results show multicollinearity of $lnAPIS$ with other independent variables.

Table-6. Regression Results and Co-integration Tests

Variable		$ln P_t^{CSI1000}$	$ln P_t^{SSE50}$	$ln T_t^{CSI1000}$	$ln T_t^{SSE50}$
c		7.34***	8.56***	−10.23***	−13.43***
$lnASI_t$		0.14***	−0.01	0.97***	1.17***
$lnAIFP_t$		0.06***	−0.13***	0.11**	−0.28***
$lnAMES_t$		−0.03***	0.07***	−0.05*	0.24***
$lnAFRP_t$		−0.04**	−0.01	−0.09*	−0.18**
Adjusted R-squared		0.42	0.31	0.68	0.35
F-statistic		112.11	67.32	325.61	80.76
Prob(-statistic)		≪ 0.001	≪ 0.001	≪ 0.001	≪ 0.001
Residual Stationarity	ADF values	−3.95	−4.09	−6.05	−5.88
	1% Critical values	−3.44	−3.44	−3.44	−3.44
	5% Critical values	−2.87	−2.87	−2.87	−2.87
	10% Critical values	−2.57	−2.57	−2.57	−2.57
	Conclusion	Stationarity	Stationarity	Stationarity	Stationarity
Conclusion		Co-integration	Co-integration	Co-integration	Co-integration

Table.6 shows the results of the four least squares regression equations and the co-integration tests. The dependent variables are $lnP_t^{CSI1000}$, lnP_t^{SSE50}, $lnT_t^{CSI1000}$, and $ln T_t^{SSE50}$. The independent variables are $lnASI_t$, $lnAIFP_t$, $lnAMES_t$, and $lnAFRP_t$. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is from July 13, 2015 to December 29, 2017.

Table 6 shows that 1) the P-value of the F-statistic of each equation is far lower than 0.001, which indicates that the combined effect of each independent variable on the dependent variables is significant at the 1% level; and 2) the adjusted R-squared of the four equations are 0.42, 0.31, 0.68, and 0.35, respectively, suggesting that retail investor attention can explain 42%, 31%, 68%, and 35% of the variance fluctuations of the closing prices of the CSI 1000 and SSE 50 indexes, and the turnovers of the CSI 1000 and SSE 50 indexes, respectively. Therefore, we

conclude that, overall, 1) the explanatory power of retail investor attention on the CSI 1000 Index is greater than that of the SSE 50 Index, and 2) the explanatory power of retail investor attention on the turnover is greater than its ability to interpret the closing price. In other words, the explanatory power of retail investor attention is greater for small-cap stocks than for large-cap stocks, and its ability to explain the liquidity of the stock market is greater than its ability to account for the stock price.

The coefficients of the independent variables in the four regression equations indicate that the attention of retail investors to different aspects exerts diverse impacts on stock price and liquidity. Particularly, $lnASI_t$ has a significant positive effect on the $lnP_t^{CSI1000}$, $lnT_t^{CSI1000}$, and $ln\,T_t^{SSE50}$, but has no significant effect on lnP_t^{SSE50}. Moreover, $lnAIFP_t$ has a significantly positive effect on $lnP_t^{CSI1000}$ and $lnT_t^{CSI1000}$, but has a significant negative effect on lnP_t^{SSE50} and $ln\,T_t^{SSE50}$. Furthermore, $lnAMES_t$ has a significant negative effect on $lnP_t^{CSI1000}$ and $lnT_t^{CSI1000}$, but has a significant positive effect on lnP_t^{SSE50} and $ln\,T_t^{SSE50}$. Finally, $lnAFRP_t$ has a significant negative effect on $lnP_t^{CSI1000}$, $lnT_t^{CSI1000}$, and $ln\,T_t^{SSE50}$, but has an insignificant negative effect on lnP_t^{SSE50}.

From the four global linear regression models, we find that the impact of financial regulatory policies on retail investors investing in stocks should not be underestimated. Findings on the negative effect of retail investor attention to financial regulatory policy on the closing price and turnover is similar to the conclusions of Xunmin (2011) on the financial regulatory policy to maintain stability. Regulatory policies have not increased the willingness of retail investors to invest, and their investment returns have fallen. Attention to Internet financial products, which mainly include currency funds, has a positive effect on small-cap stocks but a negative effect on large-cap stocks and blue-chip stocks. This outcome shows that, in reality, most retail investors prioritize small-cap stocks and currency funds rather than large-cap and blue-chip stocks. This peculiar situation is likely related to a higher proportion of institutional investment funds in the SSE 50 constituent stocks. The keywords covered by the attention to stock investment are similar to those of Liu *et al.* (2011) in terms of market conditions, action trends, and fundamentals; moreover, the impact of attention to stock investment on stock indicators is also comparable with the results of Liu Ying's research. However, attention to the macroeconomic situation, which is similar to other keywords employed by Liu *et al.* (2011) has a different effect on stock indicators relative to his research. The disparities are that, in this study, the attention to the macr0economic situation has a negative effect on the closing price and turnover of small-cap stocks and has a positive effect on the closing price and turnover of large-cap stocks and blue-chip stocks. This result shows that given the same macroeconomic situation, different types of stocks have dissimilar returns and liquidity. By contrast, Liu *et al.* (2011) believes that attention has a positive effect on the closing price and turnover of the SCI (which contains various types of stocks).

The financial regulatory attention of retail investors has an impact on investment decisions and stock trends. When regulatory policy changes or other aspects that we have overlooked also change, will the impact of the retail investor attention in other facets also change?

Given that the time interval of the sample used in the global linear regression model covers the node where the strict financial regulation policy is implemented, we build models with subsamples to accurately analyze the impact of retail investor attention to the financial regulatory policy on the different types of stocks and the changes within the influence of retail investor attention to other aspects of the different type stocks before and after strict supervision. As the adjustment and implementation of the strict supervision policy on many aspects of the stock market are mostly concentrated in the second half of 2016, this study sets the structural change point as September

12, 2016. To determine the necessity of this structural change point, this study first tests the stability of these equations using Chow's stability test.

3.5. Chow's Stability Test

When the regulatory power changes, the economic relationship or economic structure is usually altered significantly. At this time, the global linear model is usually inappropriate. We apply the Chow's stability test on Equations (1), (2), (3) and (4). The null hypothesis is that no structural break occurs at point t_0. Test results are shown in Table 7. At a significant level of 1%, we reject the null hypothesis of no structural change for each model, which indicates that the effect of retail investor attention on each stock indicator has changed significantly before and after the change point.

Table-7. Chow's stability test

	(1)	(2)	(3)	(4)
F value	14.32	196.44	21.89	46.50
Prob.F (5,595)	≪ 0.001	≪ 0.001	≪ 0.001	≪ 0.001
Structural change (yes/no)	yes	yes	yes	yes

Table.7 shows the results of the Chow's stability test on Equations (1), (2), (3) and (4). The null hypothesis is that no structural break occurs at point t_0. At a significant level of 1%, we reject the null hypothesis of no structural change for each model.

We can divide the entire sample into two subsamples according to the change point and estimate the models again. Tables 8 and 9 show the results of the models. t_0 represents the structural change point and M denotes the total length of the time interval. The new models are as follows:

$$lnP_t^{CSI1000} = \begin{cases} \alpha_{10} + \alpha_{11} * lnASI_t + \alpha_{12} * lnAIFP_t + \alpha_{13} * lnAMES_t + \alpha_{14} * lnAFRP_t + \varepsilon5_t, & 1 \leq t \leq t_0 \\ \alpha_{20} + \alpha_{21} * lnASI_t + \alpha_{22} * lnAIFP_t + \alpha_{23} * lnAMES_t + \alpha_{24} * lnAFRP_t + \varepsilon6_t, & t_0 + 1 \leq t \leq M \end{cases} \quad (5)$$

$$lnP_t^{SSE50} = \begin{cases} \beta_{10} + \beta_{11} * lnASI_t + \beta_{12} * lnAIFP_t + \beta_{13} * lnAMES_t + \beta_{14} * lnAFRP_t + \varepsilon7_t, & 1 \leq t \leq t_0 \\ \beta_{20} + \beta_{21} * lnASI_t + \beta_{22} * lnAIFP_t + \beta_{23} * lnAMES_t + \beta_{24} * lnAFRP_t + \varepsilon8_t, & t_0 + 1 \leq t \leq M \end{cases} \quad (6)$$

$$lnT_t^{CSI1000} = \begin{cases} \gamma_{10} + \gamma_{11} * lnASI_t + \gamma_{12} * lnAIFP_t + \gamma_{13} * lnAMES_t + \gamma_{14} * lnAFRP_t + \varepsilon9_t, & 1 \leq t \leq t_0 \\ \gamma_{20} + \gamma_{21} * lnASI_t + \gamma_{22} * lnAIFP_t + \gamma_{23} * lnAMES_t + \gamma_{24} * lnAFRP_t + \varepsilon10_t, & t_0 + 1 \leq t \leq M \end{cases} \quad (7)$$

$$ln T_t^{SSE50} = \begin{cases} \delta_{10} + \delta_{11} * lnASI_t + \delta_{12} * lnAIFP_t + \delta_{13} * lnAMES_t + \delta_{14} * lnAFRP_t + \varepsilon11_t, & 1 \leq t \leq t_0 \\ \delta_{20} + \delta_{21} * lnASI_t + \delta_{22} * lnAIFP_t + \delta_{23} * lnAMES_t + \delta_{24} * lnAFRP_t + \varepsilon12_t, & t_0 + 1 \leq t \leq M \end{cases} \quad (8)$$

Table-8. Regression Models with Subsamples

	$lnP_t^{CSI1000}(5)$		$lnP_t^{SSE50}(6)$	
	$1 \leq t \leq t_0$	$t_0 + 1 \leq t \leq M$	$1 \leq t \leq t_0$	$t_0 + 1 \leq t \leq M$
c	6.62^{***}	5.21^{***}	4.90^{***}	11.66^{***}
$lnASI$	0.10^{***}	0.47^{***}	0.12^{***}	-0.26^{***}
$lnAIFP_t$	0.14^{***}	-0.05^{***}	0.19^{***}	-0.12^{***}
$lnAMES_t$	-0.02	-0.002	-0.06^{***}	0.01^{*}
$lnAFRP_t$	0.01	-0.14^{***}	0.01	0.03^{**}
Adjusted R^2	0.18	0.65	0.51	0.70
$F-Statistic$	16.33	146.33	75.32	183.48
$Prob(F-Statistic)$	$\ll 0.01$	$\ll 0.01$	$\ll 0.01$	$\ll 0.01$

*, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. The entire sample period is from July 13, 2015 to December 29, 2017. The subsamples are July 13, 2015 to September 12, 2016 and September 13, 2016 to December 29, 2017. t_0 denotes the structural change point, which is equal to 346. M is equal to 605.

Table-9. Regression Models with Subsamples

	$lnT_t^{CSI1000}(7)$		$lnT_t^{SSE50}(8)$	
	$1 \leq t \leq t_0$	$t_0 + 1 \leq t \leq M$	$1 \leq t \leq t_0$	$t_0 + 1 \leq t \leq M$
c	-12.42^{***}	-8.83^{***}	-27.97^{***}	-8.68^{***}
$lnASI_t$	0.49^{***}	0.76^{***}	1.30^{***}	1.18^{***}
$lnAIFP_t$	0.76^{***}	0.09	1.23^{***}	-0.60^{***}
$lnAMES_t$	-0.06	0.01	-0.01	0.02
$lnAFRP_t$	0.06	-0.04	-0.25^{**}	-0.02
Adjusted R^2	0.47	0.33	0.66	0.10
$F-Statistic$	63.75	39.60	140.93	9.33
$Prob(F-Statistic)$	$\ll 0.001$	$\ll 0.001$	$\ll 0.001$	$\ll 0.001$

*, **, and *** represent significance at the 10%, 5%, and 1% level, respectively. The entire sample period is from July 13, 2015 to December 29, 2017. The subsamples are July 13, 2015 to September 12, 2016 and September 13, 2016 to December 29, 2017. t_0 denotes the structural change point, which is equal to 346. M is equal to 605.

Table 5 shows that 1) the P-value of the F-statistic of each equation is far lower than 0.001, which indicates that the combined effect of all independent variables on each dependent variable is significant at the 1% level; and 2) the adjusted R-squared of the models are 0.18, 0.65, 0.51, 0.70, which suggest that retail investor attention can explain 18%, 65%, 51%, and 70% of the variance fluctuation of the closing price in the two phases of the CSI 1000 and SSE 50 indexes, respectively, and that after the implementation of strict supervision, the ability of retail investor attention to explain the closing prices of the indexes significantly improved relative to that before strict supervision. Comparison of the models' intercept terms reveals that in Model (5), the intercept before the strict regulation is larger than that after the strict regulation, and the opposite result is found in Model (6). $lnAFRP_t$ has no significant effect on $lnP_t^{CSI1000}$ and lnP_t^{SSE50} before strict regulation, but after the strict regulation, it has a

significant negative effect on $lnP_t^{CSI1000}$ and a significant positive effect on lnP_t^{SSE50}. Moreover, $lnASI_t$ has a

significant effect on $lnP_t^{CSI1000}$ and lnP_t^{SSE50} in both phases, but the difference is obvious. Before the strict

regulation policy, $lnASI_t$ has almost same effect on $lnP_t^{CSI1000}$ and lnP_t^{SSE50}, but the effect changes significantly,

with a greater positive impact on $lnP_t^{CSI1000}$ and a greater negative impact on lnP_t^{SSE50}. The effect of $lnAIFP_t$ on

$lnP_t^{CSI1000}$ and lnP_t^{SSE50} differs in two stages. Before strict supervision, it has a positive effect on both, but a

negative effect after supervision. The impact of $lnAMES_t$ on $lnP_t^{CSI1000}$ is not significant in both phases, but its

impact on lnP_t^{SSE50} is significant in both phases, with a significantly negative effect before strict regulation, and a
significantly positive effect thereafter. Thus, retail investor attention to different aspects of information has a
significant difference in the effect on the closing prices of the CSI 1000 and SSE 50 indexes. In this regard, we
provide the following analysis.

Before and after the implementation of the strict regulatory policy, the influence of retail investor attention on
stock price has changed significantly. Before the strict regulation, a slight difference exists between the intercepts of
the two models. The intercept of Model (5) is higher than that of Model (6). This outcome is consistent with the
fact that the closing price of the CSI 1000 Index is always higher than that of the SSE 50 Index. During this period,
attention to financial regulatory policy has no significant effect on stock price, and attention to Internet financial
products (mainly including currency funds) has a significant effect on stock price, which means that retail investors
are more inclined to invest in stocks facing currency funds. Moreover, after the stock market experienced a bear
market from early June 2015 to early July 2015, investors were confident in the gradual recovery of the stock
market. However, during the strict supervision period, the stock trends were not as investors expected. In fact, the
stock market was polarizing, such that the closing price of the CSI 1000 Index (which represents small-cap stocks)
continued to fall, while the closing price of the SSE 50 Index (which denotes large-cap stocks) continued to increase.
We attribute most of the reasons to the strict regulatory policies. During the strict supervision period, first, the
intercept term of Model (5) decreases slightly, while that of Model (6) increases significantly. This finding shows
that when all attention variables have been controlled, changes in some factors may push up the closing price of the
SSE 50 Index but reduce the closing price of the CSI 1000 Index. We speculate that these factors must include the
changes in regulatory policies. To explain our speculation, we observe the effect of attention to financial regulatory
policy. Before strict regulation was implemented, attention to financial regulatory policy has the same effect on the
closing price of the CSI 1000 and SSE 50 Indexes. However, after strict regulatory policy, the effect changes
significantly. Attention to financial regulatory policy had a significantly negative effect on the closing price of the
CSI 1000 Index but a significantly positive effect on the closing price of the SSE 50 Index. As mentioned, the CSI
1000 Index is the representative of small-cap stocks. For retail investors with limited attention, finding stocks with
better investment expectations would be difficult in the case of market failure. Therefore, when the government
strengthens supervision of the stock market, the constituent stocks of the SSE 50 Index (which has more
concentrated blue-chips) are better choices, thus encouraging the flow of funds from the CSI 1000 constituent
stocks to the SSE 50 constituent stocks. This trend has pushed the closing price of the SSE 50 Index to continue to
rise, while causing the closing price of the CSI 1000 Index to continue to drop. In addition, during this strict
supervision period, institutional investors with professional skills are more likely to identify companies with better
prospects so that they can effectively channel funds to high-quality enterprises. Thus, stock market development

and retail investors will benefit from removing the retailing. Our findings are similar to those described by Xunmin (2011) but with a single difference. The similarity is that the implementation of regulatory policies has shown an unfavorable effect on retail investors who invest in small-cap stocks. The difference is that the positive effect of retail investors investing in large-cap stocks is also extremely obvious in the current study. This disparity occurs because the strict supervision policy differs from the stability maintenance policy of 2008. The purpose of the former is to rectify the chaos in the market and guide the flow of funds to high-quality companies. At this time, both the stock market and regulatory policies are more mature.

However, after the structural change point, retail investors show greater preference for Internet financial products, which is not conducive to the development of direct financing, especially equity financing. Internet financial products used in this study mainly involve currency funds represented by Yu Ebao. Currency funds chiefly provide commercial banks with interbank deposits, which have increased the arbitrage space in the currency market. Adding substantial money into the currency market is bound to be detrimental to the stock market. In the short term, strict supervision policies may indicate disadvantages for retail investors. It reduces the investment expectations of retail investors in the stock market but does not reduce the personal funds flowing into short-term currency funds and even boosts this phenomenon. As shown in Models (5) and (6), the influence of attention to Internet financial products on the closing prices of the CSI 1000 and SSE 50 Indexes changed from a positive role before strict supervision to a negative role during the period of strict supervision. Moreover, compared with the negative impact on small-cap stocks, the negative impact on large-cap stocks and blue-chip stocks is even greater, which further illustrates the phenomenon of personal capital outflow in the stock market. To confirm this finding, we use the orders of less than 100,000 shares or the orders which have a value of less than 200,000 yuan as a rough measure to check the flow of funds of retail investors. Since November 2016, the net inflow of the SSE 50 Index has been significantly lower than the net inflow of the CSI 1000 Index, and such inflow has been basically negative. However, prior to this period, the net inflow of the SSE 50 was acceptable, especially during the period from March 2015 to March 2016, when the net inflow was basically positive (Figure 3). The government's intention to implement strict supervision policy to introduce funds into quality companies does not seem to have the desired effect. The funds of retail investors did not flow to the constituent stocks of the SSE 50 Index that had gathered quality companies and instead showed more serious outflows. Therefore, in the short term, the strict supervision policy of the capital market contributes to the expansion of cash flow in the currency market and reduces the proportion of equity financing, which further promotes the mismatch between investment and financing deadlines. To prevent the phenomenon of "off real to virtual" funds, we think that strengthening the currency market supervision while strictly supervising the capital market is necessary. The phenomenon of "off real to virtual" funds is inseparable from the regulatory authorities' deregulation of financial innovation products.
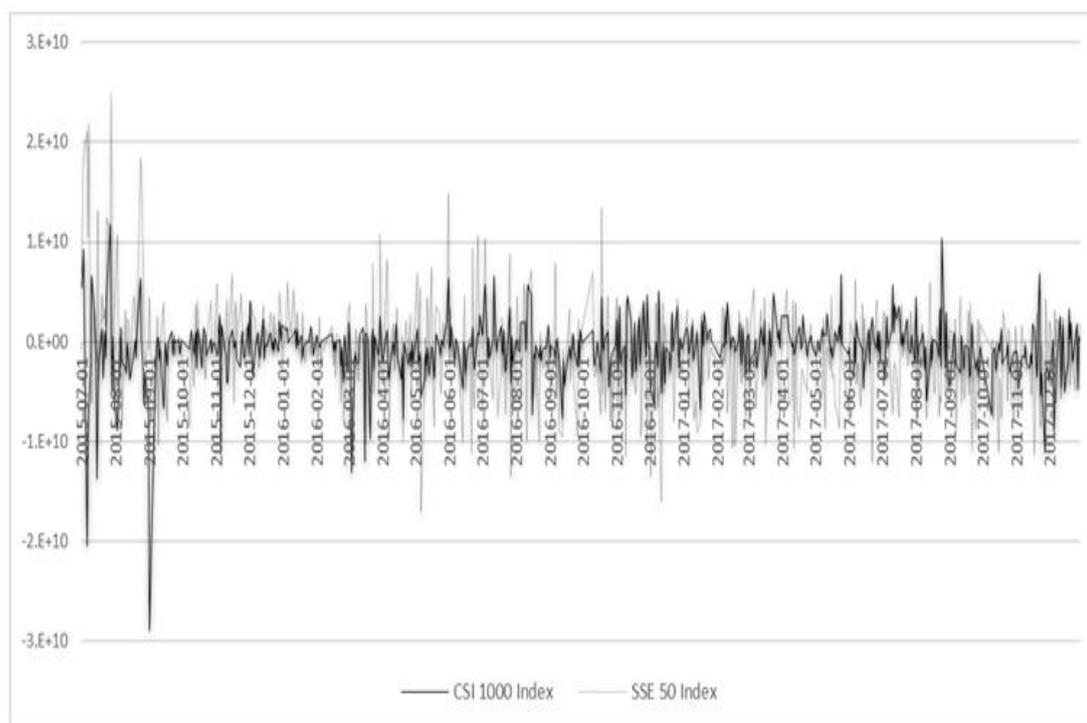
Figure-3. Net inflow of funds in CSI 1000 and SSE 50 indexes
The solid line indicates the net inflow of funds of CSI 1000 Index. The dotted line indicates the net inflow of funds of SSE 50 Index.

Before the implementation of strict supervision, attention to stock investment had a significant positive effect on the closing price of the CSI 1000 and SSE 50 indexes, which was the same outcome described by Liu *et al.* (2011). However, under strict supervision, this effect changed significantly. This attention had a positive effect on the closing price of the CSI 1000 Index but a negative effect on the SSE 50 Index. We observe the original data of this aspect of attention and find that it shows a general trend of decline during the period of strict supervision. Combined with the phenomenon in which the net inflow of funds in the SSE 50 Index (Figure 3) is basically negative, the implementation of strict supervision failed to effectively increase the willingness of retail investors to invest. This finding differs from the conclusion of Christensen *et al.* (2017) that the government's tightening supervision of the stock market will increase the retail investors' willingness to participate in the stock market, at least in the short term. The negative correlation between retail investor attention to stock investment and the closing price of the SSE 50 Index means that the movement of the said closing price is likely to be affected by the flow of institutional funds. To confirm this concept, we apply the institutional holding ratio of stocks to calculate the average ratio of the institutional holdings of the CSI 1000 and SSE 50 indexes. We find that from the third quarter of 2015 to the fourth quarter of 2017, the institutional holding ratio of the CSI 1000 and SSE 50 Indexes averaged at 27%–34% and 57%–64%, respectively. In addition, we also use the closing price on September 13, 2016 as a benchmark to calculate the stock's ups and downs. We find that stocks with high institutional shareholding ratios rise better than those with low institutional shareholding ratios. In other words, the trend of stocks with higher retail shareholdings is significantly worse than that of stocks with higher institutional ownership (Table 10).

Table-10. Institutional Shareholding Ratios and Changes of Constituent Stocks of SSE 50 and CSI 1000 Indexes

Institutional shareholding ratios		100%–80%	80%–60%	60%–50%	100%–50%	50%–0%
SSE 50 constituent stocks	Numbers	15	10	6	31	10
	Rising ratio	100%	90%	50%	87%	56%
CSI 1000 constituent stocks	Numbers	14	88	87	189	811
	Rising ratio	43%	44%	29%	38%	19%

Table.10 shows the institutional shareholdings of the constituents of the two types of indices, as well as the proportion of stocks that have risen in closing price in each proportion range from September 13, 2016 to December 29, 2017.

The attention of retail investors to the macroeconomic situation is a fundamental idea presented by Liu *et al.* (2011) who points out that such attention has a positive effect on the SCI. However, we find that with the implementation of strict supervision, the effect of attention to macroeconomic situation on the closing price of the SSE 50 Index has changed from negative to positive, and the negative impact on the closing price of the CSI 1000 Index has been weakening. The two typical aspects of the keywords that we use in the attention to macroeconomic situation are value investment that has been advocated by the Chinese government recently, and macro-control strategies which mainly include deleveraging, and lowering the interest rates on deposits, loans, and deposit reserves. The ultimate goal of value investing is to promote the flow of capital to promising quality companies. The macro-control strategy involves reducing the financing costs of enterprises, guiding the enterprises to increase the proportion of equity capital, prevent systemic risk, and promote the structural reforms of the supply-side. In short, the current macroeconomic situation in China seeks to promote the real development of the real economy. Coupled with strict supervision, such a situation is designed to provide a healthy market environment for quality enterprises and investors. This concept echoes the changes in the effect of investor attention to the macroeconomic situation on the stock market indicators.

The turnover is a typical measure of the liquidity of the stock market. According to Table 9, following the implementation of the strict regulatory policy, the ability of retail investor attention to explain turnover has weakened. The influence of attention to stock investment on the turnover of the CSI 1000 and SSE 50 indexes does not change substantially. Attention to the macroeconomic situation has no significant effect on the turnover of the indexes in two phases, which indicates that the short-term trend is not obvious. However, compared with the circumstances before the implementation of strict financial regulatory policy, attention to financial regulatory policy and Internet financial products have less influence on the turnover of the indexes and even become negative after the implementation of strict regulatory policy. Thereafter, retail investors become less active in the stock market. They become more willing to buy currency funds instead of stocks. As we concluded when analyzing the influence of retail investor attention on the closing price, the implementation of strict supervision policies, coupled with the currency funds and other factors we have not yet considered, reduce the willingness of retail investors to invest in the stock market. The negative effect on the turnover of the SSE 50 Index is particularly significant. As shown in Figure 3, the outflow of the retail investors' funds from the SSE 50 Index constituent stocks has been clear since the second half of 2016.

The preceding analysis shows that the effects of retail investor attention on the CSI 1000 and SSE 50 indexes have a clear difference. Therefore, we further investigate the phenomenon that the trend of the closing price of the CSI 1000 Index is in contrast to the trend of the closing price of the SSE 50 Index.

3.6. Trend Vision

We apply the logarithmic form of the difference between the closing price of the CSI 1000 Index and that of the SSE 50 Index as the dependent variable, namely, closing distance $ln\Delta p_t$. The independent variables are still the four attention variables presented in this paper. We use these variables to construct the regression model (9) and study the influence of retail investor attention on the peculiar phenomenon where the trend of the SSE 50 Index closing price gradually deviates from the trend of the CSI 1000 Index closing price.

$$ln\Delta p_t = \begin{cases} \theta_{10} + \theta_{11} * lnASI_t + \theta_{12} * lnAIFP_t + \theta_{13} * lnAMES_t + \theta_{14} * lnAFRP_t + \varepsilon_{11}, & 1 \leq t \leq t_0 \\ \theta_{20} + \theta_{21} * lnASI_t + \theta_{22} * lnAIFP_t + \theta_{23} * lnAMES_t + \theta_{24} * lnAFRP_t + \varepsilon_{12}, & t_0 + 1 \leq t \leq M \end{cases} \quad (9)$$

Table-11. Results of Regression Equation and Co-Integration Test

		$ln\Delta p_t$ (9)	
		$1 \leq t \leq t_0$	$t_0 + 1 \leq t \leq M$
c		6.49***	1.03**
$lnASI_t$		0.09**	0.82***
$lnAIFP_t$		0.12*	−0.003
$lnAMES_t$		−0.01	−0.002
$lnAFRP_t$		0.01	−0.21***
Adjusted R^2		0.10	0.70
F − Statistic		9.19	187.77
Prob(F − Statistic)		≪ 0.01	≪ 0.01
Residual stationary	ADF values	−3.12	−5.20
	1% critical value	−3.45	−3.45
	5% critical value	−2.87	−2.87
	10% critical value	−2.57	−2.57
	Conclusion	Stationary	Stationary
Conclusion		Co-integration	Co-integration

The dependent variable is $ln\Delta p_t$. The independent variables are $lnASI_t$, $lnAIFP_t$, $lnAMES_t$, and $lnAFRP_t$. t_0 represent the structural change point, which is equal to 346. M is equal to 605. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

As shown in Table 11, the structural relationship between the dependent and independent variables changes before and after the implementation of the strict regulatory policies. Before the implementation of the strict regulatory policies, the equation is co-integrated at the 5% level, whereas during the implementation of the strict supervision, the equation is co-integrated at the 1% level, indicating an equilibrium relationship between the dependent and independent variables in the time interval of our sample, especially after the structural change point. Retail investor attention can explain 10% and 70% of the variance fluctuations of the closing price distance before and after the structural change point, respectively. This finding indicates that with the gradual strengthening of the regulatory policy, retail investor attention has become increasingly powerful in explaining the closing price distance. Particularly, before the implementation of the strict regulatory policies, $lnAFRP_t$ has a positive but insignificant effect on $ln\Delta p_t$, whereas it has a significant negative effect after the implementation of the strict regulatory policies. $lnASI_t$ has a significant positive impact on the closing price distance, whereas the effect after strict supervision is obviously greater than that before strict supervision. $lnAIFP_t$ has a significant positive effect on $ln\Delta p_t$ before the structural change point and a small negative impact after the structural change point. $lnAMES_t$ has no significant effect on the closing price distance before and after the structural change point.

As shown in Figure 1, a particular special phenomenon where the closing price of the CSI 1000 index always falls and the closing price of the SSE 50 Index almost always rises since the implementation of the strict regulatory policies. In other words, the closing price distance decreases after the structural change point. Our independent variables can explain this phenomenon by up to 70%. Among them, the two variables of attention to regulatory

policy and to stock investment are quite significant. We speculate that retail investors with limited attention generally think that under the implementation of strict supervision policy, the constituent stocks of the SSE 50 Index outperform the constituent stocks of the CSI 1000 Index. The reason is that the constituent stocks of the SSE 50 Index are mainly blue-chip and large-cap stocks, whereas the constituent stocks of the CSI 1000 Index are mainly small-cap companies with limited liquidity. Prior to the implementation of the strict regulatory policies, the effect of retail investor attention on the two types of indexes is almost the same. However, after the implementation of the strict regulatory policies, the influence of attention on the two types of indexes changes significantly. The analysis of Models (5) and (6) shows that in the face of the constituent stocks of the CSI 1000 Index, investors prefer the constituent stocks of the SSE 50 Index after the implementation of a strict supervision policy, but their preference for currency fund products is much higher than that for the two types of stocks. This stringent regulatory policy fails to increase the retail investors' willingness to invest in the CSI 1000 Index constituent stocks and does not effectively serve as a guide to invest in the SSE 50 Index constituent stocks, instead of pushing the investors to select the currency funds. We observe the original data of attention to stock investment and find that the data have always been in a downward trend since the implementation of the strict regulatory policies. Therefore, the implementation of strict regulatory policies has not effectively increased the willingness of retail investors to invest in the stock market. The proportion of retail investors in the CSI 1000 Index is higher than the institutional shareholding ratio. Thus, the continued decline in the retail investors' willingness to invest prompts a decline in the CSI 1000 Index. The high shareholding ratio of the SSE 50 Index is the institution, whereas the decline in the investors' willingness to invest does not have a significant impact on the SSE 50 Index.

4. CONCLUSION

We use daily data from July 13, 2015 to December 29, 2017 to study the effects of retail investor attention on the Chinese A-share market with obvious policy-oriented market characteristics as the Chinese government gradually strengthens its supervision of financial markets. We review many previous documents and find that they do not consider the regulatory policy when investigating the stock market and retail investor attention and seldom study the influence of investor attention to various aspects of information on the stock market. The main research purpose of this work is to study the influence of retail investor attention on the stock market in consideration of the financial supervision policy. To conduct the study, we choose the turnover and closing prices of the CSI 1000 Index and SSE 50 Index as the stock market quotation indices because the CSI 1000 Index comprehensively reflects the performance of a group of small-cap companies and the SSE 50 Index comprehensively reflects the overall status of a group of high-quality and large-cap companies. We use the Baidu search index as the direct proxies for retail investor attention and categorize the attention of retail investors. To consider the problem of collinearity, we divide the attention of retail investors into four categories for the regression models, namely, ASI, AIFP, AMES, and AFRP. We use the aforementioned variables to construct models, examine the effect of retail investor attention on the stock market under financial regulatory policies, and analyze the changes in the influence of retail investor attention on the stock market before and after the implementation of the strict regulatory policies.

We first construct the global linear regression model and find that the ability of retail investor attention to interpret the fluctuation of the variance of the CSI 1000 Index closing price is greater than the ability to interpret the fluctuation of the variance of the SSE 50 Index closing price. Moreover, the ability of retail investor attention to interpret the fluctuation of the variance of turnover is greater than the ability to interpret the fluctuation of the variance of closing price. However, considering that changes in the regulatory policy may change the influence of retail investor attention on the stock market indicators, we use the Chow test to test the models and obtain a structural change point, which represents the time of the intensive implementation of the strict regulatory policies. Then, we construct new models with subsamples. Before the implementation of the strict regulatory policies, the explanatory power of retail investor attention on turnover is higher than that after the implementation of the strict

regulatory policies, whereas the ability to explain the closing price is exactly the opposite. Based on the different influences of retail investor attention on the two types of indices, a new model is constructed to explain this vision from the perspective of retail investor attention and explain the abnormal movement of the two types of indices. We find that retail investor attention can explain the vision up to 70% after the implementation of the strict regulatory policies.

The analysis of the models conclude that various aspects of retail investor attention have different effects on the stock market index even if the same aspect of attention has different effects on various types of indexes. In particular, the changes in external factors affect the impact of retail investor attention on the stock market indexes. Although we have not sufficiently confirmed that changes in the effects are due to the implementation of strict supervision policy, we detect the effects of changes according to the time point of intensive implementation of strict regulatory policies. Therefore, we cannot exclude this factor. In addition, we find a problem that needs to be emphasized. That is, the implementation of strict supervision policy does not effectively increase the willingness of retail investors to invest during the sample period. The implementation of such a policy fails to improve the investors' willingness to invest in the constituent stocks of the CSI 1000 and SSE 50 indexes, and it does not control retail investors' pursuit of currency funds.

Although, we discover the noneffective aspects of the strict supervisory policies adopted since Shiyu Liu took office, we do not deny the effectiveness of them. The aspects that reflect the effectiveness of the strict regulatory policies are not fully explained by our data. Thus, this issue deserves to be studied in the future. Moreover, our research helps market participants to have a microscopic understanding of the behavior of investors under regulatory policies, not excluding foreigners.

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