Investigating Investors Trading Behavior and Transactional Performance

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Abstract: *In this study by the use of Vector Autoregressive model and weekly performance scale of Greenbelt portfolio and Titman, trading patterns and transactional performance components of individual and institutional investors in Tehran Stock Exchange in the years of 2010 to 2014 has been investigated. Results totally showed that, individual investors had herding behavior but institutional investors adopted contrarian strategy. Nevertheless, there were no evidence for adoption Momentum strategy by individual and institutional investors. Institutional investors had better transactional performance in the most trading interval by adapting contrarian strategy, and significant portion of revenue was because of appropriate market timing. Although choosing inappropriate stock affected their revenue. Against, despite of the fact of reasonable performance of individual investors in terms of stock selection, part of transactional performance revenue has been wasted because of inappropriate market timing.*
Key words: *Vector Autoregressive, Contrarian Strategy, Momentum Strategy, herding behavior.*

INTRODUCTION

In theory of asset pricing such as Capital Asset Pricing Model (CAPM) and Arbitrage Pricing, if asset has not been priced properly, investors quickly and in unlimited quantities transact that, so prices adjust quickly and reach the balance point. Actually in Efficient Market hypothesis which is one of the most fundamental financial theory, investors can not achieve abnormal revenue by forecasting the price. While in the last three decades, indication of anomalies and the advent of new fields of finance which named science behavioral finance, market efficiency has been challenged. Actually the most of investors seek for achieving abnormal revenue by forecasting market price trends.

In recent studies which have been investigated the various investors trading activities was found that investors conform numerous trading patterns as anomalies and many of them are traders who adopt contrarian strategy or momentum strategy and sometimes have herding behavior. Studies in emerging markets show that institutional investors buy last loser stocks and sell last winning stock (contrarian strategy) and individual investors following herding behavior in terms of market timing and stock selection have different performance.

In the line with the studies, the purpose of this article is to investigate trading patterns and transactional performance of two main groups of investors (individual and institutional) and trading behavior effect on the performance of these two groups in Tehran Stock Exchange. Therefore, first each of trading patterns of individual and institutional investors are identified and then trading performance in both groups in terms of market timing and stock selection will be analyzed.

According to what has been said, the main hypothesis of the research are as follow:

1. Individual and institutional investors follow different trading patterns.
2. Institutional investors transactional performance has significant different with individual investors transactional performance.

Subsidiary hypothesis of the research are also as follow:

First sub-hypothesis: individual investors follow herding behavior.

Second sub-hypothesis: institutional investors follow contrarian strategy.

Third sub-hypothesis: individual investor's performance in term of "market timing" is weaker than institutional investors.

Forth sub-hypothesis: institutional investor's performance in term of "stock selection" is weaker than individual investors.

History of Research

Experimental studies have achieved different trading patterns of types of investors. Multiple researches show that the investors apply contrarian and momentum strategies in their investments and herding behavior also is seen among them.

Results of Grinblatt and Keloharju (2000) by the use of two year data of Finland Stock Exchange, analyzed the difference in behavior based on the different types of investors' past efficiency. Results showed that individual investors conducted revers and Finnish institutional investors applied contrarian strategy. In other research, Nofsinger and Sias(1999) research in New York Stock Exchange during the study of all individual and institutional investors daily deals in the period of 1977 to 2996 showed that institutional investors used momentum strategy more than individual investors and the effect of herding behavior of institutional investors on price was more than individual investors. Griffin, Harris and Topaloglu (2003) also by using quantitative analysis studied the daily cross connection between the stock revenue and individual and institutional investors' deals in nearly 100 papers. Results showed that institutional investors was seeking for returns by buying the winner stock and selling the loser stock. On the other hand, Lee (2011) by studying on Norwegian investors got that individual investors follow the contrarian strategy but institutional investors do not follow any specific trading strategy.Phansatan, Powell, Tanthanongsakkun, Treepongkaruna (2012) using data about daily transaction of four categories of investors in Thai Stock Exchange during the 1999 to 2004 and presenting the vector regressive model found that individual investors often follow herding behavior and institutional investors mainly adopt the opposite behavior. Finally the results of Ahmad Walid (2014) research in Qatar Stock Exchange which was done by using investment flows and autoregressive model showed that individual investors follow contrarian strategy while institutional investors follow momentum strategy.

Numerous researches which conducted to discover trading patterns of investors, often have studied their trading performance. The results of these researches show that different trading patterns of investors have resulted to different performance.

Barber, Lee and Odean (2004) in an article by analyzing the performance of Taiwanese investors during the five years ending in 1999, found that individual investors transactions reduce 3 percent of their annual performance and tis trading losses is due to offensive orders. On the other hand the results of this study also showed that institutional investors' transactions add one percent to their annual performance.Lee (2014) in a research in addition to identified Norwegian individual investors trading patterns found that the performance of this group of investors was depended on desirable market timing. Phansatan and his colleague (2011) also in a research studied the transactional performance of four group of investors in Thai Stock Exchange meanwhile identifying their trading behavior. They found that although institutional investors in Taiwan have desirable performance because of market timing but they are weak in stock selection. Also their research

results uphold the results of previous research which mean that herding behavior of individual investors according to inappropriate market timing lead to weak performance. Finally, Ahmad Walid (2014) by studying the investments flows of individual and institutional investors in Qatar showed that institutional investors have desired performance in market timing against individual investors' performance.

In order to identify the trading strategies of investors in the capital market of Iran, no study has done separately according to investors. Nevertheless, there are some researches which study the usefulness of momentum and contrarian strategies and identifying herding behavior of investors. For example, Mehrani and NonahalNahr (2007) in a research by executing t student statistical tests and Pierson correlation and by using short-term returns of 110 accepted company in Tehran Stock Exchange during the years of 1998 to 2005 found that unlike many of foreign researches it cannot see slowly and less than excepted reaction in 6 months so could not achieve important surplus efficiency in 6 month by using contrarian strategy in Tehran Stock Exchange. Nikbakht and Moradi (2004) studied the cross reaction hypothesis in Tehran Stock Exchange by using the mean of unusual efficiency of winner and loser portfolios in the years of 1991 to 2002. Results show the efficiency of contrarian strategy in Tehran Stock Exchange.

Kamali (2006) also in the similar research with the purpose of study the efficiency of momentum and contrarian strategies experiment the 50 company data accepted in Tehran Stock Exchange during 5 years (2001-2005). Results showed that the effect of momentum strategy in short-term could be seen in the Tehran Stock Exchange. Saeedi and Bagheri (2009) by the use of 70 accepted company data in Tehran Stock Exchange during the years of 2001- 2006 studied the efficiency of contrarian strategy. Results showed the usefulness of this strategy in Tehran Stock Exchange.In the newest study of ShariatPanahi, Sohrabi and Shariati (2013) with the sample of 80 active company in Tehran Stock Exchange in a period of 2006 to 2010 and using cumulative returns criterion, studied the contrarian strategy based on risk-reward stock selection. The results showed the profitability of contrarian strategy based on considered criterions.

In the field of herding behavior in Tehran Stock Exchange there are numerous studies. For example Keshavarz, Haddad and Rezai (2009) by studying daily, weekly, monthly and seasonal stock revenue of major investors of companies in Tehran Stock Exchange and applying data of the years of 2005 to 2007 achieved some evidences based on herding behavior among institutional investors in Tehran Stock Exchange. Moreover, Islami and Shahriyari (2006) in a research using the deviation of stock revenue of companies from market efficiency in daily, weekly, monthly interval during the years of 2000-2004 gained the evidence based on herding behavior in time of market inactivity.

In the field of study about investors' performance of portfolio management, Ahmadpour and Ghorbani (2012) by the use of integrative models during the years of 2008-2010, studied the performance of stock selection among individual and institutional investors. Results showed that there was no significant difference between their management performances.

In the newest studies, Etemadi, Daghani, Azizkhani and Farahbakhsh (2013) used the Trainer model to assess the skill of market timing and studied the performance of portfolio manager and investment companies during the year of 2004-2010. Results showed that there was no appropriate skill of market timing among portfolio managers and investment companies.

Methodology

This study is retrospective studies which is done by analyzing observed data. Population of the study are active individual and institutional investors in Tehran Stock Exchange which their all transaction data are used in the study. The sample of study consist of daily transaction details of active individual and institutional investors in market (the volume of value and cash of buying and selling in two groups) and also the index is considered from the beginning of the 2010 till the end of 2014, including 259 transactional week. The main variables have been calculated weekly.

Variables

According to the hypothesis and models used in the study endogenous variables are as follow:

Net investment flows (NIF): In the first step,for comparing the behavior and the performance of investors, trading patterns of two groups of investors is tested by using weekly data for the diagnosis the net mark of $(NIFI_t)$ and for institutional investors $(NIFJ_t)$ which are calculated from formula 1 and 2:

Formula 1 $NIF_{i,t} = \frac{buying\ value_{i,t} - selling\ value_{i,t}}{buying\ value_{i,t} + selling\ value_{i,t}}$

Formula 2 $\quad NIF_{j,t} = \frac{buying\ value_{j,t} - selling\ value_{j,t}}{buying\ value_{j,t} + selling\ value_{j,t}}$

Which buying value (i,t) is the buying volume of individual investors in t week, selling value (i,t) is the selling value of individual investors in t week, buying value (j,t) is the buying volume of institutional investors in t week, selling value (j,t) is the selling value of institutional investors during t week.

Return rate

The market index used to calculate the return rate. Thus weekly return rate is obtained by formula 3 for 259 transactional week.

Formula 3 $\qquad\qquad\qquad\qquad R = \frac{index(t) - index\ (t-1)}{index\ (t-1)}$

Which R is the weekly return rate of Tehran Stock Exchange, index (t) is the index of Tehran stock Exchange at the end of the week and index (t-1) is the index of Tehran Stock Exchange at the beginning of the week.

Research models

The study's hypothesis is investigated in two parts. The first one identify trading patterns of individual and institutional investors and the second one study the transactional performance of 2 group.

In first part, for transaction performance detailed study with the positive or negative feedback of each investors or in other word to identify the trading patterns of investors, market efficiency and past net investment flows is used to explain net investment flows for current week of each investors. Due to potential relationship between net investment flows and lagged net investment flows of both groups of investment and previous returns, to calculating correlation of investment flows vector autoregressive model (VAR) is used. (Formula 4)

Formula 4

$$NIFI_t = \sum_{n=1}^{p} \beta R_{t-n} + \sum_{n=1}^{p} \lambda NIFI_{t-n} + \sum_{n=1}^{p} \gamma NIFJ_{t-n} + \varepsilon_t$$

In the formula, R_{t-n} is the return rate for the week (t-n) , $NIFI_{t-n}$ is the net investment flows of individual investors for the week (t-n), $NIFJ_{t-n}$ is the net investment flows of institutional investors for the week (t-n), ß is the correlation between $NIFI_t$ and R_{t-n}, λ is the correlation between $NIFI_t$ and $NIFI_{t-n}$, γ is the correlation between $NIFI_t$ and $NIFJ_{t-n}$, p is the degree of vector autoregressive model.

Noted that the significant positive correlation of ß indicates adopting momentum strategy and the significant negative correlation of ß indicates adopting contrarian strategy of individual investors. In the other hand, the positive correlation of γ indicates herding behavior among two groups of investors and the negative correlation of γ indicates the different behavior or in another word shows adopting contrarian strategy. In the above vector autoregressive model an estimation which is achieved by the minimum accaeike information ensure an appropriate degree of autoregressive.

In the second part, portfolio performance scale of Grinblatt and Titman (1993) is used to study the transactional performance of individual and institutional investors of Tehran Stock Exchange and by that the net transaction performance of each investors is measured in the period of portfolio holding. Net cash gains from every week transaction of investors is estimated by using monetary value of weekly buying and selling. So transactional performance of each investors depends on market timing and stock selection. Market timing is the method of buying and selling the financial assets by predicting future market price volatility while stock selection is the method of choosing the best stock for gaining the maximum returns with low risk tolerance. Transactional performance scale will show when every investors in excellent performance of selected stock have more net buy orders than median net trade value works better than others. Meanwhile total cash gains indicates the cash value implicitly created by deals in h deal week of t week.

Total cash gains for individual investors is shown by πI_t and for institutional investors by πJ_t according to formula 5 and 6.

Formula 5 $\qquad \pi I_t = [YI_t^b \left(\frac{PI_t^S + h}{PI_t^b}\right)^{1/h} - YI_t^S \left(\frac{PI_t^b + h}{PI_t^S}\right)^{1/h}]$

Formula 6 $\qquad \pi J_t = [YJ_t^b \left(\frac{PJ_t^S + h}{PJ_t^b}\right)^{1/h} - YJ_t^S \left(\frac{PJ_t^b + h}{PJ_t^S}\right)^{1/h}]$

In the above formulas, YI_t^b is the adjusted median buying amount, YI_t^s is the adjustedmedian selling amount, PI_t^b is the adjustedmedian buying price, PI_t^s is the adjustedmedian selling price for individual investors in the t week and YJ_t^b the adjustedmedian buying amount, YJ_t^s is the adjustedmedian selling amount, PJ_t^b is the adjustedmedian buying price, PJ_t^s is the adjustedmedian selling price for institutional investors in the t week and h is the duration of trading weeks which are equaled to 1,4,8,13,26 and 52.

To identify trading benefit and loss of any investors total cash gains of each of them could be divided to two component of stock selection and market timing as formulas 7 and 8.

Formula 7 $\qquad \pi I_t = \pi I_t^T + \pi I_t^S$

Formula 8 $\qquad \pi J_t = \pi J_t^T + \pi J_t^S$

In the above formulas, πI_t is the total cash gains of individual investors, πI_t^T is a component of market timing in totalcash gains and πI_t^S is a component of stock selection in totalcash gains of individual investors and πJ_t is thetotal cash gains of institutional investors, πJ_t^T is a component of market timing in totalcash gains and πJ_t^S is a component of stock selection in totalcash gains of institutional investors.

In order to quantify the financial performance component related to market timing formula 9 and 10 is used.

Formula 9 $\qquad \pi I_t^T = (YI_t^b - YI_t^s)|R_{t+h}^M|^{1/h}$

Formula 10 $\qquad \pi J_t^T = (YJ_t^b - YJ_t^s)|R_{t+h}^M|^{1/h}$

In above formula, $|R_{t+h}^M|$ is the absolute value of the rate of market efficiency during the maintenance period of h weeks. $(YI_t^b - YI_t^s)|R_{t+h}^M|^{1/h}$is total cash gains of net purchases of individual investors. $(YJ_t^b - YJ_t^s)|R_{t+h}^M|^{1/h}$istotalcash gains of net purchases of institutional investors.

Finally stock selection transaction performance component of each two groups of investors is achieved from formula 11, 12.

Formula 11

$$\pi I_t^S = \left[YI_c^b \left(\frac{PI_t^S + h}{PI_t^b}\right)^{1/h} - YI_c^S \left(\frac{PI_t^b + h}{PI_t^S}\right)^{1/h}\right] - (YI_t^b - YI_t^s)|R_{t+h}^M|^{1/h}$$

Formula 12

$$\pi J_t^s = \left[YJ_c^b \left(\frac{PJ_t^s+h}{PJ_t^b}\right)^{1/h} - YJ_c^s \left(\frac{PJ_t^b+h}{PJ_t^s}\right)^{1/h} \right] - (YJ_t^b - YJ_t^s)|R_{t+h}^M|^{1/h}$$

To compare the transactional performance scale of individual and institutional investors in six interval mentioned transaction for all three mentioned scale, nonparametric Wilcoxon test has been conducted.

Descriptive statistics of trading value of any kinds of investors during the years of 2010 to 2014 has been shown in table 1.

Table 1: descriptive statistic the value of transaction of investors (million Rial)

Variable	Mean	Median	Max	Min	Standard deviation
Institutional investors					
Buy	3,300,841	2,030,065	79,507,250	8,994	5,912,323
Sell	3,352,375	1,968,125	79,482,620	22,278	5,988,326
Net buy (sell)	-51,533	53,593	947,590	- 3,968,840	474,672
Individual investors					
Buy	1,098,413	947,740	4,913,810	25,667	857,957
Sell	1,046,876	871,260	4,463,400	22,992	743,491
Net buy (sell)	51,536	-23,414	3,967,750	-947,590	474,670

Research Finding

The results of the first hypothesis

The first hypothesis studied the trading patterns of individual and institutional investors in Tehran Stock Exchange. In this line, as mentioned, the most desirable model gained by comparing the estimated results and accaeike information criterion ACI values. VAR model was estimated in 5 degrees then by comparing the results of one, two, three, four and five degree, finally the VAR model was selected the most desirable model, because the ACI value achieved in VAR model from degree two was lower than similar value of other estimated VAR models from other degrees and also because all coefficients of VAR model from degree two was 95 percent significant. Coefficients of model and summary of the results can be seen in table 2.

Table 2: estimate VAR model from degree two

Variable	Coefficient	T statistic	Standard Error
B	-0.01368	4.5899	0.00298
A	0.146213	2.14448	0.06818
T	-0.66831	11.92807	0.05858

Determined coefficient	0.839907
Adjusted determined coefficient	0.832347
F statistic	5.278851
ACI statistic	25.84107

According to the results from forth model with degree two (table 2) and also trading pattern of individual and institutional investors coefficient which all of them are 95 percent significant, first hypothesis is approved. In other word, individual and institutional investors adopt different trading patterns.

The results of the second hypothesis

In the second main hypothesis of research studied the transactional performance of individual and institutional investors in Tehran Stock Exchange. So after calculating each transactional performance scales of individual and institutional investors and ensure the non-normal distribution among obtained values, for comparing the transactional performance of two groups nonparametric Wilcoxon was conducted which its results is seen in table 3. In explanation of table 3 it can be said, if this phrase: there is no significant difference between transactional performance of individual and institutional investors considers as a null hypothesis, lower probability value from 0.05 doesn't confirmed the null hypothesis. So the results obtained from formula 11,12 and also table 3 show the significant different between transaction performance of individual and institutional investors in the weekly trading interval of 1, 4, 13, 26, 52. The second hypothesis is confirmed too at the 95 percent level.

Table 3: Wilcoxon test on total cash gains

description		interval	Number	Average rating	Interval	Number	Average rating
Comparing the individual investors returns versus institutional investors return	Negative rating	1	63	76.57	13	133	144.36
	Positive rating		196	147.17		126	114.84
	Z statistic		-9.953			-1.96	
	P-VALUE		0			0.05	
	Negative rating	4	82	152.13	26	147	143.89
	Positive rating		177	119.75		112	111.77
	Z statistic		-3.613			-3.577	
	P-VALUE		0			0	
	Negative rating	8	115	145.17	52	151	145.41
	Positive rating		144	117.88		108	108.45
	Z statistic		-0.116			-4.244	
	P-VALUE		0.908			0	

The first sub-hypothesis results

In this hypothesis trading patterns of individual investors in Tehran Stock Exchange is studied. The results of estimated model number 4 with degree two (table2) indicates the positive λ factor and it is significant at 95% level. As mentioned before when λ which indicates correlation between present net investment flows and past net investment flows be positive, person takes herding behavior. So it can be said that the hypothesis is

confirmed and individual investors have herding behavior in Tehran Stock Exchange. It is worth to mention that β factor which is located in the model indicates the correlation between present net investment flows and past return index shows the contrarian or momentum strategy of individual investors. Due to the low value of this factor it can be said there is no evidence based on adopting momentum and contrarian strategy by individual investors.

The second sub-hypothesis results

In this hypothesis trading patterns of institutional investors in Tehran Stock Exchange is studied.The results of estimated model number 4 with degree two (table2) indicates the negative γ factor and it is significant at 95% level. γ is the sign of correlation between the present net investment flows of individual investors and the past net investment flows of institutional investors indicates the trading pattern of institutional investors. Being positive shows the herding behavior and being negative indicates adopting contrarian strategy. So according to be negative of γ factor in the model this hypothesis is confirmed. In another words, institutional investors follow the contrarian strategy in Tehran Stock Exchange.

The third sub-hypothesis results

In this hypothesis transactional performance of individual investors and institutional investors in term of market timing is studied.in this line after calculating each transactional performance scales of market timing of individual and institutional investors and ensure the non-normal distribution among obtained values, for comparing the transactional performance of two groups nonparametric Wilcoxon has been conducted which its results is seen in table 4. In explanation of table 4 it can be said, if this phrase: there is no significant difference between transactional performance of individual and institutional investors in term of market timing, considers as a null hypothesis, lower probability value from 0.05 doesn't confirmed the null hypothesis. The results of formula 9, 10 and Wilcoxon test (table 4) show that In general, the null hypothesis is not confirmed in any of the trading interval. It means, individual and institutional investors' performance in term of market timing in all trading interval is different. Also since the average rating of institutional investors return is more than average rating of individual investors returns, it can be said transactional performance of individual investors in term of market timing is weaker than institutional investor in all trading interval so the hypothesis is confirmed at the level of 95%.

Table 4: Wilcoxon test for market timing in total cash gains

description		interval	Number	Average rating	Interval	Number	Average rating
Comparing the individual investors returns versus institutional investors return	Negative rating	1	156	138.68	13	156	145.15
	Positive rating		103	116.85		103	107.05
	Z statistic		-3.977			-4.814	
	P-VALUE		0			0	
	Negative rating	4	156	144.68	26	156	145.32
	Positive rating		103	107.77		103	106.8
	Z statistic		-4.752			-4.835	
	P-VALUE		0			0	

	Negative rating		156	144.85		156	145.63
	Positive rating	8	103	107.5	52	103	106.32
	Z statistic		-4.775			-4.876	
	P-VALUE		0			0	

The forth sub-hypothesis results

In the fourth sub-hypothesis transactional performance of individual and institutional investors in term of stock selection is studied which its results have been shown in table 5. The results of table 5 is interpreted similar to table 4. Since the average rating of individual investors return is more than average rating of institutional investors returns, it can be said transactional performance of institutional investors in term of stock selection is weaker than individual investor in all trading interval so the fourth sub-hypothesis is confirmed at the level of 95%.

Table 4: Wilcoxon test for stock selection in total cash gains

description		interval	Number	Average rating	Interval	Number	Average rating
Comparing the individual investors returns versus institutional investors return	Negative rating	1	65	68.17	13	68	82.79
	Positive rating		194	150.72		191	146.81
	Z statistic		-10.279			-9.285	
	P-VALUE		0			0	
	Negative rating	4	64	75.98	26	72	85.64
	Positive rating		195	147.73		187	147.08
	Z statistic		-9.921			-8.841	
	P-VALUE		0			0	
	Negative rating	8	66	79.18	52	68	92.85
	Positive rating		193	147.38		191	143.23
	Z statistic		-9.620			-8.719	
	P-VALUE		0			0	

Conclusion and suggestions

Despite the persistence of the efficient market hypothesis which is the most fundamental financial theory during many years, the incidence of anomalies in the financial market challenged that. Unlike the claims of the theory many of investors gain unusual revenue by following different trading patterns. According to

several studies conducted in the field of identifying different trading patterns among investors and its impact on their transactional performance in financial market, generally the results of this research show that different trading patterns of individual and institutional investors in Tehran Stock Exchange lead to different transactional performance. Results show that adopting contrarian strategy by institutional investors in most trading interval achieved more desirable transactional performance which most of cash gains of this group of investors has been gain because of appropriate market timing. Nevertheless it seems that there are several reasons such as lack of information transparency in Tehran Stock Exchange, stop the symbol suddenly and long duration of sudden stops of some companies' logo and so on causing poor performance of this group of investors in term of stock selection which is unexpected. While, following the herding behavior by individual investors causing their poor transactional performance and undesirable market timing neutralized the transactional benefits of good stock selection. The results of this research are similar to some results of Phansatan and his colleague (2012) research and Ahmad Walid (2014) in emerging markets of Thai and Qatar. So that based on the results of Phansatan and his colleague (2012), individual investors of Thai have herding behavior and institutional investors follow reverse behavior. In other hand, depend on the results of these researcher's studies individual investors' performance of Thai and Qatar in term of market timing evaluated undesirable, while institutional investors achieve desirable performance.What can be seen in the main results of internal research shows the efficiency of contrarian strategy. This research with previous results representing institutional investors' benefit of this kind of strategy and achieving its benefits. Nevertheless the results of this research is in contrast with the results of Etemadi and others (1393) research about an appropriate enabling in market timing among institutional investors. On the other hand, the results of this research are not consistent with the result of Ahmadpour and Ghorbani (1392). Based on their findings there is no significant difference in the ability of stock selection among individual and institutional investors. Generally it seems that large scale unsustainable policies, structural problems such as inflation and high interest rate and low depth of Tehran Stock Exchange and its microstructure, causing many of market participants (individual investors) follow herding behavior without long-term planning and always with short-term view and without any analysis by tolerating high transactional costs have poor performance compared with institutional investors.

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