Investor sentiment in the Chinese stock market: an empirical analysis

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Published online: 09 Jun 2011.

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This article focuses on investor sentiment and its relationships to stock returns and volatility in the Chinese stock market. By using mutual fund flows as a substitute for investor sentiment for different stocks, this study finds that investor sentiment has a tremendous impact on stock returns in the Chinese stock market. However, some of our results are inconsistent with previous research. Since the Chinese stock market is still an emerging capital market, one explanation for the inconsistency is that investor sentiment has comparatively stronger impact on stock returns in China.

I. Introduction

The history of the stock market is full of events striking enough to earn their own names: the Go-Go Years of the late 1960s, the Black Monday crash of October 1987 and the Internet or Dot com bubble of the 1990s (Baker and Wurgler, 2007). Researchers in behavioural finance have therefore been working hard to explain the market anomalies that people cannot explain under the traditional rational hypothesis. Investor sentiment, as an important subject in behavioural finance, is a belief about future cash flows and investment risk that is not justified by the facts at hand (De Long *et al.*, 1990).

There is an extensive body of behavioural finance literature that studies the different trading behaviours of institutions and individuals (Sundar *et al.*, 2000; Fiotakis and Philippas, 2004; Menkhoff and Schmidt, 2005; Li, 2007; Yu *et al.*, 2008).

However, related papers (Brown and Cliff, 2005; Verma and Verma, 2007; Schmeling, 2009) mainly study the sentiment effects on market aggregates because the sentiment measures are available only for the market as a whole. These investigations hardly answer the question that which kind of stocks tends to be disproportionately sensitive to broad waves of investor sentiment or the relationship between sentiment and individual stock returns since investor sentiment tends to vary across stocks.

Our aim is to explain which categories of stock investor sentiment will likely be affected, rather than simply pointing out that the level of stock prices in the aggregate depends on sentiment. We conduct our analysis in two main steps. First, we construct a measure for investor sentiment for individual stocks based on the mutual fund flows. Then we test the relations among sentiment, stock returns and volatility.

II. Measuring Investor Sentiment

The way to measure investor sentiment becomes the key point, since the main purpose of this article is to test the property of investor sentiment in the Chinese stock market. Generally, individual account is an appropriate source for investor sentiment. However,

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secrecy of investor trading information disappoints most researchers.

On the other hand, individual investors actively real-locate their money across different types of mutual funds. As a result, one can measure individual sentiment by looking at which funds have inflows and which have outflows and relate this sentiment to different stocks by examining the holding of mutual funds. Frazzini and Lamont (2008) devised a measure based on flows, which is defined as the actual ownership by mutual funds minus the ownership that would have occurred if every fund had received identical proportional inflows.

We will provide an example of computing investor sentiment for a Chinese stock based on the mutual fund flows. We suppose that at quarter 0, the entire mutual fund sector consists of two funds: Fund-A with 40 million Renminbi (RMB) in assets and Fund-B with 60 million RMB. Suppose at quarter 1, Fund-A has an outflow of 5 million RMB and has capital gains of 5 million RMB, so that its assets remain constant, while Fund-B has an inflow of 10 million RMB and capital gains of 10 million RMB, so that its assets reach to 80 million RMB. Suppose in quarter 1, Fund-A has 10% of its assets in Vanke, while Fund-B has 20% of its shares in Vanke. Thus in quarter 1, the mutual fund sector as a whole owns $40 \times 10\% + 80 \times 20\% = 20$ million RMB in Vanke. If Vanke has 200 million RMB in market capitalization in quarter 1, the entire mutual fund sector owns 10% of Vanke.

We now construct a counterfactual world where investors simply allocate flows in proportion to initial fund asset value. Since in quarter 0 the total mutual fund sector has 100 million RMB in assets and the total inflow is 5 million RMB, the counterfactual assumption is that all funds get an inflow equal to 5% of their initial asset value. Following Frazzini and Lamont, to simplify we also assume that the flows all occur at the end of the quarter, thus the capital gains earned by the funds are not affected by these inflows.

Accordingly, in the counterfactual world, Fund-A would receive $(0.4) \times (5) = 2$ million RMB (giving it total assets of 47 million RMB), while Fund-B would receive $(0.6) \times (5) = 3$ million RMB (giving it total assets of 73 million RMB). In the counterfactual world, the total investment in Vanke is given by $47 \times 10\% + 73 * 20\% = 19.3$ million RMB, which is 9.65% of its market capitalization. Hence, the sentiment (S) for Vanke, the per cent ownership of Vanke due to the nonproportional allocation of flows to mutual fund, is $10\% - 9.65\% = 0.35\%$.

Accordingly, following Frazzini and Lamont, we compute the sentiment indicator for individual stocks held by mutual funds.

III. Sample and Data Collection

In implementing our analysis, we have chosen to concentrate on individual stocks in the Chinese stock market instead of market aggregate. We perform the subsequent empirical analysis at quarterly frequency, and most of the quarterly data range from January 2004 to June 2008. A few variables are not available for the full sample, so we perform some of the analysis on slightly shorter subsamples. Table 1 shows the summary statistics of stock returns and investor sentiment.

After constructing the sentiment measure, we will discuss its relationships to stock returns and volatility in Section IV.

IV. Empirical Results

Sentiment effect on stock returns volatility

Table 2 presents an overview of the portfolio returns based on the last available flows. Stocks are ranked in ascending order based on the last quarterly flows. We

Table 1. Descriptive statistics

Time	2004:01	2004:02	2005:01	2005:02	2006:01	2006:02	2007:01	2007:02	2008:01
Mean R	–	−0.0337	−0.1861	0.000975	0.367217	0.277867	0.51914	0.29254	−0.7854
Median R	–	−0.0068	−0.177	−0.02372	0.3509	0.267	0.5092	0.2809	−0.7749
SD R	–	0.2324	0.273	0.245	0.312	0.3019	0.3	0.256	0.328
Minimum R	–	−0.836	−0.857	−0.764	−0.285	−0.385	−0.23	−0.382	−1.73
Maximum R	–	0.443	0.381	0.524	1.215	1.005	1.577	1.18	0.04
Mean S	4.00E−05	0.00073	0.00125	5.95E−05	−0.00266	0.001936	0.01117	−0.003	0.0001
Median S	1.00E−05	0.001	0.00099	1.14E−05	7.92E−05	−2.00E−05	0.00235	0.00356	0.0027
SD S	0.0002	0.00363	0.00483	0.0081	0.02945	0.019505	0.03	0.04764	0.046
Minimum S	−0.001	−0.0168	−0.0188	−0.045	−0.1515	−0.051	−0.0877	−0.2472	−0.286
Maximum S	0.0009	0.0095	0.013	0.0261	0.08	0.087	0.13687	0.078	0.0964

Notes: '2004:01' represents the first half year of 2004, and '2004:02' represents the second half year of 2004. *R* represents the stock returns and *S* represents the investor sentiment.

Table 2. Calendar time portfolio returns and flow, 2004–2008

|	Low sentiment	Median sentiment	High sentiment
Panel A: Sentiment level			
Average	−0.02	0.001	0.01
SD	2.00 E–4	3.00 E–6	1.00 E–4
Panel B: Equally weighted stock returns			
Average	0.09	0.001	0.06
SD	0.16	0.17	0.18
Panel C: Value-weighted stock returns			
Average	0.28	0.03	0.10
SD	0.08	0.22	0.21

Notes: In Panel A, we report average and SDs of the flow variable. In Panel B, we report equally weighted average and the SDs of stock returns. Panel C shows the value-weighted average and the SDs of stock returns in each portfolio.

notice that high flows go with the high return volatility, for instance, the SDs of stock returns for the three portfolios are 0.16, 0.17 and 0.18, respectively. As a result, we confirm that investor sentiment has an impact on volatilities. As investor sentiment follows a positive-feedback process, we argue that the Chinese investors exhibit a trend-chasing behaviour, which destabilizes exchanges and hence increases market volatility. Moreover, we will further investigate the relationship between sentiment and stock returns in Section 'Sentiment effect on accumulated stock returns'.

Sentiment effect on accumulated stock returns

We ask the question of whether, over the long-term, high-sentiment stocks are earning higher returns than low-sentiment stocks. Thus, we test the performances of stocks with different beginning-of-period sentiments to investigate how long the initial sentiment will affect stocks' future returns and whether investor sentiment causes mispricing. We sort stocks into deciles portfolios based on the beginning-of-period sentiment, and we will not change the portfolio throughout the whole period.

Figure 1 displays the different future performances of the stock portfolios with the positive sentiment and the negative sentiment at the beginning of the period. Accumulated stock returns show the same trend in 1 year, but for a long period of time, like 2 years, high-sentiment stocks earn higher returns than the low-sentiment stocks. If sentiment pushes stock prices above fundamental value, high-sentiment stocks should have low future returns. Yet, we do not see these results according to our study. Considering the short history of the Chinese stock market, we infer that investors in the Chinese stock market lack experience and investor sentiment level has comparatively considerable impact on stock returns in China.
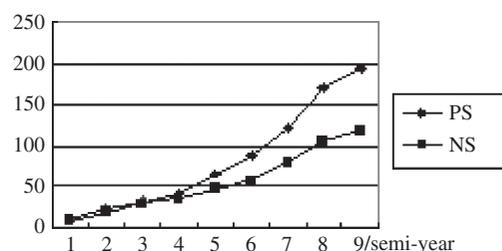
Fig. 1. Accumulated returns for stock portfolios with different sentiments
Note: The different future performance of the stock portfolios with positive sentiment (PS) and negative sentiment (NS) at the beginning of the period has been displayed.

V. Conclusions

Many of the anecdotes regarding investor sentiment believe that if sentiment pushes a stock price above its intrinsic value, high-sentiment stock should yield low future returns. However, we do not find supporting evidence in our study. On the contrary, we find evidence that the high-sentiment stocks earn higher returns than the low-sentiment stocks. The Chinese stock market is still an emerging capital market, as the first security firms entered the market in September 1992. Due to this short period of learning, Chinese investors lack experience, and the investor sentiment has comparatively stronger impact on stock returns in China, which might partly explain our findings.

Acknowledgements

The authors alone are responsible for all limitations and errors that may relate to this study and this article.

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