硕士学位论文

投资者情绪与股票横截面收益： 中国 A 股市场实证研究

INVESTOR SENTIMENT AND CROSS SECTIONAL STOCK RETURNS: EMPIRICAL FROM CHINESE A SHARE MARKET

作 者：徐舒

导 师：袁宇教授

上海交通大学上海高级金融学院二○一三年五月

**Investor Sentiment and Cross Sectional Stock Returns: Empirical from Chinese A Share Market**

**By Xu Shu**

**Under the Supervision of Professor Yuan Yu**

**Submitted in Partial Fulfillment of the Requirements**

**For the Degree of Master In Finance**

Shanghai Advanced Institute of Finance Shanghai Jiaotong University

May 2013

**Content**

**Abstract**

This paper aims to examine the investor sentiment effect on Chinese A share market from both market-level and cross-sectional level, contributing to providing more insights on Chinese market, where only a few empirical work has been done on this field.

Firstly, the paper constructs a market-level sentiment index from 1998.08 to 2012.11, using Principal Component Method. Then I construct stock portfolios on the basis of firm characteristics including size, age, past volatility, book-to-market ratio, institutional ownership and tradable A shares. Based on the sentiment index, this paper tests the predictability of sentiment on market-level return, and the furthermore cross-sectional stock returns.

Results show that investor sentiment has contrarian predictability in market-level return when lagged period equal to 5 months. Further, more influence is found to be exerted on the market return by investor sentiment in high sentiment periods than in low sentiment periods As for cross-sectional returns, non-parametric analysis shows that young, high volatile and growth stocks are more easily affected by sentiment; big firms and small firms react more to sentiment than middle-size firms. Regression analysis supports that highly volatile stocks, growth stocks and stocks with less institutional investors are more easily affected by sentiment for the full sample period. When dividing the sample period into before and after June 2005, it is shown that in period after June 2005, the predictability power of sentiment is stronger than before June 2005 for most of the firm characteristics.

**Key Words:**: investor sentiment; Cross-sectional return; Stock market

摘 要

二十世纪80年代以来，基于理性人假设的传统金融理论受到了市场“异象”的挑战，行为金融成为引人注目的研究热点。大量国外实证研究表明市场受投资者情绪的影响。在投资者存在认知偏差以及套利存在风险的假设下，投资者情绪可以作为定价因子影响股票回报。中国市场由于历史较短，正处于完善制度、信息逐步透明、投资者积累理性经验的过程中，行为金融的两大假定在中国有一定的基础。因此，研究影响投资者行为的深层次原因——投资者情绪，对于更深刻地认识中国市场有极大的理论和实践意义。

本文从市场收益率和横截面股票收益率两个角度考察了投资者情绪对中国

A股市场股票定价的影响。样本期间1998年8月至2012年11月。本文首先在

回顾现有国内外投资者情绪与股市关系的文献基础上，选取适合中国的5个市

场指标和1个主观信心指标利用主成分分析方法构建了一个投资者情绪指数。在此基础上，检验了投资者情绪指数对股票市场收益的预测能力。进一步，文章从估值难易、套利难易的角度，选取了市场规模、年龄、历史波动性、账面市值比、机构投资者持股比例以及流通股比例作为公司特征构建投资组合，检验情绪对不同股票横截面收益的影响。

结果表明，情绪指数对市场收益率存在一定反向预测能力，该反向预测能力在投资者情绪高涨时显著存在，在投资者情绪低落时预测能力不明显。在对横截面收益数据的描述中，投资者情绪对新上市股票、高波动性股票、低账面市值比股票、极小市值和极大市值股票影响较大。进一步回归发现，不同特征的公司股票横截面收益受到投资者情绪影响的程度不同。2005年6月前的样本区间中，上月的投资者情绪对市值组合有正向预测能力，在2005年6月后的样本区间中，上月的投资者情绪对本月波动性、账面价值比、以及机构投资者持股比例组合有反向预测能力；同时此“反向修正”的预测能力最多存在4个月。

**关键字：**投资者情绪；横截面收益；股市

目 录

**[Abstract](#_Toc686416663)** 2

[摘 要](#_Toc686416664) 3

**[1.](#_Toc686416665)****[Introduction](#_Toc686416665)** 3

**[1.1.](#_Toc686416666)****[Background](#_Toc686416666)** 3

**[1.1.1.](#_Toc686416667)****[Theoretical Background](#_Toc686416667)** 3

**[1.1.2.](#_Toc686416668)****[Practical Background: The Chinese Market](#_Toc686416668)** 3

**[1.2.](#_Toc686416669)****[Research Contents and Design](#_Toc686416669)** 3

**[1.3.](#_Toc686416670)****[Significance and Contribution](#_Toc686416670)** 3

**[2.](#_Toc686416671)****[Literature Review](#_Toc686416671)** 4

**[2.1.](#_Toc686416672)****[What is investor sentiment and why does it matter](#_Toc686416672)** 4

**[2.2.](#_Toc686416673)****[How to Measure Investor Sentiment](#_Toc686416673)** 4

**[2.3.](#_Toc686416674)****[Sentiment and Stock Market Return](#_Toc686416674)** 4

**[2.3.1.](#_Toc686416675)****[Sentiment and Stock Pricing](#_Toc686416675)** 4

**[2.3.2.](#_Toc686416676)****[Sentiment and Stock Market Volatility](#_Toc686416676)** 4

**[2.4.](#_Toc686416677)****[Chinese Stock Market: Specialty and Empirical Findings](#_Toc686416677)** 5

**[3.](#_Toc686416678)****[Methodology and Data Description](#_Toc686416678)** 5

**[3.1.](#_Toc686416679)****[Theoretical Analysis and Empirical Model](#_Toc686416679)** 5

**[3.2.](#_Toc686416680)****[Investor Sentiment Measures](#_Toc686416680)** 6

**[3.2.1.](#_Toc686416681)****[Choice of Proxies](#_Toc686416681)** 6

**[3.2.2.](#_Toc686416682)****[Control Variables](#_Toc686416682)** 8

**[3.2.3.](#_Toc686416683)****[Investor Sentiment Index—Principal Component Method](#_Toc686416683)** 9

**[3.3.](#_Toc686416684)****[Firm Characteristics](#_Toc686416684)** 12

**[4.](#_Toc686416685)****[The Empirical Analysis and Results](#_Toc686416685)** 13

**[4.1.](#_Toc686416686)****[Sentiment and market-level returns](#_Toc686416686)** 13

**[4.1.1.](#_Toc686416687)****[Investor sentiment change and market return](#_Toc686416687)** 15

**[4.1.2.](#_Toc686416688)****[Predictability of sentiment level to market return](#_Toc686416688)** 16

**[4.1.2.1.](#_Toc686416689)****[Simple Regression:](#_Toc686416689)** 16

**[4.1.2.2.](#_Toc686416690)****[Optimistic and Pessimistic Periods](#_Toc686416690)** 17

**[4.2.](#_Toc686416691)****[Sentiment index on future returns across deciles](#_Toc686416691)** 19

**[4.2.1.](#_Toc686416692)****[Statistical analysis](#_Toc686416692)** 19

**[4.2.2.](#_Toc686416693)****[Regression analysis on long-short portfolios](#_Toc686416693)** 28

**[4.2.3.](#_Toc686416694)****[Further confirmation on the lag length](#_Toc686416694)** 33

**[4.2.4.](#_Toc686416695)****[Robustness checks](#_Toc686416695)**[–](#_Toc686416695)**[new sentiment index](#_Toc686416695)** 36

**[5.](#_Toc686416696)****[Conclusion](#_Toc686416696)** 39

**[Bibliography](#_Toc686416697)** 39

# **1.** **Introduction**

## **1.1.** **Background**

Behavioral finance tries to explain asset pricing anomalies by factors besides fundamentals. In contrast to classical asset pricing theorists, behavioral financials believe that investors are not always rational. There is a market level unjustified expectation on the discount future cash flows which leads to a systematic mispricing of the stocks in the market in the same direction. One widely recognized reason for the existence of mispricing is limits on arbitrage. Some arbitrageurs are not allowed to to trade against investor sentiment because of institutional reasons like ban on short-selling. Even in environment where short-selling / margin are allowed, the risk of arbitrage still exists; therefore mispricing is not eliminated. There is a body of empirical studies that have shown that investor sentiment, which is broadly defined as the unjustified belief about future cash flows and investment risks (Baker and Wurgler, 2007), exists in world-wide stock markets and does have influence on the ability to forecast future return.

Chinese stock market is a good test place of investor sentiment. Since the foundation of Shanghai Stock Exchange in 1990, Chinese stock market has been developing rapidly in terms of market cap and the diversification of investors. By the end of 2008, institutional investors held 54.61% of tradable stocks in A share market. However, compared with developed markets, Chinese stock market shows more evidence of irrationality. By the end of 2012, 99% of stock trading accounts are held by individuals, while individual participation of A stock market is over 50% in terms of trading volume; Turnover rate and P/E ratio are extremely high and the performance of stocks largely deviates from the economic fundamentals. Stocks with some fancy concepts like internet, international tourism and photovoltaic technology are easily targeted by speculative investors. In only recent 20 years, Chinese A stock market experienced violent ups and downs. During period from 2006 to 2008, for example, the Shanghai Stock Composite Index has experienced ups from 1200 points to 6124 peak and then rushed down to around 1700 points. There were no short-selling arrangements such as short-sale and margin or index futures until 2010. Trading volume on margin & short sell is small compared with turnover of the stock

Market, and total amounts outstanding are only 0.5% of total tradable stock market capitalization. Overall, the impact of investor sentiment is suggested in observing Chinese stock market development.

Given the immaturity and obvious limits to arbitrage of Chinese stock market, it would be interesting to study Chinese investors' sentiment and try to find how it impact the stock market. Particularly, the study of investor sentiment on cross-sectional stock returns will provide more insights on how different stocks react to sentiment and help better understand the market.

### **1.1.1.** **Theoretical Background**

Classical finance theory recognizes that only systematic risk factors should be incorporated into pricing. The sentiment risk of stocks could be eliminated through portfolio diversification and arbitrage trading activities. However, the efficient market hypothesis has been challenged by a series of market anomalies. Empirical and theoretical studies by Delong et al. (1990), Lee et al. (1991) and Baker and Wurgler (2006) suggest the role of investor sentiment in asset pricing. Because of the impediments of arbitrage, stocks are likely to be overpriced or underpriced. There is a market wide component which drives stocks mispriced at the same time. Meanwhile, the impact of investor sentiment stays not only at market level. Investor sentiment may have asymmetric influence on stocks with different characteristics. Investors are more prone to speculate on some stocks than on others.

So far, literature on proving and explaining sentiment's role in stock market has been focused on industrialized countries' markets (Baker &Wurgler, 2006, 2007; Baker, Wurgler and Yuan, 2012). This is partially because of their long history and availability of data. Given the short time of development in emerging market, the stability of sentimental impact on market may be changing because of constantly improved regulatory framework and country-specific events. So, the role of sentiment on emerging market may be in transition and needs further study.

### **1.1.2.** **Practical Background: The Chinese Market**

As is mentioned, over the past 20 years Chinese stock market experienced volatile ups and downs. Since 1990, Chinese stock market is believed to have experienced several big bullish and bearish periods. The scene that almost everyone

Including the elderly talked about stocks and that individual investors rushed into the market in 2007 is still impressive. Newly opened accounts surged and market overall P/E ratio reached as high as 45 times. The market is packed with overconfidence and optimism. However, the market crashed in 2008 and remains bearish since the short-time rebound in 2009. Besides the ups and downs, some stocks are more sought after than others by speculators.

Since 2000, Chinese authority has taken a series of big steps in reforming the stock market, introducing rational institutional investors and educating individual investors. Measures for the administration of securities companies and The Law of the People's Republic of China on Securities Investment Fund were issued and carried out in 2002 and 2003 respectively. Qualified Foreign Institutional Investors (QFII) scheme was initiated in December 2002. Social security funds and pension funds were permitted into the stock market since June 2003 and October 2004 respectively. The reform of shareholder structure was started in May 2005 to solve the problem of non-tradable shares in the market. Given all the efforts, compared with developed markets, Chinese market is still considered less efficient because of less experienced institutional and individual investors, less transparent and qualified information disclosure and incomplete regulatory framework (Ng & Wu, 2007). Institutional investors are questioned for their effects in stabilizing the market (He et al, 2007; Cai and Song, 2010). Also, the majority of investors are individual, who are believed to be less informed and more easily influenced by word of mouth information, instead of carrying fundamental analysis themselves. What's more, the less transparent information system and policy decisions could easily mislead investors' belief. All these may indicate investors' irrational and speculative trading behavior in the whole market. Therefore, the study of investor sentiment on the stock market in China could be suggestive both theoretically and practically.

## **1.2.** **Research Contents and Design**

This paper aims at testing the impact of market-wide sentiment on stock pricing by analysing the market-level return and cross-sectional stock returns in Chinese A share market. To identify the role of investor sentiment in asset pricing is not an easy task. Following Baker and Wurgler (2006), and Daniel and Titman (1997), I will test the mispricing correction patterns in stock returns, in order to identify sentiment's

Mispricing power. If high sentiment could result in overpricing, then low stock returns

Should appear following high sentiment periods.

In particular, I will examine the following two major hypotheses:

**Market-Level**: Stocks returns at a market level are predicted by the investor sentiment. When the sentiment is high, market returns are low subsequently.

**Cross-sectional Level**: Stocks which are subjectively valued and difficult to arbitrage are more likely to be impacted by sentiment, which means having lower return following high sentiment than others.

First I will build a sentiment index based on Chinese market condition, and then identify the firm characteristics which may lead to more speculative stocks. The characteristics include market size, book-to-market ratio, age, proportion of tradable A share, and institutional ownership. Sample stocks are all listed A share stocks excluding Growth Enterprise Market Board from August 1998 to November 2012. Sample period is extended as long as possible to capture more information in the young stock market. Then the full sample period is divided into two subsample periods according to the reform of shareholder structure initiated at June 2005. Based on the identified characteristics, further tests on sentimental impact on cross-sectional returns are conducted.

This paper proceeds as follows: Part 2 covers a review on existing research on investor sentiment. Part 3 describes methodology and data employed in this study. Specifically, I will first build a sentiment index based on Chinese market condition, and then identify the characteristics which may lead to more speculative stocks. Part 4 tests the two major hypotheses respectively, i. e., Part 4.1 tests the **market-level** hypothesis and Part 4.2 shows the statistical results of the **cross-sectional level** impacts. Part 5 summarizes and discusses some of the implication from this study.

## **1.3.** **Significance and Contribution**

This paper has several major contributions and innovations:

1) I study the impact of investor sentiment at both market-level and cross-sectional level, from 1998 to 2012. Empirical work has not been done much in Chinese Market and for such a long period. Existing studies focuses more on the interaction of investor sentiment and overall market performance. This paper would contribute to the study of investor sentiment especially in cross-sectional stock returns.

2) Most current researches employ survey data or one market-performance indicator

As proxy for sentiment. Instead, I form a composite sentiment index by applying Principal Component Method, and try to find a suitable proxy for Chinese investor sentiment based on several raw proxies.

3) Cross-sectional factors I examine in the paper encompass not only size, risks, age, growth opportunities and financial distress, but also the shareholder structure. Insight on what kind of stocks in Chinese market would be more sensitive to investor sentiment and how they react in periods of optimism or pessimism sentiments would be of value to understanding the mechanism of forming investor sentiment.

# **2.** **Literature Review**

## **2.1.** **What is investor sentiment and why does it matter**

As a hot topic recently in the field of Behavior Finance, investor sentiment is broadly defined as the unjustified belief about future cash flows and investment risks (Baker and Wurgler, 2007). The―unjustified‖belief is investors' excessive expectation relative to a norm determined by fundamentals (Brown and Cliff, 2004). It is observed as the market-wide pessimism or optimism, and sometimes the speculative tendency across the market.

Classical modern asset pricing theory leaves no room for investor sentiment in asset pricing. Stocks are priced by the market systematic risks. The conventional financial theory claims that market is efficient based on rational investor activities and arbitrage mechanism. The advocators of classical financial theory believe that rational investors drive the market into an equilibrium in which stocks are fairly priced on their fundamentals and mispricing would be eliminated quickly because they would purchase undervalued stocks and sell overvalued one to make a profit. Based on this assumption, a few significant asset pricing models are proposed, such as CAPM model by Sharpe (1964), APT model by Ross (1976) and the later Fama and French (1993) three-factor model. These asset pricing models work significantly until 1980s, when a bundle of market anomalies are discovered by researchers and efficient market hypothesis is challenged.

In contrast with the classical modern finance theory, behavioral finance takes psychology into financial field to examine market behavior and proposes different underlying assumptions. There are two fundamental assumptions. One is that investors have cognitive biases, and the other is the existence of arbitrage limitation (Ritter, 2003). As for cognitive biases, investors are far from rational. People behave according to certain patterns. Patterns that are often mentioned include heuristics, overconfidence, framing and representativeness, etc (Benartzi & Thaler, 1995, Barberis et al., 2001). Behaviorists believe investor sentiment should be included in the fundamental asset pricing and therefore can affect and predict asset return (Fisher & Statman, 2000, Baker & Wurgler, 2006). The expectations of irrational investors on stock returns may be highly influenced by their sentiment.

As for limits of arbitrage, behavioral finance believes that investor sentiment

Plays a significant role in asset pricing, especially when there are limits to arbitrage in market. Limits to arbitrage come in two ways. First, arbitrage is costly and risky. It is not always risk-free to take arbitrage position in the market. Arbitrageurs face the risk of long-term mispricing before the stock price is corrected to fair value. Shleifer and Vishny (1997) develop an agency model to demonstrate that in extreme cases when prices are driven far from fundamental, arbitrage can be very risky and ineffective. In reality, capital requirement makes investors less aggressive in arbitrage because the temporary loss may seem incapable to capital providers. Arbitrageurs face performance evaluation and take the risk of losing reputation and even shortage of capital by capital providers when it is needed to meet margin calls. Since illiquid, young, unprofitable, small, growth and highly volatile stocks incur higher trading costs, and higher idiosyncratic risk, empirical studies show that arbitragers tend to avoid trading such stocks, other things equal (Wurgler & Zhuravskaya, 2002, Amihud & Mendelsohn,1986, D' Avolio,2002 and Jones & Lamont,2002). Second, there are institutional impediments to arbitrage. In developing countries, a smooth arbitrage mechanism is missing. Short-sell and margin and other channels are not well accessible. More constraints in short-selling exist when investor see overvalued stocks.

In summary, because of the limits on arbitrage, the wave of investor sentiment could drive the stock price far deviating from intrinsic value long before price reversion. Investor sentiment is an important factor to consider in pricing.

## **2.2.** **How to Measure Investor Sentiment**

As investor sentiment belongs to psychological domain, it is not always easy to accurately measure. Quite a few researchers have conducted research on the measurement, aiming to capture more of the sentiment. Widely used proxies can be categorized into 3 fields: direct, indirect, and composite indicators.

**1. Direct Survey**

Several institutions have conducted survey on different investors' opinions on future stock market trend. These surveys can provide direct statistics reflecting investors' bullish, bearish or neutral opinions. Researchers use these survey data to calculate the Bullish/Bearish Sentiment Index (BSI index): the difference between proportion of bullish opinions and bearish opinions. Frequently cited survey data in

U. S. study are *Investor Intelligence* index, which is based on the opinions of over 150 newsletters by Chartcraft company and survey conducted by *American Association of Individual Investor,* which reflects the investment opinions of its broad members.

Verma and Soydemir (2010) use the *Investor Intelligence / American Association of Individual Investors* survey data to proxy for institutional and individual investor sentiment respectively and examine their influence on foreign stock market. Brown and Cliff (2004) employ *Investor Intellige*nce data as proxy, which shows the predictive power for near-term future stock returns is relatively weak and rarely significant. Based on expressed opinions about future market trend, Statman and Michael (2000) build a bullish sentiment index and bearish sentiment index (BSI index) which reflect investor sentiment.

Another suggested indicator is the consumer confidence index (CCI). Consumer confidence index is issued based on a household survey regarding to their opinions on current economic conditions and expectation about future. Economy assessment, purchasing and consumption tendency are reflected in the index. If households are satisfied about current situation and optimistic about future consumption, high chance is that they would be optimistic about the stock market, and be willing to invest more and gamble more. Lemmon and Portniaguina (2006) extract the sentiment component from consumer confidence index by regressing the index on a broad set of macroeconomic variables and show that consumer confidence index has the power to forecast the small-stock premium and stocks with low institutional ownership. Qiu and Welch (2006) also validate that the consumer confidence measure is highly correlated with UBS/Gallup survey and that changes in consumer confidence has strong explanatory power for excess returns on small-deciles stocks.

**2. Indirect proxies**

A bundle of indirect proxies are widely used. In this category, it is argued that investors' expectation about future stock market is revealed objectively through their market activities. Lee, Shleifer and Thaler (1991) and Neal and Wheatley (1998) have demonstrated that Closed-End Fund Discount (CEFD) may be a proxy for sentiment if closed-end funds are disproportionately held by individual investors, and that the higher the discount, the more pessimistic retail investors would be. Wu and Han (2007) also documented that given the structural difference of investors in closed-end fund from U. S. CEFD could still be a sentiment proxy in Chinese market.

Indicators of market liquidity can also reflect investor sentiment because investors are more prone to trade when they are optimistic. Trading volume could be a proxy to express investors' view on the market (Baker and Stein, 2004; Scheinkman and Xiong, 2003). When investor sentiment is consistently pessimistic, trading volume tend to stay at low level. Baker and Stein (2002) explain liquidity as a sentiment indicator and have predictive power of subsequent returns.

Other proxies such as IPO number/ IPO First Day return (Lowry & William, 2002), Mutual Fund Redemption, Mutual Fund Flow (Frazzini and Lamont, 2008), Dividend Premium (Baker and Wurgler, 2004), Volatility Premium (Baker et al., 2012) are also used to capture investor sentiment. Equity share in new issues is also considered a strong proxy for investor sentiment (Baker and Wurgler, 2000, 2006, 2007)

Some proxies come from derivative markets trading. For example the option implied volatility such as VIX index. When the market are in a panic, the VIX index tends to shoot up, which could reflect investor sentiment towards the whole market. The trader position in index futures market can also express investors' belief about future stock market. When investors believe the spot market is to drop, they would hold more short position in index futures and vice versa.

**3. Composite Indicators**

Since there are so many proxies that may reflect part of investor sentiment, some researchers find their way to make a composite indicator. Their goal is to extract a common feature that disturbs these proxies and regard this as the market level sentiment. Brown and Cliff (2004) perform both the Kalman filter and principal component analysis based on a series of popular indirect proxies. The constructed indexes present high correlation with survey measures. Baker and Wurgler (2006) selected a bundle of proxies and form a composite sentiment index by using first principal analysis. This approach is reasonable because it could capture the common factor that drives the proxies given macroeconomic variables under control. Baker, Wurgler and Yuan (2012) build sentiment index by this method in an international context. A validation test is shown by using the relative prices of dual listed shares. Result shows that the indexes are justifiable. Both global and local sentiments have the contrarian predictive power of country-level returns.

## **2.3.** **Sentiment and Stock Market Return**

Behavioral finance believes that sentiment does have significant impact on stock market. Current literature explores and demonstrates the impact in broadly two aspects: the predictability power of sentiment to future market return; the impact of sentiment on stock volatility.

### **2.3.1.** **Sentiment and Stock Pricing**

Empirical researchers try to test the predictability power of sentiment to future market return, in order to find evidence supporting the role of sentiment in fundamental pricing.

Baker and Wurgler (2006) point out that there are two factors driving stocks mispriced: one is the impediment to arbitrage and the other is an uninformed demand shock. Brown and Cliff (2004) suggest that, once the irrational investors get positively correlated to a large extent, trades conducted by them may influence the entire market at the same time. Therefore, the risks imposed by the irrational investor sentiment cannot be diversified, which hence should be included in the asset pricing model. In addition, it is claimed that investor sentiment is a counter predictor of future stock returns. If at the beginning of a period sentiment is high, stock prices are likely to be pushed up. However, the stock price will ultimately be determined by the fundamentals, so after the high sentiment, the price will drop, resulting in lower realized gains.

Lee et al. (1991) employ discount of closed-end funds as a proxy for sentiment to study the relationship between sentiment and expected returns directly. They find that closed-end fund discounts are negatively correlated with portfolio returns when after controlling for size effects. This means that high sentiment may normally induce lower returns.

Neal and Wheatley (1998) studied the explanatory power of three sentiment proxies which includes net mutual redemptions, closed-end fund discounts, and odd-lot sales to purchases ratio. Consistent with Lee et al. (1991), their study also supports the argument that high sentiment in the previous period would induce a lower return in the following period.

However, different opinions about the predictive power of sentiment exist. Brown and Cliff (2004 & 2005) study the predictive power from short-term and long-term perspectives. After examining the forecasting power of several investor

Sentiment proxies proposed in prior research, Brown and Cliff (2004) shows that both sentiment changes and levels are highly correlated with current market returns, while little support is obtained in sentiment's short-run predictability in returns. Brown and Cliff first examine a set of proposed proxies and find that they are highly correlated with survey measures. Then Principal Component Analysis is employed to extract a common factor among several proxies. Furthermore, they employed Vector Auto Regression to examine the causal relationship between sentiment index and expected returns. The result does not support conventional belief that sentiment can predict near-term future market returns. Result is different in a longer horizon, though. Brown and Cliff (2005) show that over the next 1-3 years, high current sentiment is followed by low cumulative returns. This findings support the belief that investor sentiment does affect asset pricing levels.

Baker and Wurgler (2006) test the predictive power of sentiment in a cross-sectional level instead of observing the market as a whole. They first build a composite sentiment index based on suggested proxies in prior researches. The proxies include closed-end fund discounts, detrended market turnover, IPO related data, the share of equity issues in total equity and debt market, and dividend premium. As Baker & Wurgler analyze, the sentiment impact on stock returns is not equal across stocks. Some stocks are more sought after by speculators because these stocks are more difficult to arbitrage and subjective to value. This would increase the arbitrage risks and speculative propensity. By sorting firms according to their characteristics, they obtain the cross-sectional returns and test the predictive ability of sentiment on long-short portfolios. Specifically, Baker and Wurgler demonstrate that extreme growth stocks, distressed stocks, young stocks, high volatile stocks, dividend non-payers tend to have relatively higher return following a low sentiment period. When sentiment is high, these bundles of stocks record a relatively lower return. These findings have furthered our understanding of how investor sentiment impacts the market.

Chung, Hung and Yeh (2012) find evidence that the asymmetric predictive power of investor sentiment exist in the cross-sectional returns. The predictive power of sentiment is more significant when investors become more optimistic than previous state. In a recession state, investor sentiment plays an insignificant role in predicting returns of portfolios sorted by size, book-to-market ratio, P/E ratio, age etc.

Maik Schmeling (2009) finds some international evidence in predictive power of sentiment. He applies consumer confidence in 18 industrialized countries as a proxy for individual investor sentiment respectively. Consistent with U. S. empirical result., sentiment is found to be a counter predictor to aggregate stock market returns on average across countries. When sentiment is high, stock returns tend to be lower in the following period. This conclusion also holds for returns of small stocks, value stocks, growth stocks, keeps the same for different forecasting horizons. Finally, they take a cross-sectional perspective and investigate the impact of sentiment on stock returns across countries. Finding is that stock returns are higher for countries which are culturally more likely to conduct herd-like behavior and perform overreaction, and which have less market integrity.

Baker, Wurgler, and Yuan (2012) extend the study into a global context. They employed the methodology proposed by Baker and Wurgler (2006) and validate the index using dual listed shares. Consistent with previous work, this study also supported the theory that stocks which are difficult to value and arbitrage tend to be more influenced by the fluctuation of sentiment. The fluctuation of sentiment is inversely correlated with stock returns.

However, given most of the past studies in this area have concentrated on developed markets, such as the U. S. and U. K., the impact of investor sentiment on particularly emerging ones is unclear and controversial.

### **2.3.2.** **Sentiment and Stock Market Volatility**

Lee, Jiang and Indro (2001) utilize a generalized autoregressive conditional heteroscedasticity-in-mean specification to test the impact of noise trader risk on both the formation of conditional volatility and expected return. Evidence shows that changes in sentiment leads to downward (upward) revisions in volatility and higher (lower) future excess returns. It is supported that conventional measures of temporal variation in risk omit an important factor, i. e. the sentiment factor.

Verma & Priti verma (2007) separate investors into rational and irrational groups. By applying multivariate EGARCH model, they further study the relative effects of fundamental and noise trading on the formation of conditional volatility. Relationships between investor sentiments and stock market volatilities are asymmetric in periods of bullish sentiments than bearish sentiments. This supports the view that investor

Sentiment is an important determinant of stock volatilities.

Yu & Yuan (2011) present that the relationships between expected excess return and conditional variance are asymmetric in high/low sentiment periods. More specifically, the market expected excess return is positively related to the market conditional variance in low-sentiment but unrelated to variance in high-sentiment. They propose a new mechanism why sentiment drives stock prices. Price level is impacted because sentiment influences the compensation for volatility.

## **2.4.** **Chinese Stock Market: Specialty and Empirical Findings**

Chinese stock market differs from developed market such as U. S. in the two major ways. One is the yet-to-developed regulation framework; the other is the short trading history. Because of the two reasons, several problems exist. Chinese markets face a high level of information asymmetry and insider trading problems (Wang & Iorio, 2007). Most of the blue-chips are owned by the government to ensure they are controlled locally, with the result that the amount of liquid shares available for trading

In the markets is normally less than 50%. Many institutions and individual investors become policy speculators. Balsara, Chen and Zheng (2007) find empirical evidence that both the best performed and worst performed stocks are subject to adjustments of regulation. Due to the short history, Chinese institutional and individual investors are less experienced and knowledgeable, which leads to irrational investing behavior. However, the young market is experiencing rapid change and improvement which may affect investors' behavior.

A few researchers have examined the predictability of Chinese stock returns. Chen et. al (2010) test the cross-sectional return predictability of Chinese stocks according to 18 firm-specific characteristics. Only weak predictability is found compared with U. S. market. They find two explanations for the weak predictability in Chinese market. One is that predictors are more homogenously distributed in China than in U. S. The other one is that Chinese market endures long-lasting inefficiency so that price correction pattern is seldom detected.

Most of the empirical tests about investor sentiment in Chinese market focus on the short-term interaction of investor sentiment with market-level return. They adopt survey data to increase the frequency of observations. However, since survey data in

China faces the problem of non-continuity and subjective bias, researchers seldom reach agreement on the role of sentiment,. Han and Wu (2007), and Yang Peng (2008) show that Chinese investor sentiments have impact on the market return, could predict short-term return and market return could in turn affect sentiment. However, some other research, employing survey data or indirect proxies, find little support. Han (2005) states that BSI index published by CCTV is not able to predict future stock market trend. The disagreement among research may be the problem of data length and the choice of proxies. Lin (2008) avoided the possible issues discussed above by employing a relatively longer sample period compared with some of the other studies, and using multiple factors to capture the features of investor sentiment. Consistent with the findings from developed markets, the results suggested that stock returns were negatively influenced by the sentiment index for the whole sample period. Yu and Meng (2010) find that investor sentiment has influence on the stock index in periods of upward trend, while no impact on stock index when the market is falling down. As for cross-sectional effects of sentiment, Lu and Chen (2012) divided 4 types and examined cross sectional reaction of small size/ low B/M stocks to sentiment and find that market is overreacted to extreme pessimism and under reacted to extreme optimistic sentiment.

# **3.** **Methodology and Data Description**

This paper studies sentimental effect in Chinese A Share Market. In the first few years in 1990s, stock market was not complete with few stocks and poor information disclosure system. Since mid of 1990s, more stocks started to be listed. From 1996.12 on, ±10% daily price limit was introduced to the market. So it is reasonable to

Examine the period from late 1990s when the market had gone through basic development. Considering the availability of data, I will examine the sample period from 1998.09 to 2012.11, totalling 171 months. Then the full sample period is divided into two sub-samples according to the reform of shareholder structure initiated at June 2005.

All A shares listed in Shanghai Stock Exchange or Shenzhen Stock Exchange are included as raw samples. However, stocks listed in Growth Enterprise Market Board are excluded because it was newly launched in 2010. Regulation framework and requirement to be listed in GEMB stocks are different than those in main board. From 1998.09 to 2012.11, total number of listed A share stocks increases from 500 to 2472. All the market data and financial data are from Wind, CSMAR and Resset database.

**Table** **1**

**Sample Selection Procedure**

| Sample | All Chinese A shares listed in Shanghai or Shenzhen Stock Exchange | | |
| --- | --- | --- | --- |
| Sample Period | 1998.08-2012.11 | | |
| Detailed Info. | Firm Characteristics | Sentiment Index | Returns |
| 1997-2012 Annually | 1998.08-2012.11 | 1998.09-2012.11 |
| Excluding | Growth Enterprise Market Board Stocks(GEMB) | | |
| Excluding | Financial Industry Stocks | | |
| Excluding | Stocks with firm characteristics data missing; Stocks with negative equity value | | |
| Others | Firm Returns are Winsorized at 99.5% and 0.5% | | |

## **3.1.** **Theoretical Analysis and Empirical Model**

As previous literature suggests, investor sentiment has an important role in asset pricing. If arbitrage is partially limited or restricted, the influence of sentiment on stock prices can be reflected as an uninformed demand shock. The broad sentimental wave which is biased and not based on fundamentals could shift the demand of stocks and drive the stocks prices in the same direction. Therefore, at the market level, stocks

Could be mispriced.

Meanwhile, not all stocks react to broad investor sentiment proportionately. Some stocks are more sensitive and sought after by irrational investors, while others are relatively stable. Generally speaking, stocks which are subjectively valued and difficult to arbitrage are more likely to be impacted by sentiment. As Baker and Wurgler (2006) analyze, this cross sectional effect of sentiment appears in two mechanisms. First, suppose all stocks face the same speculative demand driven by investor sentiment. Since not all stocks are as easy to be arbitraged, these difficult-to-arbitrage stocks could face higher risk of arbitrage and their prices would be pushed down or up far more than those easy-to-arbitrage ones. Second, investors' speculative demand differs across stocks. The speculative demand would be higher for stocks with more subjective valuation and non-transparently disclosed stock, for example, high tech companies, or start-up firms. These features could give imaginations to investors' belief and result in cross-sectional effects of investor sentiment.

In testing the role of sentiment in asset pricing, I adopt the method from previous work (Baker and Wurgler, 2006). When stock prices deviate far from intrinsic values, there is a tendency for them to revert to mean. If prices are well overpriced, price is to drop and future returns of next period would be low; if stocks are undervalued in this period, future returns on these stocks would be high. So I will test the contrarian predictability power of sentiment in stock returns by the following general equation:

(1)

Is stock returns. It could be market-level returns or portfolio returns. t is time, is the sentiment factor at time t. i is the lag length. is the vector of control variables such as Fama French factors. and represent the influence of sentiment and other factors on stock returns respectively. By testing the significance and the sign of, I will find if sentiment plays a role in asset pricing. As Baker and Wurgler (2006), Lee et al. (1991) and Brown and Cliff (2004) demonstrate that stock returns are influenced by investor sentiment of the previous period. However, since here data is at monthly frequency, the reversal effect may not be observed in one month lag. Therefore, this study will focus on one-month lag as well as longer lag

length.

Least Square Method is applied in estimation. High chance is that incurs autocorrelation and the heteroskedasiticity problem exist in time series analysis. Estimation using simple OLS may have bias and efficiency issues. To overcome these issues, Newey-West Estimation is employed. Newey-West estimation is used to adjust the errors if autocorrelation and heteroskedasiticity issues happen. It can improve the accuracy of the standard errors and t-ratios conducted from the OLS.

Data processing and regression are conducted by SAS and Eviews 7.0.

## **3.2.** **Investor Sentiment Measures**

### **3.2.1.** **Choice of Proxies**

Prior studies domestically and abroad propose a number of proxies for sentiment. To better capture the common sentiment factor behind these proxies, I formed a composite index here, adopting Baker & Wurgler's method. First, I will examine suitable raw proxies in China market and then perform Principal Component Analysis to obtain a reasonable sentiment index.

**Turnover (TURN):**

Turnover is the total amount of stocks traded over a period of time. As an indicator of market liquidity, an abnormally high turnover reflects investors' high participation in the stock market. High liquidity signs a positive sentiment of irrational investors (Baker & Stein, 2004). However, some may argue that sudden extreme high turnover is possible when the market crashes. Since here the turnover I use is over a month, this effect could be minor (Yi & Mao, 2009). As Chinese market is expanding fast, the number of shares and total market cap display an increasing trend. I will use the turnover ratio to scale down the effect of increasing market volume. Market turnover ratio is calculated from stock-specific turnover ratios with tradable market cap as the weight:

2

Where i denotes individual stocks, and is the individual stock's tradable market cap compared with total market cap.

17

**IPO Related: IPO first day return (IPOR) and IPO number (SMFR)**

IPO market reflects the sentiment of both investors and fund raisers. IPO first day return is a reasonable proxy in reflecting investor sentiment in China because the price change in the first day return is driven by market. When investors are enthusiastic, IPO stocks are sought after, and the first day return on average would be high. Here, I use share weighted average first day return as monthly IPO first day return. For months when there's no IPO, linear interpolation method is implied.

3

4

Is the number of IPO shares of i stock, n is the total number of IPOs in the t month; is the IPO first day return of stock i.

IPO volume may reflect investor sentiment in two opposite ways. First, the IPO volume may reflect high sentiment of previous month. Studies abroad have shown that that companies tend to issue stocks when the market is optimistic. Domestic research also demonstrates that the authority tends to increase the number of approved IPOs when high sentiment and IPO first day return are observed (Shao et. al, 2010). On the other hand, however, a large volume of IPOs facing the market could incur investors' pessimism on stock market because of the pressure on the market liquidity and concern on the shortage of money flow in the secondary market. Therefore, how IPO volume reflects the sentiment needs further verification.

In China, whether companies can go public depend on the approval of regulatory department. There are even extended periods when IPO process is completely paused. To overcome the blank period of IPO, I will use total funds raised (SMFR) in equity market (through IPO, private placement, additional offering, allotment) as a proxy instead of the IPO volume.

**Closed-end Fund Discount (CEFD):**

Closed-end Fund Discount is the price deviation of closed-end fund from its net asset value. It is constantly observed in both domestic and foreign markets that closed-end funds are traded at a discount. Prior work abroad suggests that closed-end fund discount is related to investor sentiment. Lee, Shleifer and Thaler (1991) explain

The closed-end fund puzzle by relating to investor sentiment and find that discount is negatively correlated with change in sentiment. If closed-end funds are disproportionately held by individual investors, the higher the discount, the more pessimistic retail investors would be. In China, the first closed-end fund was introduced to market in 1998, and experienced product innovation since 2007. Now there are 150 closed-end funds. Most of the innovative closed-end funds have imbedded options in return and experienced high premium. In order to avoid influence from the leveraged products, I choose only traditional classic closed-end funds to calculate the market-level closed-end fund discount. Total number of closed-end funds included is 54, some of which have expired.

The closed-end fund discount is calculated in the following formula:

5

Here, n denotes number of listed closed-end fund in period t, is the close price of Fund i by the end of period t, is the net asset value by the end of period t, is the total shares outstanding of Fund i. To be noted here, positive CEFD value shows that funds are traded at a premium while negative CEFD shows a discount.

**Advance/Decline Ratio (ADR)**

Advance/Decline Ratio is ratio between the number of stocks that closed higher than their previous day's closing prices (Advances) and the number of stocks that closed lower than their previous day's closing prices (Declines). It is a commonly used technical analysis indicator. A/D ratio can reflect the power between buyers and sellers in the market, which reflects overall market opinions and enthusiasm for the stock market. High A/D ratio indicates high sentiment.

6

Is the number of advances in trading day i, month t; is the number of declines in trading day i, month t; n is the total trading days in month t.

**Consumer Confidence Index (CCI) :**

Consumer confidence index reflects consumers' confidence on consumption based on their view on current macro economy, income, and expectation on future. Even though consumer confidence index is not directly pointed to stock market, Qiu and Welch (2006) demonstrate that change in Consumer Confidence Index is highly correlated with changes in survey on stock market. As in China, major investors in the stock market are individual households; it is plausible to use the consumer confidence index to indicate their sentiment. National Bureau of Statistics of China has been publishing monthly CCI since December 1997.

**Others**

*Newly Opened Stock Accounts*: Domestic researchers have suggested some other proxies for investor sentiment. The number of newly opened stock accounts is one. This proxy is not often cited in foreign markets. Han and Wu (2007) are the first to raise this proxy. As Chinese market is still developing, the number of newly opened accounts is far from stable. It is highly correlated to the performance of stock market. Most of the newly opened accounts are driven by individuals who are easily affected by sentiment. The period of 2005 to 2007 provides significant evidence. Monthly data is not available until 2003.

*Up\_limit ratio:* Up\_limit ratio is the percentage of stocks which hit the upper price limit bound to the total number of stocks which hit the upper/lower bound. It is similar to advance/decline ratio but better capture extreme investor sentiment. To control the speculative tendency in the stock market, the daily price limit has been introduced into Chinese stock market since December 1996. Stocks cannot be traded beyond the range of last close price, except for those IPO first day stocks. Daily price limit is adopted by some countries such as France and Japan, but in U. S. stock market, there is no daily price limit. So this ratio may reflect the fierce competition power of buyers and buyers in Chinese specialty.

7

Is the number of stocks which hit the upper price limit in trading day i; is the number of stocks which hit the lower price limit in the trading day i, month t; n is the total trading days in month t.

*Survey data:* Some media conduct survey on investors' expectation on future

Stock market. Most of empirical research in Chinese market adopts survey data as

Proxy for market sentiment.

However, there is no one which is continuous and consistent in survey method.

Domestic researchers have different opinions on the predictability power.

**Table** **2**

**Final Proxies in Sentiment Construction**

In this Table, the final six raw sentiment proxies are presented. The first (TURN) is the monthly value-weighted turnover ratio of all A shares. The second (SMFR) is total capital raised from stock market each month. The third (IPOR) is the average first-day return of IPO during one month weighted by the number of shares issued. For months IPO is absent, linear interpolation method is implied. The fourth (CEFD) is the month-end value-weighted average of closed-end fund discounts. Only traditional closed-end funds are included. The fifth (ADR) is the advance-to-decline ratio which compares total advances to total declines within a month. The sixth (CCI) is the consumer confidence index compiled by National Bureau of Statistics and reflects consumers confidence on consumption. Up\_limit Ratio compares the number of stocks which hit the upper daily price limit and total number of stocks which hit the daily price limits (upper and lower limits). Monthly data is from 1998-08 to 2012-11.

| Variables | Expected  Relation | Max. | Min. | Average | Std.Dev |
| --- | --- | --- | --- | --- | --- |
| Turnover Ratio % (TURN) | + | 118.13 | 5.41 | 33.14 | 21.57 |
| Stock Market Fund Raised (SMFR) | +/- | 1866.59 | 0.00 | 264.29 | 321.7 |
| IPO First Day Return (IPOR) | + | 335.45% | -8.89% | 75.25% | 53.73% |
| Closed-End Fund Premium/Discount (CEFD) | + | 31.06% | -40.35% | -15.68% | 13.82% |
| Advance/Decline Ratio (ADR) | + | 0.70 | 0.36 | 0.51 | 0.07 |
| Consumer Confidence Index (CCI) | + | 114.46 | 97.00 | 108.29 | 4.32 |
| Up\_limit Ratio | + | 1.00 | 0.12 | 0.72 | 0.23 |

Taking all the analysis into consideration, the first 6 proxies are selected in the construction of sentiment index from 1998.08 to 2012.11. The number of newly opened accounts is used for the validation test for the constructed Sentiment Index. And Up\_limit Ratio is used for the construction of a new sentiment index for robustness check.

### **3.2.2.** **Control Variables**

People argue that these proxies of sentiment could be driven by rational factors such as common macroeconomic expectation. To set aside the rational component that might drive these proxies in the same trend, we construct the sentiment index controlling the following macroeconomic factors: Inflation rate (INF), growth in industrial added value (IAV), PPI, and Macro-economic Climax Index\* (MECI). The

Macro-economic Climax Index is published by National Bureau of Statistics of China. This index has three sub-indexes, and here I choose Macro-economic Climax Monitor Index as an indicator of whether the economy is overheated or in recession.

As presented in Equation (8), each raw proxy is regressed on the macroeconomic

\* For detailed explanation, please see [http: //www. cemac. org. cn/Azhdt. html](http://www.cemac.org.cn/Azhdt.html)

Construction of sentiment index. Here, will be denoted as ⊥in the following principal component analysis.

8

### **3.2.3.** **Investor Sentiment Index—Principal Component Method**

From the description analysis, I find that most of the proxies are significantly correlated (see Table 3) and I can use the Principal Component Analysis method to capture a common variation factor from the proxies. 6 proxies are orthogonalized on the macroeconomic variables and then applied in principal component analysis. Principal components with eigenvalues larger than 1 are included in constructing the sentiment index.

Based on the criterion, the first three principal components are taken into calculation. Then take the weighted average as the composite sentiment index (eigenvalues as the weight) \*\*.

This procedure leads to an estimated sentiment index:

Each of the raw proxies has been orthogonalized on macro economy factors and standardized. The first three principal components explain 75.9% of the total sample variance.

Several good properties appear in the Sentiment Index here. First, the Sentiment Index is in high correlation with the raw inputs. All but one proxy enters with the expected sign; with the exception of SMFR. Since all the raw proxies are standardized, the coefficient of each proxy stands for the react of sentiment to a one-standard-deviation increase in the raw proxies. Consumer confidence and IPO first day return contribute the most in the sentiment index. Second, the correlation between the Sentiment Index and the Shanghai Composite Index is 0.23, which is statistically significant at 0.01 level. Third, by comparing the Sentiment Index with the number of newly opened accounts from year 2003 on, it is shown that the number

\*\* The calculation method is following: Sentiment Index=, where is the principal

Component with eigenvalues larger than 1, is the corresponding eigenvalue.

Sentiment index. The properties above show that the Sentiment Index is reasonable and valid in capturing investor sentiment.

**Table** **3**

**Sentiment Index Data 1998:08-2012:11**

This table presents the correlation between constructed sentiment index and proxies. Each proxy is regressed on the CPI index, growth in industrial added value, PPI, and Macro-economic Climax Index. Proxies with label"⊥“

Means these proxies are orthoganalized and are residuals from the regressions. The 6 orthogonalized proxies form a Principal Component Analysis. The Sentiment Index here is the weighted-average of principal components with eigenvalues larger than 1. The last variable (NOA) is the number of monthly newly opened accounts from 2003.01 to now. NOA is for validating the Sentiment Index." \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively. All data of proxies and macro-economic variables are from Wind database.

|  | Sentiment | TURN⊥ | SMFR⊥ | IPOR⊥ | CEFD⊥ | ADR⊥ | CCI⊥ | NOA |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sentiment | 1 |  |  |  |  |  |  |  |
| TURN⊥ | .333\*\*\* | 1 |  |  |  |  |  |  |
| SMFR⊥ | -0.139\* | 0.139\* | 1 |  |  |  |  |  |
| IPOR⊥ | .883\*\*\* | .228\*\*\* | -0.141\* | 1 |  |  |  |  |
| CEFD⊥ | -.174\*\* | -.257\*\*\* | .216\*\*\* | 0.069 | 1 |  |  |  |
| ADR⊥ | 0.088 | .548\*\*\* | 0.115 | -0.002 | -0.181\*\* | 1 |  |  |
| CCI⊥ | .822\*\*\* | 0.079 | -.232\*\*\* | .546\*\*\* | 0.025 | -0.051 | 1 |  |
| NOA | 0.476\*\*\* | 0.613\*\*\* | 0.384\*\*\* | 0.341\*\*\* | 0.143 | 0.207\*\* | 0.281\*\*\* | 1 |

7,000

6,000

5,000

4,000

3,000

2,000

1,000

0

3.5

3

2.5

2

1.5

1

0.5

0

-0.5

-1

-1.5

199808

199904

199912

200008

200104

200112

200208

200304

200312

200408

200504

200512

200608

200704

200712

200808

200904

200912

201008

201104

201112

201208

-2

Shanghai Index Sentiment Index (RHS)

**Figure** **1** Sentiment Index and Shanghai Composite **Index**

The sign of SMFR shows a negative correlation with the sentiment index. When total money raised from the stock market is high, the sentiment index tends to be low. The mechanism is that, when money raised from the stock market is high, investors are expected to be pessimistic because the primary market would absorb much funds

From the secondary market and the supply of shares would exceeds the demand for a moment. So there is pressure for stock market to decline.

## **3.3.** **Firm Characteristics**

As discussed in previous part, stocks that are more sensitive to investor sentiment are those valued more subjectively and those difficult to be arbitraged. Given the suggested characteristics from Baker and Wurgler (2006), and combining the features in Chinese market, I focus on the following specific characteristics.

1. Small Size

2. Young Stocks

3. Low Book to Market Ratio

4. High past volatility stocks

5. Low institutional ownership

6. Small proportion of tradable shares

The first 1~3 characteristics are related to the subjective valuation of the stocks. Usually, more individual investors are involved in small sized firm. Individual investors are less informed and therefore valuation of the firm is more subjective to individual investors' sentiment. Young stocks are difficult to value because of the uncertainty and the unstable past performance. Book-to-market ratio has two different meanings. The two extremes of BE/ME ratio indicate growth opportunities and financial distress respectively (Baker and Wurgler, 2006). Low BE/ME firms may be stocks which have performed unusually well and show investors' belief in its rapid growth. High BE/ME firms include financial distress factors. Both kinds of stocks present difficulties to investors for valuation and pricing.

Characteristics 4~6 indicate the difficulty of arbitrage. High past volatility increases the risk of arbitrage. Before the price reverses, there is a high chance that prices will go further in one direction because of irrational trading. As Stefan Nagel (2005) has explained, low institutional ownership indicates low arbitrage capacity because institutional investors, who are regarded as more sophisticated investors, are not able to exert further selling pressure if they own only small proportion of the stock and if they are not permitted going short. Another distinct feature of Chinese stock market is a large proportion of illiquid shares which are not available to buy and sell, due to the historical structure of market. Before the reform of shareholder structure in

2005, the non-tradable proportion exceeded 2/3, while by the end of 2012, the non-tradable proportion declines to 20%. The proportion of tradable shares is so small that available shares are difficult to obtain, which may increase the cost of arbitrage.

**Table** **4**

**Summary Statistics of Firms 1998:08-2012:11**

This table presents the summary statistics of firm characteristics, including full sample period and subsample periods. Rt is the monthly return for each stock. ME is total market cap (including non-tradable shares). AGE is the years from being listed. BE/ME is the ratio of net asset end of June to ME end of June. Volatility is the monthly standard deviation of monthly returns for past 12 months (if trading months are less than 9, then delete). InstHold is the proportion of institutional holding. Institutions include mutual funds, security firms, pension funds, trusts and insurance companies. Trdashare is the proportion of tradable A share compared to the total shares of a firm. All data except InstHold are from CSMAR database. InstHold and Trdashare are from RESSET database. Sample period of InstHold is 2001:06 to 2012:06. Extremely large value of market cap appears in the table is because of Chinese National Petroleum Corp and Sino Petroleum Corp during the bull market in 2006-2007.

| Full Sample | | | | |  | Subsample Means | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Obs. | Mean | Std.Dev | Min | Max | Before  2005:06 | After  2005:06 |
| Rt | 220,345 | 1.09% | 13.69% | -34.76% | 55.38% | -0.43 | 2.06 |
| ME (￥M) | 220,345 | 6,251.65 | 34,644.14 | 76.38 | 2,547,034.28 | 3,287.86 | 8,127.96 |
| AGE (Years) | 220,255 | 7.70 | 4.85 | 0.01 | 110.16 | 5.25 | 9.24 |
| BE/ME (%) | 216,704 | 37.99 | 25.32 | 0.00 | 341.03 | 30.61 | 42.70 |
| Volatility (%) | 207,144 | 12.37 | 5.84 | 0.59 | 310.36 | 9.92 | 13.90 |
| InstHold (%) | 183,380 | 17.21 | 18.97 | 0.00 | 97.95 | 12.01 | 19.25 |
| Trdashare (%) | 218,732 | 51.65 | 26.06 | 0.88 | 100.00 | 35.48 | 61.79 |

I will construct portfolios annually based on the 6 firm characteristics respectively. Extreme values with negative equity or extremely high monthly return are excluded from the dataset. First, I rank all A share firms by one of their firm characteristic at the end of last June. Then stocks are sorted into 10 groups in an ascending order according to the rank. Portfolios are rebalanced based on the firm characteristic once every year, following Fama and French (1992). This means that the stocks keep in the same group from July of year t to the June of the next year. Lee et al. (1991), Brown and Cliff (2004) and Baker and Wurgler (2006) suggest that large firms tend to be less influenced by investor sentiment. Therefore, the sentimental impact may be diluted for the value-weighted portfolios. So, portfolios are constructed on an equal weight basis.

# **4.** **The Empirical Analysis and Results**

To find out how investor sentiment may impact stock returns, tests are conducted in two ways respectively: the market-level returns in Part 4.1 and the cross-sectional returns in Part 4.2.

## **4.1.** **Sentiment and market-level returns**

This section examines whether investor sentiment can predict market-level return, as prior literature suggests. Before the regression test of relationship between sentiment and market-level returns, the stability of time series is tested (Table 5). Both equal-weighted (Rm\_equal) and value-weighted (Rm\_value) market returns are adopted in this part to see the predictive power of Sentiment Index to market-level returns.

**Table** **5**

**Market-level Return and Sentiment 1998:08-2012:11**

This table presents the correlation of market-level return and Sentiment Index. Unit Root test is performed to test if the time series are stationary. Rm\_equal is the equal weighted monthly market-level return; Rm\_value is the value weighted monthly market-level return. Both are from CMARS database. Sentiment Index is the principal component on the six orthogonalized proxies from previous section." \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively.

|  |  |  |  |  | Correlation |  | Unit Root Test | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mean | Std.dev | Autocorrelation | Sentiment Index | Rm\_equal | Rm\_value | ADF  t-statistic | P  Value |
| Sentiment Index | 0 | 0.739 | 0.726 | 1 |  |  | -3.37 | 0.0009 |
| Rm\_equal | 1.31% | 9.85% | 0.145 | .165\*\* | 1.00 |  | -7.11 | 0 |
| Rm\_value | 0.86% | 8.90% | 0.129 | .163\*\* | .952\*\*\* | 1.00 | -11.06 | 0 |

From the Augmented Dickey-Fuller test, the null hypothesis that market level return Rm (or Sentiment Index) has a unit root is significantly rejected under the significance level of 0.01. Both the market return series and Sentiment Index are stationary. The equal-weighted market return is highly correlated to value-weighted return with correlation coefficient equal to 0.952. The mean of equal-weighted monthly return is higher than value weighted one, which may be due to the size effect: small firms' returns are less than large firms on average.

Sentiment index is positively related to the market-level return. The correlation coefficient is 0.147, which is significant at 10% level. When sentiment index is high, the market return tends to be high in the same period. However, the significance level

Is not so strong.

### **4.1.1.** **Investor sentiment change and market return**

Firstly, I examine the impact of sentiment change on market return. It is inferred that when investors become more bullish over period, the market is likely to be pushed up. Therefore, I regress market return on the sentiment change as follows:

9

Where

Before the regression result, it is observed that changes in the Sentiment Index are negatively correlated. The first order autocorrelation coefficient is -0.428. This means sentiment is not likely to move up and up continuously.

From the regression result (Table 6), we find that change in sentiment is positively significant. Market return is in strong co-movement with the change in sentiment. The coefficient of Investor Sentiment Change is 0.0426 for equal-weighted market return. When change in the sentiment index increases by one unit, equal-weighted market return is to increase 4.26%. Similar result is found in value-weighted market return, and the Sentiment Change is more significantly correlated with value-weighted market return.

**Table** **6**

**Investor Sentiment Change and Market-Level Return**

|  | Variable | Coefficient | Std. Error | t-Statistic | Prob. | Adjusted R2 |
| --- | --- | --- | --- | --- | --- | --- |
| Rm\_equal |  | 0.0426 | 0.0134 | 3.1799 | 0.0018 | 5.09% |
|  |  | 0.0138 | 0.0073 | 1.8844 | 0.0612 |  |
| Rm\_value |  | 0.0436 | 0.0120 | 3.6342 | 0.0004 | 6.70% |
|  |  | 0.0094 | 0.0066 | 1.4290 | 0.1548 |  |

### **4.1.2.** **Predictability of sentiment level to market return**

### **4.1.2.1.** **Simple Regression:**

Literature suggests that sentiment plays a contrarian role in predicting stock return. For testing the predictability of sentiment level to market return, I will apply the following univariate regression:

(10)

Is the monthly market-level return, i is the lag-length, is the coefficient of interest.

**Table** **7**

**Sentiment Level and Market Return: Univariate Regression 1998:08-2012:11**

This table presents the coefficient of lagged Sentiment Index in the univariate regression (10) to market return. Regressions are performed on equal-weighted (Rm\_equal) and value weighted monthly return resprectively. i denotes the lag length from 1 month to 5 month. All t-statistics in brackets are based on the Newey-West estimation." \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively.

|  | i=1 | i=2 | i=3 | i=4 | i=5 |
| --- | --- | --- | --- | --- | --- |
| Rm\_equal | -0.0013 | -0.0076 | -0.0100 | -0.0002 | -0.0188\* |
|  | （-0.0689） | （-0.6976） | （-0.5555） | （-0.0226） | （-1.9655） |
| Rm\_value | -0.0042 | -0.0075 | -0.0123 | -0.0034 | -0.0184\* |
|  | （-0.2238） | （-0.7331） | （-1.1399） | （-0.3396） | （-1.8801） |

Univariate regression result in Table 7 shows that all coefficients of sentiment index from lagged 1 month to 5 months are negative, which indicates the reversal effect. However, the predictive power does not become significant at level of 10% until Month 5. The coefficient of lagged Month 5 Sentiment Index is -0.0188. If the sentiment index 5 months prior to present is increased by one unit, the equal-weighted stock market return of this month would decrease by 188 basis points. When lagged periods increase from 5 months on, the coefficient of investor sentiment stays negative but becomes insignificant again. The regression result does not show short-term momentum effect when Sentiment Index is lagged one month. This is different from U. S market documented by Brown and Cliff (2004, 2005) documents, where investor sentiment has positive predictability on short-term market return while negative predictability on long-term market return. Yet this is consistent with Lu and Zou (2007), Liu and Pi (2007). Through their empirical studies, reversal effect is more significant than momentum effect in China and the short-term reversal effect is observed besides long-term reversal. Part of the reason would be data frequency. Monthly data is applied that the very short-term momentum effect of Sentiment Index is not able to be observed. Another explanation they suggest is the frequently changing government policy. The policy information overtakes company fundamentals in the market, and investor sentiment changes fast according to the more public policy information. Thus, unlike the mature market, the short term reversal

Effect is more obviously observed in Chinese market.

### **4.1.2.2.** **Optimistic and Pessimistic Periods**

This part investigates whether the predictability of Sentiment Index varies in periods when investors are optimistic or pessimistic. As prior literature suggest, the extent of investors' response in high or low sentiment is asymmetric due to the limitation of arbitrage (Gromb and Vayonos, 2010). Sentiment investors tend to hold large long position in high sentiment period while less reluctant to sell or hold short position in low sentiment period. For arbitrageurs, in the limitation of short-sales, they have more access to hold long-position when they believe stocks are undervalued and more risk and limits to hold short-position when they believe stocks are overpriced by sentiment investors. Hence, the mispricing by high investor sentiment is expected to be more severe than by low sentiment.

I will test the difference of predictability by applying dummy variables. The following two equations could be used. is the market-level return,

is the i-month lagged Sentiment Index. In Equation (11), one dummy is used to denote high/low sentiment periods. is 1 when is above average and 0 vice versa. In Equation (12), two dummy variables are used to denote high/low sentiment periods respectively. item is deleted.

is 1 when is above average and 0 vice versa. is 1 when is below average and 0 vice versa.

(11)

(12)

These two equations are equivalent. Through simple calculation, we can find that

. The benefit of applying Equation (12) is that the effect of Sentiment Index in pessimistic periods is easily recognized from regression result as without further calculation. Therefore, I will investigate the different predictability power of Sentiment Index in high/low periods based on Equation (12).

**Table** **8**

**Sentiment Level and Market Return: Optimistic and Pessimistic Periods 1998:08-2012:11**

This table presents the and coefficients in Equation (12) and adjusted . represents the predictive power of Sentiment Index in optimistic periods while represents the predictive power of Sentiment Index in pessimistic periods. Regressions are performed on equal-weighted (Rm\_equal) and value weighted monthly return resprectively. i denotes the lag length from 1 month to 5 month. All t-statistics in brackets are based on the Newey-West estimation. " \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively.

|  |  | Rm\_equal |  |  | Rm\_value |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Opti | Pessi | Adjusted | Opti | Pessi | Adjusted |
| i=1 | 0.0105 | -0.0178 | -0.82% | 0.0043 | -0.0159 | -0.84% |
|  | （0.5096） | （-0.6655） |  | （0.2106） | （-0.6412） |  |
| i=2 | -0.0170 | 0.0054 | -0.64% | -0.0157 | 0.0039 | -0.59% |
|  | （-1.2642） | （0.2222） |  | （-1.2016） | （0.1807） |  |
| i=3 | -0.0302\* | 0.0185 | 0.43% | -0.0310\*\* | 0.0142 | 0.97% |
|  | （-1.9035） | （0.9791） |  | （-2.4028） | （0.8265） |  |
| i=5 | -0.0476\*\* | 0.0241 | 2.92% | -0.0485\*\*\* | 0.0264 | 3.97% |
|  | （-2.5821） | （1.1453） |  | （-3.1020） | （1.5122） |  |

Table 8 presents the difference predictive power of lagged Sentiment Index for optimistic and pessimistic periods. Sentiment index shows no predictability for market return of future two months in both high and low sentiment periods. When the lagged periods increase to 3 months, Sentiment Index shows significant negative predictability on market return in high sentiment periods, both equal and value weighted. When the lagged periods increase to 5 months, the reversal effects are more significant. Take equal-weighted market return for instance. When the Sentiment index is one unit higher in high sentiment periods, the market-level return would decrease by 4.76% five months later. No evidence supports that Sentiment Index in low sentiment period could have predictability on market return. This regression result here supports our initial expectation that investor sentiment could result in greater price reversal in high sentiment than in low sentiment.

In predictive regression, adjusted R-square is usually small. It is suggested that adjusted R-square larger than 0.5% is significant in economic importance. (Campbell and Thompson, 2008, Xu 2004) The adjusted R-square when i=5 is 2.92%, which shows the great economic importance.

**To sum up**, from the univariate regression on sentiment, I can find an obvious role of investor sentiment on the market-level return when lag length is 5 months;

Evidence is found to support that more influence is exerted on the market return by investor sentiment in high sentiment periods than in low sentiment periods.

## **4.2.** **Sentiment index on future returns across deciles**

### **4.2.1.** **Statistical analysis**

The analysis in this section documents the predictive power of investor sentiment to cross-sectional stock returns.

The non-conditional and conditional characteristics effects are presented in the Table 7 and Figure 2 below. All A stocks are sorted according to the decile of a firm characteristic by the end of last June. Equal-weighted average monthly return for each decile is calculated.

Conditional average return is based on the level of sentiment of previous month. I divide the whole sample period into high/low sentiment period based on the mean value of sentiment index. In the long run, investor sentiment is assumed to be at a normal level. When the index is larger than mean, this period is labeled as high sentiment period (Positive), and vice versa (Negative). Conditional on the previous month sentiment, we can get each portfolios future average return. The goal of the nonparametric comparison across deciles is to identify cross-sectional effects from the difference in conditional average returns.

Let's take an overview of all the graphs in Figure 2. Horizontal axis presents portfolios ranked from smallest to biggest in an ascending order. Vertical axis presents the average monthly return for each portfolio from 1998:09 to 2012:11. The solid line is the average returns of portfolios through the whole period; the rectangle denotes the conditional average return on high sentiment of previous months; the triangle denotes conditional average return on low sentiment of previous months. From the figure, almost all stock portfolios (from 1-10, from different firm characteristics) show a lower average monthly return after positive sentiment period. This supports the general pattern that, when sentiment is high, subsequent return tend to be low. There is reversal effect. The exception of small firms with high return following high sentiment may indicate that small firms take longer time to reversal than large firms.

Specifically to each characteristic, some interesting patterns are observed.

The first rows of Table 9 present the size effects, measured by ME. During the whole sample period, without considering the sentiment factor, ME shows an obvious

Pattern across deciles. Small size firms tend to have higher monthly return on average. This is in line with Banz (1981) discovery. When conditional on previous month's sentiment, this size effect seems to exist when following positive sentiment only. Another observation is that, for small firms, the average return following high sentiment is higher than following the low sentiment. For big firms, the predictability of investor sentiment is the opposite. This pattern seems inconsistent to our hypothesis that investor sentiment is a contrarian predictor for small firms.

The effect of sentiment on firms sorted by age appears decreasing as firms grow from recent IPOs to old stocks. The cross-sectional effect is clearly observed in the very young stocks. The youngest stocks earn lower subsequent return when sentiment is high than recent IPOs. The difference in conditional average returns is the largest for the youngest stocks and this supports our hypothesis that young stocks are more easily affected by sentiment.

The cross-sectional effect of BE/ME is different from U. S. market. While Baker and Wurgler (2006) report that for the BE/ME variable, there is a U-shaped pattern in the conditional difference, due to the double roles BE/ME play. However, here an essentially monotonic pattern is observed. Growth firms with low BE/ME react more to sentiment. For value firms with high BE/ME firms, average returns in high or low sentiment periods are not obviously different.

One interesting observation with volatility is that stocks with the highest past volatility (the 10th decile) earn 37 basis points less than the lowest-past-volatility stocks per month on average. This coincides with findings in other markets that stocks with high exposure to aggregate volatility risk tends to produce low expected return (Ang et al.,2006, 2008). Taking sentiment into consideration, the highest past

Volatility decile has the lowest subsequent return and prices of these stocks fluctuate the most in sentiment. One possible explanation is that highly volatile stocks are featured with subjective valuation and arbitrage difficulty, so they are more sensitive to investor's irrationality.

Patterns of the remaining variables -- institutional ownership and proportion of tradable shares are intriguing. For the unconditional effects, returns seem flat across deciles. However, conditioned on sentiment, the patterns are difficult to interpret. For institutional ownership, the 8th-decile firms, which seem to be owned by more

Institutional investors, react more to sentiment. This is inconsistent with our

Hypothesis. Institutional investors are commonly believed as more rational investors who would stabilize the market. However, empirical study in Chinese market suggests that the leapfrog development in fund industry fails to lead a more rational and stable market (Cai and Song, 2010). Actually, it is a phenomenon that stocks which attract more institutional investors are prone to fluctuate more violently. For the tradable A share variable, firms with middle and low proportion of tradable shares are more prone to investor sentiment effect. But the lowest-decile stocks are nearly not affected in high/low periods. A natural interpretation is that the very low tradable portion makes these stocks less attractive for investors.

In summary, from the statistical analysis, several points are observed. One is that subsequent returns following high sentiment tend to be lower than that following low sentiment, across most of the cross-sectional variables. This supports our hypothesis that sentiment is able to forecast returns as a contrarian predictor. Secondly, sentiment seems to have effects on cross-sectional variables including size, age, book-to-market ratio and past volatility while patterns in institutional ownership and tradable shares are ambiguous.

**ME**

2.50%

1 2 3 4 5 6 7

10

8

9

2.00%

**Average Monthly Return**

1.50%

1.00%

0.50%

0.00%

-0.50%

-1.00%

-1.50%

-2.00%

2.00%

1.50%

**Average Monthly Return**

1.00%

0.50%

0.00%

-0.50%

-1.00%

-1.50%

**AGE**

Difference Genera l Positive Nega tive Difference Genera l Positive Nega tive

1 2 3 4 5 6 7 8 9 10

2.00%

1.50%

**Average Monthly Return**

1.00%

0.50%

0.00%

-0.50%

-1.00%

-1.50%

**BE/ME**

2.00%

1

3 4 5 6 7 8 9 10

2

1.50%

**Average Monthly Return**

1.00%

0.50%

0.00%

-0.50%

-1.00%

-1.50%

**Volatility**

Difference Genera l Positive Nega tive Difference Genera l Positive Nega tive

1 2 3 4 5 6 7 8 9 10

1.50%

1.00%

**Average Monthly Return**

0.50%

0.00%

-0.50%

**INSTHOLD**

2.00%

1 2 3 4 5 6 7 8 9 10

1.50%

**Average Monthly Return**

1.00%

0.50%

0.00%

-0.50%

**TRDAShare**

-1.00%

Difference Genera l Positive Nega tive

-1.00%

Difference Genera l Positive Nega tive

1 2 3 4 5 6 7 8 9 10

**Figure** **2** **Future Returns sorted by Firm Characteristics and Sentiment Index**

I form 10 equal-weighted portfolios based on market size (ME), listed age (AGE), book-to-market ratio (BE/ME), past volatility (Volatility), institutional ownership (InstHold) and proportion of tradable A share (Trdashare) respectively. Horizontal axis presents portfolios ranked from smallest to biggest in an ascending order. Vertical axis presents the average monthly return for each portfolio from 1998:09 to 2012:11. The solid line is the average returns of portfolios through the whole period; the rectangle denotes the conditional average return on high sentiment of previous months; the triangle denotes conditional average return on low sentiment of previous months; Solid bar is the difference between positive and negative sentiment period.

Investor

Sentiment and Cross Sectional Stock Returns:

Empirical

from

Chinese

A

Share

Market

35

**Table** **9**

**Future Returns by Sentiment Index and Firm Characteristics, 1998.09-2012.11**

This table presents the equal-weighted average monthly return of 10 portfolios sorted by the specific firm characteristics and Sentiment Index. Stocks are sorted into 10 groups by firm characteristics end of last June. Firm characteristics includes market size (ME), age from being listed (AGE), Book-to-market ratio (BE/ME), past 12-month volatility (Volatility), proportion of institutional ownership (InstHold) and proportion of tradable A shares (Trdashare). I then present the portfolio average returns conditional on whether previous month's sentiment is above average (Postive) or below average (Negative). Portfolios are ranked in an ascending order which means from smallest to largest by the firm characteristic. All A-share stocks which are listed by the end of last June are included in the portfolios. The difference between positive sentiment and negative sentiment is also reported

| Equal Weighted |  |  |  |  |  | Decile | |  |  |  |  | Comparisons | | |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sentiment t-1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  | 10-1 | 10-5 | 5-1 |
|  | Positive | 2.29% | 1.86% | 1.49% | 1.41% | 1.04% | 0.73% | 0.54% | 0.47% | 0.33% | 0.02% |  | -2.27% | -1.02% | -1.25% |
| ME | Negative | 1.50% | 1.60% | 1.40% | 1.32% | 1.48% | 1.25% | 1.35% | 1.42% | 1.50% | 1.56% |  | 0.06% | 0.08% | -0.02% |
|  | Difference | 0.79% | 0.26% | 0.08% | 0.09% | -0.44% | -0.52% | -0.81% | -0.95% | -1.17% | -1.54% |  | -2.33% | -1.10% | -1.23% |
|  | Positive | 0.52% | 0.88% | 1.02% | 1.06% | 1.16% | 1.14% | 1.10% | 1.21% | 1.09% | 0.99% |  | 0.48% | -0.17% | 0.64% |
| Age | Negative | 1.46% | 1.81% | 1.59% | 1.28% | 1.49% | 1.28% | 1.28% | 1.35% | 1.51% | 1.34% |  | -0.12% | -0.15% | 0.03% |
|  | Difference | -0.94% | -0.93% | -0.57% | -0.22% | -0.33% | -0.14% | -0.17% | -0.14% | -0.42% | -0.34% |  | 0.59% | -0.01% | 0.61% |
|  | Positive | 0.33% | 0.39% | 0.54% | 0.96% | 0.95% | 1.28% | 1.23% | 1.35% | 1.42% | 1.54% |  | 1.21% | 0.60% | 0.62% |
| BE/ME | Negative | 1.25% | 1.31% | 1.51% | 1.49% | 1.36% | 1.39% | 1.60% | 1.52% | 1.51% | 1.54% |  | 0.29% | 0.18% | 0.11% |
|  | Difference | -0.92% | -0.91% | -0.97% | -0.53% | -0.41% | -0.10% | -0.37% | -0.16% | -0.09% | 0.00% |  | 0.92% | 0.42% | 0.51% |
|  | Positive | 1.13% | 1.40% | 0.93% | 1.22% | 1.22% | 1.21% | 1.08% | 0.95% | 0.93% | 0.26% |  | -0.87% | -0.97% | 0.09% |
| Volatility | Negative | 1.47% | 1.53% | 1.50% | 1.53% | 1.42% | 1.40% | 1.46% | 1.51% | 1.36% | 1.40% |  | -0.06% | -0.01% | -0.05% |
|  | Difference | -0.34% | -0.13% | -0.57% | -0.30% | -0.20% | -0.19% | -0.38% | -0.56% | -0.43% | -1.15% |  | -0.81% | -0.95% | 0.14% |
| InstHold 200107to201211 | Positive | 0.72% | 0.95% | 0.73% | 0.76% | 0.48% | 0.77% | 0.89% | 0.66% | 0.86% | 0.63% |  | -0.09% | 0.14% | -0.23% |
| Negative | 0.97% | 0.85% | 0.98% | 0.96% | 0.97% | 0.96% | 1.01% | 1.21% | 1.11% | 0.93% |  | -0.03% | -0.04% | 0.01% |
| Difference | -0.25% | 0.10% | -0.25% | -0.21% | -0.49% | -0.19% | -0.12% | -0.54% | -0.24% | -0.30% |  | -0.06% | 0.18% | -0.24% |
| Trdashare | Positive | 0.92% | 0.78% | 1.04% | 1.17% | 0.95% | 1.10% | 1.23% | 1.09% | 0.93% | 1.00% |  | 0.08% | 0.04% | 0.03% |
| Negative | 1.17% | 1.43% | 1.45% | 1.58% | 1.63% | 1.36% | 1.49% | 1.43% | 1.33% | 1.50% |  | 0.33% | -0.13% | 0.46% |
|  | Difference | -0.25% | -0.65% | -0.41% | -0.41% | -0.68% | -0.26% | -0.26% | -0.34% | -0.40% | -0.50% |  | -0.25% | 0.17% | -0.42% |

### **4.2.2.** **Regression analysis on long-short portfolios**

After the statistical analysis in the previous part, we can find the difference of stock performances across deciles following high and low sentiment periods. For example, we find that the return gap between stocks with high book-to-market ratio and low book-to-market ratio stocks is higher following high sentiment periods than following low sentiment periods. To provide further evidence of the sentimental impact on the difference, I will first construct long-short portfolios based on the firm characteristics and perform tests by regressing the portfolio returns on previous month sentiment index and Fama-French three factors.

By longing Portfolio 1 and shorting Portfolio 10, the long-short portfolio is constructed. Portfolio 1 and Portfolio 10 are sorted based on each firm characteristic proposed in previous section: market size, listed age, book-to-market ratio, volatility, institutional ownership and proportion of tradable shares. The long-short portfolio return is the difference between the lowest decile and the highest decile. For example, long the youngest 10% of stocks and short the 10% oldest ones. If the difference between the returns of Portfolio 1 and Portfolio 10 can be predicted by sentiment index, then it may be implied that investor sentiment is a factor that influences the cross-sectional stock returns.

The regression equation is the following:

13

The dependent variable is the monthly return of a long-short portfolio, which is regressed on the sentiment index that is one month before. As Fama and French (1993) suggest, size effect and book-to-market effect are systematic factors in stock pricing. Wang and Zhu (2011) build a 8 factor models in testing Chinese cross-sectional stock returns and find that market premium and book-to-market ratios have the strongest explanatory power to portfolio returns while size effects are less prominent but still plays a nontrivial role. Therefore, market premium, SMB factor and HML factor are included as control variables in the equation. risk premium calculated from monthly market return (from CMARS database) minus one-year bank deposit rate (monthly). And SMB and HML portfolio returns constructed according to

Fama French (1993) based on all stocks we study in this paper. SMB (HML) is not included as the control variable when SIZE (BE/ME) is the independent variable. The variable of interest in the equation is the coefficient of sentiment index.

From the correlation matrix, we can find that most of the Long-short portfolio returns are significantly correlated. This may show that there is some common factor that drives them together.

Besides testing the predictability power of sentiment in the full sample period, I divide the full sample period into two and see the impact in subsample periods. The breakpoint is set in June 2005 based on two reasons. First, the reform of shareholder structure starting in May 2005 may have changed the investor component in the market thus change the micro-fundamental. Before the announced reform, two thirds of total shares in listed firms were non-tradable and mainly held by State Owned Enterprises. Second, 2005 witnessed the transition from a 4 year bear market to a irrational bullish market until 2007. So June 2005 is a good breakpoint separating two complete market cycles.

Table shows the regression results. For the whole sample period, sentimental impact on BE/ME and Institutional Ownership is significant at 0.1 and 0.05 levels respectively. The impact on stocks sorted by past volatility is weak but may be significant at 0.1 level. The negative coefficients of sentiment show that when sentiment is high, returns on low book-to-market/ growth firms, high past volatility firms and low institutional holding firms will be relatively low in subsequent month. When sentiment is increased by one unit, the monthly return of longing highly volatile stocks and shorting less volatile stocks is lowered by 0.56% in the next month. This supports our second hypotheses that these firms tend to be more impacted by sentiment. However, size, age and proportion of tradable A shares do not present strong conditional effects according to the regression result.

When I divide the full sample period into two and examine the effect of investor sentiment respectively, an interesting observation is found. Except for proportion of tradable A shares, sentiment impact on all other cross-sectional returns is significant in at least one sub-sample period. Furthermore, most of the significant cases occur in the period after Year 2005, which indicates that the role of investor sentiment becomes more significant in 2005 to 2012 market cycle. This is a little counter-intuitive because it is believed that investors should not be so easily impacted by sentiment as

Time passes since investor learn from past experience and accumulate skills. However, given a second thought, it would be explained. It is until 2005 that the number of newly opened stock accounts shoots up and stock market has attracted numerous no-experience investors including the elderly. Stock market has ever since become hot topic in families. For size factor, the impact on small minus big portfolio is positive in the first sample period and then disappears in the second. The positive sign is consistent with our statistical analysis that small stocks earn higher return while large stocks earn lower return following high sentiment. It appears that large stocks are more sensitive to investor sentiment. One possible reason is that in China, the largest cap firms are state-owned, like Chinese National Petroleum Corp and Sino Petroleum Corp. The large firm can easily been the focus of policy and attract irrational investors' attention.

**Table** **10**

**Portfolio Returns Correlation 1998:09-2012:11**

This table presents the correlation between long-short portfolios, based on different firm characteristics. The firm characteristics include market size (ME), age from being listed (AGE), Book-to-market ratio (BE/ME), past 12-month volatility (Volatility), proportion of institutional ownership (InstHold) and proportion of tradable A shares (Trdashare). Portfolio 1 is the bottom one decile while Portfolio 10 is the top decile." \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively.

|  |  | SIZE | AGE | BE/ME | Vol | InstHold | Trdshare |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SIZE | Portfolio 1-10 | 1 |  |  |  |  |  |
| AGE | Portfolio 1-10 | -0.225\*\*\* | 1 |  |  |  |  |
| BE/ME | Portfolio 1-10 | 0.105 | 0.288\*\*\* | 1 |  |  |  |
| Volatility | Portfolio 10-1 | 0.368\*\*\* | -0.305\*\*\* | 0.153 | 1 |  |  |
| InstHold | Portfolio 1-10 | 0.449\*\*\* | -0.372\*\*\* | -0.411\*\*\* | .0.325\*\*\* | 1 |  |
| Trdashares | Portfolio 1-10 | -0.058 | 0.281\*\*\* | -0.004 | -0.330\*\*\* | -0.206\*\*\* | 1 |

**Long-short Portfolios Regression Result on 1-month lagged Sentiment 1998:09-2012:11**

This table presents the regression result of long-short portfolio returns on Fama-French 3 factor models and one month lagged Sentiment Index. is the coefficient of Sentiment Index. The Long-short portfolios are based on different firm characteristics including market size (ME), age from being listed (AGE), Book-to-market ratio (BE/ME), past 12-month volatility (Volatility), proportion of institutional ownership (InstHold) and proportion of tradable A shares (Trdashare). All p value in brackets are based on the Newey-West estimation.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sentiment\_t-1** | | | | |  | **Sentiment\_t-1** | |  | **Sentiment\_t-1** | |
| RMKT,SMB,HML controlled | | Full Sample  （1998:09-2012:11） | | | Subsample  （1998:09-2005:06） | | | Subsample  （2005:07-2012:11） | | |
|  | Long-Short  Return % | d | p(d) | Adjusted  R2 | D | p(d) | Adjusted  R2 | d | p(d) | Adjusted  R2 |
| SIZE | Portfolio 1-10 | 0.92 | 0.174 | 10.70% | **2.19** | 0.001 | 18.85% | 0.34 | 0.727 | 6.96% |
| AGE | Portfolio 1-10 | 0.00 | 0.990 | 16.90% | -0.01 | 0.975 | 18.17% | 0.29 | 0.581 | 36.06% |
| BE/ME | Portfolio 1-10 | **-0.53** | 0.062 | 1.18% | 0.00 | 0.998 | 2.73% | **-0.81** | 0.029 | 5.24% |
| Volatility | Portfolio 10-1 | **-0.56** | 0.099 | 38.86% | -0.36 | 0.528 | 48.32% | **-0.87** | 0.010 | 43.69% |
| InstHold (2001.07  -2012.11) | Portfolio 1-10 | **-0.43** | 0.02 | 43.08% | -0.09 | 0.77 | 18.18% | **-0.71** | 0.01 | 52.00% |
| Trdashares | Portfolio 1-10 | 0.14 | 0.511 | 7.08% | 0.09 | 0.700 | 23.69% | 0.05 | 0.884 | 18.11% |

### **4.2.3.** **Further confirmation on the lag length**

Here, I adjust the lag length in the Sentiment Index and repeat the regressions of each long-short portfolio return on lagged Sentiment Index. By adjusting the lag length in the Sentiment Index, it is found that for the contrarian predictable power of sentiment lasts from 1 month to maximum 4 months, depending on firm characteristics. Increasing the lag length, there is still no cross-sectional effect from sentiment for the proportion of tradable A shares. As Lu and Zou (2007) analyze, reversal effect is more significant than momentum effect in China and the short-term reversal effect is observed besides long-term reversal. Therefore, it is reasonable that the sentiment of previous month predicts the stock returns conversely.

**Table** **12**

**Long-short Portfolios Regression Results on Different Sentiment Lag Lengths 1998:09-2012:11**

This table presents the regression result of long-short portfolio returns on Fama-French 3 factor models and lagged Sentiment Index. Lag length i is from 2 to 4. is the coefficient of lagged Sentiment Index. Results of the full sample period and two subsample periods are reported. Two subsample periods are divided according to The Long-short portfolios are based on different firm characteristics including market size (ME), age from being listed (AGE), Book-to-market ratio (BE/ME), past 12-month volatility (Volatility), proportion of institutional ownership (InstHold) and proportion of tradable A shares (Trdashare). Proportion of institutional ownership data is from 2001.07 to 2012.11." \*\*\*","\*\*","\*" denote significance level of 0.01, 0.05 and 0.1 respectively.

|  |  | SIZE | AGE | BE/ME | Volatility | InstHold | Trdashares |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Period | Sentiment  t-i | Portfolio 1-10 | Portfolio 1-10 | Portfolio 1-10 | Portfolio 10-1 | Portfolio 1-10 | Portfolio 1-10 |
|  | d(i=1) | 0.92 | 0.00 | -0.53\* | -0.56\*\*\* | -0.43\*\* | 0.14 |
| Full Sample (1998:09-2012:11) | d(i=2) | 0.45 | 0.10 | -0.75\*\* | -0.55\*\* | -0.15 | 0.03 |
| d(i=3) | 0.89 | 0.054 | -0.77\*\* | -0.210 | -0.15 | -0.02 |
|  | d(i=4) | 0.673 | -0.170 | -0.421 | -0.279 | -0.217 | 0.26 |
|  | d(i=1) | 2.19\*\*\* | -0.01 | 0.00 | -0.36 | -0.09 | 0.09 |
| Subsample (1998:09-2005:06) | d(i=2) | 2.13\*\*\* | 0.43 | -1.13\* | -0.54 | -0.26 | -0.31 |
| d(i=3) | 1.05 | -0.39 | -0.13 | 0.14 | 0.01 | -0.42 |
|  | d(i=4) | 2.22\*\* | -0.629 | -0.515 | -0.085 | -0.248 | -0.13 |
|  | d(i=1) | 0.34 | 0.29 | -0.81\*\* | -0.87\*\* | -0.71\*\*\* | 0.05 |
| Subsample (2005:06-2012:11) | d(i=2) | -0.24 | 0.14 | -0.62\* | -0.61\*\* | -0.22 | -0.02 |
| d(i=3) | 1.20 | 0.508 | -0.94\*\* | -0.61\*\* | -0.41\* | 0.15 |
|  | d(i=4) | 0.15 | 0.26 | -0.18 | -0.40 | -0.42\*\* | 0.18 |

### **4.2.4.** **Robustness checks**–**new sentiment index**

There is no definitive measure of investor sentiment, however. To show the robustness of the results, I decide to substitute the ADR with a new variable, which is more China specific. After comparing the new index with the original index, it is found that both the new sentiment index and the original sentiment index has contrarian predictive power for cross-sectional stock returns characterized by volatility, institutional ownership, and BE/ME.

I will substitute the ADR ratio with Uplimt Ratio in the construction of sentiment index. Following the Principal Component Method in previous part, I first orthogonalize the six raw proxies and take the first three principal components with eigenvalues larger than 1, and construct a new sentiment index. The first 3 components explain 71.33% of the total sample variance. This is slightly lower than the old Sentiment Index. As we can see from the figure below, the new sentiment index depicts well the technical bubbles and 2007 bullish market.

The new sentiment index is in high correlation with the old one without Chinese specific variable, but looks more volatile in the internet bubble and 2007 bullish periods. The new sentiment index is in higher correlation with the number of newly opened accounts from 2003.01 on. The correlation coefficient reaches 0.50.

Table 13 Correlation Matrix

|  | Senti | Senti\_new | NOA |
| --- | --- | --- | --- |
| Sentiment Index | 1 |  |  |
| Sentiment\_new | 0.871045 | 1 |  |
| NOA | 0.475788 | 0.498334 | 1 |

4

3

2

1

199808

199904

199912

200008

200104

200112

200208

200304

200312

200408

200504

200512

200608

200704

200712

200808

200904

200912

201008

201104

201112

201208

0

-1

-2

Correlation = 0.87

Sentiment Index Sentiment\_new

**Figure** **3** Comparison between two sentiment **index**

Furthermore, I test the predictive power of the Senti\_new index in the cross-sectional returns. The table presents the regression results of long-short portfolio returns on Fama-French 3 factor models and on month lagged Senti\_new. Conclusions keep the same. The new investor sentiment index has contrarian predictive power in BE/ME, Volatility and Institutional Ownership long-short portfolios for the whole sample period. For the first sample period before 2005:06, the new sentiment index has positive predictive power to the portfolio which indicates that large stocks are more sensitive to investor sentiment than small stocks. One possible reason is that in China, the largest cap firms are state-owned, Chinese National Petroleum Corp and Sino Petroleum Corp for example. The large firm can easily been the focus of policy and attract irrational investors' attention.

**Table** **14**

Long-short Portfolios Regression Result on 1-month lagged Sentiment\_new 1998:09-2012:11

| Senti-new\_t-1 | | | | |  | Senti-new\_t-1 | |  | Senti-new\_t-1 | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RMKT,SMB,HML controlled | | Full Sample (1998:09-2012:11) | | | Subsample (1998:09-2005:06) | | | Subsample (2005:07-2012:11) | | |
|  | Long-Short  Return % | d | p(d) | Adjusted  R2 | d | p(d) | Adjusted  R2 | d | p(d) | Adjuste  D R2 |
| SIZE | Portfolio 1-10 | 0.65 | 0.373 | 10.15% | 2.11 | 0.011 | 17.88% | -0.05 | 0.961 | 6.83% |
| AGE | Portfolio 1-10 | 0.03 | 0.938 | 16.90% | 0.01 | 0.979 | 18.17% | 0.23 | 0.645 | 35.99% |
| BE/ME | Portfolio 1-10 | -0.55 | 0.051 | 1.27% | -0.34 | 0.637 | 3.02% | -0.56 | 0.153 | 4.44% |
| Volatility | Portfolio 10-1 | -0.50 | 0.091 | 38.59% | -0.37 | 0.420 | 48.33% | -0.65 | 0.050 | 43.69% |
| InstHold (2001.07-  2012.11) | Portfolio 1-10 | -0.51 | 0.010 | 44.00% | 0.00 | 0.987 | 18.18% | -0.68 | 0.005 | 52.48% |
| Trdashares | Portfolio 1-10 | 0.21 | 0.382 | 7.30% | 0.22 | 0.556 | 23.88% | 0.14 | 0.693 | 18.31% |

# **5.** **Conclusion**

As more and more literature suggests that investor sentiment plays a role in stock pricing in developed markets, this paper intends to explore the role of investor sentiment in the Chinese market. By examining the predictive power of investor sentiment in both market-level return and cross-sectional return, this paper provides more insight into the Chinese market. Major findings are the following:

1) Empirical findings on the market level return present the contrarian predictability of sentiment in the subsequent market return, when lagged period is 5 months. When dividing the sample periods into high/low sentiment periods, empirical evidence supports that investor sentiment has more influence in high sentiment period. In high sentiment period, one unit higher Sentiment Index indicates lower average future market return by 4.76% in 5 months; while little evidence is found for the predictability power of investor sentiment in low sentiment periods.

2) Non-parametric analysis in the cross-sectional effect of sentiment suggests that stocks with some salient features like young stocks, small size, high past volatility, and low book-to-market ratio react more to sentiment. Institutional ownership and tradable proportion of stocks which accommodate Chinese situation show no obvious pattern in the cross-sectional returns. Regression analysis shows further evidence of sentiment impact on cross-sectional returns for long-short portfolios sorted on BE/ME, Institutional Ownership and past Volatility. By dividing the full sample period into before and after June 2005, it is suggested that all factors besides tradable A share shows conditional cross-sectional effects in at least one period, especially in the period after June 2005. This suggests that investor sentiment still plays an important role in cross-sectional stock returns, even though Chinese stock market is experiencing development and getting more complete. By adjusting the lag length in the Sentiment Index, it is found that for the contrarian predictable power of sentiment lasts from 1 month to maximum 4 months. This suggests a more obvious reversal effect than momentum effect in Chinese market.

This paper contributes to current study of investor sentiment. From the market-level and cross-sectional level, evidence is provided that sentiment does impact stock returns. This is consistent with Baker and Wurgler (2006, 2007). Chinese market is still immature and investor sentiment is an important factor in stock pricing.

Several aspects could be improved in further study. The first one is the sentiment measurement. This paper adopts 6 proxies proposed by prior researchers in domestic and foreign markets. Considering specialty in Chinese market, for example high individual participation, the choice of proxies is still controversial. More fundamental work could be done in identifying sentiment proxies. The second one is the sample period. Even though I have tried to expand the sample length as much as possible, the length of Chinese market is short compared with mature market. So the impact of sentiment on Chinese market needs to be further and continuously observed and examined.

# **Bibliography**

Amihud, Y., & Haim, M., 1986, Asset pricing and the bid-ask spread. *Journal of Financial Economics, 17(2)*, 223-249.

Ang, A., Hodrick, R. J., Xing, Y., and Zhang, X., 2006, The Cross-section of Volatility and Expected Returns, *The Journal of Finance*, 1, 259-299

Ang, A., Hodrick, R. J., Xing, Y., and Zhang, X., 2009, High idiosyncratic volatility and low returns: International and further U. S. evidence, *Journal of Financial Economics 91*, 1-23

Baker, Malcolm, and Jeffrey Wurgler, 2006, Investor Sentiment and the Cross-Section of Stock Returns, *Journal of Finance*, 61, 1645-1680

Baker, Malcolm, and Jeffrey Wurgler, 2007, Investor Sentiment in the Stock Market,

*Journal of Economic Perspectives*, 21, 129-151

Baker, Wurgler and Yuan, 2012, Global, Local and Contagious Investor Sentiment,

*Journal of Financial Economics*, 104, 272-287

Baker, Malcolm, and J. C. Stein, 2004, Market Liquidity as a Sentiment Indicator,

*Journal of Financial Markets*, 7, 271-299

Balsara, N. J., Chen, G., & Zheng, Li, 2007, The Chinese Stock Market: An Examination of the Random Walk Model and Technical Trading Rules. *Journal of Business & Economics*, *46( 2),* 43-63.

Banz, R., 1981, The relationship between return and market value of common stocks,

*Journal of Financial Economics 9*, 3-18

Barberis, N., Huang, M., and T. Santos, 2001, Prospect Theory and Asset Prices, *The Quarterly Journal of Economics*, 1, 1-53

Benartzi, S., and Thaler, R. H., 1995, Myopic Loss Aversion and the Equity Premium Puzzle, *Quarterly Journal of Economics 110*, 73-92

Brown, Gregory W., and Cliff, M. T., 2004, Investor Sentiment and the Near-term

Stock Market, *Journal of Empirical Finance 11*, 1-27

Brown, Gregory W., and Cliff, M. T., 2005, Investor Sentiment and Asset Valuation,

*The Journal of Business 78*, 405-440

Campbell, J. Y., and S. B. Thompson, 2008, Predicting the Equity Premium Out Of Sample: Can Anything Beat the Historical Average, *ReviewofFinancialStudies21*, 1509-1531.

Campbell, J. Y., and R. J. Shiller, 1988a, The dividend-price ratio and expectations of future dividends and discount factors. *Review of Financial Studies 1*:195–228.

Campbell, J. Y., and R. J. Shiller, 1988b. Stock prices, earnings, and expected dividends.

*Journal of Finance 43*: 661–76.

Chen X., Kim K. A., Yao T. and Yu T, 2010, On the predictability of Chinese stock returns, *Pacific-Basin Finance Journal*, 18, 403-425

Chung, Hung and Yeh, 2012, When does Investor Sentiment Predict Stock Returns?

*Journal of Empirical Finance 19*, 217-240

D'Avolio, G., 2002, The Market for Borrowing Stock. *Journal of Financial Economics, 66(2-3),* 271-306

De Long J. B., Shleifer A., Summers, L. H., and Waldmann R. J.,1990, Noise Trader Risk in Financcial Markets, *The Journal of Political Economy 98*, 703-738

Fama, Eugene F., and Kenneth R. French, 1989, Business Conditions and Expected Returns on Stocks and Bonds, *Journal of Financial Economics 25*:23–49.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics 33*, 3–56

Frazzini and Lamont, 2008, Dumb money: Mutual fund flows and the cross-section of stock returns, *Journal of Financial Economics 88*, 299-322

Fisher, Kenneth L. and Meir Statman, 2000, Investor Sentiment and Stock Returns,

*Financial Analysts Journal, 56(2)*, 16-23

Gromb, D. and Vayanos, D., 2010, Limits of Arbitrage, *Annual Review of Financial Economics 2*, 251-275

Jones, C., and Lamont, O., 2002, Short Sale Constraints and Stock Returns. *Journal of*

*Financial Economics, 66(2-3),* 207-239.

Lowry, M. & G. William Schwert, 2002. IPO Market Cycles: Bubbles or Sequential Learning, *JournalofFinance*,57(3), 1171-1200

Lee, C., M. C., Shleifer, A. & Thaler, R. H., 1991, Investor Sentiment and the Closed-End Fund Puzzle, *The Journal of Finance*, 46(1), 75-109.

Lemmon, Michael and Evgenia Portniaguina, 2006, Consumer Confidence and Asset Prices: Some Empirical Evidence, *Review of Financial Studies* 19(4), 1499-1529.

Nagel, Stefan, 2005, Short Sales, Institutional Investors and the Cross-section of Stock Returns, *Journal of Financial Economics*, 78, 277-309

Neal, R. and Wheatley, S. M., 1998, Do Measures of Investor Sentiment Predict Returns, *JournalofFinancialandQuantitativeAnalysis*, 33, 523-535

Ng, L., & Wu, F., 2007, The Trading Behaviour of Institutions and Individuals in Chinese Equity Markets, *Journal of Banking & Finance, 31(9),* 2695-2710.

Ritter, R. J., 2003, Behavioral Finance, *Pacific-Basin Finance Journal* 11 (4), 429-437.

Ross, Stephen A., 1976, The Arbitrage Theory of Capital Asset Pricing, *Journal of Economic Theory*, 13, 341–360.

Schmeling, Maik, 2009. Investor Sentiment and Stock Returns: Some International Evidence, *Journal of Empirical Finance*, 16(3), 394-408

Scheinkman, Jose, and Wei Xiong, 2003, Overconfidence and Speculative Bubbles

*Journal of Political Economy 111*, 1183–1219.

Sharpe, W. F. 1964. Capital Asset Pricies: a Theory of Market Equilibrium under Conditions of Risk, *Journal of Finance, 19(3),* 425-442

Shleifer, A., & Vishny, R. W, 1997, The Limits of Arbitrage. *The Journal of Finance*, 52(1), 35-55.

Slot, M. E. and Meir Statman, 1988, How Useful Is the Sentiment Index*JournalofFinancalAnalysts*, 44, 45-55

Stefan Nagel, 2005, Short sales, Institutional Investors and the Cross-section of Stock Returns, *Journal of Financial Economics*, 78, 277-309

Verma, Rahul, and Gokce Soydemir, 2009, The Impact of Individual and Institutional Investor Sentiment on the Market Price of Risk, *The Quaterly Review of Economics and Finance*, 49, 1129-1145

Verma, Rahul, and Gokce Soydemir, 2006, The Impact of U. S. Individual and Institutional Investor Sentiment on Foreign Stock Markets, *Journal of Behavioral Finance*, 7:3, 128-144

Welch, I., and A. Goyal, 2008, ―A Comprehensive Look at the Empirical Performance of Equity Premium Prediction, *Review of Financial Studies 21*, 1455-1508.

Wang, Y. N., & Di Iorio, A., 2007, The Cross Section of Expected Stock Returns in the Chinese A-share market. *Global Finance Journal*, 17(3), 335-349.

Wurgler, J. and Zhuravskaya E., 2002, Does Arbitrage Flatten Demand Curves for Stocks, *JournalofBusiness75,* 583-608

Xu, Y., 2004, Small Levels of Predictability and Large Economic Gains‖, *Journal of Empirical Finance* 11, 247-275.

蔡庆丰，宋友勇，2010，超常规发展的机构投资者能稳定市场吗？，《经济研究》第1期，90-101

程昆，刘仁和，2005，投资者情绪与股市的互动研究，《上海经济研究》第11

期，86-93

韩立岩，伍燕然，2007，不完全理性、投资者情绪和封闭式基金之谜，《经济研究》第3期, 117-129

韩泽县，2005， 投资者情绪与中国证券市场的实证研究，天津大学博士学位论文

何佳，何基报，王霞，翟伟丽，2007，机构投资者一定能够稳定股市吗？--来自中国的经验证据，《管理世界》第8期，35-42

林百宏，2008，中国投资者情绪指数的度量及其对股市收益的影响分析，厦门大学硕士学位论文

刘博，皮天雷，2007，惯性策略和反转策略：来自中国沪深A股市场的新证据，

《金融研究》第8期，154-166

陆江川，陈军，2012，投资者情绪对股票横截面收益的非对称影响研究，《预测》第5期，52-57

鲁臻，邹恒甫，2007，中国股市的惯性与反转效应研究，《经济研究》第9期，

145-155

邵新建，巫和懋，覃家琦，王道平，2010，中国IPO市场周期：基于投资者情绪与政府择时发行的分析，《金融研究》第11期，123-143

王茵田，朱英姿，2011，中国股票市场风险溢价研究，《金融研究》第7期，152-166

王美今，孙建军，2004，中国股市收益、收益波动与投资者情绪，《经济研究》第10期，75-83

易志高，茅宁，2009，中国股市投资者情绪测量研究：CICSI的构建，《金融研究》第11期，174-184

于全辉，2009，投资者情绪与证券市场价格互动关系研究，重庆大学博士学位论文

张强，杨淑娥，2009，噪音交易、投资者情绪波动与股票收益，《系统工程理论与实践》第3期，40-47

致 **谢**

**Acknowledgements**

回首撰写论文的这半年时间，我非常感谢袁宇教授。在这半年里，从最初的选题，过程中的数据处理，到最后的论文撰写，袁宇教授在每一步都给予了非常重要的指导。我深感，没有袁宇教授的指导、鼓励和鞭策，论文是不可能得以顺利完成的。袁宇教授严谨的治学态度，开拓的研究精神和对学生的认真负责都让我深深折服，而他的高标准、严要求造就了今日的我。在此，谨向我的导师致以深深的敬意。

感谢袁宇教授每次耐心地解答我的疑问，给予指导和帮助，最终能完成论文和我们数次的邮件往来和面谈是分不开的；

感谢百忙之中参与论文开题答辩、院内盲审和终稿答辩的各位教授，在各个阶段为我们的论文把关，提出建议，给予指引；

感谢硕士办公室的韦祎老师，从开题到最后答辩，一直陪伴和督促我们；感谢一同师从袁宇教授的吴悦波、任杰同学，在我们撰写论文的过程中相互

帮助、共同进步；

感谢王艳婷、魏佩雯、朱水媚和刘沩玮同学，在我完成论文过程中对我的鼓励和帮助，是我完成论文的莫大支持；

感谢养育了我二十多年的父母，没有他们的默默支持，就没有现在的我。他们的爱是我最大的精神动力。

谢谢！

**上海交通大学**

**学位论文原创性声明**

本人郑重声明：所呈交的学位论文，是本人在导师的指导下，独立进行研究工作所取得的成果。除文中已经注明引用的内容外，本论文不包含任何其他个人或集体已经发表或撰写过的作品成果。对本文的研究做出重要贡献的个人和集体，均已在文中以明确方式标明。本人完全意识到本声明的法律结果由本人承担。

学位论文作者签名： 

日期：2013 年06月07 日

中国上海淮海西路211号邮编：200030 211 West Huaihai Road, Shanghai, P. R. China,200030



**上海交通大学学位论文答辩决议书**

**SAIF Master of Finance** Thesis Defense Decision

[http: //www. saif. sjtu. edu. cn](http://www.saif.sjtu.edu.cn/)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 姓 名  Name | | Xu Shu | | 学号  Student ID | | 1113809025 | | 所在学科  Program | 金融硕士  Master of Finance | |
| 指导教师  Supervisor | | Yuan Yu | | 答辩日期  Defense Date | | 22/05/2013 | | 答辩地点  Defense Venue | Classroom 904 | |
| 论文题目  Thesis Title | | Investor Sentiment and Cross Sectional Stock Returns: Empirical from Chinese A Share Market | | | | | | | | |
| 投票表决结果： 3 / 3 / 3 （同意票数**/**实到委员数**/**应到委员数）  Voting Result: 3 / 3 / 3 (Pass Voted/Actual Presence/Scheduled Committee)  答辩结论 Defense Result: ■通过/P □未通过/F评语和决议 Comments and Decision:  The candidate chose a topic which has not been fully investigated in Chinese market, and was able to utilize the knowledge learnt during the past two year's master study. This candidate showed the thorough understanding when applying the theories and methodologies upon this paper, and analyzed in depth about the topic discussed.  This candidate clearly presented the findings, analysis and recommendations during the thesis defense, and accurately answered all the questions raised by the committee members.  All the committee members agreed for this candidate's success of the defense, and suggest awarding the master degree.  2013 年 5 月 22 日  Date: 2013 /\_5\_/\_22\_ (yyyy/mm/dd) | | | | | | | | | | |
| **答辩委员会成员签名**  **Defense Committee Signature** | **职务**  **Role** | | **姓名**  **Name** | | **职称**  **Title** | | **单 位**  **Institute** | | | **签名**  **Signature** |
| 主席  Chair | | Liu Jun | | Professor | | SAIF | | |  |
| 委员  Member | | Georges Enderle | | Professor | | University of Notre Dame | | |  |
| 委员  Member | | Yu Fan | | Associate Professor | | SAIF | | |  |
| 秘书  Secretary | | He Ai | | PhD Student | | SAIF | | |  |