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In Search of Concepts: The Effects of Speculative Demand on Returns and Volume

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Abstract

Using a novel proxy of investors' speculative demand constructed from online search interest in "concept stocks", we examine how speculative demand affects the returns and trading volume of Chinese stock indices. We find that returns and trading volume increase with the contemporaneous speculative demand. In addition, the high speculative demand causes lower near future returns, while recent high past returns cause the high speculative demand. Moreover, the speculative demand explains more variation in returns and trading volume of A shares (more populated by retail investors) than B shares (less populated by retail investors). Our findings support the attention theory of Barber and Odean (2008).

Keywords: Investor Attention, Speculative Demand, Concept Stock, Market Returns, Trading Volume

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1. Introduction

Concept stocks, prone to speculation, typically rely on certain business and investment opportunities or the emergence of a new technology. These stocks usually have highly uncertain growth prospects and are difficult to value, which leaves more room for heterogeneous views and speculation. In the literature, concept stocks are related to several heated speculative episodes, including the biotechnology bubble in the 1980s and the dot-com bubble in the 1990s (Hsieh and Walkling (2006)). These authors document the history and performance of concept stocks thoroughly, revealing that concept stocks are overpriced because they underperform in the long run.

The popularity of concept stocks in Chinese stock markets in recent years is phenomenal. Heavily populated by retail investors, the Chinese stock markets experience frequent speculative episodes. Therefore, they are routinely mentioned in the Chinese financial press and on the internet. For example, between April 2005 and February 2006, concept stocks are mentioned 325 times in the China Securities Journal, a major financial newspaper in China. Additional evidence can be seen from a search of the keywords "concept stocks" in Chinese on Google; such a search yields 17,200,000 results. A similar search on Baidu, the most popular Chinese online search engine, yields 23,600,000 relevant results. By contrast, a similar Google search on the same keyword in English yields only 29,600 results.[1] Thus, Chinese markets offer unique opportunities to better understand and investigate the impact of speculative trading on stock price dynamics and trading volume and this paper has such aims.

This paper does not study concept stocks per se, rather, it traces investors' interest in these stocks. More specifically, the paper measures the interest in concept stocks by using investors' online queries on the keywords such as "concept stocks".[2] Google provides a search volume index on certain keywords over a defined period relative to the total number of searches during that period. We argue that the search interest in concept stocks reflects investors' interest in speculation. This is due to the formidable search problem faced by the individual investor: among thousands of stocks, on which one(s) should (s)he speculate? When speculators have short horizons, Froot, Scharfstein and Stein (1992) show that they may herd on the same information. Therefore they will attempt to learn what other speculators also know. Arguably, "concept" or "ideas" provides ideal information for speculators to herd on, which may explain why speculative bubbles often start with the emergence of concept stocks. When they search for such information online, the search intensity reveals the extent of their willingness to speculate. [3]

[1] These searches are conducted on 15/02/1013.

[2] Google shut down its search service on the Chinese mainland and shifted its service to Hong Kong on 23 March, 2010. Our results do not change if we restrict our analysis to the period before that.

[3] There might be search of the keywords "concept stocks" by people other than investors. For example, a journalist may search it on Google for preparing a news article. However, their search is likely to reflect an anticipated interest of investors in concept stocks and their news article can attract further attention of investors.

We provide empirical evidence that the search interest in "concept stocks" captures investors' willingness to speculate. We show that it strongly co-moves with the number of new stock accounts in the Chinese stock markets. Shiller (2005) argues that "Investors, their confidence and expectations buoyed by past price increases, bid up speculative prices further, thereby enticing more investors to do the same, so that the cycle repeats again and again, ... ". Therefore we would expect that the number of new stock accounts will increase with the investors' willingness to speculate in the stock markets. In addition, it is significantly and positively related to the trading volume, a widely used measure of speculative trading. Trading volume reflects differences of opinion. When short selling is costly or forbidden, pessimistic investors choose to stay out of the market. Prices can be higher due to the demand from optimistic investors. However, trading volume can be driven by other motives such as liquidity needs, hedging demand, etc.. In contrast, our measure reflects investors' willingness to speculate in the market, which are unlikely to be affected by those trading motives.

To determine an unambiguous prediction of an increase in search intensity of concept stocks on stock returns, we need to know which price pressure it generates: buying or selling pressure. We argue that Chinese investors' search interest on concept stocks leads to buying pressure. First, the search problem is more severe when buying stocks than it is when selling stocks (Barber and Odean (2008)), implying that search activities are much more likely to be related to buying interest. Investors need to select from thousands of stocks when buying, but once they hold stocks and consider selling, they only need to consider the subset of those stocks they already hold. This is particularly true for retail investors because they hold fewer stocks and are much less likely to short sell stocks. In contrast, institutional investors hold much larger stock portfolios and hence face a search problem when selling stocks too. This is the case especially when they want to short sell, since they need to search for which stocks to short sell. Second, Da, Engelberg and Gao (2011) provide evidence that individual investors are more likely to use Google to search for information than are professional investors. Barber and Odean (2008) and Barber, Odean and Zhu (2009b) test and confirm the hypothesis that individual investors are net buyers of attention-grabbing stocks. Therefore the Google search volume index of "concept stocks" should reflect Chinese retail investors' speculative demand. Third, China has stringent short sales constraints,[4] which makes short selling unrealistic. Therefore online search of concept stocks is unlikely to reflect interest in short selling these stocks.

Using our novel proxy of retail investors' speculative demand, we test several hypotheses that are closely related to the "theory of attention" in Barber and Odean (2008). The theory predicts that individual investors are net buyers of attention-grabbing individual stocks. We argue that the same logic can be applied to the entire market. If the individual investors have correlated willingness to speculate, the search problem

[4]On March 31, 2010, the China Securities Regulatory Commission (CSRC) permitted short selling of 90 securities by six pilot securities dealers for the first time. However, the short sales activity remains negligible (Sharif, Anderson and Marshall (2011)).

leads to systematic active search for speculative ideas/concepts and correlated purchasing, which can move the market in the presence of short selling constraints and other limits to arbitrage such as noise trader risk. Therefore, we test whether speculative demand affects the returns and trading volume of Chinese stock indices: when the speculative demand is high, 1) contemporaneous returns are high due to price pressure, which drives up current price and returns; 2) future returns are lower. The rise of the current price is only temporary. When the mispricing is corrected, future returns decline as the price falls; 3) contemporaneous trading volume is high, as the increased speculative demand initiates additional trades. Moreover, we hypothesize that 4) the search interest in concept stocks plays a stronger role for returns and trading volume of constituents of Chinese A Shares indices than constituents of B Shares indices. This is due to the fact that A-share markets are more populated by domestic individual investors than are B-share markets, which have foreign institutional investors as their main market participants.

We document empirical evidence supporting all these hypotheses. Our results are robust to different measures of the speculative demand, outliers, nonlinearities and sub-sample analysis. Inclusion of additional controls such as moments of past returns, lagged trading volume and macroeconomic variables does not change our results. In an out-of-sample test, we find consistent results in Taiwan, the only other region where the search interest in "Concept Stocks" is significant enough to be reported by Google. Similar to the mainland China, Taiwan's stock markets are dominated by individual investors. Therefore, our results provide strong support for the attention theory of Barber and Odean (2008).

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes and summarizes our data set. Section 4 provides evidence that the search volume index of "concept stocks" captures investors' speculative demand. Our empirical results are provided in Section 5. Section 6 concludes.

2. Related Literature

In an information abundant environment such as financial markets, attention constrained investors have to allocate attention across different assets before portfolio selection. Recent theoretical studies show that limited attention affects asset price dynamics such as stock market volatility (Andrei and Hasler (2011)), return comovement, and return predictability (Peng and Xiong (2006)), and accelerates the speed of quote adjustment to information (Boulatov, Hatch, Johnson and Lei (2009)). Empirically testing the theory of attention calls for a proxy of investor attention. Traditional measures include media coverage, extreme price movement, or advertising expense. Unlike these indirect proxies of investors' passive attention, Da, Engelberg and Gao (2011) propose a direct measure of investors' active attention: the search intensity on certain assets through Google. Since their seminal paper, a growing literature revisits the relationship

between investor attention and asset prices. For example, Vlastakis and Markellos (2012) show that investor attention is positively related to stock market volatility, trading volume, and level of risk aversion. Other papers examine the usefulness of Google search volume index in explaining asset market phenomena such as stock prices around earning announcements (Drake, Roulstone and Thornock (2012)), liquidity and returns (Bank, Larch and Peter (2011) and Ding and Hou (2011)), predicting a firm's future cash flow (Da, Engelberg and Gao (2010)), biased attention towards local stocks (Mondria and Wu (2012)) This literature examines the effect of search on either individual stocks or stock indices. Unlike them, we restrict our attention to concept stocks only.

To date, academic research on concept stocks is rare. Hsieh and Walkling (2006) is a notable exception. The authors study the history and performance of concept stocks and show that concept stocks are overpriced. We trace investors' interest in concept stocks and how this interest affects asset price and trading volume dynamics. To our knowledge, this has not yet been considered in the existing literature.

As argued in the previous section, search interest in "concept stocks" is more likely to capture individual investors' speculative demand. Can individual investors move the market? If individual investors' aggregate demand is random, it should have no predictable and persistent influence on stocks prices (Kyle (1985)). However, when their erroneous demand is unpredictable and systematic, noise trade risk limits the arbitrage and influences stock returns (De Long, Shleifer, Summers and Waldman (1990)). Limits to arbitrage such as short selling constraints can prevent sophisticated investors from eliminating mispricing (Gromb and Vayanos (2010)). Barber, Odean and Zhu (2009a) show that retail trades are correlated and move the market. Kumar (2007) shows that the diversification choices of individual investors influence stock returns. Kaniel, Saar and Titman (2008) document positive excess returns in the month following intense buying by individuals and negative excess returns after individuals sell. Bloomfield, O'Hara and Saar (2009) find that noise traders increase market volume and depth in a laboratory market.

Mei, Scheinkman and Xiong (2009) examine how speculative trading affects stock prices in Chinese stock markets. Using trading volume as a measure of speculative trading, they find it explains a sizable fraction of Chinese A-B share premia. Sun and Tong (2000) argue that the excess volatility of A-share over B-share can be viewed as due to speculative trading of A-share traders, and find it is related to the A-share price premium. Unlike those papers, we use the investors' online search interest as a novel proxy for investor's speculative demand. We examine whether it affects aggregate market returns and trading volumes in the Chinese stock market. Our finding of the positive relationship between trading volume and the speculative demand supports the use of trading volume as a measure of speculative trading in Chinese stock markets.

3. Data

3.1. Search Volume Index

Google Insights provides a Search Volume Index computed as the portion of worldwide Google web search on certain keywords over a defined period relative to the total number of searches using Google during that period. These numbers are firstly normalized and then scaled from 0 to 100 in order to make them comparable across regions. We download weekly data spanning from 10/01/2004 to 24/12/2011 for a total of 416 weekly observations.

The phrase we use in Google Insights is "concept stocks" (in Chinese).[5] It reflects investors' interest in concept stocks in Mainland China. We consider two measures of investor attention based on the Google search volume index. The first one is the weekly change in the search volume index. We call this measure "Concept_stock_change". The second measure is obtained as residuals from a linear regression of the original search volume index on its own first lag in order to remove the persistence of the original series. We call this measure "Concept_stock_innovation". In the empirical analysis we report results with both measures.

Table 1 contains the summary statistics of our speculative demand variables. It can be seen that they have substantial time variations and leptokurtosis. The large standard deviation could raise concern of biased estimation due to outliers, and we address this with median regressions, which are known to be robust to outliers.

[Insert Table 1 about here]

One important question relating to our attention variables is whether they have unit roots. For that purpose we conduct three unit root tests *without* a trend component: the Augmented Dickey-Fuller test, the Phillips-Perron test, and the Dickey-Fuller-GLS test. The Dickey-Fuller-GLS test performs a modified Dickey-Fuller t test for a unit root in which the series has been transformed by a generalized least-squares regression. The results are reported in Table 2. All tests reject the existence of a unit root at the 1% level for both measures of speculative demand.

[5] We considered search volume indexes of several other phrases, such as "recommended stock", "bullish stock" (a phrase often mentioned in the Chinese financial media/internet), "value stock" and "growth stock". We find that they have much weaker relationships with returns and trading volume, and they do not affect the influence of "concept stocks". A synonym for "concept stocks" ("Gai Nian Gu") in Chinese is "Ti Cai Gu". However, its search volume is often too low to be reported as nonzero by Google Insights.

[Insert Table 2 about here]

3.2. Concept Stocks

Concept stocks are stocks related to certain investment ideas or concepts. Typical concepts are linked either with certain events or industries. The events can be mega sport events, political events or major firm events (e.g. merger and acquisitions). For example, 2008 Beijing Olympic game were believed to benefit tourism, construction and retail business, therefore the stocks of related companies are classified as Olympic-concept stocks. Dot com industry and new energy industry are two further examples related to concept stocks. Companies related to major events or new industry usually have highly uncertain growth prospects and are difficult to value. Once the companies are classified as concept stocks, they attract substantial investor attention and can be considerably overpriced. Shanghai Maling is an often cited example of overpriced concept stocks related to the dot com industry in China (see Figure 1). The company produces canned food for urban area markets. In June 1998 Shanghai Maling set up a web site for selling its own products, and was subsequently labeled as an internet concept stock. While its main business remained the same, the company's share price soared up from 149.96 Chinese yuan on December 30, 1999 to 552.7 Chinese yuan on February 18, 2000 before tumbling 46 percent to its trough four months later.

[Insert Figure 1 about here]

3.3. The Chinese Stock Market

The early 1990s saw the establishment of two domestic stock exchanges in China, the Shanghai Stock Exchange and the Shenzhen Stock Exchange. The market has been growing rapidly since then. In 2009, Chinese stock market capitalization exceeded US$3.21 Trillion, overtaking Japan as the second largest stock market in the world. At the end of 2010, China had 2062 listed companies, and the number of stock investors was 130 million compared to 4 million in 1991.

Both exchanges issue A shares and B shares. A shares are specialized shares denominated in Renminbi. They can only be traded by Chinese citizens, except those foreign nationals who have acquired a QFII (Qualified Foreign Institutional Investor) quota. In contrast, B shares were initially available exclusively for foreign investors and are traded in foreign currencies. Since 2001, B shares can be held partially by Chinese domestic investors, though they can only trade after opening foreign currency accounts, which limits the participation of domestic investors. The number of listed shares and trading volume are much smaller in

B-share markets than in A-share markets. The proportion of individual investors in A-share markets is higher than B-share markets. Figure 2 plots the ratio between the number of accounts held by the retail investors and the number of accounts held by the institutional investors in A-share markets (blue line) and B-Share markets (red line) from 2000 to 2011.[6] It shows that the ratio is twice or three times higher in A-share markets than B-share markets, indicating a potentially more important role of individual investors in A-share markets.

[Insert Figure 2 about here]

The companies listed in the Shanghai Stock Exchange are pre-dominantly by state-owned enterprises while many companies listed in the Shenzhen Stock Exchange are joint ventures. To allow for the growth of small to medium companies, Shenzhen Stock Exchange also introduced a Small and Medium Enterprises Board in May 2004. Starting with 8 listed companies on its establishment, the SME board had 646 listed companies in 2011.

3.4. Descriptive Statistics of Weekly Returns and Trading Volume

We collect data on stock indices and trading volume from Bloomberg. The sample period for both A shares and B shares spans from 10/01/2004 to 24/12/2011. The data on the stock index and trading volume of Shenzhen SME, however, are only available from 01/12/2005. Due to the Gloden week holidays (the annual 7-day national holidays) in China, our final sample consists of 387 weekly observations for both A shares and B shares, and 294 weekly observations for the Shenzhen SME. We report the descriptive statistics of weekly returns and trading volume for five Chinese stock indices in Table 3. This shows that returns display high volatility and some degree of excess kurtosis during our sample periods. The trading volume in Panel B is in billions of Chinese yuan. Its descriptive statistics differ substantially across indices, and all of them have positive skewness.

[Insert Table 3 about here]

[6] The data are provided by China Securities Depository and Clearing Corporation Limited ("CSDCC") and can be downloaded from http://www.chinaclear.cn/main/03/0305/1344586217950.pdf

4. Measure of Speculative Demand

What does the search volume index of "Concept stock" capture? We argue that it measures the (retail) investors' interest in speculating in stock markets. This is partially confirmed by our findings of its positive relationship with trading volume (see Section 5), which is a widely used measure of speculative trading in the literature. In this section we provide further evidence in support of our measure by showing that it is significantly related to the number of new stock accounts in the Chinese stock markets.

From the China Securities Depository and Clearing Corporation Limited ("CSDCC"), we obtain weekly data of the number of new stock accounts in A-share and B-share markets. The sample period spans from January 2006 to December 2011. The increased new stock accounts come mostly from individual investors (99%). Table 4 reports the correlation between the level and the change of the number of new stock accounts with the level and the change of our speculative demand measure. Panel A shows that the level of the search volume index is strongly correlated with the number of new accounts across the four markets. The correlation coefficients at the weekly frequency are about 60% to 70%, which become even larger at monthly frequency (about 80%). Panel B shows that the correlation between the change in the two variables are reduced. At weekly frequency the correlation coefficients are about 20% to 30%, while at the monthly frequency they range from 43% to 47%. All these correlation coefficients are statistically significantly at the 1% level.

[Insert Table 4 about here]

We also conduct regression analysis to examine the relationship between the number of new accounts and our speculative demand measure. When regressing the change of newly opened stock accounts on $Concept\_stock\_change$ (results untabulated), we find that the coefficients are significant and positive, even after controlling for lagged dependent variable, contemporaneous and past returns and trading volume, and the coefficients are more significant for A-share markets than B-share markets.

In summary, we find that search volume index on "concept stocks" is positively related with the number of new accounts in the Chinese stock market. Therefore we use it as a measure of speculative demand. In the following section, we examine its relationship with returns and trading volume.

5. Empirical Results

5.1. Returns, Volume and the Speculative Demand: A First Look

Before the regression analysis, we take a first look at how stock indices and trading volume are related to the speculative demand. We plot the time series of Shanghai A share index and its trading volume together

with the Google search volume index on the phrase "concept stocks".

[Insert Figure 3 about here]

Figure 3 shows strong co-movement between the speculative demand and both Shanghai A share index and its trading volume. A similar pattern can be found in the plot for Shenzhen A share indices in Figure 4.

[Insert Figure 4 about here]

We also examine returns and trading volume in periods of high speculative demand and low speculative demand. More specifically, for each measure of the speculative demand, we split our sample into periods of high speculative demand and periods of low speculative demand, where we define periods of high (low) speculative demand as the periods during which the speculative demand is higher (lower) than the median speculative demand over the whole sample period. We then calculate the average returns and trading volume for each stock index in both periods. We do the same for the original level of the speculative demand too.

[Insert Table 5 about here]

Table 5 contains these results. For returns, the table shows that returns in the high speculative demand periods are positive, while returns in the low speculative demand periods are negative. In addition, trading volume in the periods of high speculative demand is about double that in the low speculative demand periods.

We also estimate the conditional volatility using GARCH (1, 1) on weekly returns, and compare its magnitude in periods of high speculative demand and low speculative demand. Conditional volatility appears higher in periods of high speculative demand. In regression analysis of the conditional volatility on the speculative demand (results not tabulated), we find that the coefficients of the speculative demand are usually positive, but insignificant.

5.2. Regression Analysis

We now turn to regression analysis of returns and trading volume on the speculative demand. We start with univariate regressions (in addition to a constant) in order to investigate how much variation in returns and trading volume can be explained by the speculative demand alone. We then proceed to multivariate regressions to control for other variables, such as the moments of past returns and macroeconomic variables.

5.2.1. Contemporaneous Regressions of Returns on the Speculative Demand

Table 6 reports univariate regressions of weekly returns on the speculative demand measured by Google search volume index of concept stocks. In parentheses, we report the Newey-West standard errors to control for potential serial correlation in residuals. Panel A demonstrates that the coefficients on the change in the speculative demand are positive and statistically significant at the 1% level for all five stock indices. The adjusted R-squared ranges from 2% to 6%. Moreover, adjusted R-squared values for A share indices are double those for B shares, suggesting that the speculative demand explains returns of the A share indices substantially better than returns of the B share indices. This is not surprising since A shares are dominated by individual investors, while in the B share markets foreign institutional investors are the main market participants. Results on the speculative demand in Panel B are very similar to those in Panel A, suggesting that the positive relationship between returns and the speculative demand does not hinge upon our particular measure of the speculative demand.

[Insert Table 6 about here]

Mei, Scheinkman and Xiong (2009) examine how speculative trading affects stock prices in Chinese stock markets. Using trading volume as a measure of speculative trading, they find it explains a sizable fraction of Chinese A-B share premia. To investigate whether our measure of the speculative demand has incremental explanatory power for returns, we add the change or innovation of contemporaneous trading volume to our regression models (results not tabulated). While the model fit increases (adjusted R-squared values increase to 10-18%), the role of the speculative demand measured by change or innovation of search volume of concept stock remains the same.

In multivariate regressions, we additionally consider the effects of past price dynamics and trading volume on returns. We include the mean, volatility, skewness and kurtosis of the daily returns during the past month. Since trading volume is highly persistent, we run an AR(1) regression and retain the residual as our measure of trading volume innovation. We then include the trading volume innovation of the past month in our regressions to avoid endogeneity in the returns and trading volume.

Table 7 reports the multivariate regression results. Similar to the univariate regressions, we find that the coefficients of the change of the speculative demand are positive and statistically significant at the 1% level for all five stock indices. In addition, the size of these coefficients are also similar to those in Table 6. Panel B shows that the coefficients of innovation in the speculative demand are also similar to those in Panel B of Table 6. Most coefficients of other regressors in both panels of Table 7 are insignificant, although there is some evidence that the skewness of returns in the past month is negatively related to the

current returns. There is a minor increase in the adjusted R-squared values in the multivariate regressions compared with those in univariate regressions. In untabulated regressions, we also include the returns on the S&P 500 index to account for the co-movement of domestic and international markets, we find similar results. In summary, the multivariate regressions confirm the role of the speculative demand in explaining contemporaneous returns.

[Insert Table 7 about here]

One robustness check is to examine the effect of outliers and nonlinearities. We run median regressions for the same model specifications. Median regression is well known for its robustness to nonlinearities and outliers. We find that all coefficients on measures of the speculative demand remain positive and significant for all indices. An alternative way to address the problem of outliers is to truncate the variables at 1st and 99th percentile. We find similar results in such winsorized regressions.[7]

5.2.2. VAR and Causality

Although we find that the speculative demand is significantly related to contemporaneous returns, this finding is open to the possibility that both variables can be jointly determined. In addition, it cannot answer the question on causal effects between these variables. It can well be that an increase in returns inspires investors, thus raising their subsequent speculative demand.

We run Vector Autoregressive Regressions (VAR) to examine this question. More concretely, we estimate a VAR(2) model with the following specification:

$$\begin{aligned} SVI_t &= \beta_0 + \beta_1 Return_{t-1} + \beta_2 Return_{t-2} + +\beta_3 SVI_{t-1} + \beta_4 SVI_{t-2} + \eta_{1,t} \\ Return_t &= \lambda_0 + \lambda_1 SVI_{t-1} + \lambda_2 SVI_{t-2} + +\lambda_3 Return_{t-1} + \lambda_4 Return_{t-2} + \eta_{2,t} \end{aligned}$$

[Insert Table 8 about here]

where "SVI" refers to either Concept_stock_change or Concept_stock_innovation.

Table 8 reports the results. Across all stock indices in both Panel A and Panel B, the first two lags

[7] Results are available upon request from the authors.

of the speculative demand measures are negatively related to current returns. The second lags of both the speculative demand measures are significant for Shanghai A, Shenzhen A and Shenzhen SME indices, but are insignificant for both Shanghai B and Shenzhen B indices. Furthermore, the coefficients of the speculative demand measures of the two A-share indices are much larger than those of the two B-share indices, indicating substantial difference in their economic significance. This result confirms our prediction that retail investors' speculative demand plays a more important role in A-shares markets than in B-shares markets.

Our results from contemporaneous regressions suggest that an increase of the speculative demand generates price pressure to drive the current price up and leads to higher current returns. This is however only short-lived. The negative relationship between the past speculative demand in Table 8 shows that the overpricing is subsequently corrected, resulting in lower future returns in the near-term future.

Table 8 also reveals that the first lag of past returns is always positively related to current measures of the speculative demand, which are significant at the 1% level for both A-share indices, but less significant for both B-share indices. Moreover, the coefficients of these past returns of A shares are also much larger than those of B shares. Therefore, past returns have a stronger effect on the speculative demand in A-share markets than in B-share markets. The increase of the speculative demand due to higher past returns is consistent with irrational exuberance as described in Shiller (2005) (see Section 1).

Although not reported, we also estimate a VAR(2) of the speculative demand and returns, which includes returns, volatility, skewness, kurtosis of last month daily returns and innovations of last month trading volume as exogenous variables. Our results are not affected. Including additional lags of endogenous variables does not change our findings either.

5.2.3. Contemporaneous Regressions of Trading Volume on the Speculative Demand

As mentioned in the previous section, trading volume and turnover are both persistent. To avoid persistence in the data, we filter both variables with AR(1) processes, and use the residuals as measures of innovation in trading volume or turnover. We test the stationarity of these measures, and find that unit roots are rejected at the 1% significance level.

Table 9 reports univariate contemporaneous regressions of weekly trading volume on the measures of speculative demand. Both measures of the speculative demand are significantly and positively correlated with contemporaneous trading volume for Shanghai A, Shenzhen A and Shenzhen SME indices. In contrast, the coefficients of the speculative demand for both Shanghai B and Shenzhen B indices are insignificant, and their size is also much smaller compared to those for Shanghai A, Shenzhen A and Shenzhen SME indices. This lends further support to our prediction that the speculative demand plays a stronger role in explaining

the trading activities in A shares than B shares.

[Insert Table 9 about here]

Controlling for the moments of past returns and past trading volume does not change the influence of the speculative demand on trading volume. Indeed, Table 10 shows that both measures of the speculative demand are significant (at the 1% level) and positive for Shanghai A, Shenzhen B and Shenzhen SME indices. In contrast, they are insignificant for both Shanghai B and Shenzhen B indices. There is some indication of persistence remaining in the innovation of trading volume as indicated by the coefficients on innovation of past trading volume, yet it seems rather mild. We also use Newey-West standard errors to account for potential serial correlation in residuals.

[Insert Table 10 about here]

5.2.4. Monthly Regressions

In additional to weekly regressions, we examine whether our results sustain in monthly regressions. Table 11 and 12 report monthly univariate and multivariate regressions of returns on speculative demand respectively. Both tables show that the speculative demand is usually positively related to contemporaneous monthly returns. The statistical significance becomes substantially weaker, however. The coefficients of speculative demand for Shenzhen A and Shenzhen SME indices remain significant at the 10% significance level in most of the monthly regressions. The weakened findings at the monthly frequency do not come as a surprise since we find that an increase in speculative demand predicts a decline in returns over subsequent weeks in the VAR regressions (Table 8). That is, after an initial positive shock on speculative demand, mean reversion of returns within a month smooths out the variation in returns, resulting in lower explanatory power of speculative demand at the monthly frequency. Consistent with this conjecture, the impulse response functions[8] show that the effect of a speculative demand shock dies out after four weeks.

[Insert Table 11 about here]

[8]Impulse response plots are available from the authors upon request.

[Insert Table 12 about here]

We run similar univariate and multivariate regressions of trading volume on the speculative demand at the monthly frequency and report the results in Table 13 and Table 14. We find positive coefficients on the speculative demand variables for all stock indices, which are significant at the 1% level. The speculative demand alone (in addition to a constant) explains on average about 20% of the variation in innovations of trading volume for A-share markets, and about 15% of the variation for B-share markets. Although the size of those coefficients for the Shanghai B index becomes slightly larger than those in the Shanghai A index, their ability in explaining variations in innovation of returns remain lower than those in the Shanghai A index. Both the coefficients and statistical significance of speculative demand are smaller in the Shenzhen B index than for the Shenzhen A index. Controlling for the moments of past returns and past trading volume does not change the positive influence of the speculative demand on trading volume.

[Insert Table 13 about here]

[Insert Table 14 about here]

Instead of using trading volume for measuring trading activities, we use turnover as an alternative dependent variable. It is defined as the total number of shares traded over a period divided by the average number of shares outstanding for that period. These results show that employing turnover as the dependent variable does not affect the role of the speculative demand in explaining trading activities in those markets.[9]

5.2.5. Controlling for Macroeconomic Variables

Expected returns are linked to macroeconomic variables or variables that forecast macroeconomic events (Cochrane (2001)). To disentangle the effects of macroeconomic variables from the speculative demand on returns (and possibly trading volume), we include the GDP growth, the inflation rate (CPI) and the money supply (M2) in our regressions.[10]

Table 15 reports the multivariate weekly regressions of contemporaneous returns on the measure of speculative demand, the first four moments of the daily returns of the past month, the lagged trading

[9] Results are available upon request from the authors.

[10] Data on quarterly GDP growth and monthly CPI are provided by the National Bureau of Statistics, China and data on monthly M2 are provided by the People's Bank of China. We collect information on these macroeconomic variables from Datastream.

volume, and lagged macroeconomic variables. In all regressions, the speculative demand is significantly and positively correlated with contemporaneous market returns, even after controlling for the moments of past returns, the lagged trading volume, and lagged macroeconomic variables. CPI is the only macroeconomic variable that is significantly related to returns. A higher inflation rate is associated with lower contemporaneous and next month returns on all stock indices.

[Insert Table 15 about here]

We also run regressions of weekly trading volume on the speculative demand, the first four moments of past month daily returns, and lagged macroeconomic variables. Table 16 shows that our results on the role of the speculative demand are unaffected by the inclusion of lagged macroeconomic variables. In fact, lagged macroeconomic variables are not significantly related to the weekly trading volume in most of the regressions.

[Insert Table 16 about here]

In other specifications not reported, we include contemporaneous instead of lagged macroeconomic variables in our regressions. Our results on the influence of speculative demand on trading volume do not change.

5.2.6. Additional Robustness Check

The Chinese stock market experienced boom and bust periods during our sample period. In particular, both A-share markets and B-share markets decline after 2007. As an additional robustness check, we run sub-sample analysis for 2004-2007 and 2008-2011. Our findings hold in both sub-samples.

Given limited investor attention, one may argue that rising concerns over the recent financial crisis may crowd out investors' interest in "concept stocks". If the former affects the stock returns and trading volume, one would expect that the latter can be (spuriously) correlated with them too. If this is true, variation in investor attention to concept stocks should be negatively related to investor attention. In the data, however, we find that the level of search interest in "concept stocks" is only weakly and *positively* correlated with the level of search interest in "financial crisis", with a correlation coefficient of 10%. Furthermore, when considering the change of those two variables, we find that the correlation coefficient is virtually zero. Figures 3 and 4 also show that the strong comovement of the speculative demand with both returns and

trading volume exists before the outbreak of the financial crisis. Therefore, a time-varying concern over the financial crisis does not influence our results.

Another potential question is whether the search volume index from Google is representative of investor search interest in China. Indeed, Baidu Inc. has outgrown Google to become the dominant Chinese language search engine in China during our sample period. In 2008, Baidu had a market share of 60.1% while Google came second with a 25.9% share.[11] However, Baidu's search volume index has a shorter sample period and the data are not freely accessible by the public.[12] Still, we can see similar graphical patterns in the plots of SVI from Google and Baidu during 06/2006 and 02/2010. Therefore we expect similar results if Baidu SVI were available for a sufficiently long period.

We also extend our analysis to Taiwan, the only other region where the search interest in "concept stocks" is significant enough to be reported by Google Insights. Similar to the mainland China, Taiwan's stock market is dominated by individual investors. It does not have the problem of Google's service shift in mainland China, and provides additional out-of-sample evidence. We find consistent results in Taiwan. These results are not reported in the paper in the interests of brevity, but are available from the authors upon request.

6. Conclusion

We construct a novel proxy of Chinese retail investors' speculative demand from online search interest in "concept stocks", a class of stocks which are particularly prone to speculation. Based on the attention theory of Barber and Odean (2008), we argue that our proxy captures the speculative demand of attention-constrained retail investors. we show that this proxy is significantly and positively correlated with the trading volume, a widely used measure of speculative trading. In addition, it strongly co-moves with the number of new stock accounts in the Chinese stock markets.

We examine how the speculative demand affects the returns and trading volume of Chinese stock indices from January 2004 to December 2011. We find that: 1) returns and trading volume increase with the contemporaneous speculative demand; 2) the high speculative demand causes lower near future returns while recent high past returns cause the high speculative demand; 3) the speculative demand explains more variation in returns and trading volume of A shares (dominated by retail investors) than B shares (dominated by institutional investors). These results are robust across a battery of robustness tests as well

[11] See http://www.reuters.com/article/2008/01/25/us-baidu-china-share-idUSSHA11273420080125.

[12] Although Baidu publishes a search volume index which can be viewed online, the data on the index value are not freely downloadable. In addition, the Baidu search volume index starts from June 2006 only. The sample period is further constrained by a potential structural shift due to the fact that Google shut down its search service on the Chinese mainland and shifted its service to Hong Kong on 23 March, 2010.

as an out-of-sample test using data in Taiwan. Our results are consistent with the predictions of Barber and Odean (2008).

Figure 1.
Price and Trading Volume of Shanghai Maling
This figure shows the stock price and trading volume of Shanghai Maling, a canned food producer for urban areas, for the period from Jan 1999 to Dec. 2001.

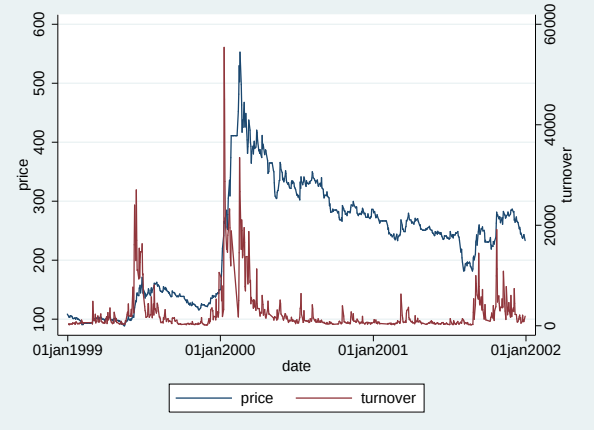
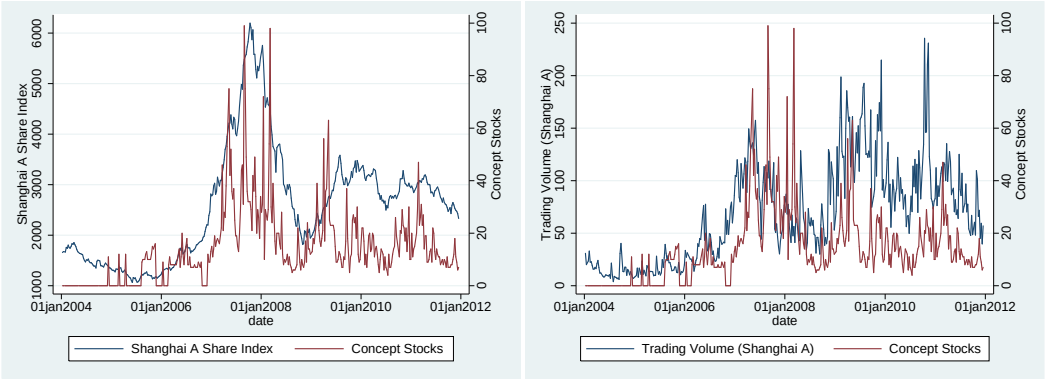


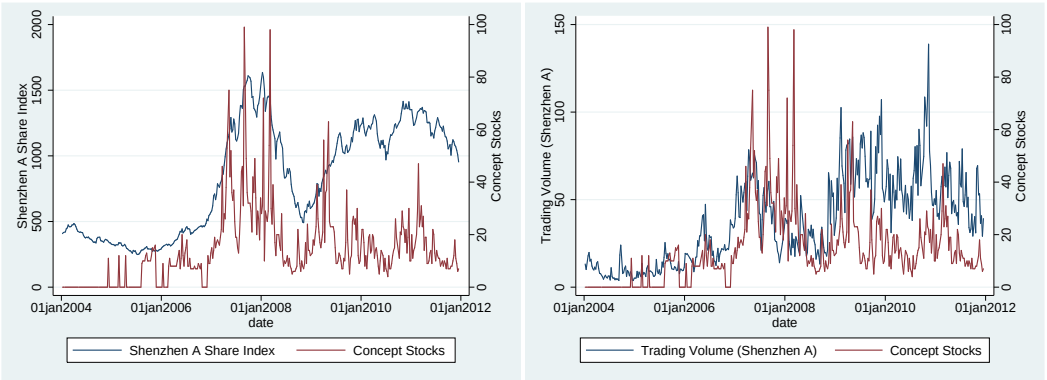
Figure 2.
Number of Accounts Held by Retail Investors and Institutional Investors
This figure presents the ratio between the number of accounts held by the retail investors and the number of accounts held by the institutional investors in A-share markets (blue line) and B-Share markets (red line). The data are provided by China Securities Depository and Clearing Corporation Limited. The sample period spans from 2000 to 2011.

Figure 3. Shanghai A Share Index and Online Search Interest in Concept Stocks
This figure presents the weekly Shanghai A share stock index and its trading volume together with the search volume index of the key words "concept stocks" provided by Google Insights. The trading volume is in billions of Chinese yuan. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005).



(a) Shanghai A share index (b) Trading Volume of Shanghai A Shares

Figure 4. Shenzhen A Share Index and Online Search Interest in Concept Stocks
The figure presents the weekly Shenzhen A share stock index and its trading volume together with the search volume index of the key words "concept stocks" provided by Google Insights. The trading volume is in billions of Chinese yuan. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005).



(a) Shenzhen A share index (b) Trading Volume of Shenzhen A Shares

Table 1.
Summary Statistics of Attention Variables
This table presents the summary statistics of attention variables. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). "Concept stocks" is the search volume index from a search of the phrase "concept stocks" in Chinese on Google. "Concept_stock_change" is the weekly change in the search volume index. "Concept_stock_innovation" is the residual from a linear regression of the original search volume index on its own first lag in order to remove the persistency of the original series.

	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
Concept_stock	13.89	14.27	0.00	99.00	2.22	10.94
Concept_stock_change	0.02	10.35	-68.00	68.00	-0.43	17.44
Concept_stock_innovation	-0.00	9.64	-46.71	72.49	1.83	17.76

Table 2.
Unit Root Tests of Speculative Demand
This table presents the results from unit root tests. Dickey-Fuller-GLS performs a modified Dickey-Fuller t test for a unit root in which the series has been transformed by a generalized least-squares regression. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). $***, **, *$ indicate significance at the 1%, 5%, and 10% levels.

	Augmented Dickey-Fuller	Phillips-Perron	Dickey-Fuller-GLS
Concept_stock_change	-25.15***	-24.65***	-25.39***
Concept_stock_innovation	-30.36***	-35.48***	-30.39***

Table 3.
Summary Statistics of Weekly Returns and Trading Volume
This table presents the summary statistics of weekly returns and trading volume. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005).

	Mean	Std. Dev.	Min.	Max.	Skewness	Kurtosis
	Panel A: Weekly Return					
Shanghai A	0.09	3.93	-14.92	13.93	0.03	4.35
Shanghai B	0.17	5.27	-18.17	29.19	0.45	6.80
Shenzhen A	0.22	4.45	-16.66	15.54	-0.26	4.16
Shenzhen B	0.17	4.47	-15.99	19.90	-0.02	4.55
Shenzhen SME	0.45	4.83	-16.49	17.71	-0.25	4.05
	Panel B: Weekly Trading Volume					
Shanghai A	345.95	240.73	25.30	1034.94	0.58	2.56
Shanghai B	3.13	3.33	0.28	33.17	4.60	34.09
Shenzhen A	189.74	129.53	14.99	588.31	0.56	2.43
Shenzhen B	3.37	2.41	0.42	17.52	2.07	9.40
Shenzhen SME	33.36	35.47	0.00	147.46	0.86	2.62

Table 4.
Correlation between the Number of Newly Opened Stock Accounts and Speculative Demand
This table presents the Spearman rank correlation between the number of newly opened stock accounts and Concept_stock. "New_account" is the number of newly opened stock accounts in A share or B share markets. "New_account_change" is the change in "New_account". $***, **, *$ indicate significance at the 1%, 5%, and 10% levels.

	Shanghai A Share	Shanghai B Share	Shenzhen A Share	Shenzhen B Share
	Panel A: correlation between New_account and Concept_stock			
Weekly Frequency	0.73^{***}	0.66^{***}	0.73^{***}	0.63^{***}
Monthly Frequency	0.82^{***}	0.83^{***}	0.82^{***}	0.82^{***}
	Panel B: correlation between New_account_change and Concept_stock_change			
Weekly Frequency	0.29^{***}	0.22^{***}	0.29^{***}	0.21^{***}
Monthly Frequency	0.46^{***}	0.46^{***}	0.47^{***}	0.43^{***}

Table 5.
Return, Volatility and Trading Volume in High and Low Speculative Demand Periods
This table presents the summary statistics of one week return (in percentage), conditional volatility (estimated from GARCH(1,1)) and trading volume (in billions of Chinese yuan) during high and low speculative demand periods. The time period is from 10/01/2004 to 24/12/2011.

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Level of speculative demand					
One week return					
Low	-0.52	-0.59	-0.52	-0.34	-0.49
High	0.77	1.02	1.06	0.74	1.11
Conditional volatility					
Low	13.43	25.95	17.02	19.82	23.03
High	18.17	33.94	23.20	19.84	24.26
Trading Volume					
Low	220.15	2.00	125.97	2.55	22.11
High	489.13	4.40	262.31	4.32	46.17
Panel B: Change of speculative demand					
One week return					
Low	-0.89	-0.86	-1.10	-0.44	-1.44
High	1.07	1.20	1.54	0.78	1.68
Conditional volatility					
Low	14.31	28.47	18.18	20.04	23.58
High	16.99	30.92	21.65	19.63	23.63
Trading Volume					
Low	250.73	2.50	139.10	2.86	23.10
High	442.32	3.75	241.08	3.89	43.80
Panel C: Innovation in speculative demand					
One week return					
Low	-0.64	-0.48	-0.70	-0.23	-0.66
High	1.38	1.32	1.85	0.87	1.88
Conditional volatility					
Low	14.84	28.96	18.90	19.93	23.38
High	17.09	30.99	21.72	19.66	24.00
Trading Volume					
Low	287.08	2.75	157.87	3.12	26.46
High	452.15	3.79	247.34	3.82	45.87

Table 6.
Univariate Regression of Contemporaneous Returns on Speculative Demand
This table reports univariate regressions of weekly returns on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	0.089***	0.075***	0.104***	0.067***	0.097***
	(0.021)	(0.027)	(0.024)	(0.023)	(0.022)
Constant	0.087	0.166	0.218	0.165	0.445
	(0.207)	(0.289)	(0.237)	(0.238)	(0.289)
Adj. R-squared	0.05	0.02	0.06	0.02	0.05
N	386	386	386	386	293
Panel B: Innovation of speculative demand					
Concept_stock_innovation	0.096***	0.099***	0.117***	0.075***	0.105***
	(0.024)	(0.034)	(0.028)	(0.029)	(0.026)
Constant	0.088	0.167	0.220	0.167	0.343
	(0.206)	(0.285)	(0.235)	(0.236)	(0.292)
Adj. R-squared	0.05	0.03	0.06	0.02	0.05
N	386	386	386	386	293

Table 7.
Contemporaneous Returns and Speculative Demand
This table reports contemporaneous regressions of weekly returns on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	0.088***	0.076***	0.101***	0.065***	0.093***
	(0.021)	(0.027)	(0.025)	(0.023)	(0.022)
L.retmean_30	0.795	0.944	0.672	0.988	0.450
	(0.620)	(0.725)	(0.629)	(0.691)	(0.681)
L.retvar_30	-0.074	-0.050	-0.021	-0.021	0.056
	(0.084)	(0.068)	(0.087)	(0.092)	(0.085)
L.retskew_30	-0.385	-0.342	-0.849**	-0.312	-1.922**
	(0.281)	(0.298)	(0.379)	(0.286)	(0.771)
L.retkurt_30	-0.108	-0.037	-0.292	0.061	-0.558*
	(0.144)	(0.130)	(0.193)	(0.123)	(0.322)
L.turnover_res	0.002	0.308	0.003	0.672***	0.013
	(0.002)	(2.575)	(0.003)	(0.223)	(0.010)
Constant	0.634	0.439	1.019	-0.136	1.073
	(0.560)	(0.685)	(0.718)	(0.597)	(0.982)
Adj. R-squared	0.07	0.02	0.08	0.04	0.07
N	385	385	385	385	287
Panel B: Innovation of speculative demand					
Concept_stock_innovation	0.093***	0.097***	0.108***	0.067**	0.099***
	(0.025)	(0.032)	(0.028)	(0.028)	(0.025)
L.retmean_30	0.544	0.732	0.387	0.835	0.247
	(0.638)	(0.711)	(0.636)	(0.685)	(0.694)
L.retvar_30	-0.119	-0.068	-0.066	-0.051	0.046
	(0.087)	(0.068)	(0.091)	(0.095)	(0.087)
L.retskew_30	-0.243	-0.248	-0.700*	-0.244	-1.882**
	(0.282)	(0.292)	(0.377)	(0.284)	(0.773)
L.retkurt_30	-0.114	-0.020	-0.282	0.060	-0.580*
	(0.145)	(0.131)	(0.192)	(0.124)	(0.325)
L.turnover_res	0.002	0.032	0.003	0.631***	0.013
	(0.002)	(2.518)	(0.003)	(0.235)	(0.010)
Constant	0.830	0.479	1.218*	-0.002	1.135
	(0.573)	(0.682)	(0.718)	(0.597)	(0.997)
Adj. R-squared	0.06	0.03	0.07	0.04	0.07
N	385	385	385	385	287

Table 8.
VAR of Returns and Speculative Demand
This table reports VAR regressions of returns and speculative demand. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005).
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
return_1					
L.return_1	0.050	0.139***	0.098*	0.074	0.063
	(0.052)	(0.052)	(0.052)	(0.052)	(0.060)
L2.return_1	0.173***	0.003	0.124**	0.033	0.123**
	(0.052)	(0.051)	(0.053)	(0.052)	(0.060)
L.Concept_stock_change	-0.028	0.024	-0.025	-0.028	-0.013
	(0.021)	(0.028)	(0.024)	(0.024)	(0.027)
L2.Concept_stock_change	-0.054**	-0.016	-0.052**	-0.017	-0.059**
	(0.021)	(0.028)	(0.024)	(0.024)	(0.027)
Constant	0.066	0.140	0.162	0.146	0.364
	(0.197)	(0.266)	(0.225)	(0.228)	(0.282)
Concept_stock_change					
L.return_1	0.383***	0.130	0.366***	0.223**	0.346***
	(0.125)	(0.094)	(0.110)	(0.108)	(0.132)
L2.return_1	0.139	0.039	0.178	-0.102	0.203
	(0.125)	(0.093)	(0.111)	(0.109)	(0.132)
L.Concept_stock_change	-0.485***	-0.454***	-0.495***	-0.451***	-0.491***
	(0.051)	(0.050)	(0.051)	(0.050)	(0.059)
L2.Concept_stock_change	-0.261***	-0.246***	-0.273***	-0.226***	-0.277***
	(0.051)	(0.050)	(0.051)	(0.050)	(0.059)
Constant	-0.019	0.001	-0.095	0.010	-0.220
	(0.474)	(0.480)	(0.473)	(0.478)	(0.621)
Panel B: Innovation of speculative demand					
return_1					
L.return_1	0.048	0.137***	0.096*	0.074	0.063
	(0.052)	(0.052)	(0.052)	(0.052)	(0.060)
L2.return_1	0.173***	0.001	0.124**	0.032	0.129**
	(0.052)	(0.052)	(0.053)	(0.052)	(0.060)
L.Concept_stock_innovation	-0.028	0.030	-0.024	-0.025	-0.024
	(0.022)	(0.029)	(0.025)	(0.024)	(0.028)
L2.Concept_stock_innovation	-0.052**	-0.017	-0.049**	-0.008	-0.070**
	(0.022)	(0.029)	(0.025)	(0.024)	(0.028)
Constant	0.066	0.140	0.162	0.146	0.454
	(0.197)	(0.266)	(0.225)	(0.228)	(0.283)
Concept_stock_innovation					
L.return_1	0.344***	0.139	0.348***	0.235**	0.291**
	(0.125)	(0.094)	(0.111)	(0.109)	(0.129)
L2.return_1	0.145	0.114	0.215*	-0.086	0.226*
	(0.126)	(0.094)	(0.112)	(0.110)	(0.130)
L.Concept_stock_innovation	-0.234***	-0.213***	-0.251***	-0.206***	-0.293***
	(0.052)	(0.052)	(0.052)	(0.052)	(0.060)
L2.Concept_stock_innovation	-0.021	-0.024	-0.039	0.006	-0.094
	(0.052)	(0.052)	(0.052)	(0.052)	(0.060)
N	384	384	384	384	291

Table 9.
Univariate Regression of Contemporaneous Weekly Trading Volume on Speculative Demand
This table reports univariate contemporaneous regressions of trading volume on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	1.588**	0.002	0.850**	-0.001	0.145**
	(0.662)	(0.009)	(0.341)	(0.006)	(0.069)
Constant	-0.029	-0.003	-0.015	0.000	0.713
	(4.513)	(9.121)	(2.502)	(0.066)	(0.664)
Adj. R-squared	0.02	-0.00	0.02	-0.00	0.01
N	386	386	386	386	293
Panel B: Innovation of speculative demand					
Concept_stock_innovation	1.956***	0.012	1.018***	0.006	0.127*
	(0.697)	(0.009)	(0.359)	(0.008)	(0.070)
Constant	0.000	0.000	0.000	0.000	0.591
	(4.397)	(9.005)	(2.451)	(0.065)	(0.672)
Adj. R-squared	0.03	0.00	0.03	-0.00	0.01
N	386	386	386	386	293

Table 10.
Contemporaneous Regressions of Trading Volume on Speculative Demand
This table reports contemporaneous regressions of trading volume on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	1.803***	0.002	0.971***	-0.000	0.183**
	(0.654)	(0.008)	(0.350)	(0.006)	(0.074)
L.vol_res	-0.243***	0.174	-0.226***	-0.132*	-0.279***
	(0.072)	(0.149)	(0.073)	(0.077)	(0.077)
L.retmean_30	14.715	0.127	6.470	0.508**	-2.126
	(14.930)	(0.263)	(7.068)	(0.216)	(1.410)
L.retvar_30	1.287	-0.048**	0.175	-0.038	-0.319
	(1.837)	(0.021)	(0.836)	(0.023)	(0.195)
L.retskew_30	0.153	-0.044	-5.945*	-0.032	1.626
	(6.192)	(0.087)	(3.512)	(0.098)	(1.626)
L.retkurt_30	-4.237	-0.074*	-3.391	0.019	-0.059
	(3.490)	(0.040)	(2.196)	(0.050)	(0.524)
Constant	11.335	0.550**	9.300	0.036	3.745*
	(15.224)	(0.215)	(9.385)	(0.234)	(2.244)
Adj. R-squared	0.07	0.05	0.06	0.03	0.08
N	385	385	385	385	287
Panel B: Innovation of speculative demand					
Concept_stock_innovation	2.383***	0.010	1.198***	0.008	0.187**
	(0.763)	(0.009)	(0.403)	(0.007)	(0.081)
L.vol_res	-0.256***	0.170	-0.235***	-0.138*	-0.280***
	(0.072)	(0.150)	(0.074)	(0.076)	(0.077)
L.retmean_30	8.235	0.109	3.275	0.494**	-2.511*
	(15.229)	(0.265)	(7.208)	(0.215)	(1.438)
L.retvar_30	0.121	-0.050**	-0.330	-0.041*	-0.337*
	(1.858)	(0.021)	(0.855)	(0.024)	(0.197)
L.retskew_30	3.606	-0.034	-4.347	-0.021	1.699
	(6.192)	(0.086)	(3.426)	(0.095)	(1.623)
L.retkurt_30	-4.315	-0.072*	-3.247	0.019	-0.102
	(3.526)	(0.040)	(2.172)	(0.048)	(0.527)
Constant	16.101	0.553**	11.422	0.049	3.858*
	(15.517)	(0.214)	(9.355)	(0.228)	(2.248)
Adj. R-squared	0.08	0.05	0.07	0.03	0.08
N	385	385	385	385	287

Table 11.
Univariate Monthly Regression of Contemporaneous Returns on Speculative Demand
This table reports univariate regressions of month returns on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	0.018	0.007	0.045*	-0.002	0.045*
	(0.026)	(0.022)	(0.025)	(0.019)	(0.024)
Constant	0.349	0.665	0.851	0.666	1.810
	(1.060)	(1.363)	(1.156)	(1.187)	(1.326)
Adj. R-squared	-0.00	-0.01	0.02	-0.01	0.02
N	95	95	95	95	73
Panel B: Innovation of speculative demand					
Concept_stock_innovation	0.026	0.024	0.058*	0.005	0.048*
	(0.034)	(0.031)	(0.030)	(0.024)	(0.027)
Constant	0.353	0.667	0.862	0.666	1.602
	(1.051)	(1.342)	(1.131)	(1.181)	(1.354)
Adj. R-squared	0.00	-0.01	0.03	-0.01	0.02
N	95	95	95	95	73

Table 12.
Multivariate Monthly Regressions of Contemporaneous Returns on Speculative Demand
This table reports multivariate monthly regressions of contemporaneous returns on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	0.021	0.005	0.063*	0.006	0.051*
	(0.032)	(0.024)	(0.033)	(0.020)	(0.028)
L.retmean_30	6.756**	5.945*	4.747	4.720	3.134
	(2.758)	(3.436)	(2.968)	(2.863)	(2.982)
L.retvar_30	0.145	0.323	-0.073	0.313	-0.361
	(0.505)	(0.299)	(0.482)	(0.345)	(0.534)
L.retskew_30	-0.153	-1.422	-0.219	-0.669	-0.257
	(1.338)	(1.800)	(1.705)	(1.309)	(2.494)
L.retkurt_30	-0.075	0.795	0.678	0.964**	0.328
	(0.540)	(0.698)	(0.612)	(0.436)	(0.781)
L.vol_res_m	-0.000	-0.001	0.005	0.160	0.007
	(0.002)	(0.003)	(0.003)	(0.143)	(0.012)
Constant	-0.075	-4.941	-1.638	-4.879*	1.880
	(2.087)	(3.738)	(2.292)	(2.521)	(2.993)
Adj. R-squared	0.02	0.01	0.07	0.04	-0.01
N	94	94	94	94	70
Panel B: Innovation of speculative demand					
Concept_stock_innovation	0.022	0.010	0.072*	0.003	0.055
	(0.038)	(0.032)	(0.038)	(0.023)	(0.034)
L.retmean_30	6.550**	5.846*	4.171	4.744*	2.858
	(2.804)	(3.456)	(2.937)	(2.852)	(2.912)
L.retvar_30	0.095	0.311	-0.224	0.311	-0.418
	(0.524)	(0.306)	(0.493)	(0.347)	(0.545)
L.retskew_30	0.036	-1.383	0.420	-0.644	0.135
	(1.271)	(1.807)	(1.756)	(1.315)	(2.569)
L.retkurt_30	-0.083	0.799	0.715	0.967**	0.348
	(0.538)	(0.707)	(0.592)	(0.442)	(0.782)
L.vol_res_m	-0.000	-0.001	0.004	0.150	0.006
	(0.002)	(0.003)	(0.003)	(0.138)	(0.012)
Constant	0.149	-4.889	-0.948	-4.878*	2.046
	(2.149)	(3.668)	(2.257)	(2.474)	(3.013)
Adj. R-squared	0.02	0.01	0.07	0.04	-0.01
N	94	94	94	94	70

Table 13.
Univariate Monthly Regression of Contemporaneous Trading Volume on Speculative Demand
This table reports univariate monthly regressions of contemporaneous trading volume on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	7.102***	0.077***	3.900***	0.067***	0.552***
	(1.608)	(0.023)	(0.857)	(0.017)	(0.173)
Constant	-1.645	-0.018	-0.903	-0.016	-0.169
	(53.743)	(0.812)	(29.011)	(0.611)	(7.820)
Adj. R-squared	0.17	0.11	0.18	0.15	0.07
N	95	95	95	95	72
Panel B: Innovation of speculative demand					
Concept_stock_innovation	8.711***	0.098***	4.670***	0.081***	0.576***
	(1.765)	(0.034)	(0.986)	(0.022)	(0.208)
Constant	0.000	0.000	-0.000	0.000	-2.718
	(48.490)	(0.769)	(26.992)	(0.583)	(7.824)
Adj. R-squared	0.22	0.16	0.21	0.19	0.06
N	95	95	95	95	72

Table 14.
Multivariate Monthly Regression of Contemporaneous Trading Volume on Speculative Demand
This table reports multivariate monthly regressions of contemporaneous trading volume on speculative demand measured by Google search volume index of concept stocks. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change of speculative demand					
Concept_stock_change	6.325***	0.086***	3.465***	0.070***	0.468***
	(1.573)	(0.033)	(0.892)	(0.020)	(0.169)
L.vol_res_m	-0.107	0.131	-0.102	0.043	-0.162*
	(0.074)	(0.162)	(0.083)	(0.132)	(0.092)
L.retmean_30	24.485	-0.667	-22.454	1.641	-42.930**
	(163.314)	(1.430)	(91.531)	(1.550)	(19.504)
L.retvar_30	27.559	-0.062	8.321	0.041	-2.907
	(16.983)	(0.185)	(8.583)	(0.271)	(2.196)
L.retskew_30	-52.861	-1.364	-75.891*	-0.652	-15.004
	(57.359)	(1.613)	(45.322)	(0.990)	(21.506)
L.retkurt_30	-25.904	0.936	-26.108	0.591	-6.441
	(29.816)	(0.701)	(20.784)	(0.481)	(5.380)
Constant	-3.990	-4.039	36.377	-2.882	34.205
	(150.061)	(2.898)	(92.093)	(2.184)	(22.245)
Adj. R-squared	0.14	0.13	0.16	0.15	0.09
N	94	94	94	94	70
Panel B: Innovation of speculative demand					
Concept_stock_innovation	8.309***	0.107***	4.417***	0.083***	0.526**
	(1.894)	(0.040)	(1.101)	(0.023)	(0.217)
L.vol_res_m	-0.115*	0.116	-0.101	0.016	-0.165*
	(0.065)	(0.148)	(0.076)	(0.123)	(0.091)
L.retmean_30	-59.172	-1.586	-58.237	0.732	-45.541**
	(158.860)	(1.389)	(86.803)	(1.543)	(19.384)
L.retvar_30	6.416	-0.176	-1.533	-0.138	-3.463
	(17.130)	(0.179)	(8.937)	(0.264)	(2.218)
L.retskew_30	22.207	-0.728	-33.724	-0.163	-11.185
	(54.802)	(1.435)	(43.695)	(0.919)	(21.743)
L.retkurt_30	-28.873	1.029	-23.650	0.630	-6.207
	(28.810)	(0.701)	(20.378)	(0.461)	(5.494)
Constant	88.791	-3.709	81.006	-2.216	35.684
	(144.317)	(2.719)	(89.169)	(1.975)	(22.555)
Adj. R-squared	0.19	0.18	0.19	0.18	0.08
N	94	94	94	94	70

Table 15.
Returns, Speculative Demand and Macro Variables
This table reports multivariate monthly regressions of contemporaneous returns on speculative demand measured by Google search volume index of concept stocks, the first four moments of past month daily returns and the past month trading volume, as well as macroeconomic variables. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
Panel A: Change in Speculative Demand					
Concept_stock_change	0.085***	0.074***	0.097***	0.063***	0.091***
	(0.020)	(0.026)	(0.023)	(0.021)	(0.021)
L.retmean_30	-0.087	0.275	-0.178	0.097	-0.505
	(0.710)	(0.725)	(0.686)	(0.726)	(0.704)
L.retvar_30	-0.004	-0.040	0.070	0.014	0.074
	(0.082)	(0.074)	(0.083)	(0.097)	(0.088)
L.retskew_30	-0.458	-0.424	-1.053**	-0.364	-1.547**
	(0.312)	(0.331)	(0.409)	(0.292)	(0.760)
L.retkurt_30	-0.220	-0.014	-0.436**	0.058	-0.549
	(0.165)	(0.133)	(0.217)	(0.119)	(0.338)
L.turnover_res	0.003*	0.517	0.004	0.766***	0.015
	(0.002)	(2.605)	(0.003)	(0.231)	(0.010)
L.cpi	-0.476***	-0.453***	-0.576***	-0.423***	-0.567***
	(0.121)	(0.148)	(0.137)	(0.114)	(0.157)
L.m2	-0.125**	-0.032	-0.153**	-0.037	-0.120
	(0.063)	(0.074)	(0.072)	(0.058)	(0.081)
L.gdp	0.236	0.296	0.242	0.041	0.285*
	(0.153)	(0.248)	(0.167)	(0.158)	(0.161)
Constant	2.217	-0.708	3.330	1.381	2.479
	(1.877)	(2.620)	(2.196)	(1.868)	(2.498)
Adj. R-squared	0.10	0.04	0.12	0.07	0.11
N	374	374	374	374	287
Panel B: Innovation of speculative demand					
Concept_stock_innovation	0.101***	0.104***	0.118***	0.077***	0.109***
	(0.024)	(0.031)	(0.027)	(0.026)	(0.024)
L.retmean_30	-0.475	0.023	-0.607	-0.114	-0.831
	(0.728)	(0.716)	(0.690)	(0.723)	(0.702)
L.retvar_30	-0.038	-0.054	0.038	-0.012	0.067
	(0.084)	(0.073)	(0.086)	(0.100)	(0.089)
L.retskew_30	-0.374	-0.355	-0.980**	-0.304	-1.486*
	(0.308)	(0.325)	(0.401)	(0.289)	(0.759)
L.retkurt_30	-0.232	0.002	-0.430**	0.060	-0.573*
	(0.166)	(0.132)	(0.215)	(0.118)	(0.342)
L.turnover_res	0.002	0.314	0.004	0.726***	0.014
	(0.002)	(2.570)	(0.003)	(0.239)	(0.010)
L.cpi	-0.541***	-0.516***	-0.649***	-0.470***	-0.645***
	(0.122)	(0.149)	(0.137)	(0.115)	(0.155)
L.m2	-0.158**	-0.071	-0.190***	-0.066	-0.153*
	(0.062)	(0.074)	(0.071)	(0.059)	(0.080)
L.gdp	0.216	0.261	0.207	0.018	0.263
	(0.151)	(0.237)	(0.164)	(0.155)	(0.160)
Constant	3.417*	0.573	4.720**	2.411	3.662
	(1.856)	(2.534)	(2.199)	(1.839)	(2.516)
Adj. R-squared	0.11	0.05	0.13	0.07	0.12
N	374	374	374	374	287

Table 16.
Trading Volume, Speculative Demand and Macro Variables
This table reports multivariate weekly regressions of contemporaneous trading volume on speculative demand measured by Google search volume index of concept stocks, the first four moments of past month daily returns and lagged macroeconomic variables. The sample spans from 10/01/2004 to 24/12/2011 (with the exception that Shenzhen SME data are only available from 01/12/2005). Newey-West standard errors are in parentheses.
Significance levels : $*$: 10% $**$: 5% $***$: 1%

	Shanghai A	Shanghai B	Shenzhen A	Shenzhen B	Shenzhen SME
	Panel A: Change in Speculative Demand				
Concept_stock_change	1.815***	0.001	0.978***	-0.000	0.184**
	(0.661)	(0.008)	(0.352)	(0.006)	(0.074)
L.vol_res	-0.259***	0.177	-0.240***	-0.133*	-0.287***
	(0.073)	(0.141)	(0.074)	(0.077)	(0.077)
L.retmean_30	15.359	0.066	7.501	0.381*	-2.195
	(16.463)	(0.263)	(7.671)	(0.230)	(1.491)
L.retvar_30	0.993	-0.056**	0.087	-0.043*	-0.276
	(2.039)	(0.022)	(0.911)	(0.025)	(0.194)
L.retskew_30	3.817	-0.068	-3.599	-0.035	1.616
	(7.226)	(0.097)	(4.290)	(0.095)	(1.681)
L.retkurt_30	-2.697	-0.083**	-2.966	0.008	-0.022
	(3.926)	(0.038)	(2.490)	(0.046)	(0.541)
L.cpi	1.060	-0.054	0.576	-0.057*	-0.034
	(2.694)	(0.036)	(1.437)	(0.031)	(0.326)
L.m2	3.445*	-0.016	1.515	0.006	0.080
	(1.997)	(0.025)	(1.086)	(0.025)	(0.243)
L.gdp	-3.373	0.117	-2.398	0.090	-0.679
	(4.348)	(0.085)	(2.207)	(0.058)	(0.431)
Constant	-23.557	-0.122	4.505	-0.748	9.101
	(56.599)	(0.678)	(31.477)	(0.645)	(7.578)
Adj. R-squared	0.08	0.06	0.07	0.03	0.08
N	374	374	374	374	287
Panel B: Innovation of speculative demand					
Concept_stock_innovation	2.385***	0.009	1.221***	0.007	0.203**
	(0.775)	(0.008)	(0.409)	(0.007)	(0.082)
L.vol_res	-0.270***	0.174	-0.249***	-0.138*	-0.290***
	(0.073)	(0.142)	(0.074)	(0.077)	(0.077)
L.retmean_30	6.174	0.048	3.046	0.366	-2.809*
	(16.825)	(0.267)	(7.841)	(0.229)	(1.531)
L.retvar_30	0.178	-0.057***	-0.247	-0.045*	-0.288
	(2.013)	(0.022)	(0.910)	(0.025)	(0.195)
L.retskew_30	5.662	-0.061	-2.876	-0.027	1.732
	(7.093)	(0.096)	(4.166)	(0.093)	(1.686)
L.retkurt_30	-2.913	-0.081**	-2.899	0.008	-0.067
	(3.953)	(0.038)	(2.470)	(0.045)	(0.550)
L.cpi	-0.454	-0.059*	-0.176	-0.060*	-0.182
	(2.637)	(0.036)	(1.409)	(0.031)	(0.326)
L.m2	2.655	-0.019	1.139	0.003	0.019
	(2.011)	(0.025)	(1.089)	(0.025)	(0.245)
L.gdp	-3.917	0.114	-2.762	0.088	-0.719*
	(4.283)	(0.083)	(2.188)	(0.057)	(0.430)
Constant	5.155	-0.006	18.996	-0.658	11.313
	(57.819)	(0.666)	(32.165)	(0.634)	(7.681)
Adj. R-squared	0.09	0.06	0.08	0.03	0.08
N	374	374	374	374	287

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