Market Behaviour of Foreign versus Domestic Investors

Following a Period of Stressful Circumstances

Meziane Lasfer, Sharon Lin* and Gulnur Muradoglu

Cass Business School, City University, London, UK

Preliminary research, please do not quote
Not to be considered for publication
15th June 2010

Abstract

In this paper we analyse the short-term stock price behaviour following a period of large stock price changes. We compare the price behaviour of A shares owned by domestic investors and B shares owned by foreign investors in the two Chinese markets, Shanghai and Shenzhen. We find significant differences across the two types of shares. We show that, while the prices of the A shares are relatively random in the short-term window (up to 10 days) after the price shock, those of the B shares carry on increasing significantly after both the positive and negative shocks. This trend is more pronounced for large shares with high liquidity, in contrast to the efficient market hypotheses expectations, which suggests that any abnormal performance should be arbitraged away sooner in a frictionless (in this case liquid) market. In the post-2001 period when the B shares are open to domestic investors, we find a significant drop in the post-shock abnormal returns in B shares. We relate these results to the high level of optimism of foreign investors.

Key words: Efficient Markets, Market Stress, Overreaction, Momentum

JEL Classification: G1, F3.

* *Corresponding author:* Cass Business School, City University, 106 Bunhill Row, London EC1Y 8TZ. Tel. +44 (0)20 7040 8944, fax. +44 (0)20 7040 8681; email: m.a.lasfer@city.ac.uk; Sharon Lin: s.lin@city.ac.uk; Gulnur Muradoglu: g.muradoglu@city.ac.uk. We are responsible for all remaining errors.

Market Behaviour of Foreign versus Domestic Investors Following a Period of Stressful Circumstances

1. Introduction

Under the efficient market hypothesis, share prices reflect all information available to market participants. This hypothesis precludes any abnormal profit opportunities as share price changes cannot be predicted and past returns are not correlated with future returns. However, recent empirical studies report that past prices can predict future price movements and that investment strategies based on historical returns can generate subsequent risk-adjusted abnormal returns. Starting with DeBondt and Thaler (1985, 1987) and Jegadesh and Titman (1993), a number of studies provide evidence in favor of long-run overreaction and short-term momentum, and conclude that markets have a tendency to overreact over a medium-term and underreact at long-run horizons as information is not immediately, fully and appropriately compounded in share prices the moment it is released.[1] This evidence suggests that markets are not efficient and that trading profits can be obtained by following some set of appropriately designed trading strategies. Other studies, on the other hand, suggest that any deviation from the efficient market hypothesis that results in abnormal returns over the short- or the long-term is likely to be due to chance and sample-specific or that, even if the anomalies existed in the sample period in which they were first identified, they tend to disappear once detected and made public (See Fama, 1998, and Schwert, 2003, for a review of market anomalies and efficiency issues). Khandani and Lo (2007) show that contrarian strategies are in recent years less profitable. They back-tested a proxy for a typical strategy, involving buying the previous day's losing stocks and selling the winners. Such a strategy would have delivered a daily return of 1.38% before (substantial) costs in 1995 but the return fell steadily to 0.15% a day in 2006.

The purpose of this paper is to contribute to this debate by examining the daily stock market behavior of foreign and domestic investors following large price changes which we refer to as "shocks" or "stressful circumstances". Chinese stock markets constitute an excellent laboratory for this work due to the two types of shares, A and B that can be traded by domestic investors and by foreign investors respectively. We investigate whether underreaction or overreaction exists in these two types of shares, reflecting the differences in the market perception of the two types of investors that owns them; whether the post-shock reaction changes through time; and whether the post-shock reaction is related to differences in market liquidity across these stocks. We expand the previous literature on stock returns by investigating the circumstances under which the momentum anomaly and the well documented biases, such as over-reaction, trend-following, and optimism, considered in the literature to drive this phenomenon, are observed for both or only one particular type of investor. In addition to the possible home bias measured through the country of origin of the investors, we investigate if the post-shock biases are triggered by the liquidity of the shares measured by volume of trade, previous performance (momentum), and market capitalization. We also document whether after the abolition in 2001 of the limitations of the country of origin of the traders, this bias was reduced. This test gives us an additional opportunity to investigate if market behavior converges following the change in the identity of the trader.

Our approach differs from much of the existing literature. First, unlike Lasfer, Melnik and Thomas (2003), we focus on individual-company price performance, not indices. In contrast to previous studies that used individual stock price data (e.g., Bremer and Sweeney, 1991; Cox and Peterson, 1994; Park, 1995), we overcome the associated problems of attempting to isolate differences in the risk profile of the individual stocks by relating each firm’s stock returns to its level of risk. We consider

each individual stock in terms of its historic price volatility both in identifying shocks and in evaluating that stock's post-shock performance. In addition, we investigate the post-shock performance taking account of the stock's size and other factors that are expected to affect the size of the shock and the speed with which it is absorbed. Second, following previous studies that have looked at indices or long-term returns (e.g., Brown, et al., 1988; Cox and Peterson, 1994; Howe, 1986; Lasfer et al, 2003; and Lehman, 1990), we analyze the momentum and reversal behavior over short-time periods.

Our motivation has theoretical as well as practical grounds. First, we use international data to test the predominantly US evidence. Fama and French (1996) argue that tests based on international data are desirable to establish whether US evidence is indicative of the general behaviour or is a special case. Second, the importance of further investigation is emphasised by the interest of fund managers in formulating portfolio strategies to exploit such a possible reaction and by the recent unprecedented volatility in stock prices and rapid growth in hedge funds. Large price shocks create both a potential for large profits and an increase in risks. However, we expect any predictability in post-shock responses to be quickly arbitraged away and that overreaction or underreaction would diminish over time because of the increase in the speed of transmission of financial data, and the pressures on fund managers and hedge funds to capture any predictable post-shock reactions. This arbitrage activity is likely to depend on a set of characteristics of the stock and the trader. In particular, we expect the arbitrage to be more difficult in less-liquid stock.[2] Thus, we anticipate that post-shock returns in these stocks would take longer to be absorbed and dissipated. In addition, we consider that the arbitrage will depend on the identity of the trader and how distant is the trader to the location of the stock (Mitchell, Pulvino and Stafford, 2002). Therefore, we hypothesize that since A shares are owned by local investors, they will be more

likely to be arbitraged than B shares. Third, the distinction between foreign and local investors allows us to test some behavioural finance hypotheses. We test whether abnormal profit opportunities after price shocks are due to behavioural biases in human nature. In particular, we investigate the three well documented biases, overreaction, trend-following and optimism in a coherent framework and describe the conditions that trigger them. International fund managers are keen on exploiting such biases to come up with successful trading strategies. Large price shocks in the Chinese A and B shares constitute a potential for large profits if predictable post-shock reactions can be traced and, because of liquidity issues, post shock returns will take longer to be arbitraged away, resulting in persistence in stock prices after the shocks. Finally, previous studies have documented some specificities in the trading patterns of Chinese investors that lead to a lack of predictability of the trades of institutional and individual investors due probably to the speculative nature of Chinese equity markets (see Mei, Scheinkman, and Xiong, 2005), the relatively inexperienced Chinese individual investors and differences in their trading behaviour. Ng and Wu (2007) report that less wealthy individual investors are contrarians, but Chinese institutions adopt momentum strategies, some wealthy individuals tend to behave like institutions when they buy stocks, but behave like less wealthy individuals when they sell, individual investors at large have no predictive power for future stock returns.

We use a very rich dataset that includes all shares traded in Shanghai and Shenzhen stock exchanges since their establishment in the early 1990s to 2004. We first compute the daily returns of each stock and then compare each of these returns to the average return in the previous 60 days. If the difference in these returns is higher than two standard deviations, we consider that return as a shock and assess the subsequent 10 days returns. The results show significant differences between the two types of shares

but not between the two markets. For the A shares, the post-shock returns are relatively random in both the Shanghai and Shenzhen stock markets. These results could be driven by the conflicting trading strategies adopted by individual and institutional investors in China (e.g., Ng and Wu, 2007). In contrast, we report strong evidence of optimistic behaviour for shares traded by foreign investors (B-shares), as positive abnormal returns follow both positive and negative shocks. The optimism we observe is more pronounced for large shares with high liquidity. This is contrary to the expectations of the proponents of the EMH that abnormal returns would be arbitraged away sooner if there is less friction, such as liquidity in this case. We also document that after the 2001 reform that allowed local investor to hold the B shares, the post-shock abnormal returns decreased significantly, suggesting that most of the optimism is driven by the presence of foreign investors in the Chinese markets. These results led us to conclude that the optimism we observe is due to human nature. Previous studies have reported optimism in several other domains.[3] However, to our knowledge, our study is the first to test the optimism to the price recovery process in an international market with predominantly institutional investors.

The rest of the paper is organised as follows: Section 2 gives a review of literature. In Section 3 we introduce the Institutional framework of Chinese stock markets. In Section 3 we describe the data and methodology used. Section 4 presents findings and Section 6 concludes.

2. Theoretical background

2.1 Review of the literature

A number of previous studies report that, in the long run, stock prices overreact. For example, DeBondt and Thaler (1985, 1987) hypothesize that following certain

shocks, stock prices take temporary swings away from their fundamental values. They argue that investors tend to overreact to extreme price changes due to the tendency to over-weigh current information and under-weigh prior data. If prices tend to overshoot their target levels after a large shock, the price reversal will reflect a movement back to equilibrium. Chopra, Lakonishok and Ritter (1992) incorporate size, prior returns and betas in their regressions to find that loser portfolios, formed on the basis of prior 5-year returns, outperform winners by 5% to 10% per year during the subsequent 5 years. Studies based on non-US data (e.g., Richards, 1995, 1997) also show that in the first six months after portfolio formation, winners continue to outperform losers, but over the subsequent three and four year, losers outperform winners. These overreaction results led a number of researchers to devise contrarian trading rules of buying losers and selling winners (e.g., Lakonishok, Shleifer and Vishny, 1994).[4]

In contrast, studies based on medium-term horizons of typically between 3 and 12 months indicate that prices underreact to information. This delayed price reaction to firm-specific news enables momentum strategies. Jegadeesh and Titman (1993) show that stocks with high returns over a given time period (of 3 to 12 months) continue to outperform the firms with lower past returns in the same period. Using US data, a large number of studies[5] provide evidence supporting momentum strategies. Similar results are documented by Liu, Strong and Xu (1999) in the UK, Rouwenhorst (1998) and Lasfer et al (2003)[6] using international equity market data, and Chui, Titman and Wei (2000) using Asian markets data.

Although the momentum and overreaction strategies appear to provide diametrically opposed predictions about the returns of past winners and losers, the two strategies are not necessarily inconsistent because of the different time scales used in empirical studies. However, both sets of results appear to provide some evidence of

'market inefficiency'. Proponents of the efficient market hypothesis suggest that the results are a compensation for other factors or are the product of data mining. In particular, the overreaction results are attributed to time-varying risk effects (Chan, 1988; Ball and Kothari, 1989), distressed firm effects (Chan and Chen, 1991), size effects (Fama and French, 1988; Zarowin, 1990), and market microstructure-related effects (Ball, Kothari and Shanken, 1995). Similarly, the apparent profitability of momentum strategies is variously linked to the cross-sectional variability in expected returns (Conrad and Kaul, 1998), book-to-market effects, trading volume, and the extent of analyst coverage (Asness, 1997; Lee and Swaminathan, 2000; Hong, Lee and Stein, 2000). The purpose of our paper is to contribute to this controversial literature by investigating the under/overreaction in the very short-term investor response to major price changes in individual stock returns in A and B shares in the two main Chinese markets. The next section provides details in the institutional framework in China.

2.2. Institutional Framework

As part of the reforms during the liberalisation program of the Chinese economy, Shanghai and Shenzhen Securities Markets were established in 1990 and 1991 respectively. The Shanghai Securities Exchange (SHSE) adopts a corporate membership system and deals with spot transaction, not including futures. There were only 8 companies in 1991 listed in the SHSE, however, by the end of year 2004, the total number of listed companies increased to more than 800 with total capitalisation of about 1 trillion RMB. The Shenzhen Securities Exchange (SZSE) was formally opened on July 3, 1991, at the same time B shares were allowed to attract foreign funds into China. The number of stocks listed in the SZSE was 18 at the end of 1991, and rose to more than 500 by the end of 2004 with total market capitalization of 1 billion RMB. As China had a stable political and economic development over the past decade, while the

growth of the US economy was slow and the US markets were sluggish and most other emerging markets were hit by various crises, B shares in China became one of the most favourable international investment opportunities for foreign investors. In February of 2001, Chinese investors were permitted to trade B shares using USD for their trading. A-Shares have traditionally been held by Chinese investors and were traded in RMB, the Chinese currency and foreign investors were not allowed to trade them. The B-shares have traditionally been dominated in RMB but listed and traded in USD. They provided foreign investors a legal channel to invest in China and were reserved for foreign investors only, until February 19, 2001, when the China Securities Regulatory Commission announced that domestic residents are allowed to open B-share accounts and engage in B-share trading with legally as long as they held foreign currency. This restriction on capital controls imposed to serve as a restriction on Chinese residents to buy B shares may be binding because although Chinese currency, RMB has achieved current account convertibility, the capital account transactions have not been permitted. As a result, the A and B share markets were segmented and price recovery processes in the two markets have been different (Allen and Quian, 2005). We test whether our results are affected by this change in the regulation by comparing the price behaviour after the shock in the pre- and post-legislative reform.

China constitutes an excellent laboratory for our purposes for the following reasons. First Chinese companies issued two classes of shares with identical voting and dividend rights listed on the same exchange either Shanghai or Shenzhen but held by different location investors. During our sample period spanning between January 1991 to December 2004, 42 companies had both A and B shares in Shanghai and in Shenzhen Stock exchanges.[7] A shares are usually more actively traded than B Shares with A shares turnover being about four times the turnover of B shares and fetch a high

premium over B shares (Mei, et.al., 2005) possibly due to speculative trading rather than liquidity.[8] Second, Chinese residents have stringent short sale constraints such that investor accounts are kept centrally, investor position is checked through a computerised system before each trade and it is illegal to short-sell. Moreover there are no futures and options markets where the Chinese residents can trade in China. Naturally this affects mainly the price recovery mechanism for A shares that are restricted to domestic residents but not the B shares that are traded by foreigners, i.e. international investors who can trade without such restrictions elsewhere in the world. Finally, Chinese stock markets are dominated by individual investors as mutual funds and pension funds are still in their infant stages of development (Mei, et.al., 2004). By the end of 1999 about 85% of tradable shares were held by individuals with little previous experience and about 15% were held by institutions (Tenev, Zhang and Berefort, 2002). Overall, the strict short-sale constraints and lack of previous trading experience Chinese investors were expected to exhibit overconfidence in their trading behaviour (Mei, et.al., 2005).

3. Data and Methodology

Data comes from Perfect Analysis and includes 1,337 stocks that were listed on the Shanghai and Shenzhen stock exchanges from the launch of the first stock markets in China in 01/1991 to 12/2004, resulting in about 120,000 daily observations in both markets. Our sample covers all industry sectors and includes live as well as dead companies. Following Lasfer et al, (2003), we define a positive (negative) price shock on day t=0 when the return on a particular day is above (below) two standard deviations of the average returns computed over the fifty days, between t= -60 to –11, ten days prior to the price shock.[9] The daily return ($R_{i,t}$) on stock i on day t is the log difference

between two successive days' closing prices. After computing the price shocks, the post-shock Cumulative Abnormal Returns (CARi,t) are calculated starting from the day after the price shock as follows: Abnormal return on day t for stock *i* is given as $AR_{i,t} = R_{i,t} - E(R_{i,t})$, the difference between $R_{i,t}$,the daily return of the share *i* on day t, and $E(R_{i,t})$, the expected return on stock *i* in day t which is calculated as the average return of the 60-day window ending 10 trading days before the price shock. The cumulative abnormal returns (CAR) and the t-tests used to test if CARs are significantly different form zero (Brown and Warner, 1985; Campbel, Lo, MacKinley, 1997) are calculated for the ten trading days following the shock as follows:

$$CAR_t = \sum_{i=1}^{n} \sum_{t=1}^{10} AR_{i,t} \ldots(1)$$

$$t = \frac{CAR_T}{s(CAR)_T} \ldots(2)$$

where, $s(ACAR_T) = s(AR_T)/(T+1)^{1/2}$ and $s(AR_T)$ is the variance over *T* days.

The next step in our analysis is to determine whether the cumulative abnormal returns can be explained by a number of firm-specific and trading related factors, such as the stock exchange in which the share is listed, the class of shares, company size, trading volume, previous performance of the share prices and the size of the shock. We first partition the data accordingly and analyze whether the CARs we calculate are robust to these factors. Next, we run the following regression for positive and negative shocks and A, and B shares separately so as to test formally for the effect of these factors on CARs:

$$CAR_{i,t} = a + b_1 JUMP_{i,t} + b_2 VOLUME_{i,t} + b_3 SIZE_{i,t} + b_4 B_{i,t} + b_5 EXCHANGE_{i,t} + b_5 TREND_{i,t} \ldots(3)$$

In equation 3, *CAR* is defined as above in equation 1, *a* stands for constant, *JUMP* is the "shock" measured as percentage change in price on event day, *VOLUME*

represents the volume of trade on event day, *SIZE* is measured as the log of market capitalization, *B* is a dummy variable that takes on the value 1 if the time is after 2001 and local residents can trade B shares as well as foreign investors and zero otherwise, *EXCHANCE* takes the value 1 if the share is traded in Shanghai and zero if traded in Shenzhen, *TREND* is the price performance of the share before the shock and is measured as the percentage price change over the past sixty days before the jump.

Table 1 provides the descriptive statistics of our sample classified by the stock exchange and class of shares. Over the fourteen year research period we investigate, a total of 116,727 price shocks of which 58,195 were positive and 58,532 were negative. The mean positive shock is about 6% and the mean negative shock is about -6.2%. The magnitude of the shocks in China appears to be higher compared to the average shocks in other markets. For example, Lasfer et al. (2003) report mean positive (negative) shocks of 2.37% (-2.34%) for developed markets and 3.62% (-3.48) for emerging markets.

Table 1 also reports strong differences in the number and magnitude of price shocks between the two markets. For A shares, there are 49,525 positive shocks and 49,968 negative shocks in both Shanghai and Shenzhen stock exchanges. The mean positive (negative) shock is 5.8% (-5.4%). For B shares, we find relatively lower number of occurrences (8,670 positive and 8,564 negative shocks), partly because of the small number of B shares, compared to A shares. However, the mean positive and negative shocks (+7% and -6.7%) appear be statistically larger than those of shares. This relative difference in the magnitude of the shocks is also observed in the two markets. In particular, while for A shares, the mean positive shock in Shanghai is 5.79% for 27,732 cases, it increase to 6.96% for the 4,513 positive shocks in B shares. The respective figures for the Shenzhen market are 5.85% for 21,793 positive shocks in A

shares compared to 7.16% for the 4,157 B shares. Similar results are observed for the negative shocks. The differences in the level of shocks between A and B shares are all statistically significant.

[Insert Table 1 here]

4. Empirical results

4.1. Post Shock Returns

Table 2 presents the average post-shock returns cumulated over the ten days following the shock. For clarity purposes we report only CAR1, CAR5 and CAR10. The full results are portrayed in Figure 1 to 4. For the sample as a whole (Panel A and B), the post-positive shock abnormal returns are positive, suggesting momentum trend. However, the trend is not linear as the mean abnormal return on the day following the positive shock is 0.0031, but the cumulative abnormal returns deteriorate over the next five days and reach 0.0019 on day five and then they start picking up and reach 0.0062 on day 10. For the negative shocks, the cumulative abnormal returns one day after the shock (CAR1) are negative (-0.0005) but they revert in day 5 to reach 0.0009 and increase to 0.0061 in day 10. These overall results do not provide full support for the momentum behaviour as observed in major international stock indices (e.g., Lasfer, 2003).

The remaining panels show strong differences in the post-shock cumulative abnormal returns between the two markets and between the two types of stocks. For the A shares, the results do not support fully the momentum or the under-reaction hypotheses, as the post-shock abnormal returns are mainly insignificant and inconsistent in sign (Table 2, Panel C and Panel D, and Figure 1 and 3). In contrast, the CARs experienced by foreigners who invest in B shares are much higher and persistent than those experienced by domestic investors who can only invest in A shares. In particular,

the B shares show a clear indication of momentum behaviour following positive shocks (Table 2, Panel E. and Figure 2), as share prices increase linearly from 0.0076 in day 1 to 0.0376 in day 10. These results are consistent with previous studies (e.g., Lasfer et al, 2003) and indicate that 10 days from the day of the shock (of 0.0705 as shown in Table 1), share prices increase by 0.1081. These results suggest that share prices have under-reacted to the positive shock. Alternatively, our results may suggest that foreign investors are too optimistic and expect the increase in prices to continue in the future.

Interestingly, the results also indicate that prices increase after negative shocks (Table 2, Panel F. and Figure 4). After a decrease in share prices by -0.0667 (Table 1, Panel B.), share prices increase from 0.0008 in day 1 to 0.0095 in day 10. Although this increase is significantly lower than the rise in stock prices after the positive shock (Panel B.) and does not compensate fully B shareholders for the loss they incurred in the negative shock, the results indicate that the market may have over-reacted to this negative shock or that foreign investors were taking advantage of the shock to increase their holding.

Finally, our results indicate that the trend in the post-shock abnormal returns differs across the two markets as the CARs experienced in Shenzhen stock exchange are much higher than those in Shanghai, mainly because the Shenzhen stock exchange is like the NASDAQ in the US lists predominantly smaller firms from new industries. For example, ten days after the positive shocks, the CARs in A shares are -0.0009 in Shanghai compared to 0.0027 in Shenzhen (p of differences in means = 0.00) and 0.020 compared to 0.0573 for B shares (p = 0.00). Similarly, the CARs 10 days after negative shocks are 0.0046 in Shanghai compared to 0.0067 in Shenzhen (p = 0.00) for A shares. The respective value for B shares are 0.0081 and 0.0115 (p = 0.00).

Overall the results are interesting on two grounds. First we observe momentum following positive shocks and overreaction following negative shocks. Second we observe this strong positive behaviour more significantly in B shares that are owned by foreign investors rather than in A shares where the post-shock returns appear to be relatively random. These trends in B shares could indicate optimism which has been widely documented in other domains (e.g., Kahneman and Reipe, 1998) and in stock price forecasts in other emerging markets (Muradoglu, 2002) but not in relation to market behaviour in empirical work. In addition, since the behaviour for A and B shares are differentiated in terms of the speed of adjustment to the shock, our analysis could presents a good opportunity to indicate that the observed optimism in market reactions is caused by the different attributes of market participants. We test further the hypothesis that the level of optimism, rather than the over- or under-reaction, is driving our results by undertaking a number of additional robustness checks. First we examine the possible effect of regulation changes in trading in B shares. We argue that, if foreign investors are more optimistic than domestic investors, the level of optimism, as reflect in the post-shock abnormal returns in the B shares, should be significantly lower in the post-2001 period when domestic investors could trade in B shares. Next we consider the idiosyncratic risk by investigating the effect of volume of trade and size of the companies. Finally, we test the momentum trends by assessing whether the post-shock abnormal returns are driven by the returns in the pre-event period which measures the expectation formation process based on extrapolating trends as described in DeBondt (1993).

[Insert Figures 1 through 4 and Table 2 here]

4.2 Are results time varying?

As stated above, the Chinese government introduced a new regulation in February 2001 that allowed domestic investors to trade in B shares. Although this legislation is subject to severe capital restriction, we expect at least a small number of domestic investors to enter the B share market. Therefore, we investigate if this regulatory change had an impact on market behaviour, particularly the level of optimism.

Table 3 reports the distribution of CARs over the two periods. Panel A. reports the results for the A shares traded in Shanghai following positive shocks. The average shock of 0.067 in the pre-2001 period is statistically higher than the 0.052 in the post-2001 period. However, the post-shock abnormal returns are statistically larger in the post-2001 period. While for A shares traded in Shanghai the post shock abnormal returns are all negative, they are larger in the post-2001 period, but CAR5 and CAR10 still remain negative. In contrast, the A shares traded in the Shenzhen market (Panel B) become strongly positive in the post-2001 period. Similar results are observed for the B shares traded in both Shanghai and Shenzhen (Panel C. and Panel D.). For example, the average CAR10 in B shares traded in Shanghai are 0.0150 in the pre-2001 period, compared to 0.028 in the post-2001 period ($p = 0.00$).

Table 3, Panel E., reports the CARs in the Shanghai market following negative shocks. While CAR1 are relatively similar in the two sample periods, CAR5 increased from -0.0054 to +0.0018 and CAR10 from 0.002 to 0.0056 ($p = 0.00$). For the A shares trading in the Shenzhen market, share prices are relatively similar over the two sub-periods, with the exception of CAR5 that increased from -0.0043 to -0.003 in the post-2001 period ($p = 0.00$). The most interesting results relate to the significant change in behaviour of B following negative shocks. Panel G and Panel H indicate strong drop in the CARs in the post-2001 period. For example, while the CAR10 after negative shock

in Shanghai in the pre-2001 period amount to 0.0144 and significant, they decrease to -0.0006 and became not significant. Similarly, in Shenzhen, while the negative post-shocks are all positive and significant in the pre-2001 period (Panel H.), they decrease substantially in the post-2001 period and become insignificant. Therefore, compared to A shares, the 2001 legislation had a significant negative impact on the post-shock cumulative abnormal returns experienced by the B shareholders. These results suggest that foreign investors are likely to be more optimistic than domestic investors.

We have also analysed the annual distribution of the post-shock returns over the whole of our sample period. These results, reported in Appendix A, do not show any particular trend in any particular year as the shocks or the abnormal returns following the shocks are not confined to a particular year or years in the sample period, with the exception of the behaviour in stock returns over the pre- and post-2001 period. Finally, we test whether our results are driven by the month effect by splitting all our results into different months based on the date of the shock. The results reported in Appendix B, do not give any consistent support to any month of the year effect. January effect is observed for A shares traded in Shanghai only. The CARs ten days after the shock are 3.7% (5.8) in January and -0.6% (-0.2%) in other months following positive (negative) shocks. In all other cases, following shocks, CARs in January are lower than CARs in other months of the year. Overall, we cannot detect any particular trend in the after shock cumulative abnormal returns confined to a particular year or a month of the year in the sample.

[Insert Table 3 here]

4.3. Risk Overhang, Initial Shock and Liquidity

We assess the impact of liquidity by examining the relation between after shock CARs and the depth of the initial shock We hypothesize that the larger the shock the lower the amount of liquidity as the number of shares traded will be lower and therefore higher the after-shock CARs. For robustness, we use two other variables that indicate liquidity. We use volume of trade scaled by market capitalisation of the company and hypothesize that for higher levels of trading volume lower will be the after-shock CARs. We use market capitalisation scaled by logarithms and hypothesize that larger the company, the more liquid the shares and thus the lower the after-shock CARs will be. We scale the actual trading volume on the day of the jump with total market capitalisations. The second measure of liquidity we use is the market capitalisation of the company itself. We rank the actual jumps and analyse the after-shock CARs in ten deciles form low to high in both cases.

Table 4 reports the results for portfolios ranked according to volume of trade. Almost all of the CARs are statistically significantly different from zero, and there are some economically significant cases. For A shares, following both positive and negative shocks, we observe that CARs are higher for companies with lower volume of trade. For A shares, following positive shocks ten day CARs are about 0.0107 for firms with low volume of trade while they are about -0.0128 for high volume of trade firms (p = 0.00). Following negative shocks, A shares with low volume of trade earn -0.002 cumulative abnormal returns in ten days in Shanghai while high volume of trade firms earn -0.0104. The trend is similar but much less pronounced in Shenzhen with CARs less than 1%. For B shares, it is possible to earn cumulative abnormal returns up to 0.058 after negative shocks in Shanghai and up to 0.1083 in Shenzhen after positive shock for low volume of trade firms. For high volume of trade firms cumulative returns are lower, up to 0.0057 in Shanghai and 0.0492 in Shenzhen respectively following

negative shocks. Overall, the CARs are higher for firms with low volume of trade, indicating that the cumulative abnormal returns are affected by liquidity of the stock, and therefore by transaction costs as arbitrage is more difficult in less liquid stocks and it takes longer to absorb dissipate the shocks.

[Insert table 4 here]

Table 5 reports the results for portfolios ranked according to market capitalization. We observe a visible pattern for A shares following positive shocks. Following positive shocks for low market capitalisation firms it is possible to earn up to 0.0162 (0.0199) in Shanghai (Shenzhen) in ten days while CARs for high market capitalisation firms are -0.015 and -0.0109, respectively. Following negative shocks, most CARs of the large companies are not significant for A shares in Shenzhen while the overall trend is similar. In contrast, for B shares optimism is much more pronounced and CARs are higher for low market capitalisation companies. It is possible to earn up to 0.0579 in Shanghai and 0.128 in Shenzhen with small companies in ten days following positive shocks. For large companies the corresponding CARs are -0217 and 0.0035 respectively. Following negative shocks CARs are not different for different size deciles in Shanghai. However, we observe an interesting phenomenon for B shares traded in Shenzhen. Ten days after the negative shock CARs are -0.0119 for large companies and 0.0291 for small companies. This is the only size related anomaly we observe related to the pronounced optimism in B shares. If CARs were driven with low liquidity we would observe higher CARs for smaller less liquid shares. However following negative shocks, we observe that optimism in B shares that can be traded only is much more pronounced for larger firms traded in Shenzhen which is similar to NASDAQ in its company base. This is in contrast to the expectations of the efficient markets hypothesis that abnormal performance should be traded away sooner for large

shares with high liquidity. We relate this phenomenon to the high level of optimism in foreign investors.

[Insert table 5 here]

4.4. Trends prior to initial shock

We test the hypothesis that investors extrapolate the previous performance to form their expectations of the future performance after the shock by first ranking all the firms in the sample into ten deciles according to the average return over the 60 days before the initial shock, and then analyse the cumulative abnormal returns up to days after the shock. Table 6 reports CARs for trend deciles. Panels A reports the CARs following positive shocks in A shares. The results are relatively monotonic as the CARs do not appear to change significantly across the pre-shock returns groups. Similar results are observed for the positive shocks in A shares traded in Shenzhen (Panel B) and for the positive shocks in B shares traded in Shanghai (Panel C.). However, Panel D., indicates that the CARs following positive shocks in B shares traded in Shenzhen are significantly larger for stocks that went down significantly in the pre-shock period (Decile 1), suggesting that the shock has acted as a reverting mechanism. The results are also interesting for the negative shocks. Panel E indicates that the CARs following negative shocks in A shares traded in Shanghai carry on decreasing after the negative shocks for companies that had the largest decrease in prices in the pre-shock period (Decile 1), but they also decrease for companies that had the biggest increase in prices (Decile 10). Similar results are observed for A shares traded in Shenzhen (Panel F). In contrast, for the B shares, Panel G and Panel H indicate strong reversal. Companies that did badly in the past (Decile 1) revert into positive returns after the negative shocks, while those that did very well (Decile 10) appear to do badly in the post-event period. For example, in Shanghai, the CAR10 of B shares following negative shock amount to

0.0989 for companies that did badly in the pre-shock period, compared to -0.0702 for companies that did very well (p = 0.00). Similarly, in Shenzhen, CAR10 or companies that did badly amount to 0.0944 compared to -0.0749 for companies that did very well in the pre-shock period (p = 0.00).

[Insert table 6 here]

4.4. Regression results

Table 7 reports the results of the regression estimates that analyse the determinants of the post-shock cumulative abnormal returns. We estimate twelve regression equations one each for CAR1, CAR5 and CAR5 and using different sub-samples for A and B shares and for negative and positive jumps using OLS estimators.[10] The explanatory variables include size of the jump, *JUMP*, the trading volume, *VOLUME*, the size of the company as measured by the log of market value of equity, *SIZE*, the exchange in which the stock is listed, *EXCHANGE*, the trend in share prices in the pre-shock period, *TREND*, and a dummy variable equals to 1 if the shock is in the post-February 2001 period, *B*.

Panel A reports the results for the CARs following positive shocks in A shares. The results indicate that CAR1 are positively related to the level of the jump, volume and they are higher in the post-2001 period, as *B* is positive and significant. However, CAR5 and CAR10 are not fully explained by these variables. In particular, while CAR10 following positive shocks in A shares are positively related to the level of the jump, they are negatively related to the volume, size, exchange, trend and the post-2001 period dummy. Similarly, Panel C. reports the regression results for the A shares following negative shocks. The determinants of CAR1 appear to be different from those of CAR5 and CAR10. In particular, CAR10 are negatively related to jump, volume,

trend and post-2001 dummy. These results confirm the relative randomness of stock returns in the post-shock period observed in A shares that are held by local investors.[11]

The results are relatively more consistent for B shares. All the CARs following positive shocks positively related to jumps and negatively related to the remaining explanatory variables. The results indicate that, following positive shocks (Panel B.), share prices in B shares increase the higher the shock, but they decrease the higher the volume and size. They are also lower in Shanghai market and in the post-2001 period. Finally, they decrease with the increase in stock prices in the pre-shock period. Similarly, Panel D. indicates that CARs decrease with the size of the shock, volume, size and past trend. They are also lower in the Shanghai market and in the post-2001 period. Overall, these results confirm the findings reported above and confirm that the post-shock behaviour of B shares is relatively more monotonic than that of the A shares but that following the 2001 regulation in the trading of domestic investors, the optimism level in the B shares decreased significantly.

[Insert table 7 here]

Conclusions

In this study, we investigate the three well documented biases, overreaction, trend-following and optimism in a coherent framework using large price shocks in the Chinese A and B shares. We find significant differences across the two types of stocks. In particular, we show that the behaviour of A shares after positive and negative shocks is relatively random. In contrast, that of B shares, owned primarily by foreign investors, exhibit significant momentum following positive and negative shocks. We test for the robustness of our results using other measures of frictions including the volume of trade and market capitalisation that indicate liquidity. For shares with higher volume of trade optimism is reduced as expected. However, the optimism is more pronounced for large

shares traded by foreigners in Shenzhen. This is contrary to the expectations of the EMH that abnormal returns would be arbitraged away sooner if there is less friction, such as liquidity in this case. Therefore we conclude that the optimism we observe might be due to human behaviour, i.e. the optimism in foreign investors about the new technology companies traded in Shenzhen in this case. We also document that the 2001 regulatory change which allowed domestic investors to trade in B shares has reduced significantly the post-shocks abnormal returns. Finally, we document that, while for A shares the relationship between the post-shock abnormal returns and the explanatory variables is not constant across the various cumulative abnormal returns, for B shares all the post-shock abnormal returns are consistently related to the size of the jump, the trading volume, the size of the company, and the pre-shock trend in returns.

REFERENCES

Allen F., Qian J. and Qian M., 2004, "Law, Finance, and Economic Growth in China," Journal of Financial Economics (forthcoming).

Asness, C., 1997, The interaction of value and momentum strategies. Financial Analysts Journal 53, 29-36.

Atkins, A. B. and E. Dyl, 1990, Price reversals, bid-ask spreads, and market efficiency. Journal of Financial and Quantitative Analysis 25, 535-547.

Ball, R. and S. P. Kothari, 1989, Nonstationary expected returns: implications for tests of market efficiency and serial correlations in returns. Journal of Financial Economics 25, 51-74.

Ball, R., S. P. Kothari and J. Shanken, 1995, Problems in measuring portfolio performance: an application to contrarian investment strategies. Journal of Financial Economics 38, 79-107.

Bekaert, G. and C. R. Harvey, 1995, Time-varying world market integration. Journal of Finance 50, 403-444.

Boehmer, E., J. Musumeci and A.B. Poulsen, 1991, Event-study methodology under conditions of event-induced variance. Journal of Financial Economics 30, 253-272.

Bowman, R. G. and D. Iverson, 1998, Short-run overreaction in the New Zealand stock market. Pacific-Basin Finance Journal 6, 475-491.

Bremer, M. A. and R. J. Sweeney, 1991, The reversal of large stock-price decreases. Journal of Finance 46, 747-754.

Brown, K. C., W. V. Harlow and S. M. Tinic, 1988. Risk aversion, uncertain information, and market efficiency. Journal of Financial Economics 22, 355-386.

Brown, K. C. and W. V. Harlow, 1988, Market overreaction: magnitude and intensity. Journal of Portfolio Management 14, 6-13.

Brown, S. J. and J. B. Warner, 1980, Measuring security price information. Journal of Financial Economics 8, 205-258.

Campbell, K. and R. J. Limmack, 1997, Long-term overreaction in the UK stock market and size adjustment. Applied Financial Economics 7, 537-548.

Chan, K. C., 1988, On The contrarian investment strategy. Journal of Business 61, 147-164.

Chan, K. C. and N. F. Chen, 1991, Structural and return characteristics of small and large firms. Journal of Finance 46, 1467-1484.

Chopra, N, J. Lakonishok and J. R. Ritter, 1992, Measuring abnormal performance: do stocks overreact? Journal of Financial Economics 31, 235-268.

Chui, A., S. Titman and K.C.J. Wei, 2000, Momentum, ownership structure and financial crises: An analysis of Asian stock markets. Mimeo, University of Texas.

Clare, A. and S. Thomas, 1995, The overreaction hypothesis and the UK stockmarket. Journal of Business Finance and Accounting 22, 961-973.

Conrad, J. and G. Kaul, 1998, An anatomy of trading strategies. Review of Financial Studies 11, 489-519.

Cox, D. R. and D. R. Peterson, 1994, Stock returns following large one-day declines: Evidence on short-term reversals and longer-term performance. Journal of Finance 49, 255-267.

DaCosta, N.C.A. Jr., 1994, Overreaction in the Brazilian stock market. Journal of Banking and Finance 18, 633-642.

DeBondt, W. F. M. and R. H. Thaler, 1985, Does the stock market overreact? Journal of Finance 40, 793-805.

DeBondt, W. F. M. and R. H. Thaler, 1987, Further evidence on investors overreaction and stock market seasonality. Journal of Finance 42, 557-581.

De Bond, W.F.M., 1993, "Betting on trends: intutive forecasts of financial risk and eturn", International Journal of Forecasting, 9, 355-371.

Dissanaike, G., 1997, Do stock market investors overreact? Journal of Business Finance and Accounting 24, 27-49.

Fama, E. F., 1998, Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics 49, 283-306.

Fama, E. F. and K. R. French, 1988, Permanent and temporary components of stock prices. Journal of Political Economy 96, 246-273.

Fama, E. F. and K. R. French, 1996, Multifactor explanation of asset pricing anomalies. Journal of Finance 51, 55-84.

Grundy, B.D. and J.S. Martin, 2001, Understanding the nature of the risk and the source of the rewards to momentum investing. Review of Financial Studies 14, 29-78.

Hong, H, T. Lim and J.C. Stein, 2000, Bad news travels slowly: Size, analyst coverage and the profitability of momentum strategies. Journal of Finance, 55, 265-295.

Howe, J. S., 1986, Evidence on stock market overreaction. Financial Analysts Journal 42, 74-77.

Jegadeesh, N. and S. Titman, 1993, Returns to buying winners and selling losers: implications for stock market efficiency. Journal of Finance 48, 65-92.

Kahneman, D. and M.W. Reipe, "Aspects of Investor Psychology", The Journal of Portfolio Management, **3** (1998), 52-65.

Khandani, A.E. and A.W. Lo, 2007, What happened to the quants in August 2007?, NBER working paper

Kraft, A., 1999, Accounting-based and market-based trading rules. Working paper, University of Chicago.

Lakonishok, J., A. Shleifer and R. W. Vishny, 1994, Contrarian investment, extrapolation, and risk. Journal of Finance 49, 1541-1578.

Lasfer, M.A., A. Melnik and D. Thomas, 2003, Short-term Reaction of Stock Markets in Stressful circumstances. Journal of Banking and Finance, 27, 1959-1977

Lehman, B.N., 1990, Fads, martingales, and market efficiency. Quarterly Journal of Economics 105, 1-28.

Lee, C.M.C. and B. Swaminathan, 2000, Price momentum and trading volume. Journal of Finance 55, 2017-2069.

Liang, Y. and D.J. Mullineaux, 1994, Overreaction and reverse anticipation: two related puzzles? Journal of Financial Research 17, 31-43.

Liu, W., N. Strong and X. Xu, 1999, The profitability of momentum investing. Journal of Business Finance and Accounting 26, 1043-1091.

Lawrance M. and M. O'Connor, 1992, "Exploring Judgemental Forecasting", International Journal of Forecasting, 8, 15-26.

Mei, J.P., J.A. Scheinkman, and X. Wei, 2005, Speculative trading and stock prices: evidence from Chinese A-B share premia, AFA 2005 Philadelphia Meetings. http://ssrn.com/abstract=498024

Mitchell, M.L., T. Pulvino and E.Stafford, 2002, Limited arbitrage and equity markets, Journal of Finance, 58, 113-1138.

Moskowitz, T. J. and M. Grinblatt, 1999, Do industries explain momentum? Journal of Finance 54, 1249-1290.

Muradoglu, G., 2002, Portfolio managers' forecasts of risk and return: Are there predictable forecast errors?, Journal of Forecasting, 21, 396-

Ng, L. and F. Wu, 2007, The trading behavior of institutions and individuals in Chinese equity markets, University of Wisconsin-Milwaukee, working paper.

Ohlsen, R.A., 1998, "Behavioral Finance and its implications for stock price volatility", Financial Analysts Journal, 2, 10-18.

Park, J., 1995, A market microstructure explanation for predictable variations in stock returns following large price changes. Journal of Financial and Quantitative Analysis 30, 241-256.

Patel, S. A. and A. Sarkar, 1998, Crises in developed and emerging stock markets. Financial Analysts Journal 54, 50-61.

Richards, A, 1995, Comovements in national stock market returns: evidence of predictability, but not cointegration. Journal of Monetary Economics 36, 631-654.

Richards, A, 1997, Winner-loser reversals in national stock market indices: can they be explained? Journal of Finance 52, 2129-2144.

Rouwenhorst, K. G., 1998, International momentum strategies. Journal of Finance 53, 267-284.

Schnusenberg, O. and J. Madura, 2001, Global and relative over- and underreaction in international stock market indexes. Mimeo, St Joseph's University, Philadelphia.

Schwert, G.W., 2003, Anomalies and market efficiency, in G.M. Constantinides, M. Harris and R. Stulz eds. Handbook of the Economics of Finance, Elsevier.

Tenev, S., C. Zhang, and L.Brefort, 2002, Corporate governance and enterprise reform in China, The World Bank and the International Finance Corporation.

Zarowin, P., 1990, Size, seasonality, and stock market overreaction. Journal of Financial and Quantitative Analysis 25, 113-126.

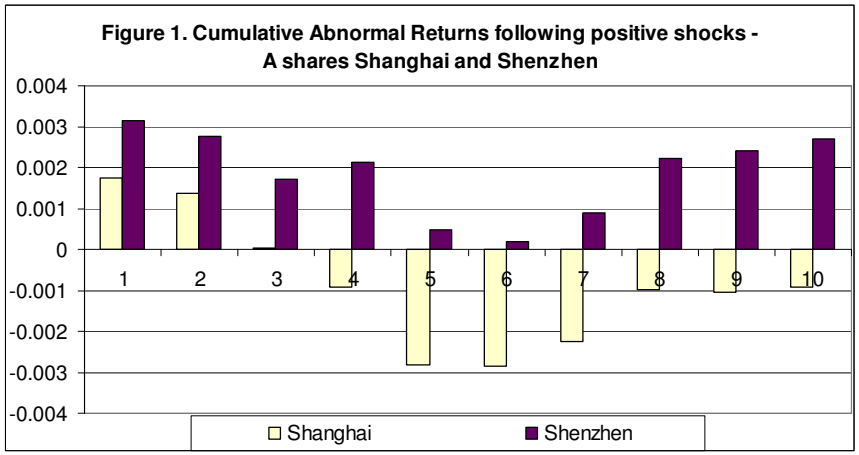
Figure 1. Cumulative Abnormal Returns following positive shocks - A shares Shanghai and Shenzhen
0.004
0.003
0.002
0.001
0
-0.001
-0.002
-0.003
-0.004
1
2
3
4
5
6
7
8
9
10
Shanghai
Shenzhen

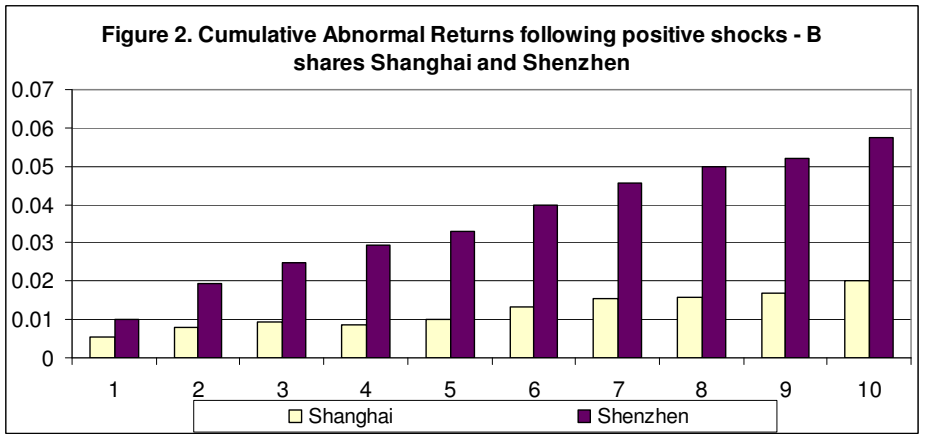
Figure 2. Cumulative Abnormal Returns following positive shocks - B shares Shanghai and Shenzhen
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1
2
3
4
5
6
7
8
9
10
Shanghai
Shenzhen

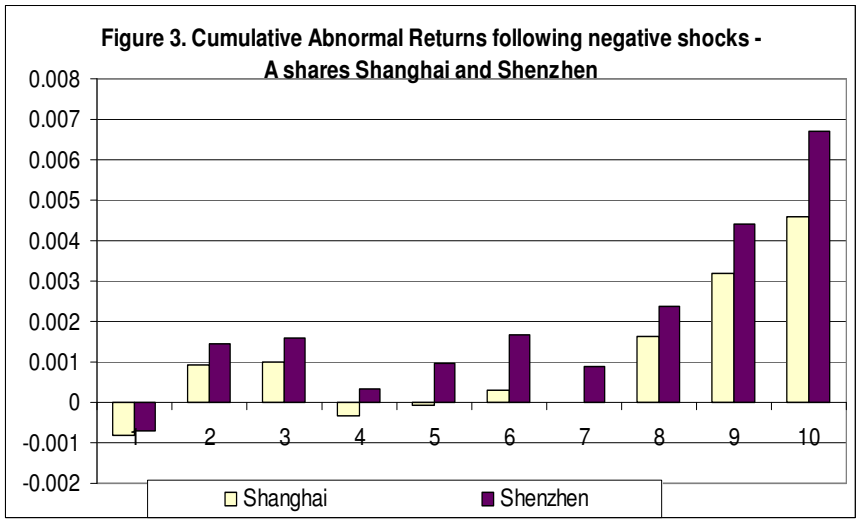
Figure 3. Cumulative Abnormal Returns following negative shocks - A shares Shanghai and Shenzhen
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
-0.001
-0.002
1
2
3
4
5
6
7
8
9
10
Shanghai
Shenzhen

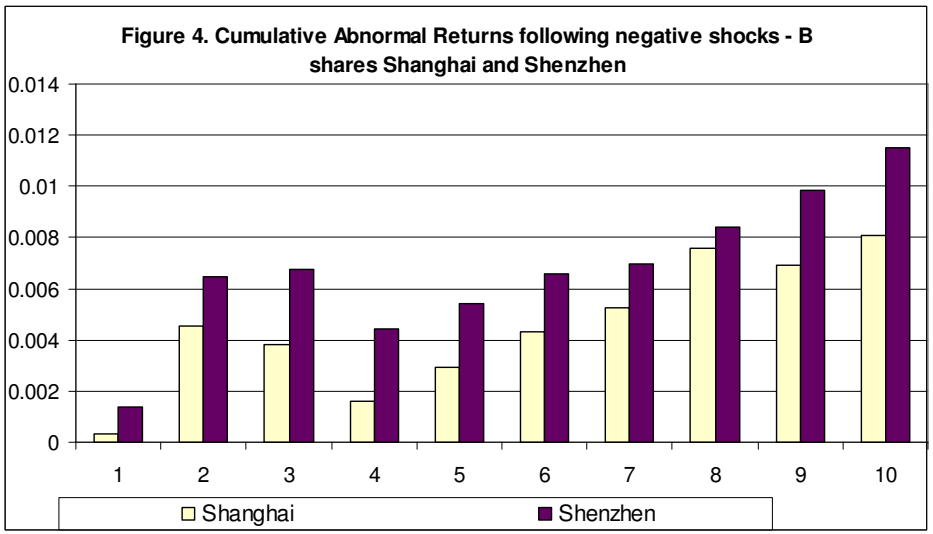
Figure 4. Cumulative Abnormal Returns following negative shocks - B shares Shanghai and Shenzhen
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
1
2
3
4
5
6
7
8
9
10
Shanghai
Shenzhen

Table 1. Descriptive Statistics of the shocks

The table presents the mean, maximum and minimum price shocks for the A and B shares traded in Shanghai and Shenzhen markets. To define the shock, we first compute for each stock the daily returns and then compare each of these returns to the average return in the previous 60 days. If the difference in these returns is higher than two standard deviations, we consider that return as a shock.

	Positive shocks				Negative shocks			
	N	mean	max	min	N	mean	max	min
				Panel A. Full sample				
All	58,195	0.0600	0.1099	0.0100	58,532	-0.0619	-0.0000	-3.7976
				Panel B. A shares				
All	49,525	0.0582	0.1099	0.0100	49,968	-0.0536	-0.1099	-0.0100
Shanghai	27,732	0.0579	0.1098	0.0100	27,770	-0.0529	-0.0100	-0.1099
Shenzhen	21,793	0.0585	0.1099	0.0100	22,198	-0.0545	-0.0100	-0.1099
				Panel C. B shares				
All	8,670	0.070 [a]	0.1099	0.0109	8,564	-0.0667 [b]	-0.1098	-0.0101
Shanghai	4,513	0.069 [a]	0.1099	0.0109	4,598	-0.066 [b]	-0.0101	-0.1099
Shenzhen	4,157	0.071 [a]	0.1099	0.0109	3,966	-0.067 [b]	-0.0104	-0.1098

Table 2. Cumulative Abnormal Returns Following Price Shocks.
The table reports the cumulative abnormal returns (CARs) 1, 5 and 10 days after price shock defined as an increase or a decrease in daily returns above two standard deviations of the returns 60 days before the event. * significantly different from zero at 1%, [a] Shanghai different from Shenzhen at 1%, [b] A shares different from B shares at 1%.

	CAR1	CAR5	CAR10	CAR1	CAR5	CAR10
	Panel A. Positive shocks			Panel B. Negative shocks		
All	0.0031*	0.0019*	0.0062*	-0.0005*	0.0009*	0.0061*
	Panel C. Positive shocks A shares			Panel D. Negative shocks A shares		
All	0.0024*	-0.0014*	0.0007	-0.0008*	0.0004	0.0056*
Shanghai	0.0017*[ab]	-0.0028*[ab]	-0.0009[ab]	-0.0008*[b]	-0.0000[b]	0.0046*[b]
Shenzhen	0.0032*[ab]	0.0005[ab]	0.0027*[ab]	-0.0007*[b]	0.0010[b]	0.0067*[b]
	Panel E. Positive shocks B shares			Panel F. Negative shocks B shares		
All	0.0076*	0.0208*	0.0376*	0.0008	0.0039*	0.0095*
Shanghai	0.0055*[ab]	0.0101*[ab]	0.0200*[ab]	0.0003[b]	0.0030*[b]	0.0081*[b]
Shenzhen	0.0099*[ab]	0.0329*[ab]	0.0573*[ab]	0.0014*[b]	0.0054*[b]	0.0115*[b]

Table 3. Distribution of CARs before and after the regulatory change in 2001

The table reports the distribution of the various CARs across two trading regimes, the pre-February 2001 when B shares can be traded only by foreign investors and post-March 2001 when domestic investors are allowed to trade in B shares. The cumulative abnormal returns CAR1, CAR5 and CAR10 are the abnormal returns 1, 5 and 10 days after the price shock defined as an increase or a decrease in daily returns above two standard deviations of the returns 60 days before the event. [a] if the average CARs before 2001 are different from the average CARs after 2001. [*] significantly different from zero at 0.01 level.

	Before 2001	After 2001	Before 2001	After 2001
	Panel A. Positive shocks A Shares Shanghai		Panel B. Positive shocks A Shares Shenzhen	
N	10736	16996	8666	13127
Average	0.067*[a]	0.052*	0.067*[a]	0.053*
CAR1	-0.0008 [a]	0.0023*	0.0025[a]*	0.0036*
CAR5	-0.0047*[a]	-0.002*	-0.0008	0.0013*
CAR10	-0.0027*[a]	-0.0002	0.0008 [a]	0.0040*
	Panel C. Positive shocks B Shares Shanghai		Panel D. Positive shocks B Shares Shenzhen	
N	2765	1748	2153	1974
Average	0.076*[a]	0.060*	0.078*[a]	0.0644*
CAR1	0.0022[a]*	0.0107*	0.0072 [a]*	0.0130*
CAR5	0.0103*	0.0097*	0.0260 [a]*	0.041*
CAR10	0.0150*[a]	0.0280*	0.0343 [a]*	0.0409*
	Panel E. Negative shocks A Shares Shanghai		Panel F. Negative shocks A Shares Shenzhen	
N	7419	20351	6169	16029
Average	-0.0660*[a]	-0.0489*	-0.0667*[a]	-0.0498*
CAR1	-0.0006	-0.0009*	-0.0006	-0.0008*
CAR5	-0.0054 [a]*	0.0018*	-0.0043 [a]*	-0.0030*
CAR10	0.0020 [a]	0.0056*	0.0054*	0.0072*
	Panel G. Negative shocks B Shares Shanghai		Panel H. Negative shocks B Shares Shenzhen	
N	2666	1932	1989	1936
Average	-0.0763*[a]	-0.0531*	-0.077*[a]	-0.056*
CAR1	0.0030 [a]*	-0.0033*	0.0038 [a]*	-0.0015**
CAR5	0.0096 [a]*	-0.0062*	0.0116 [a]*	-0.0013
CAR10	0.0144 [a]*	-0.0006	0.0221 [a]*	0.0016

Table 4. Distribution of CARs by Volume of Trade

The table reports the CARs 1, 5, and 10 days after price shock classified into volume deciles D1 (low), D5, and D10 (high) respectively. * significantly different from zero at 1%, [a] denotes CAR in D1 are statistically different from CAR in D5 at 1%, [b] denotes CAR in D5 are different from CAR in D10 at 1% level.

	D1	D5	D10	D1	D5	D10
	Panel A. Positive shocks A Shares Shanghai			Panel B. Positive shocks A Shares Shenzhen		
N	2305	2304	2305	1869	1870	1869
CAR1	0.0053[a*]	0.0023[*]	0.0004	0.0061[a*]	0.0037*	0.0011
CAR5	0.0051[a*]	-0.0011[b]	-0.0106[*]	0.0051[*]	0.0044*	-0.0090*
CAR10	0.0107[a*]	0.0037[***b]	-0.0128[*]	0.0095[*]	0.0082*	-0.0138*
	Panel C. Positive shocks B shares Shanghai			Panel D. Positive shocks B shares Shenzhen		
N	376	376	377	361	361	360
CAR1	0.0099[*]	0.0051[*]	0.0038	0.0140[*]	0.0112[*]	0.0106[*]
CAR5	0.0309[a*]	0.0099[*]	0.0038	0.0596[a*]	0.0265[*]	0.0395[*]
CAR10	0.0582[a*]	0.0216[*]	0.0057	0.1083[a*]	0.0549[*]	0.0433[*]
	Panel E. Negative shocks A Shares Shanghai			Panel F. Negative shocks A Shares Shenzhen		
N	2737	2737	2737	2196	2195	2196
CAR1	-0.0033[a**]	-0.0015[b*]	0.0013[***]	-0.0037[a*]	-0.0006	0.0004
CAR5	-0.0046[a**]	0.0019[b]	-0.0055[*]	-0.0070[a*]	0.0028[***b]	-0.0058[*]
CAR10	-0.0020[a]	0.0093[b*]	-0.0104[*]	-0.0016[a]	0.0105[b*]	-0.0113[*]
	Panel G. Negative shocks B Shares Shanghai			Panel H. Negative shocks B Shares Shenzhen		
N	404	404	403	358	358	358
CAR1	0.0039[**]	0.0016	0.0002	0.0016	0.0015	0.0075[*]
CAR5	0.0075[**]	0.0017	0.0036	0.0032	0.0094[**]	0.0206[*]
CAR10	0.0104	0.0062	0.0091	0.0151[*]	0.0150[b**]	0.0492[*]

Table 5. Distribution of CARs by Market Capitalisation

The table reports the CARs 1,5, and 10 days after price shock classified into market capitalsation deciles 1(low) , 5, 10 (high) respectively. * significantly different from zero at 1%, [a] denotes CAR in deciles 1 different from CAR in deciles 5 at 1%, [b] denotes CAR in decile 5 different from CAR in decile 10 at 1%.

	Decile 1	Decile 5	Decile 10	Decile 1	Decile 5	Decile 10
	Panel A. Positive shocks A share Shanghai			Panel B. Positive shocks A share Shenzhen		
N	2305	2304	2305	1869	1870	1869
CAR1	0.0043[a*]	0.0022 *	0.0004	0.0058[a*]	0.0031 [b*]	0.0007
CAR5	0.0071[a*]	-0.0040 [b*]	-0.0133 *	0.0109 [a*]	0.0028 [b]	-0.0092*
CAR10	0.0162[a*]	-0.0003 [b]	-0.0150*	0.0199 [a*]	0.0079 [b*]	-0.0109*
	Panel C. Positive shocks B share Shanghai			Panel D. Positive shocks B share Shenzhen		
N	376	376	377	361	361	360
CAR1	0.0103 *	0.0078 *	0.0018	0.0199 [a*]	0.0108 [b*]	0.0024
CAR5	0.0313 [a*]	0.0110 [b*]	-0.0124*	0.0711 [a*]	0.0389 [b*]	0.0071
CAR10	0.0579 [a*]	0.0176 [b*]	-0.0217*	0.1280 [a]	0.0596 [b]	0.0035
	Panel E. Negative shocks A share Shanghai			Panel F. Negative shocks A share Shenzhen		
N	107	2595	2595	4176	1690	1689
CAR1	0.0056	0.0012 [b]	-0.0028*	-0.001	0.001	0.001
CAR5	0.0636 [a*]	0.0024 [b]	-0.0037*	0.0058 [a*]	0.0007	0.0004
CAR10	0.1257 [a*]	0.0094 [b*]	-0.0125*	0.0036 [a*]	0.0102 [b*]	0.0003
	Panel G. Negative shocks B share Shanghai			Panel H. Negative shocks B shares Shenzhen		
N	430	430	430	366	365	365
CAR1	0.0063 *	0.0061 [b*]	-0.0052*	0.0031	0.0015	-0.0048
CAR5	0.0191 *	0.0102 [b*]	-0.0090*	0.0101	0.0107 *	-0.0150 *
CAR10	0.0328 *	0.0225 [b*]	-0.0153*	0.0291 *	0.0134	-0.0119

Table 6. Distribution of CARs by Trend

The table reports the CARs 1,5, and 10 days after price shock classified into trend deciles described as the price change in price over the sixty days before the shock from Decile 1(downward) , 5, 10 (upward) respectively. * significantly different from zero at 1%, [a] denotes CAR in deciles 1 different from CAR in deciles 5 at 1%, [b] denotes CAR in decile 5 different from CAR in decile 10 at 1%.

	Decile 1	Decile 5	Decile 10	Decile 1	Decile 5	Decile 10
	Panel A. Positive shocks A share Shanghai			Panel B. Positive shocks A share Shenzhen		
N	2732	2732	2732	2165	2165	2165
CAR1	-0.0004[a]	0.0030[b*]	-0.0003	0.0021[a**]	0.0051[b*]	0.0015**
CAR5	-0.0101*	-0.0063*	-0.0088*	-0.0007	-0.0008	-0.0007
CAR10	-0.0202[a*]	-0.008[b*]	-0.0177*	-0.0058	0.0004[b]	-0.0077*
	Panel C. Positive shocks B share Shanghai			Panel D. Positive shocks B share Shenzhen		
N	452	451	452	413	413	412
CAR1	-0.0015[a]	0.0066*	0.0034*	0.0134[a*]	-0.0024	0.0006
CAR5	0.0018[a]	0.0256[b*]	0.0098*	0.0575[a*]	0.0075	0.0041
CAR10	0.0028	0.0461[b*]	0.0127*	0.0572[a*]	0.0064	0.0025
	Panel E. Negative shocks A share Shanghai			Panel F. Negative shocks A share Shenzhen		
N	2739	2740	2739	2206	2206	2206
CAR1	-0.0007[a]	0.0046[b*]	-0.0045*	0.0093[a*]	-0.001[b]	-0.0052*
CAR5	-0.0156[a*]	0.0149[b*]	-0.0103*	0.0421[a*]	0.0055[b*]	-0.0350*
CAR10	-0.0054[a]	0.0296[b*]	-0.0246*	0.0798[a*]	0.0119[b*]	-0.0634*
	Panel G. Negative shocks B share Shanghai			Panel H. Negative shocks B share Shenzhen		
N	460	459	459	393	393	393
CAR1	0.0039	0.0028[b]	-0.0090*	0.0051[a**]	-0.0011	-0.0053**
CAR5	0.0465[a*]	0.0065[b]	-0.0405*	0.0458[a*]	0.0105[b**]	-0.0418*
CAR10	0.0989[a*]	0.0039[b]	-0.0702*	0.0944[a*]	0.0167[b**]	-0.0749*

Table 7: The determinants of the short-term stock price behaviour following stock market stress

The table reports the regressions of CARs against a set of explanatory variables. JUMP is the "shock" measured as percentage change in price on event day, VOLUME represents the volume of trade on event day. SIZE is measured as the log of market capitalization. We use two dummy variables. EXCHANCE takes the value 1 if the share is traded in Shanghai and zero if traded in Shenzhen. TREND represents the price performance of the share before the shock and is measured as the percentage price change over the past sixty days before the jump. B takes the value 1 if the time period is after 2001 and regulation has changed to permit local Chinese people to trade B shares, and zero otherwise. (*) indicates significance at the 5% level and (**) at 1%.

	CAR1	CAR5	CAR10	CAR1	CAR5	CAR10
	Panel A - Positive Shocks - A Shares			**Panel B- Positive Shocks - B shares**		
Constant	-0.0072*	0.0434**	0.0218*	0.0141	0.2375**	0.3553**
JUMP	0.1540**	0.1129**	0.2034**	0.3353**	0.7877**	1.5541**
VOLUME	0.0000**	0.0000**	-0.0000**	-0.0000**	-0.0000*	-0.0000
SIZE	0.0001	-0.0024**	-0.0012*	-0.0002*	-0.0160**	-0.0259**
EXCHANGE	-0.0012*	-0.0029**	-0.0029**	-0.0022*	-0.0190**	-0.0277**
TREND	-0.0192*	-0.1095**	-0.2228**	-0.0151**	-0.0486**	-0.1351**
B	0.0009*	-0.0080**	-0.0197**	-0.0152**	-0.0315**	-0.0756**
R^2	0.02	0.06	0.14	0.04	0.06	0.12
	Panel C: Negative Shocks - A shares			**Panel D: Negative Shocks - B shares**		
Constant	-0.0037	0.0018	-0.0100	0.0349**	0.0408*	0.0625*
JUMP	0.0293**	-0.1158**	-0.4090**	0.0092	-0.1586**	-0.4989**
VOLUME	0.0000*	0.0000*	-0.0000**	0.0000**	-0.0000**	-0.0000**
SIZE	0.0003	-0.0002	0.0003	-0.0018**	-0.0026*	-0.0052**
EXCHANGE	-0.0001	-0.0005	-0.0011	-0.0015	-0.0030	-0.0036
TREND	-0.0296**	-0.1446**	-0.2700**	-0.0101**	-0.1123**	-0.2154**
B	-0.0045**	-0.0114**	-0.0262**	-0.0060**	-0.0156**	-0.0150**
R^2	0.02	0.09	0.16	0.02	0.09	0.16

Appendix A. Annual distribution of CARs

The table reports the annual distribution of the various CARs after price shock defined as an increase or a decrease in daily returns above two standard deviations of the returns 60 days before the event. * if average CAR before 2001 is different from average CAR after 2001.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Panel A. Positive shocks A Shares Shanghai													
N	0	19	39	248	914	1083	1749	2643	4041	3812	4312	5537	3335
Average	0.0000	0.0759	0.0671	0.0652	0.0744	0.0780	0.0635	0.0645	0.0659	0.0521	0.0560	0.0460	0.0577
CAR1	0.0000	-0.0008	0.0153*	-0.0156	0.0001	-0.0007	0.0007	0.0042*	0.0000	0.0028*	0.0050*	0.0006	0.0013**
CAR5	0.0000	-0.0162	0.0546**	-0.0476*	-0.0063	-0.0199*	-0.0027	0.0089*	-0.0079*	-0.0060*	0.0009	-0.0004	-0.002
CAR10	0.0000	-0.0124	0.1241*	-0.0345*	-0.0340*	-0.0347	-0.0023	0.0179*	0.0001	-0.0083*	0.0090*	0.0031*	-0.006*
Panel B. Positive shocks A Shares Shenzhen													
N	0	3	17	113	539	699	1261	2091	3943	3110	3742	3906	2369
Average	0.0000	0.0751	0.0765	0.0587	0.0711	0.0805	0.0658	0.0632	0.0667	0.0512	0.0593	0.0453	0.057
CAR1	0.0000	-0.0095	-0.0156	-0.0054	0.0011	0.0009	0.0024**	0.0041*	0.0024*	0.0038*	0.0071*	0.0007	0.0026*
CAR5	0.0000	-0.1694	0.0297	-0.0351*	0.0078	-0.0181*	0.0006	0.0050*	-0.0018	-0.0050*	0.0085*	-0.0014	0.0028
CAR10	0.0000	-0.1694	0.0455	-0.0352*	0.0140**	-0.0476*	-0.0016	0.0104*	0.0041*	-0.0072*	0.0197*	0.0010	-0.001
Panel C. Positive shocks B Shares Shanghai													
N	5	71	140	230	395	337	380	522	685	523	396	451	378
Average	0.0734	0.0738	0.0637	0.0594	0.0654	0.0764	0.0845	0.0827	0.0793	0.0860	0.0489	0.0466	0.052
CAR1	0.0346	0.0103	-0.0038	-0.0061*	0.0113	0.0020	-0.0032	0.0073*	-0.0008	0.0278*	0.0065*	-0.0009	0.005*
CAR5	0.0965	0.0100	-0.0040	-0.0059	0.0248*	-0.0021	-0.0096	0.0403*	0.0037	0.0453*	-0.0239*	-0.0066*	0.015*
CAR10	0.1277	0.0103	-0.0011	-0.0048	0.0264*	-0.0234	0.0161	0.0678*	-0.0039	0.0940*	-0.0128*	-0.0066*	0.021*
Panel D. Positive shocks B Shares Shenzhen													
N	0	24	59	120	316	274	348	532	499	637	449	577	322
Average	0.0000	0.0681	0.0611	0.0552	0.0679	0.0780	0.0835	0.0863	0.0808	0.0828	0.0607	0.0512	0.057
CAR1	0.0000	0.0147	-0.0036	-0.0055	0.0165*	0.0110*	0.0041	0.0140*	-0.0019	0.0307*	0.0136*	-0.0021	0.003
CAR5	0.0000	-0.0205	-0.0110	-0.0029	0.0614*	-0.0080	-0.0051	0.0723*	0.0074	0.1272*	-0.0057	-0.0036	0.013*
CAR10	0.0000	-0.0283	-0.0258	-0.0035*	0.0537*	-0.0233*	0.0132	0.1096*	0.0063	0.2348*	0.0280*	-0.0060	0.016*

Appendix A. Cont.

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Panel E. Negative shocks A Shares Shanghai													
N	0	8	54	242	914	1076	1075	1718	2331	4464	6034	6072	3781
Average	0	-0.054	-0.071	-0.059	-0.079	-0.084	-0.064	-0.061	-0.058	-0.050	-0.047	-0.044	-0.055
CAR1	0	-0.001	0.001	0.007*	-0.013*	0.005*	0.002*	0.003***	-0.003*	0.003*	0.000	-0.003*	-0.003*
CAR5	0	-0.027	0.126*	0.006	-0.051*	-0.017*	0.010*	0.003	0.001	0.008*	0.005*	-0.004*	-0.001
CAR10	0	-0.063	0.242*	0.012*	-0.033*	-0.023*	0.015*	0.013*	0.007*	0.017*	0.018*	-0.006*	-0.009*
Panel F. Negative shocks A Shares Shenzhen													
N	0	4	19	118	527	908	917	1502	2174	4091	4942	4305	2691
Average	0	-0.053	-0.076	-0.052	-0.083	-0.089	-0.065	-0.061	-0.059	-0.050	-0.051	-0.045	-0.055
CAR1	0	-0.021	0.030	-0.003	-0.017*	0.003	-0.001	0.006*	-0.002*	0.002*	0.000	-0.004*	-0.002*
CAR5*	0	-0.090	0.103*	-0.005	-0.063*	-0.017*	0.007**	0.006*	0.003***	0.008*	0.008*	-0.006*	0.000
CAR10	0	-0.117*	0.186	-0.007	-0.056*	-0.010	0.014*	0.023*	0.010*	0.016*	0.025*	-0.008*	-0.014*
Panel G. Negative shocks B Shares Shanghai													
N	4	85	180	234	373	423	504	437	426	327	707	453	445
Average	-0.056	-0.070	-0.067	-0.063	-0.064	-0.081	-0.084	-0.085	-0.076	-0.079	-0.046	-0.044	-0.054
CAR1*	-0.008	0.001	0.007**	0.004	-0.006*	0.006*	0.002	0.006**	0.004	0.004	-0.004*	-0.006*	-0.005*
CAR5*	0.037	0.004	0.010***	0.007	0.007	0.010**	0.018*	0.014**	-0.001	0.000	-0.007*	-0.013*	-0.002
CAR10*	0.148	-0.005	0.005	0.004	0.023*	0.004	0.030*	0.035*	-0.010*	0.013	-0.006	-0.016*	0.015*
Panel H. Negative shocks B Shares Shenzhen													
N	0	16	119	136	189	355	496	361	317	393	694	431	418
Average	0	-0.047	-0.060	-0.054	-0.068	-0.083	-0.085	-0.086	-0.073	-0.077	-0.053	-0.045	-0.056
CAR1*	0	0.001	0.001	0.001	0.000	0.013*	-0.002	0.009*	0.002	0.004**	-0.005*	-0.001	-0.001
CAR5*	0	0.002	-0.008	-0.016**	0.021	0.017*	0.005	0.030*	0.010**	0.017*	-0.012*	0.004	-0.005
CAR10*	0	-0.006	-0.023**	-0.023**	0.073*	0.018*	0.011	0.055*	0.014**	0.032*	-0.014*	-0.006	0.006

Appendix B. Monthly distribution of CARs

The table reports the monthly distribution of the various CARs after price shock defined as an increase or a decrease in daily returns above two standard deviations of the returns 60 days before the event. * if January returns are significantly different for other months.

	January	February	March	April	May	June	July	August	September	October	November	December
Panel A. Positive shocks A Shares Shanghai												
N	3794	2203	2214	2925	2347	2895	1295	1548	1769	2616	2653	1473
Average	0.0605	0.0654	0.0602	0.0555	0.0581	0.0645	0.0575	0.0535	0.0535	0.0585	0.0485	0.0548
CAR1	0.0051*	-0.0028	0.0020	-0.0021	0.0020	0.0039	0.0020	0.0006	-0.0006	0.0031	0.0048	-0.0020
CAR5	0.0142*	-0.0092	0.0023	-0.0208	-0.0054	-0.0045	-0.0057	-0.0050	-0.0037	-0.0075	0.0113	-0.0130
CAR10	0.0371*	0.0009	0.0108	-0.0460	-0.0093	-0.0040	-0.0133	-0.0011	-0.0120	-0.0054	0.0264	-0.0263
Panel B. Positive shocks A Shares Shenzhen												
N	3189	1948	1790	2101	1895	2361	984	1337	1222	1969	1900	1097
Average	0.0612	0.0667	0.0615	0.0537	0.0591	0.0646	0.0567	0.0533	0.0529	0.0605	0.0481	0.0535
CAR1	0.0077*	0.0004	0.0025	-0.0005	0.0015	0.0058	0.0004	0.0019	0.0002	0.0054	0.0036	0.0016
CAR5	0.0249*	-0.0038	0.0054	-0.0125	-0.0032	-0.0030	-0.0155	-0.0063	-0.0033	-0.0024	0.0067	-0.0109
CAR10	0.0503*	0.0050	0.0094	-0.0351	-0.0107	-0.0025	-0.0318	-0.0019	-0.0091	0.0002	0.0154	-0.0118
Panel C. Positive shocks B Shares Shanghai												
N	443	270	678	325	450	484	163	429	238	283	418	332
Average	0.0661	0.0775	0.0772	0.0558	0.0754	0.0705	0.0587	0.0770	0.0631	0.0720	0.0553	0.0732
CAR1	0.0034	0.0189	0.0131	0.0015	0.0022	0.0023	-0.0015	0.0095	-0.0047	-0.0001	-0.0004	0.0123
CAR5	0.0057	0.0367	0.0527	-0.0098	0.0141	-0.0164	-0.0167	-0.0010	-0.0013	-0.0040	-0.0074	0.0291
CAR10	0.0176	0.0844	0.0912	-0.0298	0.0197	-0.0184	-0.0135	0.0092	-0.0216	0.0197	0.0236	-0.0129
Panel D. Positive shocks B Shares Shenzhen												
N	320	292	768	380	365	444	213	256	149	377	384	209
Average	0.0676	0.0753	0.0789	0.0601	0.0737	0.0800	0.0631	0.0744	0.0671	0.0693	0.0631	0.0735
CAR1	0.0004*	0.0168	0.0240	-0.0005	0.0109	0.0122	0.0084	0.0070	0.0115	-0.0038	0.0102	0.0023
CAR5	0.0008*	0.0416	0.1046	-0.0108	0.0504	0.0373	-0.0104	0.0013	0.0146	-0.0022	0.0404	-0.0090
CAR10	0.0299*	0.0940	0.1815	-0.0315	0.0831	0.0493	-0.0179	0.0264	0.0110	0.0153	0.0752	-0.0863

Appendix B – Cont.

	January	February	March	April	May	June	July	August	September	October	November	December
Panel E. Negative shocks A Shares Shanghai												
N	2898	1442	890	3054	2126	2043	2106	1670	2251	3353	3730	2207
Average	-0.0614	-0.0593	-0.0535	-0.0484	-0.0602	-0.0530	-0.0577	-0.0547	-0.0463	-0.0495	-0.0453	-0.0557
CAR1	0.0007*	0.0039	0.0034	-0.0060	0.0048	0.0013	-0.0018	-0.0009	-0.0004	-0.0011	-0.0018	-0.0049
CAR5	0.0228*	0.0198	0.0107	-0.0262	-0.0031	0.0029	-0.0066	0.0103	-0.0033	0.0057	0.0009	-0.0198
CAR10	0.0577*	0.0288	0.0101	-0.0464	-0.0049	-0.0025	-0.0007	0.0123	-0.0098	-0.0040	0.0237	-0.0023
Panel F. Negative shocks A Shares Shenzhen												
N	2580	1399	757	2226	1661	1689	1676	1393	1717	2469	2923	1708
Average	-0.0643	-0.0570	-0.0537	-0.0489	-0.0625	-0.0553	-0.0596	-0.0571	-0.0490	-0.0493	-0.0460	-0.0568
CAR1	-0.0014	0.0020	0.0043	-0.0053	0.0038	0.0052	-0.0006	-0.0029	0.0015	-0.0004	-0.0016	-0.0078
CAR5	0.0203*	0.0135	0.0131	-0.0215	-0.0052	0.0063	-0.0072	0.0083	-0.0007	0.0116	-0.0001	-0.0241
CAR10	0.0632*	0.0220	0.0097	-0.0430	-0.0042	0.0039	-0.0082	0.0110	-0.0053	0.0038	0.0146	-0.0005
Panel G. Negative shocks B Shares Shanghai												
N	507	176	280	363	379	518	347	477	175	407	519	450
Average	-0.0711	-0.0707	-0.0796	-0.0538	-0.0639	-0.0686	-0.0794	-0.0728	-0.0665	-0.0538	-0.0570	-0.0674
CAR1	-0.0030	-0.0011	0.0115	-0.0033	0.0087	-0.0049	-0.0020	-0.0010	0.0121	-0.0031	0.0008	0.0010
CAR5	0.0052	-0.0045	0.0580	-0.0120	0.0088	-0.0135	-0.0434	0.0200	0.0176	-0.0048	0.0124	0.0033
CAR10	0.0299*	0.0133	0.1058	-0.0248	0.0041	0.0044	-0.0914	0.0329	0.0160	-0.0179	0.0221	0.0092
Panel H. Negative shocks B Shares Shenzhen												
N	474	213	255	375	325	289	317	315	234	487	380	261
Average	-0.0748	-0.0632	-0.0720	-0.0566	-0.0657	-0.0741	-0.0789	-0.0747	-0.0714	-0.0524	-0.0583	-0.0738
CAR1	-0.0056*	0.0025	0.0141	-0.0011	0.0115	0.0045	-0.0009	-0.0057	-0.0024	0.0004	0.0055	-0.0034
CAR5	-0.0162*	0.0029	0.0562	-0.0131	0.0164	0.0002	0.0010	0.0012	-0.0038	0.0055	0.0287	-0.0023
CAR10	0.0000	0.0177	0.1193	-0.0385	0.0340	-0.0026	-0.0518	0.0165	0.0285	-0.0009	0.0529	0.0071

[1] For example, Jegadeesh and Titman (2001) and Rouwenhorst (1998) document the profitability of momentum strategies using more recent data and international markets, respectively. Other studies document the momentum profits after including stock specific characteristics. In particular, Lee and Swaminathan (2000) report that momentum profits are larger for stocks with higher past trading volume, Moskowitz and Grinblatt (1999) introduce the industry effects, and Korajkzyk and Sadka (2004) find momentum profits even after accounting for trading costs proxied by the bid-ask spread and price impact. Grundy and Martin (2001) find that momentum cannot be explained by time-varying expected returns.

[2] See Hong, Lim and Stein (2000) for higher momentum observed in small firms and less analyst coverage.

[3] See Kahneman and Reipe (1998) for a review

[4] Studies based on short (daily, weekly or monthly) formation period also provide support for the overreaction hypothesis, but such studies tend to be fragile, both in the definition and measurement of large price changes and in the economic significance of the overreaction. For example, Park (1995) shows that prices are affected by the bid-ask bounce and that apparent price reversal on day +1 disappears when mid-prices are used.

[5] See, for example, Conrad and Kaul (1998), Grundy and Martin (2001), Moskowitz and Grinblatt (1999), Kraft (1999), Asness (1997), Lee and Swaminathan (2000), and Hong, Lim and Stein (2000).

[6] Although these studies based on short-term horizons broadly provide support for the overreaction hypothesis, it is worth noting that their results tend to be fragile, both in the definition and measurement of large price changes and in the economic significance of the overreaction. For example, Park (1995) shows that prices are affected by the bid-ask bounce and that apparent price reversal on day +1 disappears when mid-prices are used.

[7] We repeat the estimations described below for this sample. The conclusions do not change.

[8] See, for example, Bailey, Chung and Kang (1999), Sun and Tong (2000), and Mei, Scheinkman and Xiong (2004).

[9] Market Shocks can result from several sources. However, most previous studies associate shocks with order imbalances. For example, Liu (1997) shows that typical end-of-day closure causes market stress through order imbalances which partially explains the well-documented U-shaped patterns in intraday means and variances. Blume et al (1989) find a strong linkage between order imbalances and stock price movements during the market crash of October 1987 and show that order imbalances are higher on S&P stocks than on non-S&P stocks,

suggesting that losses on S&P stocks may have been larger than necessary during the crash because the market was unable to absorb the extreme selling pressure. Jones et al (1993) find that S&P and non-S&P stocks are co-integrated even during periods of extreme market stress.

[10] We also use the GMM method. The results, available upon request, do not change.

[11] In some cases, only one of these two liquidity variables is significant because of multicollinearity. In alternative estimations utilizing only one of those variables, all the coefficient estimates are statistically significant. The results are not reported but they are available from the authors upon request.