# Momentum returns, market states, and financial crisis: evidence from China and Hong Kong

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## Abstract

This chapter investigates the profitability of the momentum trading strategy in the stock exchanges of Shanghai, Shenzhen and Hong Kong over the period 1994 to 2010. Our results show that there are significantly large momentum returns for Shanghai and Hong Kong but small and insignificant momentum returns for Shenzhen. However, the momentum trading strategy generates negative returns for all markets during the Global Financial Crisis; it appears that the momentum trading strategy fails during a financial or stock market crisis and especially in the months when the market conditions improve. We find no significant relationship between momentum returns and market states, which contradicts the results of an earlier study conducted in the U.S. market. Instead of market state it appears that it is economic activity that explains momentum returns.



*Keywords*: Momentum returns; market states; Global Financial Crises

## Introduction

Momentum refers to the tendency for past winners to continue winning while past losers continue losing. The momentum effect has been a popular issue in recent finance literature and is considered most prominent among all the stock market anomalies (Fama and French, 2008). Jegadeesh and Titman (1993) report that the momentum trading strategy of buying recent winners and selling recent losers generates an abnormal return of 1% per month (12% per year) in the U.S. market over the period 1965 to 1989.

The presence of the momentum effect in U.S. stock markets has led to a number of studies that document statistically significant and economically large momentum returns in international stock markets, e.g., . Rouwenhorst (1998) for European countries, Rouwenhorst (1999) for emerging markets, Chan, Hameed, and Tong (2000) for the stock market indexes of 23 countries, Chui, Wei, and Titman (2000) for eight Asian countries except Japan, Schiereck and Weber (1995) for the German market, Bacmann and Dubois (2000) for the Swiss market, Bacmann, Dubois, and Isakov (2001) for the G-7 countries and Hameed and Kusnadi (2002) for six Asian markets.

Behavioural explanations of the momentum anomaly are considered more reliable because the Fama-French and other risk factors fail to explain momentum returns. Behavioural theories assume that investor irrationality and psychological biases are responsible for momentum returns. The behavioural factors that the extant literature relate to the momentum effect are investor conservatism, representative heuristic, biased self-attribution, overconfidence and bounded rationality (for example, see among others, Barberis, Shleifer, and Vishny, 1998; Daniel, Hirshleifer, and Subrahmanyam, 1998, 2002; Hong and Stein, 1999; Hong and Stein, 2007). The behavioural model of Barberis et al. (1998) explains momentum returns as the result of investor underreaction to new public information and over-reaction to their beliefs. They argue that this tendency for investors to overreact to their beliefs cause prices to continue in the same direction; underreaction to new public information takes time to stop the continuity of prices. They show that underreaction to new information and over-reaction to their prior beliefs results from investors' cognitive biases including representativeness and conservatism. In the representativeness bias, investors assume that the extraordinary growth (reduction) of the firm will continue in the future and, as a result, take prices away from their fundamental values. The conservatism bias, on the other hand, leads to underreaction to new information.

Daniel et al. (1998) argue that investor overconfidence is responsible for over-reaction in stock prices, which results in momentum returns. Cooper, Gutierrez, and Hameed (2004) extend

Daniel et al.'s (1998) over-reaction theory to predict differences in momentum returns across UP and DOWN market states. They argue that, since in aggregate investors hold long positions, investor overconfidence must be higher after an UP market because the UP market brings in gains. They further explain that investors will attribute the rise in stock prices to their skills leading to a further boost in their overconfidence that generates momentum returns. So, they argue that the large rise in investor overconfidence is a result of the UP market state, and hence it is the market state that explains momentum returns. Using NYSE and AMEX listed stocks, they find significant positive momentum returns in the UP market state. Daniel and Moskowitz (2013) extend Cooper et al.'s (2004) study and reports losses to the momentum trading strategy when the market is under stress. Daniel and Moskowitz (2013) find that major losses to the momentum trading strategy occur after a severe market downturn and in the months when the market starts to rise. Daniel and Moskowitz (2013) argue that their results are loosely consistent with behavioural findings (see Loewenstein, 2000; Loewenstein, Weber, Hsee, and Welch, 2001; Sunstein and Zeckhauser, 2008). These behavioural findings suggest that investors are more fearful in extreme situations and ignore probabilities. We suggest that their fear drives the loser stocks below fundamental levels; consequently, when the market improves, loser stocks over perform. Given that the market state can explain momentum returns in the U.S., it is worth testing the market state explanation in markets outside the U.S. to show that this relationship is not due to data snooping.

This study is motivated by the following issues: first, there are very few studies on the profitability of momentum trading strategies in the Hong Kong and Chinese stock markets and the empirical evidence provided in those studies about the profitability of momentum trading strategy is mixed. The mixed evidence about the profitability of momentum in China and Hong Kong is due to the use of different holding and formation periods (from 1 week to 2 years), size of sample data sets, and the differential use of the Shanghai and Shenzhen stocks. For example, Naughton, Truong, and Veeraraghavan (2008), Wang (2008), Kang, Liu, and Ni (2002), Cheema and Nartea (2014) and Wang and Chin (2004) report that momentum strategies are profitable , but Pan, Tang, and Xu (2013), Wang (2004), Chen, Kim, Yao, and Yu (2010), Wu (2011) and Cakici, Chan, and Topyan (2011) report insignificant momentum returns. Hameed and Kusnadi (2002) find insignificant momentum returns for the HKSE in their study of six Asian markets; however, Cheng and Wu (2010) find significant momentum returns for the HKSE and they argue that Hameed and Kusnadi's (2002) findings might be the result of including small and illiquid stocks in their sample. Secondly, there are no studies on the profitability of the momentum trading strategy in China and Hong Kong during the Global Financial Crisis. Therefore, we want to test the impact of the Global Financial Crisis on the

profitability of momentum returns because the literature provides evidence that crises can affect the profitability of this trading strategy.

Using the two mainland Chinese stock markets - Shanghai Stock Exchange (hereafter **SSE**), and Shenzhen Stock Exchange (hereafter **SZSE**) - as well as the Hong Kong Stock Exchange (hereafter **HKSE**), we find positive and large momentum returns in a normal market environment (before 2007) since it appears that investors underreact to public information, whereas we find negative momentum returns from 2007 to 2010 with past losers earning more than past winners. However, we do not find any evidence that lagged market returns can explain momentum returns for China and Hong Kong. The rest of the chapter is organized as follows: Section 2 discusses the data and methodology, Section 3 presents the momentum returns for all datasets and section 4 presents the momentum returns in the UP and DOWN market states using 36-, 24- and 12-month lagged market returns and Section 5 concludes the study.

## Data and Model

*Sample and Descriptive Statistics*

We use all stocks listed on the SSE, SZSE and HKSE from the China Securities Market (CSMAR) and DataStream from November 1994 to November 2010. We exclude the period before 1994 since only a limited number of stocks were traded during that period. We also exclude all financial institutions, closed-end funds and real estate stocks. We also exclude stocks with monthly returns greater than 100% to avoid any possible data recording errors and to ensure that our results are not driven by stocks with extreme returns. At the beginning of the sample period, there were 155, 95, and 455 stocks from the SSE, SZSE and HKSE, respectively. At the end of the sample period, the number of stocks in the sample increased to 745, 690, and 815, for SSE, SZSE and HKSE, respectively.

<TABLE 1 HERE>

Table 1 reports the summary statistics for the monthly value-weighted market returns for All China, HKSE, SSE and SZSE and monthly risk-free rates for All China and HKSE.[i] Panel A reports that the average monthly (mean) value-weighted market return for the full sample for All China, HKSE, SSE and SZSE is 1.58%, 0.75%, 1.50% and 1.83%, respectively. In Panel A, Table 1, the average monthly risk-free rates for All China and HKSE are 0.32% and 0.40%, respectively. The summary statistics in Panel A show that in the long-run, market returns are larger for stock markets than for risk-free rates, consistent with risk-based theories. Panels B and C report the summary statistics before and during the Global Financial Crisis (GFC),

respectively. The average monthly (mean) value-weighted market returns before the GFC are 1.98% for All China, 0.91% for HKSE, 1.94% for SSE and 2.12% for SZSE. However, the average monthly (mean) value-weighted market returns during the GFC are very small and even negative for All China and SSE. The summary statistics results provide evidence that the GFC affected the Chinese and Hong Kong markets. Therefore, we expect to find different results before and during the GFC.

*Methodology*

First, we calculate momentum returns for each market based on the methodology proposed by Jegadeesh and Titman (1993). We use the conventional 6-month formation period for the momentum trading strategy. A month is skipped between the formation and holding period to mitigate the bid-ask bounce effect. At the end of each month t, all stocks are ranked in ascending order by their past 6-month returns (t-6 to t-1). These rankings are used to form equally-weighted decile portfolios, where the top decile portfolio (P1) is called the losers decile, and the bottom (P10) is the winners decile. We buy (sell) the winners (losers) decile and define the return of the momentum trading strategy as P10-P1. The portfolios are held for K months (K= 3, 6, 9 and 12). Following Jegadeesh and Titman (1993), the portfolio monthly return for a K-month holding period is based on an equal-weighted average of portfolio returns from strategies implemented in the current month and the previous K-1 months.

We also calculate value-weighted momentum returns to ensure that these returns are not the result of small size stocks. To calculate value-weighted momentum returns, we follow the same procedure as for equally-weighted momentum returns except that we invest money in stocks according to their market capitalization instead of equal money in all stocks.

Finally, we investigate if market states affect momentum returns by following Cooper et al. (2004) who employ UP and DOWN market states. We employ value-weighted market returns for All China, SSE composite index, the SZSE composite index, and the Hang Seng Index as proxies for the market for All China, SSE, SZSE, and HKSE over 36 months before the portfolio formation date to define the market state. If the lagged 36-month value-weighted market return is positive (negative), then the market state is defined as UP (DOWN). A longer horizon is expected to capture major changes in market states but, on the other hand, it reduces the number of observations for UP and DOWN market states (see Cooper et al., 2004). As a robustness test, we apply 24-month and 12-month market states against these momentum returns. Following Cooper et al. (2004), we use buy-and-hold momentum returns to investigate the relationship between momentum returns and market. Buy-and-hold momentum returns are

calculated at the end of 6-month holding periods instead of revising portfolio weights every month. Since the buy-and-hold returns are overlapping, we use robust Newey-West t-statistics.

Following Cooper et al. (2004), the momentum returns followed by UP and DOWN market states are adjusted for CAPM and Fama-French risk factors to ensure that momentum returns remain significant and cannot be explained by the risk factors.[ii]

$$MR_{t,6\times6} = \alpha + \sum_{m=1}^{n} \beta_m f_{i,t} + e_t \tag{2.1}$$

$MR_{t,6X6}$ is the raw momentum returns following UP and DOWN market states generated at time t with a 6-month formation and 6-month holding period. The notation $f_{i,t}$ (i=*1,2)* are risk factors (1= CAPM, 2= Fama-French) used in this study at time t, $\beta_m$ **(**m= 1,2,….,n) is the loading for risk factors, α is the coefficient estimate for constant and $e_t$ is the residual, with $(e_t) = 0$, $Cov\ (e_t, f_t) = 0$ and $e_t \approx (0, \sigma^2)$. We use the excess returns of the value-weighted market returns over risk-free return as the sole factor for the CAPM risk adjustment. We use the excess returns of value-weighted market returns; the small-minus-big return factor and the high-book-to-market-minus-low-book-to-market return factors for the Fama-French risk adjustment.

**Momentum Returns for Different Markets**

Table 2 presents the average monthly returns of the winners (P10), losers (P1) and winners minus losers (P10-P1) during the period November 1995 to November 2010.[iii]

<TABLE 2 HERE>

Panel A of Table 2 presents equally-weighted momentum returns for all markets. The average monthly equally-weighted momentum returns for All China (SSE and SZSE) are positive for different holding periods of 3 (0.56% per month), 6 (0.58% per month), 9 (0.41% per month) and 12 months (0.22% per month) and statistically significant for all the holding periods. The average monthly equally-weighted momentum returns for HKSE are positive and significant for 3- (0.76% per month), 6- (0.60% per month) and 9-month (0.43% per month) holding periods, but small and insignificant for the 12-month (0.20% per month) holding period. Momentum returns for SSE are positive and statistically significant for the 3- (0.80% per month), 6- (0.83% per month), 9- (0.73% per month) and 12-month (0.53% per month) holding periods. In contrast, there is no evidence of a momentum effect for equally-weighted portfolios in the SZSE since average monthly momentum returns for different holding periods are not statistically different from zero.

Panel B of Table 2 reports the value-weighted returns for all markets. We find large momentum returns for the Chinese and Hong Kong markets. The value-weighted momentum returns for All China are larger than equally-weighted momentum returns and statistically significant for all holding periods. This indicates that momentum returns are not driven by small size stocks. For HKSE, the value-weighted momentum returns are larger and significant for the 3- 6- and 9-month holding periods than for the corresponding equally-weighted returns, but small and insignificant for the 12-month holding period. Momentum returns for the SSE are somewhat larger and statistically significant when we use value-weighted returns. Interestingly, momentum returns for the SZSE increase when we use value-weighted returns and becomes statistically significant for 6- and 9-month holding periods.

The equal-weighted and value-weighted results in Table 2 show that the momentum trading strategy is profitable both in the SSE and HKSE markets. However, momentum returns for SZSE are small and insignificant (equally-weighted). The value-weighted momentum returns are higher than equal-weighted momentum returns for all markets in the sample. These higher value-weighted momentum returns are consistent with those shown in McLean (2010) and Korajczyk and Sadka (2005). This study also finds evidence consistent with McLean (2010) and Korajczyk and Sadka (2005) that the momentum winner effect for Chinese stocks is stronger in the equal-weighted portfolio, but the momentum loser effect is stronger in the value-weighted portfolios. The results reported in Table 2 are consistent with studies documenting a momentum effect in China (see for example Kang et al., 2002; Naughton et al., 2008; Wang, 2008). There are, however, studies that report insignificant momentum returns in China. For example Pan et al. (2013), Wang (2004), Chen et al. (2010), Wu (2011) and Cakici et al. (2011) all report insignificant equally-weighted momentum returns using A shares for both the SSE and SZSE. If we include only A-shares of both SSE and SZSE, then we get the similar results. In sum, we find that there is no evidence of a momentum effect in A- and B-shares of SZSE using equally-weighted returns but the effect is stronger and significant for both A- and B-shares in SSE.

Table 3 reports the average monthly returns of the winners (P10), losers (P1) and winners minus losers (P10-P1) before (November 1995- December 2006) and during (January 2007- November 2010) the Global Financial Crisis (GFC).[iv] Panels A and B report equally-weighted and value-weighted returns before 2007, respectively. Panels C and D show equally-weighted and value-weighted returns for the period January 2007 to November 2010. Columns one and two report loser and winner portfolios, respectively; column three presents the momentum returns (P10-P1). The next column titled "%> 0" is the percentage of momentum returns that

are positive over the sample period. The last column reports the number of months used to calculate momentum returns.

<TABLE 3 HERE>

Panel A of Table 3 presents equally-weighted momentum returns for all markets before the GFC. The equally-weighted momentum returns for All China (SSE and SZSE) before the GFC are almost twice larger (1.07% per month) than the entire sample period and are statistically significant with 69.70% of the months greater than zero. The equally-weighted returns for HKSE are also large, positive and significant (1.11% per month) before the GFC. The SSE returns are also high (1.41% per month) before the GFC. Interestingly, the SZSE returns are also large (0.31% per month) before the GFC and statistically significant. Panel B of Table 3 reports the value-weighted returns for all markets before the GFC. We find large, significant value-weighted momentum returns for both the Chinese and Hong Kong markets.

Panel C of Table 3 reports the equally-weighted momentum returns for all markets during the GFC (2007-2010). We find negative and significant momentum returns for all markets. Panel D of Table 3 reports the value-weighted returns for all markets during the GFC; there are negative momentum returns for all markets, but they are statistically insignificant. The negative momentum returns during the GFC are consistent with the findings of Chordia and Shivakumar (2002) that the profitability of momentum is related to the business cycle. Negative momentum returns during a financial crisis are broadly consistent with Daniel and Moskowitz (2013) who report worst momentum returns during recessions and financial crises, especially in the months when market conditions improved. These results are also consistent with the small and negative value-weighted market returns shown in Table 1 for All China and SSE during the GFC.

Panels C and D of Table 3 show that, from 2007, the momentum trading strategy underperformed and experienced large losses because loser stocks outperformed winner stocks. Figure 1 also shows losers outperforming winners, especially during the GFC years and, to a lesser degree, during and after the 1997 Asian financial crisis. It is evident from Figure 1 that, before 2007, past winners generally outperform past losers but, after 2007, there were many months when losers outperformed winners, especially in the months when the market started rising.

<FIGURE 1 HERE>

The sub-period analysis in Table 3 shows higher and significant momentum returns in all markets before the GFC. However, the momentum trading strategy fails to earn profits during

the GFC. The results in Table 3 are consistent with Daniel and Moskowitz's (2013) study, which argues that the momentum trading strategy is large and significant during normal environments and turns into losses during market downturns or crises.

To summarize, our results provide evidence of large momentum returns in mainland Chinese markets, but they come mainly from SSE stocks.[v] The difference in momentum returns across SSE and SZSE appears to be related to firm size since we find (see Table 2) that value-weighted returns for SSE and SZSE are higher. Higher value-weighted returns indicate that large-cap companies generate higher momentum returns, consistent with McLean (2010) and Korajczyk and Sadka (2005). Note that SSE is dominated by large-cap companies, whereas SZSE is dominated by small companies. Momentum returns for HKSE stocks are also positive and statistically significant except for 12-month holding period. The sub-period analysis shows higher and significant momentum returns in all markets before the GFC. However, we find negative momentum returns following the GFC, and it is evident that the momentum trading strategy fails to earn profits during the GFC. Our results suggest that consistent momentum returns happen in normal environments where the market supposedly underreacts to public information. The presence of consistent momentum returns in a normal environment is in line with Daniel and Moskowitz's (2013) findings because it takes time for information to be adjusted into prices. On the other hand, after 2007, we find negative momentum returns and it appears that the worst returns for the momentum trading strategy occur in the months when the market conditions improve (see Figure 1). Figure 1 shows that the winner portfolio generally performs well in a normal environment and the loser portfolio performs well when the market emerges from severe crises. This trend is somewhat consistent with some other behavioural findings (see Loewenstein, 2000; Loewenstein et al., 2001; Sunstein and Zeckhauser, 2008). During market downturns, we suggest that investors are fearful and focus more on losses especially if they already hold a loser stock. So there is a greater tendency for loser stocks to decline more than winner stocks during market downturns. When the market conditions improve, we suggest that these loser stocks experience large gains because their losses were the result of fear instead of bad performance. The strong gains of loser stocks then result in losses for the momentum trading strategy.

**Market State Effects on Momentum Returns**

In this section, following Cooper et al. (2004), we examine the effect of the market state on momentum returns. The monthly average raw returns of the momentum trading strategy, as well as the CAPM and Fama-French adjusted returns (i.e., alphas) following UP and DOWN

market states are shown in Table 4. Panel A reports the results when the market state is defined based on the past 36 months, whereas Panels B and C report the results when the market state is defined based on the past 24 and 12 months, respectively. Panel A shows that during the period November 1995 to November 2010, using 36 months to define UP and DOWN markets, the UP market raw momentum returns, CAPM, and Fama-French alphas for All China are 0.34%, 0.37% and 0.35% per month, respectively, but statistically insignificant. Following DOWN market states, the raw momentum returns, CAPM and Fama-French alphas are 1.57%, 1.55% and 1.85%, respectively. When we define market state based on the past 24 months (Panel B), the returns for All China in the DOWN market state are larger (significant) than for UP market state (insignificant). However, when market state is defined based on the past 12 months (Panel C), we find that the raw momentum returns, as well as the CAPM and Fama-French alphas following UP markets are large and statistically significant whereas those following DOWN markets are small and insignificant. In sum, we find positive momentum returns following both UP and DOWN markets, but the magnitude of momentum returns is larger and significant only for the 36- and 24-month DOWN market states and the 12-month UP market state. We conclude that there is no relationship between market state and momentum returns for China.

<TABLE 4 HERE>

The raw, CAPM and Fama-French adjusted momentum returns for HKSE in Panels A and B following 36- and 24-month (both UP and DOWN) market states are similar but statistically insignificant except the Fama-French alpha. However, the raw, CAPM and Fama-French adjusted momentum returns for the HKSE reported in Panel C following the 12-month DOWN market states are larger than the corresponding values for UP market states, but they are insignificant except for the Fama-French alpha. We do not find any relationship between market states and momentum returns for HKSE stocks since the raw and CAPM-adjusted momentum returns following UP and DOWN market states are insignificant.

These results show that the DOWN market state explains momentum returns better for SSE if 36- and 24-month lagged market returns are used to define the DOWN market state. However, we find larger momentum returns following the UP market state when we use 12-month lagged market returns to define the market state. We conclude that there is no reliable relationship between market state and momentum returns for SSE. The momentum returns for the entire sample of SZSE stocks are statistically not different from zero except the Fama-French alpha following the 36-month DOWN market state. We conclude that market state cannot explain

momentum returns for SZSE since there is no evidence of a relationship between momentum returns and 36-, 24- and 12-month market states.

In summary, it appears that momentum returns do not depend on market state since we report significant momentum returns for All China, HKSE and SSE stocks regardless of the market state before the GFC.[vi] However, momentum returns for SZSE are insignificant before the GFC. Interestingly, momentum returns become negative for all markets from 2007 until 2010 regardless of the market state. Therefore, momentum returns seem to follow worldwide business cycle expansions and recessions since momentum returns are totally different before and after 2007.

**Conclusions**

The momentum trading strategy first found profitable by Jegadeesh and Titman (1993), remains most prominent among all the anomalies found in the finance literature. The momentum effect is robust across international markets and time periods and though a few empirical studies link momentum returns with market states none has done so for the markets of China and Hong Kong. Given that China and Hong Kong are the world's fastest growing emerging markets and China expected to be the largest economy of the world by 2041, it is imperative for the global investment community to gain a deeper understanding of its financial markets. Also, the impact of the GFC on momentum returns has not been tested. The literature suggests a relationship between momentum returns and economic activity; therefore, it is important to test the relationship between momentum returns and the GFC.

In this chapter, we investigate the impact of market state and the Global Financial Crisis on momentum returns in the Chinese and Hong Kong markets. We report positive and significant momentum returns for All China, HKSE and SSE and small insignificant momentum returns for SZSE. The difference in momentum returns between SSE and SZSE appears to be related to firm size since SZSE is dominated by small companies. However, we find large momentum returns before the GFC and negative momentum returns from 2007 until 2010 for all markets. There is a dramatic impact of the GFC on momentum returns since the loser portfolio generates higher returns than the winner portfolio from 2007 until 2010 and hence negative momentum returns. Before the GFC, all markets seem to underreact to public information resulting in consistent momentum returns. However, during the GFC, it appears that investors were fearful and avoided loser stocks resulting in a decrease in the price of loser stocks beyond their fundamental level. Any improvement in market conditions after a severe downturn returns the prices of loser stocks back to their fundamental level; hence, losers generate higher returns than

winners. Our results indicating the worst momentum returns during the GFC are in line with Daniel and Moskowitz (2013), who also find the worst momentum returns during recessions and stock market crises. Our results also appear to be consistent with some behavioural findings.[vii] These behavioural findings imply that individuals are fearful in extreme situations and appear to focus more on losses and, therefore, probabilities are largely ignored. Research is needed to examine whether the empirical results documented for China and Hong Kong are fully consistent with these behavioural findings.

In the finance literature, there are largely two possible explanations for the momentum anomaly, one is risk-based, and the other is behaviour-based. We find that momentum returns cannot be explained by risk factors because momentum returns remain almost the same after controlling for the Fama-French risk factors. Among the behavioural explanations, Daniel et al.'s (1998) overreaction theory is well known, where investor overconfidence results in over-reaction that generates momentum returns. Cooper et al. (2004) extend Daniel et al.'s (1998) theory to predict differences in momentum returns across market states suggesting that if investor overconfidence is responsible for momentum returns, then overconfidence would be greater following UP market states. Cooper et al. (2004) find positive significant momentum returns following UP market states (36, 24 and 12 months) in the U.S. market.

However, unlike Cooper et al. (2004), we find no systematic relationship between market state and momentum returns in China and Hong Kong, which highlights the fact that we cannot simply generalize the findings in mature markets to new and emerging markets. Nonetheless, we find a strong relationship between momentum returns and economic activity because there are large momentum returns before the GFC.

This study contributes to the literature because it is the first study that finds a strong relationship between momentum returns and economic activity for Chinese and Hong Kong stocks. The results of this study have important implications because they provide supplementary evidence that investors could have increased their returns by using the momentum strategy because it was profitable before the GFC. Also, the results suggest that from 2007-2010 investors could have earned greater returns over the next 3 to 12 months by buying previous loser stocks because loser stocks outperform winners during economic downturns.

# References


Bacmann, J. F., & Dubois, M. (2000). La performance des stratégies contraires et momentum sur le marché suisse. *Financial Markets and Portfolio Management, 14*, 252-266.

Bacmann, J. F., Dubois, M., & Isakov, D. (2001). *Industries, business cycle and profitability of momentum strategies: An international perspective.* Paper presented at the EFMA 2001 Lugano Meetings.

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of financial economics, 49*(3), 307-343.

Cakici, N., Chan, K., & Topyan, K. (2011). Cross-Sectional Stock Return Predictability in China. *Available at SSRN 2038497*.

Chan, K., Hameed, A., & Tong, W. (2000). Profitability of Momentum Stragegies in the International Equity Markets. *Journal of Financial and Quantitative Analysis, 35*(02), 153-172.

Cheema, M. A., & Nartea, G. V. (2014). Momentum returns and information uncertainty: Evidence from China. *Pacific-Basin Finance Journal, 30*, 173-188.

Chen, X., Kim, K. A., Yao, T., & Yu, T. (2010). On the predictability of Chinese stock returns. *Pacific-Basin Finance Journal, 18*(4), 403-425.

Cheng, J. W., & Wu, H. (2010). The profitability of momentum trading strategies: Empirical evidence from Hong Kong. *International Review of Economics & Finance, 19*(4), 527-538.

Chui, A. C. W., Wei, K. C., & Titman, S. (2000). Momentum, legal systems and ownership structure: An analysis of Asian stock markets. *University of Texas at Austin working paper*.

Cooper, M. J., Gutierrez, R. C., & Hameed, A. (2004). Market states and momentum. *The Journal of Finance, 59*(3), 1345-1365.

Daniel, K. D., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. *The Journal of Finance, 53*(6), 1839-1885.

Daniel, K. D., Hirshleifer, D., & Subrahmanyam, A. (2002). Overconfidence, arbitrage, and equilibrium asset pricing. *The Journal of Finance, 56*(3), 921-965.

Daniel, K. D., & Moskowitz, T. J. (2013). Momentum crashes. *Swiss Finance Institute Research Paper*, (13-61).

Fama, E. F., & French, K. R. (2008). Dissecting anomalies. *The Journal of Finance, 63*(4), 1653-1678.

Hameed, A., & Kusnadi, Y. (2002). Momentum strategies: Evidence from Pacific Basin stock markets. *Journal of Financial Research, 25*(3), 383-397.

Hong, H., & Stein, J. C. (1999). A unified theory of underreaction, momentum trading, and overreaction in asset markets. *The Journal of Finance, 54*(6), 2143-2184.

Hong, H., & Stein, J. C. (2007). Disagreement and the stock market. *The Journal of Economic Perspectives, 21*(2), 109-128.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance, 48*(1), 65-91.

Kang, J., Liu, M.-H., & Ni, S. X. (2002). Contrarian and momentum strategies in the China stock market: 1993–2000. *Pacific-Basin Finance Journal, 10*(3), 243-265.

Korajczyk, R. A., & Sadka, R. (2005). Are momentum profits robust to trading costs? *The Journal of Finance, 59*(3), 1039-1082.

Loewenstein, G. (2000). Emotions in economic theory and economic behavior. *The American Economic Review, 90*(2), 426-432.

Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychological bulletin, 127*(2), 267.

McLean, R. D. (2010). Idiosyncratic risk, long-term reversal, and momentum. *Journal of Financial and Quantitative Analysis, 45*(04), 883-906.

Naughton, T., Truong, C., & Veeraraghavan, M. (2008). Momentum strategies and stock returns: Chinese evidence. *Pacific-Basin Finance Journal.*

Pan, L., Tang, Y., & Xu, J. (2013). Weekly momentum by return interval ranking. *Pacific-Basin Finance Journal, 21*(1), 1191-1208.

Rouwenhorst, K. G. (1998). International momentum strategies. *The Journal of Finance, 53*(1), 267-284.

Rouwenhorst, K. G. (1999). Local return factors and turnover in emerging stock markets. *The Journal of Finance, 54*(4), 1439-1464.

Schiereck, D., & Weber, M. (1995). *Zyklische und antizyklische Handelsstrategien am deutschen Aktienmarkt*. Retrieved from

Sunstein, C., & Zeckhauser, R. (2008). Overreaction to fearsome risks. *Harvard Law School Program on Risk Regulation Research Paper*(08-17).

Wang, C. (2004). Relative strength strategies in China's stock market: 1994–2000. *Pacific-Basin Finance Journal, 12*(2), 159-177.

Wang, C., & Chin, S. (2004). Profitability of return and volume-based investment strategies in China's stock market. *Pacific-Basin Finance Journal, 12*(5), 541-564.

Wang, D. (2008). Are anomalies still anomalous? An examination of momentum strategies in four financial markets. Retrieved from http://papers.ssrn.com

Wu, Y. (2011). Momentum trading, mean reversal and overreaction in Chinese stock market. *Review of Quantitative Finance and Accounting*, *37*(3), 301-323.

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**i** The risk-free rate for All China (SSE and SZSE) is the monthly rate charged by People's Bank of China to financial institutions. The risk-free rate for Hong Kong refers to the monthly interbank rate.

**ii** Momentum returns with 6-month formation and holding periods are adjusted for risk factors.

**iii** We also calculate CAPM- and Fama-French risk adjusted momentum returns that are very similar to raw momentum returns. To save space, we only report raw momentum returns.

Although the Global Financial Crisis officially started in late 2007, for convenience we define the 2007-2010 period as "the Global Financial Crisis". However, our results are robust if we define "the Global Financial Crisis period" from 2008 to 2010.

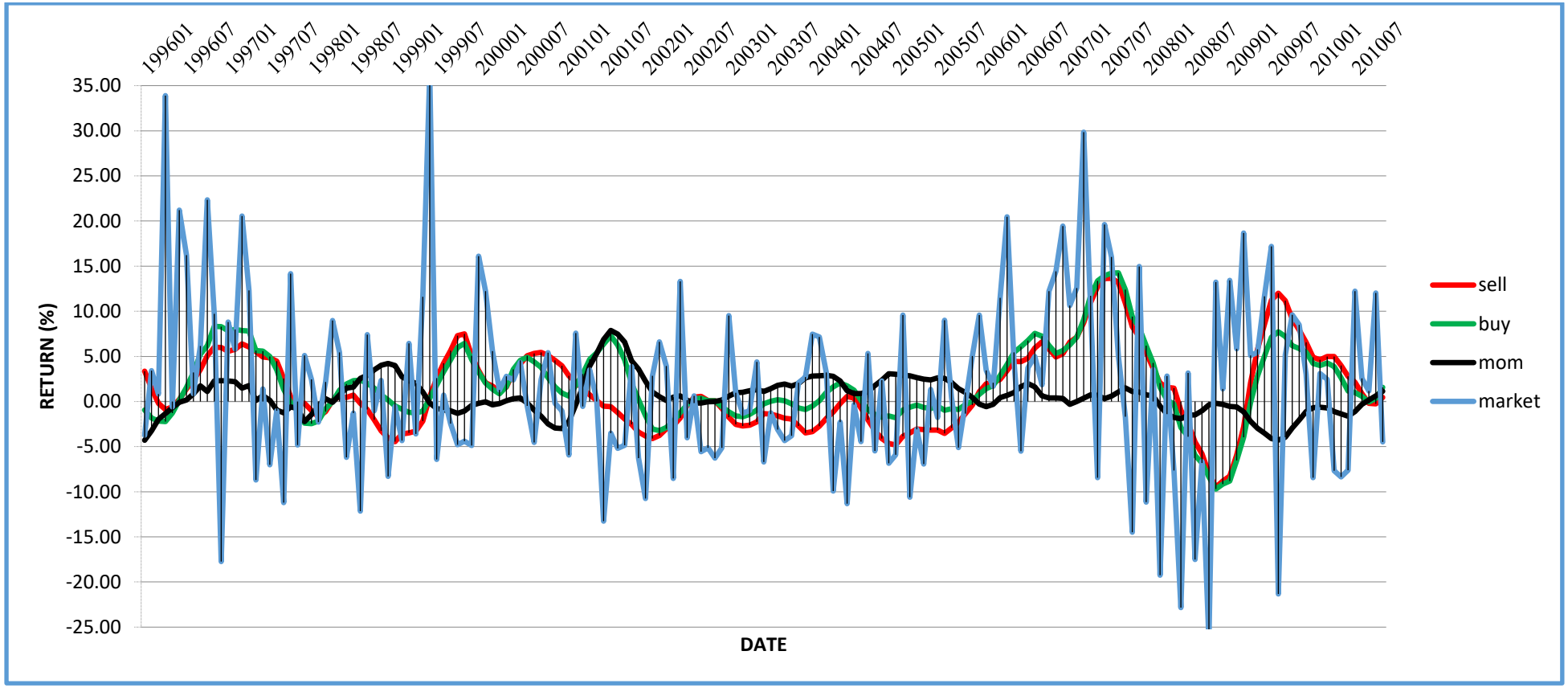
**v** Value-weighted momentum returns for SZSE are smaller than SSE and HKSE but statistically significant for 6- and 9-month holding periods. However, equal-weighted momentum returns for SZSE are insignificant for all the holding periods.

**vi** To save the space, we only report momentum returns following 24-month UP and DOWN market before and after the Global Financial Crises.

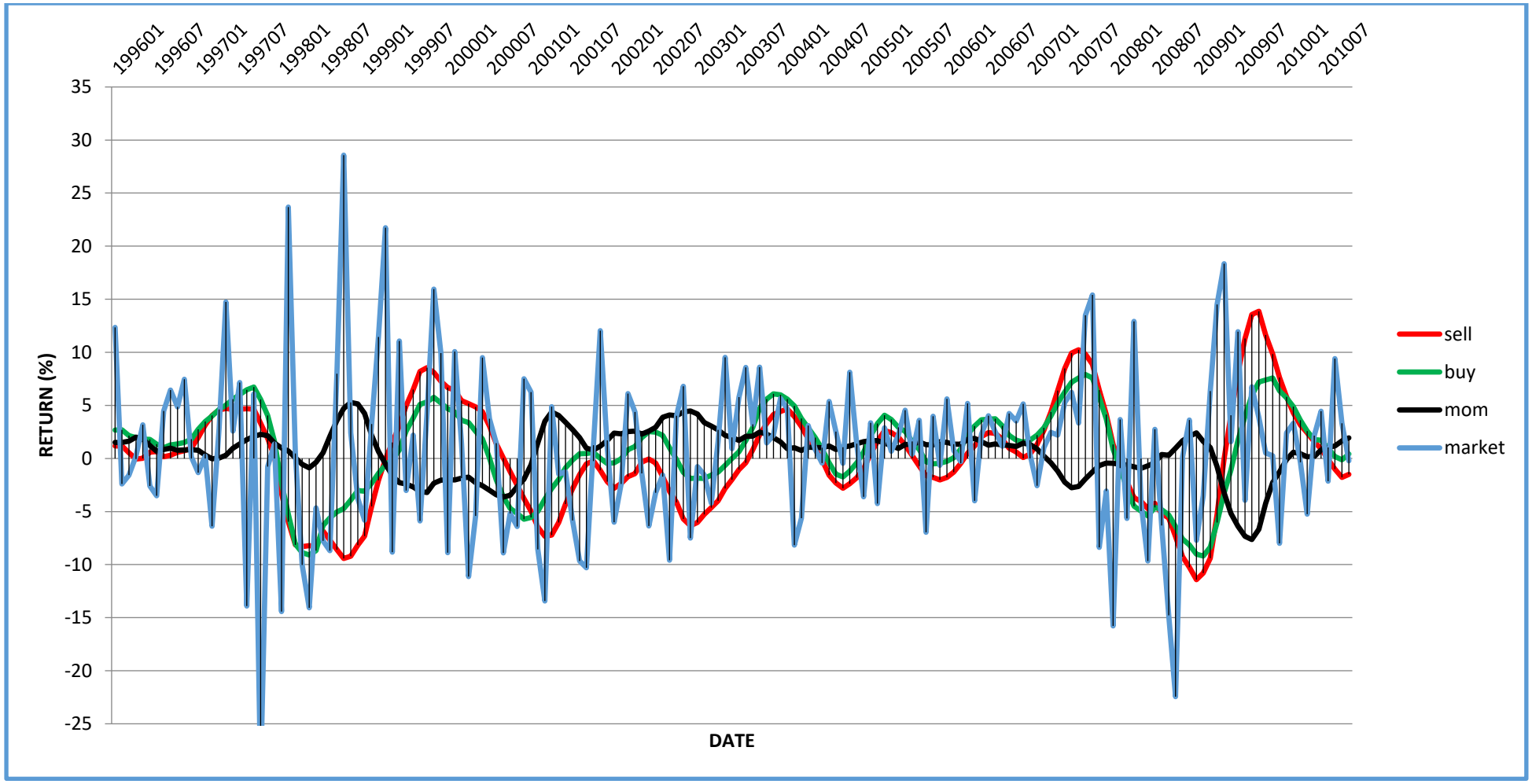
**vii** See Loewenstein (2000), Loewenstein et al. (2001) and Sunstein and Zeckhauser (2008).

**Figure 1 Momentum Returns for All China, HKSE, SSE and SZSE**

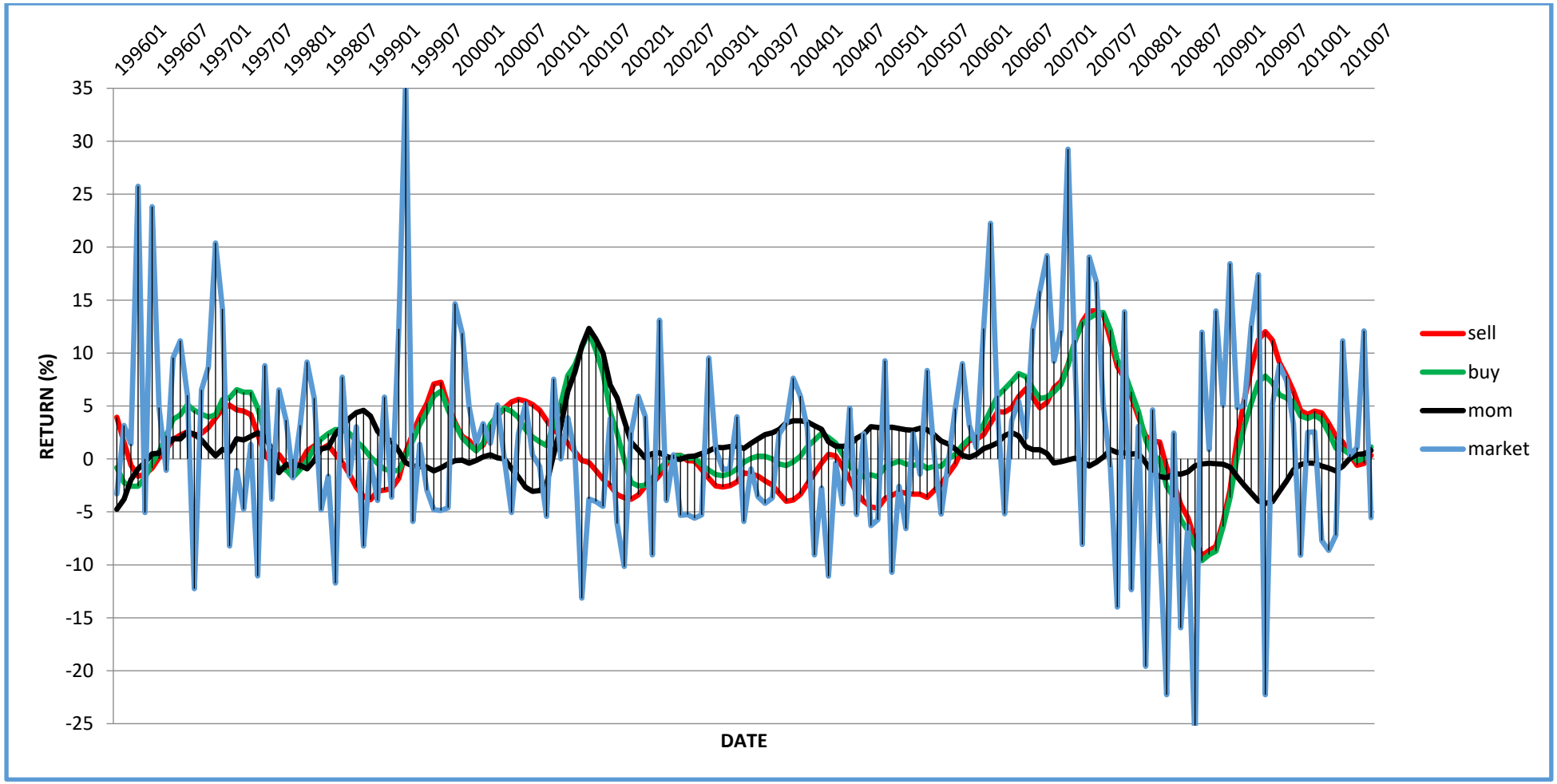
This figure provides the average monthly returns of losers (P1), winners (P10), momentum returns (P10-P1) and contemporaneous market returns of a momentum trading strategy with 6-month formation and 6-month holding period over the entire sample period.



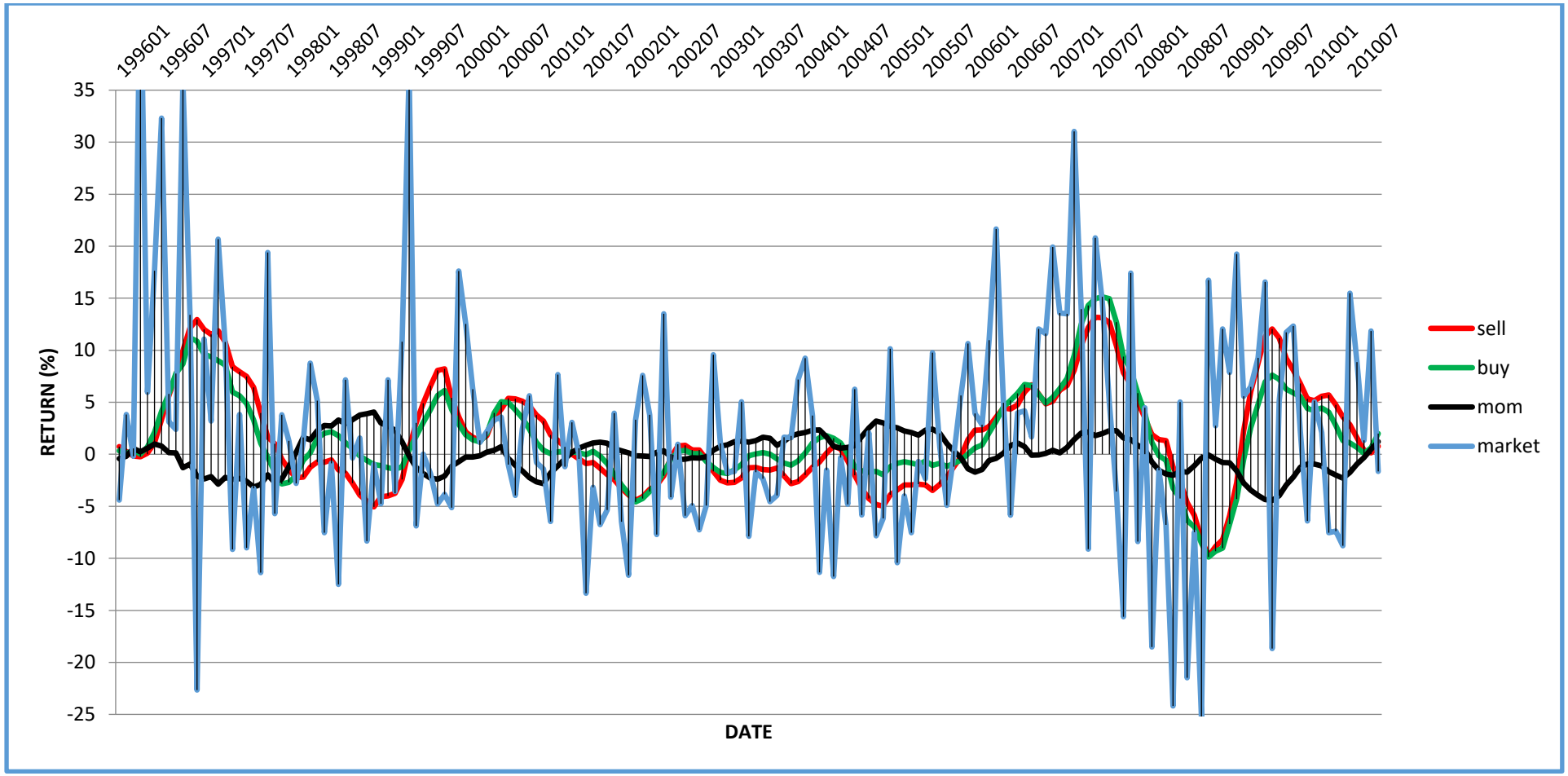

**(a) Momentum Returns for All China**




**(b) Momentum Returns for HKSE**




**(c) Momentum Returns for SSE**




**(d) Momentum Returns for SZSE**

## Table 1
**Summary Statistics (Market Return, Risk-Free Return)**

This table reports the summary statistics for the value-weighted market return (RET) of All China, HKSE, SSE and SZSE. It also reports summary statistics for the risk-free rate (RF) for All China and HKSE. Panel A reports the summary statistics for the full sample (November 1994- November 2010), Panel B reports the summary statistics before the Global Financial Crisis (November 1994-Septmber 2007) and Panel C reports the summary statistics during the Financial Crisis (October 2007-November 2010). The average monthly mean, median, 25%, 75% and 90% of the values are given in per cent.

Panel A: Summary Statistics for the full sample (1994-2010)

| Variable | N | Mean | StdDev | Median | 25% | 75% | 90% |
|---|---|---|---|---|---|---|---|
| All China-RET | 193 | 1.58 | 9.67 | 1.34 | -4.86 | 6.45 | 13.31 |
| HKSE-RET | 193 | 0.75 | 7.72 | 1.28 | -3.61 | 4.55 | 9.53 |
| SSE-RET | 193 | 1.50 | 9.43 | 1.38 | -4.87 | 5.94 | 12.58 |
| SZSE-RET | 193 | 1.83 | 10.56 | 1.16 | -4.93 | 7.17 | 13.59 |
| All CHINA-RF | 193 | 0.32 | 0.22 | 0.19 | 0.19 | 0.39 | 0.73 |
| HKSE-RF | 193 | 0.40 | 0.19 | 0.50 | 0.25 | 0.54 | 0.58 |

Panel B: Summary Statistics before the Global financial crisis (1994-2007)

| Variable | N | Mean | StdDev | Median | 25% | 75% | 90% |
|---|---|---|---|---|---|---|---|
| All China-RET | 155 | 1.98 | 9.16 | 0.90 | -4.80 | 6.45 | 14.18 |
| HKSE-RET | 155 | 0.91 | 7.55 | 1.33 | -3.44 | 4.85 | 9.53 |
| SSE-RET | 155 | 1.94 | 8.84 | 1.21 | -4.60 | 5.94 | 13.11 |
| SZSE-RET | 155 | 2.12 | 10.22 | 0.84 | -4.81 | 6.27 | 13.59 |
| All CHINA-RF | 155 | 0.34 | 0.24 | 0.19 | 0.19 | 0.46 | 0.87 |
| HKSE-RF | 155 | 0.46 | 0.14 | 0.52 | 0.32 | 0.56 | 0.58 |

Panel C: Summary Statistics during the Global financial crisis (2007-2010)

| Variable | N | Mean | StdDev | Median | 25% | 75% | 90% |
|---|---|---|---|---|---|---|---|
| All China-RET | 38 | -0.25 | 11.71 | 2.69 | -7.68 | 8.50 | 13.42 |
| HKSE-RET | 38 | 0.17 | 8.68 | 0.38 | -5.24 | 3.85 | 12.92 |
| SSE-RET | 38 | -0.47 | 11.63 | 2.48 | -7.98 | 7.38 | 13.90 |
| SZSE-RET | 38 | 0.43 | 12.18 | 2.45 | -7.49 | 9.27 | 16.57 |
| All CHINA-RF | 38 | 0.24 | 0.07 | 0.19 | 0.19 | 0.32 | 0.34 |
| HKSE-RF | 38 | 0.15 | 0.16 | 0.04 | 0.04 | 0.29 | 0.38 |

**Table** Error! No text of specified style in document.
**Equal-Weighted and Value-Weighted Momentum Returns**

At the beginning of each month t, All China, SSE, SZSE and HKSE stocks are allocated into deciles based on their lagged 6-month returns (t-6 to t-1) and portfolios are formed one month after the lagged returns used for forming these portfolios are measured (Panels A and B). We then form an equal-weighted and value-weighted (Panels A and B only) zero-cost portfolio selling (buying) the decile of stocks with the lowest (highest) 6-month lagged returns. These portfolios are held for K months (K=3, 6, 9 and 12 months). The average monthly returns of portfolio P1 (Losers), P10 (Winners) and momentum returns (P10-P1) are reported in per cent and *t*-statistics provided in parentheses. The sample period is November 1994 to November 2010.

| Panel A: Equal-weighted Momentum Returns | | | | | |
|---|---|---|---|---|---|
| | #Months | 184 | 181 | 178 | 175 |
| Market | K= | 3 | 6 | 9 | 12 |
| All China | P1 (Losers) | 1.36 | 1.37 | 1.50 | 1.62 |
| | | (3.64) | (4.03) | (4.80) | (5.59) |
| | P10 (Winners) | 1.92 | 1.95 | 1.91 | 1.84 |
| | | (5.59) | (6.16) | (6.54) | (6.93) |
| | P10-P1 | 0.56 | 0.58 | 0.41 | 0.22 |
| | | (3.04) | (3.80) | (3.29) | (2.12) |
| HKSE | P1 (Losers) | 0.39 | 0.13 | 0.25 | 0.41 |
| | | (0.92) | (0.34) | (0.78) | (1.50) |
| | P10 (Winners) | 1.15 | 0.73 | 0.67 | 0.61 |
| | | (3.28) | (2.45) | (2.50) | (2.51) |
| | P10-P1 | 0.76 | 0.60 | 0.43 | 0.20 |
| | | (4.12) | (3.58) | (3.36) | (1.67) |
| SSE | P1 (Losers) | 1.27 | 1.32 | 1.39 | 1.48 |
| | | (3.42) | (3.80) | (4.52) | (5.17) |
| | P10 (Winners) | 2.06 | 2.15 | 2.12 | 2.02 |
| | | (6.09) | (6.88) | (7.51) | (7.94) |
| | P10-P1 | 0.80 | 0.83 | 0.73 | 0.53 |
| | | (3.88) | (4.78) | (4.74) | (4.08) |
| SZSE | P1 (Losers) | 1.68 | 1.68 | 1.76 | 1.81 |
| | | (4.11) | (4.49) | (5.10) | (5.75) |
| | P10 (Winners) | 1.71 | 1.71 | 1.82 | 1.80 |
| | | (4.74) | (5.14) | (5.61) | (6.00) |
| | P10-P1 | 0.02 | 0.04 | 0.06 | -0.01 |
| | | (0.13) | (0.27) | (0.53) | (-0.06) |

**Table** Error! No text of specified style in document.**: Continued**

| Panel B: Value-weighted Momentum Returns | | | | | |
|---|---|---|---|---|---|
| | #Months | 184 | 181 | 178 | 175 |
| Market | K= | 3 | 6 | 9 | 12 |
| All China | P1 (Losers) | 0.97 | 0.90 | 0.99 | 1.15 |
| | | (2.78) | (2.85) | (3.42) | (4.32) |
| | P10 (Winners) | 1.66 | 1.67 | 1.63 | 1.58 |
| | | (4.90) | (5.25) | (5.47) | (5.77) |
| | P10-P1 | 0.69 | 0.77 | 0.64 | 0.43 |
| | | (3.68) | (4.93) | (4.99) | (3.93) |
| HKSE | P1 (Losers) | -0.84 | -0.25 | 0.33 | 0.66 |
| | | (-2.20) | (-0.68) | (1.08) | (2.43) |
| | P10 (Winners) | 0.98 | 0.79 | 0.80 | 0.78 |
| | | (3.06) | (2.84) | (3.14) | (3.16) |
| | P10-P1 | 1.82 | 1.04 | 0.48 | 0.12 |
| | | (7.18) | (4.27) | (2.52) | (0.72) |
| SSE | P1 (Losers) | 0.85 | 0.80 | 0.84 | 0.93 |
| | | (2.57) | (2.60) | (3.00) | (3.66) |
| | P10 (Winners) | 1.72 | 1.72 | 1.69 | 1.62 |
| | | (5.20) | (5.60) | (5.96) | (6.17) |
| | P10-P1 | 0.87 | 0.92 | 0.85 | 0.69 |
| | | (4.34) | (5.43) | (5.88) | (5.42) |
| SZSE | P1 (Losers) | 1.36 | 1.33 | 1.48 | 1.57 |
| | | (3.29) | (3.70) | (4.45) | (5.24) |
| | P10 (Winners) | 1.72 | 1.70 | 1.74 | 1.70 |
| | | (4.80) | (5.13) | (5.38) | (5.62) |
| | P10-P1 | 0.36 | 0.37 | 0.26 | 0.13 |
| | | (1.63) | (2.38) | (2.08) | (1.26) |

## Table 3
## Momentum Returns and Financial Crisis

At the beginning of each month t, All China, SSE, SZSE and HKSE stocks are allocated into deciles based on their lagged 6-month (t-6 to t-1) returns and portfolios are formed one month after the lagged returns used for forming these portfolios are measured. We then form an equal-weighted and value-weighted zero-cost portfolio selling (buying) the decile of stocks with the lowest (highest) 6-month lagged returns. These portfolios are held for 6 months. The average monthly returns of portfolio P1 (Losers), P10 (Winners) and momentum returns (P10-P1) are reported in per cent and *t*-statistics provided in parentheses. The sample period is November 1994 to November 2010.

Panel A: Equal-weighted Momentum Returns before the Global Financial Crisis

| Market | P1 (Losers) | P10 (Winners) | P10-P1 | %>0 | #Months |
|---|---|---|---|---|---|
| All China | 0.50 | 1.56 | 1.07 | 69.70 | 134 |
| | (1.73) | (5.97) | (6.10) | | |
| HKSE | -0.38 | 0.73 | 1.11 | 80.30 | 134 |
| | (-1.05) | (2.45) | (6.60) | | |
| SSE | 0.44 | 1.85 | 1.41 | 76.52 | 134 |
| | (1.62) | (6.89) | (6.06) | | |
| SZSE | 0.92 | 1.23 | 0.31 | 58.33 | 134 |
| | (2.49) | (4.41) | (2.11) | | |

Panel B: Value-weighted Momentum Returns before the Global Financial Crisis

| Market | P1 (Losers) | P10 (Winners) | P10-P1 | %>0 | #Months |
|---|---|---|---|---|---|
| All China | 0.27 | 1.46 | 1.19 | 80.60 | 134 |
| | (1.10) | (5.30) | (7.62) | | |
| HKSE | -0.80 | 0.86 | 1.67 | 79.85 | 134 |
| | (-2.26) | (2.29) | (6.98) | | |
| SSE | 0.14 | 1.59 | 1.45 | 80.60 | 134 |
| | (0.65) | (6.24) | (8.43) | | |
| SZSE | 0.62 | 1.33 | 0.72 | 70.90 | 134 |
| | (1.82) | (4.94) | (4.67) | | |

Panel C: Equal-weighted Momentum Returns from 2007 to 2010

| Country | P1 (Losers) | P10 (Winners) | P10-P1 | %>0 | #Months |
|---|---|---|---|---|---|
| All China | 3.81 | 3.03 | -0.78 | 31.91 | 47 |
| | (4.11) | (3.21) | (-3.69) | | |
| HKSE | 1.50 | 0.68 | -0.82 | 61.97 | 47 |
| | (1.53) | (0.90) | (-2.25) | | |
| SSE | 3.83 | 2.99 | -0.84 | 25.31 | 47 |
| | (4.11) | (3.25) | (-4.52) | | |
| SZSE | 3.81 | 3.07 | -0.74 | 34.30 | 47 |
| | (4.17) | (3.13) | (-2.76) | | |

**Table 3: Continued**

| Panel D: Value-Weighted Momentum Returns from 2007 to 2010 | | | | | |
|---|---|---|---|---|---|
| Country | P1 (Losers) | P10 (Winners) | P10-P1 | %>0 | #Months |
| All China | 2.72 | 2.29 | -0.43 | 42.55 | 47 |
| | (2.81) | (2.39) | (-1.24) | | |
| HKSE | 1.32 | 0.59 | -0.73 | 44.68 | 47 |
| | (1.38) | (0.89) | (-1.26) | | |
| SSE | 2.69 | 2.08 | -0.61 | 53.19 | 47 |
| | (2.77) | (2.23) | (-1.79) | | |
| SZSE | 3.35 | 2.76 | -0.59 | 42.55 | 47 |
| | (3.60) | (2.72) | (-1.46) | | |

## Table 4
## Momentum Returns and Market States

At the beginning of each month t, All China, SSE, SZSE and HKSE stocks are allocated into deciles based on their 6-month lagged returns and portfolios are formed one month after the lagged returns used for forming these portfolios were measured. These portfolios are held for another six months. Holding period returns are then calculated. Positive (negative) returns of the Value-Weighted Market Returns for All China, VW SSE index, VW SZSE Index and Hang Seng Index over months t-m (m=36, 24 and 12 months) are used to define UP (DOWN) market states for each market. Monthly average momentum returns (winner minus loser), CAPM alphas, and Fama-French alphas over the sample period are reported below. Panels A, B, and C report momentum returns following 36-, 24- and 12- month UP and DOWN markets over the period from 1995 to 2010, respectively. Panels D, and E and report momentum returns following 24-month UP and DOWN markets over the period from 1995 to 2006, and 2007 to 2010, respectively. All the returns are reported in per cent and the numbers in the parentheses represent robust Newey and West t- statistics.

Panel A: Momentum returns following 36-month UP and DOWN markets

| | All China | | HKSE | | SSE | | SZSE | |
|---|---|---|---|---|---|---|---|---|
| | UP | DOWN | UP | DOWN | UP | DOWN | UP | DOWN |
| *N* | 136 | 45 | 151 | 30 | 137 | 44 | 127 | 54 |
| Momentum returns | 0.34 | 1.57 | 0.54 | 0.51 | 0.65 | 1.97 | -0.18 | 0.67 |
| (t-statistic) | (1.04) | (3.71) | (1.03) | (1.06) | (1.07) | (4.56) | (-0.43) | (1.66) |
| CAPM alpha | 0.37 | 1.55 | 0.51 | 0.50 | 0.66 | 1.59 | -0.17 | 0.75 |
| (t-statistic) | (1.01) | (3.58) | (1.08) | (1.06) | (1.08) | (4.46) | (-0.57) | (1.74) |
| Fama-French alpha | 0.35 | 1.85 | 0.83 | 0.52 | 0.72 | 1.61 | -0.14 | 1.01 |
| (t-statistic) | (1.03) | (3.70) | (2.01) | (1.21) | (1.26) | (4.69) | (-0.56) | (2.01) |

Panel B: Momentum returns following 24-month UP and DOWN markets

| | All China | | HKSE | | SSE | | SZSE | |
|---|---|---|---|---|---|---|---|---|
| | UP | DOWN | UP | DOWN | UP | DOWN | UP | DOWN |
| *N* | 117 | 64 | 134 | 47 | 118 | 63 | 113 | 68 |
| Momentum returns | 0.48 | 0.93 | 054 | 0.53 | 0.77 | 1.31 | -0.15 | 0.42 |
| (t-statistic) | (1.18) | (2.92) | (1.32) | (0.86) | (1.73) | (2.98) | (-0.38) | (1.26) |
| CAPM alpha | 0.55 | 0.90 | 0.53 | 1.01 | 0.79 | 1.65 | -0.14 | 0.48 |
| (t-statistic) | (1.10) | (2.88) | (1.60) | (1.64) | (1.86) | (3.02) | (-0.36) | (1.31) |
| Fama-French alpha | 0.51 | 0.89 | 0.82 | 0.78 | 0.90 | 1.58 | -0.13 | 0.55 |
| (t-statistic) | (1.14) | (2.99) | (2.06) | (1.67) | (1.92) | (3.13) | (-0.39) | (1.56) |

## Table 4: Continued

Panel C: Monthly Momentum Returns Following 12-month UP and DOWN Markets

| | All China | | HKSE | | SSE | | SZSE | |
|---|---|---|---|---|---|---|---|---|
| | UP | DOWNN | UP | DOWN | UP | DOWN | UP | DOWN |
| N | 111 | 70 | 126 | 55 | 115 | 66 | 103 | 78 |
| Momentum returns | 0.84 | 0.33 | 0.38 | 0.88 | 1.20 | 0.55 | 0.15 | -0.03 |
| (t-statistic) | (2.06) | (1.08) | (0.99) | (1.20) | (2.50) | (1.59) | (0.57) | (-0.13) |
| CAPM alpha | 0.85 | 0.42 | 0.37 | 1.10 | 1.20 | 0.69 | 0.13 | 0.13 |
| (t-statistic) | (2.05) | (1.19) | (1.12) | (1.67) | (2.48) | (1.60) | (0.51) | (0.47) |
| Fama-French alpha | 0.82 | 0.54 | 0.66 | 1.23 | 1.25 | 0.79 | 0.17 | 0.22 |
| (t-statistic) | (2.03) | (1.27) | (1.71) | (1.97) | (2.55) | (1.86) | (0.62) | (0.79) |

Panel D: Momentum Returns Following 24-month UP and DOWN Markets before 2007

| | All China | | HKSE | | SSE | | SZSE | |
|---|---|---|---|---|---|---|---|---|
| | UP | DOWN | UP | DOWN | UP | DOWN | UP | DOWN |
| N | 80 | 54 | 98 | 36 | 83 | 51 | 69 | 65 |
| Momentum returns | 1.08 | 1.19 | 0.89 | 1.26 | 1.55 | 1.66 | 0.09 | 0.56 |
| (t-statistic) | (2.16) | (4.16) | (2.13) | (2.02) | (2.47) | (4.97) | (0.27) | (1.79) |
| CAPM alpha | 1.20 | 1.16 | 0.87 | 1.48 | 1.59 | 1.65 | 0.12 | 0.65 |
| (t-statistic) | (2.29) | (4.01) | (2.13) | (2.07) | (2.59) | (5.32) | (0.36) | (1.81) |
| Fama-French alpha | 1.06 | 1.19 | 1.00 | 2.06 | 1.56 | 1.58 | 0.01 | 0.71 |
| (t-statistic) | (2.16) | (4.10) | (2.19) | (2.32) | (2.51) | (5.11) | (0.27) | (2.03) |

Panel E: Momentum Returns Following 24-month UP and DOWN Markets from 2007 to 2010

| | All China | | HKSE | | SSE | | SZSE | |
|---|---|---|---|---|---|---|---|---|
| | UP | DOWN | UP | DOWN | UP | DOWN | UP | DOWN |
| N | 36 | 11 | 35 | 12 | 34 | 13 | 43 | 4 |
| Momentum returns | -0.83 | -0.32 | -0.14 | -2.53 | -1.11 | -0.04 | -0.53 | -1.80 |
| (t-statistic) | (-2.01) | (-0.61) | (-0.39) | (-1.69) | (-2.08) | (-0.11) | (-1.40) | (-2.05) |
| CAPM alpha | -0.84 | -0.36 | -0.14 | -3.57 | -1.12 | -0.09 | -0.62 | -1.31 |
| (t-statistic) | (-2.02) | (-0.82) | (-0.40) | (-1.60) | (-2.04) | (0.24) | (-1.59) | (-1.71) |
| Fama-French alpha | -0.69 | -0.53 | 0.05 | -3.61 | -1.10 | -0.26 | -0.42 | -1.21 |
| (t-statistic) | (-1.61) | (-0.59) | (0.10) | (-1.25) | (-2.14) | (-0.32) | (-0.97) | (-1.31) |