INVESTOR OVERREACTION IN ASIAN AND US STOCK MARKETS: EVIDENCE FROM THE 2008 FINANCIAL CRISIS

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ABSTRACT

This study explored the effectiveness of the contrarian and momentum strategies in the United States stock market-S&P 500 and Chinese stock markets (Taiwan, Hong Kong, & Singapore) both during the 2008 financial crisis and during the pre-crisis period. Additionally, the study examined the similarities and differences between investor behavior (specifically overreaction and underreaction) in western and eastern countries, to assist global investors and fund managers in their decision-making in those regions. The sample period was from May 2003 to October 2012, providing both long-term and short-term analysis and including a non-crisis financial period and a crisis period. This study used an empirical research design and was non-experimental in nature. Results showed that in the short-term, the momentum strategy is significant in Taiwan, Hong Kong, and Singapore, but not in the S&P 500. Additionally, the momentum strategy is not significant in the financial crisis period in the Asian markets. However, the momentum strategy did provide significant profit in the financial crisis period in the U.S. market. The contrarian strategy is significant in the long-term except in the S&P 500, but it is also not significant in the crisis period.

JEL: G01, G15

KEYWORDS: 2008 Financial Crisis, Investor Behavior, Trading Strategies, US Market, Asian Markets

INTRODUCTION

This paper analyses the role of investor behavior in stock market returns and evaluates the effectiveness of the momentum and contrarian trading strategies from May 2003 to October 2012 in the United States stock market and the Chinese influenced markets of Taiwan, Hong Kong, and Singapore. This study also compares eastern and western influenced stock markets to show how investor behavior affects stock markets in different countries, providing international evidence for both trading strategies. Utilizing principles of behavior finance theory provides a better understanding of the influence of human behavior in investor decision making. De Bondt and Thaler (1985), Jegadeesh and Titman (1993), and the latest researchers provide evidence that investor behavior caused stock market effectiveness in the short-term momentum and long-term contrarian. However, previous research has never included a global crisis period. This issue is important because few articles have considered an economic cycle or financial crisis into their trading strategies. While Lakonishok, Shleifer & Vishny (1994) researched the NYSE from 1963-1990 and showed that the contrarian strategy is not affected by systematic risk during four economic recessions, their test period did not include a global financial crisis. Globalization has created one world economy, and it is necessary to observe the relationships between different countries, investor behavior, and trading strategies.

Previous research shows the contrarian strategy can have positive results in both long-term (3-5 years) and short-term (1 week to 1 month) holding periods, while the momentum strategy has a better advantage in medium-term (3-12 months) holding periods (Conrad and Kaul, 1998). Research also shows that Asian markets such as Hong Kong (Fung 1999), Singapore (Ramiah, Naughton & Veeraraghvan, 2009) and Taiwan (Chen 2002) can be profitable using both the momentum and contrarian trading strategies. However, after the 1997 Asian Financial Crisis, Ahmad and Tjan (2004) found that in the Malaysian

stock market, contrarian strategy did not create significant positive returns before the financial crisis period, but it provided significant positive returns during financial crisis period while the momentum strategy did not. Otchere and Chan (2003) also compared the contrarian strategy in the Hong Kong stock market both pre and post the 1997 Asian financial crisis, and their results showed the Hong Kong stock market had profit before the Asian financial crisis, but they were not able to provide a significant result regarding the post-financial crisis period. The current body of research does not include an in-depth analysis of the contrarian and momentum strategies in Asian markets or the United States after 2000 and does not include a financial crisis period.

By studying the contrarian and momentum strategy effectiveness from May 2003 to October 2012 in the United States and Chinese influence stock markets, this research provides recent data of the effects of the 2008 crisis period in all four countries and can help understand the role of investor behavior during a crisis period. This study provides new data regarding the performance of momentum and contrarian strategies in three periods. The first is a non-financial crisis period from May 2003 to August 2008, the second is a financial crisis period from September 2008 to October 2012, and the third is an overall period from May 2003 to October 2012. These results allow for a comparison of trading strategies performances in various times and situations to see how a global financial crisis affects each country's stock market. In order to understand the role of behavior finance and trading strategies in this research, this paper first provides a literature review of behavior finance theory and overreaction and underreaction behaviors. The literature review also includes the background of the contrarian and momentum strategies and past trading research in the United States and the three Chinese influenced markets. Next, the paper discusses the data collection procedures and systematic methodology for testing used in the study. The following section provides descriptive statistics results for both strategies and holding periods in all markets and includes a review of the findings. Lastly, we provide an overview of the study and findings, study limitations, and opportunities for future research.

LITERATUR REVIEW

De Bondt and Thaler (1985) were the first researches to combine behavior and cognitive psychology with economics and finance to help to explain stock return anomalies. This became known as behavior finance and provided researchers an alternative method to the traditional CAPM to explain stock market behavior. Behavior finance emphasizes the importance of investor psychological factors such as overreaction and underreaaction and relies on the contrarian and momentum trading strategies to explain how investors can obtain abnormal returns in different holding periods based on these psychological factors.

Overreaction and underreaction are extremely important concepts in behavioral finance field and create the biggest challenges to the efficient market hypothesis. Barberis, Shleifer, and Vishny (1998) explained that investors' conservatism causes short-term momentum effect and representativeness heuristic, which can cause overreaction and have long–term reserve on stock price. Daniel, Hirshleifer, and Subrahmanyam (1998) believed investors' overconfidence and self-attribution bias explained the overreaction. Hong and Stein (1999) believed that the attitude of different investors to judge the information causes the effect. Odean (1998a, 1998b, 1999) and Barber and Odean (1999, 2000a, 2000b, 2001) conducted in-depth research concluding overconfidence explains the phenomena. Odean (1998a) introduced that investor's overconfidence can affect investor's decisions. He extended the research by Shefrin and Statman (1985) that discussed another anomaly in behavior finance called the disposition effect that states investors tend to sell stocks quickly when the price has increased and try to keep their security while the price has dropped. Odean found that investors are reluctant to realize their losses and tend to hold losing investments too long and sell winning investments too soon, supporting the disposition effect. Overall, there is significant research and evidence from behavior finance articles supporting the role of investor overreaction on stock prices in short-term momentum and long-term reserve.

De Bondt and Thaler (1985) first developed the contrarian strategy and Jegadeesh and Titman (1993) developed momentum strategy. Contrarian strategy is to buy loser stocks (stocks with bad performance in the past) and sell winner stocks (stocks with good performance in the past). Momentum is simply the opposite strategy: buying winner stocks and selling loser stocks. Investor overreaction and underreaction creates these two trading strategies: When investors underreact to current events, they continue creating a momentum effect, and when they realize and adjust their decisions, they are using the contrarian strategy to readjust the security price.

De Bondt and Thaler (1985) studied the contrarian trading strategy in the United States stock market from 1926- 1982 and showed abnormal profits with investor overreaction in the long-term period. Lakonishok, Shleifer and Vishny (1994) also showed that the contrarian strategy has positive results in both long-term (3-5 years) as well as the short-term (1 week to 1 month) holding periods in the U.S market between 1963 and 1990. Their results also show that the contrarian strategy is not affected by systematic risk (an economic recession), because the contrarian strategy still made profit during four economic recessions in the testing period. Kang, Liu, & Ni (2002) researched the Chinese market from 1993 to 2000 and showed that short-term contrarian has positive profits.

Conrad and Kaul (1998) used different formation and holding periods in the US NYSE/AMEX stock market from1926-1989 and concluded that the momentum strategy has a better advantage in medium-term (3-12 months) holding periods. Kang, Liu & Ni (2002) had similar results when they studied the Chinese market from 1993 to 2000. Hameed and Kusnadi (2002) showed that momentum strategies are profitable among high-turnover stocks, but are not profitable among low-turnover stocks in six Asian countries. Schiereck, De Bondt, and Weber (1999) and Chui, Titman & Wei (2000) both demonstrated that six Asian Pacific markets except Japan have the momentum effect. Rouwenhorst (1999) also found that winners have higher turnover than losers in 16 out of 20 emerging markets. Zuchel (2001) provided evidence that links momentum and trading volume, and Glaser and Weber (2002) found that momentum is stronger among high-turnover stocks in German Stock market. Ramiah, Naughton and Veeraraghvan (2009) researched the momentum strategy in Singapore during 1990 to 2004 and have the average return 11.22% per month on the main board.

DATA & METHODOLOGY

Data from May 2003 to October 2012 was obtained by DataStream database. Our data included monthly returns for all the companies listed in the stock market in the New York stock exchange, Taiwan stock exchange, Hong Kong stock exchange, and Singapore stock exchange main board. The Hong Kong Stock Exchange is the sixth largest in the world and has 1,477 listed companies with a combined market capitalization of HK$17 trillion. The Singapore Exchange Limited is an investment holding company that provides various securities and derivatives trading services. They have a combined market capitalization of S$650 billion and have 774 listed companies. Operating since 1962, The Taiwan Stock Exchange Corporation has seven listed companies with a combined market capitalization of TW$23 million. These three Asian markets provide well-rounded markets to use in an Asian financial markets research. This research used the S&P 500 index to represent the New York Stock Exchange (NYSE) due to the difficulty of obtaining data from the NYSE. However, the S&P 500 is widely used and commonly accepted as the best representation of the U.S. stock market since it includes the 500 leading publicly traded companies. This research design is non-experimental in nature as all data used was historical.

Taiwan, Hong Kong, Singapore and the S&P 500 were tested in three different periods: an overall period including a non-financial crisis and financial crisis period (May 2003 to October 2012), a non-financial crisis period (May 2003 to August 2008), and a financial crisis period (September 2008 to October 2012). Using methodology from Conrad and Kaul (1993) and Jegadeesh and Titman (1993), the formation period (J) consisted of 3, 6, 12, and 24 months, and holding period (K) included 3, 6, 12, and 24 months.

Each formation period tested data with each holding period, thus providing sixteen portfolios for every period in each country. Additionally, the top 20% of stocks in each J formation period were designated as the "winner portfolios" and the bottom 20% of stocks were designated as the "loser portfolios"; both portfolios were held for K holding periods. This research covers all three holding periods: short-term period is between one and three months, intermediate-term period is between three and twelve months, and long-term period is above twelve months. This provided a large amount of data to observe investors' behavior more precisely. T-tests were also used to exam the results.

Using a five-step method, our study evaluated the data in three ways to understand the relationship between trading strategies and a financial crisis, as well as the relationship between trading strategies and performance in our specified markets. The first evaluation examined the performance of contrarian and momentum in different situations, which is the pre financial crisis period and financial crisis period. The second evaluation examined the trading strategy performance differences between a pre crisis period and crisis period. The third evaluation examined the U.S. and Chinese relative stock market performance by using different trading strategies in different periods. After these three evaluations, it is easy for an investor to understand the relationship between financial crisis and trading strategies as well as the trading strategies' performance between U.S. and Asia stock markets.

Step 1: Based on Jegadeesh and Titman's (1993) research, the winner and loser stocks are defined by the previous J month's return. This study uses the methodology from Fung (1999) and Chen (2007) to sort the stocks from cumulative return over the past J month's formation period.

$$R_{i,j} = \prod_{t=-(J-1)}^{0} \left(1 + r_{i,t}\right) - 1 \qquad (1)$$

J is the formation period or month
$r_{i,t}$ is the stock returns in t month(s) for i company
$R_{i,j}$ is the cumulative return based on formation period J in i company

In our study, $r_{i,t}$ is the stock returns for security i in month t. In order to define winner and loser stocks, we used $R_{i,j}$ to calculate the total return of security i in the J month formation period before the portfolio formation date T. Then, in each formation date T, we rank the total return $R_{i,j}$ for all the companies with J month formation months. In our study, J is 3, 6, 12 and 24. Lastly, we choose the top 20% highest stocks as winner and the worst 20% stocks as loser and we divide them as describe below in step #2. Step 2: The sorted stocks are divided into five groups. This division system is similar to Chen's (2007) method. However, there are different division methods than this including De Bondt and Thaler (1985) who selected the top 10% stock return as their winner and the bottom 10% as their loser for the contrarian strategy, and Jegadeesh and Titman (1993) who split ten groups for the momentum. We chose to split our sorted stocks into five groups because there are not as many companies listed in our selected three Asian countries as compared to numbers in the US stock markets.

We chose the best performance group of stock returns (top 20%) as the winner portfolio and the worst performance group (bottom 20%) as the loser portfolio for every formation date T. Our study has four formation periods: 3-months, 6-months, 12-months, and 24-months. For example, in the 12-month formation period we rank the total return for all companies by $R_{i,12}$ and select the top 20% as the winner portfolio and the bottom 20% as the loser portfolio. The total 12-month period starts from month -11 and goes until month 0. The end of month 0 is the formation date T. This same method is used for 3, 6, and 24-month formation periods by ranking the total return$R_{i,3}$, $R_{i,6}$, and $R_{i,24}$. Since we rebalance the portfolio for every month, we have formation date T every month and repeat the processes to rank winner

and loser portfolios for$R_{i,3}$, $R_{i,6}$ $R_{i,12}$ and $R_{i,24}$ every month throughout the sample period. Step 3: In our study, we also use the formula (1) concept to calculate the average return of winner and loser portfolios. After choosing the winner and loser stocks in formation date T for J months formation period, we calculate the total return from month 1 to month K, where K is the holding period. We do this for each company in our winner and loser portfolios. N_p is the number of portfolios of winners firms or loser firms. The formula below shows the average returns and allows us to compare the performance of winner or loser portfolios after holding K month(s).

Winner portfolio average return

$$R_W = \frac{1}{N_p}\sum_{n=1}^{N_p}\left[\prod_{t=1}^{K}\left(1 + r_{i,t}^{W}\right) - 1\right] \quad (2)$$

Loser portfolio average return

$$R_L = \frac{1}{N_p}\sum_{n=1}^{N_p}\left[\prod_{t=1}^{K}\left(1 + r_{i,t}^{L}\right) - 1\right] \quad (3)$$

R_W is the winner portfolio average return in t month
R_L is the winner portfolio average return in t month
N_p is the number of portfolios of the winner firms or loser firms
K is the holding period

Step 4: For each formation date T, we use a winner or loser portfolio (based on the performance of J (J= 3, 6, 12, 24) months formation period) to determine the winner or loser stocks and hold K (K= 3, 6, 12, 24) months to obtain the average return of the winner or loser portfolio. We will repeat this each month Q times for each J formation and K holding periods through the sample period selected.

Formation Period | Holding Period
T_1-j $T=T_1$ T_{1+}k

Formation Period | Holding Period
T_2-j $T=T_1+1=T_2$ T_{2+}k

Formation Period | Holding Period
T_Q-j $T=T_{Q-1}+1=T_Q$ T_{Q+}k

After repeating the formation and holding periods though the sample period, we select for Q times. The resulting total average return for a winner portfolio is as follows:

$$AR_W = \frac{1}{Q}\sum_{q=1}^{Q} R_W \quad (4)$$

The total average return for a loser portfolio is as follows:

$$AR_L = \frac{1}{Q}\sum_{q=1}^{Q} R_{L,} \quad (5)$$

Step 5: The following two formulas (6&7) show the momentum and contrarian strategies.

The return method for the momentum strategy is to buy the winner group and sell the loser group:

$$AR_W - AR_L \tag{6}$$

The return method for the contrarian strategy is to buy the loser group and sell the winner group:

$$AR_L - AR_W \tag{7}$$

In our study, we examined both the pre financial crisis period (B) and financial crisis period (D). In order to do this, we used $AR_W^B - AR_L^B$ to describe the return by using the momentum strategy before the financial crisis period and $AR_W^D - AR_L^D$ to describe the return by using the momentum strategy during the financial crisis period. Additionally, $AR_L^B - AR_W^B$ is the return by using the contrarian strategy before the financial crisis period and $AR_L^D - AR_W^D$ is the return by using the momentum strategy before the financial crisis period. The t test, as referenced from De Bondt and Thaler (1985), was used to examine the momentum and contrarian strategies performance for each stock market. For the momentum strategy test, which will provide the total return of winner portfolio minus loser return $AR_W - AR_L > 0$ for each J month formation period and K month holding period after we repeat Q time though our sample period, the t-statistic will be:

$$T_t = \frac{AR_W - AR_L}{\sqrt{{2S_t}^2 / Q}}$$

While

$${S_t}^2 = {[\sum_{q=1}^{Q}(R_W - AR_W)^2 - \sum_{q=1}^{Q}(R_L - AR_L)^2]} / {2(Q-1)}$$

For the test of the contrarian strategy, which shows the return $AR_W - AR_L > 0$, the t-statistic will be

$$T_t = \frac{AR_L - AR_W}{\sqrt{{2S_t}^2 / Q}}$$

While

$${S_t}^2 = {[\sum_{q=1}^{Q}(R_L - AR_L)^2 - \sum_{q=1}^{Q}(R_W - AR_W)^2]} / {2(Q-1)}$$

RESULTS

This research tested both the momentum and contrarian strategies during different formation and holding periods to discover which strategies can generate significant profit in the selected markets. Tables 1 thru 8 show the statistics tests for both the winner and loser portfolios in the Taiwan stock market, Singapore stock market, Hong Kong stock market (main board only), and the U.S stock market (S&P 500). The tests included three sample periods to understand how a financial crisis could affect investors' behaviors and decisions in stock markets. The first sample period from May 2003 to October 2012 included both

financial crisis and non-financial crisis periods, the second sample period from May 2003 to August 2008 was a non-financial crisis period, and the third sample period from September 2008 to October 2012 was a financial crisis period. Each country data has a table for the winner portfolio and the loser portfolio. Each table is divided into three sections: the overall period portfolio, the non-financial crisis portfolio, and the financial crisis portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation. Refer to Table 1 through Table 8 for descriptive statistics.

Table 1: Taiwanese Stock Market Winner Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Winner portfolio J=3, K=3	109	0.0420	0.6409	-0.3731	0.1603
Winner portfolio J=3, K=6	106	0.0820	0.7359	-0.5137	0.2406
Winner portfolio J=3, K=12	100	0.1389	1.130	-0.5094	0.3569
Winner portfolio J=3, K=24	88	0.2797	1.289	-0.4824	0.4816
Winner portfolio J=6, K=3	106	0.0396	0.4887	-0.3784	0.1609
Winner portfolio J=6, K=6	103	0.0696	0.5908	-0.5039	0.2278
Winner portfolio J=6, K=12	97	0.1241	0.9248	-0.5443	0.3378
Winner portfolio J=6, K=24	85	0.2555	1.269	-0.4752	0.4792
Winner portfolio J=12, K=3	100	0.0289	0.4056	-0.3399	0.1443
Winner portfolio J=12, K=6	97	0.0562	0.5269	-0.5086	0.2121
Winner portfolio J=12, K=12	91	0.1017	0.8561	-0.5747	0.3245
Winner portfolio J=12, K=24	79	0.2258	1.255	-0.4678	0.4612
Winner portfolio J=24, K=3	88	0.0286	0.4735	-0.3401	0.1488
Winner portfolio J=24, K=6	85	0.0542	0.5741	-0.5240	0.2212
Winner portfolio J=24, K=12	79	0.1069	0.8260	-0.5732	0.3435
Winner portfolio J=24, K=24	67	0.2565	1.194	-0.4891	0.4910
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	59	0.0475	0.3815	-0.2440	0.1483
Winner portfolio J=3, K=6	56	0.1050	0.5162	-0.4219	0.1959
Winner portfolio J=3, K=12	50	0.1910	0.9168	-0.4192	0.3053
Winner portfolio J=3, K=24	38	0.5082	1.2319	-0.2488	0.4057
Winner portfolio J=6, K=3	56	0.0485	0.3951	-0.3143	0.1620
Winner portfolio J=6, K=6	53	0.0884	0.5266	-0.4374	0.1985
Winner portfolio J=6, K=12	47	0.1859	0.8210	-0.4303	0.3067
Winner portfolio J=6, K=24	35	0.5108	1.253	-0.2163	0.4107
Winner portfolio J=12, K=3	50	0.0320	0.3545	-0.3399	0.1476
Winner portfolio J=12, K=6	47	0.0767	0.4176	-0.4402	0.1861
Winner portfolio J=12, K=12	41	0.1869	0.8561	-0.4318	0.2991
Winner portfolio J=12, K=24	29	0.5325	1.255	0.1478	0.3276
Winner portfolio J=24, K=3	38	0.0457	0.3316	-0.3082	0.1500
Winner portfolio J=24, K=6	35	0.1082	0.4386	-0.3701	0.1840
Winner portfolio J=24, K=12	29	0.2756	0.8260	-0.3696	0.2993
Winner portfolio J=24, K=24	17	0.7353	1.194	0.2319	0.2936
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	45	0.0666	0.6409	-0.1508	0.1512
Winner portfolio J=3, K=6	42	0.1222	0.7359	-0.2209	0.2359
Winner portfolio J=3, K=12	36	0.1950	1.130	-0.2254	0.3610
Winner portfolio J=3, K=24	24	0.2796	1.289	-0.2954	0.4972
Winner portfolio J=6, K=3	42	0.0545	0.4887	-0.1350	0.1263
Winner portfolio J=6, K=6	39	0.0894	0.5741	-0.2281	0.1823
Winner portfolio J=6, K=12	33	0.1153	0.8090	-0.2431	0.2488
Winner portfolio J=6, K=24	21	0.1126	1.014	-0.3361	0.3358
Winner portfolio J=12, K=3	36	0.0231	0.2017	-0.1545	0.0873
Winner portfolio J=12, K=6	33	0.0238	0.2022	-0.2291	0.1045
Winner portfolio J=12, K=12	27	-0.0021	0.2766	-0.2507	0.1417
Winner portfolio J=12, K=24	15	-0.1179	0.1846	-0.3426	0.1123
Winner portfolio J=24, K=3	24	-0.0109	0.1930	-0.1911	0.0913
Winner portfolio J=24, K=6	21	-0.0421	0.1240	-0.2862	0.1154
Winner portfolio J=24, K=12	15	-0.1433	0.1330	-0.3213	0.1160
Winner portfolio J=24, K=24	3	-0.1101	-0.0312	-0.1801	0.0611

The table shows descriptive statistics for the winner portfolio of the Taiwanese Stock Market. The table is divided into three sections: the overall period winner portfolio, the non-financial crisis winner portfolio, and the financial crisis winner portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 2: Taiwanese Stock Market Loser Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Loser portfolio J=3, K=3	109	0.0308	0.6552	-0.4238	0.1783
Loser portfolio J=3, K=6	106	0.0649	1.290	-0.5453	0.2904
Loser portfolio J=3, K=12	100	0.1450	1.989	-0.5506	0.4736
Loser portfolio J=3, K=24	88	0.3365	2.344	-0.4435	0.6110
Loser portfolio J=6, K=3	106	0.0293	0.8787	-0.4209	0.1885
Loser portfolio J=6, K=6	103	0.0602	1.352	-0.5572	0.3071
Loser portfolio J=6, K=12	97	0.1645	1.914	-0.5438	0.5013
Loser portfolio J=6, K=24	85	0.3732	2.518	-0.4590	0.6332
Loser portfolio J=12, K=3	100	0.0377	0.9721	-0.4437	0.2020
Loser portfolio J=12, K=6	97	0.0901	1.332	-0.5630	0.3217
Loser portfolio J=12, K=12	91	0.2147	2.139	-0.5177	0.5272
Loser portfolio J=12, K=24	79	0.4357	2.489	-0.4863	0.6404
Loser portfolio J=24, K=3	88	0.0539	0.811	-0.4386	0.2057
Loser portfolio J=24, K=6	85	0.1207	1.267	-0.5572	0.3362
Loser portfolio J=24, K=12	79	0.2531	2.049	-0.5152	0.5491
Loser portfolio J=24, K=24	67	0.4092	2.424	-0.4113	0.6650
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	59	0.0291	0.4600	-0.3092	0.1501
Loser portfolio J=3, K=6	56	0.0624	0.5972	-0.2504	0.1933
Loser portfolio J=3, K=12	50	0.1597	1.020	-0.2778	0.3144
Loser portfolio J=3, K=24	38	0.4508	1.569	-0.1237	0.4426
Loser portfolio J=6, K=3	56	0.0220	0.3429	-0.2414	0.1430
Loser portfolio J=6, K=6	53	0.0455	0.5510	-0.2496	0.1859
Loser portfolio J=6, K=12	47	0.1788	1.134	-0.2902	0.3344
Loser portfolio J=6, K=24	35	0.4927	1.450	-0.1386	0.4344
Loser portfolio J=12, K=3	50	0.0258	0.4025	-0.2591	0.1398
Loser portfolio J=12, K=6	47	0.0806	0.5461	-0.2327	0.1823
Loser portfolio J=12, K=12	41	0.2424	1.120	-0.2739	0.3400
Loser portfolio J=12, K=24	29	0.6369	1.434	-0.0234	0.3949
Loser portfolio J=24, K=3	38	0.0533	0.5187	-0.2448	0.1666
Loser portfolio J=24, K=6	35	0.1286	0.6459	-0.2628	0.2225
Loser portfolio J=24, K=12	29	0.3522	1.174	-0.3062	0.3902
Loser portfolio J=24, K=24	17	0.7791	1.329	0.3126	0.3086
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	45	0.0639	0.6552	-0.2401	0.1883
Loser portfolio J=3, K=6	42	0.1275	1.290	-0.3675	0.3421
Loser portfolio J=3, K=12	36	0.2231	1.989	-0.3784	0.5949
Loser portfolio J=3, K=24	24	0.4481	2.344	-0.3517	0.8223
Loser portfolio J=6, K=3	42	0.0421	0.8787	-0.2234	0.1892
Loser portfolio J=6, K=6	39	0.0590	0.8448	-0.3476	0.2396
Loser portfolio J=6, K=12	33	0.0997	1.369	-0.3755	0.3909
Loser portfolio J=6, K=24	21	0.2395	1.881	-0.2913	0.5292
Loser portfolio J=12, K=3	36	0.0077	0.4157	-0.2288	0.1388
Loser portfolio J=12, K=6	33	0.0038	0.3116	-0.3285	0.1778
Loser portfolio J=12, K=12	27	0.0038	0.4372	-0.3642	0.2447
Loser portfolio J=12, K=24	15	0.0314	0.3541	-0.2498	0.1720
Loser portfolio J=24, K=3	24	-0.0192	0.4006	-0.1985	0.1331
Loser portfolio J=24, K=6	21	-0.0525	0.1426	-0.3140	0.1367
Loser portfolio J=24, K=12	15	-0.1385	0.0967	-0.2662	0.0916
Loser portfolio J=24, K=24	3	-0.0859	-0.0133	-0.1268	0.0515

The table shows descriptive statistics for the loser portfolio of the Taiwanese Stock Market. The table is divided into three sections: the overall period loser portfolio, the non-financial crisis loser portfolio, and the financial crisis loser portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 3: Singapore Stock Market Winner Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Winner portfolio J=3, K=3	109	0.0502	0.6049	-0.4337	0.1733
Winner portfolio J=3, K=6	106	0.1038	1.190	-0.5405	0.3054
Winner portfolio J=3, K=12	100	0.1802	1.520	-0.5809	0.4342
Winner portfolio J=3, K=24	88	0.3203	2.017	-0.5514	0.5782
Winner portfolio J=6, K=3	106	0.0417	0.6279	-0.4169	0.1583
Winner portfolio J=6, K=6	103	0.0863	1.032	-0.4514	0.2707
Winner portfolio J=6, K=12	97	0.1661	1.548	-0.6402	0.4181
Winner portfolio J=6, K=24	85	0.3037	1.720	-0.5917	0.5663
Winner portfolio J=12, K=3	100	0.0394	0.5650	-0.3675	0.1494
Winner portfolio J=12, K=6	97	0.0798	0.8436	-0.4680	0.2495
Winner portfolio J=12, K=12	91	0.1513	1.258	-0.6692	0.3915
Winner portfolio J=12, K=24	79	0.3010	1.707	-0.5800	0.5831
Winner portfolio J=24, K=3	88	0.0366	0.4268	-0.4667	0.1561
Winner portfolio J=24, K=6	85	0.0821	0.7654	-0.5496	0.2747
Winner portfolio J=24, K=12	79	0.1671	1.099	-0.6818	0.4250
Winner portfolio J=24, K=24	67	0.2731	1.465	-0.5379	0.5410
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	59	0.0734	0.6049	-0.2265	0.1671
Winner portfolio J=3, K=6	56	0.1531	1.190	-0.3291	0.3038
Winner portfolio J=3, K=12	50	0.3231	1.520	-0.3470	0.4514
Winner portfolio J=3, K=24	38	0.7016	2.017	-0.1393	0.5418
Winner portfolio J=6, K=3	56	0.0654	0.6279	-0.2615	0.1602
Winner portfolio J=6, K=6	53	0.1439	1.032	-0.3520	0.2931
Winner portfolio J=6, K=12	47	0.3340	1.548	-0.3606	0.4508
Winner portfolio J=6, K=24	35	0.7478	1.720	-0.1761	0.5038
Winner portfolio J=12, K=3	50	0.0690	0.5650	-0.2881	0.1616
Winner portfolio J=12, K=6	47	0.1522	0.8436	-0.3863	0.2740
Winner portfolio J=12, K=12	41	0.3493	1.258	-0.4643	0.4019
Winner portfolio J=12, K=24	29	0.8362	1.707	0.1963	0.4715
Winner portfolio J=24, K=3	38	0.0635	0.4268	-0.2754	0.1625
Winner portfolio J=24, K=6	35	0.1507	0.7654	-0.3117	0.2893
Winner portfolio J=24, K=12	29	0.3722	1.099	-0.4233	0.4115
Winner portfolio J=24, K=24	17	0.8462	1.465	0.2723	0.3611
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	45	0.0564	0.5052	-0.1545	0.1474
Winner portfolio J=3, K=6	42	0.1267	0.9835	-0.1517	0.2512
Winner portfolio J=3, K=12	36	0.1723	1.063	-0.2420	0.3089
Winner portfolio J=3, K=24	24	0.2459	1.259	-0.3500	0.4308
Winner portfolio J=6, K=3	42	0.0547	0.4945	-0.1462	0.1186
Winner portfolio J=6, K=6	39	0.0883	0.6706	-0.1592	0.1808
Winner portfolio J=6, K=12	33	0.1068	0.8943	-0.2691	0.2330
Winner portfolio J=6, K=24	21	0.1116	0.7662	-0.3232	0.3104
Winner portfolio J=12, K=3	36	0.0181	0.1569	-0.1722	0.0741
Winner portfolio J=12, K=6	33	0.0286	0.1757	-0.1749	0.1008
Winner portfolio J=12, K=12	27	0.0160	0.3034	-0.2127	0.1183
Winner portfolio J=12, K=24	15	-0.0855	0.0718	-0.2875	0.1022
Winner portfolio J=24, K=3	24	0.0174	0.1991	-0.1678	0.0823
Winner portfolio J=24, K=6	21	0.0061	0.2028	-0.2100	0.1162
Winner portfolio J=24, K=12	15	-0.0487	0.2877	-0.2432	0.1548
Winner portfolio J=24, K=24	3	-0.0431	0.0038	-0.0710	0.0333

The table shows descriptive statistics for the winner portfolio of the Singapore Stock Market. The table is divided into three sections: the overall period winner portfolio, the non-financial crisis winner portfolio, and the financial crisis winner portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 4: Singapore Stock Market Loser Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Loser portfolio J=3, K=3	109	0.0314	0.8972	-0.4977	0.2006
Loser portfolio J=3, K=6	106	0.0661	1.527	-0.5649	0.3581
Loser portfolio J=3, K=12	100	0.1812	2.291	-0.6526	0.6065
Loser portfolio J=3, K=24	88	0.3418	2.738	-0.5600	0.7409
Loser portfolio J=6, K=3	106	0.0302	1.134	-0.4890	0.2180
Loser portfolio J=6, K=6	103	0.0811	1.652	-0.6226	0.3951
Loser portfolio J=6, K=12	97	0.1886	2.085	-0.6553	0.6330
Loser portfolio J=6, K=24	85	0.2170	2.085	-0.6553	0.6593
Loser portfolio J=12, K=3	100	0.0452	1.236	-0.5166	0.2481
Loser portfolio J=12, K=6	97	0.1007	1.854	-0.6163	0.4341
Loser portfolio J=12, K=12	91	0.2289	2.254	-0.6238	0.6838
Loser portfolio J=12, K=24	79	0.2701	2.254	-0.6238	0.7156
Loser portfolio J=24, K=3	88	0.0665	1.092	-0.5001	0.2571
Loser portfolio J=24, K=6	85	0.0688	1.092	-0.5001	0.2613
Loser portfolio J=24, K=12	79	0.2920	2.708	-0.5609	0.6890
Loser portfolio J=24, K=24	67	0.4854	2.932	-0.4528	0.8828
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	59	0.0172	0.3354	-0.3374	0.1430
Loser portfolio J=3, K=6	56	0.0477	0.7153	-0.3595	0.2660
Loser portfolio J=3, K=12	50	0.2453	2.291	-0.4092	0.6043
Loser portfolio J=3, K=24	38	0.6613	2.738	-0.2580	0.7192
Loser portfolio J=6, K=3	56	0.0068	0.4395	-0.2820	0.1428
Loser portfolio J=6, K=6	53	0.0428	0.7409	-0.3009	0.2631
Loser portfolio J=6, K=12	47	0.2463	2.085	-0.3714	0.6090
Loser portfolio J=6, K=24	35	0.2828	2.085	-0.2883	0.6233
Loser portfolio J=12, K=3	50	0.0166	0.5836	-0.2712	0.1550
Loser portfolio J=12, K=6	47	0.0726	1.111	-0.2796	0.3194
Loser portfolio J=12, K=12	41	0.3231	2.254	-0.3438	0.6948
Loser portfolio J=12, K=24	29	0.3694	2.254	-0.2323	0.7066
Loser portfolio J=24, K=3	38	0.0733	0.5959	-0.2127	0.1961
Loser portfolio J=24, K=6	35	0.0888	0.5959	-0.2088	0.1953
Loser portfolio J=24, K=12	29	0.5911	2.708	-0.3371	0.7657
Loser portfolio J=24, K=24	17	1.5795	2.932	0.6983	0.6852
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	45	0.0824	0.8972	-0.2165	0.2294
Loser portfolio J=3, K=6	42	0.1700	1.527	-0.2944	0.4107
Loser portfolio J=3, K=12	36	0.2296	1.586	-0.3641	0.5258
Loser portfolio J=3, K=24	24	0.3452	1.942	-0.3038	0.7231
Loser portfolio J=6, K=3	42	0.0910	1.134	-0.2278	0.2656
Loser portfolio J=6, K=6	39	0.1481	1.652	-0.2970	0.4193
Loser portfolio J=6, K=12	33	0.1431	1.652	-0.3602	0.4809
Loser portfolio J=6, K=24	21	0.2318	1.652	-0.3602	0.5260
Loser portfolio J=12, K=3	36	0.0196	0.3975	-0.2154	0.1361
Loser portfolio J=12, K=6	33	0.0210	0.4020	-0.2935	0.1920
Loser portfolio J=12, K=12	27	-0.0099	0.7048	-0.3421	0.2424
Loser portfolio J=12, K=24	15	0.0164	0.2211	-0.3359	0.1794
Loser portfolio J=24, K=3	24	0.0126	0.3999	-0.2189	0.1632
Loser portfolio J=24, K=6	21	0.0140	0.3999	-0.2189	0.1743
Loser portfolio J=24, K=12	15	-0.0044	0.8565	-0.3527	0.3309
Loser portfolio J=24, K=24	3	0.1279	0.1993	0.0764	0.0521

The table shows descriptive statistics for the loser portfolio of the Singapore Stock Market. The table is divided into three sections: the overall period loser portfolio, the non-financial crisis loser portfolio, and the financial crisis loser portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 5: Hong Kong Stock Market Winner Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Winner portfolio J=3, K=3	109	0.0841	1.236	-0.4857	0.2448
Winner portfolio J=3, K=6	106	0.1822	2.469	-0.5919	0.4424
Winner portfolio J=3, K=12	100	0.3512	1.957	-0.7125	0.6119
Winner portfolio J=3, K=24	88	0.5824	2.991	-0.4876	0.7860
Winner portfolio J=6, K=3	106	0.0778	1.122	-0.5098	0.2382
Winner portfolio J=6, K=6	103	0.1563	1.790	-0.5568	0.3937
Winner portfolio J=6, K=12	97	0.3159	1.673	-0.7544	0.5552
Winner portfolio J=6, K=24	85	0.5055	2.357	-0.5474	0.7207
Winner portfolio J=12, K=3	100	0.0717	0.9897	-0.4424	0.2103
Winner portfolio J=12, K=6	97	0.1480	1.454	-0.5853	0.3572
Winner portfolio J=12, K=12	91	0.2554	1.402	-0.7726	0.5150
Winner portfolio J=12, K=24	79	0.4203	2.288	-0.4825	0.6943
Winner portfolio J=24, K=3	88	0.0417	0.5183	-0.5370	0.1946
Winner portfolio J=24, K=6	85	0.0902	0.7963	-0.6308	0.3258
Winner portfolio J=24, K=12	79	0.1902	1.286	-0.7723	0.5110
Winner portfolio J=24, K=24	67	0.3211	1.821	-0.4603	0.6641
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	59	0.1203	1.236	-0.2874	0.2544
Winner portfolio J=3, K=6	56	0.2705	2.469	-0.3682	0.4812
Winner portfolio J=3, K=12	50	0.5566	1.957	-0.4476	0.5834
Winner portfolio J=3, K=24	38	1.041	2.991	0.1567	0.6600
Winner portfolio J=6, K=3	56	0.1152	1.122	-0.3501	0.2522
Winner portfolio J=6, K=6	53	0.2417	1.790	-0.3415	0.4406
Winner portfolio J=6, K=12	47	0.5400	1.673	-0.4835	0.5260
Winner portfolio J=6, K=24	35	0.9860	2.357	0.1150	0.5731
Winner portfolio J=12, K=3	50	0.1136	0.9897	-0.3773	0.2265
Winner portfolio J=12, K=6	47	0.2467	1.454	-0.3657	0.3823
Winner portfolio J=12, K=12	41	0.4629	1.402	-0.4754	0.4378
Winner portfolio J=12, K=24	29	0.9024	2.288	0.2051	0.4971
Winner portfolio J=24, K=3	38	0.0572	0.5183	-0.3700	0.1836
Winner portfolio J=24, K=6	35	0.1369	0.6711	-0.3617	0.3050
Winner portfolio J=24, K=12	29	0.3714	1.028	-0.4747	0.4031
Winner portfolio J=24, K=24	17	0.8416	1.609	0.1839	0.4109
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	45	0.0775	0.7012	-0.2545	0.2016
Winner portfolio J=3, K=6	42	0.1663	1.177	-0.3175	0.3342
Winner portfolio J=3, K=12	36	0.2959	1.699	-0.3283	0.5482
Winner portfolio J=3, K=24	24	0.4881	2.171	-0.1802	0.7893
Winner portfolio J=6, K=3	42	0.0731	0.6986	-0.2693	0.1936
Winner portfolio J=6, K=6	39	0.1140	0.7717	-0.3321	0.2598
Winner portfolio J=6, K=12	33	0.1854	1.339	-0.3132	0.4169
Winner portfolio J=6, K=24	21	0.2276	1.575	-0.1503	0.5284
Winner portfolio J=12, K=3	36	0.0339	0.3142	-0.3023	0.1333
Winner portfolio J=12, K=6	33	0.0420	0.3972	-0.3049	0.1811
Winner portfolio J=12, K=12	27	0.0260	0.3868	-0.2831	0.2408
Winner portfolio J=12, K=24	15	-0.1173	0.2215	-0.2450	0.1060
Winner portfolio J=24, K=3	24	-0.0120	0.2724	-0.2995	0.1204
Winner portfolio J=24, K=6	21	-0.0658	0.1804	-0.3629	0.1442
Winner portfolio J=24, K=12	15	-0.2107	0.1121	-0.3509	0.1388
Winner portfolio J=24, K=24	3	-0.2247	-0.1871	-0.2652	0.0319

The table shows descriptive statistics for the winner portfolio of the Hong Kong Stock Market. The table is divided into three sections: the overall period winner portfolio, the non-financial crisis winner portfolio, and the financial crisis winner portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 6: Hong Kong Stock Market Loser Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Loser portfolio J=3, K=3	109	0.0748	0.8527	-0.5674	0.2403
Loser portfolio J=3, K=6	106	0.1639	1.550	-0.6543	0.4548
Loser portfolio J=3, K=12	100	0.3818	3.912	-0.7322	0.9080
Loser portfolio J=3, K=24	88	0.7892	3.989	-0.4248	1.180
Loser portfolio J=6, K=3	106	0.0694	1.062	-0.5606	0.2596
Loser portfolio J=6, K=6	103	0.1576	1.729	-0.6686	0.5020
Loser portfolio J=6, K=12	97	0.3843	4.060	-0.7111	0.9024
Loser portfolio J=6, K=24	85	0.8309	4.291	-0.4052	1.242
Loser portfolio J=12, K=3	100	0.0618	1.154	-0.5681	0.2628
Loser portfolio J=12, K=6	97	0.1612	1.885	-0.6470	0.5123
Loser portfolio J=12, K=12	91	0.4626	3.894	-0.6435	0.9928
Loser portfolio J=12, K=24	79	1.011	4.631	-0.3842	1.350
Loser portfolio J=24, K=3	88	0.0895	1.070	-0.5513	0.2939
Loser portfolio J=24, K=6	85	0.2297	2.584	-0.6126	0.5905
Loser portfolio J=24, K=12	79	0.6484	3.928	-0.6104	1.168
Loser portfolio J=24, K=24	67	1.151	5.356	-0.3883	1.647
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	59	0.0859	0.5624	-0.3464	0.2064
Loser portfolio J=3, K=6	56	0.2127	1.550	-0.3535	0.4171
Loser portfolio J=3, K=12	50	0.5673	3.912	-0.4834	0.9377
Loser portfolio J=3, K=24	38	1.321	3.989	-0.0022	1.097
Loser portfolio J=6, K=3	60	0.0940	0.6528	-0.3422	0.2292
Loser portfolio J=6, K=6	53	0.2023	1.729	-0.4153	0.4648
Loser portfolio J=6, K=12	47	0.5647	4.060	-0.3680	0.8787
Loser portfolio J=6, K=24	35	1.381	4.291	-0.0330	1.216
Loser portfolio J=12, K=3	50	0.0612	0.5368	-0.3457	0.1978
Loser portfolio J=12, K=6	47	0.2093	1.885	-0.3561	0.4662
Loser portfolio J=12, K=12	41	0.7209	3.894	-0.3337	1.014
Loser portfolio J=12, K=24	29	1.909	4.631	0.3197	1.296
Loser portfolio J=24, K=3	38	0.1195	0.8105	-0.2911	0.2728
Loser portfolio J=24, K=6	35	0.3694	2.584	-0.2946	0.6597
Loser portfolio J=24, K=12	29	1.285	3.928	-0.3110	1.290
Loser portfolio J=24, K=24	17	3.113	5.356	0.9830	1.367
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	45	0.0922	0.8527	-0.3410	0.2446
Loser portfolio J=3, K=6	42	0.1819	1.509	-0.4075	0.4549
Loser portfolio J=3, K=12	36	0.3001	2.543	-0.4062	0.7799
Loser portfolio J=3, K=24	24	0.6316	3.835	-0.3576	1.214
Loser portfolio J=6, K=3	42	0.0748	1.062	-0.3445	0.2714
Loser portfolio J=6, K=6	39	0.0874	1.406	-0.3834	0.3804
Loser portfolio J=6, K=12	33	0.1396	2.207	-0.4224	0.6391
Loser portfolio J=6, K=24	21	0.3630	2.717	-0.3465	0.9299
Loser portfolio J=12, K=3	36	-0.0027	0.2521	-0.3144	0.1441
Loser portfolio J=12, K=6	33	-0.0462	0.3257	-0.4395	0.1906
Loser portfolio J=12, K=12	27	-0.0769	0.4469	-0.4356	0.2925
Loser portfolio J=12, K=24	15	-0.0526	0.4903	-0.3632	0.2447
Loser portfolio J=24, K=3	24	-0.0358	0.2338	-0.3256	0.1435
Loser portfolio J=24, K=6	21	-0.1077	0.1750	-0.3463	0.1456
Loser portfolio J=24, K=12	15	-0.2313	0.0605	-0.3860	0.1229
Loser portfolio J=24, K=24	3	-0.1563	-0.1191	-0.1968	0.0318

The table shows descriptive statistics for the loser portfolio of the Hong Kong Stock Market. The table is divided into three sections: the overall period loser portfolio, the non-financial crisis loser portfolio, and the financial crisis loser portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 7: Us Stock Market (S&P) Winner Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Winner portfolio J=3, K=3	109	0.0315	0.3654	-0.2708	0.1014
Winner portfolio J=3, K=6	106	0.0664	0.4593	-0.4598	0.1608
Winner portfolio J=3, K=12	100	0.1301	0.6645	-0.4404	0.2219
Winner portfolio J=3, K=24	88	0.2842	1.143	-0.4104	0.3748
Winner portfolio J=6, K=3	106	0.0307	0.2770	-0.3626	0.1017
Winner portfolio J=6, K=6	103	0.0626	0.4081	-0.4303	0.1532
Winner portfolio J=6, K=12	97	0.1240	0.4886	-0.4426	0.2182
Winner portfolio J=6, K=24	85	0.2776	0.9896	-0.4632	0.3576
Winner portfolio J=12, K=3	100	0.0247	0.2124	-0.3545	0.1011
Winner portfolio J=12, K=6	97	0.0534	0.3326	-0.4343	0.1527
Winner portfolio J=12, K=12	91	0.1136	0.4850	-0.4374	0.2249
Winner portfolio J=12, K=24	79	0.2552	0.9072	-0.4297	0.3432
Winner portfolio J=24, K=3	88	0.0285	0.2017	-0.3857	0.1097
Winner portfolio J=24, K=6	85	0.0546	0.2876	-0.4500	0.1639
Winner portfolio J=24, K=12	79	0.1143	0.4794	-0.4337	0.2314
Winner portfolio J=24, K=24	67	0.2543	0.8363	-0.3639	0.3574
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	59	0.0423	0.1771	-0.0969	0.0642
Winner portfolio J=3, K=6	56	0.0987	0.4291	-0.0537	0.0877
Winner portfolio J=3, K=12	50	0.1971	0.4718	0.0013	0.1021
Winner portfolio J=3, K=24	38	0.4810	0.8701	0.0935	0.1898
Winner portfolio J=6, K=3	56	0.0483	0.2770	-0.1044	0.0746
Winner portfolio J=6, K=6	53	0.0990	0.4081	-0.0566	0.0852
Winner portfolio J=6, K=12	47	0.2021	0.4619	-0.0177	0.1130
Winner portfolio J=6, K=24	35	0.4958	0.7190	0.1605	0.1702
Winner portfolio J=12, K=3	50	0.0427	0.1884	-0.1046	0.0736
Winner portfolio J=12, K=6	47	0.0908	0.3061	-0.0584	0.0809
Winner portfolio J=12, K=12	41	0.1935	0.4850	-0.0005	0.1323
Winner portfolio J=12, K=24	29	0.5065	0.9072	0.1878	0.1614
Winner portfolio J=24, K=3	38	0.0485	0.2017	-0.1180	0.0763
Winner portfolio J=24, K=6	35	0.0974	0.2290	-0.0607	0.0832
Winner portfolio J=24, K=12	29	0.2126	0.4794	0.0456	0.1029
Winner portfolio J=24, K=24	17	0.4992	0.7644	0.2649	0.1411
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Winner portfolio J=3, K=3	45	0.0471	0.3654	-0.2003	0.1046
Winner portfolio J=3, K=6	42	0.0973	0.4593	-0.2030	0.1453
Winner portfolio J=3, K=12	36	0.2015	0.6645	-0.0547	0.1898
Winner portfolio J=3, K=24	24	0.4718	1.143	0.1174	0.3342
Winner portfolio J=6, K=3	42	0.0481	0.2376	-0.1627	0.0845
Winner portfolio J=6, K=6	39	0.0966	0.3888	-0.2466	0.1257
Winner portfolio J=6, K=12	33	0.1913	0.4886	-0.1246	0.1663
Winner portfolio J=6, K=24	21	0.4698	0.9896	0.1472	0.2579
Winner portfolio J=12, K=3	36	0.0378	0.2124	-0.2066	0.0847
Winner portfolio J=12, K=6	33	0.0790	0.3326	-0.2119	0.1246
Winner portfolio J=12, K=12	27	0.1711	0.4346	-0.0956	0.1627
Winner portfolio J=12, K=24	15	0.3320	0.4928	0.1641	0.0990
Winner portfolio J=24, K=3	24	0.0386	0.1787	-0.2087	0.0908
Winner portfolio J=24, K=6	21	0.0495	0.2677	-0.2504	0.1371
Winner portfolio J=24, K=12	15	0.0551	0.2746	-0.0541	0.0968
Winner portfolio J=24, K=24	3	0.3591	0.4959	0.2125	0.1159

The table shows descriptive statistics for the winner portfolio of the US Stock Market. The table is divided into three sections: the overall period winner portfolio, the non-financial crisis winner portfolio, and the financial crisis winner portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Table 8: Us Stock Market (S&P 500) Loser Portfolio Descriptive Statistics

All Period	**Number**	**Mean**	**Maximum**	**Minimum**	**Std.Dev.**
Loser portfolio J=3, K=3	109	0.0846	4.642	-0.4032	0.4580
Loser portfolio J=3, K=6	106	0.1252	5.234	-0.5068	0.5435
Loser portfolio J=3, K=12	100	0.1934	5.381	-0.4650	0.6045
Loser portfolio J=3, K=24	88	0.3286	5.961	-0.4710	0.7526
Loser portfolio J=6, K=3	106	0.0855	4.600	-0.4061	0.4633
Loser portfolio J=6, K=6	103	0.1243	5.160	-0.5242	0.5536
Loser portfolio J=6, K=12	97	0.1943	5.291	-0.4943	0.6208
Loser portfolio J=6, K=24	85	0.3192	5.823	-0.4264	0.7842
Loser portfolio J=12, K=3	100	0.0847	4.647	-0.3983	0.4839
Loser portfolio J=12, K=6	97	0.1250	5.199	-0.5326	0.5775
Loser portfolio J=12, K=12	91	0.1856	5.354	-0.5211	0.6484
Loser portfolio J=12, K=24	79	0.3084	5.928	-0.4584	0.8361
Loser portfolio J=24, K=3	88	0.0350	0.801	-0.3999	0.1606
Loser portfolio J=24, K=6	85	0.0694	1.330	-0.5344	0.2641
Loser portfolio J=24, K=12	79	0.1198	1.616	-0.5069	0.3729
Loser portfolio J=24, K=24	67	0.1957	2.504	-0.4889	0.5687
Non-Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	59	0.1222	4.642	-0.0970	0.5988
Loser portfolio J=3, K=6	56	0.1630	5.234	-0.1408	0.6906
Loser portfolio J=3, K=12	50	0.2636	5.381	-0.1616	0.7446
Loser portfolio J=3, K=24	38	0.5090	5.961	0.0277	0.9111
Loser portfolio J=6, K=3	60	0.1145	4.600	-0.0994	0.6100
Loser portfolio J=6, K=6	53	0.1487	5.160	-0.1470	0.7014
Loser portfolio J=6, K=12	47	0.2478	5.291	-0.2095	0.7566
Loser portfolio J=6, K=24	35	0.4603	5.823	0.1082	0.9284
Loser portfolio J=12, K=3	50	0.1184	4.647	-0.1136	0.6519
Loser portfolio J=12, K=6	47	0.1564	5.199	-0.1587	0.7498
Loser portfolio J=12, K=12	41	0.2409	5.354	-0.1594	0.8185
Loser portfolio J=12, K=24	29	0.4363	5.928	0.0223	1.047
Loser portfolio J=24, K=3	38	0.0126	0.3766	-0.1092	0.0847
Loser portfolio J=24, K=6	35	0.0202	0.3457	-0.1653	0.1010
Loser portfolio J=24, K=12	29	0.0625	0.5448	-0.2418	0.1557
Loser portfolio J=24, K=24	17	0.1760	0.6412	-0.0086	0.1620
Financial Crisis	Number	Mean	Maximum	Minimum	Std.Dev.
Loser portfolio J=3, K=3	45	0.0691	0.7008	-0.2518	0.1524
Loser portfolio J=3, K=6	42	0.1547	1.159	-0.1715	0.2605
Loser portfolio J=3, K=12	36	0.2726	1.431	-0.1352	0.3634
Loser portfolio J=3, K=24	24	0.5608	2.161	0.0711	0.5816
Loser portfolio J=6, K=3	42	0.0861	0.8256	-0.2379	0.1693
Loser portfolio J=6, K=6	39	0.1521	1.326	-0.1374	0.2886
Loser portfolio J=6, K=12	33	0.2455	1.655	-0.0823	0.3823
Loser portfolio J=6, K=24	21	0.5010	2.574	0.0833	0.6336
Loser portfolio J=12, K=3	36	0.0308	0.1980	-0.1728	0.0961
Loser portfolio J=12, K=6	33	0.0577	0.3652	-0.1776	0.1358
Loser portfolio J=12, K=12	27	0.0973	0.3304	-0.0898	0.1018
Loser portfolio J=12, K=24	15	0.1760	0.3591	0.0550	0.0741
Loser portfolio J=24, K=3	24	0.0341	0.1523	-0.1612	0.0911
Loser portfolio J=24, K=6	21	0.0590	0.4015	-0.1117	0.1335
Loser portfolio J=24, K=12	15	0.0561	0.3430	-0.1050	0.1136
Loser portfolio J=24, K=24	3	0.2276	0.3064	0.1736	0.0570

The table shows descriptive statistics for the loser portfolio of the US Stock Market. The table is divided into three sections: the overall period loser portfolio, the non-financial crisis loser portfolio, and the financial crisis loser portfolio. Each section includes the formation period (J), holding period (K), and the number of portfolios, mean, maximum, minimum, and standard deviation.

Trading Strategy Performance

This study compared the financial crisis period and non-financial crisis period by using the SPSS Independent Samples T-test with a 95% confidence interval. Tables 9-12 only show the momentum strategy results because the P values of momentum and contrarian, which creates a significant difference if P is less than 0.05, are the same. Further, only the positive and negative reverse on the t-statistic. However, discussions below include an analysis of the contrarian and momentum results for each market.

Table 9 shows the momentum strategy results in the Taiwanese stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic. There were no significant profits from use of the momentum strategy in the overall sample period that included a financial crisis and a non-financial crisis. However, when the sample periods were separated into non-financial crisis period and financial crisis period, the momentum strategy generated significant profit in the non-financial crisis period when J=3 and K=6, 12, or 24, as well as when J=6 and K=3 or 6. Chen (2002) had similar results.

Table 9: Momentum Strategy: Taiwan Stock Market

Panel A: Overall Sample Period					
Ranking Period (J)		Holding Period (K)			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0420	0.0820	0.1389	0.2797
	loser	0.0308	0.0649	0.1450	0.3365
	winner-loser	0.0112	0.0171	-0.0060	-0.0569
	(t-statistic)	0.1018	1.078	-0.1929	-1.411
6	winner	0.0396	0.0696	0.1241	0.2555
	loser	0.0293	0.0602	0.1645	0.3732
	winner-loser	0.0103	0.0094	-0.0404	-0.1177
	(t-statistic)	1.078	0.4621	-1.070	-4.172
12	winner	0.0289	0.0562	0.1017	0.2258
	loser	0.0377	0.0901	0.2147	0.4357
	winner-loser	-0.0088	-0.0339	-0.1130	-0.2099
	(t-statistic)	-0.6206	-1.374	-2.579	-4.384
24	winner	0.0286	0.0542	0.1069	0.2565
	loser	0.0539	0.1207	0.2531	0.4092
	winner-loser	-0.0253	-0.0665	-0.1462	-0.1527
	(t-statistic)	-1.661	-2.406	-3.014	-2.766
Panel B: Non-Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0475	0.1050	0.1910	0.5082
	loser	0.0291	0.0624	0.1597	0.4508
	winner-loser	0.0185	0.0426	0.0314	0.0574
	(t-statistic)	0.5534	9.808***	2.921***	1.973***
6	winner	0.0485	0.0884	0.1859	0.5108
	loser	0.0220	0.0455	0.1788	0.4927
	winner-loser	0.0265	0.0429	0.0071	0.0182
	(t-statistic)	2.577***	4.448***	0.3611	0.7483
12	winner	0.0320	0.0767	0.1869	0.5325
	loser	0.0258	0.0806	0.2424	0.6369
	winner-loser	0.0062	-0.0039	-0.0555	-0.1043
	(t-statistic)	0.9131	-0.6971	-2.168	-2.505
24	winner	0.0457	0.1082	0.2756	0.7353
	loser	0.0533	0.1286	0.3522	0.7791
	winner-loser	-0.0076	-0.0204	-0.0766	-0.0437
	(t-statistic)	-0.6359	-0.9501	-1.619	-1.842
Panel C: Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0666	0.1222	0.1950	0.2796
	loser	0.0639	0.1275	0.2231	0.4481
	winner-loser	0.0027	-0.0053	-0.0281	-0.1685
	(t-statistic)	0.0170	-0.1362	-0.3515	-1.234
6	winner	0.0545	0.0894	0.1153	0.1126
	loser	0.0421	0.0590	0.0997	0.2395
	winner-loser	0.0124	0.0303	0.0156	-0.1269
	(t-statistic)	0.5637	0.3935	0.2933	-1.388
12	winner	0.0231	0.0238	-0.0021	-0.1179
	loser	0.0077	0.0038	0.0038	0.0314
	winner-loser	0.0153	0.0200	-0.0060	-0.1493
	(t-statistic)	0.8397	0.7880	-0.1525	-4.285
24	winner	-0.0109	-0.0421	-0.1433	-0.1101
	loser	-0.0192	-0.0525	-0.1385	-0.0859
	winner-loser	0.0083	0.0104	-0.0047	-0.0242
	(t-statistic)	0.4100	0.6337	-7.522	-1.039

This table shows the momentum strategy results in the Taiwanese stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic with 95% confidence interval.

Further, there were no significant profits during the financial crisis period. There were significant profits in both the long-term non-financial crisis period and the financial-crisis period with the use of the contrarian strategy. In the overall period, there were profits when J=3 and K=24; J=6 and K=24; J=12 and K=6, 12, or 24; and when J=24 and K=3, 6, 12, or 24. In the non-financial crisis period, significant profit occurred when J=12 and K=12 or 24; and when J=24 and K=12 or 24. In the financial crisis period, contrarian strategy profits happened when J=6 and k=24; J=12 and K=24; and when J=24 and K=12.

Table 10 shows the momentum strategy results in the Singapore stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic. Singapore also had significant profits during the non-financial crisis period when J=3 and K=3, 6, or 12; when J=6 and K=3, 6, 12, or 24; when J=12 and K=3 or 6; and when J=24 and K=6. However, there was no evidence showing profit in the financial crisis period. Unlike Taiwan, the overall period did show significant profit when J=3 and K=3 or 6; when J=6 and K=24; and when J=24 and K=6. The reason for this is the very strong profits seen in the non-financial crisis period easily covered the non-significant results found in the financial crisis period. The significant results in the 2003-2008 non-financial crisis periods are similar to Ramiah, Naughton, and Veeraraghvan's (2009) results for the Singapore market from 1990-2004.

Singapore's contrarian strategy results are similar to Taiwan's results as they generated profit in the long-term in both the non-financial crisis period and the financial crisis period. In the overall period, significant profit occurred when J=12 and K=12; and when J=24 and K=3, 12, or 24. In the non-financial crisis period, significant profit is seen when J=24 and K=12 or 24. Additionally, both 12 and 24-month holding periods have over 50% profit from the loser portfolio. Overall, Singapore has a significant difference in the short-term when the ranking periods and holding periods are both either 3-months or 6-months. This result is because the non-financial crisis period in these short-term periods generates significant profit with the momentum strategy. Additionally, the momentum strategy generates negative returns in the financial crisis period in those same short-term periods. The Singapore stock market also has a significant difference in the 24-month ranking period and 24-month holding period. This is a result of using the contrarian strategy during a long-term period, especially in a non-financial crisis period. Although both the non-financial crisis period and financial crisis period are significant, the non-financial crisis period outperforms the financial crisis period by 56% at the 24-month ranking period and 24-month holding period and causes the significant difference. This shows underreaction and overreaction behavior by investors affected this financial crisis and caused the short-term momentum and long-term contrarian strategies to create a significant difference in the Singapore Stock Market.

Table 11 shows the momentum strategy results in the Hong Kong stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic. There were no significant profits for the overall sample period, but there were significant profits in the non-financial crisis period when J=3 and K=3 or 6, and when J=12 and K=3. Moreover, there were also significant profit in the financial crisis period when J=12 and K= 3, 6, or 12; and when J=24 and K=3 or 6. Additionally, the winner and loser portfolios had over 100% profit in the 24-month holding period. This is attributed to the numerous Chinese companies that experienced over 100% returns in this period due to China's economic growth. Fung's (1999) research on Hong Kong's market from 1982-1993 also supports the data that Hong Kong achieves very high return from the momentum strategy.

Table 10: Momentum Strategy: Singapore Stock Market

Panel A: Overall Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0502	0.1038	0.1802	0.3203
	loser	0.0314	0.0661	0.1812	0.3418
	winner-loser	0.0188	0.0377	-0.0010	-0.0215
	(t-statistic)	1.935***	2.066**	-0.0233	-0.4337
6	winner	0.0417	0.0863	0.1661	0.3037
	loser	0.0302	0.0811	0.1886	0.2170
	winner-loser	0.0115	0.0052	-0.0225	0.0867
	(t-statistic)	0.7833	0.1903	-0.4645	2.354***
12	winner	0.0394	0.0798	0.1513	0.3010
	loser	0.0452	0.1007	0.2289	0.2701
	winner-loser	-0.0058	-0.0209	-0.0775	0.0309
	(t-statistic)	-0.2909	-0.5540	-1.363	0.6574
24	winner	0.0366	0.0821	0.1671	0.2731
	loser	0.0665	0.0688	0.2920	0.4854
	winner-loser	-0.0299	0.0133	-0.1250	-0.2123
	(t-statistic)	-1.365	1.439*	-2.035	-2.472
Panel B: Non-Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0734	0.1531	0.3231	0.7016
	loser	0.0172	0.0477	0.2453	0.6613
	winner-loser	0.0563	0.1054	0.0777	0.0403
	(t-statistic)	4.962***	5.330***	1.354*	0.5177
6	winner	0.0654	0.1439	0.3340	0.7478
	loser	0.0068	0.0428	0.2463	0.2828
	winner-loser	0.0586	0.1011	0.0876	0.4650
	(t-statistic)	5.994***	2.463***	1.452*	7.390***
12	winner	0.0690	0.1522	0.3493	0.8362
	loser	0.0166	0.0726	0.3231	0.3694
	winner-loser	0.0525	0.0796	0.0262	0.4668
	(t-statistic)	8.031***	2.997***	0.3760	4.694***
24	winner	0.0635	0.1507	0.3722	0.8462
	loser	0.0733	0.0888	0.5911	1.579
	winner-loser	-0.0098	0.0619	-0.2189	-0.7333
	(t-statistic)	-0.5418	1.690*	-1.793	-5.037
Panel C: Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0564	0.1267	0.1723	0.2459
	loser	0.0824	0.1700	0.2296	0.3452
	winner-loser	-0.0261	-0.0434	-0.0574	-0.0993
	(t-statistic)	-0.9833	-0.8543	-0.7976	-0.8204
6	winner	0.0547	0.0883	0.1068	0.1116
	loser	0.0910	0.1481	0.1431	0.2318
	winner-loser	-0.0363	-0.0598	-0.0363	-0.1203
	(t-statistic)	-0.9791	-1.002	-0.4881	-1.267
12	winner	0.0181	0.0286	0.0160	-0.0855
	loser	0.0196	0.0210	-0.0099	0.0164
	winner-loser	-0.0014	0.0076	0.0258	-0.1018
	(t-statistic)	-0.0743	0.2604	0.6239	-2.583
24	winner	0.0174	0.0061	-0.0487	-0.0431
	loser	0.0126	0.0140	-0.0044	0.1279
	winner-loser	0.0048	-0.0079	-0.0444	-0.1710
	(t-statistic)	0.1636	-0.2702	-0.5675	-6.040

This table shows the momentum strategy results in the Singapore stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic with 95% confidence interval.

The contrarian strategy was profitable in the long-term during the non-financial crisis period and in the overall period. However, the overall period significant profit is a reflection of the significant profit in the non-financial crisis period. In both the overall period and the non-financial crisis period, contrarian strategy profit occurred when J=6 and K=24; J=12 and K=12 or 24; and when J=24 and K=3, 6, 12, or 24.

The only significant profit seen in the financial crisis period is when J=24 and K=24.Overall, significant differences occur when the ranking period is 12-months and holding period is 12 or 24-months, and when the ranking period is 24-months and holding periods are 3, 6, 12, or 24-months.

Table 11: Momentum Strategy: Hong Kong Stock Market

Panel A: Overall Period					
Ranking Period (J)		Holding Period (K)			
Period(J)	Portfolio	3	6	12	24
3	Winner	0.0841	0.1822	0.3512	0.5824
	Loser	0.0748	0.1639	0.3818	0.7892
	winner-loser	0.0093	0.0183	-0.0307	-0.2068
	(t-statistic)	0.1414	0.1227	-0.0323	-0.1661
6	Winner	0.0778	0.1563	0.3159	0.5055
	Loser	0.0694	0.1576	0.3843	0.8309
	winner-loser	0.0084	-0.0012	-0.0683	-0.3253
	(t-statistic)	0.8340	-0.0402	-0.9408	-2.948
12	Winner	0.0717	0.1480	0.2554	0.4203
	Loser	0.0618	0.1612	0.4626	1.011
	winner-loser	0.0098	-0.0132	-0.2072	-0.5910
	(t-statistic)	0.6210	-0.3522	-2.316	-4.509
24	Winner	0.0417	0.0902	0.1902	0.3211
	Loser	0.0895	0.2297	0.6484	1.151
	winner-loser	-0.0479	-0.1395	-0.4582	-0.8297
	(t-statistic)	-2.028	-2.597	-3.854	-4.473
Panel B: Non-Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.1203	0.2705	0.5566	1.041
	loser	0.0859	0.2127	0.5673	1.321
	winner-loser	0.0344	0.0579	-0.0107	-0.2799
	(t-statistic)	0.1636	0.1706	-0.0103	-0.2260
6	winner	0.1152	0.2417	0.5400	0.9860
	loser	0.0940	0.2023	0.5647	1.381
	winner-loser	0.0213	0.0394	-0.0247	-0.395
	(t-statistic)	1.843**	1.919**	-0.238	-2.149
12	winner	0.1136	0.2467	0.4629	0.9024
	loser	0.0612	0.2093	0.7209	1.909
	winner-loser	0.0524	0.0374	-0.2580	-1.007
	(t-statistic)	3.330***	0.9500	-1.784	-4.453
24	winner	0.0572	0.1369	0.3714	0.8416
	loser	0.1195	0.3694	1.285	3.113
	winner-loser	-0.0622	-0.2325	-0.9135	-2.272
	(t-statistic)	-1.876	-2.317	-3.943	-6.970
Panel C: Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
Period(J)	Portfolio	3	6	12	24
3	winner	0.0775	0.1663	0.2959	0.4881
	loser	0.0922	0.1819	0.3001	0.6316
	winner-loser	-0.0147	-0.0156	-0.0042	-0.1435
	(t-statistic)	-0.0749	-0.0357	-0.0053	-0.1100
6	winner	0.0731	0.1140	0.1854	0.2276
	loser	0.0748	0.0874	0.1396	0.3630
	winner-loser	-0.0017	0.0265	0.0458	-0.1354
	(t-statistic)	-0.0561	0.5889	0.5352	-0.7915
12	winner	0.0339	0.0420	0.0260	-0.1173
	loser	-0.0027	-0.0462	-0.0769	-0.0526
	winner-loser	0.0365	0.0882	0.1029	-0.0646
	(t-statistic)	3.958***	8.429***	3.160***	-1.097
24	winner	-0.0120	-0.0658	-0.2107	-0.2247
	loser	-0.0358	-0.1077	-0.2313	-0.1563
	winner-loser	0.0238	0.0419	0.0206	-0.0684
	(t-statistic)	1.462*	9.117***	1.196	-37.963

This table shows the momentum strategy results in the Hong Kong stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic with 95% confidence interval.

This is because the profits in the long-term non-financial crisis period using the contrarian strategy are both significant and large. On average, the non-financial crisis period outperforms more than 70% of the

time than during the financial crisis period. However, the significant momentum in the short-term non-financial crisis period did not cause the significant difference due to the small return. This is a result of the overreaction in the Hong Kong Stock Market during the financial crisis period.

Table 12 shows the momentum strategy results in the United States stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic. The United States showed significant profit in the financial crisis period when J=12 and K=6, 12, or 24; and when J=24 and K=3. In the non-financial crisis period, there were only significant results when J=24 and K= 3, 6, 12, or 24. The overall period had no significant profits. These results are different compared to the Asian stock markets, and this is attributed to the S&P 500 index consisting of well and healthy companies. Essentially, all 500 companies are in the winner portfolio of the NYSE, thus creating different results than the Asian stock markets. Chen and De Bondt (2004) showed that the momentum happens in the long-term period, which supports these results. In the overall period for the U.S. market, significant difference occurs at the 24-month ranking period when the holding period is either 12 or 24-months.

This result is because the contrarian strategies in these periods are significant. In the non-financial crisis period, the 24-month ranking period when holding periods are 3, 6, 12, or 24-months are significant, because the momentum strategy in the S&P 500 is significant during these long-term periods. In the financial crisis period, there is significance when both the ranking and holding periods are 6-months, and when the ranking period is 12-months and holding periods are 12 or 24-months. These results are also due to the significance of the momentum strategy in the S&P 500.

Stock Market Comparisons

The results during the non-financial crisis period in all three Chinese relative stock markets support Jegadeesh and Titman's (1993) findings that significant profits using the momentum strategy occur in the short-term and intermediate-term. However, the findings also show that investor behavior in these three markets changed during the financial crisis period, causing no significant momentum profit in the short-term and intermediate-term. It appears that the financial crisis period caused investors to change their previous behaviors and decisions. Additionally, the three Chinese relative Asian stock markets showed that contrarian strategy profits occurred in long-term periods when J=24 and K=12 or 24. Previous literature supports this result as Lakonishok, Shleifer, and Vishny (1994) studied the U.S. stock market from 1963-1990 and found that the contrarian generated significant profit even during the four major economic recessions that occurred during that time. Additionally, it is plausible that some investors cannot distinguish when a financial crisis ends or begins, and thus they make the same decisions in the long-term ranking period and holding period for the contrarian strategy.

Contrary to the Asian stock market results, the S&P 500 in the United States achieved significant profit in the short-term financial crisis period when utilizing the contrarian strategy. However, during the non-financial crisis period, the results are similar to Chen and De Bondt's (2004) findings. Overall, the financial crisis period influenced investors to change their behavior to the contrarian strategy.Taiwan shows different results from the other three stock markets between the financial crisis period and non-financial crisis period. Although the short-term momentum and long-term contrarian strategies profits are significant in Taiwan, both periods' profits are small. For example, the 6-month ranking period and 3-month holding period has the largest significant momentum profit, but the profits during the non-financial crisis period are only 4.8% larger than during the financial crisis period.

Table 12: Momentum Strategy: US Stock Market- S&P 500

Panel A: Overall Period					
Ranking Period (J)		**Holding Period (K)**			
	Portfolio	3	6	12	24
3	winner	0.0315	0.0664	0.1301	0.2842
	loser	0.0846	0.1252	0.1934	0.3286
	winner-loser	-0.0532	-0.0587	-0.0632	-0.0443
	(t-statistic)	-1.237	-1.160	-1.119	-0.6332
6	winner	0.0307	0.0626	0.1240	0.2776
	loser	0.0855	0.1243	0.1943	0.3192
	winner-loser	-0.0549	-0.0617	-0.0703	-0.0417
	(t-statistic)	-1.244	-1.313	-1.184	-0.5470
12	winner	0.0247	0.0534	0.1136	0.2552
	loser	0.0847	0.1250	0.1856	0.3084
	winner-loser	-0.0600	-0.0716	-0.0720	-0.0532
	(t-statistic)	-1.261	-1.259	-1.124	-0.6167
24	winner	0.0285	0.0546	0.1143	0.2543
	loser	0.0350	0.0694	0.1198	0.1957
	winner-loser	-0.0065	-0.0148	-0.0055	0.0586
	(t-statistic)	-0.5181	-0.6567	-0.1674	1.076
Panel B: Non-Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
	Portfolio	3	6	12	24
3	winner	0.0423	0.0987	0.1971	0.4810
	loser	0.1222	0.1630	0.2636	0.5090
	winner-loser	-0.0798	-0.0643	-0.0665	-0.0281
	(t-statistic)	-1.021	-0.6961	-0.6309	-0.1916
6	winner	0.0483	0.0990	0.2021	0.4958
	loser	0.1145	0.1487	0.2478	0.4603
	winner-loser	-0.0661	-0.0497	-0.0457	0.0355
	(t-statistic)	-0.8103	-0.5147	-0.4144	0.2267
12	winner	0.0427	0.0908	0.1935	0.5065
	loser	0.1184	0.1564	0.2409	0.4363
	winner-loser	-0.0757	-0.0656	-0.0474	0.0702
	(t-statistic)	-0.8177	-0.5965	-0.3708	0.3593
24	winner	0.0485	0.0974	0.2126	0.4992
	loser	0.0126	0.0202	0.0625	0.1760
	winner-loser	0.0358	0.0772	0.1501	0.3231
	(t-statistic)	5.903***	7.860***	6.802***	16.257***
Panel C: Financial Crisis Period					
Ranking Period (J)		**Holding Period (K)**			
	Portfolio	3	6	12	24
3	winner	0.0471	0.0973	0.2015	0.4718
	loser	0.0691	0.1547	0.2726	0.5608
	winner-loser	-0.0221	-0.0574	-0.0710	-0.0891
	(t-statistic)	-1.322	-1.698	-1.356	-0.8975
6	winner	0.0481	0.0966	0.1913	0.4698
	loser	0.0861	0.1521	0.2455	0.5010
	winner-loser	-0.0380	-0.0555	-0.0541	-0.0312
	(t-statistic)	-1.660	-1.316	-0.8897	-0.2411
12	winner	0.0378	0.0790	0.1711	0.3320
	loser	0.0308	0.0577	0.0973	0.1760
	winner-loser	0.0070	0.0212	0.0738	0.1560
	(t-statistic)	0.9067	2.224**	2.965***	8.890***
24	winner	0.0386	0.0495	0.0551	0.3591
	loser	0.0341	0.0590	0.0561	0.2276
	winner-loser	0.0046	-0.0096	-0.0010	0.1315
	(t-statistic)	3.097***	-1.373	-0.0616	1.842

This table shows the momentum strategy results in the United States stock market for the overall period (Panel A), non-financial crisis period (Panel B), and financial crisis period (Panel C). Each panel shows the ranking period (J), type of portfolio, holding period (K) and the t-statistic with 95% confidence interval.

The overall period shows significance between Singapore and the S&P 500 in the long-term period. This is a result of the contrarian strategy in these periods. The non-financial crisis period has roughly the same results as Hong Kong and the United States, because the long-term momentum profits in the S&P 500 and the long-term contrarian profits in Singapore are both significant. During the financial crisis period, significant difference only occurs in the 24-month ranking period and 24-month holding period. This is because the contrarian profit is significant in this period. The S&P 500 and Hong Kong Stock market have significant differences in the long-term overall period when ranking period is 24-months and holding period is 3, 6, 12, or 24-months. This result is because Hong Kong has significant contrarian profits in these periods. Further, the non-financial crisis period and overall period are the same due to Hong Kong's significant contrarian profits in the non-financial crisis and S&P 500's significant momentum profits. In the financial crisis period, with ranking period at 12-months and holding periods at 6 or 24-months, and with ranking period at 24-months and holding period at 6-months, there is significant differences because the momentum strategy in Hong Kong and the United States are both significant.

CONCLUDING COMMENTS

This paper evaluated the effectiveness of the momentum and contrarian trading strategies from May 2003 to October 2012 in the United States (S&P 500) and the Chinese influenced markets of Taiwan, Singapore, and Hong Kong (main board only). The purpose was to compare the effectiveness of trading strategies during various periods in the United States and Chinese influenced Asian markets. Additionally, the research helps understand how behavior finance principles such as overreaction and underreaction affect investor decision-making during a global financial crisis period and non-financial period. Using monthly data obtained by Stream database, SPSS Independent Samples T-tests with a 95% confidence interval were ran to analyze the effectiveness of the contrarian and momentum strategies in long-term, medium-term, and short-term holding periods that included both a financial crisis and non-crisis period, only a crisis period, and only a non-crisis period. Statistic tests in each market showed both contrarian and momentum strategies generate profits in different ranking and holding periods to provide the latest evidence of these trading strategies. Results showed the short-term momentum and long-term contrarian strategies are significant in Hong Kong, Taiwan, and Singapore in the non-financial crisis period, but not significant during the financial crisis period. However, S&P 500 results show the long-term momentum is significant in the non-financial crisis period, and the short-term contrarian is significant in the financial crisis period. It is important to point out that the S&P 500 consists of the healthy companies in the U.S. stock market. Therefore, the S&P 500 is essentially the winner portfolio in the U.S. stock markets, which explains the different results between the Asian stock markets and the U.S market.

For investors looking to invest in the Chinese related stock markets, the short-term momentum and long-term contrarian strategy both can generate profit in a non-financial crisis period, especially when J=6 and K=6 in short-term momentum, and when J=24 and K=24 in long-term contrarian. Long-term contrarian can generate more profit than short-term momentum. Additionally, Singapore has the highest short-term momentum strategy profit in these three markets and Hong Kong has the highest long-term contrarian profit. These strategies are not significant in a financial crisis period. On the other hand, long-term momentum strategy is significant in the S&P 500 in both financial crisis and non-financial crisis periods, but the contrarian strategy is only significant in the short-term. By selecting different trading strategies in the right period, investors can generate significant profit in these four stock markets. Further, if investors want to diversify their trading strategy risk from the S&P 500, they can choose to invest in the Singapore, Hong Kong, or Taiwan market because the significant differences between each of these markets within the S&P 500 have the same result in each period.

There were a few limitations in the study. First, monthly data was used to create the winner and loser portfolios, which meant the study was not able to provide data on very short-term holding period

performance such as one or two weeks. Second, this study used the S&P 500 instead of the NYSE to represent the U.S. stock market because of the difficulty involved in obtaining the NYSE data. However, the range for the NYSE is a little larger than the Asian stock markets since there are over three thousands stocks on the NYSE. Lastly, while the U.S. has market data for more than 20 years, the Asian market data does not go back that far. In the future, it would be ideal to observe a period of more than 20 years for all markets.

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