Impact of positive and negative price shocks on investment portfolios in selected Asian markets

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Abstract: This study examines portfolios returns following markets large price movements and finds that large initial price increases are followed by price continuation and mixed stocks reactions to large initial price decreases. Despite the result suggesting that retail investors are unlikely to profit from such phenomenon after considering the relevant transaction costs, it is still possible for institutional investors to exploit the profit opportunities. In addition, the result shows that both bid-ask spread and market liquidity cannot explain the price reversal observed in this study.

Keywords: *China, index, spread, liquidity, portfolio, investment*

1. INTRODUCTION

This research aims to shed light on economic significance of stock reactions to large price changes and answer the question as if ordinary investors can earn economic profits after large stock price increase/decrease by studying 10 portfolios comprised of the most and the lease liquid stocks (basing on stocks' average trading volumes) from 5 major Asian markets, namely mainland China, Japan, Korea, Hong Kong and Taiwan. Numerous finance researches attribute "shocks" or "black swan" events to investors' overreaction. De Bondt and Thaler (1985) conjecture that abnormal movements in stock prices will be followed by corresponding price movements in the opposite direction and more significant the initial price movements, the greater will be the corresponding adjustment afterward. They conclude that such phenomenon is not consistent with EMH. Bremer and Sweeney (1991), Bremer, Hiraki and Sweeney (1997), Bowman and Iverson (1998) all suggest that price behaves differently to what the EMH suggested. On the other side, Atkins and Dyl (1990) conclude that price movements after "shocks" is in favour of EMH after accounting for bid-ask bounce and liquidity despite overreaction in U.S daily stock prices being well documented. Their findings echo Lasfer et al. (2003), who find support for return continuations in stock indexes and authors attribute that phenomenon to momentum behaviour in returns. Brown et al. (1998) argue that Uncertain Information Hypothesis (UIH) offers a better explanation of short-term price movements. Cox and Peterson (1994) studied on NYSE stocks and found inconsistent behaviour of prices following large price declines from one sub-sample period to another. More important, they conjectured an inverse relationship between general liquidity in security markets and returns.

While developed economies struggling with recessions, emerging markets in Asia have shown significant resilience and signs of strong economic recovery. This phenomenon attracts proliferate foreign capitals flowing into those markets. Since Investing in Asia is the "headline" in the financial world at the moment, a study that solely emphasises on 5 major Asian stock markets provides useful information to those who are interested in investment opportunities in Asia. China and Japan are two of the largest economy in the world. Technology sector is the investors' favourite pick under the current circumstance, NASDAQ by far outperformed DJIA. Korea and Taiwan as being leaders of technology innovations are the investment "hot spots". 5 markets that are studied in this paper share many similarities as far as structure of the trading mechanism concerns. The results of those 5 markets then can be compared on the same ground. Contrary to American exchanges, the 5 markets being used in this study are essentially a single price, two-way, transaction-based continuous auction market with special procedures designed to suppress fast and large price changes. (Bremer, 1997). There are no designated market makers (they cannot make a market using their own account, as NYSE specialists do), but there are exchange officials who match orders between the buyers and sellers to process single price transactions. Therefore, there are no competitive bid and ask prices among market makers. In addition, because of those structural differences, findings that have been documented in those studies focusing on American stocks may not be the case for Asian stocks.

Consider the following naïve trading strategy. Buy (sell short) an amount of any Shanghai Composite stock that had a 5% or greater decrease (increase) on the day of the price change at the closing price. What is the profit after commissions and securities transactions taxes from such a strategy for retail investors? What is the profit for members of exchanges who normal pay no commissions at all? The round trip commission that apply for most of the period examined in this study are large and not negotiable. It ranges from 3.5% (KOSPI) of the stocks' value on the smallest transaction to 0.3%(NIKKI) for the largest transaction (Bremer, 1997). There is also a securities transaction tax (it's being called different names though, in China, such tax is named stamp tax). Bremer et al (1997) found that 67% of cumulative abnormal returns after large price declines are positive suggesting a profit opportunity for firm brokers/deals as well as retail investors capable of making large transactions; but on closer examination, they concluded that profits after being adjusted by systematic risks are not likely. Ten (10) portfolios that are studied in this paper showed clear evidence of price continuation after large price increases and a mixed picture of how stocks behave following large price decreases. Statistically significant post-event mean daily return indicates that both bid-ask spread and liquidity are not sufficient to explain either price reversal or continuation observed in this study. In addition, the duration of the price pattern hints that traders or naïve investors might profit from large price changes. On other side, the size of price pattern may reduce the profit making opportunities for retail investors after considering transaction costs, bid-ask spreads and other surcharges. Finally, the result shows that big-cap portfolios performed better following the price increases whereas small-portfolios tend to be superior after large price drops. But such differences are not statistically significant, meaning that the firm's size does not matter.

2. LITERATURE REVIEW

Since 1980s, numerous researches that studied stock returns showed rich empirical evidences suggesting the failure of ever-so popular asset pricing models. During that time, several empirical puzzles had been extensively studied. Keim and Stambaugh (1985), French (1980) identified the day of the week effect and weekend effects on stock returns. Banz (1981) Reinganum (1983) proposed a size effect. Third well-known puzzle of stock returns pattern is the reversal of large-price increases/decreases. De Bondt and Thaler (1985) were recognized as the first work of providing compelling evidence of long-run overreaction. However, numerous studies investigated possible weakness of De Bondt and Thaler(1985)'s hypothesis, i.e. Conrad and Kaul (1993). Despite the divergences on possible causes for long-run reversal phenomenon, short-term return reversal seems being consistently attributed to over-reaction.

Bremer and Sweeney (1991) studied the stock returns of all firms that are included in the Fortune 500 from 1962 to 1986. The result showed statistically significant abnormal returns of which the trading days follows an extremely large negative price change. They then went on to conclude that such price reactions are not in line with the Efficient Market Hypothesis. Brown, Harlow and Tinic (BHT) (1988) inferred that price movements in response to either good or bad news should be positive on average. Bowman and Iverson (1998) found support for the over-reaction hypothesis after studying stock prices in New Zealand following a large weekly change in price. The authors inferred that the stock market does over-react, especially when a large price decline occurs. They attributed reversal phenomenon to risk, size, seasonal and bid-ask spread. Laser et al (2003), however, provided the evidence that is not consistent with over-reaction hypothesis. The work echoes Cox and Peterson (1994) supporting the short-term under-reaction hypothesis as well as momentum behavior in returns. Laser et al (2003) might be the first work factoring in "economic divergence" when studying stock indexes' reactions to large price changes. They found differences across the 2 types of markets: the degree of the large price changes is more significant in developing markets than in OECD markets. Zhang (2006) investigated the impact of information uncertainty on price continuation anomalies and cross-sectional variations in stock returns. Zhang (2006) evidence supported UIH. Brown et al. (1988), Ajayi et al. (2006) all found evidence supporting UIH.

Veronesi (1999) found the evidence that the magnitude of market over-reactions is correlated with market conditions based on the fact that the equilibrium price function increase and convex in investors' posterior probability of the high state which is due to the extra discount investors seek in anticipation of the higher volatility of returns that occur when they are more uncertain about the true state of the world. Mazouz, Joseph and Palliere (2009) examined the short-term price behavior of 10 Asian market indexes following large price changes. Their result showed a substantial variation in the impacts of large price changes in markets that are investigated indicating that the price reactions to "shocks" are vary by countries. Atkins and Dly (1990) used daily returns for all NYSE stocks from Jan 1975 through Dec 1984 and argued that the price of a share will decrease (increase) during a trading day if more traders sell (buy) that stock. On average, such phenomenon could give the occurrence of the observed price reversals. Bowman and Iverson (1998) suggested that Atkins and Dly (1990)'s work provides some support for the bid-ask bounce explanation of the return reversals.

Earlier works on study reversal phenomenon failed to recognize the role of bid-ask spread when evaluating the economic significant of price reversal. Despite many investors, i.e floor traders and members of stock exchanges, not being subject to any normal brokerage fees, bid-ask bounce is still able to affect traders' ability to benefit financially from predictable changes in stock changes. Work of Stoll and Whaley (1983) argued that the existence of bid-ask spread is crucial in determining the possibility of earning abnormal returns by exploiting market anomalies. Accounting for bid-ask bounce is also of interest in the light of work by Keim (1989), who inferred that systematic shifts from trading at one end to another might proportionally explain temporal stock return patterns, i.e. the day of the week effect, the turn of the month effect, etc. A similar shift might also partially account for the over-reaction that is observed in the stock market. Atkins and Dyl (1990) found that stock prices do over-react in the short-run, especially in response to negative information; but that significance of over-reactions, despite being statistically significant, is negligible compared to bid-ask spread observed in the stock markets. Kaul and Nimalendran (1990) found that bid-ask bounce might be the cause of the apparent price reversals in the daily data for NASDAQ companies. They found no evidence of over-reaction after controlling for the bid-ask bounce. In addition, the authors documented strong positive correlations between market capitalization, stock price and trading volume; which are all negatively linked with the bid-ask spread. Ball et al. (1995) argued that bid-ask spread accounts about two thirds of the following-week profits from a contrarian strategy. Jegadeesh and Titman (1995) echoed Ball et al. conclusion. On other side Park (1995) concluded that bid-ask spread does not fully explain price reversals that have seen in US stocks. Contrary to a common held view that short-term over-reaction and long-term reversal in returns are integrated, George and Hwang (2004) found that momentum is mainly caused by the "anchor and adjust" bias where

momentum and reversals are separate phenomenon. As the nature of an anchor-and adjust bias being more tractable to describe investor behavior than its peers, the authors believed that investors do not over react when they adjust for an anchor. Du (2008), however, challenged the finding of George and Hwang (2004) that despite an anchor-and-adjust bias being a better description of investors behavior, they do over-react when they adjusting and international momentum strategies are worth to explore even after taking into accounts of risk and transaction-cost adjustments.

3. DATA, METHODOLOGY, AND DISCUSSIONS

In this study, 10 portfolios are constructed basing on the market capitalization: each market that is studied in this research has 2 portfolios, namely Portfolio Big Cap and Portfolio Small Cap and each portfolio contains 20 stocks that ranked the highest in that category. The close to close prices of stocks of 5 Asian markets being studied in this research were retrieved by DataStream Advance 4.0. Information regarding market capitalization and trading volumes are obtained from Finance Yahoo and Thompson One Banker. The sample period is ranged from January 2004 to December 2017. 5 market indices are SSC, TOPIX, TAIEX, Hang Seng and KOSPI. Bremer et al (1997) stated that by studying stocks from large stock markets one can effectively avoided missing observations and potential measurement errors, as stocks are more actively traded and stock exchanges check recorded prices more thoroughly.

Following Bremer et al (1997), stock returns used in this research are not dividend-adjusted. The effect of missing dividend on abnormal returns would not cause any concern since ex dividend days for those stocks are concentrated on 2 calendar days, which are the last trading day of the semi-annual fiscal period in March and September. Results in Bremer et al (1997) showed that roughly 17% of large price changes happened around the end of fiscal periods.

This study uses same way that was used in Atkins and Dyl (1990), Cox and Peterson (1994), and Bremer et al (1997) to identify events or "shocks". An event day (shock) is identified according to magnitude of raw rates of returns on indexes. Consider all daily rates of returns of 5 market indexes that are included in this study that were greater than or equal to 3% or less than or equal to -3% during 1st Sep 2004 and 31st Aug 2009; name those rates of returns as "shocks" or large price changes. According to Bremer et al. (1997), "shocks" are existed from surprise new information which eventually affecting the value of stocks. For this study, surprise information is likely to be monetary policies; fiscal policies; political issues; forex …etc. According to Atkins and Dly (1990), "shocks" create opportunities to assess if markets preciously price surprise new information or over/under react to them. For positive price shocks during the sample interval, this study uses trigger value Tv+ as follows: +3%< Tv+ <+5%; +5%< Tv+<+10%; and Tv+≥+10%. Similarly, for negative price changes during the sample period, this study uses trigger value Tv- as follows: -3%> Tv- >-5%; -5%> Tv->-10%; and Tv-≤-10%. Despite statistically significant abnormal returns following large one-day returns being academically intriguing, it is also important to make sure that such phenomenon is worth exploiting from a standpoint of practice finance, meaning that it must be able to offer material yields after considering all costs incurred.

Table 1. Frequency of Positive and Negative Shocks from January 2004 to December 2017

Country	Frequency of positive shocks for various trigger values				
	Total Obs.	+3%<St<+5%	St≥5%	-5%<St<-3%	St≤-5%
China	1304	54	12	55	22
Japan	1304	23	6	28	11
Hong Kong	1304	39	20	45	17
Taiwan	1304	17	7	46	4
Korea	1304	23	8	29	10

Table 1 shows the frequency of positive and negative price shocks of different magnitudes. The slight greater occurrence of negative shocks, perhaps reflects the period of high market volatility following the financial crisis that rocked the entire financial system world-wide. As expected, smaller positive and negative price shocks are more frequent than larger positive and negative shocks. For price shocks within the range of 3% to 5%, China has the most price shocks and Taiwan has the fewest. Hongkong has 20 5% plus price shocks, which is the most in the sample whereas Taiwan only has 7. For price declines with the range of -3% to -5%, China once again has the most price shocks with 55 events and Japan has the fewest with 28 times. 22 5% or worse price drops happened in China during Sep 1st 2004 to Aug 31th 2009, which is the most and only 4 happened

in Taiwan during same period. Cumulative abnormal returns for each stock are calculated by adding the individual day abnormal returns. Panel A in which average returns, market model intercepts and market model slopes corresponds to the price rise between 3% to 5% by countries are presented shows that the Hong Kong has the lowest event day market return, setting at 3.658%, Japan has the highest event day market return of 3.795% whereas other 3 markets' returns fall between returns for the Hong Kong and Japan. Interestingly, Hong Kong and Japan are only 2 countries where display price reversals following one-day price rise between 3% and 5%. On other hand, Taiwan has the strongest price continuation following the initial price rise where day 1-3 mean daily market return is 0.42%.

Day 0 returns of the portfolios show a very similar picture relative to market returns. Japan and China all have over 4% returns. Towards the lower end, the return of Hong Kong was 3.24%. Matched pair *t*-statistics are used to compare the differences of mean daily return, market model alpha and market model beta around the "initial event period". Unsurprisingly, post-event mean daily return of both big and small cap portfolios of Japan are significantly larger than that of pre-event period as the t-statistics sitting at -3.55 and -4.02 respectively. Big-cap portfolio of China is the only portfolio didn't display the price continuation during the post-event period as its matched pair t-statistic is statistically insignificant at 10% level. The significance of market model alphas tell use if a large price changes signal the beginning of a prolonged period of "change of course" performance compared to the past. The t-statistic of post-event market model alpha for Hong Kong big-cap is statistically significant at 95% level sitting at -2.35, which suggests that a sharp price drop may signal the beginning of a prolonged period of "sub-par" performance relative to its past track record. The economic significance of changes in average betas from pre-event to post-event period is immaterial according to Cox and Peterson (1994). The results show that on average, market model intercepts and market model slopes corresponds to the price rise of 5% or more by countries. The results show that Hong Kong has the highest event day market return, sitting at 8.361%, Taiwan has the lowest event day market return of 5.817% whereas other 3 markets' returns fall between returns for Hong Kong and Taiwan. Japanese market doesn't exhibit the price reversal following a one day price rise of 5% or more whereas China and Hong Kong have negative day 1-3 mean daily market return. Both Japan's big and small-cap portfolios are the best performer in their categories, which former has a return of 9.44% whilst latter offers 8.34%. Post-event mean daily return of Japan's big-cap portfolio is 0.19% with a t-statistic of -6.95.On the lower end, China and Taiwan's big and small-cap portfolios failed to deliver the return that is statistically better than those of the pre-event periods. The t-statistic of post-event market model alpha for Japan big and small-cap is statistically significant at 99% level sitting at -38.14 and-22.92 respectively, which suggests that a sharp price drop is very likely to signal the beginning of a prolonged period of "sub-par" performance relative to its past track record.

In addition, the results also show that on average, market model intercepts and market model slopes corresponds to the price decline between 3% to 5% by countries and China has the lowest event day market return, setting at -3.882%. Korean has the highest event day market return of -3.648% whereas other 3 markets' returns fall between returns for the China and Korean. Taiwan is the only country that does not exhibit price reversals following one-day price drop between 3% and 5%. On other hand, Korean has the strongest price continuation following the initial price decline where day 1-3 mean daily market return is 0.526%. China's big-cap portfolio is the biggest causality following the one day price decline of 3%-5% as it's day 0 return is -4.24%; both big and small-cap portfolio of Korean are the stellar performers on the day where the market plummeted between 3-5% with a event day return of -3.5% and -1.63% respectively. 4 out of 5 countries big-cap portfolios showed a statistically better post-event return relative to those of pre-event, Japan's return is statistically better than that of pre-event period at 99% level. For large-cap portfolios, towards the lower end the return of Korean big-cap was -8.09% and return of Japan was -7.94%; on the higher end, Taiwan's big-cap produced the best return of -5.88%, which was followed by China big-cap's return of -6.82%.For small-cap portfolios, Taiwan's small cap produced the best result of -4.32% when facing market headwinds. Korean's small-cap performed much better than its big-cap, sitting at -4.42%, which is the second best perform in the group. On the lower end, Japan small-caps return is -7.58%, which is the worst return in the group. 2 portfolios of China failed to delivery statistically meaningful post-event mean daily return comparing to those of pre-event period whilst returns of 2 portfolios of Japan were all statistically superior relative to past at 99% level.

Contrary to finding of Cox and Perterson(1994), our result shows a mixed picture of portfolios' performance over 21th to120th trading days following the initial event. All portfolios showed statistically meaningful price continuation following price rise within 3% to 5% except 2 from China. However, portfolios' performance following price increase of 5% or more were "sub-due" somewhat. 4 portfolios from China and Taiwan showed no sign of price continuation during post-event period. Japan as being the only emerged market in the sample displayed the strongest price continuation in both case. As far as Price declines concern, convincing evidence

of price reversal during post-event periods is observed. Large-cap portfolios performed slightly better following the price decline of 3% to 5% during the post-event period judging by t-statistics whereas small-cap portfolios displayed a better resistance corresponding to large price declines. As being the largest emerging market in the world, portfolios of China didn't show price continuation following price rises, nor did it show price reversal after price drops whilst portfolios of Japan made the strongest cases in supporting both price reversal and price continuation phenomenon.

The results on average abnormal returns for each portfolio following large price changes during initial event periods show that the average abnormal returns for each portfolio following positive shocks are within the range of 3% to 5%. All 10 portfolios showed positive returns following the initial price increase during day 1 to day 3, of which both big-cap and small-cap portfolios of china shown statistically significant price continuations during period of day 1-3. 3 portfolios prices moved in the opposite direction during day 4 to day 20; but only Hong Kong small-cap portfolio's price reversal is statistically meaningful at the 90% level. Consistent with the result showing during first 3 days after the initial price change, the big-cap and small-cap portfolios of China show strong price continuation judging by the t-statistics. Overall, 3 small-cap portfolios showed stronger price continuations during day 1 to day 3 whilst Big-cap portfolios performed better from day 4 to day 20. 7 portfolios showed positive returns following the initial price increase during day 1 to day 3, of which only small-cap portfolio of Korea shown statistically significant price continuations during period of day 1-3 whereas small-cap of China, small and big cap portfolios of Japan exhibited price reversal to the extend which t-statistics are insignificant. 5 portfolios prices moved in the opposite direction during day 4 to day 20; but 2 small-cap portfolio's price reversal is statistically meaningful at the 90% level. Overall, occurrence of statistically price reversal increased as the initial price change goes up. Panel C displays the average ARs for both big and small cap portfolios following the initial price declines of 3% to 5%. Big cap portfolio of China showed the most significant price reversal during 1-3 days as well as 4-20 days. Big cap Japan is only other portfolio that displayed statistically meaningful price reversal during day 4 to day 20 after the initial price "shocks". There were more portfolios displaying price reversals during day 1 to day 3 than day 4 to day 20 and all portfolios displaying price reversals during day 4 to day 20 were big cap portfolios.

Consistent with results above, both big and small capitalization portfolios from China showed strong price reversals from day 4 to day 20 despite returns of day 1 to day 3 being statistically insignificant. Only small cap portfolios exhibited price continuations that offer profit opportunities during day 1 to day 3 whilst only big cap portfolios showed meaningful price continuations judging by t-statistics. The price continuation is confirmed by cumulative abnormal returns of portfolios once again. Only 2 small-cap portfolios exhibited price reversal but can be neglected judging by t-statistics. Panel B shows portfolios cumulative ARs after price rises of 5 percent or more, in which 2 portfolios of China made the a strong case for price continuations whereas Taiwan big-cap and Korean small-cap exhibit statistically meaningful price reversals. All in all larger positive trigger value provides more convincing support for price continuation following price increases and small-cap portfolios tend to offer higher returns relative to big-cap portfolios. Panel C presents CARs of portfolios following price drops within the range between -3% and -5%, only bid-cap Hong Kong displayed a statistically meaningful price continuation. More price continuations are observed in panel D, where display CARs of portfolios after price drops of 5 percent or worst. However, only 2 price continuations are statistically significant. All in all, small-cap portfolios showed better resistance corresponding to large price drops. This study follows Cox and Peterson (1994), using the pre-event mean daily return as the benchmark to study any possible price continuation or reversal beyond day 20. Post-event mean daily returns of portfolios being statistically significant signal the start of an extended period of price continuations following large price changes and price reversals after large price drops.

4. CONCLUSIONS

This paper sheds lights on reactions to large price changes in 5 major East Asian countries. The result of ex-post returns of 20 trading days after the "initial event" shows a clear evidence of price continuation after large price increases, which is consistent with Lasfer et al (2003), Bowman and Iverson (1998); and a mixed evidence of price reversal following large price declines, which echoes Ajayi et al (2006) and Veronesi (1999). In addition, evidences shown in the study are contrary to Cox and Peterson (1994) that bid-ask spread and liquidity are not sufficient to explain neither price reversals nor price continuations. Portfolios of China performed the best during the "initial event period". The duration as well as the magnitude of the price pattern observed in this paper hint that traders, or even naïve investors may be benefit from large price changes; institutional investors (who are not subject to trading sur-charges) are more likely to capitalize on opportunities that manifested themselves following large price movements. As far as stocks performance beyond "event windows" period (from 21st trading days onwards) is concerned, this research is consistent with Cox and

Peterson (1994) confirming markets prone to enter an extended period of relatively good performance where price continuations / reverse is itself continued after a "initial event period". Portfolios comprised of Japanese stocks are the most superior over the extended periods (from 21st trading day to 120th trading days). However, results of price continuations/ reversal over longer periods can vary depending on the method used, which warrants further examinations. Small-cap portfolios in chosen East Asia countries performed better following larger or negative price changes. But in general, the influence of size effect is neglect in this study, which also warrants further studies. An important point that needs to be mentioned when comparing results stated in this paper to those done on European and/or American stocks is that trading mechanism in Asia is different from elsewhere. Most of Asia capital markets do not use market makers, hence there is no competitive bid-ask spreads. According to Bremer (1997), Asia markets' high, fixed commissions may motivate dealers/brokers providing liquidity on days when stock prices plunged without requiring any compensation. Such behaviors may partially contribute to some findings of this research.

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