STOCK MARKET OVERREACTION AND TRADING VOLUME: EVIDENCE FROM MALAYSIA

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ABSTRACT

We investigate the stock market overreaction in Bursa Malaysia from January 2000 to October 2010 using weekly data. We find that winner portfolios tend to have negative returns whereas loser portfolios have positive returns for various holding periods from 1 to 52 weeks. Loser stocks experience more persistent and stronger return reversals than winner stocks. The evidence implies that a lower level of overreaction exists for winner stocks. Overall, a loser-winner portfolio yields highly significant returns. Comparing the overreaction of low-, medium- and high-volume stocks, we find that low volume stocks experience more consistent and larger return reversals. Therefore, trading volume is inversely related to overreaction. We also document more persistent overreaction for loser than winner stocks for all volume categories. The results suggest that investor may be able to obtain significant profits by implementing a short term contrarian strategy focused on low volume stocks.

Keywords: overreaction, trading volume, return reversal, contrarian, return predictability

INTRODUCTION

The overreaction hypothesis, as postulated by De Bondt and Thaler (1985), dictates that stocks that have performed poorly in the past (loser stocks) tend to outperform stocks that have performed well in the past (winner stocks). Rooted in investor psychology, the overreaction hypothesis contends that investors suffer from cognitive biases that affect their trading activities and, consequently, stock prices. As news arrives, investors overestimate the impact of the information that has been disseminated and trade based on this misconception. As a result, prices tend to overshoot, causing mispricing to occur. Stocks for which favourable news is released tend to experience greater price increases than appropriate. Similarly, prices for stocks associated with negative news tend to fall further than ideally they should. Subsequently, when investors realise the true extent of the news,

they revise their beliefs and trade to correct the lapse in judgment. This correction manifests itself as a reversal in stock prices. Investors adopting a contrarian strategy are able to profit from this overreaction. The contrarian strategy involves selling winning stocks and buying losing stocks in the anticipation that the prices will reverse.

As noted by Lobe and Rieks (2011), the literature on non-US short-term overreaction is limited compared to that on long-term overreaction. Thus, we have focused our attention on this area of research. In this study, we investigate whether overreaction is present in Malaysia for various holding periods from 1 week to 1 year. Although studies on overreaction have been previously conducted regarding the Malaysian market, these studies suffer from various limitations (with regards to sample size and time period) as discussed in the next section. We also contribute to the existing literature by investigating the relationship between trading volume and overreaction in Malaysia. Previous studies examining trading volume and overreaction have produced conflicting results. For example, Hameed and Ting (2000) contended that "the notion of overreaction presupposes heavy trading in the securities" (p. 69), thus underreaction rather than overreaction may occur for low volume stocks. Therefore, greater overreaction should be present for stocks with high trading volume. On the other hand, studies such as that of Iihara, Kato and Tokunaga (2004) have reported an inverse relationship between volume and overreaction. These authors have postulated that low volume stocks tend to be neglected and investors are therefore more prone to overreact regarding these stocks upon the arrival of new information. It would be interesting to re-examine the nature of the relationships in the Malaysian stock market for the current period. To summarise, the first objective of this paper is to establish whether investors exhibit overreaction in the stock market for time horizons of 1 week to 1 year after portfolio formation. Second, we also investigate the relationship between stock trading volume and the magnitude of overreaction.

The remaining sections are arranged as follows. Previous studies on short-term overreaction are presented in Section two, and evidence on trading volume is detailed in Section three. Details of the methodology used are presented in Section four, and in Section five, we present and discuss the results of this study. The final section provides our conclusions.

SHORT AND INTERMEDIATE OVERREACTION

In their seminal work, De Bondt and Thaler (1985) discovered patterns of return predictability in the U.S. stock market for the long-term horizon of 3 to 5 years. Stocks with poor past returns (loser stocks) outperformed those with relatively

good past performance (winner stocks). In other words, winner and loser stock returns tend to reverse over time. De Bondt and Thaler (1985) suggested that investor's overreactions to good and bad news were the cause of this phenomenon. The authors postulated the overreaction hypothesis based on the findings of an experimental study in psychology conducted by Kahneman and Tversky (1982), wherein individuals were found to initially overreact to the arrival of unexpected news. In a similar vein, the overreaction hypothesis states that investors tend to overweigh the significance of recent news. Investor's misjudgments cause prices to increase or decrease beyond reasonable levels. Investors then realise their error in judgment, revise their beliefs and trade in a manner that results in a return reversal. Follow-up studies have shown that the observed overreaction could not be fully attributed to seasonality (De Bondt & Thaler, 1987), size (Zarowin, 1990) or risk (Braun, Nelson, & Sunier, 1995).

In addition to the long-term overreaction documented by De Bondt and Thaler (1985), many studies have documented the existence of short-term overreaction. Among these studies, that of Jegadeesh (1990) found significant returns for contrarian portfolios that had been formed based on the previous one-month return. Additionally, Lehman (1990) examined whether overreaction existed in weekly returns. Winner and loser stocks were selected based on the returns for the past week. Portfolio returns were then evaluated for five holding periods ranging from 1 to 52 weeks. Notable return reversals were documented for both winner and loser portfolios.

Evaluating weekly returns, Lo and MacKinlay (1990) focused on whether contrarian profits are caused by overreaction. Based on their results, the authors concluded that stock market overreaction generated less than 50% of the profits. Moreover, the authors suggested that contrarian profits might not be solely driven by stock market overreaction and presented the lead lag effect as a primary contributor. However, Jegadeesh and Titman (1995) argued that contrarian profits are not generated by the lead lag effect. In their study, a similar strategy to that of Lo and MacKinlay (1990) was employed where stocks were ranked using past one-week returns, and the contrarian portfolio was held for the following week. A larger sample of stocks was employed over the period from 1963 to 1990. Significant contrarian profits were reported. A decomposition of the contrarian profits revealed that a majority of the profits could indeed be attributed to the overreaction of stock prices to firm-specific information. Providing further support, Da, Liu and Schaumburg (2010) recently discovered that contrarian returns arise as a result of investor overreaction in response to the arrival of firm-specific news on discount rate as well as liquidity shocks.

In markets other than the U.S., Kang, Liu and Ni (2002) found short-term contrarian returns for the Chinese stock market. Unfortunately, the loser minus

winner portfolio (formed based on the past 1-week return) yielded significant returns for only the holding period of 1 week. Whilst returns were largely positive from weeks 2 to 26, none of the returns were significant. A later study by Wang, Burton and Power (2004) corroborated the evidence by documenting significant returns for only the first week after portfolio formation. Returns for weeks 2 to 20 were insignificant. In contrast to situation in the Chinese market, Chou, Wei and Chung (2007) documented highly profitable contrarian returns for the Tokyo stock exchange. For the one-month formation period, the returns were significant for all holding periods, from 1 to 24 months. Recently, a study by Griffin, Kelly and Nardari (2010) covered 56 stock markets with loser minus winner portfolios constructed based on 1-week holding and formation periods. Argentina, Zimbabwe, Canada and Pakistan recorded some of the highest average weekly returns for the contrarian portfolio. Overall, returns were significant for 21 out of the 26 developed stock markets and 14 out of the 17 emerging markets that were examined.

One of the earliest studies of the Malaysian stock market was conducted by Mohd Arifin and Power (1996). The authors investigated overreaction using weekly data from 1990 to 1994. It should be noted that the study was severely limited in terms of sample size, as only 47 stocks were studied. Moreover, only the top and bottom 10 stocks were selected for the winner and loser portfolios. Thus, the stocks in the winner and loser portfolios were limited compared to previous studies. The KLSE composite index was used to compute market-adjusted excess returns, and the average cumulative excess return (ACER) was examined over ten weeks. The winner stocks exhibited negative returns for weeks one to three, and the loser stocks yielded positive returns throughout the ten weeks, indicating the existence of return reversals. The ACER of the loser minus winner stocks was also positive for all ten weeks. However, the statistical significance of the ACER could not be assessed as the *t*-value and/or *p*-value was not provided by the authors. Nevertheless, the CER *p*-value indicated that the returns were positively significant for one week following portfolio formation. Though accompanying data on significance was not provided, the authors concluded that overreaction is 'statistically significant' for the first two weeks.

Ahmad and Tjan (2004) found that winner and loser stocks experience return reversals and claimed that overreaction does occur in Malaysia. However, loser minus winner portfolios did not yield any significant positive returns. On the contrary, the returns were negative and insignificant. As stipulated by De Bondt and Thaler (1985), the difference between the loser and winner portfolios has to be significantly positive to justify that overreaction is indeed present. The lack of evidence found could be attributed to the sample selection method employed. Rather than screening the entire stock universe and choosing a reasonable percentage or number of stocks for portfolio formation, only the top

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10 best and worst performing stocks (as reported by the local newspaper) were selected. Moreover, the sample was tested for only a one-year period: 1997. The holding period was restricted to 1, 2 and 3 weeks. The authors also investigated the effect of the 1997 Asian financial crisis by dividing the sample into pre-crisis (January to June 1997) and crisis (July to December 1997) periods. Returns for the pre-crisis period remained negative but were surprisingly significant at the 5% level for the 2-week holding period with a return of –7.88%. During the crisis, contrarian returns were positive (but insignificant), and the highest return of 2.99% was obtained for the 2-week holding period. Overall, the evidence pointed towards an unprofitable contrarian strategy for the year 1997.

Recently, Ali, Nassir, Hassan and Abidin (2010) also studied short-term overreaction in the Malaysian stock market. However, the study was limited to gauging the market reaction to specific events. In particular, 13 individual events (such as the announcement of a general election) that took place between January 1987 and December 2006 were investigated. Overall, the results were inconclusive. Overreaction was found for some events (e.g., political events), but not for others such as international events. Nevertheless, it should be noted the actual sample size (the number of stocks) used in the study was not specified. Moreover, neither the method for computing abnormal returns nor the market proxy was detailed.

TRADING VOLUME AND SHORT-HORIZON RETURN PREDICTABILITY

Conrad, Hameed and Niden (1994) provided some of the first evidence regarding return reversal and trading volume. The sample comprised stocks listed on NASDAQ from 1983 to 1990. Only marginal evidence regarding reversals for one week following portfolio formation was obtained. Nevertheless, the authors established a much stronger result for trading volume and reversals. The sample was divided into high and low volume stocks based on the changes in the number of transactions over the previous week. Return reversals were present only for high volume stocks. Surprisingly, low volume stocks exhibited negative returns for the loser minus winner portfolio. In other words, high volume stocks were associated with reversals whereas price continuation occurred for low volume stocks.

Providing further evidence, Cooper (1999) investigated the overreaction hypothesis in high and low volume stocks using a sample of large market capitalization NYSE and AMEX stocks. The authors found that short-term overreaction existed for the period from 1962 to 1993. Moreover, the overreaction persisted after controlling for market microstructure effects. High-

and low-volume securities were selected using various percentage filters. For example, stocks need to exhibit an increase in volume of 50% to 100% from the previous week for the stocks to be classified as high volume. Contrary to Conrad et al. (1994), the findings showed that low-volume stocks had stronger reversals than high-volume stocks.

Using Malaysian stock market data, Hameed and Ting (2000) examined short-term contrarian returns and trading volume. The sample consisted of stocks listed on the Kuala Lumpur Stock Exchange from January 1977 to December 1996. For the holding period of 1 week, low volume portfolios did not experience any significant reversals. This led the authors to suggest that in order for overreaction to occur, there needs to be a high level of trading activity (volume). The authors concluded that the contrarian profits are greater for high-volume stocks than low-volume stocks.

Interestingly, Lee, Chan, Fatt and Kalev (2003) contrarily found significant short-term contrarian profits in Australian markets using weekly returns. Upon further investigation, volume was shown to have influenced the contrarian returns. The high-volume stocks had significantly lower levels of short-term contrarian returns. In contrast to the previous study by Conrad et al. (1994), the returns increased as the stock volume decreased. Lee et al. (2003) suggested that this could be attributed to differences in the definition of trading volume. Alternatively, the authors argued that low volume stocks could primarily be small capitalisation stocks, and small stocks tend to have higher returns. Thus, the higher contrarian returns for low-volume stocks could be caused by the effect of size.

On the other hand, Iihara et al. (2004) examined winner and loser portfolios based on past 1-month returns in the Japanese stock market for the period from 1975 to 1997. The authors found significant return reversals and suggested that these could be due to overreaction. With respect to trading volume, the evidence indicated that the return reversals were much more prominent in low-volume stocks. The authors argued that the return reversals are driven primarily by the returns from low-volume loser stocks. These results contrast with those of an earlier study by Bremer and Hiraki (1999). Using weekly returns, Bremer and Hiraki (1999) found higher contrarian returns for high-volume stocks in the Japanese stock market.

Looking at weekly contrarian and momentum strategies, McInish, Ding, Pyun and Wongchoti (2008) also uncovered a positive relationship between trading volume and contrarian returns. Return reversals were higher for high-volume stocks than for low volume stocks for Hong Kong, Malaysia and Japan.

However, it should be noted that significant reversals were present only for the one-week holding period (with the exception of Japan).

Overall, the evidence regarding trading volume is ambiguous; some studies report a positive relationship and others noting an inverse relationship between volume and short-term return reversals.

DATA AND METHODOLOGY

Given the limitations of previous studies, it is necessary to conduct a more comprehensive examination of overreaction. Accordingly, we investigate the overreaction hypothesis in relation to the Bursa Malaysia (formerly known as the Kuala Lumpur Stock Exchange). Stock price, stock index, trading volume and outstanding stock data are obtained from Datastream Advance. For the purpose of this study, we utilise weekly stock price data for the period from January 2000 to October 2010. Stocks with incomplete data are excluded from the study. The final sample comprises 297 stocks listed on the Bursa Malaysia.

The winner, loser and loser-winner portfolios are constructed similarly to the method used by Iihara et al. (2004). First, the stocks are ranked according to the past week's return. We use the top and bottom one third of the stocks for portfolio construction rather than deciles or quintiles due to the smaller number of stocks compared to studies in other markets. The top one third are classified as winner stocks and the bottom one third are classified as loser stocks. Equally weighted winner and loser portfolios are then constructed using these selected stocks. The portfolios are held for the following H weeks, where H takes the value 1, 2, 3, 4, 12, 24, 36 or 52. The portfolio returns are calculated accordingly to assess whether there is any overreaction. Under the overreaction hypothesis, the ACAR of the loser minus winner portfolio should be greater than zero when overreaction is present.

As in De Bondt and Thaler (1985), abnormal returns are computed for all stocks for each week using the market-adjusted model. The market-adjusted returns are calculated as follows:

$$AR_{it} = R_{it} - R_{mt} \qquad (1)$$

where R_{it} is the return for stock i at week t, and R_{mt} is the return for the market at week t. The FTSE Bursa Malaysia KLCI index is used as a proxy for market return.

Cumulative abnormal returns (CARs) are calculated over the next *H* weeks (where *H* takes the value 1, 2, 3, 4, 12, 24, 36, or 52). CAR is simply the sum of abnormal returns over *H* weeks. Finally, the average cumulative abnormal return (ACAR) is computed for the winner and loser portfolios as follows:

$$\text{ACAR}_{pt} = \left(\frac{1}{Z} \right) \sum_{Z=1}^{Z} \text{CAR}_{pzt} \tag{2}$$

where ACAR_{pt} is the average CAR for portfolio *p*, *Z* represents the test periods and CAR is the cumulative abnormal return for portfolio *p*. The ACAR for the arbitrage portfolio is the difference between the loser and winner portfolios (i.e., $\text{ACAR}_{loser} - \text{ACAR}_{winner}$).

As dictated by the overreaction hypothesis, if there is significant return for the arbitrage portfolio ($\text{ACAR}_{loser} - \text{ACAR}_{winner} > 0$), then overreaction is present in the market. For efficient markets, the Efficient Market Hypothesis (EMH) implies that the difference should be zero ($\text{ACAR}_{loser} - \text{ACAR}_{winner} = 0$).

For the second part of the analysis, we segregate the stocks based on volume. We define trading volume as the turnover ratio at the end of previous year. Trading volume may have elements of firm size intertwined with it such that any finding obtained from the analysis could have resulted from trading volume and /or size. Thus, turnover ratio is used to separate components of any size from the trading volume. Turnover ratio is the trading volume divided by the number of shares outstanding. The turnover ratio at the end of the previous year is used to sort the stocks equally into high-, medium- and low-volume stocks. Following this, stocks within each volume category are sorted again based on the returns for the previous week, and winner and loser portfolios are formed accordingly. In other words, overreaction is tested within each of the high-, medium- and low-volume categories to examine the relationship between overreaction and trading volume.

FINDINGS

Descriptive statistics are provided in Table 1. Panel A describes the total sample. The average return for the 297 stocks is 0.07% per week. The study encompasses 591 weeks. As portfolios are formed each week, the results presented in the following sections are the average of 591 test periods. Panel B details the return characteristic for each volume category. The returns for the low-volume stocks are higher than those of the high- and medium-volume stocks. This is consistent

with the study of Chen et al. (2010), where high-volume stocks were found to have lower returns than low-volume stocks. Low-volume stocks have higher returns and lower standard deviations than high- and medium-volume stocks. The high-volume stocks appear to be more volatile based on their higher standard deviations. The highest return (maximum) and lowest return (minimum) are both found in the high-volume category.

Table 1
Descriptive statistics

Panel A: Descriptive statistics for total sample

No. of stocks	297
No. of weeks	591
Average weekly return %	0.07
Average annual market capitalisation MYR 000's	1,373
Average annual turnover ratio	0.36

Panel B: Descriptive statistics for volume categories

Volume	Average weekly return	Standard Deviation	Skewness	Kurtosis	Maximum	Minimum
High volume	0.002	2.469	0.455	2.170	8.892	−12.235
Medium volume	0.043	1.770	0.276	2.828	7.381	−9.260
Low volume	0.113	1.684	0.282	2.558	8.670	−7.258

Notes: Table 1 provides descriptive statistics for the total sample as well as the volume categories. Panel A details average weekly returns (%), market capitalisation and turnover ratio for the total sample of 297 stocks. Panel B provides average weekly return, standard deviation, skewness and kurtosis of the weekly returns for each volume category. In addition, the last two columns state the highest and lowest weekly return for the volume categories.

Table 2 presents the results for the winner, loser and loser-winner portfolios for various holding periods. The winner (loser) portfolio was constructed using the best (worst) performing stocks based on the previous 1-week return, and the portfolio returns were subsequently computed for *H* holding weeks. The first column labelled 'formation period' provides the portfolio abnormal returns for week *t*–1. The remaining columns provide the average cumulative abnormal returns (ACAR) for 8 holding periods ranging from 1 to 52 weeks after portfolio formation. The associated t-statistics for one sample *t*-test are also provided.

Table 2
ACAR (%) for winner, loser and loser-winner portfolios

Portfolio	Formation Period	Holding Period (weeks)							
		1	2	3	4	12	24	36	52
W	5.27	–0.50	–0.53	–0.58	–0.47	0.03	0.61	1.20	2.03
t-stat	42.12	–5.19	–4.06	–3.88	–2.79	0.12	1.56	2.47	3.47
L	–4.82	0.58	0.71	0.85	0.90	1.03	1.15	1.64	2.60
t-stat	–56.62	6.67	5.65	5.26	4.86	3.37	2.50	2.81	3.86
L-W	–10.08	1.08	1.24	1.44	1.36	1.00	0.53	0.44	0.56
t-stat	–81.13	12.73	10.77	10.87	9.46	4.66	1.75	1.14	1.20

Notes: Table 2 presents the average cumulative abnormal return (ACAR) and associated one sample *t*-statistic for the winner (W), loser (L) and loser-winner portfolio (L-W). The winner (loser) portfolios are composed of the top (bottom) one third of the best (worst) performing stocks based on the return for the past one week. The loser-winner portfolio is computed as the difference in weekly market adjusted returns of the loser and winner portfolio. Formation period provides the 1 week average abnormal return during portfolio formation period of the portfolios. ACAR (%) for a total of 8 holding periods are reported ranging from 1 to 52 weeks. FTSE Bursa Malaysia KLCI index is used to proxy market return.

Comparison between the formation and holding period returns reveal prominent reversals especially for loser portfolios. For the formation period, winner stocks had significant positive returns and loser stocks have negative returns. During the holding period, the positions clearly reverse, as the loser stocks now have positive returns whereas the winner stocks have predominantly negative or lower positive returns.

For the winner portfolio, there is a strong positive return in week t–1, but the returns turn negative in week 1. Subsequent weeks also display similar statistically significant negative returns (at the 1% level) up to week 4. However, a gradually increasing positive trend in returns can be observed for holding periods of 12 weeks and above. At 52 weeks, the returns are not only economically significant with an ACAR of 2.03% but are also highly significant at the 1% level. Hence, return reversals appear to gradually decrease after 4 weeks. In contrast, there are notable positive returns for the loser portfolio, and the reversals tend to increase over time at a steady rate. The 52-week holding period has the highest return (2.60%). Moreover, returns for all holding periods are statistically significant at the 1% level with the exception of the 24-week holding period where the return is significant at the 5% level. Overall, there are consistent and large return reversals for loser stocks.

Overall, there are disproportionate levels of reversal for winner and loser portfolios. The reversals extend up to 52 weeks for the loser portfolio, but weaken for winner portfolios for holding periods exceeding 4 weeks. This implies that the overreactions for the loser stocks are more severe than those for the winner stocks. Several other studies have also documented notably greater reversals for losers (e.g., Bremer & Hiraki, 1999). We relate this result to the findings of Kahneman and Tversky (1982), wherein individuals were found to place a larger emphasis on unexpected bad news than on good news. Similarly, it would appear that investors tend to overestimate the effect of negative news than that of positive news on the stock market. This propels greater overreaction and subsequent return reversals for loser stocks.

The last row in Table 2 provides the difference in ACAR between the loser and winner for the various holding periods. If the returns are positive, then there is support for the overreaction hypothesis. We find positive ACARs throughout the holding periods. The returns are particularly prominent for periods from 1 to 12 weeks with returns ranging from 1% to 1.44%. In addition, highly significant returns (at the 1% level) can be found for periods from 1 to 12 weeks. Though the returns are only marginally significant for 24 weeks and insignificant for 36 and 52 weeks, nevertheless the ACARs remain positive. The lower returns towards the one-year period are due to the cessation of reversal for winner stocks. By 52 weeks, winner stocks yield a return of 2.03% and loser stocks yield a slightly higher return of 2.60%. Overall, the results of this study present strong evidence in support of overreaction. A contrarian strategy would be profitable, particularly when the arbitrage portfolio is held for 12 weeks or less.

Overall, we document much stronger and more consistent overreaction in the Malaysian market than did Mohd Arifin and Power (1996). Mohd Arifin and Power found significant overreaction for only weeks 1 and 2. The severely limited sample size of 47 stocks and the small number of stocks in the loser-winner portfolio could have caused the lower and less significant returns that were documented by Mohd Arifin and Power (1996). In any case, the findings broadly corroborate the findings of the earlier study in that overreaction is present in Malaysia. On the other hand, the findings are contradictory to those of Ahmad and Tjan (2004), where the loser minus winner portfolio did not yield any positive returns. In contrast, our study documents economically and statistically significant positive returns. This could possibly be due to differences in the methodology used. As highlighted, the study by Ahmad and Tjan (2004) was conducted only for the year 1997.

We have established the presence of significant overreaction in the Malaysian stock market. In the following, we proceed to investigate the relationship between the level of overreaction and the stock trading volume. The

sample is divided into high-, medium- and low-volume categories based on the turnover ratio at the end of the previous year, and the presence of overreaction is tested within each volume category. The results are provided in Table 3. The formation period returns (%) are in the first column. The average cumulative abnormal returns (ACAR) for the eight holding periods are also detailed in Table 3.

To begin, we examine the immediate reaction of investors by comparing the formation period returns at week $t-1$ with the ACAR for week 1. For all volume portfolios, the returns for winners are negative for the first week. Similarly, loser portfolios experience immediate reversals, as evidenced by the positive returns in the post-formation week. Thus, there are notable reversals for the week following portfolio formation. To understand the extent of reversal, we examine the returns for low-volume losers. The return for week $t-1$ is –4.43% (t-value = –53.29), but the return for the next week is 0.72% (t-value = 8.72). Likewise, the ACAR for the loser minus winner are significantly positive at the 1% level for week 1 throughout all volume divisions. The highest ACAR for week 1 can be found for the low-volume stocks, which yield a return of 1.23% (t-value = 13.98). To surmise, there is a prompt reaction from investors who revise their judgment and trade to correct the mispricing.

For the high-volume winners, there are positive returns for all holding periods except 52 weeks. However, the returns are statistically significant from weeks 1 to 4. The levels of returns are inconsistent, and there are no conspicuous trends for the holding periods. Interestingly, the reversals for loser are also present predominantly for up to 4 weeks. Beyond 4 weeks, the returns are no longer significant, and there are negative returns for holding periods of 24, 36 and 52 weeks. Overall, the reversals are short lived for high-volume stocks and do not last for more than 1 month. The ACAR for the loser minus winner portfolio is consistently positive for all holding periods. As expected, the ACAR is highly significant for periods of up to 12 weeks.

Table 3
ACAR (%) for high, medium and low volume stocks

Trading volume	Portfolios	Formation period	Holding period (weeks)							
			1	2	3	4	12	24	36	52
High-volume	Winner	5.62	–0.56	–0.70	–0.83	–0.70	–0.55	–0.79	–0.61	0.02
	t-stat	33.51	–4.36	–3.96	–4.02	–3.02	–1.44	–1.42	–0.91	0.03
	Loser	–5.21	0.54	0.67	0.73	0.71	0.44	–0.10	–0.20	0.46
	t-stat	–48.61	4.46	3.95	3.40	2.91	1.06	–0.17	–0.26	0.51
	Loser-Winner	–10.83	1.10	1.38	1.56	1.41	0.99	0.68	0.41	0.44
	t-stat	–71.69	9.84	9.64	9.48	7.48	3.46	1.68	0.84	0.75
Medium-volume	Winner	4.95	–0.47	–0.44	–0.57	–0.41	–0.09	0.44	0.97	1.68
	t-stat	41.08	–4.63	–3.27	–3.65	–2.42	–0.32	1.11	1.93	2.66
	Loser	–4.53	0.50	0.57	0.75	0.76	0.93	1.09	1.47	2.12
	t-stat	–53.01	5.88	4.63	4.68	4.14	3.06	2.47	2.60	3.15
	Loser-Winner	–9.49	0.97	1.01	1.32	1.18	1.02	0.64	0.50	0.44
	t-stat	–79.08	10.60	8.18	9.14	7.33	4.19	1.94	1.21	0.88
Low-volume	Winner	4.96	–0.50	–0.50	–0.38	–0.27	0.74	2.03	3.03	4.36
	t-stat	41.68	–5.39	–4.01	–2.58	–1.62	2.82	5.62	6.78	8.14
	Loser	–4.43	0.72	0.90	1.07	1.27	2.09	3.18	4.26	5.75
	t-stat	–53.29	8.72	7.54	7.07	7.25	7.38	7.65	8.43	9.73
	Loser-Winner	–9.40	1.23	1.40	1.45	1.54	1.35	1.15	1.22	1.39
	t-stat	–73.87	13.98	11.30	10.27	9.90	5.72	3.42	2.98	2.69

Notes: Table 3 provides the return for the winner, loser and loser-winner portfolio for three volume categories. High, medium and low volume stocks are selected based on turnover ratio for the past year. Winner and loser portfolio are composed of stocks with the best and worst returns respectively for the previous 1 week. The average returns (ACAR) for the formation period and 8 holding periods are reported.

Significant negative returns were observed for the medium-volume stocks in the winner portfolio. The reversals gradually decrease, eventually giving way to positive returns. By the 52-week holding period, the returns are positive and significant at the 1% level with a large ACAR of 1.68%. Unlike the winner portfolio, there is sustained reversal for the loser portfolio, as seen by the progressively positive returns. The highest reversal is at 52 weeks, yielding up to 2.12%. Moreover, from a statistical standpoint, the returns are highly significant for all holding periods. As is the case with the high-volume stocks, the reversal

for the loser stocks is higher than for the winner stocks. This suggests that investors overreact to a greater extent on the arrival of negative news. The return for the loser minus winner portfolio is significantly positive for up to 12 weeks. Nevertheless, the returns tend to decrease from week 3 onwards. At 24 weeks, the returns are lower and marginally significant at the 10% level. The ACARs are no longer significant for the holding periods of 36 and 52 weeks.

Except for week 4, low volume winners display significant returns at the 1% level for all holding periods. However, not all returns are negative. Weeks 12 to 52 have positive returns indicating that a price continuation exists rather than a price reversal. This evidence appears to agree with the results obtained by Jegadeesh and Titman (1993), where price continuation (or momentum) was found to be present for 3 to 12 months. However, losers do not display any momentum; instead strong return reversals could be found for all periods. The return reversal increases drastically with time and are as high as 5.75%. The loser minus winner portfolio provides further support for the overreaction hypothesis, as the returns are consistently above 1% and statistically significant at 1% level for all weeks. Such strong evidence contributes compelling evidence for stock market overreaction. Moreover, it documents that greater overreaction is present for low-volume stocks.

Indeed, the returns are clearly more prominent for low-volume stocks than for high-volume stocks. The overreaction for low-volume stocks is more persistent, as demonstrated by the relatively consistent ACAR throughout the holding periods. In contrast, return reversal reduces over time for high-volume stocks. This reduction is particularly evident after 12 weeks, where the ACAR is smaller and no longer statistically significant. The differences become more prominent as the holding period increases. For the 52-week holding period, the ACAR for the loser minus winner portfolio is 1.39% for low-volume stocks, but the returns are merely an insignificant 0.44% for high-volume stocks.

Overall, the evidence indicates that low-volume stocks tend to overreact more than high-volume stocks and exhibit correspondingly higher return reversals. The results corroborate the evidence presented by Cooper (1999), Lee et al. (2003) and Iihara et al. (2004). Low-volume stocks may have less analyst coverage, and the information available to investors with regards to these stocks may not be as extensive as that of high-volume stocks. As suggested by Iihara et al. (2004), low-volume stocks are more likely to be neglected and are thus more prone to mispricing. Hence, a greater level of overreaction would be present for low-volume stocks than high-volume stocks.

However, our findings are inconsistent with the study of Hameed and Ting (2000) on the Malaysian stock market, which found no reversals for low-

volume portfolios and concluded that high trading volumes are required for overreaction to occur. Moreover, the level of overreaction presented in this study appears to be much higher than that reported by Hameed and Ting (2000). One possible explanation is the difference in the periods examined. Hameed and Ting (2000) examined the pre-1997 Asian financial crisis period. As documented by Ahmad and Tjan (2004), the returns for a loser minus winner portfolio were negative for the pre-crisis period but turned positive for the crisis period. A positive return for the loser minus winner portfolio could be anticipated to persist for the post-crisis period. In addition, the positive return could be due to the differences in portfolio formation; the portfolios in Hameed and Ting (2000) were formed based on weighted relative strength rather than equal weighting.

The findings indicate that investors might be able to profit from employing a contrarian strategy implemented on the Malaysian stock market. However, overreaction is present only for periods of up to 12 weeks; thus, a portfolio holding period beyond 12 weeks would not be profitable. Nevertheless, further investigation reveals that overreaction persists for low-volume stocks for periods of up to 52 weeks. Capitalising on trading volume information would allow investors to implement profitable contrarian strategies for up to a year (52 weeks). Moreover, low-volume stocks appear to overreact more than high- or medium-volume stocks. Thus, the results imply that investors could generate greater returns by focusing on low-volume stocks. However, further investigation should be undertaken regarding whether the contrarian strategy remains profitable after taking transaction costs into consideration.

CONCLUSIONS

Overall, we find strong evidence in support of the overreaction hypothesis in the Malaysian market for periods ranging from 1 to 52 weeks. In particular, the overreaction is stronger for holding periods of 1 to 4 weeks. The evidence also suggests that loser stocks experience greater return reversals than winner stocks. We attribute this finding to the tendency for individuals to place greater emphasis on bad news than on good news. Moreover, the overreaction is higher for low-volume stocks than for high- and medium-volume stocks. In other words, there is a negative relationship between trading volume and overreaction.

Based on the findings of this study, a contrarian strategy of buying loser stocks and selling winner stocks could yield significant profits especially for periods of between 1 and 12 weeks. It should be noted that the returns might not be economically significant after considering transaction costs. Nevertheless, we expect that investors would be able to profit from overreaction despite the trading costs by adopting a 'smart' approach to portfolio construction as suggested by de

Groot et al. (2011). In addition, the results also imply that a strategy focused on low-volume stocks would be able to generate higher contrarian returns, and these returns could be sustained over a longer horizon of up to 52 weeks. However, a low-volume portfolio could possibly be composed of small stocks that are illiquid, and this could reduce the profitability of the arbitrage portfolio.

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