

Mean reversion on the JSE

1. INTRODUCTION

One of the cornerstones of modern financial markets is the proposition that markets are efficient. This implies that prices of securities in the market should be equal to their intrinsic value and reflect a present value of a rational forecast of the expected future dividend payments. Furthermore, prices of shares should follow random walks. This study looks at one key challenge to the efficient market hypothesis, namely the mean reversion of returns of shares.

The existence of mean reverting returns is a challenge to market efficiency as it implies that future stock prices can be predicted from historical prices. Following De Bondt and Thaler (1985), the presence of this anomaly will be indicated by portfolios made up of loser/winner shares ratios having significantly abnormally positive/negative cumulative returns relative to the market in the post-portfolio creation period. This empirical phenomenon has been observed for other stock markets and has been attributed to biases in investors' decision making processes. The two key contributions of this paper are an examination of the existence of this anomaly in relation to securities traded on the JSE for the period October 1983 to December 2005 using a data set that has been corrected for survivorship bias; and the use of price to earnings (P/E) ratios to allocate shares to the winner/loser portfolios.

The rest of the article is laid out as follows. The weakly efficient form of the efficient market hypothesis and the body of evidence that challenges it is reviewed in the following section. The methodology used by De Bondt and Thaler (1985) to test for mean reversion is adapted and applied to data from the JSE in the next section. Finally the findings are presented and discussed.

2. LITERATURE REVIEW

Fama (1965) presented strong evidence supporting the efficient market hypothesis (EMH). This implies that prices of securities reflect their intrinsic value and consequently prices are unpredictable and follow a random walk. If the efficient market hypothesis is true then it should not be possible to devise trading rules which allow abnormal profits to be made. The most basic form of the EMH is the weak form which states that a market is weak form efficient if past prices alone cannot be used to earn abnormal returns.

The assumption that individuals are rational and consequently make optimal decisions based on the information available to them has always been held as the key to efficient markets. Prices should thus reflect all available information and therefore investors cannot outperform the market unless they are privy to special information. There is a significant body of evidence of bias in individuals' decision making behaviour. The field of behavioural finance focuses on the implications of these identified biases. A brief review of some of the key biases and their implications for investors' overreaction are presented before the evidence regarding mean reversion of share returns is reviewed.¹

2.1. Decision makers' biases

Overconfidence is one of the most strongly documented behavioural biases and, according to De Bondt and Thaler (1990), the finding that people are overconfident is perhaps the most robust finding in the psychology of judgement (Daniel and Titman, 1999). People have a tendency to overweight recent events and discount longer term fundamentals and this can lead to overreaction as decision makers extrapolate from trends from recent events (Kahneman and Tversky, 1973). Experts also tend to be more overconfident than relatively inexperienced individuals (Griffin and Tversky, 1992). The degree to which individuals are overconfident depends on the situation and is generally stronger for more diffuse tasks where feedback is slower (Einhorn, 1980).

A rational investor should combine all the information at hand according to Bayes' rule. This implies that the weight placed on a piece of information should be proportional to its respective precision. Overconfidence results in individuals putting too much weight on information they collect themselves because they tend to overestimate the precision of the information (Daniel, Hirshleifer and Subrahmanyam, 1998). Individuals also filter information in ways which allow them to maintain confidence, and thus tend to ignore or underweight information which lowers their self-esteem. Thus investors would be reluctant to sell losers as this means admitting to making a mistake (Odean, 1998). Investors also overweight information which confirms their original view and underweight information which is inconsistent with their views. This could produce momentum in the way of delayed

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¹The weak form of the EMH has been tested both in the short run using the event study methodology (testing overreactions to announcements) and the long run using portfolio performances (testing for mean reversion of returns). For reasons of brevity only the key long run mean reversion studies will be reviewed here.

overreaction. It has been shown that overconfidence is likely to influence the judgement of investors relatively more when they are analysing vague subjective information. This implies that, for example, low book-to-market companies' prices should be more susceptible to investor overconfidence (Daniel, Hirshleifer et al. 1998).

2.2. Evidence of overreaction in stock markets

Fama (1965) presented empirical evidence in favour of the random-walk hypothesis. However the early studies leading to Fama's initial conclusion that share prices were unpredictable were criticised for focussing on short-run correlations using a small data set (De Bondt and Thaler, 1989). As Summers (1986) showed, as many as 6000 data points were required in order to give a standard test for a random walk a 50% chance of rejecting a false null hypothesis – Fama (1965) used samples of 1200 to 1700 in his initial work. A review of longer time periods and larger data sets revealed very different results. Poterba and Summers (1988) found a tendency for price to show positive autocorrelation over short time periods and negative autocorrelation over longer time periods. Fama and French (1988) regressed the returns for shares over a set length period against the returns over a prior period of equal length, using monthly nominal return data. They studied both equal-weighted and value-weighted indexes and also compared portfolios based on size of the firms. They generally found negative serial correlation. This implies that share prices are made up of both transitory and permanent components.

Basu (1977) first presented evidence of a negative relationship between the P/E ratios of US shares and their subsequent investment performance over the period 1956 to 1971, even when adjustments were made for risk (proxied by the firms' betas). However it was the De Bondt and Thaler (1985) paper which really began the wave of research into this area. They used cumulative relative returns over a five year period to rank shares and then used these rankings to compose portfolios of 'winners' and 'losers'. They presented evidence of long run mean reversion of returns for these portfolios in US data for the period 1926 – 1982 and linked it to biases in investors' decision making behaviour discussed above. In their later paper (De Bondt and Thaler, 1987) they find the same results when adjustments are made for firm size and risk (again proxied by their betas).

A number of explanations have been offered for the loser firm phenomena. Losers tend to be smaller than average and small firms earn abnormally high returns (Zarowin, 1989). Zarowin (1990) reviews US shares and finds that all of the relative over/under performance can be explained by the firms' relative size (but not their risk as measured by their betas). He interprets this to be evidence of the small firm effect, not the overreaction hypothesis. Clare and Thomas

(1995) review UK data that shows long run mean reversion, but this disappears when firm size is controlled for.

Another explanation is that losers have become riskier and as such demand higher returns. Ball and Kothari (1989) investigated whether mean reversion can be attributed to asset mispricing or the changes in the risk properties of the securities. The pattern of serial correlation was examined for abnormal risk-adjusted returns as opposed to total returns on stock market indices. They argued that unless a firm dynamically adjusts its debt/equity ratio, consistently negative share price returns will both raise the equity cost of capital and increase its leverage. As risk is a linear function of leverage, the higher returns observed are normal. Chopra, Lakonishok and Ritter (1992) controlled for risk by grouping companies into similar risk classes and then estimated the betas. Large differences between portfolio formation and test beta's were found, confirming the results of the Ball and Kothari (1989) study. However differences in betas do not fully account for differences in returns, leading to the questioning of the validity of the Capital Asset Pricing Model (CAPM). They suggested a revised model of asset pricing incorporating a term to capture the tendency of prices to mean revert.

Several authors have supporter De Bondt and Thaler's original conclusions. Chopra, Lakonishok et al. (1992) find evidence of mean reversion for shares even when controlling for size and betas, although the effects are reduced when compared with De Bondt and Thaler (1985) and the overreaction is more extreme for smaller firms than for larger ones. Lakonishok and Shleifer (1994) also find evidence of mean reversion of US shares when controlling for differences in firm size. Albert and Henderson (1995) revisit Zarowin (1990)'s study and, using an alternative size matching methodology, find that there is evidence of a separate overreaction when firm size is controlled for.

La Porta, Lakonishok, Shleifer and Vishny (1997) find evidence that the superior returns of US value shares are due to earning surprises (i.e. investor overreaction to previous earning trends) which are significantly more positive for value shares – even when controlling for firm size. Daniel and Titman (1999) did a related study examining the book-to-market values of companies and the relationship to mean reversion. They found that high book-to-market portfolio's outperformed the low book-to-market portfolios. Whilst book-to-market values and P/E ratios are linked to a certain extent, evidence of mean reversion on the one will not necessary imply mean reversion on the other as the portfolios will not be exactly matched. Gropp (2004) examines the existence of mean reversion by using a panel data, industry specific approach for multiple US stock exchanges and finds that there is evidence that it does exist, even on a risk adjusted basis.

The bulk of the studies reviewed above are based on the US experience, but the results found are supported for other markets. Chan, Hamao and Lakonishok (1991), using data from 1971-1988 on the Japanese stock market, find evidence of mean reversion. Power and Lonie (1993) repeated the study on the London Stock Exchange and found similar results. Bauman, Conover, Mitchell and Miller (1999) find evidence of overreaction in 20 established stock markets using data for the period 1986 to 1996. Otchere and Chan (2003) show that the Hong Kong stock market does overreact and that the overreaction is more pronounced for winners than losers. Chiao and Hueng (2005) consider the application of the Fama and French (1992) three factor model to the Japanese and New York stock exchanges and find that overreaction effects still exist even when the book to market and size are controlled for.

There are two direct long run tests for evidence of the overreaction hypothesis on the JSE.

Plaistowe and Knight (1986) compare the average cumulative weekly returns to winner and loser portfolios over a period of a year after the portfolio formation date. These returns are drawn from a sample of 35 shares for the period 1973 to 1980. They ranked their shares on their relative market to book ratios and all shares trading at a premium/discount were placed into winner/loser portfolios. They find that while the loser portfolios did not exhibit abnormal returns relative to the returns of the RDM 100 Index of industrial shares, the winner portfolios did exhibit significant abnormal losses.

Page and Way (1992) examine the returns for 204 shares traded for the period 1974 to 1989 using monthly returns. They follow the approach of De Bondt and Thaler (1985) more closely and used cumulative historical returns to rank shares at the portfolio formation period. Two separate sets of portfolios were constructed. The first was comprised of non-overlapping portfolios of two years duration each; and the second of overlapping portfolios of three year duration. Two start dates per year were used (1st of July and 1st of January) for each approach to account for timing issues. They conclude that there is 'clear evidence of investor over-reaction on the Johannesburg Stock Exchange' (Page and Way, 1992:43). For the 36-month portfolios the loser portfolios on average out perform the winner portfolios on a relative basis by almost 15%. A similar result is achieved for the two year non-overlapping portfolios.

A key weakness of both of these studies is that their analysis is based solely on shares that were still being traded at the end of the periods under consideration – in other words their conclusions suffer from survivorship bias. As will be shown in the discussion of the data set used in this paper, the number of firms excluded from their analyses is indeed large. This

paper uses a data set that includes the returns for all shares listed on the JSE All Share Index (ALSI) over the entire period under consideration.

3. RESEARCH METHODOLOGY

It was decided to follow the approach used by De Bondt and Thaler (1985 and 1987) as closely as possible in order to develop directly comparable results². However their approach could not be replicated exactly for two reasons. Firstly, our relatively short data set meant that we could not replicate their non-overlapping five year portfolio approach. We also construct five year portfolios, but these are overlapping. Secondly, we do not use cumulative historical abnormal returns to rank shares at the portfolio formation date but rather use P/E ratios to rank the shares.

3.1 Data

Historical data for shares traded on the JSE was obtained from Inet-Bridge. Inet-Bridge is a market data source that maintains a database of historical data published by the JSE Securities Exchange updated to correctly account for share splits and unbundlings³. The month end price, price earnings yield and dividend yield data were collected for all shares listed on the ALSI of the JSE for the period 31 October 1983 to 31 December 2005 (255 data points per share).

A list of de-listed shares was obtained from the data providers and all the P/E data for these shares was included in the dataset for this period. Over the entire period the returns for 1320 separate shares were included, of which 841 had either been delisted or were removed due to some other type of corporate action by the end of the period⁴. The relatively high proportion of delisted firms highlights the potential for error due to the presence of survivorship bias. The use of this complete data set represents a key advance over the previous South African studies reviewed above.

An equally weighted share index (EWI) was created and the monthly returns for this index were calculated

²It would also allow us to directly compare our results to the work of Page and Way (1992).

³The data set was carefully checked for errors and cleaned where possible. Where no data was available for a share the share was eliminated from the dataset. The data used was adjusted for corporate actions so returns and P/E and Dividend yields were comparable.

⁴The number of shares listed on the market has fluctuated depending on a number of factors. Reasons for delisting include corporate actions such as consolidations between companies, bankruptcy and financial considerations. An increase in the number of listings is normally consistent with favourable market conditions.

for purposes of establishing the portfolio's relative returns. We also used the ALSI's monthly returns for comparison purposes. The historical ALSI index information was also sourced from Inet-Bridge for the same period. This process was complicated by the fact that the index changed from July 2002 when the JSE became part of the FTSE. The JSE only restated 7 years of historical data so it was necessary to calculate the returns for the two indices and splice them together to get a consistent return for the JSE overall index for the 22 year period.

3.2. Ranking of firms on the basis of P/E ratios

De Bondt and Thaler (1985, 1987) calculated the cumulative relative historical returns for each share for the five year period preceding the portfolio formation date and ranked the shares on this criterion. Due to the relatively limited amount of data available for the JSE we decided to use the contemporaneous P/E rankings for the shares in issue at each point to identify the winner and loser portfolios. This is consistent with the work of Basu (1977). The use of P/E ratios has another advantage over the cumulative returns approach – the P/E value for a share represents a forward looking market determined relative ranking for the shares at any point in time. The approach used by De Bondt and Thaler defines the relative attractiveness of a share at a point in time in terms of its historical cumulative performance – it is a backwards looking methodology which will not necessarily reflect investors' contemporaneous attitudes towards individual shares.

3.3. Portfolio creation

We follow De Bondt and Thaler (1985) by constructing portfolios from the top 35 and bottom 35 shares as rated by their P/E ratio at the portfolio formation date. These shares are weighted equally and the excess monthly returns (relative to both the ALSI index returns and the Equally Weighted Index (EWI)) were then tracked for 5 years from the start date. The start date was then incremented one month forward and the process repeated. Doing this over the entire period allowed for the creation of 206 winner and loser portfolios each giving a total of 412 portfolios. The monthly returns for each winner and loser portfolio were then combined and averaged on a restated basis to give the final average relative returns for each category. What this means is that the returns for month 1 of all the winner portfolios were combined to give the average winner portfolio return for month 1. The same exercise was conducted for the loser portfolios to give the average returns for each month for these portfolios.

This approach allowed us to meet two objectives, namely to overcome the issues of a smaller dataset and to take the timing element out of the study. Examining the data using the exact De Bondt and

Thaler (1985, 1987) methodology would have significantly limited the number of portfolios we could have generated. While this does have negative implications for the power of the significance tests applied to the results it does maximise the number of portfolios that can be created from the data set. In the original De Bondt and Thaler (1989) study there was a definite timing element in their data which showed that shares mean reverted more in January. There was a concern that, due to the more volatile nature of the SA market, market timing would play a bigger role and an effort was made to remove the timing element and focus entirely on the question of whether or not the shares' returns reverted to the mean.

Due to the large quantity of data used in the study a Visual Basic application was developed to analyse the data. This application was called JAM and it created each of the portfolios. This was achieved by selecting the shares in the database that were being traded at the start date and ordering them by P/E. The top and bottom 35 shares were then divided up into the winner and loser portfolios. Following on De Bondt and Thaler's (1989) methodology these portfolios were equally weighted.

For each of these shares the following 60 months of returns were selected and placed in the database with a unique portfolio code representing the start date and the type of portfolio. After the two portfolios were formed on the start date, the date was incremented one and the process was repeated. The resulting 412 separate portfolios contained 728 441 individual data points.

The returns for individual shares comprised of the capital gains/losses over the month combined with one twelfth of the annualised dividend⁵. The return for each of these portfolios was then calculated by JAM on a month by month basis. This was achieved by averaging the returns for each share for each month. At each month the portfolio return relative to the market (EWI /ALSI) was calculated.

The returns of the 412 winner/loser portfolios were then again combined into two average (or representative) winner/loser portfolios on a month by month basis⁶. This washed out any returns as a result of the returns being a result of market timing. The final output from JAM was two portfolios of 60 months returns relative to either the EWI or the ALSI.

4. RESULTS

⁵The annualised dividend was calculated from the share's dividend yield published at the end of each month.

⁶In other words, all the returns for first month for all the winner/loser portfolios were combined to give the average return for month one for the representative winner/loser portfolio. This was repeated for all 60 months.

The cumulative abnormal returns for the representative winner and loser portfolios for the 60 month period post portfolio formation date relative to the EWI are presented in Figure 1. The loser portfolios outperform the winner portfolios on average by 61,5% over this five year period. This equates to an excess compound average return of 11,15% per annum.

The returns of the representative winner and loser portfolios relative to the ALSI are presented in Figure 2. The difference in relative total cumulative performance is 73%. The loser portfolios outperform the winner portfolios by approximately 11,5% on a per annum average compounded return basis. When viewed as individual pairs, the loser portfolios outperformed their winner portfolio partner on a cumulative return basis 85,9% of the time when viewed relative to the EWI and 84,5% when viewed relative to the ALSI. When viewed in combination, this is strong evidence for the presence of mean reversion of share returns on the JSE Securities Exchange for the period 1983 – 2005.

The average returns for each portfolio month in the post portfolio formation period for both winner and

loser portfolios relative to EWI and the ALSI are presented in Figures 3 and 4.

While the winner portfolios do well on average in the first month post portfolio formation the loser portfolios on average match or outperform the winner portfolios for 56 of the 60 months under consideration for both the ALSI and EWI comparisons.

The small difference in performance between the portfolios relative to the two market indices indicates that the returns for the ALSI and EWI portfolios are not significantly different.

The significance of the difference between the mean returns to the representative winner and loser portfolios relative to both the EWI and ALSI was examined for using a *t*-test calculate with a pooled variance. Table 1 contains the results of this test.

The pooled variance *t*-test comparing the total returns found over the different time periods show that the mean difference is statistically different from zero. Thus the loser portfolio outperforms the winner portfolio in a statistically significant manner.

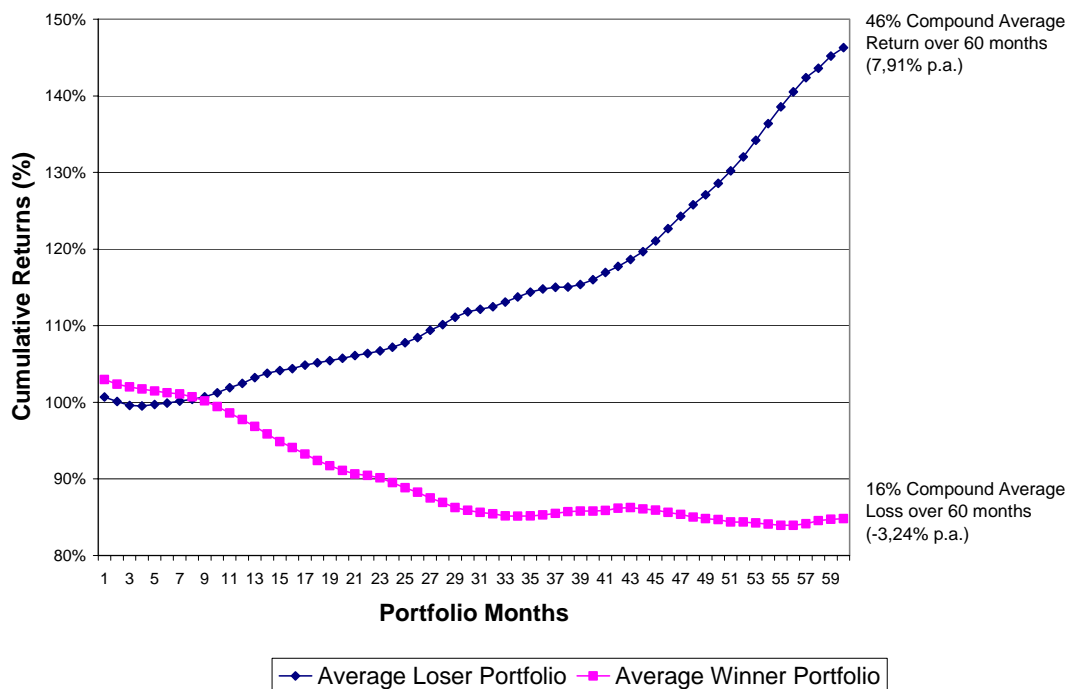


Figure 1: Average winner and loser portfolios cumulative performance relative to EWI

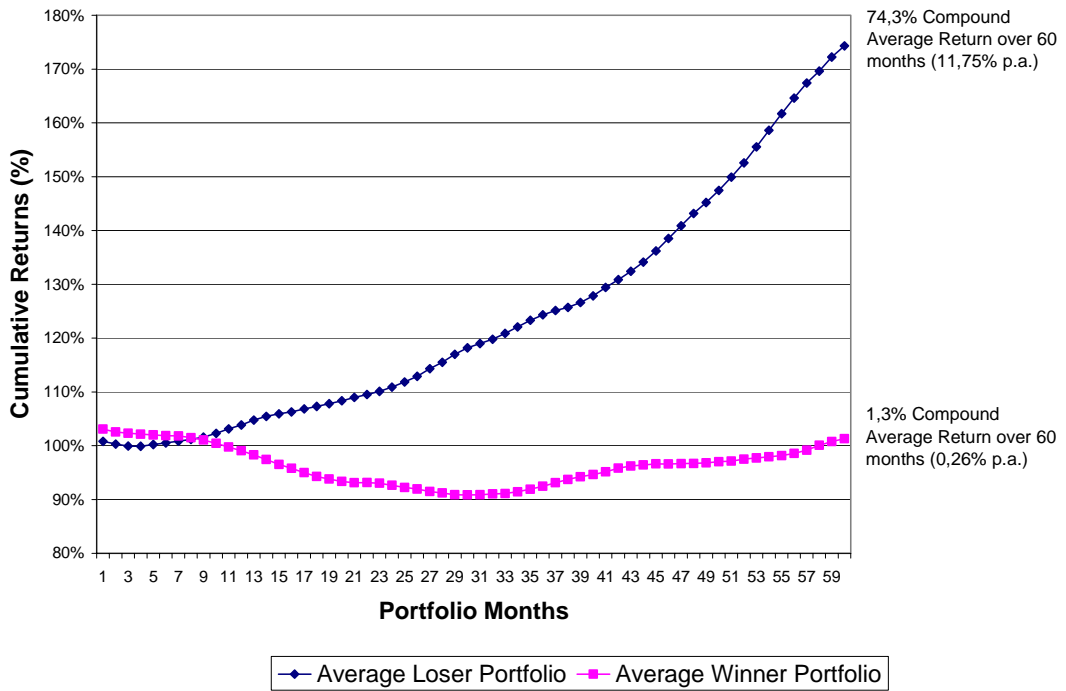


Figure 2: Average winner and loser portfolios cumulative performance relative to ALSI

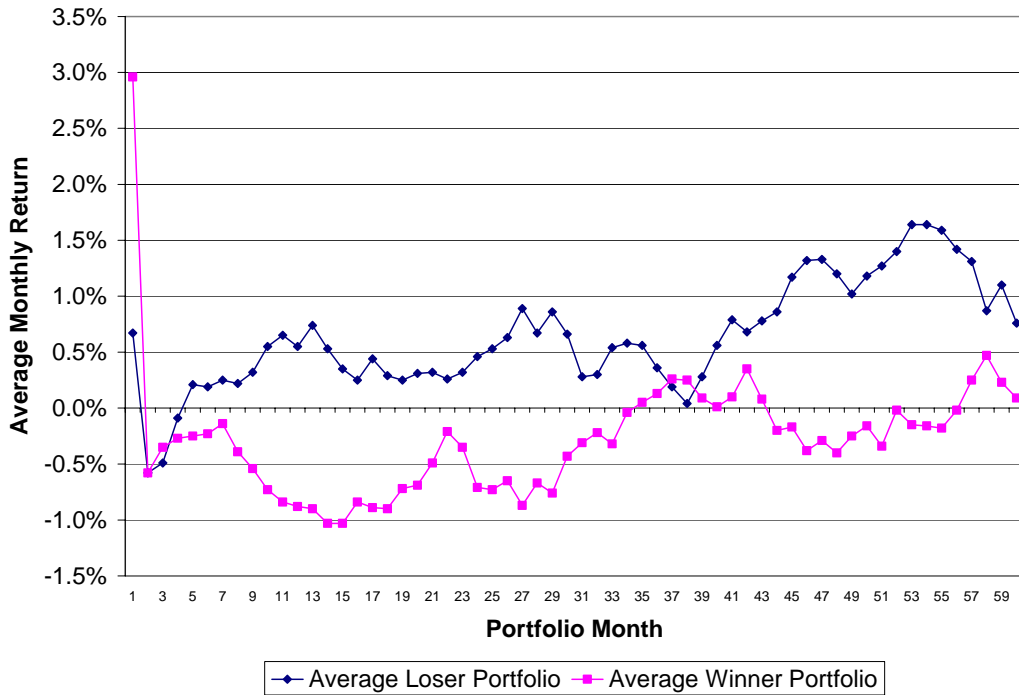


Figure 3: Average monthly returns for winner and loser portfolios relative to EWI

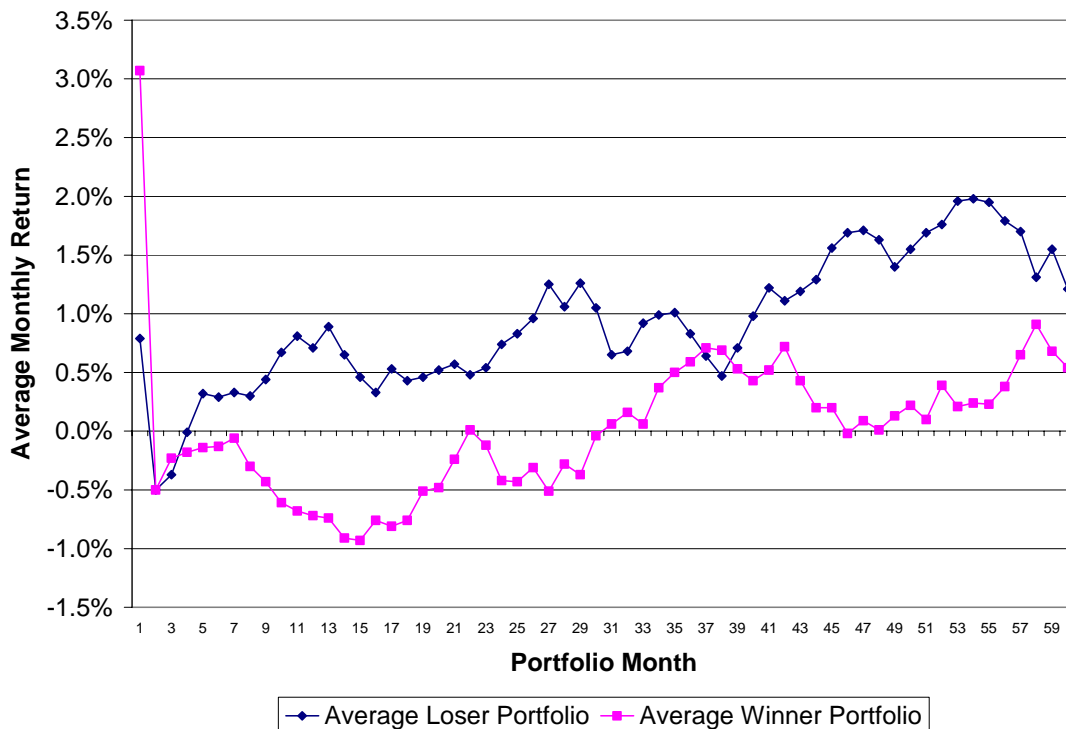


Figure 4: Average monthly returns for winner and loser portfolios relative to ALSI

Table 1: Test for difference in mean returns for winner and loser portfolios

	L – W (EWI)	L – W (ALSI)
Number of observations (Months)	120	120
Hypothesized Mean Difference	0	0
Df	118	118
t Stat	9,458	8,397
P(T<=t) one-tail	0,000	0,000

5. CONCLUSIONS AND RECOMMENDATIONS

Markets are the results of many decisions made by people every day and if one can discover patterns in the way people are making these decisions there is the potential to profit from this predictability. There is evidence to suggest that people overweight recent data when making forecasts (Kahneman and Tversky, 1973) and this behavioural bias can create trading opportunities.

It is clear from the Figures 1 to 4 that the results of this study are consistent with the De Bondt and Thaler’s (1985) and Page and Way’s (1992) findings. The portfolio of low P/E shares significantly outperforms the portfolio of high P/E shares and therefore revert to the mean. These results show that constructing portfolios of shares with a low P/E relative to the rest of the market can produce returns above the market in the longer term as these shares re-rate. This suggests that

the value approach to investing in terms of taking contrarian views could be potentially successful for asset managers in the SA market.

There is one key difference between our results and those of the De Bondt and Thaler (1985) and the Page and Way (1992) studies. In their studies the loser portfolio immediately outperforms the winner portfolio in cumulative terms as opposed to these studies results were the path of returns is different. In cumulative terms the winner portfolio outperforms the loser portfolio for the first 8 months before the loser portfolio consistently outperforms the winner portfolio. This is due to the approximately 3% average abnormal monthly return that the winner portfolios generate in the first month post formation date. This suggests that the approach needs to be refined before it is considered for use as a trading rule.

There were a number of limitations in this study which should provide for future research opportunities. Firstly we have not tried to adjust the portfolios for either firm size or risk – both of which have been shown to explain at least part of the observed pattern of returns. Secondly, while the evidence suggests that mean reversion exists on average for the JSE for this period, we do not know yet how it might vary over time. Chen and Sauer (1997) examined the degree or extent to which market overreaction varies in the US over time. They find that there are periods in which the profits to be made from a contrarian investment strategy based on the mean reversion leads to variable profits. Sometimes it is extremely large (post the Great

Depression), sometimes it works the other way (the Great Depression and the 1980's) and finally there are times when it doesn't seem to happen at all (the period of the mid 1940's to the mid 1950's). This type of analysis would be vital in understanding what drives overreaction and why it might change over time.

REFERENCES

- Albert RL and Henderson GV. 1995. Firm size, overreaction, and return reversals. *Quarterly Journal of Business and Economics*, 34(4): 60-81.
- Ball R and Kothari SP. 1989. Non-stationary expected returns. *Journal of Financial Economics*, 25(1): 71-74.
- Basu S. 1977. Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *Journal of Finance*, 32(3): 663-683.
- Bauman WS, Conover CM, Mitchell C and Miller RE. 1999. Investor overreaction in international stock markets. *Journal of Portfolio Management*, 25(4): 102-111.
- Chan LKC, Hamao Y and Lakonishok J. 1991. Fundamentals and stock returns in Japan. *Journal of Finance*, 46(5): 1739-1764.
- Chen CR and Sauer DA. 1997. Is stock market overreaction persistent over time? *Journal of Business Finance and Accounting*, 24(1): 51-66.
- Chiao C and Hueng CJ. 2005. Overreaction effects independent of risk and characteristics: Evidence from the Japanese stock market. *Japan & the World Economy*, 17(4): 431-455.
- Chopra N, Lakonishok J and Ritter JR. 1992. Measuring abnormal performance: Do stocks overreact? *Journal of Financial Economics*, 31(2): 235-268.
- Clare A. and Thomas S. 1995. The overreaction hypothesis and the UK stockmarket. *Journal of Business Finance & Accounting*, 22(7): 961-973.
- Daniel K, Hirshleifer D and Subrahmanyam A. 1998. Investor psychology and security market under- and overreactions. *Journal of Finance*, 53(6): 1839-1886.
- Daniel K and Titman S. 1999. Market efficiency in an irrational world. *Association for Investment Management and Research*, (November/December): 28-40.
- De Bondt WFM and Thaler RH. 1985. Does the stock market overreact? *Journal of Finance*, 40(3): 793-806.
- De Bondt WFM and Thaler RH. 1987. Further evidence on investor overreaction and stock market seasonality. *Journal of Finance*, 42(3): 557-582.
- De Bondt WFM and Thaler RH. 1989. Anomalies. *Journal of Economic Perspectives*, 3(1): 189-202.
- De Bondt WFM and Thaler RH. 1990. Do security analysts overreact? *American Economic Review*, 80(2): 52-58.
- Einhorn HJ. 1980. Overconfidence in judgement. *New Directions for Methodology of Social and Behavioural Science*, 14(1)(Jan): 1-16.
- Fama EF. 1965. The behavior of stock-market prices. *Journal of Business*, 38(1): 34-105.
- Fama EF and French KR. 1988. Permanent and temporary components of stock prices. *Journal of Political Economy*, 96(2): 246-274.
- Fama EF and French KR. 1992. The cross-section of expected stock returns. *Journal of Finance*, 47(2): 427-465.
- Griffin D and Tversky A. 1992. The weighing of evidence and the determinants of overconfidence. *Cognitive Psychology*, 24(3 (July)): 411-435.
- Gropp J. 2004. Mean reversion of industry stock returns in the U.S., 1926 -1998. *Journal of Empirical Finance*, 11(4): 537-551.
- Kahneman D and Tversky A. 1973. On the psychology of prediction. *Psychological Review*, 80: 237-251.
- La Porta R, Lakonishok J, Shleifer A , and Vishny R. 1997. Good news for value stocks: Further evidence on market efficiency. *Journal of Finance*, 52(2): 859-874.
- Lakonishok J and Shleifer A 1994. Contrarian investment, extrapolation, and risk. *Journal of Finance*, 49(5): 1541-1578.
- Odean T. 1998. Are investors reluctant to realise their losses? *Journal of Finance*, 53(5): 1775 -1798.
- Otchere I and Chan J. 2003. Short-term overreaction in the Hong stock market: Can a contrarian trading strategy beat the market? *Journal of Behavioral Finance*, 4(3): 157-171.
- Page MJ and Way CV. 1992. Stock market overreaction: The South African evidence. *Investment Analysts Journal*, 36(4): 35-49.
- Plastowe T and Knight RF. 1986. Premium to book value may be a contrary indicator. *Investment Analysts Journal*, 28(4): 35-39.

Poterba JM and Summers LH. 1988. Mean reversion in stock prices: evidence and implications. *Journal of Financial Economics*, 22: 27-59.

Power DM and Lonie AA. 1993. The overreaction effect: Anomaly of the 1980s? *The British Accounting Review*, 25(4): 325-366.

Summers LH. 1986. Does the stock market rationally reflect fundamental values? *Journal of Finance*, 41(3): 591-603.

Zarowin P. 1989. Does the stock market overreact to corporate earnings information? *Journal of Finance*, 44(5): 1385-1399.

Zarowin P. 1990. Size, seasonality, and stock market overreaction. *Journal of Financial and Quantitative Analysis*, 25(1): 113-125.

