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The value creation effects of mergers and acquisitions: Evidence from the JSE Securities Exchange South Africa

1. INTRODUCTION

The aggregate gains from mergers and acquisitions (M&As) and the distribution thereof continues to attract the interest of finance researchers. The South African research on M&As is limited, constrained by small samples and tends to focus more on the short-term price reaction. It places too much faith on the rationality paradigm, the notions and implications of market efficiency, contains no methodological innovations and at best involved replications. This paper aims to examine the long-term price effects of M&A activity for firms listed on the JSE Securities Exchange South Africa (JSE), taking into consideration the recent advances and trends in methodology.

The paper is organised as follows. In Section 2 we review the literature. In Section 3 we make a critical appraisal of the methodologies that were followed in long-term studies by previous reseach. We also outline the steps that are followed in this research to test the null which states that M&As create persistent monthly postitive abnormal returns over the long term for the shareholders of the acquiring firm. Section 4 discusses the way in which the data was obtained and collated. In Section 5 we present the preliminary statistics and various results. Section 6 provides a summary of the findings and indicates the directions for future research.

2. LITERATURE REVIEW

M&As are not new financial innovations and the incentives for managers to acquire target firms are standard. A summary of the motivating factors where the aim is to generate gains for shareholders include differential efficiency, market integration, market irrationality, agency and information asymmetry related theories (Baker & Wurgler, 2000; Brealey & Myers, 2000; Damodaran, 1997; Gaughan, 1999; Gort, 1966; Stein, 1996; Shleifer & Vishney, 2001; Van Horne & Wachowicz, 1998). The managerial theory, where the maximization of shareholder wealth is not a priority includes ideas such as empire building, job security and the hubris hypothesis (Mueller, 1977; Hughes, Muller and Singh, 1980:38; Roll, 1986). An emerging theory is that the external environment (such as industry deregulation), as opposed to the internal actions of managers, determines M&A activity (Andrade, Mitchell & Stafford, 2001; Mulherin & Boone, 2000).

Studies of the short-term effects of M&As indicate that M&As create value, even though most of this value accrues to the target firm. Research in the USA and UK indicates that the shareholders of the target firms experienced gains of between 16% and 45%. Acquiring firms' shareholders, on the other hand, experienced abnormal returns ranging from -1,1% to 7,9%. The combined firms' abnormal return was between 1,8% and 3,5%. (See Jensen & Ruback, 1983; Franks & Harris, 1989; Becher, 2000; Mulherin & Boone, 2000; Kohers & Kohers, 2000; Andrade *et al.* 2001.)

Research in South Africa (SA) supports the international findings. The shareholders of the target firms experienced abnormal gains of between 30% and 44% in the short-term, whilst the acquiring firms' shareholders had abnormal returns of between -2% and 11%. (See Affleck-Graves, Burt & Cleasby, 1988; Affleck-Graves, Flach & Jacobson, 1988; Bhana, 1987; Bhana, 1999; Mc Namara, 1987; Van den Honert, Barr, Affleck-Graves & Smale, 1988.)

The results of the short-term price reaction studies were interpreted as information about market expectations regarding the longer-term impact of the M&A transaction. This price reaction indicates little about whether the expectations are correct (Barnes 1984:45). An examination of the long-term share price effects of M&As is therefore necessary to determine if the overall gains from M&As are permanent in nature and how they compare to those observed in the short-term studies.

There is no reliable research in SA regarding the long-term effects of M&As. The long-term effects of M&As in the USA and the UK have been examined extensively (See Agrawal, Jaffe & Mandelker, 1992; Barnes, 1984; Franks, Harris & Titman, 1991; Gregory, 1997; Kennedy & Limmack, 1996; Limmack, 1991; Loderer & Martin, 1992; Lougharan & Vijh, 1997; Mitchell & Stafford, 2000; Rau & Vermaelen, 1998). These studies, although criticised regarding their methodology, all indicate that the shareholders of the acquiring firms in most instances lose value. The negative abnormal returns were as high as -20%. The

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generation of negative abnormal returns is true especially when the method of acquisition was other than via tender offers.

3. METHODOLOGIES USED TO DETERMINE THE LONG-TERM EFFECTS

The three methodologies used in long-term event studies include the cumulative abnormal returns (CAR) (Agrawal *et al.*, 1992; Rau & Vermaelen, 1998), the buy and hold abnormal returns (BHAR) (Barber & Lyon, 1997; Loughran & Vijh, 1997) and the calendar time abnormal returns (CTAR) methods (Mitchell & Stafford, 2000). The benchmarks used in long-term event studies include market indexes, used in asset-pricing models (Kothari & Warner, 1997), matched firms, used in BHAR, (Barber & Lyon, 1997) or matched portfolios, used in CARs (Rau & Vermaelen, 1998). Although the type of benchmark is dependent upon the methodology employed, the factors considered can be similar.

The CAR method involves calculating the sum of each of the average monthly abnormal returns. The starting point for each average monthly abnormal return calculation is the previous months share price. The BHAR on the other hand, calculates the abnormal return over a period where the starting point is the time of the merger, and the end is for example 5 years later. With the CTAR method, a portfolio is created every month containing all firms that completed a transaction during the previous 36 months.

The calculation of the BHAR, CAR and CTAR answers different questions. The BHAR determines the abnormal return over a particular period. It is the abnormal return generated from holding the shares of the sample firm for the entire period, ignoring holding costs. The CAR and CTAR on the other hand determine if "sample firms persistently earn abnormal monthly returns", ignoring the transaction costs of monthly repurchasing (Lyon, Barber & Tsai, 1999:192).

All long-term event studies can suffer from several biases including skewness bias, new listing bias, survival bias, measurement bias, rebalancing bias and momentum bias. The BHAR method may conceptually generate an economically useful figure, but is subject to the most criticism. The rebalancing bias and the skewness bias distort the results of the BHAR method severely. Furthermore, it is more difficult to determine an appropriate benchmark for the BHAR method. It was decided that the CAR and CTAR methods are the most appropriate methods to use in order to test the hypothesis for this research.

3.1 The research hypothesis

This research aims to identify the long-term effects of M&As within the South African context. The hypothesis to be tested is as follows:

H_0: Mergers and acquisitions create persistent monthly positive abnormal returns over a long term for the shareholders of the acquiring firm.

H_1: Mergers and acquisitions do not persistently create positive monthly abnormal returns over a long term for the shareholders of the acquiring firm.

4. THE DATA

4.1 Defining M&A activity

The industrial sector provides a good representation of M&A activity in SA over the last decade, in terms of both the value and number of transactions. According to the Ernst & Young surveys, industrial firms accounted for at least one third of the value of M&A activity over the last decade. Furthermore, M&A activity in industrial firms was not distorted by a relatively small number of large transactions. Finally, there were more firms listed in the industrial sector than in any other sector.

A database of industrial firms' M&A activity was created through a review of the newspaper clippings held by The SA Press Group. The existing M&A databases of Ernst & Young and McGregor's Takeover Talk were also reviewed for confirmatory purposes.

Not all acquisitions were defined as events for the purposes of this research. The first criterion was to only look at acquisitions made whilst a firm was listed in the industrial sector. Secondly, a transaction that was insignificant relative to the size of the firm would have less impact on the returns to shareholders than large transactions. Significant transactions were identified by applying the size criterion set out in the JSE Listings Requirements. Only category 1 and category 2 transactions were regarded as being significant. For a category 1 transaction, the consideration is 30% or more of the market capitalisation at the time of the announcement of the transaction. This ratio is between 20% and 30% for a category 2 transaction.

The final criterion used to determine if there was an event was the relationship between the target firm and the acquiring firm. The M&A would create value to the extent that the acquiring firm had the ability to exercise some influence over the decision-making procedures of the target firm, for example in order to extract cost savings. This would be the case where firms merged, or a joint venture was formed, or the business was purchased, or if the entire share capital of the target firm was acquired. Where less than 100% of the share capital was bought, a subsidiary or associate company relationship would indicate that the acquirer could sufficiently influence the operations of the target firm. The 20% shareholding level was used as a cut-off

point to determine whether or not there was significant influence.

4.2 Generating financial information on the population

This research aims to determine the effects of M&A activity for a 10-year period from 1989 to 1998. The event window, or measurement period for the effects of an event, is for 36 months after the first announcement.

Although the years 1989 to 1998 form the period from which the sample was drawn, the 3 years before 1989 and after 1998 are also relevant. It is necessary to consider the post-1998 period in order to determine the 36-month effect for transactions occurring during 1998. For both the pre-1989 and post-1998 period, it is important to ensure that any benchmark used for control purposes does not include firms that were involved in transactions in the previous 36 months.

Care was taken to ensure that the population of industrial firms was complete and included all firms that de-listed or changed sectors during the review period. Pyramid firms and the N ordinary shares of firms with both ordinary and N ordinary shares were excluded from the population. The Listings Requirements define a pyramid firm as a listed firm whose sole asset is 50% or more of the voting rights of another listed firm. Including pyramid firms and N ordinary shares would have incorrectly resulted in the double counting of the share price movement and M&A activity of the underlying firm.

The monthly share price information for the population was downloaded from I-Net. The shares in issue were captured from I-Net after 1994 and from the McGregor's Who Owns Whom publications (McGregor's) before this period. McGregor's was also used to capture the dividend details and the net tangible book value per firm. It was difficult to identify the total intangible net asset value, as some firms wrote goodwill off against share premium whilst others did not. McGregor's reported a net asset value per share figure based on the ordinary shareholders' interest, excluding minority shareholders, preference shareholders and intangible assets. A focus on tangible asset value, as presented by McGregor's, resolves the inconsistencies of some firms showing intangible assets on the balance sheet, and others writing it off against equity.

The number of securities listed in the industrial sector from 1989 until 2001 was 728. The total final population was 609 firms. The securities excluded from the population include 31 N ordinary shares, 58 pyramid firms and 30 firms for which there was no or incomplete share price data.

Three key figures were calculated for each firm. The return to shareholders was calculated as the capital gain (being the closing share price minus the opening share price) plus the dividend. The market capitalisation was not available for the entire period from I-Net and was recalculated as the number of shares in issue multiplied by the shares closing price. The final key figure was the book-to-price value. This was calculated by dividing the net tangible book value by the closing price multiplied by the shares in issue at the last financial year-end.

4.3 The methodology applied

In order to calculate abnormal returns, it was necessary to calculate the 'normal' or expected returns. In this research, a 'normal' return was determined by using the control portfolio method. The population was divided into three groups. The sample included firms with M&A events as defined. The second group consisted of the excluded firms. Excluded firms were those that engaged in M&A activity of sufficient size and where significant control over the target firm was secured, but which were excluded from the sample due to timing or sector classification issues. Timing issues included, for example, a pre-1989 M&A event. The remaining firms, being the total population minus the sample and minus the excluded firms, were the benchmark firms

The benchmark firms were grouped together to form 25 control portfolios based firstly on their size and secondly on the ratio of their net tangible book value to their market value (BM). The sequential sorting process, first employed by Ikenberry, Lakonishok and Vermaelen (1995), was used to create these benchmark portfolios. Every month, the benchmark firms were ranked into one of five size portfolios, based on their market capitalisation at the beginning of the month. Each of the size quintiles was divided further into five BM groups (where the ratios are also calculated at the beginning of the month). This resulted in 25 control portfolios. All benchmark firms that existed in a particular month were included, even if they subsequently de-listed. The control portfolios were re-formed every month. This frequent rebalancing enabled the capturing of the changing nature of the underlying population firms. Firms that were in the top size-quintile in one month may be in the bottom size-quintile the following month.

The sample firms were then matched on a monthly basis, firstly to a control portfolio of a similar size, and then within that size portfolio, to firms of a similar BM ratio. The size and BM ratio of the sample firms changed throughout the 36-month post-event period. The control portfolio that the sample is matched to therefore changes during the 36-month event window.

The monthly returns for the benchmark firms within each portfolio were added together and the monthly average portfolio returns (APR) were calculated. Each firm's return received an equal weighting within the

APR calculation in order that larger firms in the control portfolio would not distort the returns. The number of firms included in the population did not remain constant from 1989 to 2001. Kothari and Warner (1997:306) argue that in order to minimize the effect of survival bias it is better to estimate the abnormal performance for as many months as data is available.

The monthly abnormal return (AR) for each sample firm was calculated as the return of the sample firm in that calendar month minus the APR of the matched benchmark portfolio. The calculation effectively assumes that the sample firm's shares were acquired at the beginning of the month and then sold again at the end of the month and ignores all transaction costs.The individual ARs needed to be added together in a manner that created meaningful results. Both the CAR and CTAR methods were used for this in order to test the research hypothesis.

The ARs for the individual sample firms for every event month (for example all t+5 ARs) were summed and averaged on a straight-line basis. This created the average monthly abnormal return (AAR). The CAR was then determined by summing the AARs over time (Ikenberry *et al.*, 1995:187). As with the calculation of the benchmark return, each sample firm received an equal weighting in the AAR calculation.

Multiple M&A events occurred where firms announced more than one M&A transaction within a 36-month period. The AAR calculation measured the AR of each event separately. This assumed that events were independent of one another. It is however unlikely that the characteristics of a firm did not affect the abnormal return calculation. A small sample may therefore be biased, if it merely reflects numerous transactions by the same, or a small number of firms. As suggested by Rau and Vermaelen (1998), the effect of the multiple events was determined through a sensitivity analysis.

For the CTAR method the calendar month as opposed to the event month is important (Mitchell & Stafford 2000). A sample firm portfolio was created for each calendar month, which included all firms with events in the previous 36 months. This meant that each sample firm was only included once, and multiple events were ignored. (Although the firms involved in the multiple events were still included).

The ARs for the firms in the sample firm portfolio were summed for every calendar month to create the CTAR. The sample firm portfolio was re-formed or rebalanced every month. This was necessary in order to include firms that announced an event, and to exclude those for whom more than 36 months passed since the announcement of an event. The (monthly) CTAR was determined by using the equally-weighted average of the monthly ARs, which involves investing an equal rand value in each share to form an equally-weighted abnormal return (i.e. ignoring the size of the firm).

The CTAR measures the month-on-month performance of the portfolio of firms engaging in M&A activity. In order to measure the effects of investing in a portfolio of M&A event firms over the review period, a cumulative CTAR was determined. In order to calculate the cumulative CTAR, the CTARs for every month were added together. The cumulative CTAR in August 2001 therefore is the net return of investing in the M&A portfolio every month from January 1989 (i.e. for 272 months).

Statistical inference is made using both a parametric test and nonparametric tests. The t-statistic test can be used if the distribution is normal. The problem with the AAR calculation is that it is not traditionally normally distributed. Although the underlying distribution may not be normal, the t-statistic test can still be used. In terms of the Central Limit Theorem, the sample means calculated from all possible samples will be approximately normally distributed within a large sample (Pindyck & Rubinfeld 1998:58). The t-statistic is therefore calculated and analysed.

Nonparametric tests have the benefit of not relying upon the assumption about a particular underlying distribution. Rau and Vermaelen (1998) use bootstrapping, which involves generating an empirical distribution of the abnormal returns under the null hypothesis, to test the significance of their results. This bootstrapping test is open to criticism (see Brav, 2000; Kothari & Warner, 1997 and Mitchell & Stafford, 2000) and is therefore avoided. In addition, the size of the population in SA was significantly smaller than the populations in the USA, which can bring additional problems with the bootstrapping method.

The methodology employed in this research involves matching sample firms to a control portfolio. The sign and Wilcoxon sign-ranked tests are therefore appropriate nonparametric tests. The sign test is simple, and involves comparing the number of negative and positive observations. The only downside of this test is that it ignores the measured values in the data (Sprent 1989:30). The Wilcoxon sign-ranked test, which is an extension of the sign test, takes into account the measured data. It is particularly well suited to a matched pair sample such as found in this research. With the matched pair sample the focus is on the difference between the sample firm and its matched control portfolio, which results in the data forming one sample. The Wilcoxon sign-ranked test relies on the assumption of symmetry. Neave and Worthington (1988:161) indicate that this automatically arises with a matched pair sample, where there is symmetry of the differences under the null hypothesis.

Statistical inferences were not undertaken on the CTAR as the M&A sample is not random. Lyon *et al.* (1999:193) indicate the problems of statistical inferences for the CTAR method in non-random samples. In addition, the CTAR method identifies patterns or 'noise' that cannot be smoothed through

the application of a standard deviation adjustment. The CTAR calculation is therefore used in order to identify patterns within M&A activity.

5. RESULTS

5.1 Preliminary statistics

Table 1, which is self explanatory, contains the data pertaining to the M&A activities during the period 1989 and 1998.

Table 2 provides an analysis of the characteristics of the sample of 299 M&A events used for the CAR calculation and compares it to two North American studies. Most of the sample firms are neither extremely large nor small, with 75% (223) of the events being classified within the three middle size groups. The BM distribution is however biased towards firms with a lower BM. Thirty seven percent (110) of the events fall into the first BM group, and 57% fall into the two lowest BM groups.

Table 1: Number of M&A events and observations

Column	A	B	C	D	E
Year	Number of M&A events	% M&A events per year (A/Total A)	Number of observations	% observations per year (B/Total B)	Average observations per event (A/B)
1989	37	12%	1 104	12%	29,8
1990	20	7%	580	6%	29,0
1991	28	9%	910	10%	32,5
1992	22	7%	705	8%	32,0
1993	18	6%	552	6%	30,7
1994	14	5%	464	5%	33,1
1995	17	6%	545	6%	32,1
1996	21	7%	732	8%	34,9
1997	52	17%	1 646	18%	31,7
1998	70	23%	2 066	22%	29,5
Total	299		9 304	100%	31,1

A total of 299 M&A events were identified. The table below indicates the number of M&A events per year of announcement. The most M&A events, being 70, occurred during 1998, whilst 1994 witnessed the least active M&A year, with 14 events. M&A activity is concentrated in two years, 1997 and 1998, which together account for 40% of all events in the 10-year review period. The effects for each M&A event are monitored for 36 months after the announcement (or for a lesser period if the firm does not survive that long). Each month for which the effects of the M&A event are monitored is called an observation. Column C indicates the number of observations arising from an M&A event in a particular year. The average observations per event are set out in Column E. On average, the effects of each of the 299 events are monitored for 31 months, resulting in 9 304 observations for the sample.

Table 2: Comparison of the characteristics of the sample firms and those of two North American studies

	Size group				BM group		
	Study 1	Study 2	Study 3		Study 1	Study 2	Study 3
Smallest	9%	4%	14%	Smallest	37%	20%	26%
2	26%	9%	13%	2	20%	26%	23%
3	22%	17%	15%	3	15%	24%	21%
4	27%	27%	24%	4	14%	18%	17%
Largest	16%	42%	35%	Largest	13%	11%	13%

The distribution characteristics, being the size and BM of firms with M&A events examined in this research (study 1) were compared to two North American studies. The two international studies were those of Rau and Vermaelen (1998) (study 2) and Mitchell and Stafford (2000) (study 3). Whilst study 1 and 3 used five size and BM groups for ranking purposes, study 2 used ten size and BM groups. For comparative purposes, the ranking deciles of study 2 were reduced into five groups. These five groups are in line with the summary presented by Rau and Vermaelen (1998:229).
Unlike the South African study, the studies in the USA have a similar size distribution in terms of the fact that the largest group contains the most M&A events. The BM distribution is similar across all three studies, with firms in the lowest two BM groups accounting for almost half of the distribution of M&A events.

5.2 CTAR results and discussion

An examination of the cumulative CTAR at a point in time indicates the cumulative return on the portfolio of M&A firms from January 1989. The cumulative CTAR can be used to identify trends in M&A activity over the 10-year review period. A graph of the cumulative CTAR (sum of the CTARs) is set out in Figure 1, and indicates that there are three negative trends and only one positive trend in the CTARs.

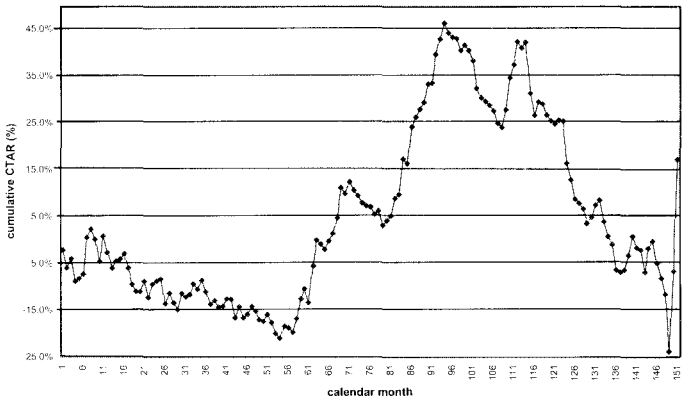

Figure 1: Cumulative month-on-month abnormal returns for a portfolio of all of the firms with M&A events

In this figure the starting month of the review period, January 1989, is defined as calendar month 1, whilst the last point, calendar month 152, is August 2001. The CTAR method calculates the abnormal return relative to the previous month. The CTARs are summed to present a cumulative CTAR, which indicates the cumulative performance of the M&A portfolio from January 1989.
The monthly CTARs are volatile. There are however four definite trends. The negative trends are from September 1989 to July 1993, November 1996 to December 1997 and August 1998 to June 2000. A positive trend in the abnormal returns occurs from August 1993 to November 1996. The large increase in the CTAR for July and August 2001 is a distorted result, due to the reduced number of firms in the portfolio.

Furthermore, of the 152 calendar months (equalling 7 691 observations) 82 are negative and 70 are positive. The negative results add up to -202,1% (an average of -2,5% per negative observation). The positive calendar months add up to 219,7% (or an average of 3,1% per positive observation). The implications of the analysis of the CTAR results are that the CAR calculation is likely to be negative.

One final issue in Figure 1 that requires discussion is that although there are several months with large CTARs, the results for three months are distorted by the ARs of just one or two firms. In August 1989 and July 2001, the abnormal return for one firm, of 97% and 84% respectively for the two months, accounts for more than half of that CTAR. In August 2001, of the four firms in the portfolio, one has an AR of 38% and another has an AR of 47%. All three of these months fall within the period that is susceptible to distortion due to a reduced number of shares in the portfolio. Ignoring the two unusual months for 2001 produces a cumulative CTAR of -23,7% by June 2001.

5.3 CAR results and discussion

Figure 2 indicates that by t+3 and again by t+14 the CAR is almost zero. This means that investing in firms with M&A events generates no abnormal returns after 3 months and again after 14 months from the announcement of an event. The performance for M&A event firms is neutral from t+14 until t+18. After t+18 however, firms with M&A events generate net negative abnormal returns. From t+24 to t+32 a slight positive trend occurs, although it is not large enough to counteract the initial negative returns. From t+32 to t+36 the negative trend returns, so that by t+36 the cumulative average abnormal return is at its lowest point of –10,5%.

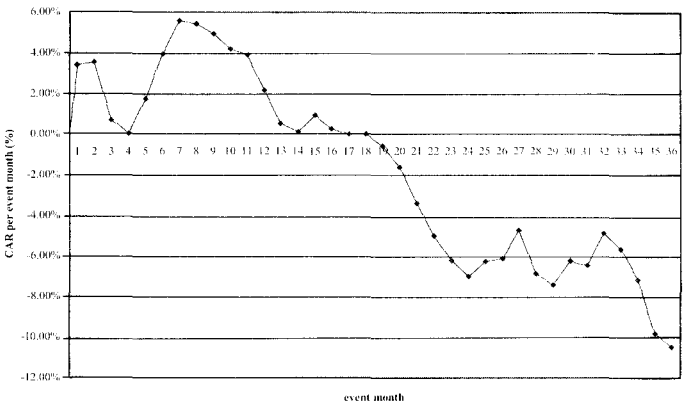

Figure 2: The CAR per event month

The average abnormal monthly returns per event month are summed to generate the cumulative AAR (CAR). This graph indicates that there are constant negative AARs of a magnitude larger than the positive AARs. By 36 months after the announcement of an event, the CAR is -10,5%. A shareholder is therefore worse off by investing in firms that engage in M&A events.

A direct comparison of this study to those discussed in the literature review is difficult. The research papers on the long-term effects do not report their results in a comparable format. There are differences in methodologies and time horizons between the various studies. The comparison set out in Table 3 therefore only compares the results of this study (study 1), those of Agrawal *et al.* (1992) for the eighties (study 2) and the bias-adjusted results for mergers of Rau and Vermaelen (1998) (study 3).

Although the trends of the three studies are similar during the second year after the announcement, what is unusual and different is that this study (1) shows a positive CAR after the first year. The CARs for the next

two years are also larger than those of the comparative studies. This may imply that the market is over-optimistic in the first year after the announcement, but adjusts to compensate for this mistake in later years. The slow reaction of the South African market could be due in part to the fact that firms in the USA release quarterly earnings figures versus the six monthly reporting of South African firms.

The significance of the AR results were tested using the t-statistic test. The results, set out in Table 4 indicate that the AR is only significant during the second year. Due to the biases inherent in long-term event studies, the results of the parametric test may be mis-specified. More emphasis is therefore to be placed on the results of the nonparametric tests.

Table 3: Comparison of the South African CAR to two North American studies

Time horizon sampled Sample size	Study 1 1989 to 1998 299	Study 2 1980 to 1987 765	Study 3 1981 to 1991 2 823
Post-announcement period			
1-12	2,2%	-2,8%	-1,8%
13-24	-9,2%	-7,6%	-2,7%
25-36	-3,5%	-2,0%	-0,4%
1-36	-10,5%	-12,4%	-4,9%

The results from calculating the CAR for the sample were compared to the results of two North American studies. In the table below study 1 refers to the results of this research report (covering mergers from 1989 to 1998), study 2 is that of Agrawal *et al.* (1992) (for the period 1980 to 1987) and study 3 reflects the bias-adjusted results for mergers for Rau and Vermaelen (1998) (for the period 1981 to 1991). The post-announcement period refers to the number of months after the announcement of the event for which the AARs are summed.

Studies 1 and 2 (and the unadjusted CAR for study 3) use the same method to calculate the CAR, and therefore the results are comparable. Due to methodology issues, the bias-adjusted results of study 3 are not directly comparable to the results for study 1 and 2, but are shown here to illustrate the trends. The trend in the CAR for all three studies is similar for the period 13 to 24 months, with the greatest negative CAR occurring during this period.

Rau and Vermaelen (1998) report an unadjusted CAR for 36 months after the event of -15,23%, which is directly comparable to the 36-month CAR for study 1 and 2. Unfortunately, they do not give a detailed breakdown of the results, which would be useful for comparative purposes. The magnitude of the 36-month CAR for study 1, 2, and the unadjusted CAR is similar.

Table 4: The t-statistics for the ARs

Column	A Year 1	B Year 2	C Year 3	D Total
t statistic	0,62	-2,30	-0,73	-1,37
Significant at	53,7%	2,2%	46,5%	17,2%

The t-statistics for the ARs, per observation for the 36-month post-event period, are set out below. Year 1 (column A) includes all the ARs for the period of t+1 to t+12 (the first year after the announcement of the event) whilst column B and C set out the t-statistics for the ARs for the second and third year respectively after the announcement of the event. The final column D provides the information for the entire sample, irrespective of when the observation occurs relative to the announcement of the event.

This table shows that the ARs are only significant during the second year after the announcement of the event, with a significant level of 2,2%. The first and third years are in no way significant, whilst the overall results are significant only at the 17,2% level. This is far in excess of the traditionally acceptable maximum levels of around 5%.

Table 5 contains the results of the nonparametric tests and indicates that the ARs are significantly more negative than positive (at below a 1,07% critical level). This result is true for both of the nonparametric tests performed i.e. for the sign test, which ignores the value of the ARs, as well as for the Wilcoxon sign-ranked test, which takes into consideration the actual values of the ARs.

5.4 Sensitivity analysis

Three sensitivities were run on the CAR results in order to identify the source of the negative results. Firstly, firms were categorised as either value, neutral or glamour firms. Next, the effect of the method of payment was investigated and noted. Thirdly, the effect of multiple events was examined.

Rau and Vermaelen (1998) find that the results of their study differ depending on whether the firms are value or glamour firms. Value firms are those with high BM ratios, whilst glamour firms have low BM ratios.

In Table 6, the sample was grouped into value, neutral and glamour firms and the CAR results recalculated. The results are similar to those of Rau and Vermaelen (1998:241) in that the value firms actually show positive CARs in the first and third year after the announcement

of the transaction, and for the 3-year post announcement period as a whole. Similarly, the neutral and glamour firms experience negative CARs for the 36-month post-announcement period. The results of this research differ from those of Rau and Vermaelen (1998) however, in that the neutral firms, as opposed to the glamour firms, are the worst performers.

Rau and Vermaelen (1998) analysed their results in terms of value and glamour shares where the method of finance was 100% cash or 100% shares. They found that share-financed transactions produced negative abnormal returns for both value and glamour firms. On the other hand, when cash was used to finance the transaction, value firms gained, and glamour firms generated negative abnormal returns. A similar analysis was performed for the results of this research.

Table 5: Nonparametric statistics

Column	A Year 1	B Year 2	C Year 3	D Total
Number of observations	3 500	3 137	2 667	9 304
Sign value	-76	-165,5	-81,5	-323
p Value	1,07%	<0,01%	0,17%	<0,01%
Wilcoxon sign-ranked value	-164601	-292485	-123245	-1737692
p Value	0,59%	<0,01%	0,19%	<0,01%

The results from the two nonparametric tests are calculated for the entire sample (column D), and are analysed further by examining the three years separately. Year 1 (column A) is for all ARs during the period of t+1 to t+12 (i.e. the first year after the announcement of the event) whilst year 2 and year 3 cover the period t+13 to t+24 and t+25 to t+36 respectively.
The sign value and the Wilcoxon sign-ranked value (set out below) are the sums of the ranks for the negative ARs for the two respective tests. For the purposes of interpreting the results, the sign (as opposed to the actual value) is important. The negative sign indicates that the negative observations are more than the positive observations. The p values are the key figures, indicating the probability that the number of positive observations is greater than the negative observations. In all instances p values are low. This means that irrespective of whether one examines a specific period or the entire sample, there is significant evidence that the ARs are negative.

Table 6: CAR results for value, neutral and glamour firms

Column	A All firms	B Value firms	C Neutral firms	D Glamour firms
Post-announcement period				
1-12	2,2%	13,0%	-8,4%	1,0%
13-24	-9,2%	-4,3%	-13,4%	-9,8%
25-36	-3,5%	1,5%	-7,1%	-5,6%
1-36	-10,5%	10,1%	-28,9%	-14,4%

The results of the CAR for the sample as a whole and the CAR of the sample categorized into value, neutral and glamour firms are set out below. The post-announcement period refers to the number of months after the announcement of the event for which the AARs are summed.
Value firms have a positive CAR for the 36 months after the announcement of the transaction. This is due to the positive CAR of 13% for the first year. Both neutral and glamour firms have negative CARs for the 36-month period, with the neutral firms being the worst performers.

The results for the firms in SA differ from those in the research of Rau and Vermaelen (1998). Cash-financed transactions generate negative ARs irrespective of the categorization of the firm (although the results are not significant for value firms). Share-financed transactions only generate negative ARs for neutral and glamour firms, and not for value firms.

The sample contained firms with multiple events within the same 36-month calendar period and firms with several smaller transactions aggregated in order to form an event. The clustering of events may affect the abnormal return calculations. Lyon *et al.* (1999:190) believe that overlapping returns breach the assumption of independence between events and results in mis-specified test statistics. The firms with multiple events were therefore removed from the sample, and the results were recalculated. For the reduced number of 4 393 observations (151 firms), the 36-month post-event CAR was -4,5% (which was significant based on the nonparametric tests). Whilst still negative, this result is less than half of the CAR for the entire sample of -10,5%, for a similar 36-month post-event period. This implies that firms engaging in multiple and overlapping events generate more negative ARs than those firms with single events.

6 SUMMARY, CONCLUSION AND DIRECTION FOR FUTURE RESEARCH

The CAR for the 36 months after the announcement of an event is a significant -10,5%. The results therefore support the alternative hypothesis that firms engaging in M&A activity do not persistently create positive abnormal returns over the long-term. The largest negative 12-month CAR is for the period 13 months to 24 months after the announcement of the event. The method of payment does not have a significant effect on these results. These results are all in line with the findings in the USA and UK.

Based on the results of this research, shareholders should not be long-term investors in M&A active firms. The CTAR results (figure 1) indicate that a portfolio of M&A active firms had more negative abnormal return trends. The CAR results set out in figure 2 indicate that in order to maximize their returns investors should sell their shares in M&A active firms after seven months from the announcement of an event. Even value firms, which generated a positive 36-month CAR (Table 6), had the biggest positive CAR in the first year.

It would appear that a policy of investing in value firms is more beneficial than investing in neutral or glamour firms. Graham and Uliana (2001) support this theory, in their study of the performance of value and glamour firms on the JSE from 1987 until 1996. It may be difficult to distinguish value firms from neutral firms. Mistaking a neutral firm for a value firm could be detrimental to an investor as neutral firms engaging in M&As generate the worst returns.

Management should consider their motives for engaging in M&A activity carefully. If they allow their actions to be driven by activity in the stock market, the benefits of their M&As will be short lived.

M&A activity was beneficial for shareholders between 1989 and 1996 (figure 1). During this period, there was no specific M&A wave. The 1997, 1998 M&A wave can be seen in Table 1 with increased activity during this period. Investors should be careful of increasing M&A activity as this could signal an M&A wave, which may produce negative abnormal returns for M&A active firms in the long-term.

The methodology debate remains an unresolved issue, and it may be useful to explore some of these issues using the SA M&A database. The long-term effects of M&As could be calculated using the BHAR and the calendar-time portfolio regression methods. Other benchmarks (such as a control portfolio constructed using the Fama and French three-factor model) could also be used in order to calculate the abnormal returns. An analysis could then be made between the results generated by these different methods and those produced in this research report.

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