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# The effect of mergers and acquisitions on long-run financial performance of acquiring companies

Dieter B. Halfar

10646711

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## **ABSTRACT**

Mergers and acquisitions continue to enjoy importance as strategies for achieving growth, although their success in creating shareholder value remains contested.

The aim of this research was to evaluate whether, in the long-run, acquiring companies created or destroyed value by evaluating the differences between pre- and post-acquisition firm performance, using, abnormal share price performance, operating financial performance and intrinsic value performance metrics.

This research used a non-representative, judgemental sample of 29 JSE listed firms to conclude that, on average, mergers and acquisitions destroy value within two years post-acquisition, although some evidence was found in support of acquiring firm value creation in the third year after the acquisition.

Results indicated a significant -6.62% decline in acquiring firm average cumulative average abnormal return (ACAAR) between 504 trading days before and after acquisition announcement dates. This finding reversed in year three, resulting in a positive ACAAR of 8.76%. Similarly, average intrinsic value (AIV) performance indicated that between one year before and one year after the acquisition, AIV deteriorated with a significant -0.131. However, between year one and two after the acquisition, AIV recovered by 0.112. Overall evidence indicated positive and significant AIV growth of 0.370 between one year before and three years after the acquisition. The research found insignificant results for the pre and post-acquisition evaluation of industry-adjusted cash-flow return on all assets (IACRAA).

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## **KEYWORDS**

acquisitions; intrinsic value; abnormal returns; operating financial performance;  
long-run performance

## DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Dieter B. Halfar

09 November 2011

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I wish to dedicate this research report to my wife and children for whom I am so grateful. To my wife Chantal, thank you for your continuous love, support and understanding during the two years of this MBA. Although we can never reclaim the past we have missed together, I believe now more than ever that our future life, love and prosperity will only be limited by the extent of our ability to dream. To my children Daniel and Lyndsey, thank you for making my life one of meaning, purpose and love. I have grown to understand that few things are as precious as the opportunity to be a father to the two of you.

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The MBA experience has given me a new perspective on myself and the world I live in, it has taught me to listen, to respect, to appreciate the precious gift of time, and above all has given me the power of knowledge and the wisdom to use it.

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## **1. CHAPTER 1 – INTRODUCTION TO THE RESEARCH PROBLEM**

### **1.1 Introduction**

In 2008 the global financial crisis introduced many new uncertainties into the world economy. Powerful interventionist monetary policies, created by governments and central banks to stimulate aggregate demand, were seen as a hallmark of the recovery process that followed, but the consequences of these interventions remained uncertain (Ernst & Young, 2010). In 2009, with growing concern for the long term impact of the financial meltdown, global business confidence evaporated, leading to a reduction in merger and acquisition (M & A) expenditure of 30%, measured against 2008 activity levels (Ernst & Young, 2010).

Although 2009 annual global M & A transaction deal values were down to \$2.1 trillion, a level last reached in 2004, deal counts remained buoyant, approximating 45,000 deals and indicating that the appetite for M & A was not completely lost, but had rather reduced to smaller, more frequent portions (Ernst & Young, 2010). A review of merger and acquisition activity in the global consumer goods market confirmed this statement, when in 2010 KPMG reported that companies with strong balance sheets were still engaging in M & A activity, acquiring targets under distress, whilst either attempting to increase cost control through vertical integration or pursuing horizontal expansion, gaining new products and access to new markets (KPMG, 2010b). Sectors that showed greatest activity included healthcare, energy and utilities, whilst country participation was dominated by China, Brazil and the US (Ernst & Young, 2010).

It is clear that despite the presence of fluctuating market conditions, if the opportunity is right, companies and shareholders will continue to invest in M & A activity. However, even though M & A activity continues post the global financial meltdown, a new trend is emerging. There is a growing demand for increased shareholder scrutiny and evaluation of post merger and acquisition performance as a critical factor in ensuring future M & A shareholder value creation (KPMG, 2010a).

## **1.2 Research Title**

The effect of mergers and acquisitions on long-run financial performance of acquiring companies.

## **1.3 Research Problem and Purpose**

Although mergers and acquisitions enjoy importance as strategies for achieving growth, their success in creating long term shareholder value remain contested. A meta-study completed by Bruner (2002) found that long-run value creation has, on average, eluded shareholders of acquiring companies. In contrast, studies by Powel and Stark (2005) and Heron and Lie (2002), found evidence of acquiring company post-acquisition operating performance in excess of the industry average (Paul, 2009). Most recently, a study published in the Financial Times, completed by the Cass Business School on behalf of Towers Watson (Towers Watson, 2011), revealed that acquiring firms continued to outperform the Morgan Stanley Capital International (MSCI) world index in the first quarter of 2011, with an average adjusted return of 5.1% above the index. According to Towers Watson (2011) acquirers have consistently outperformed the MSCI world index

for the last three years, with an average performance from Q1 2008 to Q1 2011 of 3.4% above the MSCI world index.

Upon closer evaluation of the above mentioned studies and reports, it becomes obvious that the myriad of post acquisition performance metrics, variations in research methodologies, event-time study windows and research characteristics have resulted in mixed results around whether mergers and acquisitions create or destroy value for acquiring companies. This study has purpose, as it aims to conclude whether, after acquisition, acquiring companies destroy or create value in the long-run.

#### **1.4 Research Motivation**

Compared to the prevalence of short-run post-acquisition performance studies, relatively few long-run published studies could be located. Long-run studies evaluated by Bruner (2002) were characterised by differences in research event window periods, variances in performance metrics applied and variations in the characteristics of sample sets used. Based on the differences in research results as listed by Bruner (2002), a conclusive finding on whether acquisitions destroyed or created value in the long-run is yet to be concluded.

The focus on only long-run event window performance, compared to the numerous short-run studies as studied by Bruner (2002), was further motivated by Smit and Ward (2007) who confirmed the need to research event windows past the two year post acquisition period, since according to Andrade, Mitchell

and Stafford (2001), the market for mergers and acquisitions changes over time. It was also reasoned that potential synergistic benefits from acquisitions only realised a few years after the acquisition and could therefore only be effectively evaluated over a longer period of time (Smit & Ward, 2007).

A recent publication from Ma, Whidbee and Zhang (2011) questioned the event based research methodologies and metrics that had been adopted by numerous researchers, including those researchers listed by Bruner (2002) and including Smit and Ward (2007) and Kyei (2008). Ma et al. (2011) indicated the tendency for pre-acquisition over-valuation to bias share price return estimations, a popular metric for determining post-acquisition performance. Ma et al. (2011) further proposed the use of intrinsic value as an alternative to share-price regression models.

Finally, as detailed in section 4.1 of this report, when the intent of a study is to infer a cause and effect relationship, such as understanding the effect of the occurrence of a merger and acquisition on the long-run financial performance of an acquiring company, a causal study is required (Blumberg, Cooper & Schindler, 2008).

It may be reasoned that without purposefully crafting a causal research design, the causal effect of an acquisition may not be reliably determined. As with the determination of any cause and effect relationship, the impact of mergers and acquisitions on firm performance would require a direct comparison of pre-acquisition versus post-acquisition firm performance. Most of the current studies that were located do not meet this simple requirement. As an example, a recent

study from Smit and Ward (2007) only explicitly measure share price performance for a defined event window around the announcement date, never comparing the pre and post-acquisition performance windows directly. This shortcoming is also prevalent in the study by Kyei (2008). Kyei (2008) incorrectly notes that by only confirming the presence of abnormal share price returns in the post-acquisition event window, the research outcome supports the proposition that M & A's create value.

In summary, the lack of comparable, long-run event window studies and potentially biased and mixed long-run post-acquisition performance results provides the primary motivation for this research study. The use of questionable research propositions, methods and associated hypotheses provides additional motivation for this research study. This study will therefore constructively contribute to the understanding of M & A long-run post-acquisition performance, by building and improving on the research methodologies of Smit and Ward (2007), Kyei (2008) and Ma et al. (2011). As per Smit and Ward (2007), this study will compare share-price return and operating financial performance with an additional intrinsic value creation measure as proposed by Ma et al. (2011). Comparability of results will be ensured through the use of common event windows and common sample observations.

Due to researcher time constraints, it is not the intention of this research to investigate any specific deal characteristics or the impact of these characteristics on long-run post-acquisition financial performance, such as payment methods and price-earnings characteristics of acquiring or target firms.

## **1.5 Research Aim**

The aim of this research is to evaluate whether, in the long-run, acquiring companies create or destroy value with target acquisitions by comparing and evaluating pre- and post-acquisition performance within defined event windows, using three metrics namely, abnormal share price return, abnormal operating cash-flow return and abnormal intrinsic value creation.

## **1.6 Research Objectives**

- 1) Identify and investigate relevant methods from previous work undertaken in the measurement and analysis of long-run post-acquisition company performance with specific focus on three performance metrics, namely;
  - a. Abnormal share price return,
  - b. Abnormal operating cash-flow return,
  - c. Abnormal intrinsic value creation.
- 2) Apply specific data analysis methods to the sample, measuring each of the three metrics listed above, and evaluate the results.
- 3) Compare study results with previous work undertaken and conclude findings.

## **2. CHAPTER 2 - LITERATURE REVIEW**

### **2.1 The Role of Mergers and Acquisitions**

For some companies, mergers and acquisitions (M & A) represent an opportunity to create new business cycle growth, whilst for others the lure takes the form of rapid inorganic growth through access to new products and markets (KPMG, 2010b). Andrade and Stafford (2004) found evidence of companies making acquisitions in pursuit of industry consolidation or expansion, as firms either absorbed excess industry capacity or expanded their capabilities through inorganic growth. Ficery, Herd and Pursche (2007) argued that the executives involved in M & A believed that they could extract synergistic value from M & A, since in many cases business combinations existed that could easily create additional cash-flows through enhanced revenue streams and a reduction in operating costs. They continued by citing an example of two firms serving the same customer base. The obvious duplication of client facing functions and an overlap in distribution and logistics capabilities presented the acquiring company with quick-wins. M &A synergy may be defined as the “present value of the net additional cash-flow that is generated by a combination of two companies that could not have been generated by either company on its own” (Ficery et al., 2007, p. 35). Similar to Andrade and Stafford (2004), Akdogu (2009) cited the reason for horizontal mergers as an attempt by an acquiring company to increase market concentration and potentially creating monopolistic returns for the remaining firms. Akdogu (2009) also reported that vertical mergers could be an attempt to dominate a common industry resource, thereby engineering an increase in rival firms cost structures.

## **2.2 Post Acquisition Long-Run Performance Studies**

Smit (2005) reported that long-term event studies have been criticised for their wide range of results. Andrade et al. (2001) noted that the three-year expected share price returns may range from between 30% to 65%, making it difficult to estimate whether an abnormal return of 15% is statistically significant or not. Andrade (2001) cited some of the reasons for the large variation in long-term event study results as the presence of new market information, other than the merger or acquisition i.e. annual or interim results announcements that impact share price performance as well as the cyclical nature of mergers and acquisitions, clustering over time and industries. Smit (2005) indicated that these factors created difficulty in determining what the expected returns are when a large percentage of firms in an industry undertook mergers and acquisitions during the long-term event window under review.

Regardless of the criticism levelled against long-run event studies, as motivated in section 1.4, the long-run performance of acquiring companies in excess of two years post-acquisition window remain important (Smit & Ward, 2007).

### **2.2.1 Share Price Performance Studies**

In *Does M&A pay? A survey of evidence for the decision-maker* by Bruner (2002), a published meta-study on post acquisition performance research that included 44 acquiring firm abnormal share price return event studies for the period from 1978 to 2001, concluded that on average acquiring firms earned no abnormal share price returns post acquisition. Out of the 44 studies, 11 studies were considered long-run studies with event windows of between 365 and 1250

days post-acquisition. The long-run share return studies evaluated by Bruner (2002) are listed in Table 2-1. Six out of 11 long-run studies indicated statistically significant negative returns ranging between -4% cumulative abnormal returns (CAR) and -18% CAR.

The smallest statistically significant negative CAR of -4% was found by Rau and Vermaelen (1998) who studied 3968 mergers between 1980 to 1991 with an event window of 36 months post acquisition. The largest statistically significant negative CAR of -14.3% was found by Loughran and Vjih (1997) who studied 434 mergers between 1970 to 1989 with an event window of 1250 days post-acquisition.

Only 2 share price return studies noted by Bruner (2002) indicated statistically significant positive CAR, namely tender (instead of merger) studies by Rau and Vermaelen (1998) and Loughran and Vjih (1997), resulting in positive 9% and 61,3% CAR respectively.

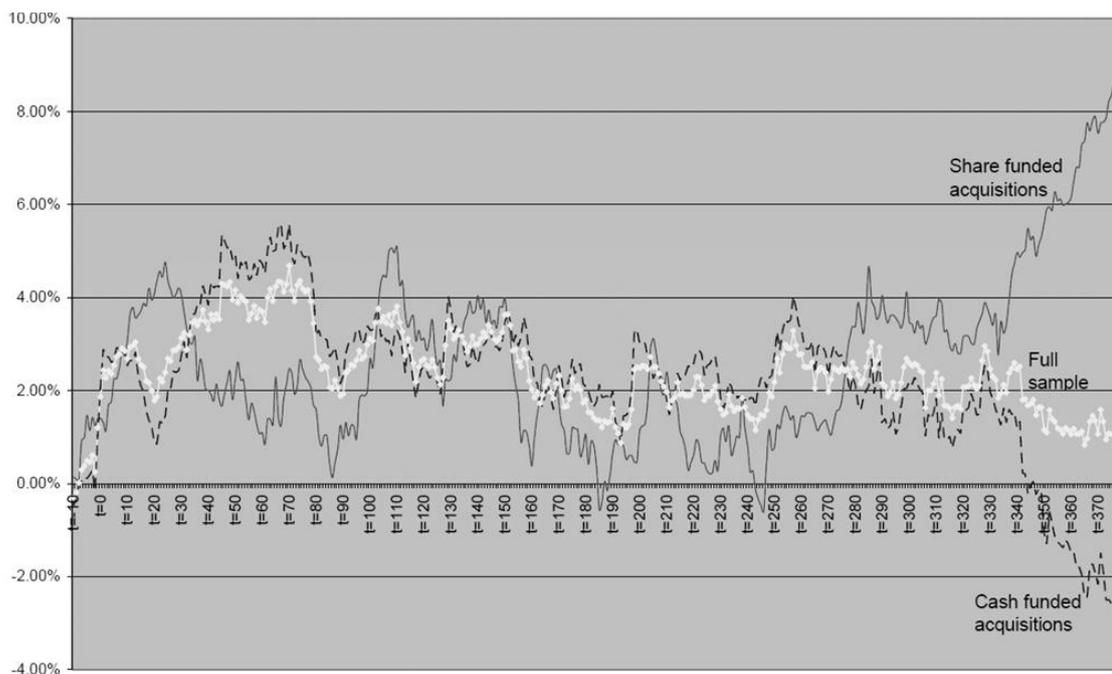
**Table 2-1 : Bruner (2002) event studies reporting long-term share price returns to acquirers**

Study	Cumulative Abnormal Returns (CAR)	Sample Size	Sample Period	Event Window (Days)	Notes
Mandelker (1974)	-1.32%	241	1941-63	(0,365)	Successful bids only
Dodd & Ruback (1977)	-1.32%	124	1958-78	(0,365)	Successful bids only
	-1.60%	48		(0,365)	Unsuccessful
Langtieg (1978)	-6.59%*	149	1929-69	(0,365)	Successful bids only
Asquith (1983)	-7.20%*	196	1962-76	(0,240)	Successful bids only
	-9.60%*	89		(0,240)	Unsuccessful
Bradley, Desai & Kim (1983)	-7.85%*	94	1962-80	(0,365)	Unsuccessful
Malatesta (1983)	-2.90%	121	1969-74	(0,365)	Whole Sample After 1970 Smaller Bids
	-13.70%*	75		(0,365)	
	-7.70%	59		(0,365)	
Agrawal, Jaffe & Mandekler (1992)	-10.26%*	765	1955-87	(0,1250)	
Loderer & Martin (1992)	1.50%	1298	1966-86	(0,1250)	
Gregory (1997)	-18%*	452	1984-92	(0,500)	
Loughran & Vjih (1997)	-14.20%	434	1970-89	(0,1250)	Merger
	61.30%*	100		(0,1250)	Tender
	-0.10%	100		(0,1250)	Combined
Rau & Vermaelen (1998)	-4%*	3968	1980-91	(0,36 months)	Mergers
	9%*	348		(0,36 months)	Tender

\* Significant at the 5% level  
Note : Unless otherwise noted, event date is the announcement date of the merger/bid

A recent long-term share price return event study by Kyei (2008), studying 14 acquisitions, between 2000 to 2002 over a 378 day period and Laabs and Schiereck (2010) studying 164 acquisitions with an event window of 36 months post-acquisition, indicated an insignificant average cumulative abnormal return (ACAR) of 1.37% on day 378 and a statistically significant buy-and-hold abnormal return (BHAR) of -16.68% respectively. The ACAR plot of Kyei (2008) may be seen in Figure 2-1 below.

**Figure 2-1: Kyei (2008) average cumulative abnormal returns (-10,378) results**



Of interest in the Kyei (2008) study is the net positive ACAR over the post-acquisition event window period with a peak ACAR of 4.69% for the full sample, 67 days after the acquisition date, denoted  $t=0$ . Kyei (2008) also included a sample parameter, namely payment method i.e. share based vs. cash based

acquisitions with ACAR results visible in Figure 2-1. Although Kyei (2008) concluded that post-acquisition share price performance yields statistically insignificant abnormal returns on the last day of the event window, the presence of significant returns on day 67 of the event window supported the statement by Rau and Vermaelen (1998, pg.252 ) “...that short-term measurements of abnormal performance do not capture the full effects of the market reaction to an event ” and that “... market participants systematically tend to react sluggishly to corporate financial and strategic decisions ”. This finding has further relevance in that it contradicts the efficient market hypothesis on which many financial models are built (Kyei, 2008).

Two other studies, namely Andrade, Mitchell and Stafford (2001) and Mushidzhi and Ward (2004) studied abnormal share price returns whilst calculating acquiring firm average abnormal return (AAR). Although the method used by Andrade et al. (2001) differed from that of Mushidzhi and Ward (2004), neither study found statistically significant AR's, concluding that based on the measurement of AR, mergers and acquisitions neither created nor destroyed value for shareholders of acquiring firms.

More specifically, Andrade et al. (2001) found, using 3688 mergers and acquisitions from 1973 to 1998 that for the event window defined as [-20,close], indicating a window period starting 20 days prior the announcement date and concluding on the closing day or effective date of the acquisition, that abnormal return measured an insignificant -3,8%.

### 2.2.2 Operating Financial Performance Studies

Smit (2005) utilised operating financial performance of combined and enlarged companies (acquiring companies combined with the target companies) before and after an acquisition as another indicator to determine whether acquisitions created or destroyed value in the long-run.

The value of operating financial performance studies were noted by Andrade et al. (2001) and Healy et al. (1997). Andrade et al. (2001) described operating financial performance as a means to determine whether the benefits of mergers and acquisitions are actually realised through operating cash-flows as opposed to share price appreciation. Healy et al. (1997, pg. 46) wrote that “Post-takeover accounting performance measures represent *actual* economic benefits generated by takeovers, whereas takeover announcement returns represent *investors' expectations* benefits”.

Bruner (2002) also performed a review of accounting studies as an alternative method of studying M & A returns with measures such as return on assets, return on capital and return on equity. 15 Accounting studies were evaluated by Bruner (2002) and included studies by Healy et al. (1997), Healy et al. (1992) and Gosh (2001). The 15 accounting studies surveyed by Bruner (2002) are listed in Table 2-2 below.

**Table 2-2 : Bruner (2002) accounting studies**

Study	Sample Size	Sample Period	Metric	Notes
Meeks (1977)	233	1964-72	ROA	ROA decline post merger
Salter & Weinhold (1979)	16	N/A	ROE	ROE 44% below NYSE ROE
Mueller (1980)	287	1962-72	ROS	Acquirers less profitable (insignificantly)
Mueller (1985)	100	1950-92	ROS	Acquirers suffer significant losses
Ravenscraft & Scherer (1987)	471	1950-77	ROA	Negative relation between acquirer ROA and tender activity
Ravenscraft & Scherer (1987)	471	1950-77	ROA	ROA decline avg. 0.5% per year for target companies
Herman & Lowenstein (1988)	56	1975-83	ROC	ROC for acquirers increased post merger 1975-78. Decline in ROC for 1981-83.
Seth (1990)	102	1962-79	Equity Value	9.3% additional equity returned
Healy, Palepu & Ruback (1992)	50	1979-84	Asset Turnover, Cash-flow Return	Significant increase in asset turnover, but no significant cash-flow increases
Chatterjee & Meeks (1996)	144	1977-90	Profit Returns	Between 1985-90 significant improvement in profit post acquisition
Dickerson, Gibson, Tsakalotos (1997)	613	1948-77	ROA	5 year post acquisition ROA lower than non-acquirers
Healy, Palepu & Ruback (1997)	50	1974-84	Cash-flow Return	M& A zero NPV activity.
Parrino & Harris (1999)	197	1984-92	Cash-flow Return	2.1% cash-flow return after merger
Parrino & Harris (2001)	197	1970-89	Cash-flow Return	Significant increases in cash-flow return when target and acquirer have common business line.
Gosh (2001)	315	1981-95	Cash-flow Return	No significant difference in pre vs. post cash-flow return.

One of the most notable studies regarding post-acquisition operating performance was completed by Healy et al. (1992) who studied 50 of the largest US mergers between 1979 and 1984 with an event window of five years post-

acquisition. Acquiring company operating financial performance was measured against industry performance as cash-flow return on tangible assets, excluding any premium paid by the acquirer. The results indicated that, post-acquisition, acquiring firms improved their asset productivity and delivered statistically significant industry-adjusted cash-flow returns on all tangible assets (IACRTA) of 2.8% compared to industry benchmarks. Healy et al. (1992) noted that the acquiring firms, relative to their industry peers, achieved the abnormal operating cash-flow returns despite maintaining a constant rate of research, development and capital expenditure.

A few years later, a similar study by Healy et al. (1997) showed contradictory results. Healy et al. (1997) again studied the same 50 large US mergers, but now included the cost of the acquisition premium. Although the results showed a significant abnormal asset productivity, they indicated no statistically significant abnormal increases in industry-adjusted cash-flow return on all assets (IACRAA), delivering an insignificant 2.1% IACRAA.

The last study surveyed by Bruner (2002), namely Gosh (2001), reported on 315 acquisitions between 1981 and 1995. Similar to Healy (1992), Gosh (2001) defined operating cash-flows as sales minus cost of goods sold, minus selling and administrative expenses, plus depreciation and goodwill amortization expenses. Gosh (2001) then utilised a standard change model to calculate the difference between the acquiring firm's three-year industry-adjusted pre- and post-acquisition cash-flow return performance. The average pre-acquisition

difference between acquiring firms' cash-flows and industry-average cash-flows was a significant 2.89%, average three years prior to the acquisition and a significant 3.5%, average three years post-acquisition. Although this indicated that acquiring firms outperformed industry-average firms over both pre and post-acquisition years, the difference between average pre- and post-acquisition cash-flow was an insignificant 0.66%. Gosh (2001) concluded that when comparing the industry-adjusted cash-flow between pre- and post-acquisition years, using a simple change model, the mean increase in operating performance following acquisitions was neither statistically nor economically significant.

When Gosh (2001) studied the acquisition-induced changes in cash-flow by estimating the intercept of the cross-sectional regression of post-acquisition industry-adjusted cash-flows on pre-acquisition industry-adjusted cash-flows, following Healy et al. (1992), different results were obtained. Similar to Healy et al. (1992), Gosh (2001) showed that regression estimates indicated that industry-adjusted cash-flow of acquiring firms increased by a significant 2.4% post acquisition. Gosh (2001) argued that a regression intercept estimate of 2.4% suggested that acquiring firm's operating financial performance improved post-acquisition and that this contradicted the change model results first calculated.

More recently, Smit and Ward (2007) also performed two pre- and post-acquisition operating financial performance analyses. Smit and Ward (2007)

studied industry-adjusted cash-flow return on tangible assets (IACRTA), similar to Healy et al. (1992) excluding the acquirers' acquisition premium, and industry-adjusted cash-flow return on all assets (IACRAA), similar to Healy et al. (1997) including the premium or goodwill paid, for 27 acquisitions, two years post acquisition.

Smit and Ward (2007) reported two year average pre-acquisition acquiring firm cash-flow return on tangible assets as an insignificant 1.57%, whilst the two year average post-acquisition acquiring firms' cash-flow return on tangible assets was reported as an insignificant 1.34%. For the IACRAA results, the two year average pre-acquisition acquiring firms' cash-flow return on all assets was an insignificant 1.42%, whilst the two year average post-acquisition acquiring firms' cash-flow return on all assets was an insignificant 0.91%. Similar to Gosh (2001) this indicated that acquiring firms outperformed industry-average firms over both pre and post-acquisition years, although the performance was on average statistically insignificant.

Smit and Ward (2007) finally concluded that based on the operating financial performance of acquiring firms before and after large acquisitions, large acquisitions, on average, do not result in any improvement or deterioration in acquiring firm performance. Table 2-3 below compares the pre- and post-acquisition cash-flow return on asset results for Healy et al. (1992), Healy et al. (1997), Gosh (2001) and Smit and Ward (2007).

**Table 2-3 : Recent comparative pre- and post acquisition cash-flow return on asset studies**

Study	Cumulative Abnormal Returns (CAR)	Sample Size	Metric	Event Window (Years)	Abnormal return
Healy et al. (1992)	-1.32%	50	IACRTA	(-5,-1)	0.30%
Healy et al. (1992)	-1.32%	50	IACRTA	(+1,+5)	2.8%***
Healy et al. (1997)	-1.60%	50	IACRA	(-5,-1)	0.50%
Healy et al. (1997)	-6.59%	50	IACRA	(+1,+5)	2.10%
			Follows Healy (1992)		
Gosh (2001)	-7.20%	315	IACRTA	(-3,-1)	2.81***
			Follows Healy (1992)		
Gosh (2001)	-9.60%	315	IACRTA	(+1,+3)	3.06***
Smit and Ward (2007)	-7.85%	27	IACRTA	(-2,-1)	1.57%
Smit and Ward (2007)	-2.90%	27	IACRTA	(+1,+2)	1.34%
Smit and Ward (2007)	-7.85%	27	IACRA	(-2,-1)	1.42%
Smit and Ward (2007)	-2.90%	27	IACRA	(+1,+2)	0.91%

\*\*\* Significant at the 1% level, two tailed test.

### 2.2.3 Intrinsic Value Studies

Recent literature by Dong, Hirshieifer, Richardson and Siew (2006), Rhodes-Kropf, Robinson and Viswanathan (2005) and Ang and Chen (2006) have indicated that merger decisions are influenced by stock miss-valuation and that poor long-run post-acquisition performance may be representative of a market correction, as opposed to bad performance. This introduces a bias into studies

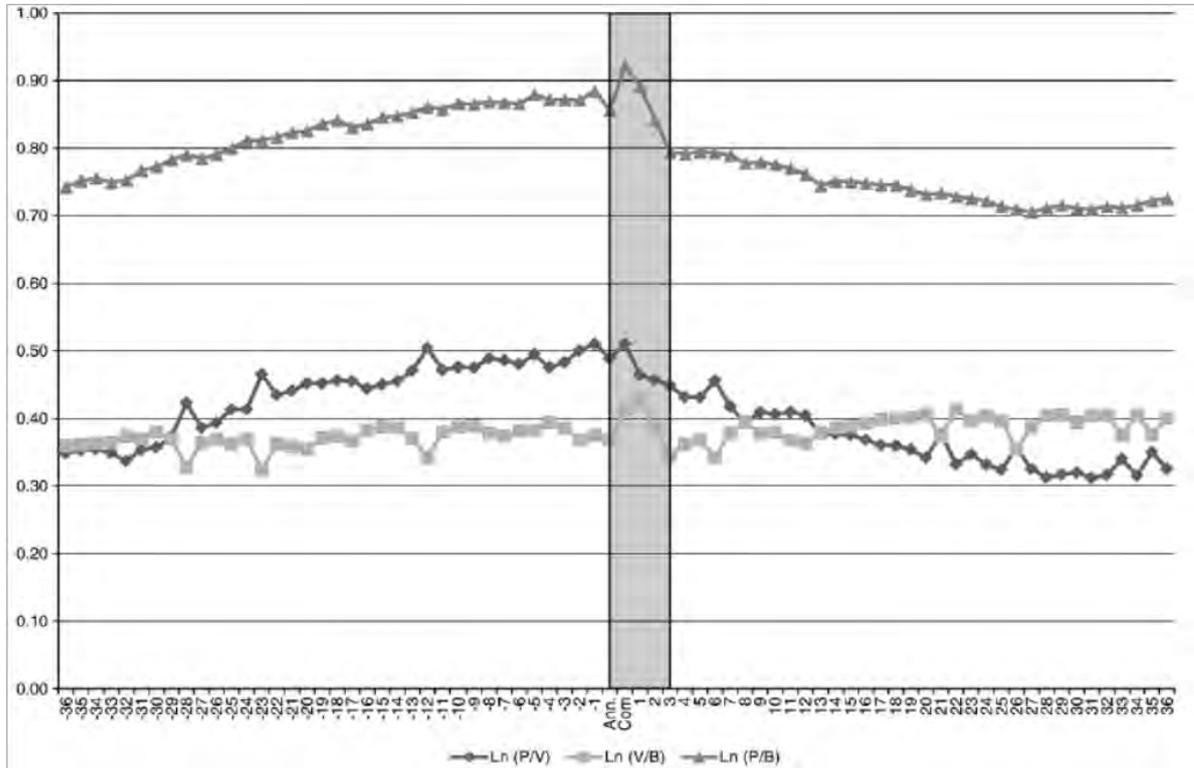
measuring economic impact of acquisitions, since they implicitly rely on the assumption that share prices reflect the intrinsic value (IV) or fundamental value of a firm. Ma et al. (2011) also challenged abnormal share price return event study methodologies and indicated the existence of a tendency for pre-acquisition over-valuation to bias post-acquisition share price return estimations.

An alternative to the use of share price, when determining economic impact through an event study methodology, is an accounting methodology, namely the residual income model (Ma et al., 2011).

Following the residual income model as used by Ohlson (1995) and estimation techniques of Lee, Myers and Swaminathan (1999), Ma et al. (2011) studied 1077 mergers and acquisitions between 1978 and 2002 and estimated acquiring firm's raw and industry-adjusted intrinsic value. Ignoring the two month period post the acquisition announcement, due to delays in deal completion, Ma et al. (2011) expressed the level of the acquiring firm's intrinsic value as a ratio to the firm's book-value as well as market value for a 36 month pre and post-acquisition period.

Figure 2-2 below shows the time series sample average of acquiring firm's raw intrinsic value, measured as a ratio to market value,  $\ln(P/V)$ , as a ratio to book value,  $\ln(V/B)$ , as well as market to book,  $\ln(P/B)$ , for a period 36 months before after deal completion (Ma et al., 2011).

**Figure 2-2 : Ma et al. (2011) raw 36 month pre and post-acquisition average firm intrinsic value to market & book ratios**



The results shown in Figure 2-2 indicated that acquiring firm raw average intrinsic value (AIV), measured as the natural logarithm of the value to book or V/B ratio, showed only modest changes over time. Ma et al. (2011) reported an AIV change of -0.029 at three months, a positive AIV change of 0.002 at 12 months and a positive AIV change of 0,054, 36 months after the merger. Ma et al. (2011) also showed that when adjusting acquiring firm AIV for industry movements, over the 36 months post announcement date period, industry-adjusted AIV decreased to a significant level of 5.5. These findings suggested that even when acquiring firms increase raw AIV, they do not keep up with industry norms (Ma et al., 2011). In addition, Ma et al. (2011) noted a decrease

in both  $\ln(P/B)$  and  $\ln(P/V)$  ratios in the months after the announcement of the merger.

Guest, Bild and Runsten (2010) analysed 303 acquiring firms, between 1985 and 1996, using a residual income model to estimate changes in acquiring firm fundamental value. In addition, Guest et al. (2010) compared these effects to changes in profitability and short- and long-run share price returns.

Guest et al. (2010) adapted the residual income valuation model as used by Ohlson (1995) in order to measure the impact of an acquisition on the fundamental value of an acquiring firm. Guest et al. (2010) examined the difference between the expected (forecasted) fundamental value pre-acquisition and the realised (actual) post-acquisition fundamental value. Value creation would be realised in the event of a positive difference between pre- and post-acquisition fundamental value.

Guest et al. (2010) found that the impact of an acquisition on the fundamental value of an acquiring firm resulted in an insignificant industry-adjusted intrinsic value of -4.55, measured in the terminal period (three years) post acquisition. This result differed when compared to the effect of acquisitions on profitability, which was significantly positive compared to the effect of acquisitions on share returns, which was significantly negative (Guest et al. ,2010).

It was clear that when evaluating both event and accounting studies as detailed in section 2.1.1 to 2.2.3, whilst considering the myriad of performance metrics

and event windows evaluated, the overall result of whether M & A activity created or destroyed value in the long run, remained mixed and therefore inconclusive.

### **2.3 Measuring Pre and Post Acquisition Performance**

According to Bruner (2004), four general methods are used to evaluate whether acquiring companies create or destroy value with acquisitions, namely event studies, accounting studies, clinical surveys and surveys of executives. It will be shown in sections 2.3.1 to section 2.3.3 that this study will use both an event study as well as accounting study methods.

#### **2.3.1 Measuring Abnormal Share Price Performance**

According to Aktas, de Bodt and Cousin (2007), the standard empirical methodology in finance research is the event study methodology as conceived by Fama, Fisher, Jensen and Roll (1969), and the steps are well known. Fama et al. (1969) used event studies to estimate unusual or abnormal returns (Smit, 2005).

Event studies are known to be sensitive to unrelated or confounding events within the event window period, resulting in a bias of the return generating process parameters (Aktas et al., 2007). In an attempt to improve the reliability in estimating abnormal returns, numerous event study model variations exist today, such as the mean adjusted model, market model, market adjusted model, and control portfolio model (Mushidzi & Ward, 2004).

According to Rau and Vermaulen (1998), long-term event studies are more sensitive to the choice of model utilised, compared to short-term studies. Ward and Muller (2010) and Mutooni and Muller (2007) recommended the use of a

control portfolio model, adapted from the Fama and French (1996) three factor expected return model, as the most appropriate for long-term studies.

The Fama-French three-factor control portfolio model groups firms into portfolios based upon a number of predefined characteristics and expects the acquiring firm's return to be similar to those of peer firms in the same portfolio. Empirical studies have shown that the share price return estimation accuracy of a three-factor control portfolio model exceeds that of the traditional one-factor CAPM model (Hirschey and Norfsinger, 2010).

The three-factor model of Fama and French (1996) illustrates how an expected share price return may be calculated:

$$E(R_i) - R_f = b_1(E(R_m) - R_f) + s_1E(SMB) + h_1E(HML) + \varepsilon_{it} \quad \text{Equation 1}$$

Where:

$E(R_i)$  = the expected return of security i

$R_f$  = the risk-free rate

$b_1$ , = the market Beta ( $\beta$ )

$s_1$  = the coefficient of tilt or factor sensitivity towards small company shares, away from large company shares

$h_1$  = the coefficient of tilt or factor sensitivity towards high book-to-market equity ratio companies' shares and away from low book-to-market equity ratio companies' shares

$E(R_m)$  = the expected return on the broad market portfolio

$E(SMB)$  = (Small minus Big) , the difference between the expected return on a portfolio of small companies' shares and the expected return on a portfolio of big companies' shares

$E(HML)$  = (High minus Low) , the difference between the expected return on a portfolio of high book-to market companies' shares and the expected return on a portfolio of small book-to-market companies' shares

$\varepsilon_{it}$  = the error term

The Fama-French three-factor model is essentially a multi-factor CAPM model that explains the difference between the expected return of a security and the risk-free rate,  $E(R_i) - R_f$  , using the sensitivity of the security to the difference in return of the broad market portfolio and the risk-free rate,  $(E(R_m) - R_f)$ , the difference in the return of a portfolio of small stocks and large stocks,  $E(SMB)$  and the difference in the return of a portfolio of high book-to-market stocks and low book-to-market stocks  $E(HML)$ . Unfortunately, even the three-factor model still does not explain all the variation in average share price returns (Hirschey and Norfsinger, 2010).

This research study utilised a multi-factor control portfolio model designed by Ward and Muller (2010) to measure daily expected acquiring firm returns. The expected returns were required in order to compare pre-acquisition and post-acquisition long-run share price abnormal return performance.

### 2.3.2 Measuring Abnormal Operating Financial Performance

Healy, Palepu and Ruback (1997) suggested an accounting study that measured a firm's operating cash-flows, expressed as a return on assets, whilst adjusting for industry performance over an event period. This technique resulted in a robust financial performance measuring methodology that could overcome the influences of accounting treatments, financing methods, the level of assets employed as well as industry and economic factors (Healy et al., 1997).

Gosh (2001) and Healy, Palepu and Ruback (1992) defined operating cash-flow as sales minus cost of goods sold minus selling and administrative expenses plus non-cash items, such as depreciation and amortisation. This is represented in an equation below

$$\text{Cash Flow} = (\text{Sales} - \text{COGS}) - \text{S\&A} + (\text{Depr.} + \text{Amort.}) \quad \text{Equation 2}$$

According to Healy et al. (1997), year zero, the year of acquisition, was excluded from the calculation of combined target and acquirer cash-flows, since the target firm contributed assets to the union of the firms, but without contributing the associated full year income.

This study utilised the operating financial performance study design principles as used by Smit and Ward (2007).

### 2.3.3 Measuring Abnormal Intrinsic Value Creation

Residual income (RI) models measure changes in intrinsic value as defined by Ohlson (1995) and may be used to measure long-run economic impact of a firm without the use of share prices, making RI models immune to the share price miss-valuation bias.

A firms' intrinsic value may typically be defined as the present value of a firms future dividend flows. Such fundamental or intrinsic values are easily calculated using the standard dividend discount model as shown in the equation below:

$$V_t = \sum_{i=1}^{\infty} \frac{E_t[D_{t+1}]}{(1+R_e)^i} \quad \text{Equation 3}$$

Where:

$V_t$  = the value of the firm at time t

$D_{t+1}$  = the dividend for period t+1

$R_e$  = the cost of firm equity

$E_t[\ ]$  = expectation operator conditional on information at time period t

Lee et al. (1999) indicated that the residual income model is based on the premise that as long as a firms' book-value and earnings are forecast in a manner consistent with "clean surplus" accounting, then the intrinsic value of a firm, defined in equation 3, may be rewritten as the reported book-value at time t

plus the infinite sum of discounted residual income. Clean surplus accounting requires that all gains and losses affecting book-value are also included in earnings. Therefore, the change in book-value from time to time, is equal to earnings, minus net dividends (Lee et al., 1999).

The RI model is based on the dividend discount model, but relies on clean surplus accounting principles in order to rewrite it into equation 4 shown below:

$$V_t = B_t + \sum_{i=1}^{\infty} \frac{E_t[NI_{t+1} - (R_e * B_{t+i-1})]}{(1+R_e)^i} \quad \text{Equation 4}$$

Where:

$V_t$  = the value of firm common equity at time t

$B_{t,t+i-1}$  = the book-value of the firm at time t and t+i-1

$NI_{t+1}$  = the net income for period t+1

$R_e$  = the cost of firm equity

$E_t[\ ]$  = expectation operator conditional on information at time period t

This research study built on the work done by Ma et al. (2011) and measured and compared pre- and post-acquisition average intrinsic value in order to provide an alternative view compared to the event-based abnormal share-price return research methodology as used by Smit and Ward (2007).

### 3. CHAPTER 3 - RESEARCH HYPOTHESES

#### 3.1 Hypothesis 1

The null hypothesis states that the average cumulative average abnormal returns (ACAAR) of the acquiring company post-acquisition equals the average cumulative average abnormal return (ACAAR) of the acquiring company pre-acquisition.

The alternative hypothesis states that the average cumulative average abnormal return (ACAAR) of the acquiring company post-acquisition does not equal the average cumulative average abnormal returns (ACAAR) of the acquiring company pre-acquisition.

$$H1_0: ACAAR_{post} - ACAAR_{pre} = 0$$

$$H1_A: ACAAR_{post} - ACAAR_{pre} \neq 0$$

#### 3.2 Hypothesis 2

The null hypothesis states that the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies post acquisition equals the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies pre acquisition.

The alternative hypothesis states that the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies post acquisition does not equal the average industry-adjusted

operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies pre acquisition.

$$H2_0: IACRAA_{post} - IACRAA_{pre} = 0$$

$$H2_A: IACRAA_{post} - IACRAA_{pre} \neq 0$$

### 3.3 Hypothesis 3

The null hypothesis states that average intrinsic value (AIV) of the acquiring company post-acquisition equals the average intrinsic value (AIV) of the acquiring company pre-acquisition.

The alternative hypothesis states that average intrinsic value (AIV) of the acquiring company post-acquisition does not equal the average intrinsic value (AIV) of the acquiring company pre-acquisition.

$$H3_0: AIV_{post} - AIV_{pre} = 0$$

$$H3_A: AIV_{post} - AIV_{pre} \neq 0$$

## **4. CHAPTER 4 - RESEARCH METHODOLOGY**

### **4.1 Proposed General Research Method and Design**

In the interest of identifying and evaluating previous work under-taken in the field of post-acquisition financial performance, secondary data research was completed. The secondary research assisted in accomplishing the first objective of this research study. Relevant methods from previous work undertaken, used for the measurement and analysis of long-run post-acquisition company performance, was investigated.

In the interest of being able to successfully test the proposed hypotheses described in chapter 3, this research study required precise procedures and data source specification and was therefore classified as a formal, quantitative study. Qualitative studies such as clinical studies and surveys of executives were therefore not conducted.

The objectives of the study required a causal, longitudinal, ex-post facto design, since the intent of this research was to understand the effect of changes in one variable, the occurrence of a merger and acquisition, on another variable, the long-run financial performance of an acquiring company, over a defined period of time (Blumberg, Cooper & Schindler, 2008).

Evaluating the hypotheses and metrics in section 4, it was noted that two of the three metrics utilised, namely average cumulative average abnormal returns or average abnormal returns and industry-adjusted cash-flow return on all assets, are all three reflective of a pre-test, post test, control group, or more precisely a non equivalent control group, quasi-experimental design. The researcher did not

have full control of the experiment and the population contained two non-equivalent natural groups, namely those firms that had undergone a merger and acquisition and those firms that had not.

The research design followed the following diagrammatic illustration:

$$\frac{O_1 \quad X \quad O_2}{O_3 \quad O_4}$$

Where:

$O_1$  : Pre-test observation of test variable

$O_2$  : Post-test observation of test variable

$O_3$  : Pre-test observation of control variable

$O_4$  : Post-test observation of control variable

$X$  : Treatment or exposure to manipulation of test variable

Evaluating the hypothesis and metric for average intrinsic value performance, the lack of an industry-adjusted control group changes the research design to that of a time-series design, where sample observations would act as their own control comparing pre and post event changes directly.

#### **4.2 Cumulative Average Abnormal Returns Research Design**

The event study methodology used closely followed Smit and Ward (2007), yet utilised the control portfolio model as designed by Ward and Muller (2010) in order to calculate expected long-run share price returns. According to Henderson (1990), three commonly used metrics for measuring abnormal returns are,

average cumulative abnormal returns (ACAR), abnormal index performance (AIP) and standardised cumulative prediction error (SCPE). In the interest of extending the study done by Smit and Ward (2007), this study used a variation of ACAR, namely average cumulative average abnormal return (ACAAR) and average abnormal return (AAR) as the appropriate metric for hypothesis testing of abnormal share-price returns.

Similar to the research event window constructed by Sinha, Kaushik and Chaudhary (2010), the abnormal return calculations were completed for a maximum pre-merger event window of three years and a maximum post-merger event window of three years. Separate event windows and event window parts were constructed for purposes of period comparisons. Event windows and event window part definitions were defined as:

$[-3;+3]$  = the event window representing three financial years, or 756 trading days, or 36 months prior to the announcement date and three financial years, or 756 trading days, or 36 months post to the announcement date.

$[-2;+2]$  = the event window representing two financial years, or 504 trading days, or 24 months, prior to the announcement date and two financial years, or 504 trading days, or 24 months post to the announcement date.

$[-1;+1]$  = the event window representing one financial year, or 252 trading days, or 12 months prior to the announcement date and one financial year, or 252 trading days, or 12 months post to the announcement date.

Individual event window parts based on the three event windows listed above were also used, such as [-1] and [+1], representing one financial year, or 252 trading days, or 12 months prior to the announcement date and one financial year, or 252 trading days, or 12 months post to the announcement date respectively. Unless otherwise indicated, the above mentioned event window definitions served as the default evaluation time periods and excluded acquiring firm confounding events such as other mergers and acquisitions.

This research study utilised a pre-designed control portfolio model as constructed by Ward and Muller (2010) to measure daily expected acquiring firm returns in order to compare both pre- and post-acquisition long-run abnormal share price return performance.

#### **4.2.1 The Event Study Control Portfolio Design**

As described in section 2.3.1, Ward and Muller (2010) and Mutooni and Muller (2007) recommended the use of a multi-factor control portfolio model, adapted from the Fama and French (1996) three-factor expected return model. The standard Fama-French three-factor model does not adequately control for company size, incorporate differences between growth and value firms and differentiate between resource-based and non-resource based firms (Ward & Muller, 2010). Ward and Muller (2010) constructed a 12-factor control portfolio model, including the cross-sectional factors of size, classifying small, medium and large sized firms, growth and value firms, and resource based and non-resource based firms. This research utilised the exact Ward and Muller (2010)

12-factor control portfolio model to generate expected firm returns. The 12 control portfolios may be seen in Table 4-1 below.

**Table 4-1: Ward and Muller (2010) multi-factor control portfolio model factors**

<b>Control Portfolio</b>	<b>Size</b>	<b>Growth /Value</b>	<b>Resource/ Non Resource</b>
SGN	Small	Growth	Non Resource
SGR	Small	Growth	Resource
SVN	Small	Value	Non Resource
SVR	Small	Value	Resource
MGN	Medium	Growth	Non Resource
MGR	Medium	Growth	Resource
MVN	Medium	Value	Non Resource
MVR	Medium	Value	Resource
LGN	Large	Growth	Non Resource
LGR	Large	Growth	Resource
LVN	Large	Value	Non Resource
LVR	Large	Value	Resource

Ward and Muller (2010) defined the size of the firm as the market capitalisation of the firm. The total list of JSE listed firms were ranked in descending order of market capitalisation. The large firm portfolio constituted the top 40 firms with the largest market capitalisation. The medium firm portfolio constituted the firms ranked between 41 and 100 in market capitalisation size, whilst the remaining

firms logically made up the small market capitalisation control portfolio. The decision to classify a firm as either a growth or value firm was determined using a firms' price-to-earnings (PE) ratio. A firms' PE ratio was compared to the median price-to-earnings ratio of all the JSE listed firms. Above median PE ratio firms were classified as growth and below median PE firms were classified as value firms. A simple classification criterion was used to distinguish „resource' firms from „non-resource' firms. All mining and non-mining resource firms were classified as resource firms, whilst all the rest were classified as non-resource firms. Control portfolios were then constructed by placing each of the firms in to one of the portfolios as defined in Table 4-1. Quarterly rebalancing of the portfolios ensured that changes in relevant firm characteristics were incorporated into the control portfolio model (Ward & Muller, 2010).

Daily indices were constructed for each of the 12 control portfolios using log returns.

$$R_{it} = \log((P_{it})/(P_{it-1})) \quad \text{Equation 5}$$

Where:

$R_{it}$  = the equal weighted share return for control portfolio i for day t;

$P_{it}$  = the equal weighted share value of control portfolio i at the end of day t.

Regression coefficients were calculated through a regression, over the preceding 48 months of the monthly log-function share price return of individual firms against the monthly log-function returns of each of the control portfolio indices, as calculated in equation 5. The resultant regression equation, seen in equation 6, measured the expected return of firm or security  $i$  in period  $t$  as the sum of the sensitivity of firm or security  $i$  to the returns on the 12 control portfolios and a calculated alpha estimate in period  $t$ .

$$\begin{aligned}
 E(R_{it}) = & \text{ait} + b_1(SGNt) + b_2(SGRt) + b_3(SVNT) + b_4(SVRt) \\
 & + b_5(MGNt) + b_6(MGRt) + b_7(MVNT) + b_8(MVRt) + b_9(LGNT) \\
 & + b_{10}(LGRt) + b_{11}(LVNT) + b_{12}(LVRt)..
 \end{aligned}
 \tag{Equation 6}$$

Where:

$E(R_i)$  = the expected return of security  $i$  on day  $t$

$ait$  = the alpha-intercept of security  $i$  on day  $t$

$b_1 - b_{12}$  = the regression coefficients on each of the 12 control portfolio returns

$SGN - LVR$  = the log-function share price returns on each of the twelve control portfolios as set out in Table 4-1 on day  $t$ .

#### 4.2.2 Calculating Average Cumulative Average Abnormal Returns

After completing the daily firm expected return calculation, using the Ward and Muller (2010) 12-factor control portfolio model and regression equation as described in section 4.2.1, the daily abnormal return was calculated by subtracting the actual firm return from the firm's expected return, as shown in equation 7.

$$AR_{it} = R_{it} - E(R_{it}) \quad \text{Equation 7}$$

Where:

$AR_{it}$  = abnormal return for security i for day t

$R_{it}$  = the actual return for security i for day t

$E(R_{it})$  = the expected return for security i for day t, as calculated in section 4.2.1

After calculating the daily AR for each firm in the sample, the daily sample average abnormal return (AAR) was calculated.

$$AAR_{K,L} = \frac{1}{n} \sum_{i=1}^n AR_{i,K,L} \quad \text{Equation 8}$$

Where:

$AAR_{K,L}$  = the daily average abnormal return for the sample on the day  $t=K$  to  $t=L$ .  $K$  and  $L$  represent the start and end of the event period under study

$AR_{i,K,L}$  = abnormal return for security  $i$  for day  $t=K$  to  $t=L$ , as defined in equation 7

$n$  = the number of firms in the sample on specified day  $t$

For each day within the event window defined, the cumulative average abnormal return (CAAR) was calculated by using the geometric mean return equation, equation 9, to calculate the compounded rate of return over the defined event window. Consecutive daily abnormal returns were used.

$$CAAR_{K,L} = \left( \prod_{i=K}^L \left( (1 + AAR_{K,L}) \right)^{1/L} - 1 \right) \quad \text{Equation 9}$$

Where:

$CAAR_{K,L}$  = Daily cumulative average abnormal return for the sample for the day  $t=K$  to  $t=L$

$AAR_{K,L}$  = Daily average abnormal return for the sample for day  $t=K$  up to day  $t=L$ , as calculated in equation 8.

For all the event windows defined, the average cumulative average abnormal return (ACAAR) was calculated by averaging the daily sample CAAR, as shown in equation 10.

$$ACAAR_E = \frac{1}{(L-K)} \sum_{i=K}^L CAAR_{K,L} \quad \text{Equation 10}$$

Where:

$CAAR_{K,L}$  = Daily cumulative average abnormal return for the sample for the day  $t=K$  to  $t=L$ , as defined in equation 9

$ACAAR_E$  = Sample average cumulative average abnormal return for the event window E starting on day  $t=K$  up to day  $t=L$

### 4.3 Industry-adjusted Cash-flow Return Research Design

Barber and Lyon (1996) suggested the use of matched control firms as benchmarks in evaluating operating financial performance, whilst Healy et al. (1997) utilised industry acquirer peer statistics to compare financial performance against. In line with the accounting study methodology utilised by Smit and Ward (2007) as well as Smit (2005), this study adopts the use of industry-adjusted average cash-flow return on all assets (IACRAA).

IACRAA for a company is defined as:

$$IACRAA_{c,y} = \left( \frac{CF_{c,y}}{A_{c,y}} \right) - ICFAA_y \quad \text{Equation 11}$$

Where:

$IACRAA_{c,y}$  = Industry-adjusted abnormal cash-flow return for company c for financial year y

$CF_{c,y}$  = the cash-flow return for company c for financial year y

$A_{c,y}$  = The assets of company c for financial year y

$ICFAA_y$  = the average industry cash-flow return on all assets for financial year y, where the industry definition follows the lowest level JSE sector definition as used by Smit (2005)

In a similar fashion to the calculation of ACAAR defined in section 4.2.2, equation 10, the average IACRAA was calculated for each of the event window parts, defined using a series of financial years as in section 4.1, by summing the sample IACRAA's for each of the event window parts defined and dividing by the number of financial years in the event window.

#### 4.4 Intrinsic Value Research Design

Following the accounting study methods of Ma et al. (2011), Lee et al. (1999) as well as Guest et al. (2010), a residual income valuation or raw intrinsic value,  $V_{j,t}$  was calculated for each firm j at the end of each month t, for the events windows, using months as defined in section 4.1.

In order to apply equation 4 practically, the researcher followed Ma et al. (2011) and Lee et al. (1999), calculating intrinsic value using a three year forecast horizon for each firm in the sample set according to equation 12 below.

$$V_{j,t} = B_{j,t} + \frac{[fROE_{j,t+1} - (R_e)] \cdot B_{j,t}}{(1+R_e)^1} + \frac{[fROE_{j,t+2} - (R_e)] \cdot B_{j,t+1}}{(1+R_e)^2} + \frac{[fROE_{j,t+3} - (R_e)] \cdot B_{j,t+2}}{R_e \cdot (1+R_e)^2} \quad \text{Equation 12}$$

Where:

- $V_{j,t}$  = the intrinsic value per issued share of firm j at period t
- $B_{j,t}$  = Firm j book-value of equity per issued share from the most recent financial statements for the firm at period t. Book-value of equity is calculated from the balance sheet as ordinary share equity minus preference shares minus intangible assets
- $B_{j,t+i}$  =  $B_{j,t+i-1} + fEPS_{j,t+i} - fDPS_{j,t+i}$ , where  $B_{j,t+i}$  is the forecasted book-value of equity for the firm in the next time horizon, period t+i, and where  $fDPS_{j,t+i}$  is the forecasted dividend per share for firm j in period t+i, estimated using the current dividend payout ratio (k). Specifically,  $fDPS_{j,t+i} = fEPS_{j,t+i} \cdot (k)$ .
- $fROE_{j,t+i}$  = the forecasted ROE for firm j in period t+i, fROE, is calculated as forecasted earnings per share (EPS) in period t+i, divided by the book-value of equity for the period t+i-1. ( $fROE = fEPS_{t+i} / B_{t+i-1}$ )
- $R_e$  = the cost of individual firm equity, calculated using the standard CAPM equation.  $R_e = R_f + \text{Beta} \cdot \text{MRP}$ .  $R_f$  is the market risk-free rate, Beta is the specific firm risk Beta and MRP the market risk premium

The intrinsic value  $V_{j,t}$  was then scaled, using the book-value per issued share,  $B_{j,t}$ , of the firm  $j$  at month  $t$ , to ensure comparability across firms and time.  $(\frac{V}{B})_{j,t}$  represented the scaled raw intrinsic value (IV).

In a similar fashion to the calculation of ACAAR in section 4.2.2, equation 10, the firm IV was calculated for each month and then averaged across the months per defined event window, as described in section 4.1, in order to produce an average IV (AIV) per firm, per event window.

#### **4.5 Method of Data Analysis**

For each hypothesis, a two-tailed paired sample T-test, at the 5% level of significance, was used to test for statistically significant difference of means between the pre-acquisition and post-acquisition event windows. Statistical analysis was completed using IBM's SPSS software package.

#### **4.6 Unit of Analysis**

The unit of analysis was the merger or acquisition of a target company by an acquiring company. The event date of the merger and acquisition was defined as the announcement date, rather than the effective date, due to the expected movements in share price from date of announcement.

#### **4.7 Population of Data**

The study population was defined as all mergers and acquisitions that had occurred between 2000 and 2009. Event windows were defined as per section 4.1.

#### **4.8 Sampling Method and Sample Size**

The population was defined as all mergers and acquisitions that had occurred between 2000 and 2009, as listed in the Ernst and Young mergers and acquisition activity reports, totalling 6050 transactions. The sampling method was however purposive, restricted and judgemental including only acquisitions by acquiring companies listed on the South African JSE, which acquired a listed or private target company between the year 2000 and 2009. Acquisitions were defined as an acquisition where the value exceeded 5% of the acquirer's market capitalisation at the time of the transaction announcement. Initial acquisition size filters only included acquisitions in excess of 20% of the acquirers' market capital, due to research data requirements. The JSE listings requirements classify large acquisitions as acquisitions in excess of 20% of the acquirers' market capital, referred to as category 1 and 2 type transactions.

The decision to initially only include large, JSE listed, mergers and acquisitions in the population sample was related to the following:

- a) The requirement for pre-acquisition operating cash-flow information for all acquirer and target firms, between 2000 and 2009, could not be met using only publicly accessible resources, within the time period allotted to this task.
- b) The South African JSE Listing Requirements require Category 1 and 2 acquiring firms to publish a circular with both the target and acquirer financial information in addition to other details prior to the actual merger and acquisition. This meant that the researcher was able to acquire the

necessary data in order to study the pre and post-acquisition operating cash-flow performance of the target and acquiring firms, provided they were categorised as type 1 and 2 transactions.

However, the restriction of the sample to include only acquisitions in excess of 20% of the acquirer firms' market capitalisation at the time of announcement aggressively reduced the sample size. In the interest of procuring a larger sample set for this research, the sample selection requirements were relaxed in order to include acquisitions where the value exceeded 5% of the acquirer's market capitalisation at the time of the transaction announcement.

All sample observations were identified from the Ernst and Young Mergers and Acquisition activity review reports, with editions dated 2000-2009, as this source contained all JSE listed acquiring company mergers and acquisitions that had occurred in the defined timeframe on the JSE. The data was received in an electronic format. Similar to Smit and Ward (2007) and Ma et al. (2011), the final judgemental sample of 29 firms was compiled through application of the following observation characteristics as strict selection criteria:

For the ACAAR study, the following selection criteria applied:

- a. Transaction description = acquisition/merger of related business, hostile takeover, tender offer for shares, unconditional offer for shares, conditional offer for shares, public tender for shares.

- b. The acquiring company was listed on the JSE for a minimum of one year pre-acquisition and minimum one year post-acquisition, to ensure financial data was available.
- c. The acquirer code or firm was neither unlisted nor undisclosed.
- d. The target code or firm was not undisclosed.
- e. The transaction value was above 5% of the acquiring firms' market capitalisation at the end of the previous year end.
- f. No unrelated confounding events occurred within a minimum of one year pre-acquisition and minimum of one year post-acquisition.
- g. The acquirer was a constituent of the JSE all share index (ALSI) within the period between 2000 and 2009.
- h. The acquiring firm market capital was available for the year end prior to the announcement date.
- i. The acquiring firm share code or JSE ticker, shares in issue and daily closing share price could be located and verified within the defined pre and post event windows.

For the IACRAA study, the criteria as per ACAAR study listed above applied, and in addition

- a. Target company pre-acquisition financial cash-flow and balance sheet data was available on the acquiring firms' circular to shareholders.

For the AIV study, all the ACAAR criteria applied, and in addition:

- a. Acquiring firm pre-acquisition and post acquisition financial income statement, balance sheet data, three year rolling average beta and analyst earnings per share forecast was available.

#### **4.9 Data Collection and Analysis**

As seen from section 4.8, in order to perform the required testing of hypotheses one to three, additional information, not contained in the Ernst and Young (E&Y) database, was required. The sample selection and final calculation of IACRAA, ACAAR and AIV required data in an electronic format from the E&Y database, JSE Bulletin, Sharenet, INET-Bridge and the BFA McGregor financial and library database. In addition, access to the prebuilt Ward and Muller (2010) control portfolio model and event analyser was required in order to avoid the manual and time consuming calculation of firm abnormal returns.

Once the selection criteria listed in section 4.7 was applied to the 2000-2009 Ernst and Young M&A database a final sample of 29 firms remained. The data collection process was then broken into three separate work-streams, each dealing with one of the three performance measures, namely share price return, operating financial return and intrinsic value performance.

##### **4.9.1 Share Price Performance**

The sample firm announcement dates, along with each firm's minimum and maximum pre- and post-acquisition event window periods were positioned on a common time-scale axis using an Excel worksheet. The announcement dates

were set as day 0. Event windows were demarcated on the data sets, as defined in section 4.1.

The list of firm share codes, with individual announcement dates as well as the maximum non-confounding pre and post announcement window start and end dates, were fed into the Ward and Muller (2010) control portfolio model and event analyser to obtain daily abnormal returns per sample firm.

Using the abnormal returns (AR) exported to Excel, the calculation of daily average abnormal returns (AAR) and daily cumulative average abnormal return (CAAR) could be completed in Excel. Finally, through averaging each defined event window part e.g. [-1] and [+1], representing -252 days prior and 252 days post the announcement date respectively, the average CAAR or ACAAR was calculated. Similarly, these calculations were completed for event windows [-1,+1], [-2,+2] and [-3,+3].

In the event of firm abnormal return data not being available for the whole defined event window, the effected firm would be removed from the sample. In the case where confounding events shortened a specific firm pre and post event window period to below the minimum defined window period, such a firm would be removed from that specific event window sample.

During the calculation of daily sample CAAR it was noted that certain individual firm AR contributed to a disproportionate increase in sample CAAR. A series of

individual firm spaghetti charts were constructed by indexing the firm AR from 100 from date of announcement in either direction. Outlying sample firms were identified as small market capitalisation firms that experienced thin share trading during the certain time periods under investigation. Thin trading activity distorted daily return calculations and as such were treated by removing outlying daily positive and negative AR in excess of 10%, in order to minimise the distorted impact of thin trading.

Final completed AAR and CAAR event window data sets were exported to SPSS for statistical analysis, whilst all graphical charting work was completed in Excel.

#### **4.9.2 Operating Financial Performance**

The qualifying acquiring sample firms, along with each firm's announcement date, minimum and maximum pre- and post-acquisition event window periods were positioned on a common time-scale axis using an Excel worksheet. The announcement date was set in year 0. Event windows were demarcated on the data sets, as defined in section 4.1.

The pre and post acquisition operating financial performance of the acquiring firm, the target firm and of the enlarged post-acquisition firm (combined acquiring firm and target firm) was obtained from the McGregor BFA financial and library database.

It was known that to measure industry-adjusted cash-flow return on all assets required the calculation of cash-flow, previously defined in section 2.3.2. In practice although the McGregor BFA financial statements are standardised into a common format, the acquiring firm published circulars containing target firm financial statements were not. Given the inability to directly combine acquirer and target firm financial statement information and the assumptions required in applying equation 2, as per section 2.3.2, the calculation of cash-flow was substituted with a direct reading of the *operating cash-flow ex operations* number obtained from both acquiring and target firm financial statements.

Pre and post acquisition acquiring firm cash-flow statements and balance sheets were obtained directly from McGregor BFA's financial database, whilst acquiring firm shareholder circulars with target firm financial information was drawn from the McGregor BFA news library. Only a small sub-sample of firms met the data requirements for cash-flow return calculations due to pre-acquisition shareholder circulars only being required for large acquisitions in terms of the Listings Requirements of the JSE, as discussed in section 4.7. Pre and post acquisition operating cash-flow numbers as well as *total assets* were then used to calculate individual firm cash-flow return on all assets for each defined event window financial year, as defined in section 4.1.

In order to calculate the industry-adjusted cash-flow return on all assets (IACRAA), McGregor BFA was used to extract consolidated industry financial statements. Following Smit (2005), the researcher defined each sample firm's

industry as the lowest level JSE sector in which the sample firm resides. All the sub-sector firms' income, cash-flow and balance sheets, including the sample firms', were consolidated through the McGregor BFA financial statement query manager. The consolidated financial statements were used to calculate the industry cash-flow return. Individual industry-adjusted cash-flow return on all assets was calculated by subtracting the industry return from the individual firm return as defined in section 4.3.

#### **4.9.3 Intrinsic Value Performance**

The qualifying acquiring sample firms, along with each firm's announcement date, minimum and maximum pre- and post-acquisition event window periods were positioned on a common time-scale axis using an Excel worksheet. The announcement date was set in month 0. Event windows were demarcated on the data sets, as defined in section 4.1.

Each firms' historic book-value of equity was computed from McGregor BFA extracted full-year balance sheet statement information, for each month within the event windows defined. In the case where the firm's acquisition date was prior to the publication of the firm's year-end financial results, the previous years' results were used to calculate a book-value for the months running up to the next financial year-end.

Forecasted book-values or book-values for the next time horizon period were calculated using a combination of historic book-values, forecasted earnings per share and dividends per share, as defined in equation 12. For each defined

month in the chosen event windows, forecasted earnings per share for one, two and three year time horizons into the future were retrieved from Sharenet analyst forecasts. All book-values were normalised to book-value per share by dividing the book-value by the number of shares in issue for each month in the event window. INET-bridge was used to request the number of shares in issue for each month defined in the event window.

Forecasted dividend per share (DPS) was calculated using the forecasted EPS and a calculated dividend payout ratio, as defined in equation 12. Payout ratios were calculated from sample firm income statements as the ratio between *dividends paid* and *net income*. In line with Lee et al. (1999), where dividend payout ratio's exceeded 1, the payout ratio was capped at 100%, whilst for firms with negative earnings; the payout ratio was calculated by dividing the dividends paid by 6% of the sample firm's balance sheet *total assets* value.

The cost of individual firm equity was calculated using the standard CAPM equation. The risk free rate was taken as a 10 year, 2000-2010, average of the South African 10 year, and beyond, bond yield rate. In order to calculate this average, South African Reserve bank bond yield data was downloaded using the Reserve bank's online data query system. The chosen proxy for the risk free rate was the KBP2003J indicator, described as the yield on loan stock traded on the stock exchange for government bonds 10 years and over. This bond yield average equaled 9% with a maximum yield of 13% in 2000 and a low of 8% in 2005. The calculation of the cost of equity in this research utilized the 10 year average of 9% to approximate the risk free rate  $R_f$ . The market risk premium was

estimated at 6%. Individual firm risk three-year Beta's were procured from Sharenet.

Sample firm closing share price data was downloaded from INET-bridge and used together with the calculated intrinsic value per share and book-value per share to calculate the scaled intrinsic value V/B, as well as the alternative valuation indicators of price-to-book (P/B) and price-to-value (P/V).

#### **4.10 Research Limitations**

Due to the use of a judgemental sampling method, as opposed to probabilistic random sampling, this study was not statistically representative of the total population and could therefore not be used to infer the nature of long-run post-acquisition performance for all acquiring firms. The study was restricted to a selection of acquisitions on the JSE, with a performance evaluation period of 2000-2009. Similar to other long-run post-acquisition performance studies, this study only used a few performance metrics and evaluation techniques, resulting in a research outcome and conclusion that was limited by the power of the statistical techniques and metric definitions utilised.

In addition, this research only considered the acquiring firms listed in the Ernst and Young database and hence are subject to the completeness and accuracy of data in this database. This research did not investigate other characteristics of the acquiring or target firm and ignored the differences between acquisitions aimed at horizontal diversification and vertical integration. This research did not distinguish between acquiring firm industry differences, since acquisitions in certain sectors may be value-creating, whilst in other sectors be value-

destroying. All the performance measures were tested on very small sample sizes, restricting the representativeness of the statistical tests. Performance measures such as intrinsic value utilised analyst forecasts that may be biased or include large degrees of forecast error. The use of book-value of equity may be subject to accounting policy changes and limitations. Finally, the lack of an industry-adjusted control group for the measurement of average intrinsic value changes forced the use of a time-series research design, where sample observations would act as their own control, comparing pre and post event changes directly. An obvious limitation of this research method is the inability to isolate the source of the observed changes in intrinsic value and exclude broad market effects.

## **5. CHAPTER 5 – DATA ANALYSES**

### **5.1 Description of Sample**

The population consisted of all mergers and acquisitions listed in the Ernst & Young database for the nine-year period from 2000 to 2009, totalling 6050. The final sample of 29 firms was chosen after the application of strict selection criteria as stated in Chapter 4, section 4.8. The selection criteria used was generally aimed at excluding all transactions that (1) did not have sufficient information available and (2) had confounding events within the defined event window periods both prior and after the announcement date of the merger or acquisition. Appendix Table 9-1 contains detailed information on the selected sample. Table 5-1 provides a descriptive summary of the total sample. Based on the data requirements of each investigation, only test cases, from the list of 29 sample firms, with the relevant data available, were used as part of individual test samples.

### **5.2 Share Price Performance**

The investigation and hypothesis testing of sample average abnormal returns (AAR) was not the focus of this study. However, in the interest of gaining further insights into the behaviour of cumulative average abnormal returns (CAAR), a series of sample AAR tests were completed. Significant daily AAR one sample t-test results are shown in Table 5-2, 5-3 and 5-4, whilst the corresponding daily AAR t-value plots may be viewed in Figures 5-1, 5-2 and 5-3. Individual daily AAR t-test results for each part of the defined event window periods as well as the paired sample t-test results indicating mean sample AAR difference, between paired pre and post period event windows, defined in all cases as post-period

minus pre-period, may be located in Table 5-5 and 5-6 respectively. Cumulating the daily sample AAR's over three defined events windows resulted in daily cumulative average abnormal returns (CAAR). Figures 5-4, 5-5 and 5-6 graphically illustrate daily CAAR for the defined event windows. Table 5-7 indicates average CAAR (ACAAR) t-test results for each part of the defined event window periods. Paired sample t-test results indicating ACAAR difference, between paired pre and post period event windows, defined as post-period minus pre-period in all cases, may be located in Table 5-8.

**Table 5-1: Summary of sample descriptive and frequency statistics**

<b>Statistic</b>	<b>Value</b>
<b>Population size (#)</b>	<b>6050</b>
<b>Population start date</b>	<b>2000</b>
<b>Population end date</b>	<b>2009</b>
<b>Sample size (#)</b>	<b>29</b>
<b>Sample acquisition occurrence frequency (#)</b>	<b>29</b>
2002	1
2003	2
2004	5
2005	6
2006	3
2007	5
2008	2
2009	5
<b>Sample acquirer frequency of cross border transactions (#)</b>	<b>29</b>
Cross border	5
Local	24
<b>Sample acquirer frequency of increased focus or diversification (#)</b>	<b>29</b>
Increased Focus	26
Diversification	3
<b>Sample acquirer JSE sector frequency (#)</b>	<b>29</b>
Basic Materials	9
Consumer Services	3
Financials	9
Industrials	1
Industrials	5
Oil & Gas	1
Technology	1
<b>Acquisition purchase consideration (R'm)</b>	
Largest	38,000
Smallest	29
Mean	2,963
Range	37,971
Standard Deviation	7,246
<b>Relative size of acquisition as % of acquirer market capitalisation</b>	
Largest	225.6%
Smallest	5.6%
Mean	28.8%
Range	220.0%
Standard Deviation	45.6%

### 5.2.1 Average Abnormal Return (AAR)

For each Table 5-2, 5-3 and 5-4, panel A, indicates significant daily AAR's for the event windows [-1,+1], [-2,+2] and [-3,+3] respectively. The event window [-1,+1] represents one year ,or 252 trading days, pre and post the announcement date, denoted day 0. Similarly, [-2,+2] and [-3,+3] represent 504 and 756 trading days pre and post the announcement date. In all cases panel B of each table summarises the number of positive and negative AAR days for each part of the defined event window. Due to space constraints, Table 5-2 summarises only the significant days, AAR, t-stat and level of significance denoted as the p-value. Furthermore Table 5-3 and 5-4 only list the top 10 most significant AAR days, as per the largest t-stat value. For Table 5-2, 5-3 and 5-4, all t-tests were one sample, two tailed, t-tests with a null hypothesis value equal to zero, a 95% confidence interval and at a 5% level of significance.

Figures 5-2, 5-3 and 5-4 present AAR t-value plots for each of the defined event windows. A day with an AAR t-value that breaches the indicated critical t-value level was considered significant at the 5% level. Critical t-values were calculated for each of the defined event windows using Microsoft Excel's TINV function. A critical t-value was defined as the t-value that has a probability equal to or less than 5% total in both tails of a t-distribution with n-1 degrees of freedom, where n is the sample size (Albright, Winston & Zappe, 2009).

Table 5-5 represents individual AAR t-test results for event window parts [-1], [+1], [+2] and [+3], where the [-1] represents one year ,or 252 trading days, prior

the announcement date, denoted by day 0. The remaining event window parts follow logically. Event window parts with AAR p-values smaller than 5% indicate AAR with a significant difference from the null hypothesis value of zero. Table 5-6 indicates the results of paired sample, two tailed, t-tests indicating mean AAR difference between paired pre and post period event windows. For the paired t-test, mean AAR difference was calculated as post-period minus pre-period, with a 95% confidence interval and a 5% level of significance.

**Table 5-2: Significant daily average abnormal return (AAR) for event window (-1, 1)**

<b>Panel A: Significant AAR Days Summary</b>			
<b>Sample Size :</b>		<b>26</b>	
<b>Day</b>	<b>AAR</b>	<b>t-stat</b>	<b>p-value</b>
-245	1.25%	2.491	.020
-222	-1.43%	-3.226	.003
-205	-.70%	-2.260	.033
-203	.71%	2.255	.033
-176	.83%	2.105	.046
-160	-.76%	-2.033	.053
-126	-1.02%	-2.437	.022
-75	.76%	2.295	.030
-69	-.84%	-2.153	.042
-67	.86%	2.230	.035
-63	-1.04%	-2.416	.023
-54	.74%	2.095	.046
-42	-1.11%	-2.422	.023
0	1.11%	2.166	.040
9	1.28%	2.251	.033
10	-.68%	-2.031	.053
27	-1.66%	-3.686	.001
49	-.88%	-2.059	.050
51	1.02%	2.143	.042
85	1.11%	2.507	.019
117	-.85%	-2.097	.046
129	1.09%	2.749	.011
143	-.73%	-2.348	.027
153	-.64%	-2.218	.036
167	-.83%	-2.452	.022
184	-.64%	-2.033	.053
212	-1.05%	-2.070	.049
246	.82%	2.537	.018
<b>Panel B: Number of days positive &amp; negative AAR</b>			
<b>Event Window</b>	<b>Days Positive</b>	<b>Days Negative</b>	<b>Total Days</b>
<b>[-1]</b>	<b>123</b>	<b>129</b>	<b>252</b>
<b>[+1]</b>	<b>119</b>	<b>133</b>	<b>252</b>

**Note: One Sample T-Test – Hypothesis Value = 0, all listed AAR values statistically significant at the 5% level**

**Table 5-3: Top 10 Significant daily average abnormal return (AAR) for event window (-2, 2)**

<b>Panel A1: Top 10 Significant Positive AAR Days Summary</b>			
<b>Sample Size :</b>	<b>14</b>		
<b>Day</b>	<b>AAR</b>	<b>t-stat</b>	<b>p-value</b>
-405	1.52%	2.945	.011
-390	1.45%	2.416	.033
-125	1.62%	3.091	.009
-67	1.40%	2.567	.023
-61	1.68%	2.596	.022
129	1.65%	2.470	.028
176	1.65%	2.506	.026
293	1.19%	2.869	.013
431	1.32%	2.690	.020
455	1.08%	2.717	.018
<b>Panel A2: Top 10 Significant Negative AAR Days Summary</b>			
<b>Sample Size :</b>	<b>14</b>		
-445	-1.11%	-3.107	.008
-416	-1.72%	-2.771	.016
-186	-1.31%	-2.903	.012
27	-2.28%	-3.053	.009
143	-1.23%	-2.967	.011
218	-1.41%	-3.009	.010
303	-2.08%	-3.905	.002
319	-2.13%	-3.117	.008
364	-1.39%	-3.024	.010
407	-1.61%	-3.357	.006
<b>Panel B: Number of days positive &amp; negative AAR</b>			
<b>Event Window</b>	<b>Days Positive</b>	<b>Days Negative</b>	<b>Total Days</b>
<b>[-2]</b>	<b>241</b>	<b>263</b>	<b>504</b>
<b>[+2]</b>	<b>243</b>	<b>261</b>	<b>504</b>

**Note: One Sample T-Test – Hypothesis Value = 0, all listed AAR values statistically significant at the 5% level**

**Table 5-4: Top 10 Significant daily average abnormal return (AAR) for event window (-3, 3)**

<b>Panel A1: Top 10 Significant Positive AAR Days Summary</b>			
<b>Sample Size :</b>	<b>7</b>		
<b>Day</b>	<b>AAR</b>	<b>t-stat</b>	<b>p-value</b>
-726	2.84%	3.754	0.009
-694	1.21%	4.064	0.007
-382	2.08%	4.252	0.005
-275	2.54%	3.281	0.017
21	1.63%	5.721	0.001
122	1.40%	3.748	0.010
441	1.26%	3.351	0.015
455	1.35%	3.740	0.010
561	1.55%	3.510	0.013
616	0.91%	3.716	0.010
<b>Panel A2: Top 10 Significant Negative AAR Days Summary</b>			
<b>Sample Size :</b>	<b>7</b>		
-573	-1.77%	-5.418	0.003
-464	-1.12%	-3.656	0.011
-398	-0.88%	-3.357	0.015
-28	-1.06%	-5.383	0.002
-20	-1.01%	-3.516	0.013
117	-1.72%	-3.825	0.009
244	-1.68%	-5.073	0.002
365	-2.17%	-3.537	0.012
473	-1.39%	-3.458	0.013
589	-1.66%	-5.099	0.002
612	-0.70%	-4.077	0.010
<b>Panel B: Number of days positive &amp; negative AAR</b>			
<b>Event Window</b>	<b>Days Positive</b>	<b>Days Negative</b>	<b>Total Days</b>
<b>[-3]</b>	<b>389</b>	<b>367</b>	<b>756</b>
<b>[+3]</b>	<b>386</b>	<b>370</b>	<b>756</b>

**Note: One Sample T-Test – Hypothesis Value = 0, all listed AAR values statistically significant at the 5% level**

**Table 5-5: Average abnormal return (AAR)**

Event Window	Sample Size	AAR	t-stat	p-value
[-3]	7	0.0316%	1.015	.310
[-2]	14	0.0144%	.493	.622
[-1]	26	0.0048%	.170	.865
[+1]	26	-0.0029%	-.102	.918
[+2]	14	-0.0296%	-1.051	.294
[+3]	7	0.0325%	1.156	.248

**Note: One Sample T-Test – Hypothesis: 0, at 5% level of significance.**

**Table 5-6: Average abnormal return (AAR) difference**

Event Window	Sample Size	AAR Diff	t-stat	p-value
[-1,1]	26	-.0077%	.202	.840
[-2,2]	14	-.0441%	1.105	.270
[-3,3]	7	.0009%	-.022	.983

**Note: Paired Two Sample T-Test – Hypothesis: Post – Pre, at 5% level of significance.**

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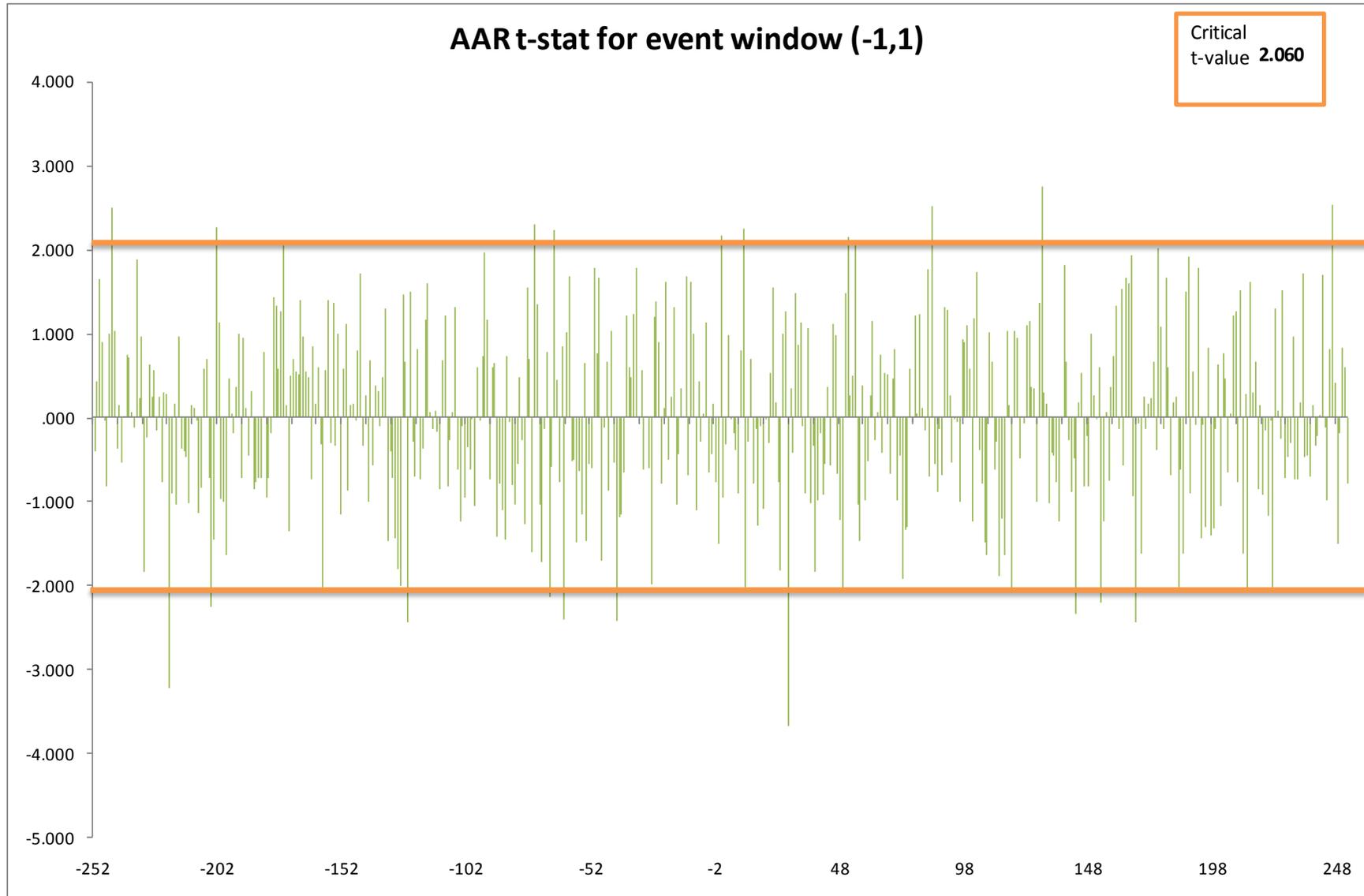


Figure 5-1: Daily average abnormal return (AAR) one sample t-stat values, n = 26, event window (-1,1)

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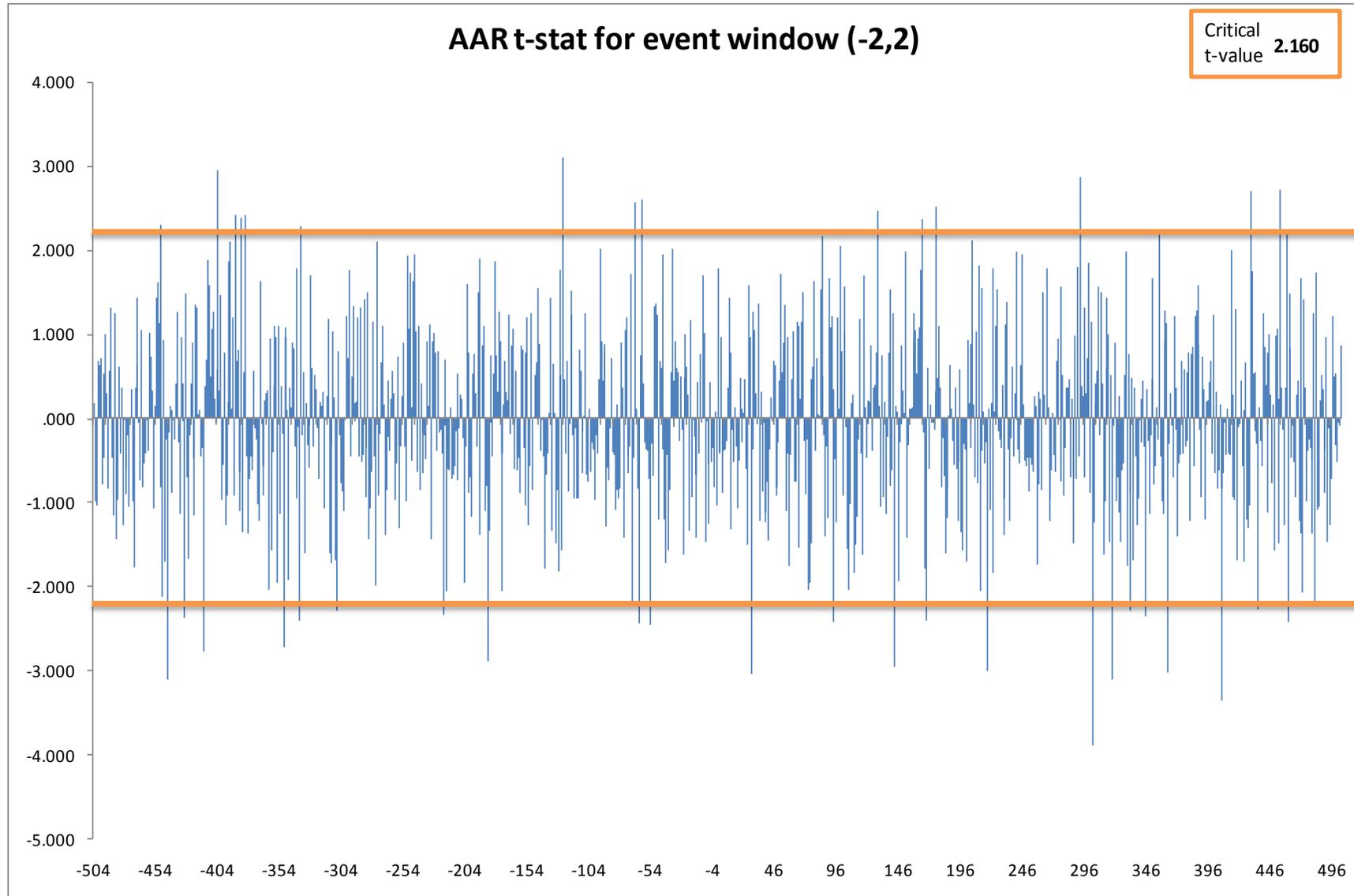


Figure 5-2: Daily average abnormal return (AAR) one sample t-stat values,  $n = 14$ , event window (-2,2)

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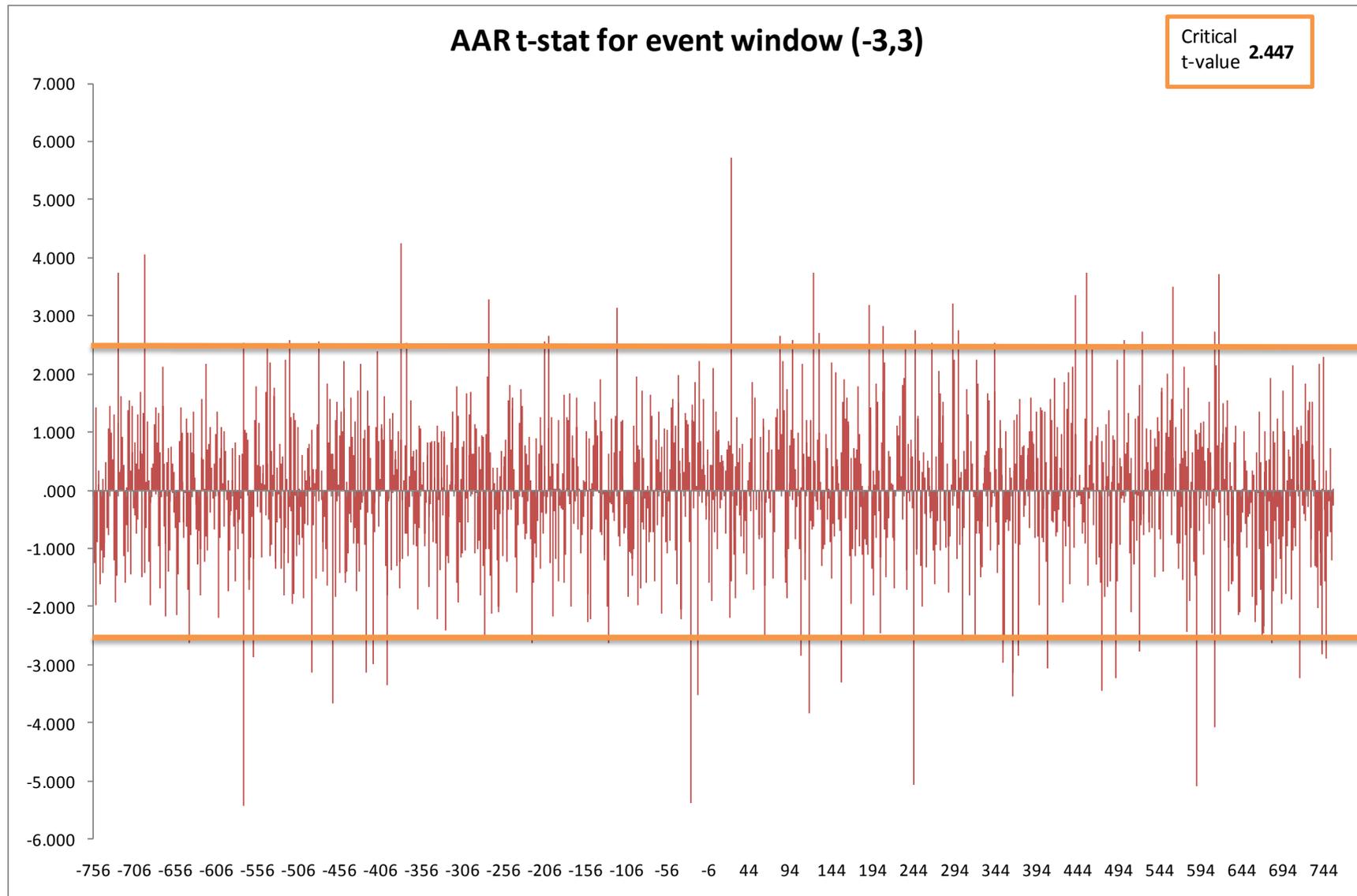


Figure 5-3: Daily average abnormal return (AAR) one sample t-stat values, n = 7, event window (-3,3)

### 5.2.2 Average Cumulative Average Abnormal Return (ACAAR)

Once the daily sample average abnormal returns (AAR) were cumulated into cumulative average abnormal returns (CAAR), the average CAAR (ACAAR) for each part of the defined event window was calculated. Table 5-7 represents ACAAR t-test results for individual event window parts [-1], [+1], [+2] and [+3], where the [-1] represents one year, or 252 trading days, pre the announcement date, denoted by day 0. The remaining event window parts follow logically. Event window parts with ACAAR p-values smaller than 5% indicate ACAAR with significant difference from the null hypothesis value of zero. Table 5-6 indicates the results of paired sample t-tests indicating ACAAR difference, between paired pre and post period event windows, defined as post-period minus pre-period in all cases. Figures 5-4, 5-5 and 5-6 present daily CAAR value plots for each of the defined event windows.

**Table 5-7: Average cumulative average abnormal return (ACAAR)**

Event Window	Sample Size	ACAAR	t-stat	p-value
[-3]	7	13.6%*	50.896	0.00
[-2]	14	0.6%*	3.910	0.00
[-1]	26	-0.9%*	-7.180	0.00
[+1]	26	-1.3%*	-18.395	0.00
[+2]	14	-6.0%*	-26.705	0.00
[+3]	7	22.3%*	50.164	0.00

**Note: One Sample T-Test – Hypothesis Value = 0, at 5% level of significance.**

**\* Indicates statistical significance at the 5% level.**

**Table 5-8: Average cumulative average abnormal return (ACAAR) difference**

Event Window	Sample Size	ACAAR Diff	t-stat	p-value
[-1,1]	26	-0.45%*	-3.274	.001
[-2,2]	14	-6.62%*	-40.071	.000
[-3,3]	7	8.76%*	13.054	.000

**Note: Paired Two Sample T-Test – Hypothesis: Post - Pre, at 5% level of significance.**

**\* Indicates statistical significance at the 5% level.**

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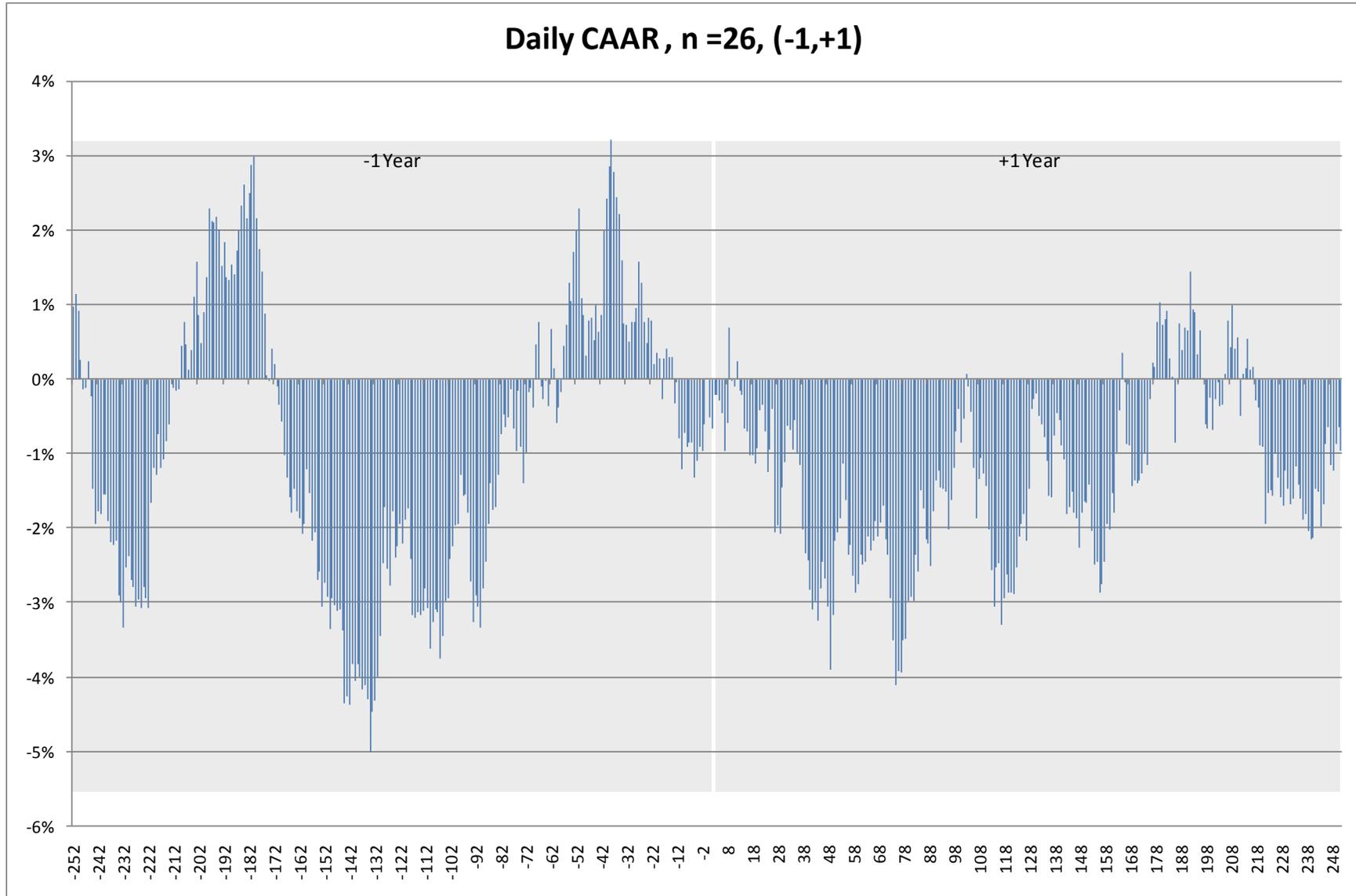
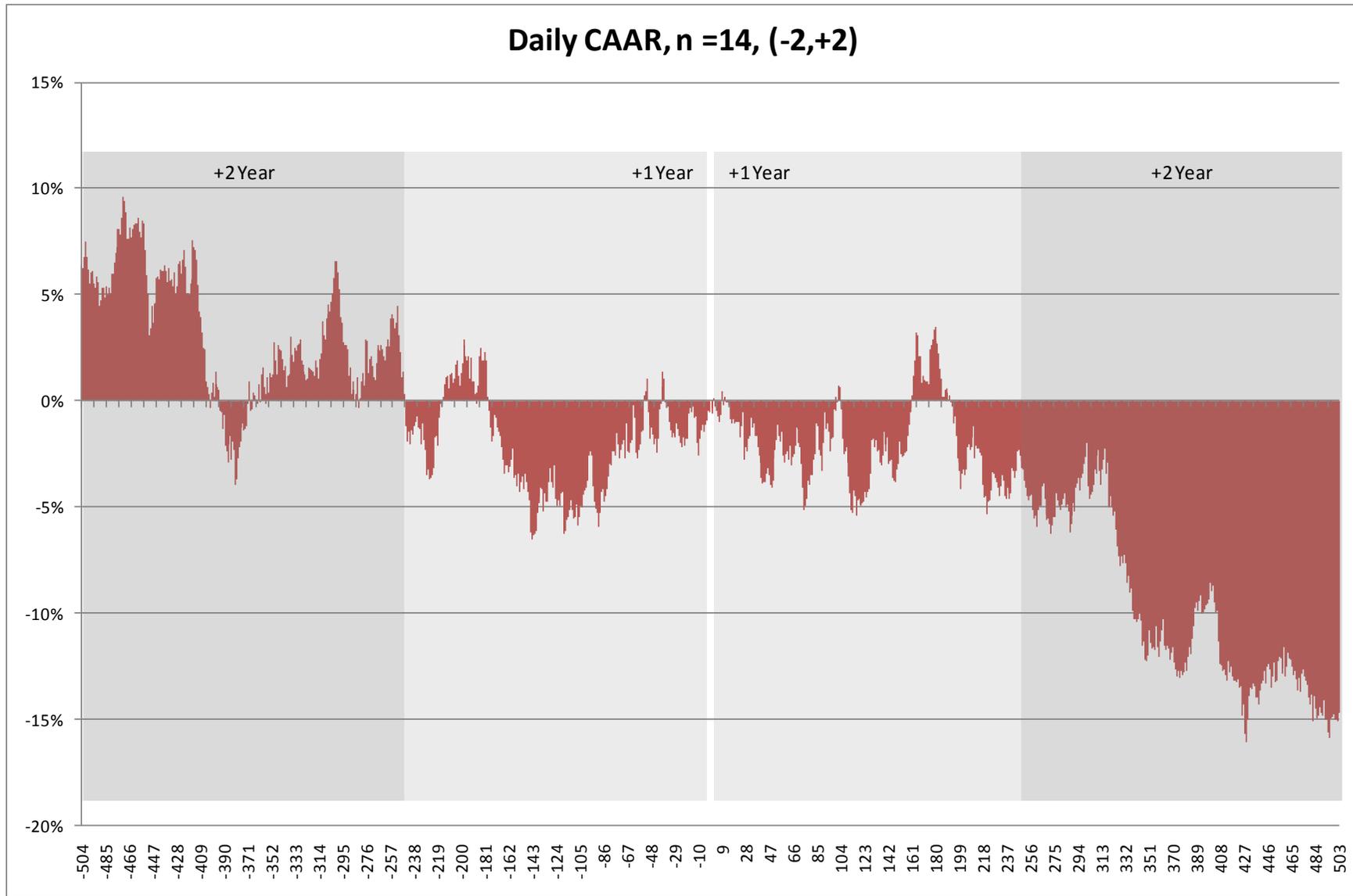


Figure 5-4: Daily cumulative abnormal returns (CAAR), n = 26, event window (-1,1)

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**Figure 5-5: Daily cumulative abnormal returns (CAAR), n =14, event window (-2,2)**

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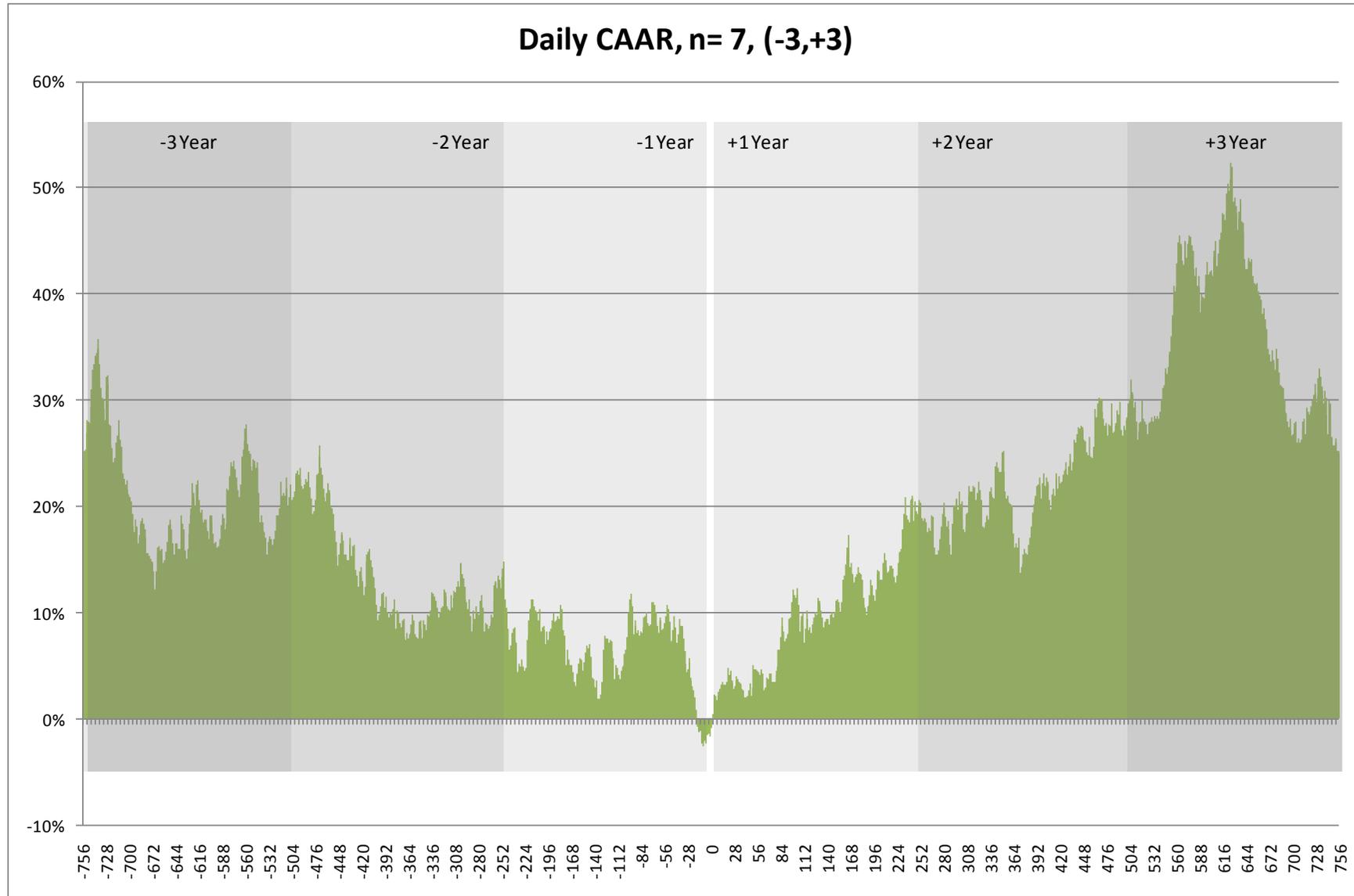


Figure 5-6: Daily cumulative abnormal returns (CAAR), n = 7, event window (-3,3)

### 5.3 Operating Financial Performance

The measurement of operating financial performance consisted of an accounting study using cash-flow return on assets. Three individual calculations were completed in order to determine industry-adjusted cash-flow return on all assets. Table 5-9, panel A, provides each samples cash-flow return on all assets (CRAA) for event window parts [-1], [+1], [+2] and [+3], where the [-1] represents one financial book year pre the announcement date. Logically [+1], [+2] and [+3] respectively denote one, two and three financial book years post the announcement date.

Table 5-9, panel B, indicates the corresponding industry cash-flow return on all assets (ICRAA) for each sample for each event window. Table 5-9, panel C, shows the difference between ICRAA and CRAA, denoted as IACRAA or the industry-adjusted cash-flow return on all assets. IACRAA was calculated as ICRAA minus sample CRAA. Table 5-9, panel C, also presents individual IACRAA t-test results for event window parts [-1], [+1], [+2] and [+3]. Event window parts with IACRAA p-values smaller than 5% indicate IACRAA with significant difference from the null hypothesis value of zero. Table 5-10 indicates the results of paired sample, two tailed, t-tests indicating mean IACRAA difference, between paired pre and post period event windows. Pairs were constructed by pairing the event window part [-1] with [+1], [+2] and [+3] respectively. For the paired t-test, mean IACRAA difference was calculated as post-period minus pre-period, with a 95% confidence interval and a 5% level of significance. Figure 5-7 graphically illustrate the three individual measures

calculated, namely sample cash-flow return on all assets (CRAA), industry cash-flow return on all assets (ICRAA) and industry-adjusted cash-flow return on all assets (IACRAA) for each part of the event window.

**Table 5-9: Sample, industry & industry-adjusted cash-flow return on all assets**

<b>Panel A: Sample Cash-flow Return on All Assets (CRAA)</b>				
<b>Event Window</b>	<b>Sample Size</b>	<b>CRAA</b>		
[-1]	5	21.25%		
[+1]	5	16.89%		
[+2]	4	28.60%		
[+3]	4	9.39%		
<b>Panel B: Industry Cash-flow Return on All Assets (ICRAA)</b>				
<b>Event Window</b>	<b>Sample Size</b>	<b>Industry CRAA</b>		
[-1]	5	30.42%		
[+1]	5	13.35%		
[+2]	4	19.09%		
[+3]	4	15.06%		
<b>Panel C: Industry-adjusted Cash-flow Return on All Assets (IACRAA)</b>				
<b>Event Window</b>	<b>Sample Size</b>	<b>IACRAA</b>	<b>t-stat</b>	<b>p-value</b>
[-1]	5	-9.17%	-.649	.552
[+1]	5	3.54%	1.319	.258
[+2]	4	9.52%	1.398	.257
[+3]	4	-5.68%	-.692	.539

**Note: One Sample T-Test – Hypothesis Value = 0, at 5% level of significance.**

**Table 5-10: Industry-adjusted cash-flow return on all assets (IACRAA) difference**

Event Window	Sample Size	IACRAA Diff	t-stat	p-value
[-1,+1]	5	12.71147%	.815	.461
[-1,+2]	4	21.77109%	1.328	.276
[-1,+3]	4	6.57786%	.275	.801

**Note: Paired Two Sample T-Test – Hypothesis: Post - Pre, at 5% level of significance.**

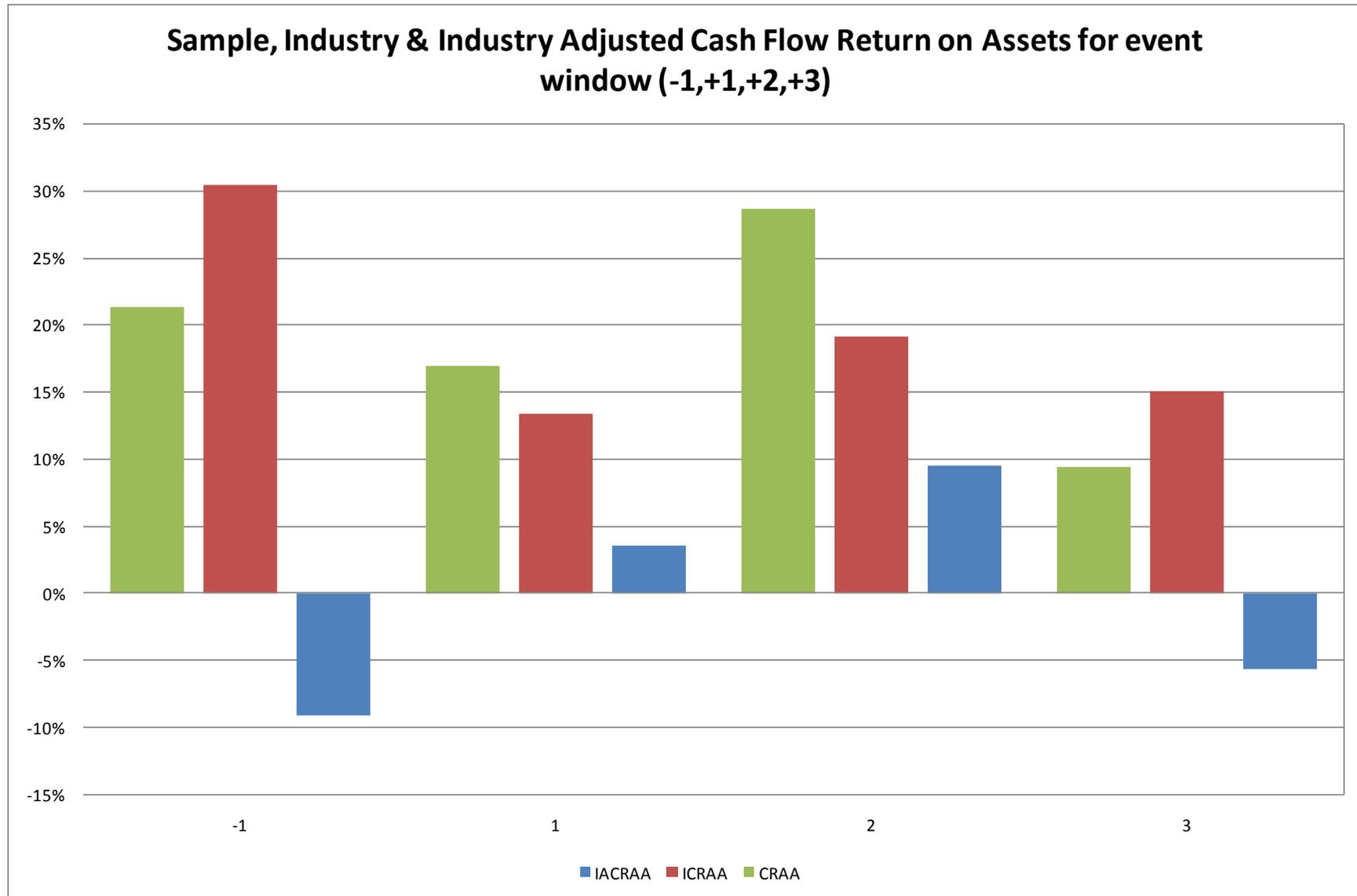


Figure 5-7: Sample, industry & industry-adjusted CRAA , max. n = 5, event window (-1, +1, +2, +3)

#### 5.4 Intrinsic Value Performance

This study evaluated the level of intrinsic value (IV).  $V$  was scaled, for each firm, by its book-value of equity,  $B$ , so that the scaled estimate of intrinsic value  $V/B$  would be comparable across firms, industries and time. The share price,  $P$ , was also compared to the firm intrinsic value by calculating  $P/V$ . The ratio  $P/V$  represents the level of miss-valuation of the firm by comparing the value attributed to the firm by investors and the firm's intrinsic value. Following Ma et al. (2011), price-to-book,  $P/B$ , was calculated as an alternative valuation indicator. In addition, the natural logarithm,  $\ln$ , was used to scale  $V/B$ ,  $P/B$  and  $P/V$  in order to normalise the distribution and minimise the impact of outliers.

Table 5-11 represents individual average IV t-test results for event window parts [-1], [+1], [+2] and [+3], where [-1] represents 12 calendar months pre the announcement date, denoted by month 0. The remaining event window parts follow logically. Event window parts with IV p-values smaller than 5% indicate IV with significant difference from the null hypothesis value of zero. Table 5-11 also contains the mean price-to-book and price-to-intrinsic value calculations for each part of the event window.

Table 5-12 indicates the results of paired sample, two tailed, t-tests indicating average IV difference, between paired pre and post period event windows. Pairs were constructed by pairing the event window part [-1] with [+1], [+2] and [+3] respectively. For the paired t-test, mean IV difference was calculated as post-

period minus pre-period, with a 95% confidence interval and a 5% level of significance.

**Table 5-11: Average intrinsic value (AIV) and valuation levels**

Event Window	Sample Size	Mean IV (lnV/B)	t-stat	p-value	Mean (lnP/B)	Mean (lnP/V)
[-1]	9	.349*	9.235	.000	.745	.396
[+1]	9	.218*	12.072	.000	.756	.538
[+2]	6	.669*	24.550	.000	1.228	.559
[+3]	5	.788*	44.342	.000	1.260	.472

**Note: One Sample T-Test – Hypothesis Value = 0, at 5% level of significance.**

\* Indicates statistical significance at the 5% level.

**Table 5-12: Average intrinsic value (AIV) difference**

Event Window	Sample Size	Mean. IV (lnV/B) Diff	t-stat	p-value
[-1,+1]	9	-0.131*	-2.438	.033
[-1,+2]	6	0.112	1.934	.079
[-1,+3]	5	0.370*	8.104	.000

**Note: Paired Two Sample T-Test – Hypothesis: Post-Pre, at 5% level of significance.**

\* Indicates statistical significance at the 5% level.

Figures 5-8, 5-9 and 5-10 trends monthly sample intrinsic value,  $\ln(V/B)$  versus sample valuation level indicators,  $\ln(P/B)$  and  $\ln(P/V)$ , for each of the defined event windows. Due to the use of the natural logarithm,  $\ln$ , ratio's of  $V/B$ ,  $P/B$  and  $P/V$  larger than one, would result in a value of  $\ln(V/B)$ ,  $\ln(P/B)$  and  $\ln(P/V)$  greater than zero.

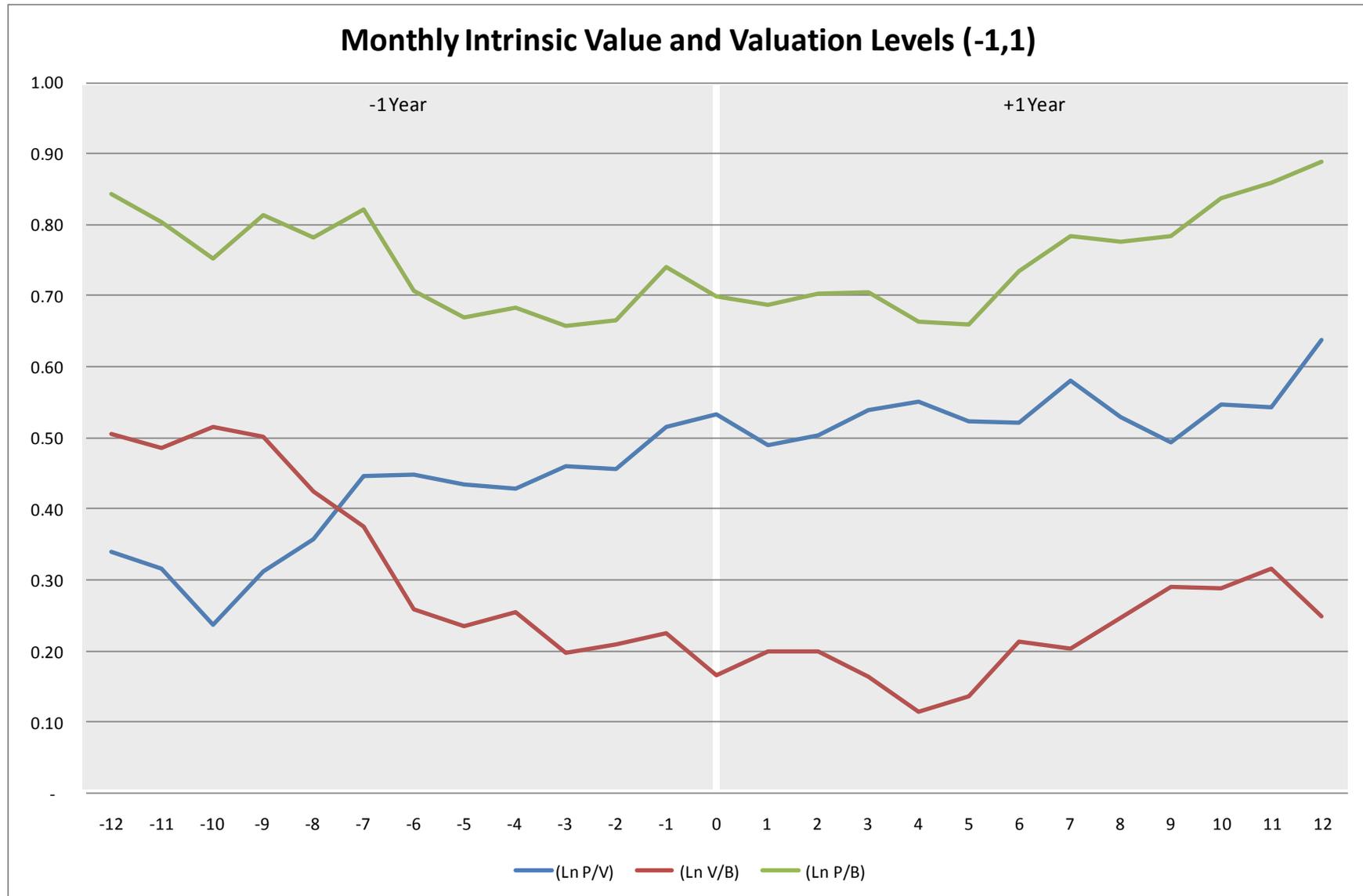


Figure 5-8: Monthly intrinsic value (IV) and valuation levels, n = 9, event window (-1, 1)

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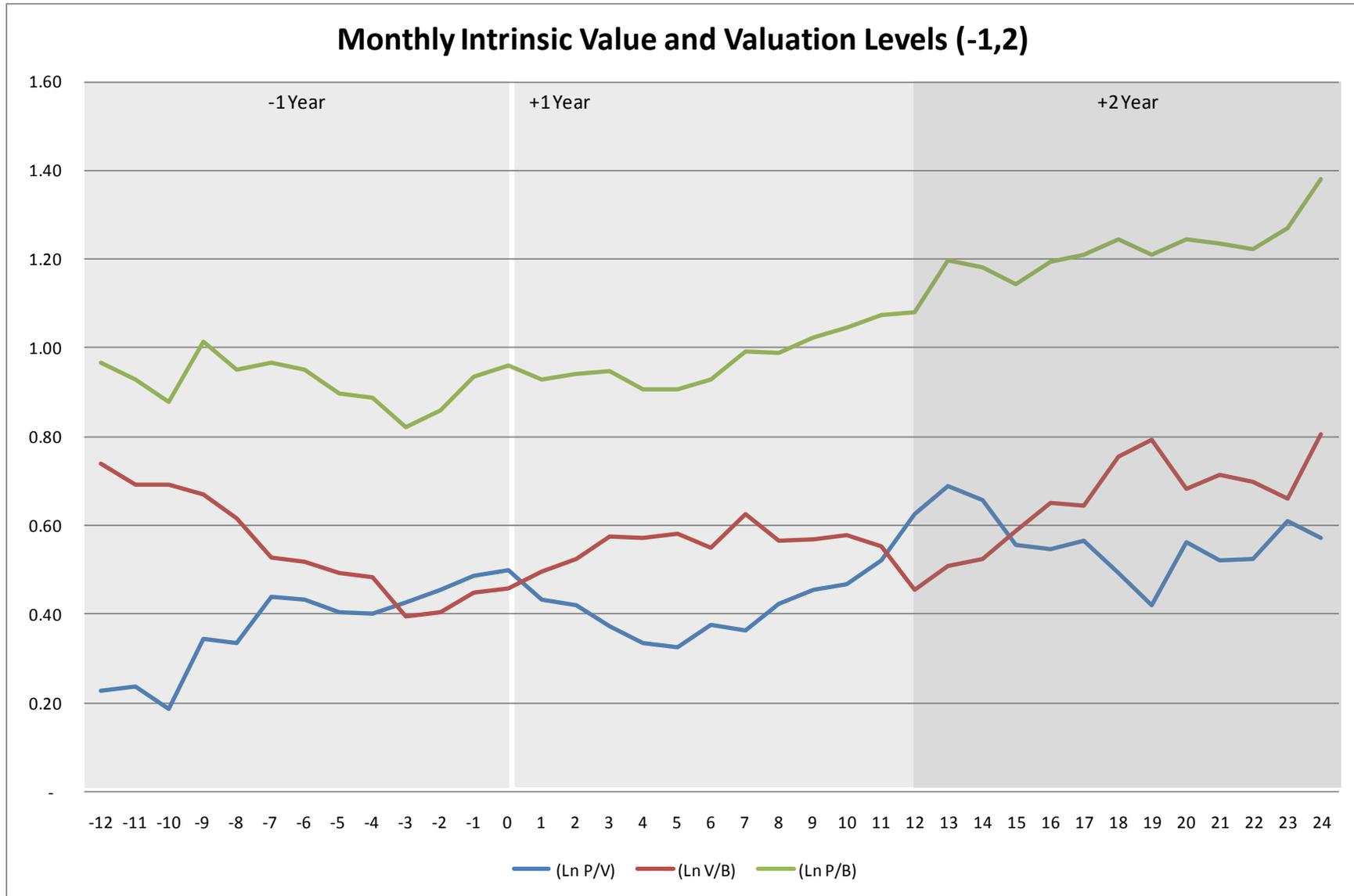


Figure 5-9: Monthly intrinsic value (IV) and valuation levels, n =6, event window (-1, 2)

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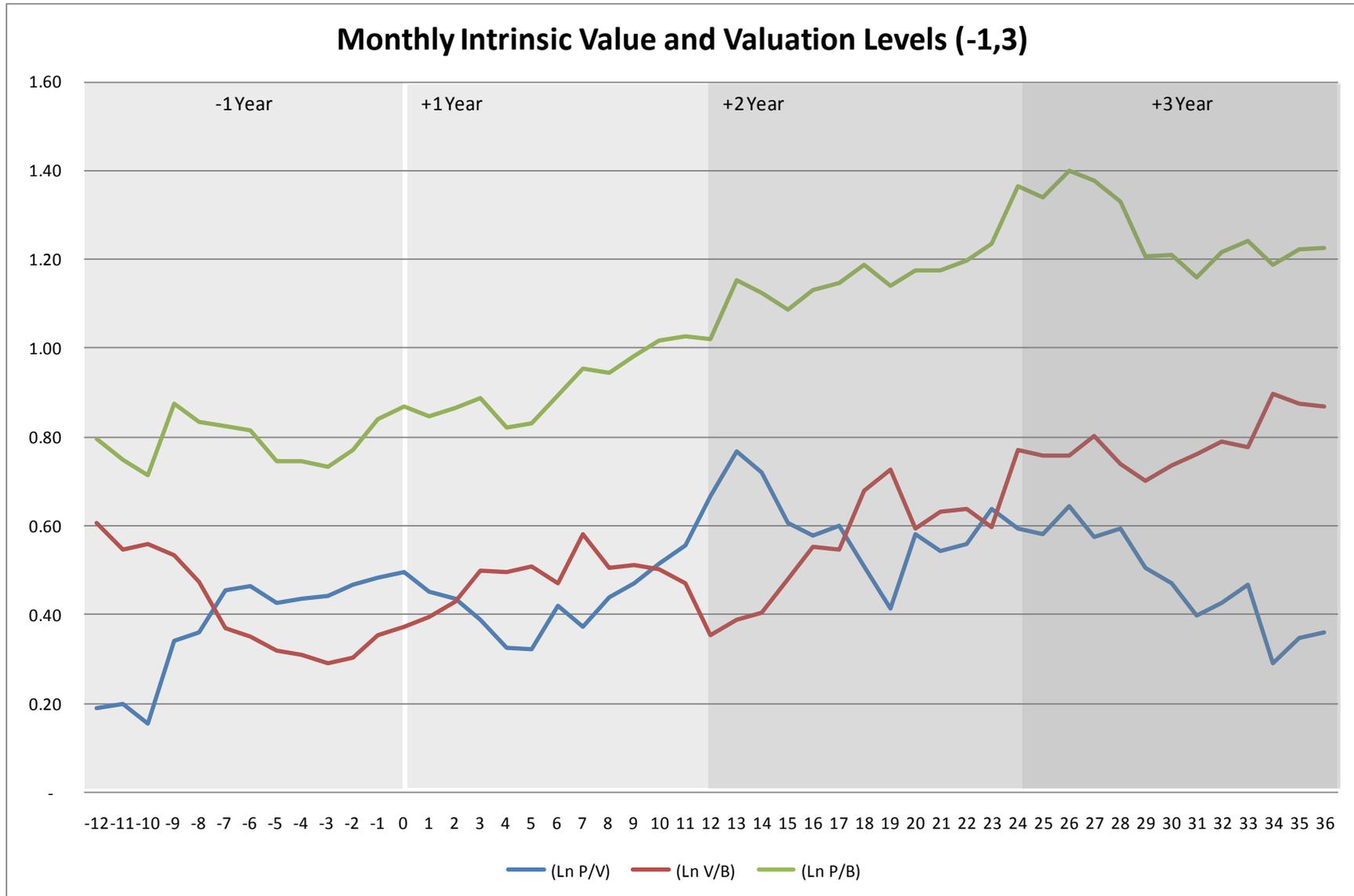


Figure 5-10: Monthly intrinsic value (IV) and valuation levels, n =5, event window (-1, 3)

## **6. CHAPTER 6 - RESULTS**

### **6.1 Share Price Performance**

Chapter 3, section 3.1, defined that for the investigation of long-run post-acquisition share price performance measurement, hypothesis testing would be completed. Hypothesis test 1 was designed to measure the difference between pre-acquisition sample average cumulative average abnormal returns (ACAAR) and post-acquisition period ACAAR.

Resolution of hypothesis test 1 would result in either proving or disproving the ability of mergers and acquisitions to extract or create shareholder value.

However, prior to testing hypothesis 1, average abnormal returns (AAR) were investigated in the interest of supporting ACAAR test results through gaining further insights into the behaviour of abnormal returns in the long-run.

#### **6.1.1 Average Abnormal Return (AAR)**

Table 5-2, 5-3 and 5-4 indicates that a number of statistically significant average abnormal returns (AAR) were observed for the event windows [-1,+1], commencing 252 trading days before the announcement date and ending 252 trading days after, [-2,+2], commencing 504 trading days before the announcement date and ending 504 trading days after and [-3,+3], commencing 756 trading days before the announcement date and ending 756 trading days after.

### 6.1.1.1 Daily AAR for Event Window [-1,+1]

Table 5-2 summarised the individual daily AAR studies, for a 26 firm sample, with event window [-1,+1]. The studies revealed statistically significant AAR both prior and post the announcement date. 13 Days of significant AAR was detected in the long-run period spanning 252 trading days prior to the announcement date. None of the significant AAR days were detected in the period closer than day 42 to the announcement date. The announcement date, day 0, returned a positive significant AAR of 1.11%. The announcement day was followed by a series on insignificant AAR days, up to and including day 8. Day 9, post the announcement day, recorded the first significant AAR post the announcement date. In total 14 days of significant AAR were detected in the long-run period spanning 252 trading days post the announcement date. In both the pre and post announcement periods the number of negative AAR days marginally exceeded the positive days as seen in panel B of Table 5-2.

It was noted from the analysis of individual daily AAR in Table 5-2 as well as Figure 5-1 and the AAR t-stat value plot for event window [-1,+1], that no clearly discernable trend was detectable in either the pre or post announcement periods. Figure 9-3, the daily AAR plot, also supported the finding that AAR seemingly fluctuated between positive and negative values randomly. The researcher is of the meaning that any perceived pattern or trend in the daily AAR data represented nothing more than reversion to the mean, since similar cyclic trends were visible in both pre and post periods.

### **6.1.1.2 Daily AAR for Event Window [-2,+2]**

Table 5-3 summarised the individual daily AAR studies, for a 14 firm sample, with event window [-2,+2]. The 14 firm sample studied in Table 5-3 represented a sub-sample of the 26 firm sample studied in Table 5-2.

The studies revealed statistically significant AAR both prior and post the announcement date. 21 Days of significant AAR was detected in the long-run period spanning 504 trading days prior to the announcement date. None of the significant AAR days were detected in the period closer than day 54 to the announcement date. The announcement date, day 0, returned a positive insignificant AAR of 1.54%. The announcement day was followed by a series on insignificant AAR days, up to and including day 26. Day 27, post the announcement day, recorded the first significant AAR post the announcement date. In total 23 days of significant AAR were detected in the long-run period spanning 504 trading days post the announcement date. It was seen from Figure 5-2 and the AAR t-stat value plot for event window [-2,+2], that no clearly discernable trend was detectable in either the pre or post announcement periods with AAR seemingly fluctuating between positive and negative values randomly. In both the pre and post announcement periods the number of negative AAR days exceeded the positive days as seen in panel B of Table 5-3.

Similar to the discussion regarding Figure 9-3, Figure 9-4, the daily AAR plot for event window [-2,+2], showed no discernable trend neither prior nor post the announcement date.

### **6.1.1.3 Daily AAR for Event Window [-3,+3]**

Table 5-4 summarised the individual daily AAR studies, for a seven firm sample, with event window [-3,+3]. The seven firm sample studied in Table 5-4 represented a sub-sample of both the 14 firm sample of Table 5-3 as well as a sub-sample of the 26 firm sample studied in Table 5-2.

The studies revealed statistically significant AAR both prior and post the announcement date. 25 Days of significant AAR was detected in the long-run period spanning 756 trading days prior to the announcement date. None of the significant AAR days were detected in the period closer than day 20 to the announcement date. The announcement date, day 0, returned a positive, marginally insignificant AAR of 1.54%. The announcement day was followed by a series on insignificant AAR days, up to and including day 20. Day 21, post the announcement day, recorded the first significant AAR post the announcement date. In total 50 days of significant AAR were detected in the long-run period spanning 756 trading days post the announcement date. It was seen from Figure 5-3 and the AAR t-stat value plot for event window [-3,+3], that no clearly discernable trend was detectable in either the pre or post announcement periods with AAR seemingly fluctuating between positive and negative values randomly. In both the pre and post announcement periods the number of positive AAR days exceeded the negative days as seen in panel B of Table 5-4.

Similar to the discussion regarding Figure 9-3 and Figure 9-4, Figure 9-5, the daily AAR plot for event window  $[-3,+3]$ , showed no discernable trend neither prior nor post the announcement date.

#### **6.1.1.4 Total Event Window AAR**

Table 5-5 summarised the sample mean AAR for all the defined event window parts.

The pre-announcement period,  $[-1]$ , sample mean AAR tested positive, however t-tests revealed that the mean AAR did not differ statistically from zero at the 5% level of significance. The post-announcement period,  $[+1]$ , sample mean AAR tested negative, however t-tests revealed that the mean AAR did not differ statistically from zero at the 5% level of significance.

Similar to the  $[-1]$  and  $[+1]$  event window discussed above, the pre-announcement period,  $[-2]$  sample mean AAR tested positive and the post-announcement period,  $[+2]$  sample mean AAR tested negative. T-tests revealed that both the pre and post-announcement mean AAR did not differ statistically from zero at the 5% level of significance.

The pre-announcement period,  $[-3]$ , sample mean AAR tested positive, whilst interestingly the post-announcement period,  $[+3]$ , differed from the other post-announcement event windows with a positive sample mean AAR. However, t-tests still revealed that the mean AAR still did not differ statistically from zero at the 5% level of significance.

Table 5-6 summarised the results of a difference test between pre-acquisition sample mean AAR and post-acquisition sample mean AAR for all of the defined event windows.

For the event window, [-1,+1], using a 26 firm sample, the difference in mean post minus pre AAR was negative and insignificant, equalling – 0.0077%. For the event window, [-2,+2], using a 14 firm sample, where the sample is a sub-sample of the larger 26 firm sample, the difference in mean post minus pre AAR was negative and insignificant, equalling – 0.0441%.

For the event window, [-3,+3], using an even smaller seven firm sample, where the sample is a sub-sample of the larger 14 and 26 firm sample, the difference in mean post minus pre AAR was positive and insignificant, equalling 0.0009%.

#### **6.1.1.5 Conclusion on AAR Testing**

It was concluded from the tests conducted that although several, both positive and negative, significant individual AAR days existed in both the pre and post-announcement event windows, no discernable pattern of individual, daily AAR build-up or destruction could be detected.

In fact, when assessing average event window AAR, no significant or statistically different from zero AAR was detected. This indicates that on average, AAR for all defined event windows, were zero. Similarly, no statistically significant differences were detected when comparing pre and post-announcement average AAR. The

AAR research therefore concluded that no statistical evidence was found that mergers and acquisitions created or destroyed acquiring firm shareholder value.

Similar to this research, Andrade et al. (2001) also calculated AAR for an event window three years post acquisition and reported a negative and insignificant post-acquisition AAR trend. Andrade et al. (2001) noted an insignificant negative AAR of -5% for a three year long-run post announcement date period and therefore also concluded that no statistical evidence was found that mergers and acquisitions created or destroyed acquiring firm shareholder value.

Similar to those of Andrade (2001) and this research, Kyei (2008) also noted statistically insignificant AAR for a long-run 378 day post-acquisition period. Even though Kyei (2008) reported a positive post-acquisition AAR of 0.0043%, the findings were statistically insignificant and therefore, similar to this research, inconclusive regarding the creation or destruction of acquiring firm shareholder value.

Although not statistically significant, it was however noted that the average AAR and average AAR difference test summarised in Table 5-5 and 5-6 indicated similar trends. In both cases, average pre-announcement period AAR were positive up to three years or 765 trading days prior to the announcement date. Between year one and two, or 252 to 504 trading days post the announcement date, average AAR as well as average AAR differences showed a negative trend. Although statistically insignificant, this indicated a trend in reduction of abnormal

returns and potential destruction in shareholder value up to two years post the announcement date.

Negative AAR post-acquisition trends were also noted in the research results of Andrade (2001) as well as Laabs and Shiereck (2010). Laabs and Shiereck (2010) investigated long-run post-acquisition share price performance in the automotive supply industry and utilised an equally weighted Fama-French three factor model to determine a 36 month average abnormal return. They reported a significant negative average monthly abnormal return of  $-0.6\%$ .

However, this research showed that in the third year or between 504 and 756 days post the announcement date, average AAR as well as average AAR difference recorded a positive average AAR, seemingly recovering from the previous two years of market under performance.

The researcher was cautious to conclude anything from the sudden reversal in average AAR trend detected in year three. In fact, since all average AAR and average AAR difference tests concluded to be insignificant, none of the trends observed were of real relevance. In addition the small sample size of only seven firms utilised in testing the event window  $[-3,+3]$  made any reliance on the sample data very difficult.

Despite some interesting observations and comparisons to previous studies into average AAR behaviour and trends, this AAR research maintains that no

statistical evidence could be found that mergers and acquisitions created or destroyed acquiring firm shareholder value.

### **6.1.2 Average Cumulative Average Abnormal Return (ACAAR)**

Table 5-7 summarised the sample average cumulative average abnormal return (ACAAR) for all the defined event window parts.

The pre-announcement period, [-1], representing 252 days prior to the announcement date, 26 firm sample ACAAR, tested negative, -0.9%. T-tests revealed that the ACAAR differed statistically from zero at the 5% level of significance. The post-announcement period, [+1], representing 252 days post the announcement date, 26 firm sample ACAAR, also tested negative, -1.3%. T-tests revealed that the ACAAR differed statistically from zero at the 5% level of significance.

In contrast to the [-1] event window discussed above, the pre-announcement period [-2], representing 504 days prior to the announcement date, 14 firm sample ACAAR, tested positive, 0.6%. The post-announcement period, [+2], representing 504 days post the announcement date, 14 firm sample ACAAR, tested negative, -6%. T-tests revealed that both the pre and post-announcement ACAAR differed statistically from zero at the 5% level of significance.

The pre-announcement period, [-3], representing 756 days prior to the announcement date, seven firm sample ACAAR, tested positive, 13.6%. The

post-announcement period, [+3], representing 756 days prior to the announcement date, differed from the other post-announcement event windows with a positive, 22.3%, 7 firm sample ACAAR. T-tests still revealed that the mean ACAAR differed statistically from zero at the 5% level of significance.

Table 5-8 summarised the results of a difference test between pre-acquisition sample ACAAR and post-acquisition sample ACAAR for all of the defined event windows.

For the event window, [-1,+1], using a 26 firm sample, the difference in post minus pre ACAAR was negative and significant, equalling – 0.45%. For the event window, [-2,+2], using a 14 firm sample, where the sample is a sub-sample of the larger 26 firm sample, the difference in post minus pre ACAAR was negative and significant, equalling – 6.62%.

For the event window, [-3,+3], using an even smaller seven firm sample, where the sample is a sub-sample of the larger 14 and 26 firm sample, the difference in post minus pre ACAAR was positive and significant, equalling 8.76%.

#### **6.1.2.1 Testing Hypothesis 1**

The null hypothesis stated that the average cumulative average abnormal returns (ACAAR) of the acquiring company sample post-acquisition would equal the average cumulative average abnormal return of the acquiring company sample pre-acquisition. The alternative hypothesis stated that the ACAAR of the

acquiring company sample post-acquisition would not equal the ACAAR of the acquiring company sample pre-acquisition.

Hypothesis 1 could be depicted as:

$$H1_0: ACAAR_{post} - ACAAR_{pre} = 0$$

$$H1_A: ACAAR_{post} - ACAAR_{pre} \neq 0$$

It was concluded from testing Hypothesis 1 that for:

Event window [-1,+1], the null hypothesis is rejected.

Event window [-2,+2], the null hypothesis is rejected.

Event window [-3,+3], the null hypothesis is rejected

### **6.1.2.2 Conclusion on ACAAR Testing**

It follows logically that a strong positive correlation may be expected between the ACAAR and the AAR test results. A high degree of similarity compared to AAR results was found in both the individual ACAAR as well as ACAAR difference tests, with the exception of the individual event window part [-1]. In general the ACAAR tests revealed that, similar to the AAR test results, average cumulative average abnormal returns deteriorate prior to the announcement date, dropping from a positive, significant 13.6%, three years prior to the announcement date, to a negative, significant -6.0%, two years after the announcement date. In addition, the ACAAR difference tests compared equivalent paired samples pre and post

the announcement date, confirming that ACAAR significantly deteriorated post the announcement date.

This research result was unlike the results of Kyei (2008), who indicated an insignificant net positive ACAR of 1.37% over the 378 day post acquisition event window. Similar to six out of 11 long-run studies noted by Bruner (2002) that indicated statistically significant negative returns ranging between -4% cumulative abnormal returns (CAR) and -18% CAR, this research concluded that mergers and acquisitions destroyed acquiring firm shareholder value, in the period up to and including two years, or 502 days, post the announcement date. This indicated a rejection of the null hypothesis as defined for hypothesis 1.

At face value, this research also returned results similar to tender studies by Rau and Vermaelen (1998) and Loughran and Vjih (1997), who showed three and five year post announcement period, significant positive 9% and 61,3% CAR respectively. Correlating with the AAR results obtained, this research indicated that in the third year or between 504 and 756 days post the announcement date, both individual event window ACAAR of 22.3%, as well as pre and post ACAAR differences of 8.76%, were positive and statistically significant.

However when Figure 5-6, the daily CAAR plot for the seven firm sample over event window [-3,+3], was evaluated, it was noted that unlike in Figure 5-4 and 5-5, both pre and post period ACAAR was mostly positive and increasing. When the researcher considered that the seven firm sample used for testing the event window parts [-3] and [+3] were sub-sets of and over-lapping with the larger 17

as well as 26 firm samples used for testing event windows  $[-2,+2]$  and  $[-3,+3]$  respectively, an inconsistency was discovered. It was expected that Figure 5-6 would follow the ACAAR trend results of Figure 5-4 and 5-5, showing a similar sharp decline to negative post announcement daily CAAR for the first two years, prior to recovering into significant positive CAAR, averaging 22.3% for the period three years post the announcement date. Unfortunately, as seen in Figure 5-6, this expectation did not realise.

The inconsistency detected when comparing the  $[-3,+3]$  event window ACAAR to other event window periods was reasoned to be due to the very small sample utilised in testing the event window  $[-3,+3]$ . Such a small sample made any reliance on the sample data very difficult. Although the result indicated a rejection of the null hypothesis as defined for hypothesis 1, the researcher remained cautious and sceptical about concluding anything from the statistical test results for the event window  $[-3,+3]$ .

## **6.2 Operating Financial Performance**

Chapter 3, section 3.2, defined that for the investigation of long-run post-acquisition operating financial performance, hypothesis testing would be completed. Hypothesis test 2 was designed to compare the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies post acquisition with the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies pre acquisition.

Resolution of hypothesis test 2 would result in either proving or disproving the ability of mergers and acquisitions to create or destroy economic value realised through operating cash-flows.

Table 5-9, panel A, B and C, summarised the sample cash-flow return on all assets (CRAA), industry cash-flow return on all assets (ICRAA) and industry-adjusted cash-flow return on all assets (IACRAA) performance measures for all the defined event window parts.

Sample CRAA for event window [-1], or one financial year prior to the announcement date, indicated a positive 21.25% CRAA. The event window [+1], or one financial year post the announcement date indicated a positive, albeit reduced CRAA of 16.89%. Event window [+2] and [+3] indicated 28.6% and 9.39% respectively.

After calculating the appropriate sample industry average cash-flow return on all assets or ICRAA, the difference between the sample CRAA and sample ICRAA was determined.

The pre-announcement period, [-1], representing one financial year prior to the announcement date, five firm sample IACRAA, tested negative, -9.16%. The post-announcement period, [+1], representing one financial year post the announcement date, five firm sample IACRAA, tested positive, 3.54%.

The post-announcement period, [+2], representing two financial years post the announcement date, four firm sample IACRAA, tested positive, 9.52%. The post-announcement period, [+3], representing three financial years post the announcement date, four firm sample IACRAA, tested negative, -5.68%. T-tests revealed that in all cases the IACRAA did not differ statistically from zero at the 5% level of significance.

Table 5-10 summarised the results of a difference test between pre-acquisition sample IACRAA and post-acquisition sample IACRAA for all of the defined event windows.

For the event window, [-1,+1], using a five firm sample, the difference in post minus pre IACRAA was insignificant and positive, equalling 12.71%. For the event window, [-2,+2], using a four firm sample, where the sample is a sub-sample of the five firm sample, the difference in post minus pre IACRAA was insignificant and positive, equalling 21.77%.

For the event window, [-3,+3], using a four firm sample, where the sample is a sub-sample of the five firm sample, the difference in post minus pre IACRAA was insignificant and positive, equalling 6.5%.

### 6.2.1.1 Testing Hypothesis 2

The null hypothesis states that the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies post acquisition equals the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies pre acquisition. The alternative hypothesis states that the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies post acquisition does not equal the average industry-adjusted operating cash-flow return on all assets (IACRAA) of the combined acquirer and target companies pre acquisition.

Hypothesis 2 may be depicted as:

$$H_{2_0}: IACRAA_{post} - IACRAA_{pre} = 0$$

$$H_{2_A}: IACRAA_{post} - IACRAA_{pre} \neq 0$$

It was concluded from testing Hypothesis 2 that for:

Event window [-1,+1], the null hypothesis is accepted.

Event window [-2,+2], the null hypothesis is accepted.

Event window [-3,+3], the null hypothesis is accepted.

### **6.2.1.2 Conclusion on IACRAA Testing**

The hypothesis tests indicated that the sample average industry-adjusted cash-flow return on all assets increased post acquisition although remained insignificantly different from zero in all event windows tested.

This research result was similar to the results of Healy et al. (1997) , Gosh (2001) as well as Smit and Ward (2007). Healy et al. (1997) showed an insignificant post-acquisition increase in industry-adjusted cash-flow return on all assets (IACRAA) of 2.8%. Similarly, Gosh (2001) indicated that acquiring firms outperformed industry-average firms over post-acquisition years, although the performance was on average statistically insignificant. Gosh (2001) concluded that the mean increase in operating performance following acquisitions was neither statistically nor economically significant at 0.66%. Smit and Ward (2007) indicated that large acquisitions, on average, do not result in any improvement or deterioration in acquiring firm performance two years post the acquisition.

The researcher concluded that mergers and acquisitions neither created nor destroyed economic value when measuring changes in industry-adjusted cash-flow returns on all assets of the enlarged acquirer.

### **6.3 Intrinsic Value Performance**

Chapter 3, section 3.3, defined that for the investigation of long-run post-acquisition acquiring firm intrinsic value, hypothesis testing would be completed. The tests were designed to compare the difference between pre and post announcement date event window average intrinsic value of the acquiring firm.

Resolution of hypothesis test 3 would result in either proving or disproving the ability of mergers and acquisitions to create or destroy economic value of a firm through the measurement of changes in acquiring firm intrinsic value over time.

Table 5-11, summarised the sample average intrinsic value (AIV) performance as well as price-to-book and price-to-value valuation levels for all the defined event window parts.

The nine firm sample AIV for event window [-1], or 12 calendar months prior to the announcement date, indicated a positive AIV of 0.349. The event window [+1], or 12 calendar months post the announcement date showed a positive yet reduced AIV of 0.218.

The six firm sample AIV for event window [+2], or 24 calendar months post to the announcement date, indicated an increased positive AIV of 0.669, whilst the five firm sample with event window [+3], or 36 calendar months post the announcement date also showed a positive AIV of 0.788.

Both the six and five firm samples used for event window parts [+2] and [+3] were sub-samples of the nine firm sample used for event window parts [-1] and [+1].

T-tests revealed that in all cases the AIV differed statistically from zero at the 5% level of significance.

Table 5-12 summarised the results of a difference test between pre-acquisition sample AIV and post-acquisition sample AIV for all of the defined event windows.

For the event window, [-1,+1], using a nine firm sample, the difference in post minus pre AIV was significant and negative, equalling -0.131. For the event window, [-1,+2], using a six firm sample, where the sample is a sub-sample of the nine firm sample, the difference in post minus pre AIV was insignificant and positive, equalling 0.112.

For the event window, [-1,+3], using five firm sample, where the sample is a sub-sample of the nine firm sample, the difference in post minus pre AIV was significant and positive, equalling 0.370.

### **6.3.1.1 Testing Hypothesis 3**

The null hypothesis states that average intrinsic value (AIV) of the acquiring company post-acquisition equals the average intrinsic value (AIV) of the acquiring company pre-acquisition. The alternative hypothesis states that average intrinsic value (AIV) of the acquiring company post-acquisition does not equal the average intrinsic value (AIV) of the acquiring company pre-acquisition.

Hypothesis 3 may be depicted as:

$$H3_0: AIV_{post} - AIV_{pre} = 0$$

$$H3_A: AIV_{post} - AIV_{pre} \neq 0$$

It was concluded from testing Hypothesis 3 that for:

Event window [-1,+1], the null hypothesis is rejected.

Event window [-1,+2], the null hypothesis is accepted.

Event window [-1,+3], the null hypothesis is rejected.

### **6.3.1.2 Conclusion on AIV Testing**

The sample AIV difference tests indicated that the sample average intrinsic value decreased in the first year post the acquisition announcement date. The decrease in intrinsic value was significant and resulted in the rejection of the null hypothesis for event window [-1,+1]. This result was similar to the results of Ma et al. (2011) that reported a decline in intrinsic value between the month prior to the announcement date and three months after merger completion.

In contrast, the sample average intrinsic value started a slow recovery in the second year post the acquisition announcement date. Although positive, the pre and post intrinsic value difference was insignificant from zero and resulted in the acceptance of the null hypothesis for event window [-1,+2]. The sample average intrinsic value showed a continuation of positive growth into the third year post the acquisition announcement date. The pre and post intrinsic value difference

was significant and resulted in the rejection of the null hypothesis for event window [-1,+3]. Similarly, Ma et al. (2011) reported statistically significant intrinsic value increases between the third and 36th months following merger completion.

Unlike Ma et al. (2011), this research did not report a decrease in both  $\ln(P/B)$  and  $\ln(P/V)$  ratios in the months after the announcement of the merger. In addition, Ma et al. (2011) measured only modest changes in intrinsic value,  $\ln(V/B)$ . Ma et al. (2011) reported an AIV change of -0.029 at three months, a positive AIV change of 0.002 at 12 months and a positive AIV change of 0,054 36 months after the merger. The percentage change detected by Ma et al. (2011) represented a growth in sample AIV of only 6.68% over three years. This research reported a positive change in AIV of 89% over three years. Although the change in AIV presented a large variance when compared to the results of Ma et al. (2011), the ratio between the sample firm share price and intrinsic value,  $\ln(P/V)$ , remained above zero, indicating that on average the share value out-priced the intrinsic value in every event window defined.

The hypothesis test results led to the finding that although mergers and acquisitions destroyed economic value within the first year post the announcement, by year two acquiring firms slowly recovered value back to pre announcement date intrinsic value levels. It was found that three years post the announcement date, acquiring firms created intrinsic firm value.

## 7. CHAPTER 7 – CONCLUSION

The aim of this research was to evaluate whether, in the long-run, acquiring companies create or destroy value with target acquisitions by comparing and evaluating pre- and post-acquisition performance within defined event windows, using three metrics namely, abnormal share price return, abnormal operating cash-flow return and intrinsic value creation.

This research concluded that, on average, mergers and acquisitions are value destroying in the first one to two years after the acquisition announcement date when considering acquiring firm share price performance as well as intrinsic value creation. The research results indicated a reversal of this finding in the third year after the announcement date. This finding supports the views of Smit and Ward (2007) that potential synergistic benefits from acquisitions only realise a few years after mergers and acquisitions whilst in addition, providing further support and rationale for evaluating post-acquisition performance over a longer period of time.

However, this research also concluded that when considering acquiring firm operating financial performance, on average mergers and acquisitions neither create nor destroy value up to three years after the acquisition announcement date.

The acquiring firm share price performance research results, measuring average cumulative average abnormal return (ACAAR), concluded that mergers and

acquisitions destroyed economic value within the first two years post the announcement date. For the event window, [-1,+1], indicating one trading year or 252 days before and after announcement date, using a 26 firm sample, the difference in post minus pre ACAAR was negative and significant, equalling – 0.45%. Similarly, the event window, [-2,+2], indicating two trading years or 504 days before and after the announcement date, using a 14 firm sample, where the sample is a sub-sample of the larger 26 firm sample, the difference in post minus pre ACAAR was negative and significant, equalling – 6.62%.

The losses suffered post-acquisition were however recovered within the third year, eventually exceeding pre-acquisition ACAAR levels and therefore created shareholder value. For the event window, [-3,+3], indicating three trading years or 756 days before and after the announcement date, using an even smaller seven firm sample, where the sample is a sub-sample of the larger 14 and 26 firm sample, the difference in post minus pre ACAAR was positive and significant, equalling 8.76%.

The ACAAR research result contradicted the results of Kyei (2008), who indicated an insignificant net positive ACAR of 1.37% over a 378 day post acquisition event window. When considering the first two years post-acquisition, this research agreed with six out of 11 studies listed by Bruner (2002), which indicated statistically significant negative returns ranging between -4% cumulative abnormal returns (CAR) and -18% CAR. Interestingly, when considering the results obtained for the third year post-acquisition, this research agrees with

tender study results obtained by Rau and Vermaelen (1998) and Loughran and Vijh (1997). Rau and Vermaelen (1998) and Loughran and Vijh (1997) also showed significant and positive three and five year post announcement period CAR.

Although the corroborating research results, such as those discussed above, could be found, the extremely small sample used for testing the [-3,+3] event window made any reliance on the research results very difficult and the researcher remained cautious and sceptical about any conclusion made regarding the ACAAR performance in the third year post-acquisition.

The acquiring firm intrinsic value performance research, measured using average intrinsic value creation, AIV, concluded that mergers and acquisitions destroyed economic value within the first year post the announcement date, however, within the second year after the announcement date, acquiring firm intrinsic value slowly recovered back to pre-acquisition intrinsic value levels. It was found that three years post the announcement date, acquiring firms created intrinsic value.

For the event window, [-1,+1], indicating one financial year before and after the announcement date, using a nine firm sample, the difference in post minus pre AIV was significant and negative, equalling -0.131. For the event window, [-1,+2], indicating one financial year before and two financial years after the announcement date, using a six firm sample, where the sample is a sub-sample of the nine firm sample, the difference in post minus pre AIV was insignificant and

positive, equalling 0.112. In contrast, for the event window, [-1,+3], indicating one financial year before and three financial years after the announcement date, using five firm sample, where the sample is a sub-sample of the nine firm sample, the difference in post minus pre AIV was significant and positive, equalling 0.370. This research aligned with research by Ma et al. (2011), who reported a decline of 0.029 in AIV in the first few months after the merger, whilst between 12 and 36 months after the announcement date, Ma et al. (2011) showed positive incremental AIV changes of 0.002 and 0.054 respectively. The percentage change detected by Ma et al. (2011) represented a net growth in sample AIV of 6.68% over three years. This research reported a positive change in AIV of 89% over three years. Although the change in AIV presented a large variance when compared to the results of Ma et al. (2011), the ratio between the sample firm share price and intrinsic value remained above zero, indicating that on average the share value out-priced the intrinsic value in every event window defined.

The acquiring firm operating financial performance research, measured using industry-adjusted cash-flow return on all assets, IACRAA, concluded that mergers and acquisitions neither destroyed nor created economic value within any of the three years post the announcement date.

For the event window, [-1,+1], indicating one financial year before and after the announcement date, using a five firm sample, the difference in post minus pre IACRAA was positive. Positive IACRAA indicated that the enlarged acquiring firms outperformed their industry-average firms. However, the statistical results

were insignificant, equalling 12.71%. For the event window, [-2,+2], indicating two financial years before and after the announcement date, using a four firm sample, where the sample is a sub-sample of the five firm sample, the difference in post minus pre IACRAA was also positive although still insignificant, equalling 21.77%. For the event window, [-3,+3], indicating three financial years before and after the announcement date, using a four firm sample, where the sample is a sub-sample of the five firm sample, the difference in post minus pre IACRAA was also positive although also still insignificant, equalling 6.5%.

This research result was similar to the results of Healy et al. (1997) , Gosh (2001) as well as Smit and Ward (2007), showing an insignificant post-acquisition increase in industry-adjusted cash-flow return on all assets. Interestingly, Gosh (2001) also indicated that acquiring firms outperformed industry-average firms over post-acquisition years, although the performance was also statistically insignificant.

This study constructively contributed to the understanding of M & A long-run post-acquisition performance, by building and improving on the research methodologies of Smit and Ward (2007), Kyei (2008) and Ma et al. (2011). Improvements included the successful completion of long-run post-acquisition performance tests using share-price return, operating financial performance and intrinsic value creation performance metrics. Improved comparability of results was ensured through the use of common event windows and common sample observations. In addition, the criticism of biased event based research

methodologies, as used by Smit and Ward (2007) and Kyei (2008), was addressed through the inclusion of an additional measure, namely intrinsic firm value. Finally, this research intended to infer a cause and effect relationships, namely the effect of the occurrence of a merger and acquisition on the long-run financial performance of an acquiring company. All three hypotheses were designed and executed according to the requirements of a causal study as defined by Blumberg et al. (2008), representing an improvement in research design when compared to Smit and Ward (2007) and Kyei (2008).

Further research work is recommended, since this research did not investigate any specific deal characteristics or the impact of these characteristics on long-run post-acquisition financial performance, such as payment methods, differences between vertical integration and horizontal diversification mergers and acquisitions, industry differences as well as price-earnings characteristics of acquiring or target firms. The use of probabilistic random sampling techniques is recommended as well as the increase in final sample size. This will ensure that the research results are representative of the larger population, making statistical inferences for the total population of mergers and acquisitions possible. The Ernst and Young database used as the population of relevance for this research has been discontinued as of 2009 and it is therefore recommended that an alternative, larger sampling frame be identified. This research may also be repeated over a different time period, since according to Andrade et al. (2001) the market for mergers and acquisitions changes over time. Similar to other long-run post-acquisition performance studies, this study only used a few performance

metrics and evaluation techniques, resulting in a research outcome and conclusion that was limited by the power of the statistical techniques and metric definitions utilised.

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## 9. APPENDIX A

Figure 9-1: Sample acquirer JSE sector frequency

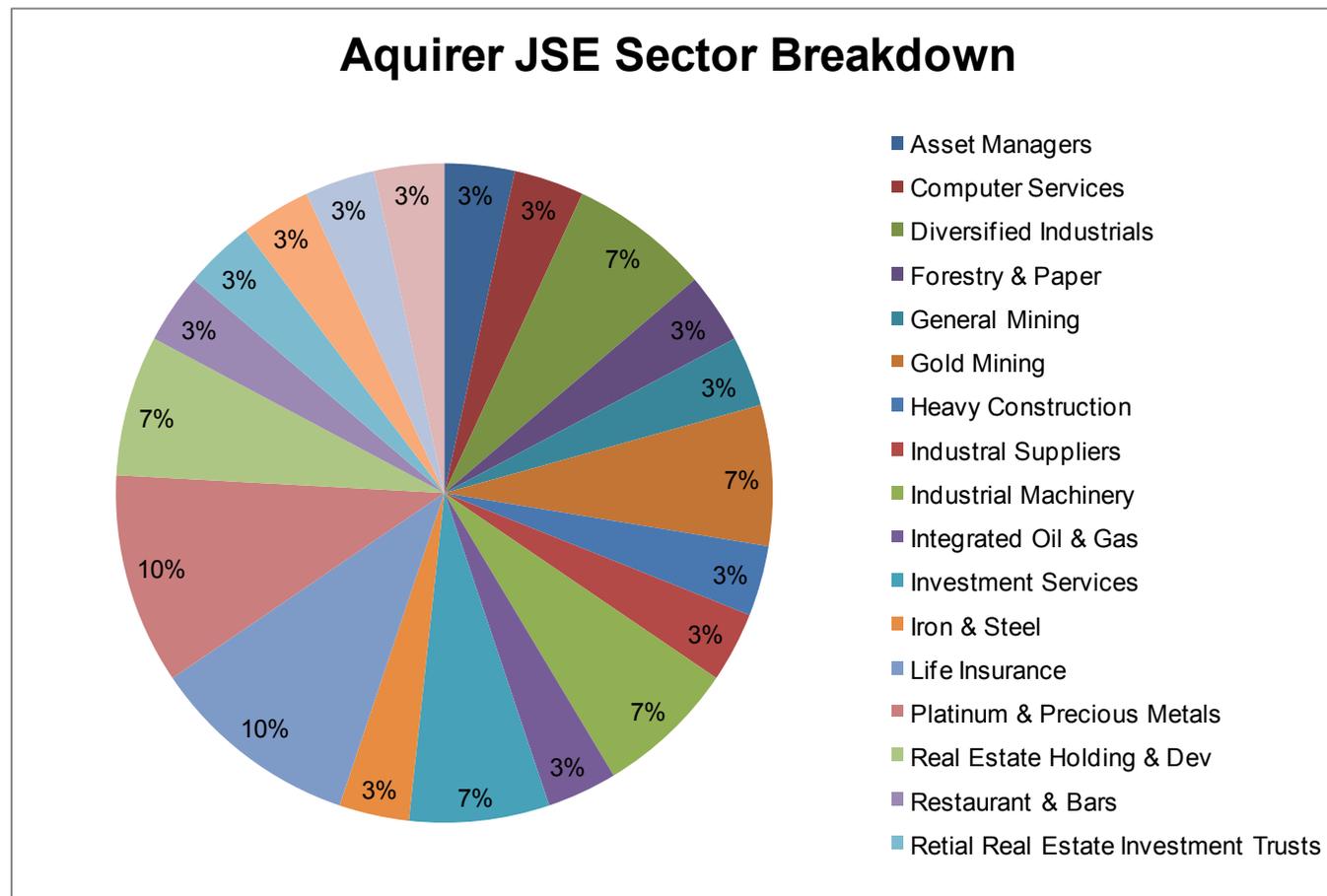
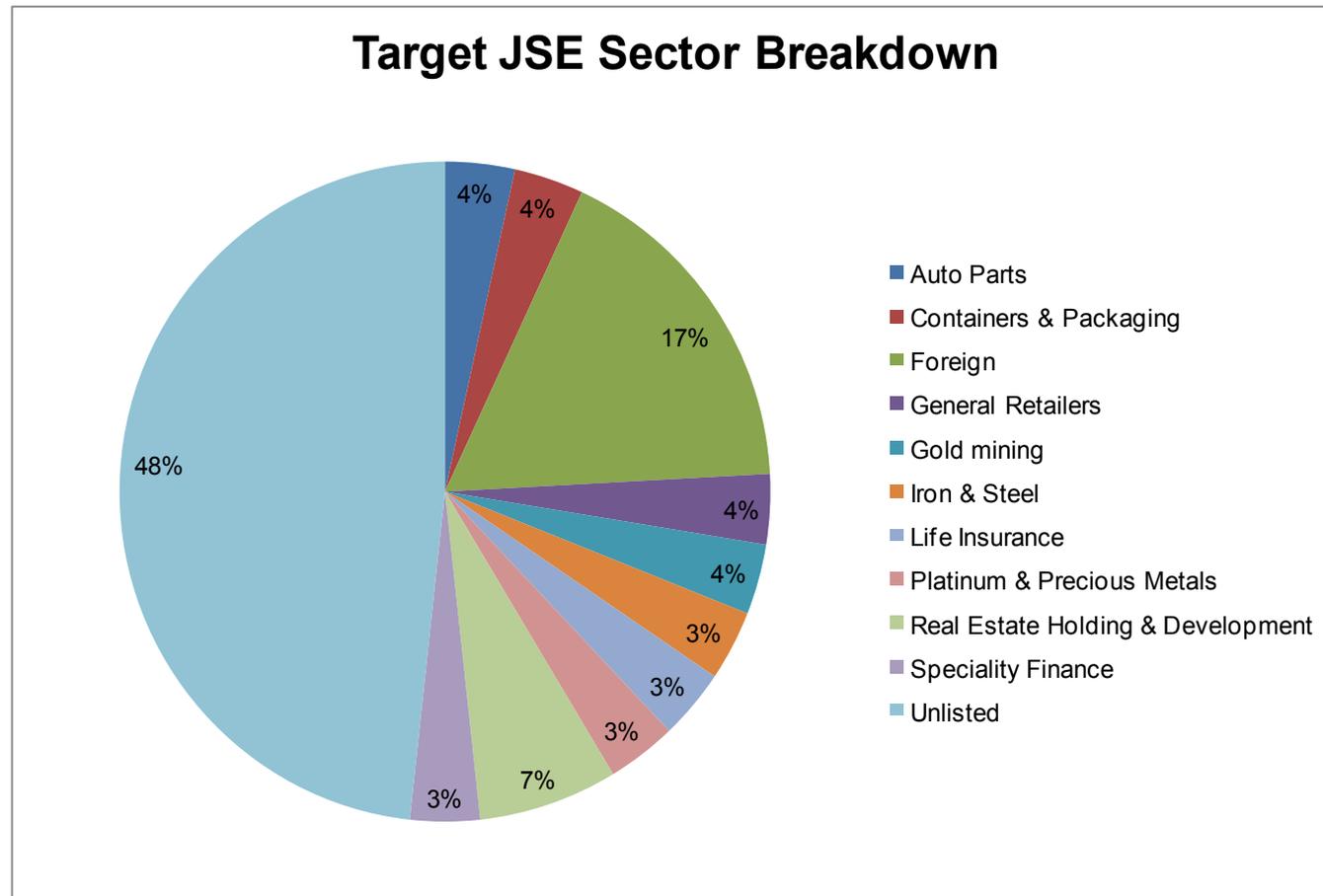


Figure 9-2: Sample target JSE sector frequency



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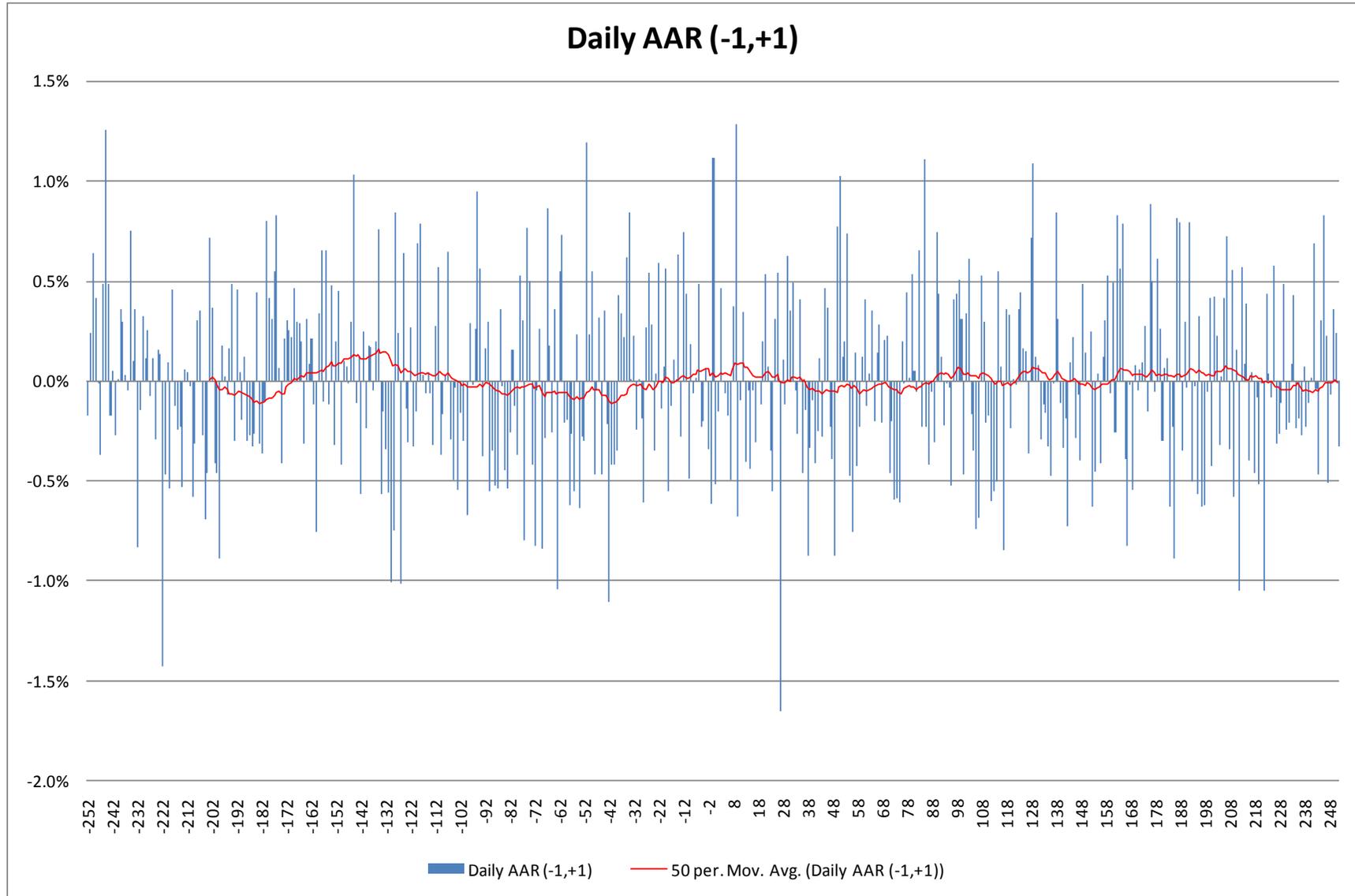
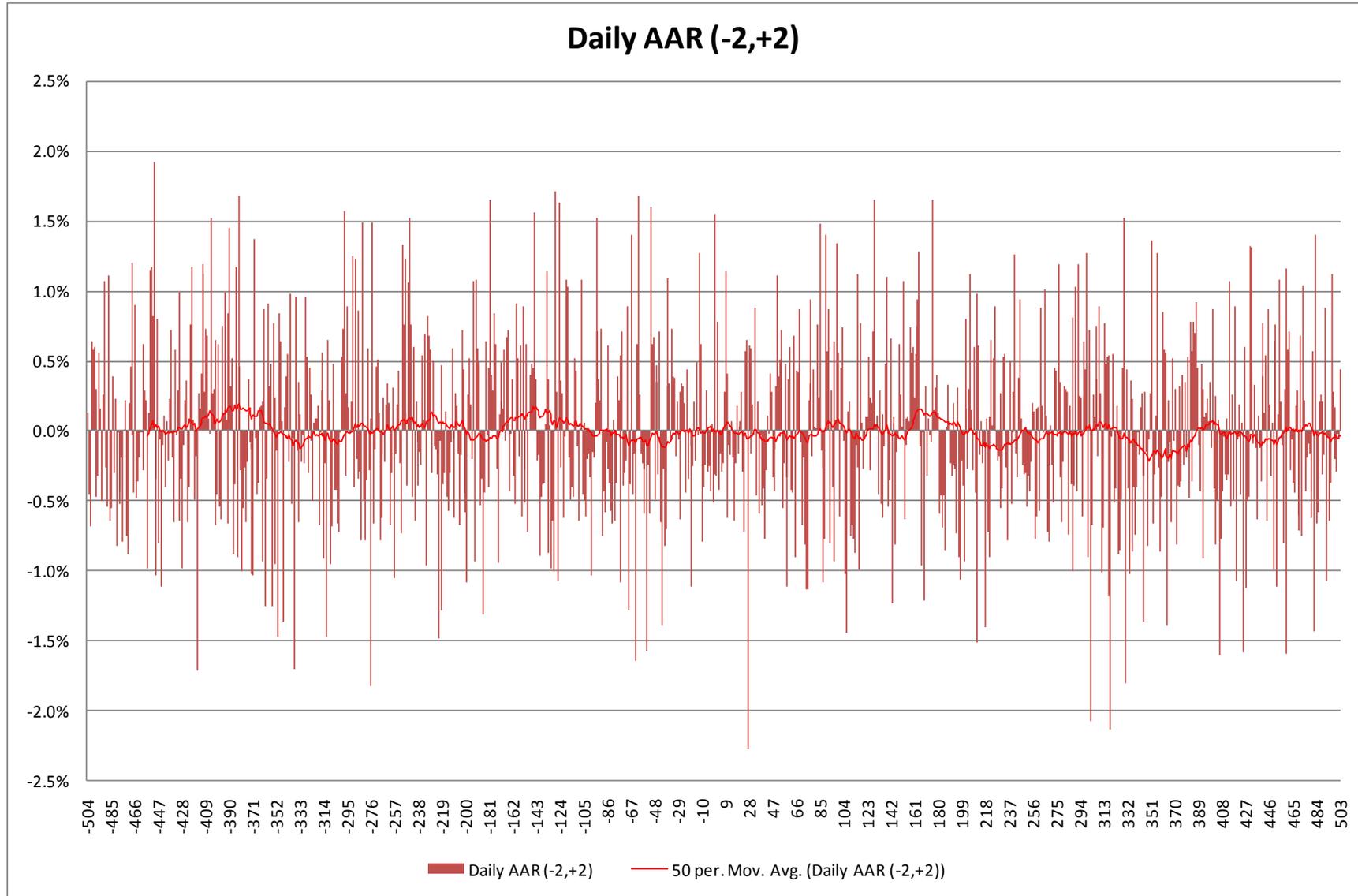


Figure 9-3: Average abnormal returns (AAR), n=26, event window (-1,1)

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**Figure 9-4: Average abnormal returns (AAR), n =14, event window (-2,2)**

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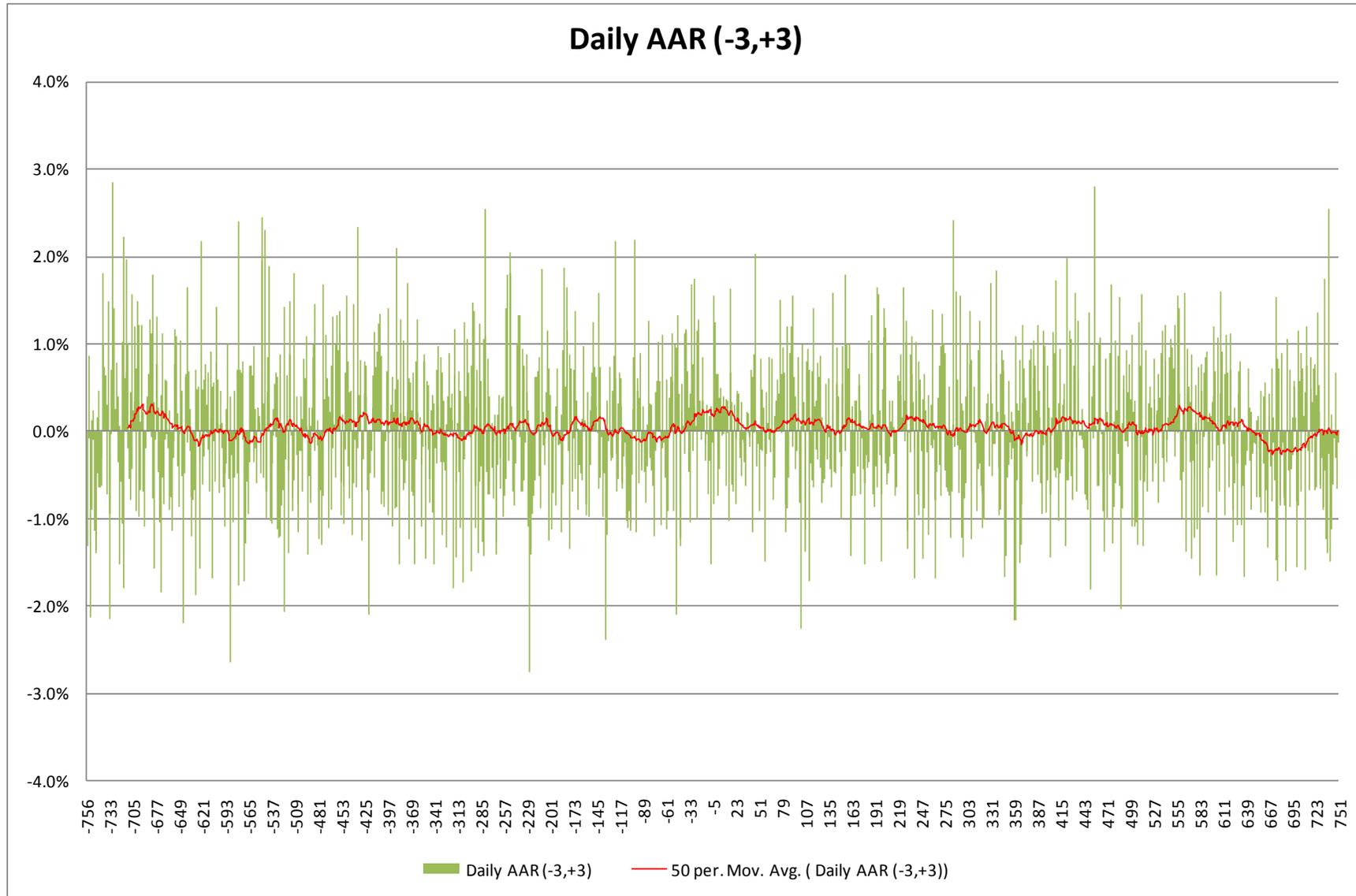


Figure 9-5: Average abnormal returns (AAR), n =7, event window (-3,3)

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Table 9-1: Sample selected

SAMPLE NUMBER	ERNST & YOUNG TRX NUMBER	ACQ. TICKER SYMBOL	ACQUIRER NAME	ACQUIRER JSE SECTOR (Level 1)	ACQUIRER JSE SECTOR (Level 3)	TARGET NAME	TARGET JSE SECTOR (Level 3)	ACQUISITION VALUE (R'm)	ACQUIRER MARKET CAP. (R'm)	ACQUISITION % MARKET CAP.	ACQUISITION ANNOUNCEMENT DATE
1	869	HAR	Harmony	Basic Materials	Gold Mining	Goldfield	Gold mining	R 4,221	R 28,264	14.9%	2004/12/08
2	6	ADH	Advtech Ltd	Consumer Services	Specialised Consumer	Trinityhouse School	Unlisted	R 104	R 1,791	5.8%	2008/05/22
3	609	CMH	Combined motor holdings Ltd	Consumer Services	Speciality Retailers	Auto Umhlanga	Unlisted	R 29	R 470	6.2%	2004/09/08
4	65	FBR	Famous brands Ltd	Consumer Services	Restaurant & Bars	Mugg & Bean	Unlisted	R 104	R 1,525	6.8%	2009/07/27
5	154	REM	Remgro Ltd.	Industrials	Diversified Industrials	Venfin Ltd.	Speciality Finance	R 3,713	R 29,665	12.5%	2009/06/23
6	720	EOH	EOH Holdings Ltd.	Technology	Computer Services	Bromide Techn.	Unlisted	R 30	R 469	6.4%	2006/11/24
7	27	BSR	Basil Read Hldgs Ltd.	Industrials	Heavy Construction	Blasting & Excav. (Pty) Ltd.	Unlisted	R 100	R 896	11.2%	2007/03/23
8	24	RDF	Redefine Income Fund Ltd.	Financials	Real Estate Holding & Dev	ApexHi Ltd. & Madison Ltd.	Real Estate Holding & Development	R 12,675	R 5,619	225.6%	2009/03/09
9	224	VKE	VukileProperty Fund Ltd.	Financials	Real Estate Holding & Dev	Vukile Manco Business & Sanlam Property Asset mgmt.	Real Estate Holding & Development	R 332	R 2,704	12.3%	2009/03/03
10	251	SIM	Simmer & Jack mines Ltd.	Basic Materials	Gold Mining	Tau Lekoa mine	Unlisted	R 600	R 2,018	29.7%	2009/02/17
11	41	ARI	African Rainbow Minerals Ltd	Basic Materials	General Mining	Nkomati nickel	Unlisted	R 260	R 4,670	5.6%	2004/02/09
12	122	BVT	Bidvest Group Ltd.	Industrials	Diversified Industrials	Nampak Ltd.	Containers & Packaging	R 2,339	R 32,646	7.2%	2008/09/04
13	439	OMN	Omnia Holdings Ltd.	Basic Materials	Speciality Chemicals	Zetachem (pty) Ltd.	Unlisted	R 206	R 3,422	6.0%	2007/08/17
14	324	IVT	Invicta holdings Ltd.	Industrials	Industrial Machinery	Bearing man Ltd.	General Retailers	R 330	R 1,012	32.6%	2005/06/02
15	210	INL	Investec Ltd.	Financials	Investment Services	Kensington group	Foreign	R 3,960	R 19,466	20.3%	2007/05/31
16	150	SAC	SA Corporate Real Estate Fund	Financials	Retail Real Estate Investment Trusts	Collins Property & Buffet investments	Unlisted	R 1,022	R 3,079	33.2%	2007/05/28
17	173	WEZ	Wesizwe platinum Ltd.	Basic Materials	Platinum & Precious Metals	Anglo Platinum project & Africa Wide Mineral (Pty) Ltd.	Platinum & Precious Metals	R 1,300	R 1,966	66.1%	2007/04/26
18	586	SFN	Sasfin holdings Ltd.	Financials	Investment Services	NIB-MDM private equity fund 1	Unlisted	R 35	R 522	6.7%	2005/09/07
19	698	CML	Coronation capital	Financials	Asset Managers	Metair Ltd.	Auto Parts	R 491	R 2,097	23.4%	2006/12/13
20	97	SOL	Sasol Ltd.	Oil & Gas	Integrated Oil & Gas	Uhambo Oil Ltd.	Foreign	R 4,500	R 54,242	8.3%	2004/02/19
21	443	ILA	Iliad africa Ltd.	Industrials	Industrial Suppliers	Corpbuild business	Unlisted	R 263	R 215	122.6%	2003/08/06
22	390	EHS	Evraz	Basic Materials	Iron & Steel	Highveld Steel and Vanadium Ltd.	Iron & Steel	R 3,068	R 8,784	34.9%	2006/07/13
23	577	OML	Old Mutual Plc	Financials	Life Insurance	Forsakringsaktiebolaget Skandia	Foreign	R 38,000	R 55,618	68.3%	2005/08/31
24	340	LON	Lonmin Plc	Basic Materials	Platinum & Precious Metals	Lonmin Platinum Limpopo	Unlisted	R 1,305	R 16,286	8.0%	2005/06/15
25	160	HDC	Hudaco industries Ltd.	Industrials	Industrial Machinery	Powermite businesses	Unlisted	R 65	R 1,045	6.2%	2005/03/24
26	807	LBH	Liberty Holdings Ltd.	Financials	Life Insurance	Liberty Group Ltd.	Life Insurance	R 650	R 8,693	7.5%	2005/03/01
27	76	NHM	Northam platinum Ltd.	Basic Materials	Platinum & Precious Metals	Khumama Platinum (Pty) Ltd.	Unlisted	R 460	R 2,130	21.6%	2004/02/12
28	450	DSY	Discovery holdings Ltd.	Financials	Life Insurance	Destiny Health Inc.	Foreign	R 168	R 2,745	6.1%	2003/08/26
29	184	SAP	Sappi Ltd.	Basic Materials	Forestry & Paper	Pollatch business and pulp and paper mill	Foreign	R 5,600	R 28,689	19.5%	2002/03/18

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