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GIBS MBA 2005/6

RESEARCH PROJECT

"HOSTILE" TAKEOVERS AND INVESTMENT PERFORMANCE OF ACQUIRERS AND TARGETS

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfillment of the requirements for the degree of Master of Business Administration

November 2006

ABSTRACT

Mergers and acquisitions (M&A) can be either “hostile” or “friendly” in nature. This study looks at the corresponding long-term investment performance of “hostile” and “friendly” takeovers within the mining sector, pre and post the takeover of targets, with the aim to investigate whether there are statistically significant differences about which the investor community should be aware.

36 months of monthly share price performance, pre and post first formal merger/takeover announcement date, are studied, for each acquirer is compared with the bourse mining index to calculate the percentage time the acquirer outperforms the market (mining index). Research of the major mining stock exchanges of the world – New York, Toronto, Australia, London and Johannesburg – reveals that the investment performances of “hostile” acquiring mining companies, pre first formal announcement date, are statistically significantly greater than post first formal announcement date. No statistically significant difference was found pre and post first announcement date for “friendly” acquiring mining companies. Although clear differences in post first formal announcement date investment performance are noted between “hostile” acquirers and “friendly” acquirers, there is no statistically significant difference between the investment performances of “friendly” versus “hostile” acquirers.

DECLARATION

I declare that this research project is my own, unaided work. It is submitted in partial fulfillment of the requirements of the degree of Master of Business Administration for the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other university.

…….. Date:…….

Arne Hansen

ACKNOWLEDGEMENTS

Thanks to my supervisor, Dr Adrian Saville, for his guidance and technical input whilst conducting this research. Dr Saville's academic and industry experience was critical to the success of this research project.

Thanks to Beulah Muller, Gordon's Institute of Business Science librarian; Dianne Kruger, Rand Merchant Bank infozone researcher and Tanya Botha, BHP Billiton information centre officer, for their help in collecting sample data for the research project.

Thanks to Tudor Maxwell, who helped familiarise me with the statistical software package NCSS, required to perform the statistical hypothesis testing seen in this report.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

M&A	Mergers and Acquisitions
BHP	Broken Hill Proprietary Company
Ltd	Limited
Plc	Public limited company
USA	United States of America
US	United States of America
UK	United Kingdom
TSX	Toronto Stock Exchange
JSE	Johannesburg Stock Exchange
LSE	London Stock Exchange
NYSE	New York Stock Exchange
ASX	Australian Stock Exchange
GDP	Gross domestic product
AMEX	American Stock Exchange
$	Dollars

CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM

1.1. DESCRIPTION OF THE PROBLEM AND BACKGROUND

"Hostile" takeovers receive a lot of press and, more often than not, lead to "bad blood" between acquirers and target organisations. A case in point is the recent "hostile" takeover attempt by Harmony Gold on Gold Fields in South Africa. From the time of the "hostile" takeover announcement, around October 2004, to February 2005, over R14bn in market capitalisation (Gold Fields, 2005) was removed from the two organisations' valuations. Intuitively, one would think that "friendly" mergers and acquisitions (M&A) would result in better investment returns to the shareholders, as in the commodity success story of Broken Hill Proprietary Company (BHP) Limited (Ltd) merging with Billiton Public Limited Company (Plc). BHP Billiton's market capitalisation, as at 19th October 2006, stands at US$111.9bn, 61 per cent larger than its nearest rival Rio Tinto (US$69.7bn) and 75 per cent larger than Anglo American (US$63.9bn) (Deutsche Bank, 19th October 2006[1]). However at the time of the merger, in 2001, BHP Billiton's market capitalisation was only marginally greater than Anglo American and Rio Tinto.

Could it be true that "friendly" takeovers/mergers produce better investment performance for shareholders than "hostile" takeovers?

[1] Mackinnon, J., Richardson, P. and Willis, T. (2006) Digging the Dirt – China Growth: commodity supportive. Deutsche Bank Equity Research-Metals & Mining, 19 October 2006, p 3.

Numerous studies have demonstrated that M&A on average have destroyed value in the longer term. The long-term effects of M&A in the United States of America (USA) and the United Kingdom (UK) have been examined extensively (see Agrawal, Jaffe & Mandelker, 1992; Barnes, 1984; Franks, Harris & Titman, 1991; Gregory, 1997; Kennedy & Limmack, 1996; Limmack, 1991; Loderer & Martin, 1992; Lougharan & Vijh, 1997; Mitchell & Stafford, 2000; Rau & Vermaelen, 1998). Although the methods used to investigate the question have varied, the results are in agreement that the shareholders of the acquiring firms in most instances lose value. The negative abnormal returns were as high as 20 per cent. Andrade, Mitchell and Stafford (2001) argue that, in the USA, acquiring firms have realised -1.4 per cent abnormal returns between 1961 and 1993 (three years post-merger). In the case of South Africa, Wimberley and Negash's (2004) study on the South Africa industrial sector claims the cumulative abnormal monthly returns for the 36 months after the announcement of an event is a significant -10.5 per cent. The issue has gone relatively unexplored in South Africa, especially in some of South Africa's most important sectors, such as mining.

A significant amount of M&A activity has taken place in the mining sector. This is supported by Andrade, Mitchell and Stafford's (2001) research which showed that metal mining in the USA was the number one ranked industry on average annual merger activity during the 1970s and 1990s. Interestingly, this sector has gone relatively unexplored. This study's research explores a more granular

issue, that being v investment performance between “hostile” and “friendly” takeovers/mergers in the mining sector.

The South African stock market has been dominated by mining companies for decades. They currently constitute 40 per cent of the total Johannesburg stock exchange market capitalisation (Bloombergs, as at 9-11-2006)[2]. Other major mining bourses such as, Toronto Stock Exchange (TSX), Vancouver Stock Exchange, Johannesburg Stock Exchange (JSE), London Stock Exchange (LSE), New York Stock Exchange (NYSE) and Australian Stock Exchange (ASX), are also explored in this study.

The problem that this research project addresses is whether the nature of mining sector mergers/takeovers, “hostile” or “friendly”, affect the investment performance of the merged/combined entity.

1.2. PURPOSE OF THE STUDY

This study looks at the corresponding long-term investment performance (36 months pre and post first formal merger/takeover announcement date) of “hostile” and “friendly” takeovers within the mining sector, pre and post the takeover of targets. TSX, JSE, LSE, NYSE, ASX and Vancouver stock exchange mining sectors are explored to analyse whether the nature of mining

[2] Source: Subscription electronic stock market database called Bloombergs

mergers/takeovers, 

to significantly different investment performance for the shareholders.

The research report is structured around seven chapters and proceeds from this chapter into:

- Chapter 2: Literature Review
- Chapter 3: Hypotheses
- Chapter 4: Research Method
- Chapter 5: Data Set
- Chapter 6: Results, Results Analysis and Interpretation
- Chapter 7: Conclusion

CHAPTER 2: LITERATURE REVIEW

"Friendly" M&A and "hostile" takeovers are corporate phenomena that have captured the minds of stakeholders for decades. Shleifer & Vishny (1991) describe "friendly" takeovers as those that are carried out with the consent of the management of the target firm. Andrade, Mitchell and Stafford (2001) describe a bid as "hostile" if the target company publicly rejects it, or describes it as unsolicited and "unfriendly". Within the study, mergers are also regarded as "friendly" due to the consensual nature of a merging of two rival companies. Numerous research studies have been conducted on these topics but to keep the literature review relevant, the following research headings are proposed:

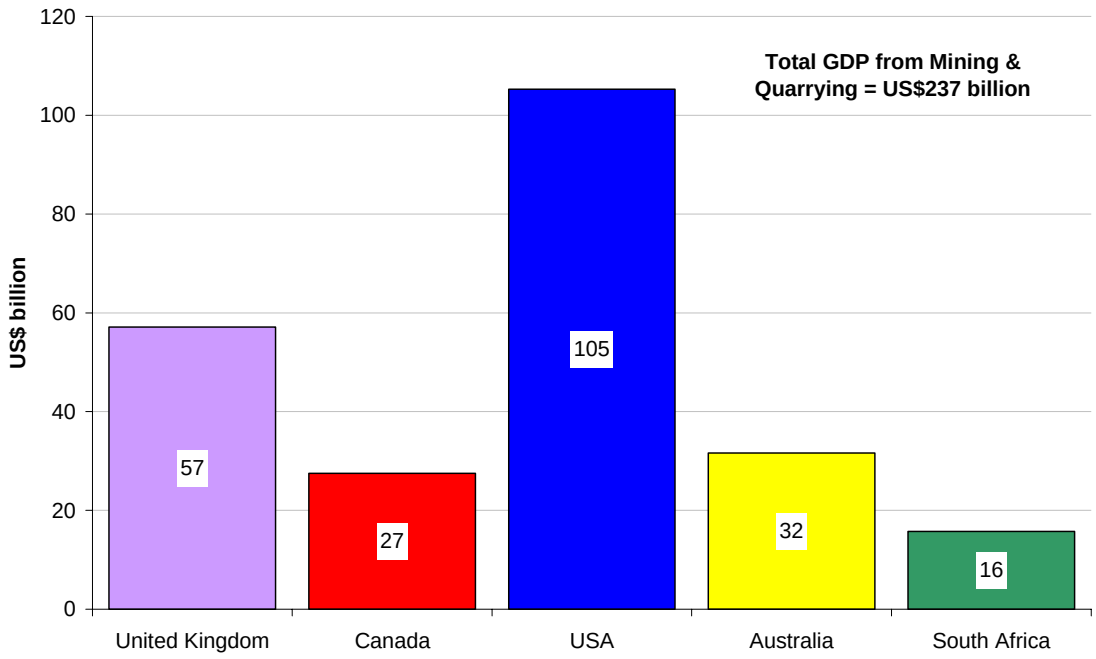
- Mining sector's size and contribution to the USA, UK, South African, Australian and Canadian economies and stock markets;
- M&A activity in the mining sector;
- Investment performance of acquiring companies engaged in M&A.

2.1. MINING SECTOR'S SIZE AND CONTRIBUTION TO THE USA, UK, SOUTH AFRICAN, AUSTRALIAN AND CANADIAN ECONOMIES AND STOCK MARKETS

Total gross domestic product (GDP) from mining and quarrying in Canada, USA, South Africa, UK and Australia equals US$237 billion dollars (real 2005

US$) for 2005 (Eu ...s the individual country contribution that the mining sector contributes to GDP. Interestingly, the USA mining sector is the biggest contributor at US$105 billion (Euromonitor, 2006); however, Figure 2 shows that it's the smallest percentage contributor to total GDP, US$12,487 billion (Euromonitor, 2006), at 0.8 per cent. South Africa's mining sector is the smallest contributor at US$16 billion (Euromonitor, 2006), yet it's the biggest percentage contributor to total South African GDP, US$240 billion (Euromonitor, 2006), at 6.6 per cent.

Figure 1: GDP from mining and quarrying in 2005 (real 2005 US$).

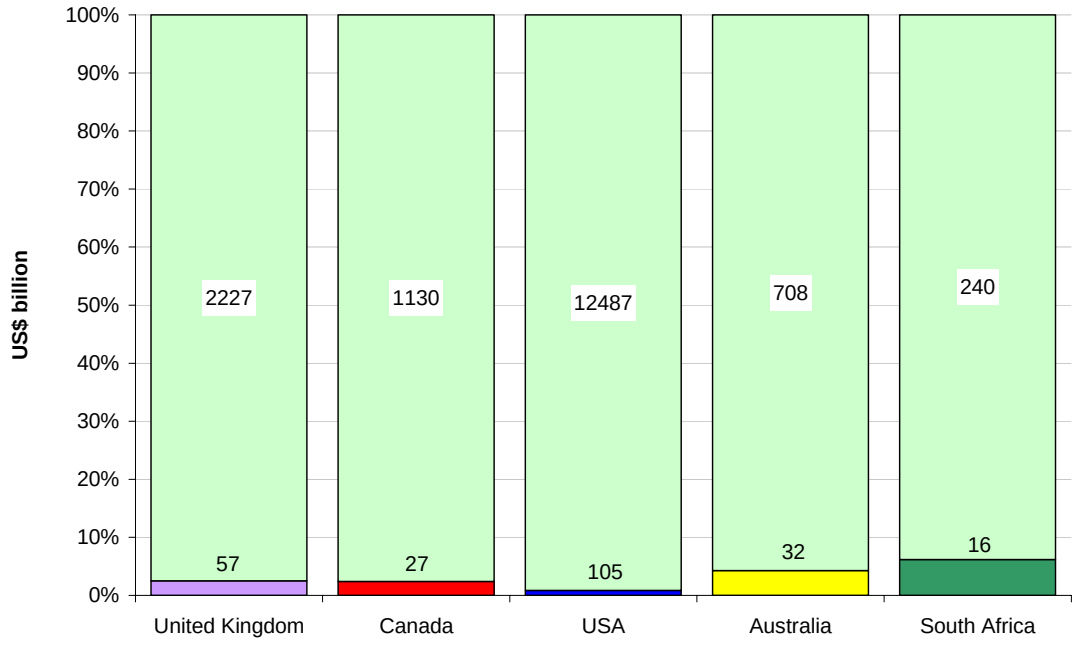


Source: Euromonitor international statistics database, 2006.

[3] Source: Euromonitor international statistics database, 2006

Although the percen than 10 per cent for each research country, as seen in Figure 2, the sheer size of the sector at US$237 billion (in year 2005) is indeed large and an integral part of each country's economy.

Figure 2: GDP from mining and quarrying relative to total GDP in 2005 (real 2005 US$).



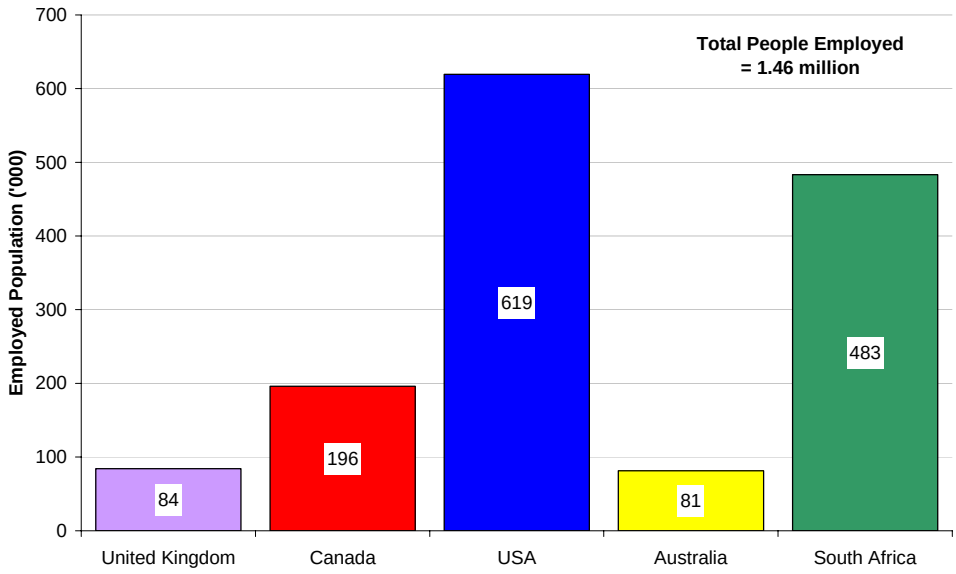
Source: Euromonitor international statistics database, 2006.

1.46 million people (Euromonitor, 2006)[4] are employed in the mining sector across Canada, USA, South Africa, UK and Australia. Figure 3 shows the USA is the biggest employer with 619,280 (Euromonitor, 2006) people employed in its mining sector, representing 0.4 per cent (Euromonitor, 2006) of the total people employed in the USA. South Africa employs 483,298 (Euromonitor,

[4] Source: Euromonitor international statistics database, 2006

2006) people in its r cent (Euromonitor, 2006) of the total employed population. South Africa has the largest percentage of its employed population in mining relative to the other countries being researched.

Figure 3: Number of people employed in the Canadian, UK, USA, Australian and South African mining and quarrying sector.

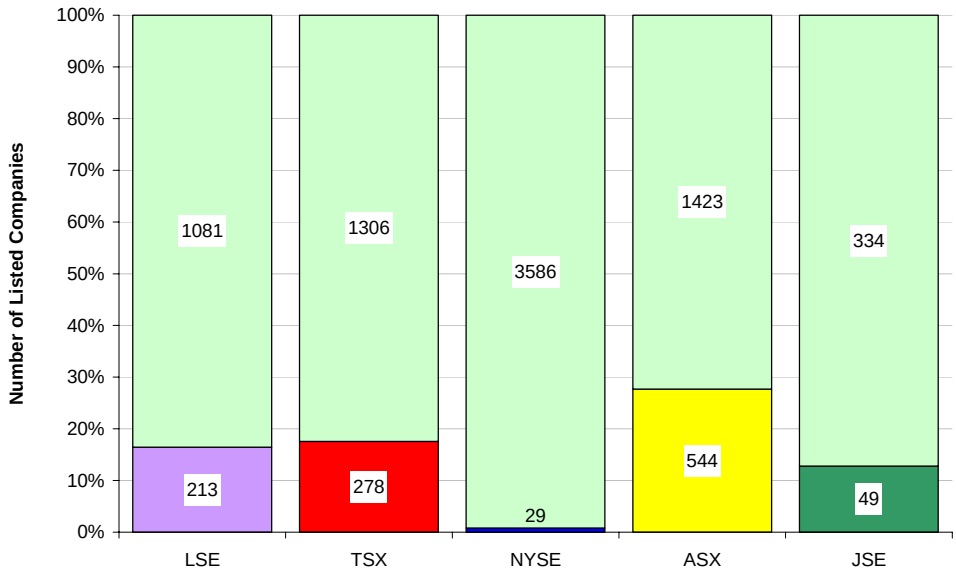


Source: Euromonitor international statistics database, 2006.

1.46 million people's livelihoods are dependent on the mining sectors being researched, supporting the view that the mining sector is an integral part of each country's economy, and their citizens' livelihoods and career prospects.

There are 1,113 (E companies on the TSX, LSE, NYSE, ASX and JSE representing 13 per cent of the 8,843 (Bloombergs, 2006) companies listed on these exchanges. Figure 4 shows that 28 per cent (Bloombergs, 2006) of all listed companies on the Australian stock exchange are mining companies, followed by 18 per cent (Bloombergs, 2006) of the TSX, 16 per cent (Bloombergs, 2006) of the LSE and 13 per cent (Bloombergs, 2006) of the JSE. This represents a large proportion of the total number of companies available for investors to invest in.

Figure 4: Relative number of listed mining companies to the total number of listed companies on the LSE, TSX, NYSE, ASX and JSE.



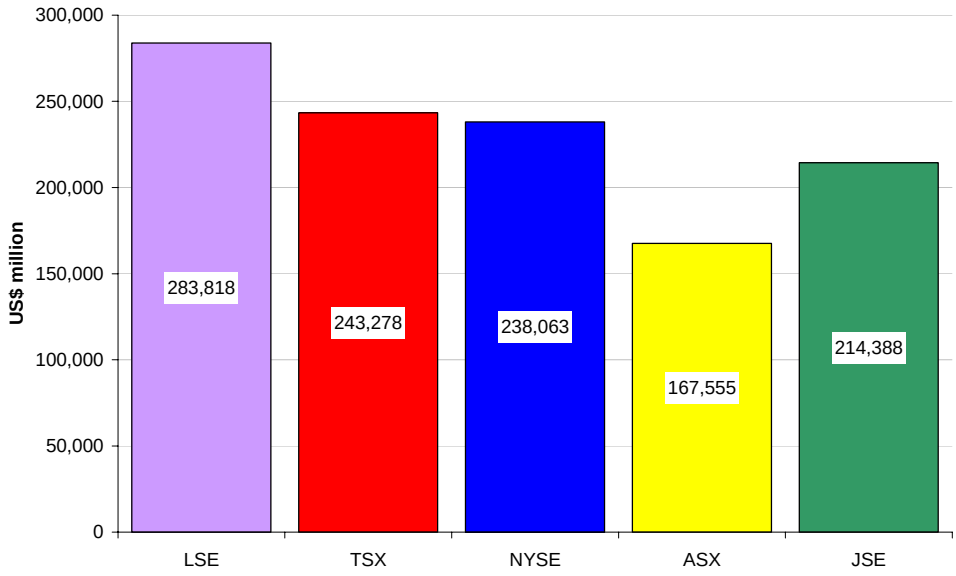
Source: Bloomberg database, LSE, TSX, NYSE and JSE websites.

The total market capitalisation of all listed mining companies on the aforementioned stock exchanges, as at October 2006, is US$1,147 trillion

[5] Source: Subscription electronic stock market database called Bloombergs

(Bloombergs, 2006) ched stock exchange has relatively similar mining sector market capitalisations ranging from US$168 billion for ASX to US$283 billion for the LSE (Bloombergs, 2006)[6].

Figure 5: Market capitalisation of the mining sector per exchange.

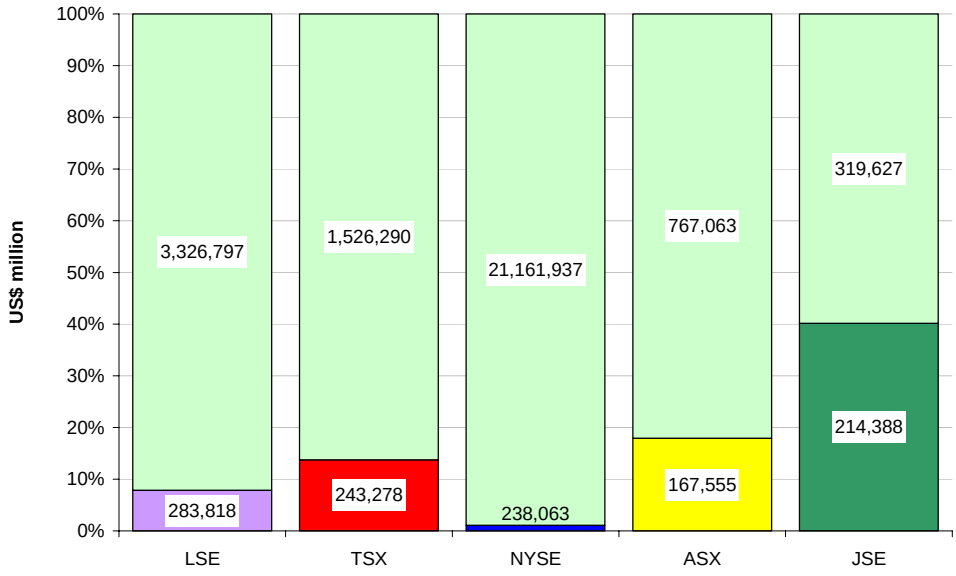


Source: Bloomberg database.

Figure 6 shows that 40 per cent[7] of the total market capitalisation on the JSE, 18 per cent[7] of the ASX and 14 per cent[7] of the TSX are mining stocks. Clearly demonstrating how significant the mining sector weighting is to these countries' equity markets. Mining has less of a sizable weighting on the NYSE and LSE with one per cent and eight per cent weighting, respectively.

[6] Source: Subscription electronic stock market database called Bloombergs
[7] Source: Bloomberg database, LSE, TSX, NYSE and JSE websites.

Figure 6: Market ca elative to the total market capitalisation per exchange.



Source: Bloomberg database, LSE, TSX, NYSE and JSE websites.

The mining sector of the researched countries, with US$237 billion (real 2005 US$ terms) GDP contribution for calendar year 2005 (Euromonitor, 2006)[8], the employment of 1,464 million people (Euromonitor, 2006), and market capitalisation of US$1,147 trillion (Bloombergs, as at Oct 2006)[9] shared among 1,113 (Bloombergs, 2006) listed mining companies; testifies to the immense size of this sector, its importance as an investment choice for investors and its contribution to each country's wealth.

[8] Source: Euromonitor international statistics database, 2006
[9] Source: Subscription electronic stock market database called Bloombergs

2.2. M&A ACTIVITY IN THE MINING SECTOR

The mining sector is subject to substantial M&A activity. Andrade, Mitchell and Stafford's (2001) M&A research of all listed firms in the NYSE, American Stock Exchange (AMEX) and NASDAQ revealed that the metal mining industry sector has been the number one ranked sector on average annual merger activity during the 1970s and 1990s.

Table 1: Top five industries based on average annual merger activity (Andrade, Mitchell and Stafford, 2001).

1970s	1980s	1990s
Metal Mining	Oil & Gas	Metal Mining
Real Estate	Textile	Media & Telecom.
Oil & Gas	Misc. Manufacturing	Banking
Apparel	Non-Depository Credit	Real Estate
Machinery	Food	Hotels

Mulherin and Boone's (2000) analysis of all listed industry sectors on the NYSE, AMEX and NASDAQ, during the period 1990-1999, revealed that 17 per cent of the listed metals and mining firms were acquired during this period. This supports the view that there is substantial M&A in the mining sector.

The evidence suggests that the mining sector is subject to substantial M&A activity, which is consistent with theory as to why this would occur. The literature is well versed in strategic rationales for M&A, from operating synergies, expanding markets or product lines, gaining technological expertise and providing a more efficient production system (Ketz, 2000). Other motivating

factors where the ai olders include differential efficiency, market integration, market irrationality, and agency ad information asymmetry related theories (Baker & Wurgler, 2000; Brealey & Myers, 2000; Damodaran, 1997; Gaughan, 1999; Gort, 1966; Stein, 1996; Shleifer & Vishny, 2001; Van Horne & Wachowicz, 1998).

Bhide (1989) describes six major groupings as the most likely motives for acquisitions:

- Build or redeploy corporate portfolio: Herein the expected benefit of an acquisition is the advancement of the acquirer's diversification strategy.
- Acquire undervalued assets: Acquirers believe the target is worth more than the purchase price, either because of stock market undervaluation or because of some anticipated change in demand, price, or costs affecting the firm's value.
- Improve efficiency by restructuring: Acquirer expects to profit from changing the target's strategy – for example, divesting certain business units, implementing cost reductions, or discontinuing unprofitable reinvestment.
- Create operating synergies: The benefits expected from combining or coordinating non-financial functions such as production or marketing.
- Maintain independence: When acquirers are under imminent threat of being taken over and seek an acquisition to neutralise the threat.
- Tax motives: The search for an acquisition is motivated by the acquirer's desire to take advantage of existing tax credits or tax loss carry forwards.

Managerial theory, eholder wealth is not a priority, includes ideas such as empire building, job security and the hubris hypothesis (Mueller, 1977 and Roll, 1986). Mitchell and Mulherin (1996) argue that a substantial portion of takeover activity could be explained by industries reacting to major shocks, such a deregulation, increased foreign competition, financial innovations and oil price shocks. Andrade, Mitchell and Stafford (2001) argue that one particular kind of industry shock, deregulation, accounts for nearly half of the merger activity since the late 1980s.

However M&A on a whole have proved to be largely unsuccessful for investors. Section 2.3 reviews the research done on the investment performance of M&A and how M&A has impacted shareholders' financial returns.

2.3. INVESTMENT PERFORMANCE OF ACQUIRING COMPANIES ENGAGED IN M&A

Strong opposing views exist in the literature as to whether mergers, acquisitions and "hostile" takeovers provide any benefit to shareholders. Porter (1987) argues that less than half of all acquisitions in the USA benefit shareholders of the acquiring company in the long run, as research found only 45 per cent of acquisitions were still retained by the acquirers seven years later. Black and Grundfest (1988) on the other hand suggest that US$134.4bn of shareholder gains accrued due to takeovers of public US companies during the period 1981-1986.

Studies of the short-term effects of M&A/takeovers indicate that they do create value on a whole, even though most of this value accrues to the target firm (Wimberley & Negash, 2004). Research in the USA and UK indicates that the shareholders of the target firms experienced gains of between 16 per cent and 45 per cent. Acquiring firms' shareholders, on the other hand, experienced abnormal returns ranging from -1.1 per cent to 7.9 per cent (see Jensen & Ruback, 1983; Franks & Harris, 1989; Becher, 2000; Mulherin & Boone, 2000; Kohers & Kohers, 2000). Andrade, Mitchell and Stafford (2001) supported this view with research in the USA over the period 1973-1998 indicating that the shareholders of the target firms experienced abnormal returns of 23.8 per cent over the announcement period (20 days prior to the merger announcement to the end of the merger closing date). Acquiring firms' shareholders, over the same period, experienced abnormal returns of -3.8 per cent.

An examination of the long-term share price effects of M&A is necessary to determine if the overall gains from M&A are permanent in nature and how they compare to those observed in the short-term studies (Wimberley & Negash, 2004). The long-term effects of all sector M&A in the USA and the UK have been examined extensively. Agrawal, Jaffe and Mandelker's (1992) study of mergers over the period 1955-1987 between NYSE acquirers and NYSE/AMEX targets found that stockholders of acquiring firms suffer a statistically significant loss of about 10 per cent over the five-year post-merger period.

Barnes' (1984) stuc L974 and February 1976 quoted on the LSE revealed that while there were slight share-price gains around the time of the merger, there were substantial and significant price decreases in the longer term after the merger. By month 25, the cumulative average residual had fallen to -11.25 per cent before rising back to -4.7 per cent in month 40 and falling again to -6.3 per cent within the 60-month period.

Gregory's (1997) study of UK takeovers over the period 1984-1992 showed that the two-year post-takeover performance for these UK acquirers was significantly negative, ranging between -8.15% and -11.15% depending on the methodology used.

Kennedy and Limmack's (1996) study of UK quoted companies involved in takeover bids in the period January 1980 to December 1989 showed that the two-year post-takeover mean excess returns for these UK bidders was -4.92 per cent.

Limmack's (1991) study examined the distribution of returns and wealth changes to shareholders of target and bidder firms in UK takeover bids over the period 1977-1986. The results demonstrate that, although there is no net wealth decrease to shareholders in total as a result of takeover activity, shareholders of target firms obtained significant positive wealth increases at the expense of bidder firms. Bidder firms showed -18.2 per cent wealth changes to shareholders over the two-year post-takeover period.

Rau and Vermaelen and 348 tender offers with acquirers listed on the NYSE, AMEX, and NASDAQ, and bids announced between January 1980 and December 1991. The study found that, on average, acquirers in mergers underperform equally weighted control portfolios by a statistically significant four per cent over a period of three years after the merger completion date.

Franks, Harris & Titman, 1991; Loderer & Martin, 1992; Lougharan & Vijh, 1997 and Mitchell & Stafford, 2000 support the views expressed by Agrawal, Jaffe & Mandelker, 1992; Barnes, 1984; Gregory, 1997; Kennedy & Limmack, 1996; Limmack, 1991; and Rau & Vermaelen, 1998, all indicating that the shareholders of the acquiring firms in most instances lose value. The negative abnormal returns were as high as 20 per cent.

Research in South Africa supports the notion that the long-term effects of M&A destroy value. Wimberley and Negash (2004) researched the long-term (36 months after first announcement) effects of M&A in South Africa's industrial sector, concluding that the cumulative abnormal monthly returns for the 36 months after the announcement are a significant -10.5 per cent. A shareholder is therefore worse off investing in firms that engage in M&A events.

This is especially true in the case of "hostile" takeovers. Peter Drucker (1986) is quoted as saying, "There can be absolutely no doubt, that hostile takeovers are exceedingly bad for the US economy." Acquired companies are burdened with "heavy debt", which is said to "severely impair the company's potential for

economic performa for "hostile" acquirers to recoup the premia they have paid for the target, and because so much of their cash flow is committed to servicing debt, acquirers stop investing in the future. Spending on capital equipment, research and development of new products is cut back and acquisitions are harvested for cash or short-term profits. Consequently, long-term performance deteriorates after a "hostile" takeover.

Bhide's (1989) study of 47 "hostile" takeovers (over US$100m in value) that were attempted in 1985 and 1986, shows that the five-year average return on equity of "friendly" targets was some three per cent higher than their industry average as compared to two per cent for "hostile" targets; and their five-year average stock returns outperformed the industry average by 18 per cent as compared to minus four per cent for "hostile" targets.

The issue of whether the nature of the merger/takeover (i.e. "hostile" versus "friendly") has an impact on investment performance has gone relatively unexplored. Furthermore, the impact in the M&A active mining sector too has gone relatively unexplored. This study aims to test whether the investment performance of mining company acquirers, over the long term, has anything to do with the nature of the M&A ("hostile" versus "friendly").

CHAPTER 3: HYPOTHESES

The long-term effects of all-sector M&A have been examined extensively, with most researchers claiming that M&A destroy value. The mining sector constitutes a large proportion of the total JSE (40 per cent), ASX (18 per cent) and TSX (14 per cent) market capitalisations[10] and thus the importance of this sector to investors can't be understated. The world's major mining bourses namely, TSX, JSE, LSE, NYSE and ASX, are investigated to analyse the investment performance effects of M&A on the mining sector in specific. Hypotheses one and two aim to test whether all M&A in the mining sectors destroy value in the long term:

1. The investment performance of acquirers involved in a "friendly" merger/takeover declines post-merger/takeover compared with pre-merger/takeover.
2. The investment performance of acquirers involved in a "hostile" takeover declines post-takeover compared with pre-takeover.

Hypothesis three aims to test whether the nature of the merger/takeover, "friendly" or "hostile", has an impact on the investment performance of the acquired/merged entity. The expectation being that "hostile" will be more negative than "friendly". Hypothesis three tests this assertion:

3. The investment performance of companies formed by "hostile" takeovers is lower than those formed by "friendly" mergers/takeovers.

[10] Source: Subscription electronic stock market database called Bloombergs

Statistical analysis of long-term share price data (36 months pre- and post-takeover or merger) will be used to test the hypotheses. Monthly closing share prices of acquirers and the bourses' mining index are both indexed to the date of first formal announcement date of the merger/takeover. The percentage time the indexed share price outperforms the mining index during the 36 months pre first formal announcement date and post, known as the "investment performance", is measured for each merger/takeover. The sample is divided into two sub-samples, "hostile" mergers/takeovers and "friendly" mergers/takeovers. Hypotheses one and two compare the investment performance of the acquirers within each sub-sample, pre and post first formal announcement date. Hypothesis three compares the investment performance post first formal announcement across sub-samples ("hostile" versus "friendly").

CHAPTER 4: RESEARCH METHOD

The study aims to apply quantitative research (testing formal relationships between variables) to assess whether the investment performance of acquirers varies depending on the hostility of the transaction. The study's design classification is that of a "formal study" in which time series data are used to test hypotheses. The research method is documentary research. Scott (2006) describes documentary research as research that involves the use of texts and documents as source material. The study's source material is the relevant mining company's share price data and mining index data sourced from the TSX, JSE, LSE, NYSE and ASX. The dependent variable is the investment performance of the acquiring company pre and post first formal announcement date of the merger/takeover. The independent variable is the nature of the transaction, either "friendly" or "hostile" takeover/merger.

There are marked similarities between quasi-experimental research of the interrupted time-series design and this study's documentary research. Experimental research attempts to show that the intervention (independent variable) changes the dependent variable of the units of analysis considerably according to the hypothesis (Welman & Kruger, 2001). In the interrupted time-series design, more than one measure of the dependent variable is obtained, with equal intervals before and after the intervention (Welman & Kruger, 2001). This study's documentary research collected historical data in which the intervention (cornerstone of any form of experimental research) is either a

"friendly" or "hostile ence between this study and the quasi-experimental research design is that this study's documentary research analysed past mergers/takeovers and their impact on the investment performance historically, as opposed to experimenting with organisations today, as implied by true experimental research.

4.1. POPULATION OF RELEVANCE

The population of relevance consisted of all TSX-, ASX-, JSE-, LSE- and NYSE-listed mining sector companies that have undergone "hostile" takeovers or "friendly" merger transactions over the period 1974-2003. The criteria used in determining the population of relevance included:

- The takeovers or mergers needed to be made by mining/resource companies.
- The mining/resource companies needed to be listed companies and not private (example: family owned) companies.
- The mining/resource companies needed to be listed on the TSX, ASX, JSE, LSE, NYSE or Vancouver stock exchanges.
- The merger/takeover activity needed to be during the period 1974-2003. The sample period closed in 2003 as all subsequent mergers/takeovers would not have the full 36 months of complete trading months post-merger/takeover.
- The merger or takeover needed to be a transaction that involved greater than 50 per cent of the target company being acquired by the acquirer;

50 per cent w oint at which a company is deemed to have majority control (shareholding).

4.2. PROPOSED UNIT OF ANALYSIS

The unit of analysis is the company; that is, listed mining companies on the TSX, JSE, LSE, NYSE, ASX and Vancouver (Canadian) stock exchanges that have engaged in “hostile” or “friendly” M&A activity over the period 1974-2003.

4.3. SAMPLING METHOD AND SIZE

A sample of 16 mining mergers/takeovers is used in the analysis. The exact size of the population is unknown. A primary data set of 64 mining mergers and takeovers was collected during the first screening phase. However, only 16 of these 64 had the complete monthly share price data sets required to be used in the final sample. For each company, 36 months of time series share price data pre- and post-merger/takeover activity needed to be available. Ideally the whole population of relevance would have been used in the data analysis. The size of the population usually makes it impractical and uneconomic to involve all the members of the population in the research project (Welman and Kruger, 2001). The final sample was thus all those companies that fell within the population of relevance criteria and had complete share price data sets.

The sampling meth ıdom sampling. Stratified because the population in focus was composed of two clearly recognisable, non-overlapping subpopulations that differ from one another mutually in terms of a variable (Welman & Kruger, 2001), the variable being whether the company had undergone a “friendly” merger or “hostile” takeover. In that way, analysis of the two sub-samples (“hostile” and “friendly”) could be performed and compared with each other to determine whether there are investment performance differences between the two sub-samples.

4.4. DATA COLLECTION METHOD

The research method used was that of documentary research. Scott (2006) describes documentary research as research that involves the use of texts and documents as source material. There were no face-to-face interviews. Electronic data searches were used to identify companies that fit within the population of relevance. Electronic databases included: Thomson Financial Sector Data Worldwide Merger and Acquisition, Factiva (a product of Reuters), company websites (downloaded company annual reports), Metals Economics Group Strategic Report, McGregor’s Who Owns Whom, Ernst and Young's Review of Merger and Acquisition Activity, Skillings International Yearbook, market intelligence websites[11] and online newspaper reports[12].

[11] www.marketwatch.com
[12] such as the New York Times
http://query.nytimes.com/gst/fullpage.html?res=9C04EFDC1030F935A35756C0A961958260

Once the primary (; was identified, monthly share price and stock exchange mining indices were collected from sources such as the Financial Forecast Center, NYSE website[13], Dow Jones website[14], Bloombergs, I-Net Bridge Station, Factiva Station and McGregor BFA Station.

4.5. DATA COLLECTION DESIGN TOOL

Data collected through electronic and documentary research were screened for key information, which was inserted into a model template (Appendix A). Information extracted included the:

- acquirer's company name, primary listing, stock exchange code;
- current company name of the acquirer if there has been a name change between the transaction date and November 2006;
- target company name, primary listing of target;
- type of transaction: merger, acquisition/takeover;
- the percentage of the target company acquired by acquirer;
- nature of transaction: "friendly" or "hostile";
- first formal announcement date of the transaction;
- final transaction date; and
- value of transaction.

This study uses Shleifer & Vishny's (1991) definition of "friendly" mergers/takeovers as those that are carried out with the consent of the

[13] www.nyse.com
[14] http://djindexes.com/mdsidx/index.cfm?event=showAvgMethod

management of the ell and Stafford's (2001) definition of "hostile" takeovers as those where the target company's management publicly rejects it, or describes it as unsolicited and "unfriendly".

The first formal announcement date of the transaction is an important date to note. Once a merger/takeover is announced, the financial markets immediately start to factor in the value addition or destruction reflected in the company's share price. The final transaction date is the date at which the formal proceedings of a merger/takeover are concluded. The fact that markets start to reflect merger/takeovers in a company's share prices the moment information arrives means the first formal announcement date is thus the date preceding which investment performance is deemed pre-merger/takeover and after which investment performance is deemed post-merger/takeover.

The documentary research at that stage had identified a primary data set of 64 transactions involving 128 companies that had been extracted and imported into the template seen in Appendix A. The next stage involved re-checking that no duplication of transactions existed, all transactions involved greater than 50 per cent of the target acquired, all companies were mining/resource listed companies, and that all companies were listed on the JSE, LSE, ASX, TSX, NYSE or Vancouver stock exchanges. Since 36 months of share price data pre and post first formal announcement date was needed, all transactions that took place post-October 2003 were excluded. The primary data set now included 64 transactions, which, provided share price data could be found, could be used in the analysis. To identify the final sample to be used in the statistical hypothesis

testing, further elec to find complete sets of monthly share prices for both the acquirer and target within each transaction. Share price data needed to have adjustments made for historical events such as share splits and other major capital events such as corporate unbundling of assets and special dividends. This was done by eyeballing and trawling through each transaction's graphed time series of indexed share prices versus the corresponding mining index. Appendix B demonstrates the graphed time series data of the 16 transactions included in the final sample. Major capital events such as corporate unbundling, share splits and others, would result in obvious rises and falls in graphed indexed share price data within the space of a day's trading. The eyeballing of the data confirmed the data provider's assertions that the data has been adjusted for share splits and hence the data did not require further adjustments.

In the event that an acquirer performs multiple M&A events within the analysis period (i.e. 36 months post-merger/takeover), the transaction is excluded from the final sample as the share price is deemed to be contaminated because it reflects numerous transactions by the same firm.

For the NYSE, TSX, LSE, JSE and ASX, a mining index was required against which to compare the acquirers' share price performances. The following mining indices were used:

- NYSE: the Dow Jones United States Mining Index (DJUSMG);

- ASX: the AS -July 2002 and AS45 for the period April 2000-August 2006. The AS27 was discontinued by the ASX as at July 2002;
- TSX: the TSX metal and minerals index (0100I) for the period January 1988-January 2004 and capped diversified metals and mining index (SPTSMN) for the period January 1998-September 2006. The 0100I was discontinued by the TSX as at January 2004;
- JSE: the mining index (ACI10) for the period January 1991-July 2002 and mining index (J177) for the period June 1995-September 2006; and
- LSE: the FTSE all-share mining index (FAMNG) for the period January 1987-September 2006.

Of the 64 transactions in the primary data set (128 companies: 64 acquirers and 64 targets), 16 transactions had:

- complete monthly closing share price data 36 months pre and post first formal transaction announcement data; and
- corresponding stock exchange mining index data 36 months pre and post first formal transaction announcement data.

In summary, this extensive data screening and scrubbing process had resulted in an impeccably “clean” final sample of 16 transactions, nine “friendly” mergers and seven “hostile” takeovers.

The scrubbed final sample set of 16 transactions was stratified into two subgroups, those M&A that were “hostile” in nature and those that were “friendly”. Three analysis approaches were adopted in preparing data to assess the performance of 16 acquiring companies within the 16 mergers/takeovers:

1. The share prices and respective stock exchange mining indices were all indexed to the month preceding the first formal announcement date. For the 36 months of indexed share price date pre first formal announcement date, the percentage time the acquirer’s share price index is lower than the mining index is calculated. This percentage tells us how often the share price outperforms the mining index. The same calculation is calculated for acquirers post-first formal announcement date. However this percentage is calculated on how much time the indexed share price data was higher than the relevant stock exchange mining index. This too indicates how much time the share price index outperforms the index. By comparing the post and pre first formal announcement date stock outperformance percentages for each acquiring company, it was determined whether the acquirer’s investment performance decreased or increased post-takeover/merger. The average of the nine “friendly” acquirers’ outperformance percentages and the seven “hostiles” were compared to get a feel for the differences between the two sub-samples.
2. The indexed share price in the 36th month post-first formal announcement date is compared to the corresponding mining indexed figure. Dividing the mining index into the share price index and

calculating th rowth rate calculates the percentage above or below the index the acquirer performed on an annualised basis. Negative percentages indicate underperformance by the acquirer compared to the mining index, and conversely positive percentage indicates the percentage the acquirer outperformed the mining index. The average of all the acquirers engaged in "hostile" takeovers is compared to "friendly" mergers.

3. The distribution of "hostile" takeovers investment outperformance, pre- and post-merger/takeover as defined in 1. above, was compared with "friendly" mergers using hypothesis testing statistical techniques. A two-sampled t-test was used to test if there is a significant statistical difference between the means of the:
    - investment outperformance of "friendly" acquirers pre and post merger/takeover announcement date;
    - investment outperformance of "hostile" acquirers pre and post merger/takeover announcement date; and
    - investment outperformance of "hostile" versus "friendly" acquirers post-merger/takeover. In essence, this meant analysing whether the means of the two stratified sub-samples were statistically significantly different to conclude that the nature of the deal ("hostile" or "friendly") resulted in higher or lower investment performance.

Andrade, Mitchell and Stafford (2001) argue that a distinction needs to be made between stock-financed mergers/acquisitions and the others, such as cash purchases. The basic idea is that managers of the acquiring firm are more likely to issue equity when they perceive that the acquirer is overvalued by the stock market, than when undervalued. Consequently, investors observing an equity issue will bid down the stock price, which comes through the analysis as being a destruction of value due to the merger/takeover. This research study did not stratify the population into acquirers that used stock-financing and those that did not due to this variable not being included in the scope of the research project. A potential MBA research topic for future students could be, “An investigation of the investment performance effects of stock-financed versus cash-purchased M&A”.

Andrade, Mitchell and Stafford (2001) raise the concern that the fundamental problem in any long-term investment performance study is that to reliably measure long-term abnormal returns (value adding or destructive), one must first be able to measure long-term expected returns precisely – and no one has provided a convincing way to do this. The approach proposed in this research report, that is, that the investment performance is the share price return over or below the mining index return, might be useful in comparing “hostile” and “friendly” subgroups. However, it doesn’t describe the actual abnormal returns that a shareholder could have experienced if the merger or takeover did not take place. Strictly, long-term performance can be assessed in many ways. The

three most common firm event studies include the cumulative abnormal returns (Agrawal *et al.*, 1992; Rau & Vermaelen, 1998), the buy-and-hold abnormal returns (Barber & Lyon, 1997; Loughran & Vijh, 1997) and the calendar-time abnormal returns method (Mitchell & Stafford, 2000). However, for the sake of this study, the buy-and-hold method described is adopted to assess performance because it gives an economically useful figure in understanding what the outperformance/underperformance of the acquirer is in the event that you buy the stock and hold it over the merger/takeover period.

The sample size of 16 acquirers is also considered too small to draw definitive research conclusions. Further research may yield a large sample which would allow for parametric statistical hypothesis tests.

Notwithstanding these limitations, this study is important because it gives the investment community of the world's major mining bourses insight into whether the nature of M&A has an impact on the investment performance of mining acquirers. Since the mining sector constitutes as much as 40 per cent of the market capitalisation of these mining bourses, it's little wonder that this study is of interest to mining company shareholders.

CHAPTER 5: DATA SET

Extensive documentary research of electronic databases, such as Thomson Financial Sector Data Worldwide Merger and Acquisition, Factiva (a product of Reuters), company websites (downloaded company annual reports); publications of Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of Merger and Acquisition Activity, Skillings International Yearbook; market intelligence websites[15] and online newspaper reports[16]; collected a primary data set of 64 mergers/takeovers that met the criteria stipulated in the population of relevance (section 4.1). This chapter is divided into three sections, the first (5.1) describes the primary data set of 64 mergers/takeovers, the second (5.2) describes the final sample of 16 mergers/takeovers used in the statistical hypothesis testing and the third (5.3) describes high-level analytical statistics on the final sample.

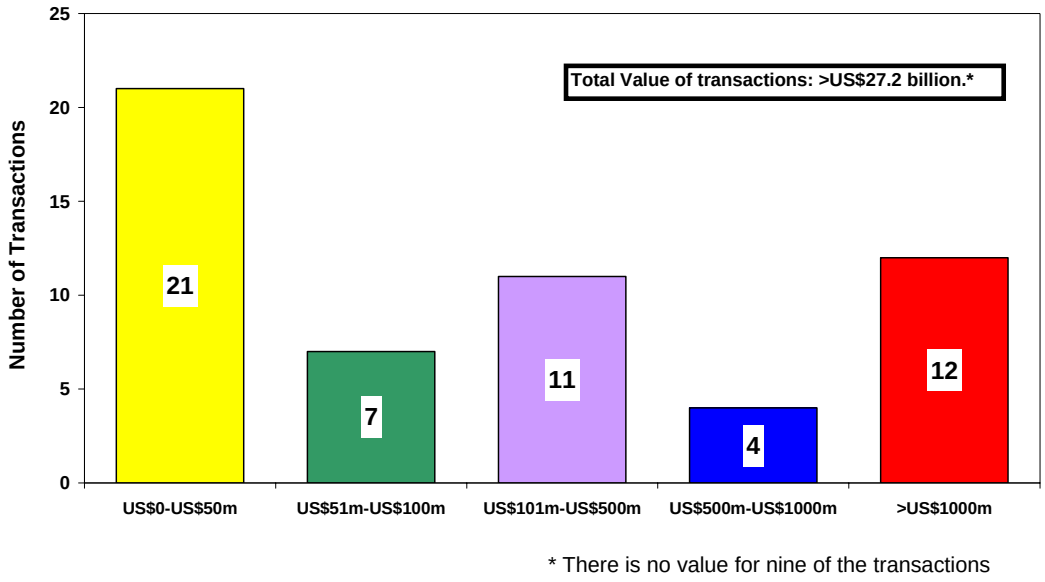
5.1. DESCRIPTIVE STATISTICS OF PRIMARY DATA SET

The total value of all 64 mergers/takeovers in the primary data set is greater than US$27.2 billion. Values for nine of the transactions are not included due to the difficulty of finding details about the transaction whilst conducting documentary research.

[15] www.marketwatch.com
[16] such as the New York Times
http://query.nytimes.com/gst/fullpage.html?res=9C04EFDC1030F935A35756C0A961958260

Figure 7 shows that ; well spread, with 38 per cent (21 out of 55) of the transactions between US$0-US$100 million and 22 per cent above US$1,000 million in value. The primary data set is thus not hugely biased to one transaction value range category.

Figure 7: Transaction sizes (values) in the primary data set.

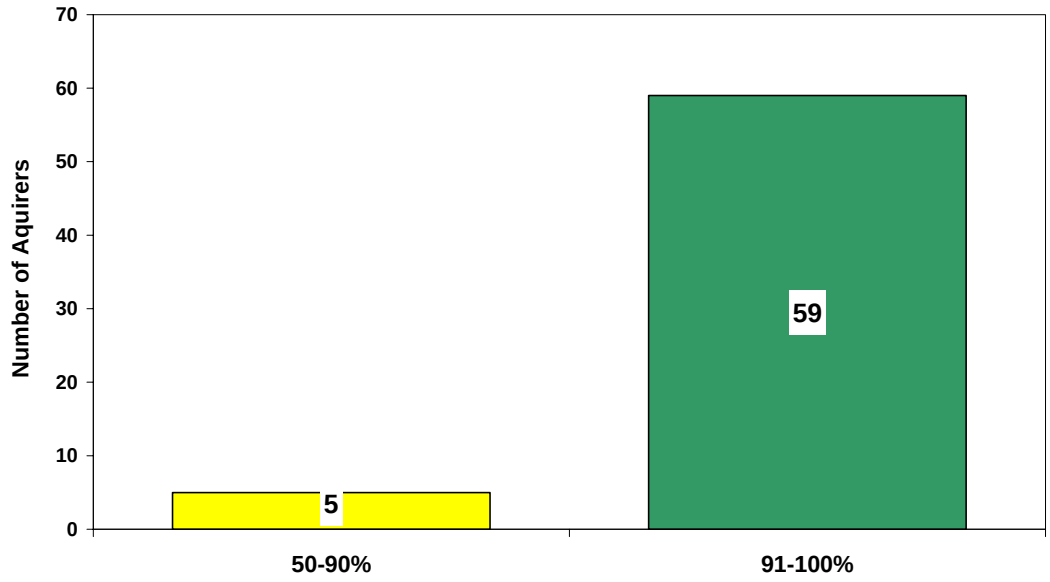


* There is no value for nine of the transactions

Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

92 per cent of all th 8, involved the purchase of 91-100 per cent of the target company share capital. Thus there is little doubt that the acquirers had effective control of the targets once acquired.

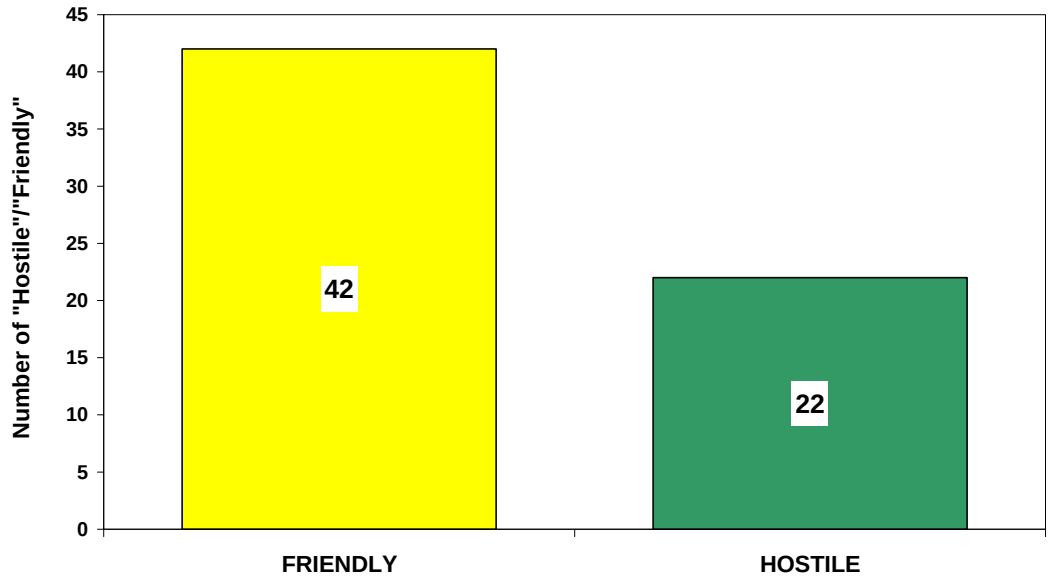
Figure 8: The primary data set's percentage of target company acquired by acquirer.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

Figure 9 shows tha ntified, 22 are “hostile” in nature and 42 “friendly” in nature; thus, the primary data set is indeed biased towards “friendly” mergers/takeovers.

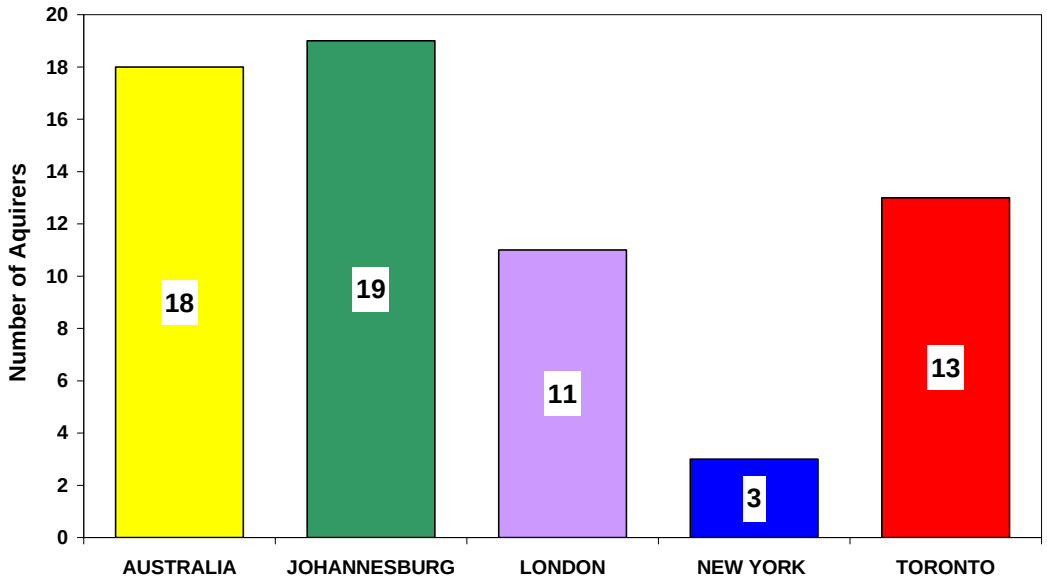
Figure 9: Number of “hostile” and “friendly” mergers/takeovers in the primary data set.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor’s Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

Figure 10 shows th rises 18 ASX-, 19 JSE-, three NYSE-, 13 TSX- and 11 LSE-listed companies. The primary data set thus has a wide distribution of acquirer listings with only NYSE listings being few in number.

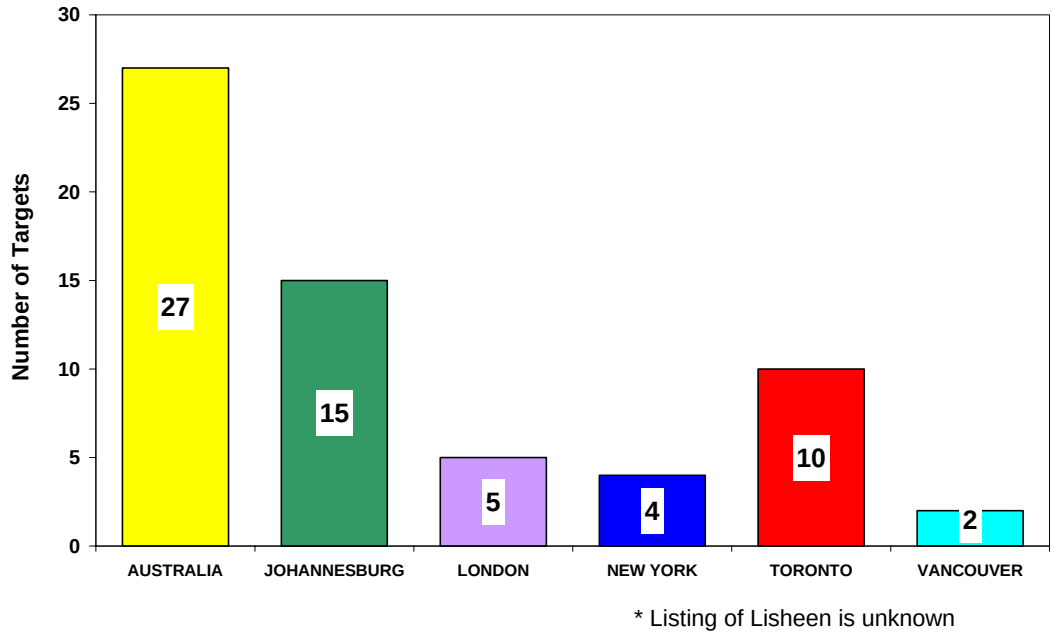
Figure 10: Distribution of acquirers' primary listings in the primary data set.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

The target companies are well represented across the different stock exchanges investigated, with 27 ASX-, 15 JSE-, four NYSE-, 10 TSX-, two Vancouver- and five LSE-listed companies, as seen in Figure 11.

Figure 11: Distribution of target companies' primary listings in the primary data set.

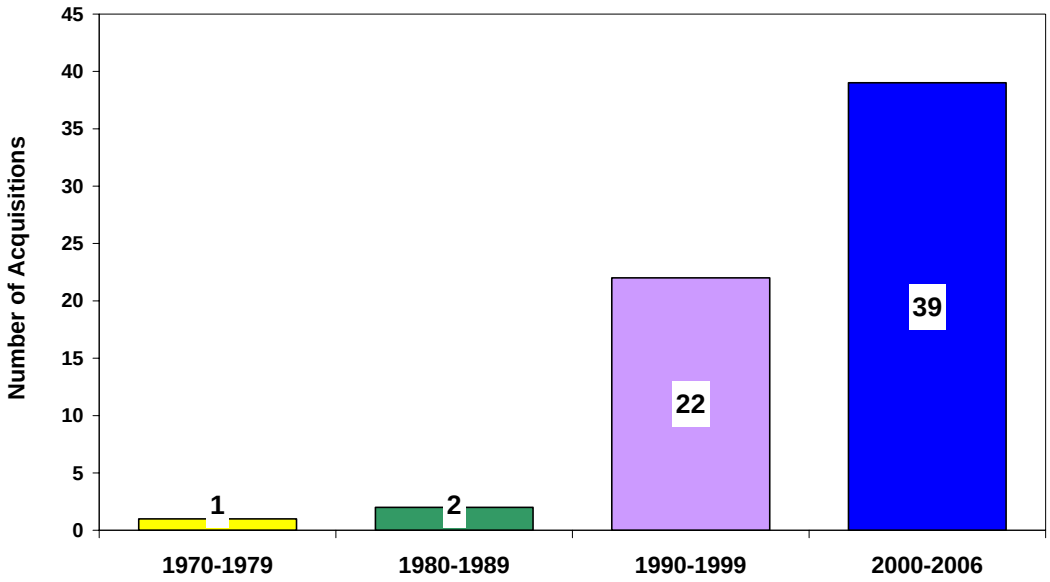


* Listing of Lisheen is unknown

Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

The dates when all between June 1974 and October 2003 with figure 12 showing that 34 per cent (22 out of 64) of the transactions took place between 1990 and 1999 and 61 per cent (39 out of 64) between 2000 and 2003. The primary data set is thus biased towards recent M&A activity of the 1990s and 2000s.

Figure 12: Distribution of merger/takeover transaction dates in the primary data set.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

5.2. DESCRIPTIVE STATISTICS OF FINAL SAMPLE

The primary data set of 64 mergers/takeovers were all identified as potential companies to be included in the final sample. However not all companies in the primary data set had all the necessary share price history and some were contaminated by multiple M&A events. The primary data set was thus subjected to a rigorous data scrubbing process to ensure that contaminated data was removed and only clean data points were used in the final sample. The scrubbing and screening process of the primary data set involved numerous steps to finalise the composition of the final sample:

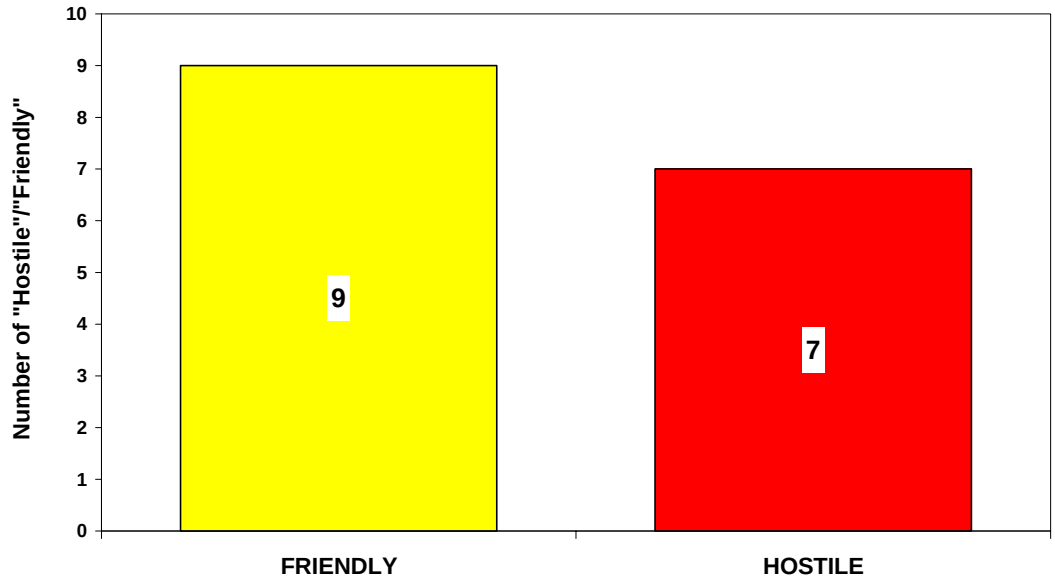
- Mergers/takeovers needed to have complete 36-month share price time series data, pre and post first formal announcement. Online electronic databases such as Bloombergs, Factiva (Reuters) and BFA McGregor didn't have historical share price data of some of the companies identified in the primary data set and hence couldn't be included in the final sample. Other companies de-listed within the 36-month window, preventing them from being included in the final sample.
- Acquirers that had undergone more than one M&A activity within the 36-month window of a transaction were deemed contaminated and excluded. This ensured that there was no contamination of the share price data by other M&A activity whilst trying to analyse the investment performance effects of a particular transaction.
- The share price data collected needed to have adjustments made for historical events such as share splits and other major capital events

such as corp ecial dividends. This was done by eyeballing and trawling through each transaction's graphed time series of indexed share prices versus the corresponding mining index. Appendix B demonstrates the graphed time series data of the transactions included in the final sample.

Of the 64 transactions in the primary data set, 48 transactions were eliminated due to being contaminated by more than one M&A event within the 36-month window, becoming de-listed or not having complete historical share price data records. The final sample of 16 transactions is thus deemed "clean" due to a thorough scrubbing and screening process, giving the researcher comfort that sound analytical outcomes could be inferred from this final sample. The final sample included nine "friendly" mergers/takeovers and seven "hostile" takeovers. The remainder of this chapter describes the final sample, looking for any obvious sample bias.

Figure 13 shows th included in the sample, seven were “hostile” in nature and nine “friendly” in nature. The final sample thus has two sub-samples not too dissimilar in the number of transactions.

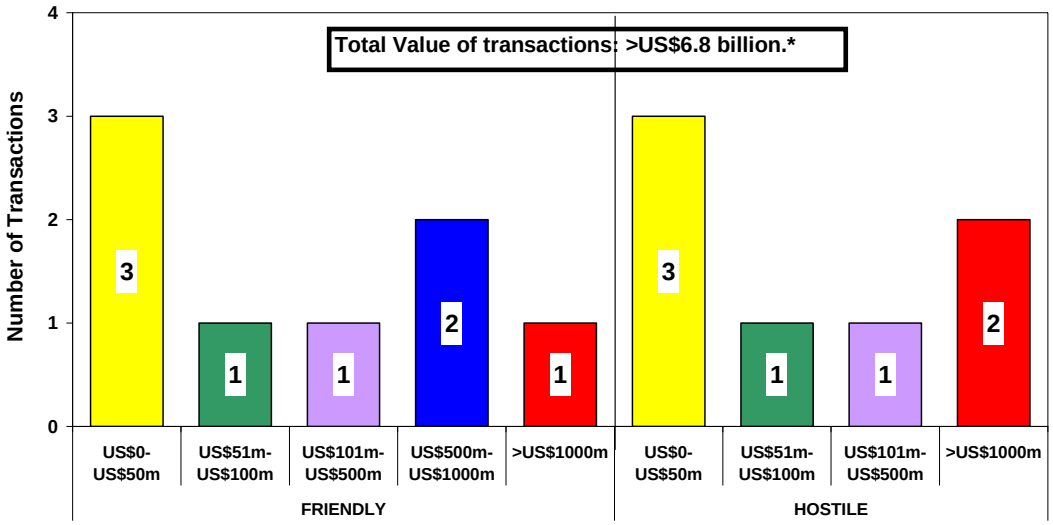
Figure 13: Number of “hostile” and “friendly” mergers/takeovers in the final sample.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor’s Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

The total value of th 6.8 billion. Values for one of the transactions are not included due to the difficulty of finding details about the transaction whilst conducting documentary research. Figure 14 shows that the range of transaction values is well represented across the size categories with 40 per cent (six out of 15) between US$0-US$50 million and 20 per cent (three out of 15) greater than US$1,000 million. The final sample is thus not hugely biased to one transaction value range category.

Figure 14: The range of transaction sizes (values) in the final sample.

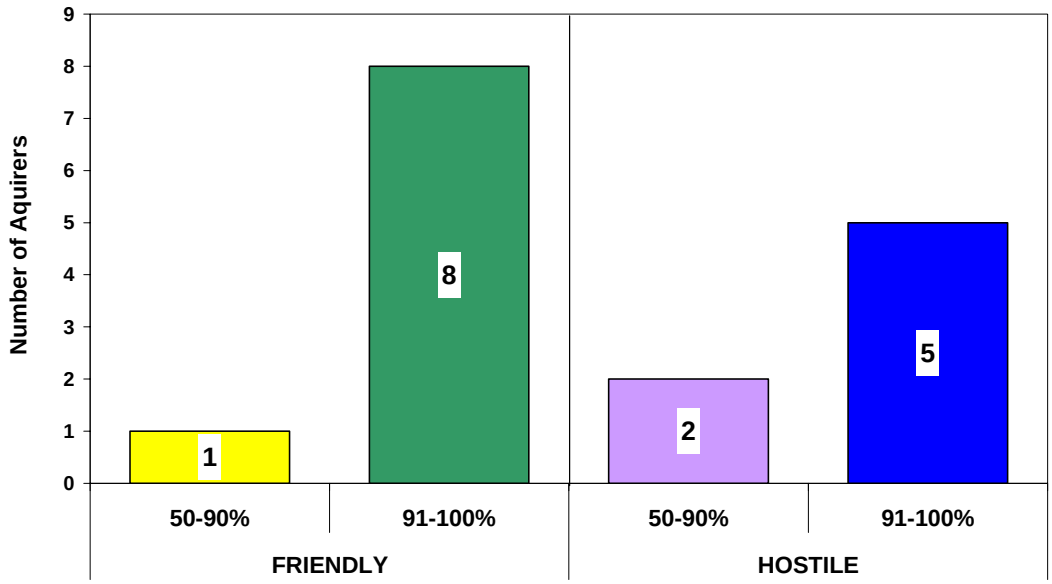


* There is no Value for 1 of the friendly transactions

Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

89 per cent (eight) of the final sample of "friendly" mergers/takeovers, as shown in figure 15, involved the purchase of 91-100 per cent of the target. Similarly, 71 per cent of all the "hostile" mergers/takeovers involved the purchase of 91-100 per cent of the target. There can be little doubt that the acquirers had effective control of the targets once acquired.

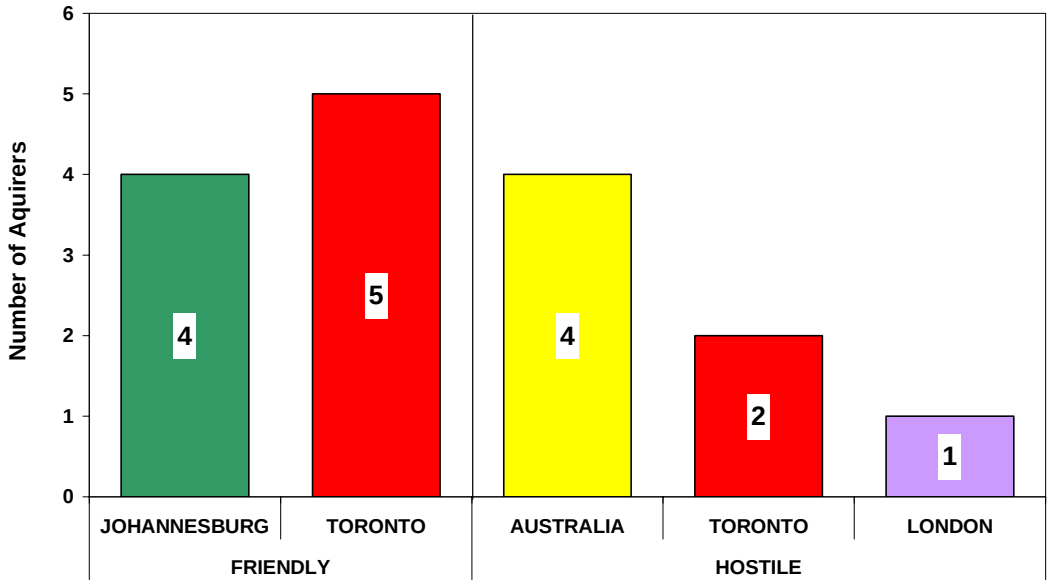
Figure 15: The final sample's percentage of target company acquired by acquirer.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

Figure 16 shows th acquirers comprises five TSX- and four JSE-listed companies, whilst the "hostile" acquirers comprise two TSX-, one LSE- and four ASX-listed companies. Interestingly, figure 16 shows that no JSE-listed mining companies in the final sample were involved in "hostile" mergers/takeover only "friendly" and vice versa for ASX-listed companies. More research would be needed to justify the claim that Australian listed companies have traditionally been more aggressive than their South African counterparts when undertaking M&A activity.

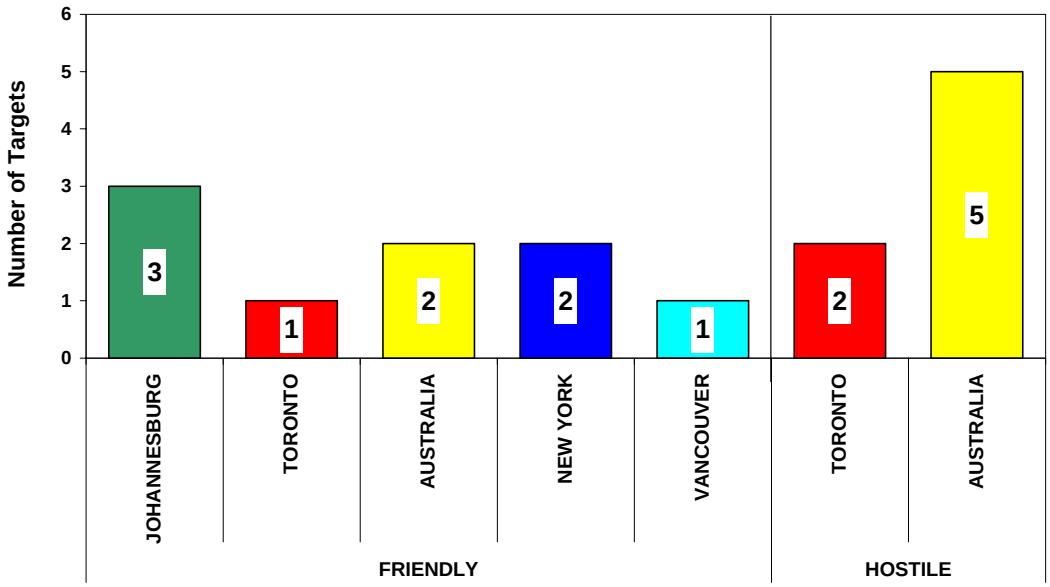
Figure 16: Distribution of acquirers' primary listings in the final sample.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

Figure 17 shows th y" mergers/takeovers are well spread between the different stock exchanges investigated, with two ASX-, three JSE-, two NYSE-, one TSX- and one Vancouver-listed company. The sample of target companies in "hostile" takeovers is comprised of five ASX- and two TSX-listed companies. Once again this suggests that Australian listed companies have traditionally been more aggressive than their South African counterparts, as no JSE-listed mining companies in the final sample have been subjected to "hostile" takeover.

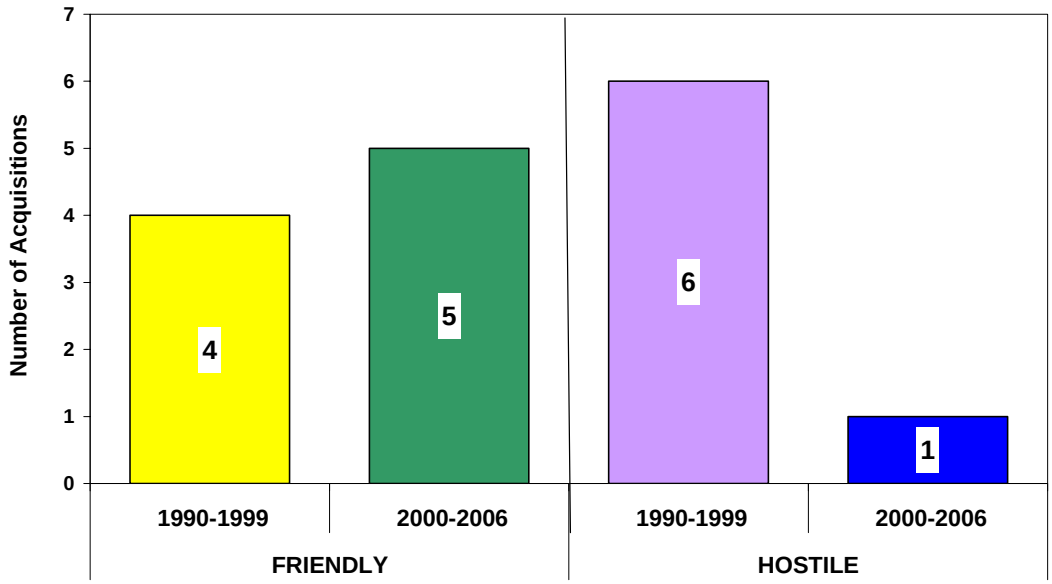
Figure 17: Distribution of target companies' primary listings in the final sample.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

Figure 18 shows f 16) of the sampled mergers/takeovers took place between 1990 and 1999, with the remaining post-2000. The final sample is thus biased towards recent M&A activity of the 1990s and 2000s, as no 1974-1989 transactions found in the primary data set made it into the final sample, due largely to limited historical share price data available for these transactions.

Figure 18: Distribution of merger/takeover transaction dates in the final sample.



Source: Derived from TFSD Worldwide M&A database, Factiva, company websites, Metals Economics Group Strategic Report, McGregor's Who Owns Whom, Ernst and Young's Review of M&A Activity, Skillings International Yearbook, market intelligence websites & online newspaper reports.

5.3. ANALYTICAL STATISTICS ON THE FINAL SAMPLE

The final sample of 16 acquirers have investment performance statistics listed in tables 2 and 3 below. Tables 2 and 3 show the analytical results of the final sample as performed using the investment performance analysis approach, numbers one and two, described in section 4.6. To summarise these analytical approaches, analysis approach one looked at the percentage time the stock outperformed the mining index during the 36 months pre and post first formal announcement date of the merger/takeover. Analysis approach two looked at the three-year cumulative annual growth rate showing how the acquirer had outperformed the mining index over the period from the first formal announcement date to 36th months post-announcement.

Table 2: "Friendly" acquirers' investment performances pre and post first formal announcement date.

Acquirer	Friendly / Hostile	First formal announcement date	% time acquirer outperforms mining index pre formal announcement date	% time acquirer outperforms mining index post formal announcement date	Acquirer's CAGR investment performance above/(below) mining index
AngloGold	Friendly	11 October 1999	50%	0%	-12%
Teck	Friendly	26 July 2000	8%	53%	-0.1%
Lionore Mining International	Friendly	03 June 2003	97%	2.8%	-38%
Rooiberg Tin Ltd (Metorex)	Friendly	20 February 1997	3%	0%	-31%
General Mining Union (Gencor)	Friendly	10 October 1997	6%	94%	11%
Western Areas Gold Mining Company	Friendly	25 January 1994	94%	94%	12%
Solitario Resources	Friendly	12 July 2000	61%	0%	-31%
Barrick Gold Corporation	Friendly	25 June 2001	3%	50%	-12%
First Quantum minerlas	Friendly	21 August 2001	67%	67%	32%
AVERAGE			**43%**	**40%**	**-8%**
% acquirers with declining investment performance post-acquisition			**67%**		
% acquirers with imroving investment performance post-acquisition			**33%**		

Source: Derived from Arne Hansen analysis of data sourced from the Financial Forecast Center, NYSE website, Dow Jones website, Bloombergs Station, I-Net Bridge Station, Factiva Station and McGregor BFA Station.

Table 2 lists the nin[illegible]mple. The nine acquirers include: AngloGold, which acquired Acacia Resources of Australia for 832 million Australian dollars; Teck's merger with fellow TSX-listed Cominco for US$1049 million; Lionore Mining International's merger with Australia's Dalrymple Resources on the 3rd June 2003; South Africa's Rooiberg Tin Ltd merging with fellow South African Maranda Mining on the 20th February 1997; General Mining Corporation's US$426 million merger with JSE-listed Asteroid; the South African gold mining merger of Western Areas with South Deep Exploration valued at US$505 million; TSX-listed Solitario Resources merger with Vancouver-listed Altoro Gold on the 12th July 2000; the global gold-mining giant Barrick Gold Corporation's merger with NYSE-listed Homestake; and First Quantum Minerlas's US$53 million merger with Cyprus Amax Kansanshi.

The average percentage time these nine acquirers outperformed the mining index, prior to formal announcement period equalled 43 per cent. That is, for 43 per cent of the 36 months prior to the first formal announcement, acquirers engaged in "friendly" mergers/takeovers outperformed the mining index. Table 2 also shows the acquirers have on average outperformed the mining index 40 per cent of the time post-merger/takeover. Hence a change from 43 per cent pre-announcement to 40 per cent post-announcement. This is a decline of three per cent due to the "friendly" merger/takeover. Table 2 shows that of the nine acquirers in the final sample, 67 per cent showed a declining investment performance (i.e. percentage time indexed share price outperforms the mining index) post-takeover/merger. Conversely, 33 per cent showed an improved investment performance post-merger/takeover announcement compared to

prior the announce/s that on average the cumulative annual out-performance rate post-first announcement date equals minus eight per cent per annum. This demonstrates that "friendly" acquirers have on average underperformed the mining index by eight per cent per annum over the 36 months post-first formal announcement of the merger/takeover.

Table 3 lists the seven "hostile" acquirers in the final sample. The seven "hostile" acquirers include: Beaconsfield Gold's merger with fellow ASX-listed Allstate Exploration on the 19th April 1996; the 2.22 billion Canadian dollar acquisition of LAC Minerals from American Barrick; the global mining giant Rio Tinto's 3.5 billion Australian dollar merger with North; Aztec Mining's 79 per cent acquisition of fellow ASX-listed Nicron on the 21st July 1990; Lachlan Resources' takeover of Archaen Gold; TSX-listed Luscar Coal's US$364 million acquisition of Manalta Coal; and Sipa Resources' 90 per cent acquisition of fellow ASX-listed Arcadia Minerals.

The average percentage time these acquirers outperformed the mining index, pre formal announcement period, equalled 83 per cent. That is, for 83 per cent of the 36 months prior to the first formal announcement, acquirers engaged in "hostile" mergers/takeovers outperformed the mining index. Table 3 also shows the acquirers have on average outperformed the mining index 15 per cent of the time post-merger/takeover. Hence a change from 83 per cent pre-announcement to 15 per cent post-announcement. This shows a decline of 68 per cent due to the "hostile" merger/takeover. Table 3 shows that of the seven acquirers sampled, 100 per cent showed a declining investment performance

(i.e. percentage tim s the mining index) post-takeover/merger. Table 3 also shows that on average the cumulative annual outperformance rate post first announcement date equals -17 per cent per annum. This demonstrates that "hostile" acquirers have on average underperformed the mining index by 17 per cent per annum over the 36 months post first formal announcement of the merger/takeover.

Table 3: Table of "hostile" acquirers' investment performances pre and post first formal announcement date.

Acquirer	Friendly / Hostile	First formal announcement date	% time acquirer outperforms mining index pre formal announcement date	% time acquirer outperforms mining index post formal announcement date	Acquirer's CAGR investment performance above/(below) mining index
Beaconsfield Gold NL	Hostile	19 April 1996	89%	75%	6%
American Barrick	Hostile	25 July 1994	67%	0%	-14%
Rio Tinto PLC	Hostile	23 June 2000	36%	3%	-2%
Aztec Mining Co ltd	Hostile	21 July 1990	100%	8%	-15%
Lachlan Resources	Hostile	16 May 1996	92%	0%	-27%
Luscar Coal income fund	Hostile	22 July 1998	100%	6%	-21%
Sipa Resources International NL	Hostile	27 March 1997	94%	11%	-43%
AVERAGE			**83%**	**15%**	**-17%**
% acquirers with declining investment performance post-acquisition			**100%**		
% acquirers with imroving investment performance post-acquisition			**0%**		

Source: Derived from Arne Hansen analysis of data sourced from the Financial Forecast Center, NYSE website, Dow Jones website, Bloombergs Station, I-Net Bridge Station, Factiva Station and McGregor BFA Station.

Table 4 compares the results of "friendly" acquirers (seen in Table 2) with the results of "hostile" acquirers (seen in Table 3). Table 4 shows that in every metric used in analysis approach number one and two, outlined in section 4.6, "hostile" acquirers demonstrate poorer investment performances post-merger/takeover compared to "friendly":

- percentage time the acquirers in "hostile" and "friendly" mergers/takeovers outperform the mining index post first formal announcement are 40 per cent for "friendly" acquirers and 15 per cent for

"hostile". A d) post-merger/takeover in "friendly" and 58 per cent for "hostiles";

- 100 per cent of the final sample "hostile" acquirers showed a declining investment performance (i.e. percentage time indexed share price outperforms the mining index) post-takeover/merger compared to 67 per cent for "friendly";
- "Hostile" acquirers have on average underperformed the mining index by 17 per cent per annum over the 36 months post first formal announcement of the merger/takeover compared to eight per cent per annum for "friendly".

Table 4: Comparison of investment performance metrics for "friendly" and "hostile" mining company acquirers.

	"Friendly" mining acquirers	"Hostile" mining acquirers
% time acquirer outperforms mining index pre formal announcement date	43%	83%
% time acquirer outperforms mining index post formal announcement date	40%	15%
Acquirer's CAGR investment performance above/(below) mining index as at 36 months post-acquisition	-8%	-17%
% acquirers with declining investment performance post-acquisition	67%	100%
% acquirers with improving investment performance post-acquisition	33%	0%

Source: Derived from Arne Hansen analysis of data sourced from the Financial Forecast Center, NYSE website, Dow Jones website, Bloombergs Station, I-Net Bridge Station, Factiva Station and McGregor BFA Station.

Interestingly, "hostile" acquirers were outperforming the mining index 83 per cent of the time pre-merger/takeover compared with 43 per cent for "friendly". This is a story in itself as further research might indicate that acquirers engaged in "hostile" takeovers are high-performing companies who have become over confident and ego driven, and thus reluctant to engage in "friendly" negotiations

with target compan ave it" approach, due to acquiring company hubris created during strong periods of investment outperformance, may result in more "hostile" activity. Conversely, "friendly" acquirers have on average outperformed the mining index 43 per cent of the time pre merger/takeover announcement and are thus potentially less confident, more humble and prepared to engage in more constructive and consensual negotiations with target company management before approaching the target company shareholders.

Preliminary analytical statistics of the final sample would suggest that "hostile" mining company acquirers demonstrate lower investment performance post-merger/takeover compared to "friendly". Chapter 6 proceeds to test this assertion using statistical hypothesis testing techniques.

CHAPTER 6: RESULTS, RESULTS ANALYSIS AND INTERPRETATION

The final sample of 16 transactions was divided into two sub-samples, “friendly” acquirers and “hostile” acquirers. The distribution of investment performances pre and post first formal announcement date of merger/takeover calculated in the analysis approach number one, discussed in section 4.6, that is, the percentage time the acquirer outperforms the mining index, was subjected to statistical hypothesis testing. Two-sampled t-test statistical hypothesis testing was used to determine whether the means of the two sub-samples are statistically significantly different from each other so as to reject the null hypothesis. The two-sampled t-test analytical function within the statistical software package NCSS was used, as the t-test is deemed the most appropriate test to compare the means of two sub-samples. In some case, a more specific forms of t-test, such as the Mann-Whitney U test, were used in cases where normality was rejected. The t-test is a powerful tool in determining whether there are in fact significant differences in the investment performances of “hostile” and “friendly” mergers/takeovers.

The three null hypotheses listed in chapter 3 and analysed in this chapter include:

1. The investment performance of acquirers involved in a “friendly” merger/takeover declines post-merger/takeover compared with pre-merger/takeover.

2. The investme ed in a “hostile” takeover declines post-takeover compared with pre-takeover.
3. The investment performance of companies formed by “hostile” takeovers is lower than those formed by “friendly” mergers.

6.1.1. HYPOTHESIS STATISTICAL TESTING OF “FRIENDLY” ACQUIRERS’ INVESTMENT PERFORMANCES PRE AND POST FIRST FORMAL ANNOUNCEMENT DATE OF THE TRANSACTION.

Null hypothesis number one is tested in this section by testing the means of two sub-samples, investment performance of “friendly” acquirers pre and post first formal announcement date of the merger/takeover. Figure 19 shows the box plots of the two sub-samples, illustrating that the medians (50th percentile) of the two sub-samples and the distribution of investment performance outcomes are not dissimilar.

Figure 19: Box plot comparing investment performance of “friendly” acquirers pre and post first formal announcement date (extract from t-test results in Appendix C).

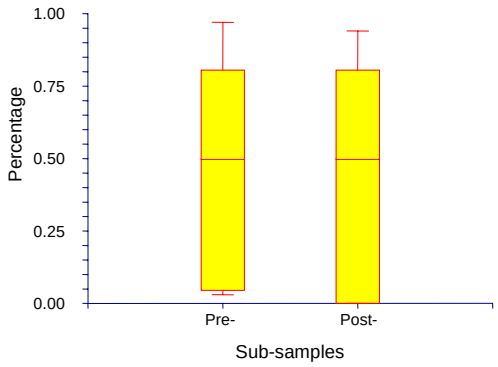


Table 5 shows the investment performance means pre and post "hostile" announcement, 43 per cent and 40 per cent respectively and standard deviations (0.39 and 0.40), signaling to the researcher that the investment performance pre and post first formal announcement date should not be significantly different.

Table 5: Descriptive statistics of "friendly" acquirers' investment performances pre and post first formal announcement date (extract from t-test results in Appendix C).

Variable	Count	Mean	Standard Deviation	Standard Error
Pre-	9	0.4322222	0.3914645	0.1304882
Post-	9	0.4008889	0.4033263	0.1344421

To determine whether a t-test is the most appropriate test to use, the two sub-samples need to show normality and equal variance in their probability distributions. Table 6 shows the two sub-samples are normally distributed with equal variance. Hence a two-sampled t-test is used to compare the means of the sub-samples at a significance level of five per cent (confidence level of 95 per cent).

Table 6: Test of as pre- and post-merger/takeover sub-samples (extract from t-test results in Appendix C).

Assumption	**Decision (5%)**
Skewness Normality (Pre-)	Cannot reject normality
Kurtosis Normality (Pre-)	Cannot reject normality
Omnibus Normality (Pre-)	Cannot reject normality
Skewness Normality (Post-)	Cannot reject normality
Kurtosis Normality (Post-)	Cannot reject normality
Omnibus Normality (Post-)	Cannot reject normality
Variance-Ratio Equal-Variance Test	Cannot reject equal variances
Modified-Levene Equal-Variance Test	Cannot reject equal variances

Table 7 shows an extract from the t-test result (full results in Appendix C) stating that the alternate hypothesis fails to be rejected i.e. the study rejects the null hypothesis that the investment performance of acquirers involved in a “friendly” merger is less post-merger than pre-merger. This despite the apparent reduction in investment performance, as seen in section 5.3, across three measures: average percentage time outperforming the mining index pre and post first formal announcement date of the merger/takeover, cumulative annual growth rate above or below the mining index for the 36 months post first formal announcement date and percentage of the acquirers that had declining investment performance post merger/takeover announcement date.

Table 7: T-test of t-merger/takeover sub-samples (extract from t-test results in Appendix C).

Alternative Hypothesis	**Prob Level**	**Decision (5%)**
Difference <> 0	0.869276	Accept Ho
Difference < 0	0.565362	Accept Ho
Difference > 0	0.434638	Accept Ho

Difference: (pre)-(post)

This result is inconsistent with Agrawal, Jaffe & Mandelker (1992); Barnes (1984); Fransk, Harris & Titman (1991); Gregory (1997); Kennedy & Limmack (1996); Limmack (1991); Loderer & Martin (1992); Lougharan & Vijh (1997); Mitchell & Stafford (2000); Rau & Vermaelen (1998) and Wimberley and Negash's (2004) literature on the long-term value destructive effects of M&A in the USA, UK and South Africa. Nor does this result support the Black and Grundfest (1988) notion that M&A have added value in the long term. Rather the result suggests that "friendly" M&A in the mining sector have led to no change in investment performance pre- and post-takeover/merger; thus there was no long-term value addition or destruction due to "friendly" mining M&A.

In conclusion there is no significant statistical difference between the investment performance of mining acquirers pre and post "friendly" merger/takeover.

6.1.2. HYPOTHESIS STATISTICAL TESTING OF "HOSTILE" ACQUIRERS' INVESTMENT PERFORMANCES PRE AND POST FIRST FORMAL ANNOUNCEMENT DATE OF THE TRANSACTION.

Null hypothesis number two is tested in this section by testing the means of two sub-samples – the investment performance of "hostile" acquirers pre and post first formal announcement date of the merger/takeover. Figure 20 shows the box plots of the two sub-samples, illustrating that the medians (50th percentile) of the two sub-samples (0.92 and 0.06) and the distribution of investment performance outcomes are not similar.

Figure 20: Box plot comparing investment performance of "hostile" acquirers pre and post first formal announcement date (extract from Mann-Whitney U test results in Appendix D).

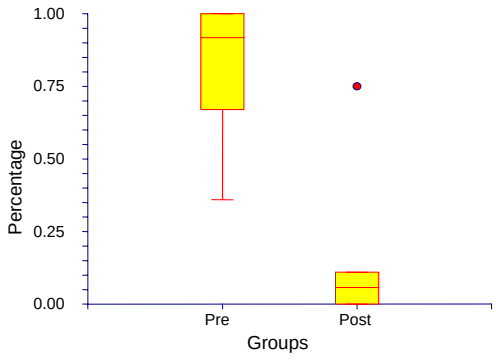


Table 8 shows dissimilar "hostile" acquirers' investment performances pre and post "hostile" announcement as 83 per cent and 15 per cent respectively, whilst

the standard deviati respectively. This signals that the investment performance pre and post first formal announcement date should be significantly different.

Table 8: Descriptive statistics of "hostile" acquirers' investment performances pre and post first formal announcement date (extract from Mann-Whitney U test results in Appendix D).

Variable	Count	Mean	Standard Deviation	Standard Error
Pre	7	0.8257143	0.2337989	8.836766E-02
Post	7	0.1471429	0.2689309	0.1016463

Figure 20 does show that there is an outlier, a data point that lies outside one and a half interquartile ranges (as defined by the nature of the sub-samples' probability distribution of outcomes). The outlier is Beaconsfield Gold NL which demonstrated 89 per cent of the time prior to the "hostile" announcement that it outperformed the mining index. Post announcement date it outperformed the index 75 per cent of the time. The result appears reasonable and thus not convincing enough to be excluded from the sample of seven "hostile" acquirers.

To determine whether a t-test is the most appropriate test to use, the two sub-samples need to show normality and equal variance in their probability distributions. Table 9 shows the sub-samples have equal variance but not enough data points to complete tests for normality (skewness and kurtosis). Because normality can not be tested, the assumption made is normality can be rejected and hence a two-sampled Mann-Whitney U test is used to compare the

medians of the sub- five per cent (confidence level of 95 per cent).

Table 9: Test of assumptions of "hostile" acquirers' pre- and post-merger/takeover sub-samples (extract from Mann-Whitney U test results in Appendix D).

Assumption	**Decision (5%)**
Skewness Normality (Pre)	
Kurtosis Normality (Pre)	Cannot reject normality
Omnibus Normality (Pre)	
Skewness Normality (Post)	
Kurtosis Normality (Post)	Cannot reject normality
Omnibus Normality (Post)	
Variance-Ratio Equal-Variance Test	Cannot reject equal variances
Modified-Levene Equal-Variance Test	Cannot reject equal variances

Table 10 shows an extract from the Mann-Whitney test result (full results in Appendix D) stating that the alternate hypothesis is rejected i.e. the study fails to reject the null hypothesis that the investment performance of acquirers involved in a "hostile" merger is less post-merger than pre-merger.

Table 10: Mann-Whitney U test of "hostile" acquirers pre- and post-merger/takeover sub-samples (extract from Mann-Whitney U test results in Appendix D).

	Approximation Without Correction		**Approximation With Correction**	
Alternative Hypothesis	**Prob Level**	**Decision (5%)**	**Prob Level**	**Decision (5%)**
Diff<>0	0.003961	Reject Ho	0.004844	Reject Ho
Diff<0	0.998020	Accept Ho	0.998387	Accept Ho
Diff>0	0.001980	Reject Ho	0.002422	Reject Ho

The result is not surprising as investment performance declines were clearly apparent in section 5.3, across three measures: average percentage time outperforming the mining index pre and post first formal announcement date of the merger/takeover, cumulative annual growth rate above or below the mining index for the 36 months post first formal announcement date and percentage of the acquirers that had declining investment performance post merger/takeover announcement date. This result is consistent with Agrawal, Jaffe & Mandelker (1992); Barnes (1984); Fransk, Harris & Titman (1991); Gregory (1997); Kennedy & Limmack (1996); Limmack (1991); Loderer & Martin (1992); Lougharan & Vijh (1997); Mitchell & Stafford (2000); Rau & Vermaelen (1998) and Wimberley and Negash's (2004) literature on the long-term value destructive effects of M&A in the USA, UK and South Africa.

In conclusion there is a significant statistical difference between the investment performance of mining acquirers pre and post "hostile" mergers/takeovers. The investment performance of mining acquirers involved in "hostile" mergers is less post-merger than pre-merger.

6.1.3. HYPOTHESIS STATISTICAL TESTING OF INVESTMENT RETURNS POST FIRST FORMAL ANNOUNCEMENT DATE OF "FRIENDLY" ACQUIRERS VERSUS "HOSTILE" ACQUIRERS.

Null hypothesis number three is tested in this section by testing the means of two sub-samples – the investment performance of "hostile" acquirers post first formal announcement date of the merger/takeover compared to "friendly". Figure 21 shows the box plots of the two sub-samples, illustrating that the medians (50th percentile) of the two sub-samples (0.50 and 0.06) and the distribution of investment performance outcomes are not similar.

Figure 21: Box plot comparing investment performance of "hostile" versus "friendly" acquirers post first formal announcement date (extract from Mann-Whitney U test results in Appendix E).

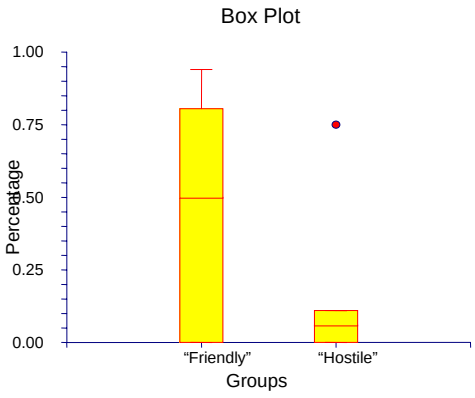


Table 11 shows dissimilar "friendly" acquirers' investment performance post merger/takeover announcement compared with "hostiles" at 40 per cent and 15 per cent respectively, whilst the standard deviations are also dissimilar at 0.40

and 0.27 respecti optically different, the distribution of "hostile" investment performances is not offset from "hostile". This signals that although the means and medians of the investment performance are different, this doesn't mean they are statistically different enough to reject the null hypothesis.

Table 11: Descriptive statistics of "hostile" and "friendly" acquirers' investment performance post first formal announcement date of merger/takeover (extract from Mann-Whitney U test results in Appendix E)

Variable	Count	Mean	Standard Deviation	Standard Error
"Friendly"	9	0.4008889	0.4033263	0.1344421
"Hostile"	7	0.1471429	0.2689309	0.1016463

Figure 21 does show that there is an outlier, the same transaction identified in section 6.1.2. The Beaconsfield Gold NL transaction is treated the same way as in section 6.1.2 and not excluded from the sample.

Table 12 shows the sub-samples have equal variance but not enough data points to complete tests for normality (skewness and kurtosis). Because normality can not be tested, the assumption made is normality can be rejected and hence a two-sampled Mann-Whitney U test is used to compare the medians of the sub-samples at a significance level of five per cent (confidence level of 95 per cent).

Table 12: Tests o 'friendly" acquirers' investment performances post-merger/takeover sub-samples (extract from Mann-Whitney U test results in Appendix E)

Assumption	**Decision (5%)**
Skewness Normality ("friendly")	Cannot reject normality
Kurtosis Normality ("friendly")	Cannot reject normality
Omnibus Normality ("friendly")	Cannot reject normality
Skewness Normality ("hostile")	
Kurtosis Normality ("hostile")	Cannot reject normality
Omnibus Normality ("hostile")	
Variance-Ratio Equal-Variance Test	Cannot reject equal variances
Modified-Levene Equal-Variance Test	Cannot reject equal variances

Table 13 shows an extract from the Mann-Whitney test result (full results in Appendix E) stating that the alternate hypothesis fails to be rejected, i.e. the study rejects the null hypothesis that the investment performance of companies formed by "hostile" takeovers is less than those by "friendly" mergers. This despite the apparent difference in investment performance, as seen in section 5.3, across three measures: average percentage time outperforming the mining index pre and post first formal announcement date of the merger/takeover, cumulative annual growth rate above or below the mining index for the 36 months post first formal announcement date and percentage of the acquirers that had declining investment performance post merger/takeover announcement date.

Table 13: Mann-Whitney U test results for "hostile" and "friendly" acquirers' post-merger/takeover investment performance sub-samples (extract from Mann-Whitney U test results in Appendix E).

	Approximation Without Correction		Approximation With Correction	
Alternative Hypothesis	**Prob Level**	**Decision (5%)**	**Prob Level**	**Decision (5%)**
Diff<>0	0.554262	Accept Ho	0.590838	Accept Ho
Diff<0	0.722869	Accept Ho	0.740584	Accept Ho
Diff>0	0.277131	Accept Ho	0.295419	Accept Ho

The lower investment performances observed in "hostile" acquirers compared to "friendly", as seen in the high-level statistics section 5.3 (table 4), are supported by Bhide's (1989) study of 47 "hostile" takeovers in which the average five-year stock returns of "friendly" targets outperformed "hostile" targets. However, through detailed statistical hypothesis testing in this section, these high-level differences haven't translated into statistically significant differences between "friendly" and "hostile" investment performances post-takeover/merger.

In conclusion there is no significant difference between the investment performances of mining companies formed by "hostile" takeovers and those formed by "friendly" mergers/takeovers.

CHAPTER 7: CONCLUSION

7.1. SYNTHESIS OF RESEARCH FINDINGS

"Hostile" mining company acquirers have statistically significant lower investment performance (average of 15 per cent) post first formal announcement of the merger/takeover than pre-announcement (average 83 per cent). Thus the conclusion can be made that merger/takeovers in the mining sector that are "hostile" in nature lead to lower investment performance for the acquiring mining company.

"Friendly" mining company acquirers don't have statistically significantly lower investment performance (average of 40 per cent) post first formal announcement of the merger/takeover than pre-announcement (average 43 per cent). Thus the conclusion can be made that merger/takeovers in the mining sector that are "friendly" in nature do not lead to significantly lower investment performance for the acquiring mining company.

"Hostile" mining company acquirers appear to show lower investment performance post-merger/takeover compared to "friendly"; however, statistical hypothesis testing proved that there is no statistically significant difference between the investment performances of companies formed by "hostile" takeovers and those formed by "friendly" mergers/takeovers.

Shareholders in mining companies should be aware of the impact mergers/takeovers have on the investment performance of their companies. The evidence is clear that mining companies engaging in “hostile” takeovers have on average received lower investment returns post-takeover. Thus, if the mining company of which you are a shareholder decides to engage in “hostile” takeover activity, then statistical evidence suggests you should immediately sell your shareholding as not only does the investment performance decline but also the company tends to underperform the market (mining index) considerably.

Interestingly, although “friendly” mining company acquirers don’t show statistically significant lower investment performance post-merger/takeover, the evidence is still there that on average there is a decline in investment performance post-merger/takeover. The recommendation to shareholders of “friendly” mining company acquirers is thus less clear cut. Some “friendly” acquirers will not only increase investment performance post-acquisition but they will also outperform the market whilst others will follow a “hostile” acquirer’s investment performances. Recommendation to shareholders is to be cautious when your company announces M&A activity, as evidence suggests that both “friendly” and “hostile” M&A can lead to lower investment performances.

The recommendation to those shareholders invested in companies engaged in “hostile” M&A activity is clear and concise – sell and look for other companies to invest in. The recommendation to those shareholders invested in companies

engaged in "friendl of caution. Be sure to understand the value proposition that management of the acquiring company is communicating to you as the owner. If at any point there isn't clarity in the shareholder's mind, then the recommendation is that you sell your shares and look for other companies to invest in.

7.3. FUTURE RESEARCH RECOMMENDATIONS

The study raised some interesting further hypotheses for future research. The investment performance of "hostile" mining company acquirers pre-merger/takeover first formal announcement period is considerably higher than "friendly" acquirers, at 83 per cent versus 43 per cent. This in itself is an area for future research: could it be that companies performing considerably better than the market (mining index) have become over-confident and hence more aggressive in their acquisition campaigns, leading to more frequent "hostile" encounters with managements of target companies?

What is it about "hostile" takeovers that leads to lower investment performance post first formal announcement period compared to pre-announcement? Potential reasons include:

- over-confidence, hubris of the acquiring company's management in the newly formed company structures;
- the sudden departure of skills as the target company's management is removed;

- the impositio :ure and systems on the target company leading to resistance by former target company employees.

Is there a significant difference in the investment performance of both “friendly” and “hostile” acquirers 48, 60 or 72 months after the first formal announcement? Can it be assumed that 36 months is a long-enough period post first formal announcement to capture the full effects of the merger/takeover on the acquirer? It should be explored whether there is a tipping point in the merged company’s evolution, such that investment performance trends are reversed and thereafter mining index outperformance occurs.

Similar analysis as performed on the acquiring company’s investment performance is recommended to be performed on the mining target company. This will be difficult as the majority of target companies de-list from their stock exchanges as all their outstanding shares are bought by the acquiring company. Of the 64 target mining companies identified in this study, share price data for 40 of these were collected (of these only six had complete 36 months pre and post announcement date share price data) and 30 of the 40 target companies de-listed on average seven months post first formal announcement date of their acquisition. Where data can be found in light of the challenges mentioned above, it would be interesting to see if target companies show increased investment performance after first formal announcement period. This would help to determine whether shareholders would rather be investors in target mining companies than acquiring companies or alternatively not be investors in either.

The latter would give an indication whether M&A on a whole results in reduced investment performance for both mining acquirers and targets and thus unfavourable investment destinations for shareholders the moment an M&A is announced between two parties.

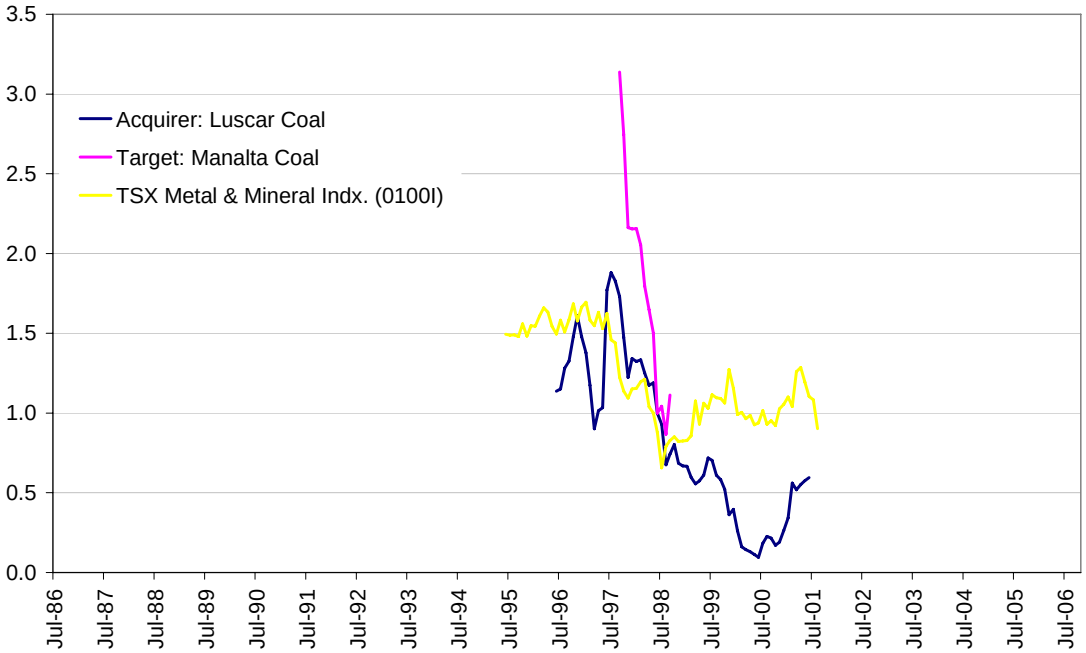
Drawing the results of this study together, it is evident that the investment performances of “hostile” acquiring mining companies, pre first formal announcement date, are statistically significantly greater than post first formal announcement date. This is consistent with theory and literature that states that the shareholders of the acquiring firms in most instances lose value. No statistically significant difference was found pre and post first announcement date for “friendly” acquiring mining companies. This is inconsistent with theory and literature and suggests that in cases of “friendly” M&A transactions, acquirers on average perform indifferently post-acquisition compared to pre-acquisition. Although clear differences in post first formal announcement date investment performance are noted between “hostile” acquirers and “friendly” acquirers, there is no statistically significant difference between the investment performances of “friendly” versus “hostile” acquirers post first formal announcement date. Implications for investors in mining companies engaged in “hostile” M&A activity is sell and look for other companies to invest in. If invested in mining companies engaged in “friendly” M&A activity then be sure to understand the value proposition of the acquisition. If at any point there isn’t clarity in the investor’s mind, then sell and look for other companies to invest in.

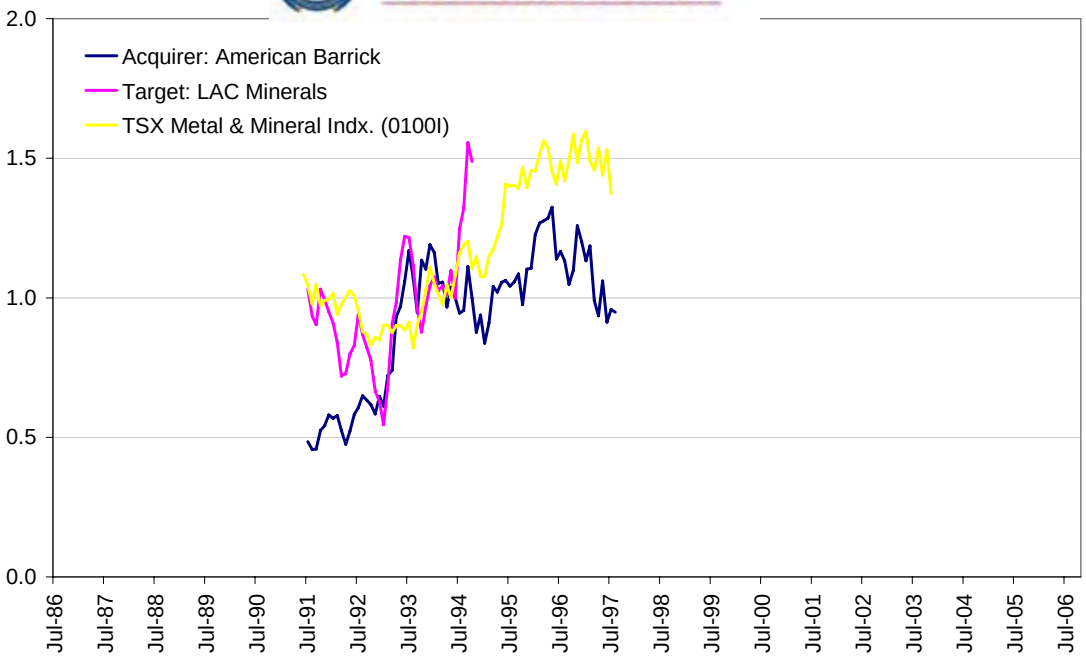
APPENDICES

APPENDIX A: DATA COLLECTION DESIGN TOOL: PRIMARY DATA SET OF 64 TRANSACTIONS

	Current company name	Primary listing (Secondary listing)	Acquirer	Stock exchange code	Target	Listing of Target/ Candidate	Merger/ Acquisition/ Take over/	% Acquisition (Must be >50%)	Friendly / Hostile	First formal announcement date	Final transaction date	Value of transaction	Source	Source	Source
1	Acacia Resources	Australia	Acacia Resources	AAA	Solomon Pacific Resources	Australia	Acquisition	90	Hostile	29 February 1996	21 June 1996	US $ 66.2 Million	TFSD Worldwide	http://www.delisted.c	
2	Arcadia Minerals NL	Australia	Sipa Resources Internation	SRI	Arcadia Minerals NL	Australia	Acquisition	89	Hostile	27 March 1997	26 September 1997	Holders of Arcadia SH	Factiva	http://www.delisted.c	
3	Aztec Mining Co Limited	Australia	Aztec Mining Co ltd	AZT	Nicron Resources Ltd	Australia	Acquisition	79	Hostile	21 July 1990	11 September 1990	US $ 76.4 Million	TFSD Worldwide	http://www.delisted.c	
4	Beaconsfield Gold NL	Australia	Beaconsfield Gold NL	BCD	Allstate Exploration NL	Australia	Merger	100	Hostile	19 April 1996	13 August 1996	US $ 12.2 Million	TFSD Worldwide	http://www.delisted.c	
6	CRA	Australia	CRA	CRA	Coal & Allied Industries	Australia	Acquisition	100	Hostile	12 March 1993	28 April 1993	A$716 million (alread	Factiva	http://www.delisted.c	
7	Equatorial Mining	Australia	Quay Mining (wholly-owned	EQM	Equatorial Mining	Australia	Acquisition	100	Hostile	23 December 1996	31 March 1997	$54 million	http://www.delisted.co	Factiva	
8	Goldfields of Kalgoorlie, G	Australia	Goldfields of Kalgoorlie, Go	GKL	Gilt-edged Mining	Australia	Takeover	97	Hostile	27 January 2000	20 June 2000	A$35m cash takeover	http://www.delisted.co		
9	Great Central Mines	Australia	Great Central Mines	GCM	Wiluna Mines Ltd	Australia	Acquisition	100	Hostile	20 August 1997	01 December 1997	A$121 million	http://www.delisted.co		
10	Lachlan Resources	Australia	Lachlan Resources	LLR	Archaean Gold	Australia	Takeover	100	Hostile	16 May 1996	01 July 1996	A$50 million	http://www.delisted.co	Factiva	
11	Placer Dome	Australia	Placer Dome	PDG	AurionGold	Australia	Takeover	100	Hostile	01 May 2002	31 December 2002	US $ 1.2 billion	http://www.azom.com/d	http://www.abc.net.a	http://www.abc.net.a
12	Poseidon Gold (formerly N	Australia	Poseidon Gold Ltd	PGO	Aztec Mining Co Ltd	Australia	Acquisition	100	Hostile	15 December 1993	18 March 1994	US $ 203.5 Million	TFSD Worldwide	http://www.delisted.c	
13	Resplendid (Resplendid w	Australia	Resplendid (Resplendid wa	WMC/NPL	Australian Consolidated	Australia	Acquisition	100	Hostile	24 July 1991	25 October 1991	A$260 million	http://www.delisted.co	http://www.delisted.c	Factiva
14	Sand Queen Gold Mines	Australia	Sand Queen Gold Mines	SQG	Richfield Resources RRN	Australia	Merger	100	Friendly	26 March 1998	26 March 1998	US$0.1 million	TFSD Worldwide	http://www.delisted.c	
15	Sipa Resources Internatio	Australia	Sipa Resources Internation	SRI	Arcadia Minerals NL	Australia	Acquisition	90	Hostile	27 March 1997	27 June 1997	US $ 22.5 million	TFSD Worldwide	http://www.delisted.c	
16	St Barbara Mines	Australia	St Barbara Mines	SBM	Taipan Resources	Australia	Merger	100	Friendly	21 December 2000	18 April 2001	US$8.6 million	TFSD Worldwide	http://www.delisted.c	http://www.takeovers
17	Tanganyika Gold NL	Australia	Tanganyika Gold NL	TGO	Panorama Resources NL	Australia	Acquisition	100	Hostile	19 January 1998	17 April 1998	US $ 8.0 Million	TFSD Worldwide	http://www.delisted.c	
18	Zanex NL	Australia	Zanex NL	ZEX	Finders Gold NL	Australia	Acquisition	100	Hostile	16 October 1992	10 November 1992	US $ 0.8 Million	TFSD Worldwide	http://www.delisted.c	
5	BHP Billiton	Australia	BHP	BHP	Dia Met Minerals (DMM.A	Toronto	Merger	100	Friendly	02 April 2001	02 November 2001	Canadian $687 million	TFSD Worldwide	http://www.delisted.c	http://ekati.bhpbilliton
19	AngloGold	Johannesburg	AngloGold	ANG	Acacia Resources	Australia	Acquisition	100	Friendly	11 October 1999	22 November 1999	$A832 million takeove	Metals Economics		
31	Harmony Gold Mining Cor	Johannesburg	Harmony Gold Mining Com	HARJ	New Hampton Goldfields	Australia	Acquisition	100	Hostile	19 December 2000	01 April 2001	A$57 million	TFSD Worldwide		
21	Consolidated African Mine	Johannesburg	NK Properties	NKPSA	Consolidated Mining Corp	Johannesburg	Merger	100	Friendly	11 June 1997	29 August 1997	SEE FACTIVA SEAR	TFSD Worldwide	Factiva	
23	Driefontein Consolidated	Johannesburg	Driefontein Consolidated	DFRN	Gold Fields	Johannesburg	Merger	100	Friendly	18 February 1999	10 May 1999	US$1544.6 million	TFSD Worldwide		
24	Durban Roodepoort Deep	Johannesburg	Durban Roodepoort Deep	DUR	Blyvooriutzicht Gold Mining	Johannesburg	Merger	100	Friendly	23 April 1997	15 September 1997	US$117.1 million	TFSD Worldwide		
25	Durban Roodepoort Deep	Johannesburg	Durban Roodepoort Deep	DUR	Crown Consolidated Gold	Johannesburg	Merger	100	Friendly	08 June 1998	31 August 1998	US$15.8 million	TFSD Worldwide		
26	Durban Roodepoort Deep	Johannesburg	Durban Roodepoort Deep	DUR	Hargraves Resources	Johannesburg	Merger	100	Friendly	12 July 1999	17 January 2000	US$27.1 million	TFSD Worldwide		
27	Durban Roodepoort Deep	Johannesburg	Durban Roodepoort Deep	DUR	Dome Resources	Johannesburg	Merger	100	Friendly	12 January 2000	26 May 2000	US$31.8 million	TFSD Worldwide		
28	Elandsrand Gold Mining	Johannesburg	Elandsrand Gold Mining	EGMLF	Deelkraal Gold Mining	Johannesburg	Merger	100	Friendly	25 March 1997	17 November 1997	US$22.5 million	TFSD Worldwide		
29	General Mining Union (Ge	Johannesburg	General Mining Union (Gen	GMFJ	Asteroid (Goldfields of SA,	Johannesburg	Merger	100	Friendly	10 October 1997	02 February 1998	US$425.6 million	TFSD Worldwide		
32	Ingwe (IGE)	Johannesburg	Trans Natal	TNC	Rand Coal (RNC)	Johannesburg	Acquisition	100	Friendly	30 August 1994	01 October 1994	R 5.9 billion	Factiva	McGregors Who	Ernst and Young's Re
33	Maranda	Johannesburg	Rooiberg Tin Ltd (Metorex)	ROI	Maranda Mining	Johannesburg	Merger	100	Friendly	20 February 1997	13 May 1997	US$19.4 million R 84	TFSD Worldwide	Factiva	McGregor's Who
34	Randfontein Estates	Johannesburg	Randfontein Estates	RFN	Lindum Reefs Gold	Johannesburg	Merger	100	Friendly	19 January 1998	19 January 1998	US$4.0 million	TFSD Worldwide		
35	Rustenburg Platinum	Johannesburg	Rustenburg Platinum	RPT	Lebowa Platinum Mines	Johannesburg	Merger	100	Friendly	15 April 1997	29 August 1997	Check commentary (V	TFSD Worldwide	FACTIVA	
36	Western Areas Gold Minin	Johannesburg	Western Areas Gold Mining	WAR	Elsburg Gold Mining	Johannesburg	Merger	100	Friendly	10 June 1974	01 July 1974	US $ 504.5 Million	Skillings International		
37	Western Areas Gold Minin	Johannesburg	Western Areas Gold Mining	WAR	South Deep Exploration	Johannesburg	Merger	100	Friendly	25 January 1994	24 February 1995	US$ 504.5 Million	TFSD Worldwide	Western Areas	
30	Harmony Gold Mining Cor	Johannesburg	Harmony Gold Mining Com	HARJ	African Rainbow Minerals	Johannesburg	Merger (Called a	100	Friendly	02 May 2003	22 September 2003	On 2 May 2003, Harm	http://www.harmony.co.		
20	Billiton	Johannesburg	Billiton	BLT	Rio Algom	Toronto	Takeover	100	Friendly	27 March 2000	25 August 2000	US $ 1.2 billion. Billito	Annual report		
22	De Beers Consolidated	Johannesburg	De Beers Consolidated	DBR	Winspear Diamonds	Toronto	Takeover	96	Hostile	26 June 2000	09 September 2000	C$305 million dollars	Factiva		
39	Ashton Mining	London	Ashton Mining	AHTA	Carr Boyd Minerals	Australia	Merger	100	Friendly	25 June 1990	29 June 1990	US$40.8 million	TFSD Worldwide		
40	Billiton	London	Billiton	BLT	Groote Eylandt Mining,	Australia	Merger	100	Friendly	18 December 1998	18 December 1998	US$372.9	TFSD Worldwide		
45	Waverley Mining Finance	London	Waverley Mining Finance	WMF	Westralian	Australia	Merger	100	Friendly	11 November 1993	06 April 1994	Check commentary (V	TFSD Worldwide	FACTIVA	
46	Xstrata	London	Xstrata	XTA	MIM Holdings Limited	Australia	Acquisition	100	Friendly	20 November 2002	24 June 2003	A$3 billion	http://www.xstrata.com/	http://media.xstrata.c	http://www.xstrata.co
38	Anglo American PLC	London	Anglo American PLC	AAL	Reunion Mining	London	Acquisition	96	Friendly	21 April 1999	09 June 1999	US $60 million in cash	Metals Economics	AA offered	
42	Ennstone	London	Ennstone	ENN	Bruntcliffe Aggregates	London	Merger	100	Friendly	22 August 1997	03 November 1997	US$45.1 million	TFSD Worldwide		
43	Greenwich Resources	London	Greenwich Resources	GNWH	Kyprou Gold	London	Merger	100	Friendly	16 November 2001	10 December 2001	US$11.2 million	TFSD Worldwide		
41	Costain Group	London	Costain Group	COST	Pyro Energy	New York	Merger	100	Friendly	14 June 1989	01 September 1989	US$203.2 million	TFSD Worldwide		
44	Ivernia West	London	Ivernia West	IVWL	Lisheen Deposit		Merger	100	Friendly	17 May 1993	10 November 1994	US$68.7 million	TFSD Worldwide	http://www.minex.ie/	
48	Rio Tinto PLC	London (Australia)	Rio Tinto PLC	RIO	North LTD	Australia	Merger	100	Hostile	23 June 2000	10 October 2000	A$ 3.5 billion	http://query.nytimes.co	http://www.north.com	
47	BHP Billiton	London (Australia)	BHP	BLT/BHP	Billiton	London (Australia)	Merger	100	Friendly	19 March 2001	29 June 2001	Under the terms of th	Annual report		
51	Pasminco Ltd	New York	Pasminco Ltd	PAS	Savage Resources	Australia	Acquisition	100	Hostile	20 October 1998	12 February 1999	A$452 million	TFSD Worldwide	http://www.pasminco.	Factiva
50	Newmont Mining	New York	Newmont Mining	NEM	Santa Fe Pacific Gold	New York	Merger	100	Hostile	05 December 1996	05 May 1997	US$2 505.5 million	TFSD Worldwide	http://query.nytimes.c	
49	Homestake Mining	New York	Homestake Mining	HM	Argentina Gold (ARP)	Vancouver	Merger	100	Friendly	09 March 1999	29 April 1999	US$172.8 million	TFSD Worldwide	Factiva	http://www.secinfo.co
58	Newmont Mining Corp	Toronto	Newmont Mining Corp	NMC	Normandy Mining Ltd	Australia	Acquisition	100	Friendly	14 November 2001	20 February 2002	A$4.56bn.	http://ir.newmont.com/p		
52	Alcan	Toronto	Alcan	AL	British Aluminium PLC	London	Acquisition	100	Friendly	26 October 1982	29 November 1982	Alcan offered 60 pend	http://query.nytimes.co	http://www.publicatio	
54	Barrick Gold Corporation	Toronto	Barrick Gold Corporation	ABX	Homestake	New York	Merger	100	Friendly	25 June 2001	14 December 2001	US$ 2.29 million	http://www.sedar.com/	http://www.barrick.co	
56	First Quantum Minerals	Toronto	First Quantum minerlas	FM	Cyprus Amax Kansanshi	New York	Merger	100	Friendly	21 August 2001	21 August 2001	US$52.5 million	TFSD Worldwide		
55	Campbell Resources	Toronto	Campbell Resources	CCH	GeoNova Explorations	Toronto	Merger	100	Friendly	28 March 2001	30 June 2001	US$1.7 million	TFSD Worldwide		
57	Luscar Coal income fund	Toronto	Luscar Coal income fund	LUS	Manalta Coal income fund	Toronto	Acquisition	100	Hostile	22 July 1998	23 September 1998	$364.3 million	http://query.nytimes.co	Factiva	
59	Newmont Mining Corp	Toronto	Newmont Mining Corp	NMC	Franco-Nevada	Toronto	Merger	100	Friendly	14 November 2001	17 February 2002	Each common share	http://ir.newmont.com/p	Factiva	
61	Tahera Corpoartion	Toronto	Lytton Minerals Limited	LTL	New Indigo Resources Inc	Toronto	Merger	100	Friendly	2 October 1997	28 February 1999	Tahera issued 115,67	http://www.siliconinvest	http://www.tahera.co	
62	Teck Cominco	Toronto	Teck	TEK	Cominco (CLT)	Toronto	Merger	50	Friendly	26 July 2000	26 August 2000	US$1049.4 million	TFSD Worldwide	Factiva	
63	Zaruma Resources ZMR	Toronto	Laminco Resources (LMR)	LMR	Zaruma Resources	Toronto	Merger	100	Friendly	17 May 2000	23 October 2000	Check commentary (V	TFSD Worldwide	http://www.zaruma.c	
53	Barrick Gold Corporation	Toronto	American Barrick	ABX	LAC Minerals	Toronto	Acquisition	100	Hostile	25 July 1994	24 August 1994	Canadian $2.22 billio	Factiva	http://www.marketwa	
60	Solitario Resources	Toronto	Solitario Resources	SLR	Altoro Gold ATG	Vancouver	Merger	100	Friendly	12 July 2000	19 October 2000	US$6.4 million	TFSD Worldwide		
64	Lionore Mining Internation	Toronto (London)	Lionore Mining Internationa	LIM	Dalrymple Resources NL	Australia	Merger	100	Friendly	03 June 2003	30 October 2003	Under the merger, Da	http://www.lionore.com/	http://www2.cdn-	http://www.dalrymple

APPENDIX B: FINAL SAMPLE: INDEXED SHARE PRICE DATA AND MINING INDICES




Acquirer: American Barrick
Target: LAC Minerals
TSX Metal & Mineral Indx. (0100I)
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1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
Jul-94
Jul-95
Jul-96
Jul-97
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Jul-99
Jul-00
Jul-01
Jul-02
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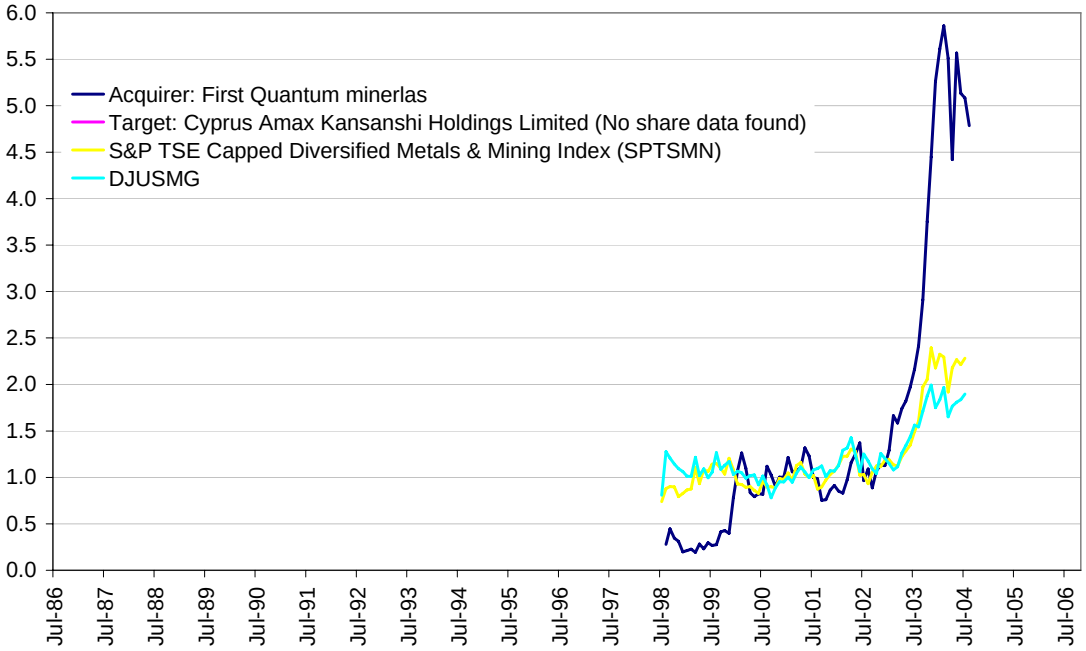
Jul-06


Acquirer: First Quantum minerlas
Target: Cyprus Amax Kansanshi Holdings Limited (No share data found)
S&P TSE Capped Diversified Metals & Mining Index (SPTSMN)
DJUSMG
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
Jul-94
Jul-95
Jul-96
Jul-97
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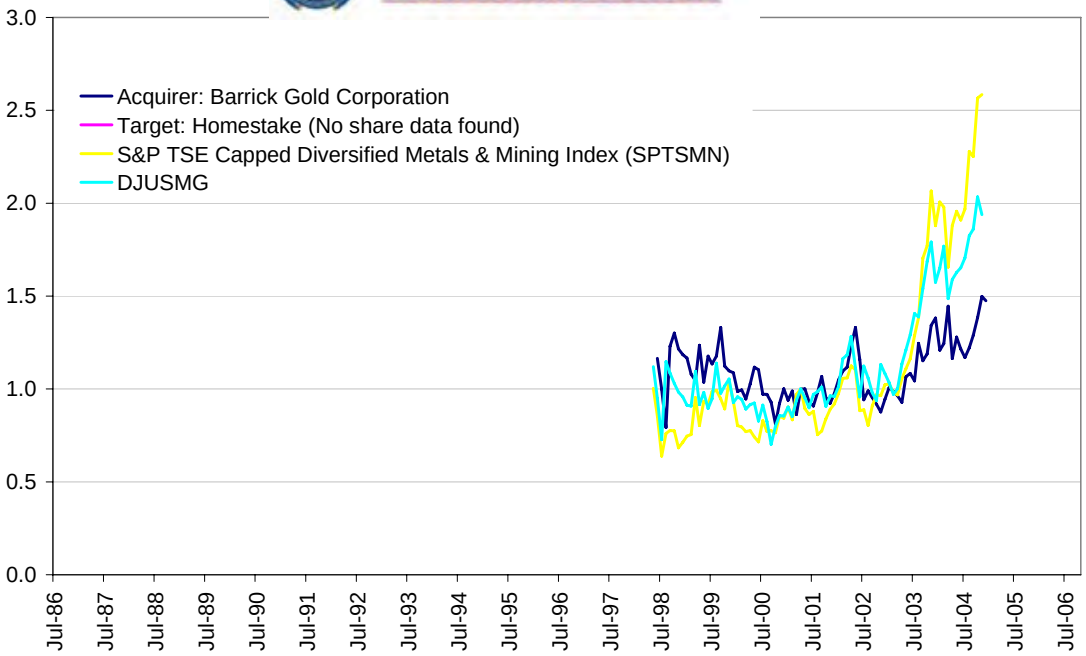
Jul-05
Jul-06


Acquirer: Barrick Gold Corporation
Target: Homestake (No share data found)
S&P TSE Capped Diversified Metals & Mining Index (SPTSMN)
DJUSMG
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
Jul-94
Jul-95
Jul-96
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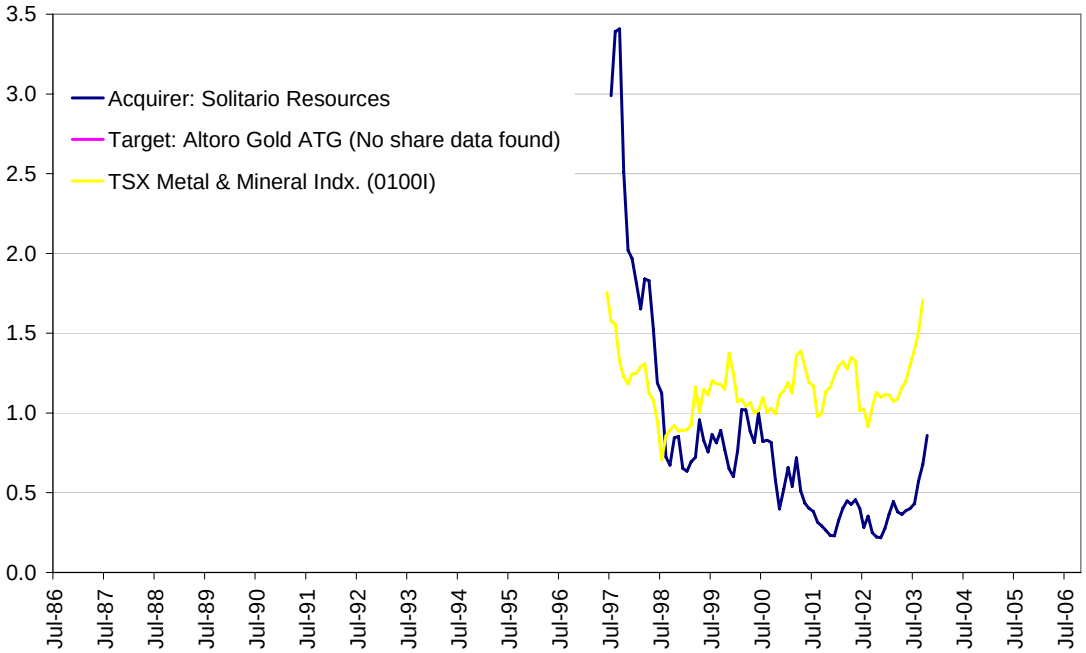
Jul-06


Acquirer: Solitario Resources
Target: Altoro Gold ATG (No share data found)
TSX Metal & Mineral Indx. (0100I)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
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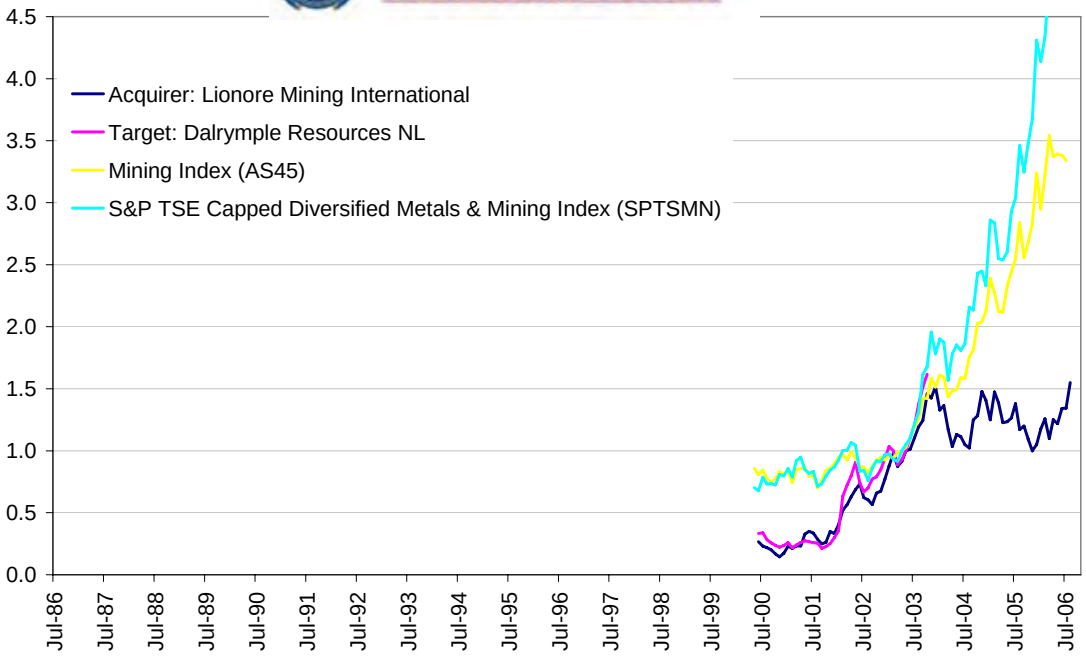
Jul-06


Acquirer: Lionore Mining International
Target: Dalrymple Resources NL
Mining Index (AS45)
S&P TSE Capped Diversified Metals & Mining Index (SPTSMN)
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4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
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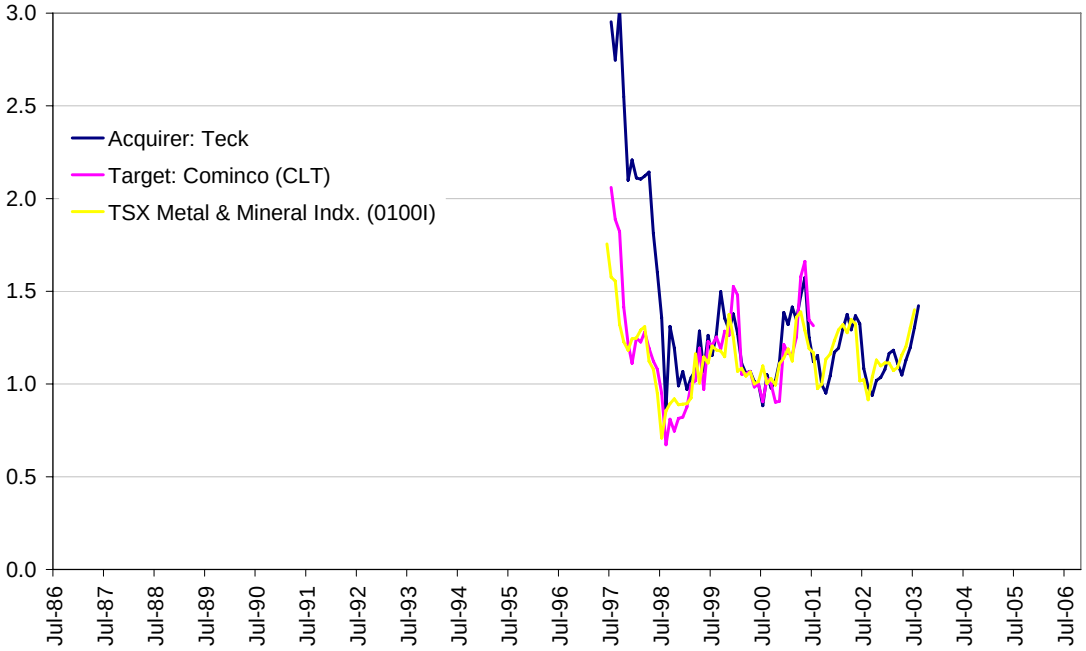
Jul-06


Acquirer: Teck
Target: Cominco (CLT)
TSX Metal & Mineral Indx. (0100I)
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2.0
1.5
1.0
0.5
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Jul-86
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2.0
1.5
1.0
0.5
0.0
Acquirer: Western Areas Gold Mining Company Ltd
Target: South Deep Exploration Ltd (No share data found)
Mining Index (ACI10)
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
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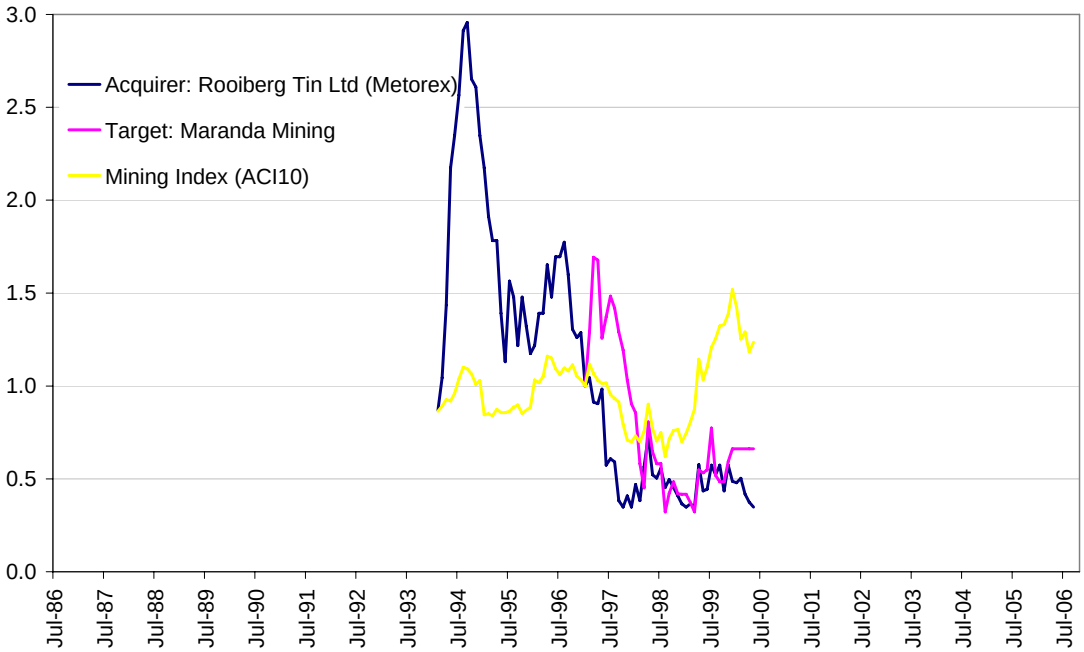
Jul-05
Jul-06


3.0
2.5
2.0
1.5
1.0
0.5
0.0
Acquirer: Rooiberg Tin Ltd (Metorex)
Target: Maranda Mining
Mining Index (ACI10)
Jul-86
Jul-87
Jul-88
Jul-89
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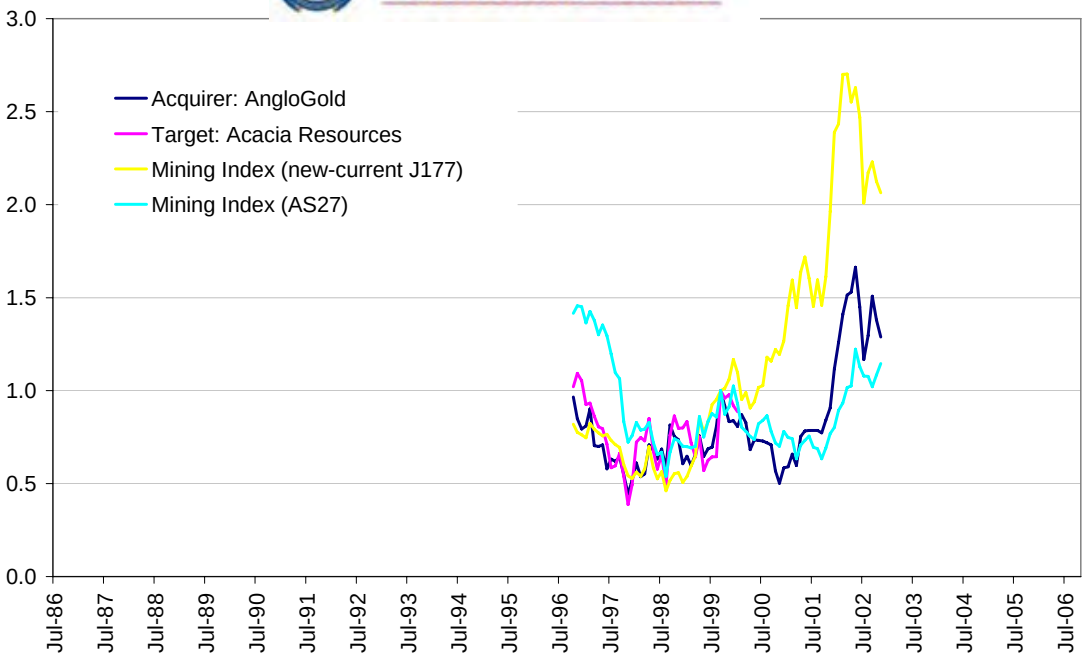
Acquirer: AngloGold
Target: Acacia Resources
Mining Index (new-current J177)
Mining Index (AS27)
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2.5
2.0
1.5
1.0
0.5
0.0
Jul-86
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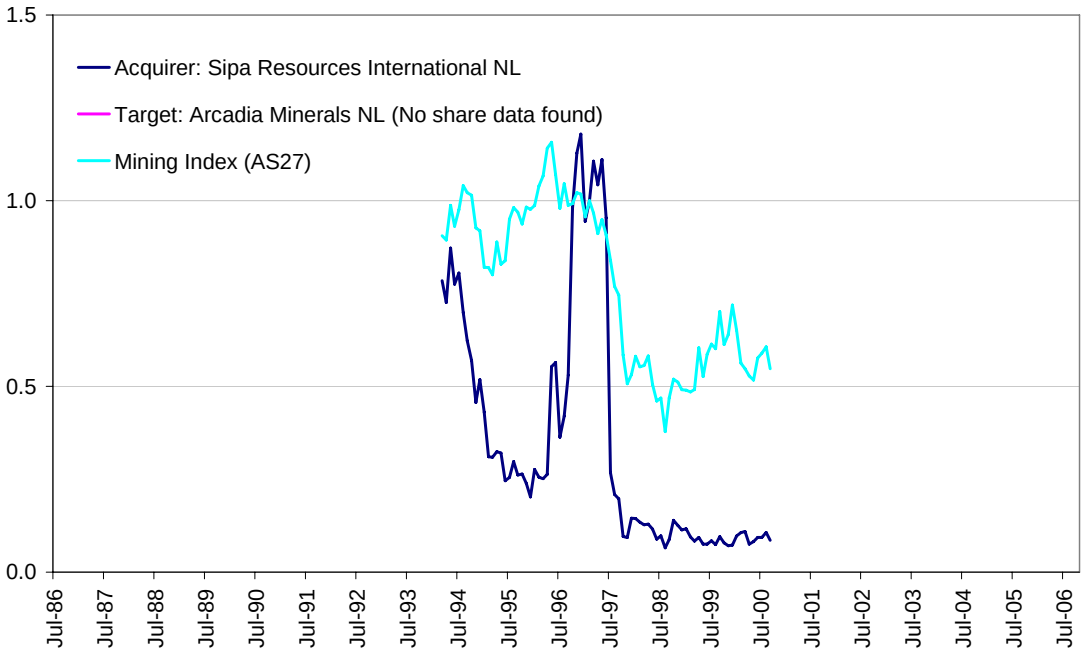
Acquirer: Sipa Resources International NL
Target: Arcadia Minerals NL (No share data found)
Mining Index (AS27)
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1.0
0.5
0.0
Jul-86
Jul-87
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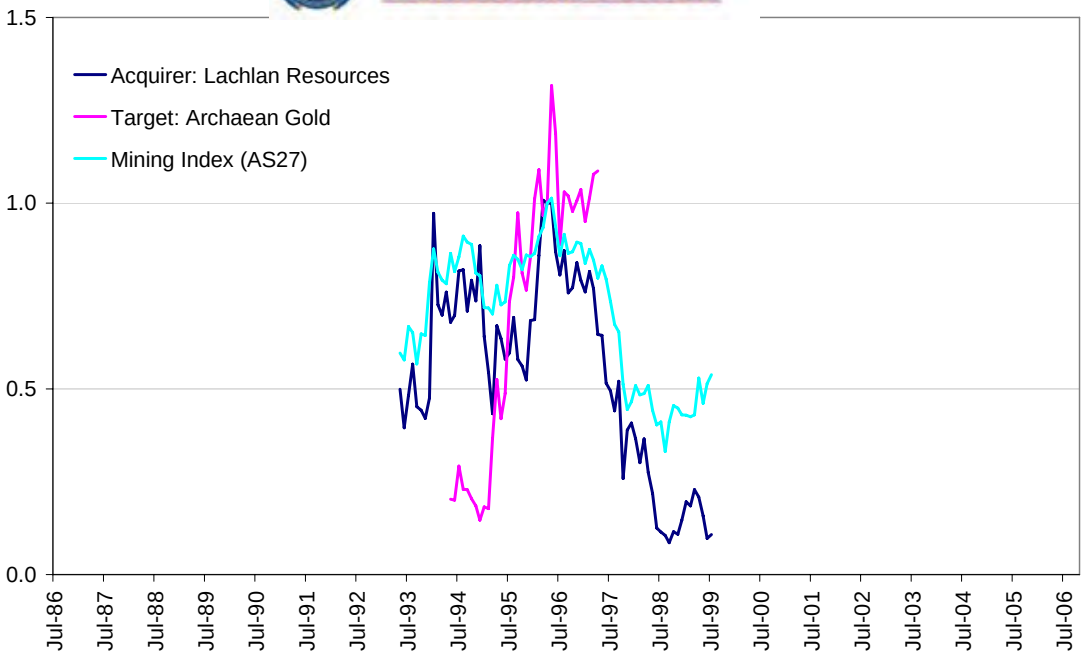
Acquirer: Lachlan Resources
Target: Archaean Gold
Mining Index (AS27)
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1.0
0.5
0.0
Jul-86
Jul-87
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Jul-89
Jul-90
Jul-91
Jul-92
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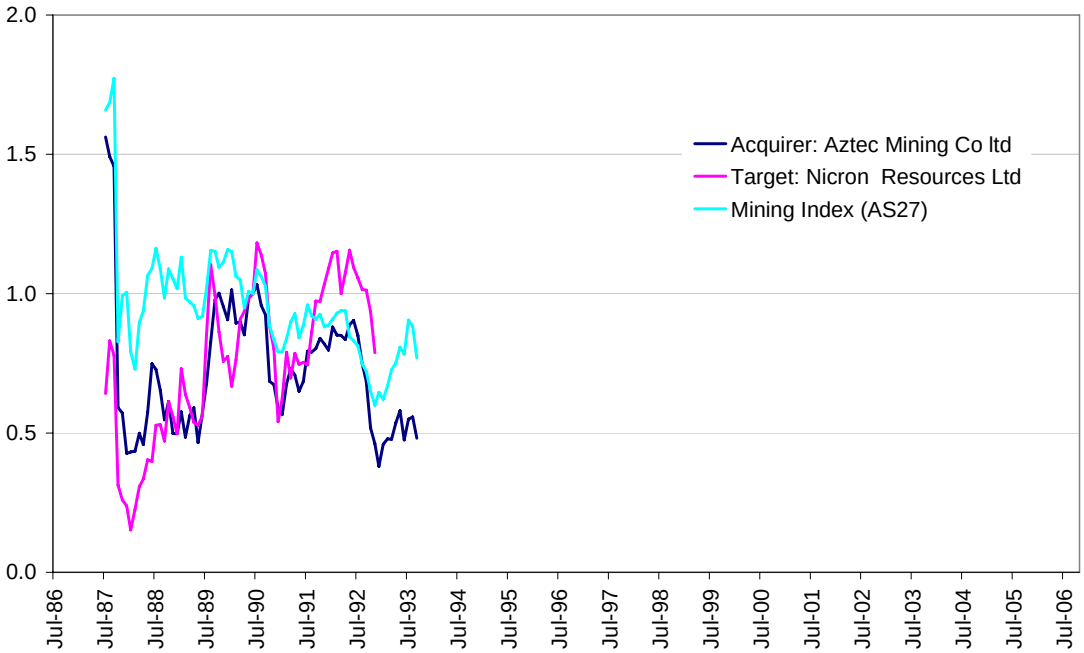
Acquirer: Aztec Mining Co ltd
Target: Nicron Resources Ltd
Mining Index (AS27)
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1.0
0.5
0.0
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
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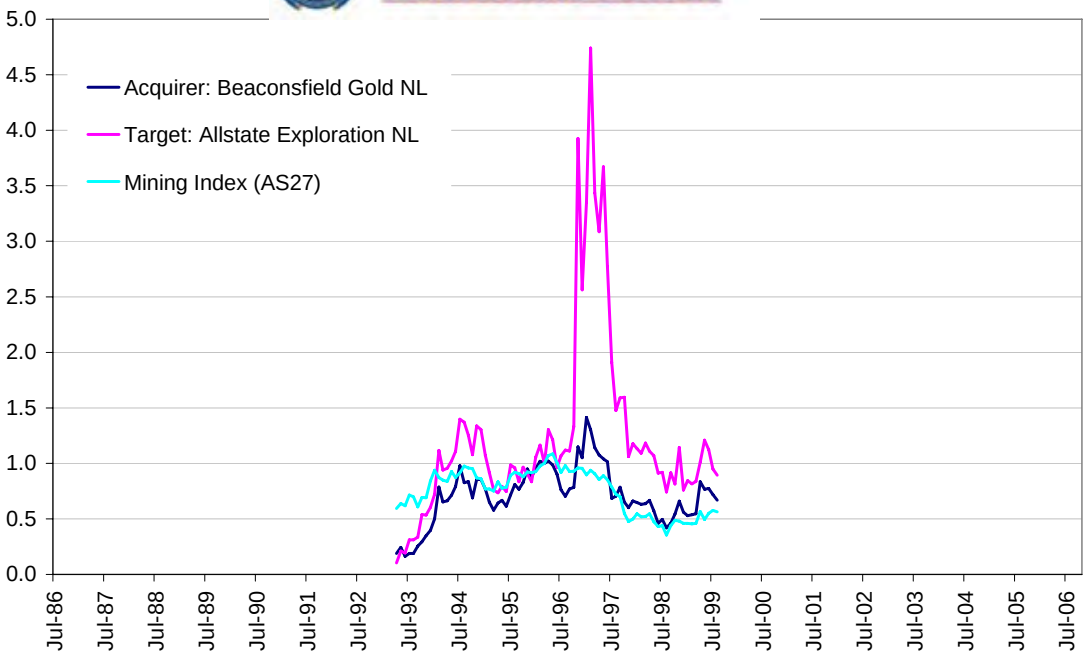
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3.0
2.5
2.0
1.5
1.0
0.5
0.0
Acquirer: Beaconsfield Gold NL
Target: Allstate Exploration NL
Mining Index (AS27)
Jul-86
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
Jul-94
Jul-95
Jul-96
Jul-97
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APPENDIX C: TWO-SAMPLED T-TEST REPORT OF THE INVESTMENT RETURNS OF "FRIENDLY" ACQUIRERS PRE AND POST FIRST FORMAL ANNOUNCEMENT DATE.

Two--sampled Test Report

Page/Date/Time 1 2006/10/28 12:05:53 PM
Database
Filter C7=2
Variable C6

Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
Pre	9	0.4008889	0.4033263	0.1344421	9.086484E-02	0.7109129
Post	7	0.1471429	0.2689309	0.1016463	-0.1015767	0.3958624

Note: T-alpha (C8=1) = 2.3060, T-alpha (C8=2) = 2.4469

Confidence-Limits of Difference Section

Variance Assumption	DF	Mean Difference	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
Equal	14	0.253746	0.3520674	0.1774253	-0.1267933	0.6342854
Unequal	13.76	0.253746	0.4847638	0.1685427	-0.1083255	0.6158175

Note: T-alpha (Equal) = 2.1448, T-alpha (Unequal) = 2.1482

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	1.4302	0.174610	Accept Ho	0.265839	0.095539
Difference < 0	1.4302	0.912695	Accept Ho	0.001309	0.000141
Difference > 0	1.4302	0.087305	Accept Ho	0.388211	0.151403

Difference: (Pre) -(Post)

Aspin-Welch Unequal-Variance Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	1.5055	0.154789	Accept Ho	0.288604	0.106787
Difference < 0	1.5055	0.922605	Accept Ho	0.001034	0.000108
Difference > 0	1.5055	0.077395	Accept Ho	0.415420	0.167335

Difference: (Pre) -(Post)

Tests of Assumptions Section

Assumption	Value	Probability	Decision (5%)
Skewness Normality (Pre)	0.3188	0.749878	Cannot reject normality
Kurtosis Normality (Pre)	-1.6976	0.089591	Cannot reject normality
Omnibus Normality (Pre)	2.9833	0.224997	Cannot reject normality
Skewness Normality (Post)	0.0000		
Kurtosis Normality (Post)		1.000000	Cannot reject normality
Omnibus Normality (Post)			
Variance-Ratio Equal-Variance Test	2.2492	0.339073	Cannot reject equal variances
Modified-Levene Equal-Variance Test	3.3311	0.089385	Cannot reject equal variances

Page/Date/Time 2 2006/10/28 11:48:31 AM
Database
Filter C8=1
Variable C6

Median Statistics

Variable	Count	Median	95% LCL of Median	95% UCL of Median
Pre	9	0.5	0.03	0.94
Post	9	0.5	0	0.94

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Variable	Mann Whitney U	W Sum Ranks	Mean of W	Std Dev of W
Pre	50	95	85.5	11.26029
Post	31	76	85.5	11.26029

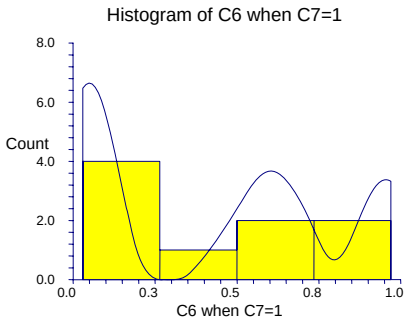
Number Sets of Ties = 5, Multiplicity Factor = 66

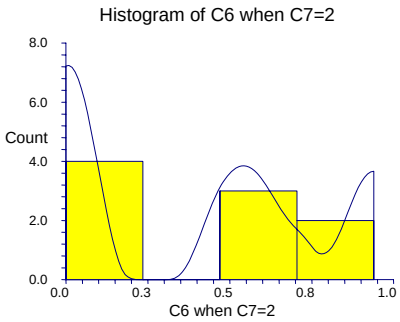
Alternative Hypothesis	Exact Probability Prob Level	Exact Probability Decision (5%)	Approximation Without Correction Z-Value	Approximation Without Correction Prob Level	Approximation Without Correction Decision (5%)	Approximation With Correction Z-Value	Approximation With Correction Prob Level	Approximation With Correction Decision (5%)
Diff<>0			0.8437	0.398852	Accept Ho	0.7993	0.424134	Accept Ho
Diff<0			0.8437	0.800574	Accept Ho	0.8881	0.812750	Accept Ho
Diff>0			0.8437	0.199426	Accept Ho	0.7993	0.212067	Accept Ho

Kolmogorov-Smirnov Test For Different Distributions

Alternative Hypothesis	Dmn Criterion Value	Reject Ho if Greater Than	Test Alpha Level	Decision (Test Alpha)	Prob Level
D(1)<>D(2)	0.444444	0.5891	.050	Accept Ho	0.3517
D(1)<D(2)	0.000000	0.5891	.025	Accept Ho	
D(1)>D(2)	0.444444	0.5891	.025	Accept Ho	

Plots Section





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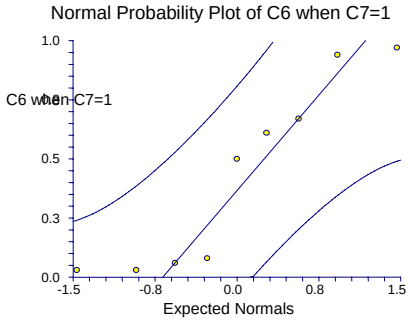

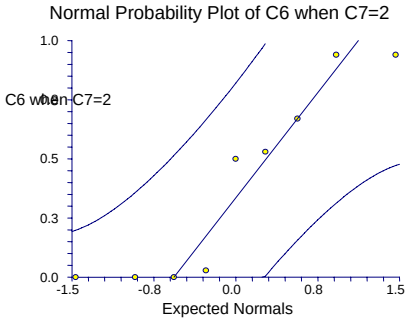

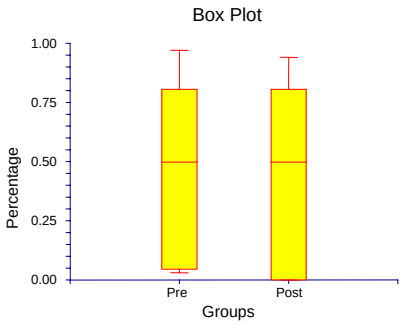

APPENDIX D: TWO-SAMPLED T-TEST REPORT OF THE INVESTMENT RETURNS OF "HOSTILE" ACQUIRERS PRE AND POST FIRST FORMAL ANNOUNCEMENT DATE.

Two--sampled Test Report

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Database
Filter C8=2
Variable C6

Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
Pre	7	0.8257143	0.2337989	8.836766E-02	0.6094864	1.041942
Post	7	0.1471429	0.2689309	0.1016463	-0.1015767	0.3958624

Note: T-alpha (C7=1) = 2.4469, T-alpha (C7=2) = 2.4469

Confidence-Limits of Difference Section

Variance Assumption	DF	Mean Difference	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
Equal	12	0.6785714	0.2519779	0.1346878	0.3851118	0.9720311
Unequal	11.77	0.6785714	0.3563505	0.1346878	0.384481	0.9726619

Note: T-alpha (Equal) = 2.1788, T-alpha (Unequal) = 2.1835

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	5.0381	0.000290	Reject Ho	0.995908	0.958319
Difference < 0	5.0381	0.999855	Accept Ho	0.000000	0.000000
Difference > 0	5.0381	0.000145	Reject Ho	0.998987	0.982494

Difference: (Pre) -(Post)

Aspin-Welch Unequal-Variance Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	5.0381	0.000308	Reject Ho	0.995800	0.957028
Difference < 0	5.0381	0.999846	Accept Ho	0.000000	0.000000
Difference > 0	5.0381	0.000154	Reject Ho	0.998965	0.981967

Difference: (Pre) -(Post)

Tests of Assumptions Section

Assumption	Value	Probability	Decision(5%)
Skewness Normality (Pre)	0.0000		
Kurtosis Normality (Pre)		1.000000	Cannot reject normality
Omnibus Normality (Pre)			
Skewness Normality (Post)	0.0000		
Kurtosis Normality (Post)		1.000000	Cannot reject normality
Omnibus Normality (Post)			
Variance-Ratio Equal-Variance Test	1.3231	0.742558	Cannot reject equal variances
Modified-Levene Equal-Variance Test	0.0170	0.898447	Cannot reject equal variances

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Database
Filter C8=2
Variable C6

Median Statistics

Variable	Count	Median	95% LCL of Median	95% UCL of Median
Pre	7	0.92	0.36	1
Post	7	0.06	0	0.75

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Variable	Mann Whitney U	W Sum Ranks	Mean of W	Std Dev of W
Pre	47	75	52.5	7.809019
Post	2	30	52.5	7.809019

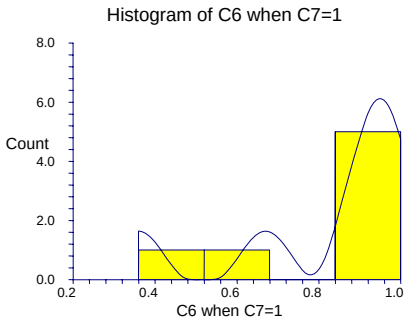
Number Sets of Ties = 2, Multiplicity Factor = 12

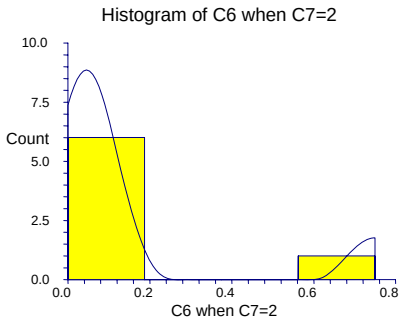
	Exact Probability		Approximation Without Correction			Approximation With Correction		
Alternative Hypothesis	Prob Level	Decision (5%)	Z-Value	Prob Level	Decision (5%)	Z-Value	Prob Level	Decision (5%)
Diff<>0			2.8813	0.003961	Reject Ho	2.8173	0.004844	Reject Ho
Diff<0			2.8813	0.998020	Accept Ho	2.9453	0.998387	Accept Ho
Diff>0			2.8813	0.001980	Reject Ho	2.8173	0.002422	Reject Ho

Kolmogorov-Smirnov Test For Different Distributions

Alternative Hypothesis	Dmn Criterion Value	Reject Ho if Greater Than	Test Alpha Level	Decision (Test Alpha)	Prob Level
D(1)<>D(2)	0.857143	0.6556	.050	Reject Ho	0.0082
D(1)<D(2)	0.000000	0.6556	.025	Accept Ho	
D(1)>D(2)	0.857143	0.6556	.025	Reject Ho	

Plots Section





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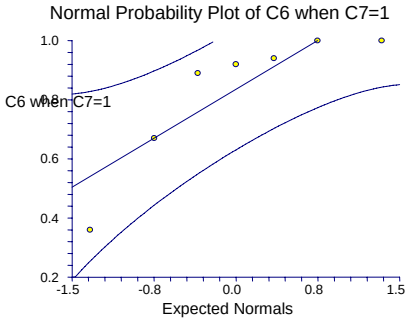
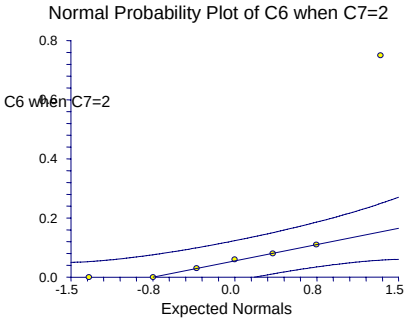
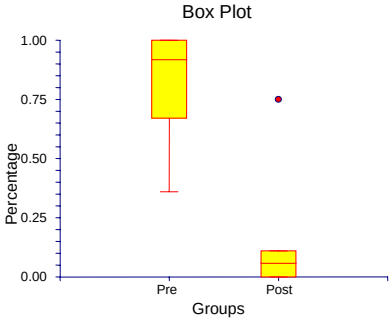
Variable C6







APPENDIX E: TWO-SAMPLED T-TEST REPORT COMPARING THE INVESTMENT RETURNS POST FIRST FORMAL ANNOUNCEMENT DATE OF "FRIENDLY" ACQUIRERS VERSUS "HOSTILE" ACQUIRERS.

Two--sampled Test Report

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Database
Filter C7=2
Variable C6

Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
"Friendly"	9	0.4008889	0.4033263	0.1344421	9.086484E-02	0.7109129
"Hostile"	7	0.1471429	0.2689309	0.1016463	-0.1015767	0.3958624

Note: T-alpha (C8=1) = 2.3060, T-alpha (C8=2) = 2.4469

Confidence-Limits of Difference Section

Variance Assumption	DF	Mean Difference	Standard Deviation	Standard Error	95% LCL of Mean	95% UCL of Mean
Equal	14	0.253746	0.3520674	0.1774253	-0.1267933	0.6342854
Unequal	13.76	0.253746	0.4847638	0.1685427	-0.1083255	0.6158175

Note: T-alpha (Equal) = 2.1448, T-alpha (Unequal) = 2.1482

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	1.4302	0.174610	Accept Ho	0.265839	0.095539
Difference < 0	1.4302	0.912695	Accept Ho	0.001309	0.000141
Difference > 0	1.4302	0.087305	Accept Ho	0.388211	0.151403

Difference: ("Friendly") - ("Hostile")

Aspin-Welch Unequal-Variance Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision (5%)	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	1.5055	0.154789	Accept Ho	0.288604	0.106787
Difference < 0	1.5055	0.922605	Accept Ho	0.001034	0.000108
Difference > 0	1.5055	0.077395	Accept Ho	0.415420	0.167335

Difference: ("Friendly") - ("Hostile")

Tests of Assumptions Section

Assumption	Value	Probability	Decision(5%)
Skewness Normality ("Friendly")	0.3188	0.749878	Cannot reject normality
Kurtosis Normality ("Friendly")	-1.6976	0.089591	Cannot reject normality
Omnibus Normality ("Friendly")	2.9833	0.224997	Cannot reject normality
Skewness Normality ("Hostile")	0.0000		
Kurtosis Normality ("Hostile")		1.000000	Cannot reject normality
Omnibus Normality ("Hostile")			
Variance-Ratio Equal-Variance Test	2.2492	0.339073	Cannot reject equal variances
Modified-Levene Equal-Variance Test	3.3311	0.089385	Cannot reject equal variances

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Database
Filter C7=2
Variable C6

Median Statistics

Variable	Count	Median	95% LCL of Median	95% UCL of Median
“Friendly”	9	0.5	0	0.94
“Hostile”	7	0.06	0	0.75

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Variable	Mann Whitney U	W Sum Ranks	Mean of W	Std Dev of W
“Friendly”	37	82	76.5	9.300201
“Hostile”	26	54	59.5	9.300201

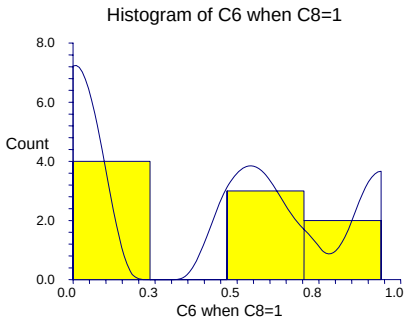
Number Sets of Ties = 2, Multiplicity Factor = 126

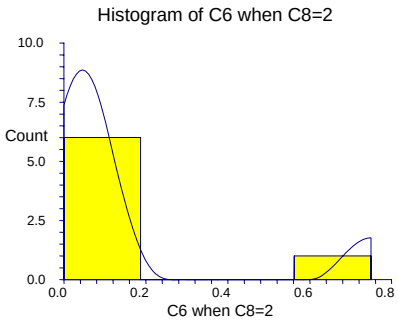
	Exact Probability		Approximation Without Correction			Approximation With Correction		
Alternative Hypothesis	Prob Level	Decision (5%)	Z-Value	Prob Level	Decision (5%)	Z-Value	Prob Level	Decision (5%)
Diff<>0			-0.5914	0.554262	Accept Ho	-0.5376	0.590838	Accept Ho
Diff<0			-0.5914	0.722869	Accept Ho	-0.6451	0.740584	Accept Ho
Diff>0			-0.5914	0.277131	Accept Ho	-0.5376	0.295419	Accept Ho

Kolmogorov-Smirnov Test For Different Distributions

Alternative Hypothesis	Dmn Criterion Value	Reject Ho if Greater Than	Test Alpha Level	Decision (Test Alpha)	Prob Level
D(1)<>D(2)	0.412698	0.6240	.050	Accept Ho	0.4302
D(1)<D(2)	0.158730	0.6240	.025	Accept Ho	
D(1)>D(2)	0.412698	0.6240	.025	Accept Ho	

Plots Section





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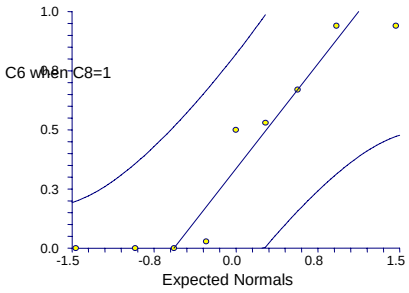
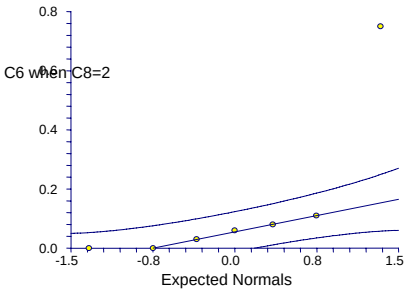
Variable C6

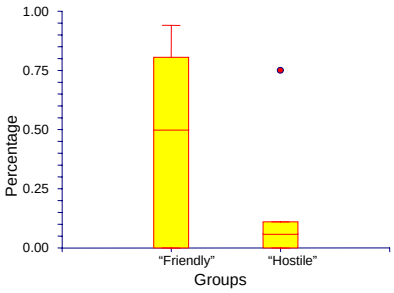
Normal Probability Plot of C6 when C8=1



Normal Probability Plot of C6 when C8=2



Box Plot



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