Takeovers and returns to shareholders of target firms

Mark John Stewart

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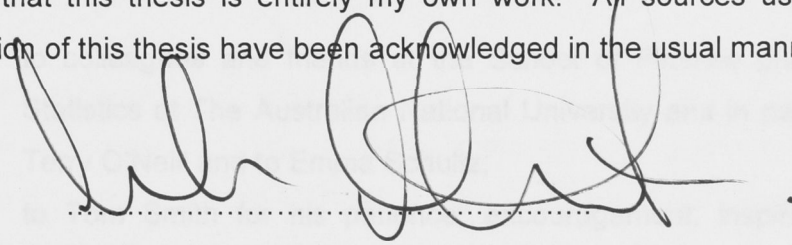
I certify that this thesis is entirely my own work. All sources used in the preparation of this thesis have been acknowledged in the usual manner.

signed  .

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I dedicate this thesis to my parents, Rhondda and Reg Stewart. They provided a safe, healthy, and loving family environment and the foundations for my life.

Abstract

This thesis comprises three papers that address takeovers in Australia with a focus on the returns to the shareholders of Target firms.

Takeovers represent an important part of the market for control of corporations and their assets. In recent years the level of takeover activity has been at record highs. The period of interest for this study is 1997 to 2007 and captures the most recent wave of takeover activity.

In assessing abnormal returns a new model, the matched clone model has been developed. It represents an improvement on the market model in that the returns of the firm of interest are adjusted with respect to peer companies operating in the same sector.

Heckman sample selection analysis was used to investigate the presence and effects of sample selection bias. The author believes this is the first application of this type of analysis to takeovers in assessing returns and their determinants.

In the first paper a takeover likelihood model is developed to investigate the characteristics of firms subject to successful takeover offers. The results of the study suggest that several factors influence the likelihood of a takeover and the most significant factors relate to recent stock price performance and asset efficiency. The findings are consistent with the view that Buyer firms are attracted to acquisitions that exhibit potential for value creation.

The second paper addresses an investigation of the returns to shareholders of Target firms and the factors that influence the premium paid by Buyer

firms. The results of the study confirm previous research that shareholders of Target firms receive substantial economic benefits. The level of premium varied depending upon the form of consideration (lower for cash) and the pre bid shareholding of the Buyer firm (lower if the Buyer held more than 5%).

An analysis of the determinants of premium suggest a positive relationship with the ratio of market to book value of the Target firm and a negative relationship with pre bid performance of the Target firm and equity markets and cash flow and revenue growth of the Target firm. Heckman sample selection analysis indicated the presence of sample selection bias. Allowance for this bias produced a revised set of determinants, each with a negative influence, comprising pre bid performance and cash flow and the size of the Target firm.

The third paper addresses the influence of Independent Expert Reports (IERs) on the returns to shareholders of Target firms. About half of the takeovers in Australia involve IERs.

The results of the study find that IERs have little influence on returns. However, the determinants of returns are influenced by the IER state.

For offers involving IERs the significant factors influencing premium were recent share price performance and operating cash flows of the Target firm.

An investigation of sample selection bias and its impact on the determinants of premium produced varied results depending upon the event window.

For event windows with a focus on the pre offer announcement period there is evidence of sample selection bias. Allowance for this bias resulted in additional significant factors influencing premium related to the recent performance of the market and the financial resources of the Target firm.

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Chapter 1 Introduction

Takeovers represent an important part of the market that facilitates change in the ownership of assets. Commonly known as M&A (Mergers and Acquisitions), this market comprises several types of transactions such as private treaty sales, the privatization of government owned assets and initial public offerings. The expression "takeover" is usually associated with a transaction involving the acquisition of shares in a company that owns assets of interest to a buyer and almost invariably (but not exclusively) this company is publicly listed on a local stock exchange.

The level of M&A activity varies over time and is sometimes referred to as occurring in "waves" (see for example Martynova and Renneboog (2005)). Five waves have been observed: the early 1900s; the 1920s; the 1960s; the 1980s; and, the 1990s. Currently the market is experiencing the conclusion of a sixth wave that commenced in the mid 2000s.

In Australia, although a relatively small market, the amount of recent M&A activity has also been at record levels. For the five year period 2003 to 2007 there were 377 takeovers for a total market value of AUD320 billion[1].

The economic outcomes (or performance) of takeovers have been subject to extensive study. Of interest are the economic outcomes to shareholders of Buyer firms and of Target firms.

Bruner (2001) comments on various research approaches to assessing the performance of M&A transactions (including takeovers). He defines three

[1] Connect 4 2007 Mergers and Acquisitions Legal Advisors Survey

possible economic outcomes each with reference to the required return of investors:

value is conserved	the investment returns equal the required return and therefore investors should be "satisfied"
value is created	the investment returns exceed the required return and therefore investors should be "very happy"
value is destroyed	the investment returns are less than the required return and therefore investors should be "unhappy"

Most studies address shareholder returns (as distinct from investor returns which may include not only returns to shareholders but returns to other capital providers to the firm) and use event study methodology to investigate returns to shareholders as evidenced in share price movements.

As noted by Bruner (2001), research suggests that shareholders of Target firms receive substantial positive abnormal returns[2] and shareholders of Buyer firms receive close to zero abnormal returns (see for example: Kaplan and Weisbach (1992), Smith and Kim (1994), Mulherin and Boone (2000), Healy, Palepu and Ruback (1992), Schwert (1996), Bradley, Desai and Kim (1988), Rau and Vermaelen (1998)).

The focus of the three papers in this thesis is on Target firms and the returns to their shareholders.

In assessing abnormal returns a new model, the matched clone model, has been developed. It represents an improvement on the market model in that the returns of the firm of interest are adjusted with respect to peer companies.

[2] Most studies investigate "abnormal returns" as distinct from "returns". Consideration of abnormal returns is intended to remove effects on returns not associated with the offer (for example, the movement in equity markets generally).

The most common method of measuring abnormal returns is using the market model. Barber and Lyon (1997) find this model has inherent biases and suggest a more reliable method is to benchmark the firm of interest with similar firms (as distinct from the market of all firms).

The matched clone model follows this suggestion. The performance of the firm of interest is benchmarked against an index comprising three clone firms of similar size to and from the same sector as the firm of interest.

The sample comprises Target firms subject to a successful takeover offer in Australia in the period 1997 to 2007.

The firms listed on Australian Securities Exchange have an unusually high proportion of relatively small firms and this characteristic is reflected in the sample of Target firms. Data associated with small companies should be viewed with caution due to thin trading and corporate activities more commonly associated with private companies.

Due to their large proportion within Target firm numbers, the inclusion of small companies in the sample obfuscates bona fide data from material transactions associated with larger companies and could potentially distort findings. To mitigate this influence this study investigates offers involving Target firms with a market capitalization in excess of AUD100 million.

In assessing the factors of influence that determine returns this study investigates the presence and effects of sample selection bias.

The sample of Target firms is determined by a selection decision – the decision of a Buyer firm to make an offer for a firm determines whether or not that firm becomes a Target firm. Similarly, the presence of a voluntary IER in

conjunction with an offer is determined by a selection decision – the decision of the board of a Target firm to commission an IER.

Consequently these samples may have sample selection bias that may effect the inferences in relation to determinants of premium.

Heckman sample selection analysis was used to investigate the presence and effects of sample selection bias. The author believes this is the first application of this type of analysis to takeovers in assessing returns and their determinants.

In the first paper (Chapter 2) a takeover likelihood model is developed to investigate the characteristics of firms subject to successful takeover offers. This work represents the first application of this type of analysis in the Australian market.

As noted by Powell (1997), the modeling of takeover likelihood can serve two purposes:

- knowledge of the characteristics of Target firms may improve understanding of the motives underlying takeover activity
- it may provide the basis for an investment strategy seeking to capitalize on positive abnormal returns to shareholders of Target firms

The characteristics of interest can generally be divided into two types – market linked (such as stock price performance) and financial statement linked (such as debt levels). Some characteristics have aspects of both types (such as Tobin's q).

The analysis suggests several factors associated with a firm influence the likelihood of it becoming a takeover target. The most persistent and

significant factors relate to stock price performance and asset efficiency. The results are consistent with theories addressing the scope for Buyer firms to create value from the acquisition of Target firms.

The second paper (Chapter 3) addresses an investigation of the returns to shareholders of Target firms and the factors that influence the premium paid by Buyer firms.

Market commentators often make reference to premium as an indicator of the economic merits of an offer. Premium is usually measured with reference to the market price of the Target firm at a relevant pre bid date. The use of several event windows enable an assessment of pre bid performance of a Target firm and the extent to which the market anticipates offers.

Factors influencing premium are investigated using standard regression analysis. This is followed by Heckman selection analysis to determine the effect, if any, of sample selection bias.

The results confirm that shareholders of Target firms receive substantial economic benefits from offers. Lower premiums are associated with offers where the consideration is cash and with offers where the Buyer firm has a pre bid interest in the Target firm in excess of 5%.

The results suggest that pre bid financial and stock price performance of the Target firm and equity markets have a negative influence on premium and the ratio of market to book value of the Target firm has a positive influence.

Heckman sample selection analysis indicates the presence of sample selection bias. Allowance for this effect changes the variables of significance to pre bid stock price performance and cash flow of the Target firm and the size of the Target firm.

The third paper (Chapter 4) addresses the influence of IERs on the returns to shareholders of Target firms.

About half of the takeovers in Australia involve IERs. Under certain circumstances the Corporations Act requires the Target firm to commission an IER. Otherwise, the decision to commission an IER is at the discretion of the board of the Target firm.

The purpose of an IER is to assist the shareholders of the Target firm to make a fully informed decision on whether or not to accept an offer. In some cases the board of the Target firm uses the findings of the IER to help improve the terms of an offer.

There has been considerable debate amongst market commentators as to the efficacy of IERs. This study investigates the influence of IERs on the returns to shareholders from several perspectives.

An offer can be considered in one of three IER states: involving a voluntary IER; involving a statutory IER; and, not involving an IER. This study investigates the effect of these IER states on returns.

The IER sets out findings in relation to value and must contain an opinion on whether an offer is fair and reasonable from the perspective of the shareholders of the Target firm. This study investigates the effect of the conclusions of an IER on returns.

This study also investigates any change in the determinants of returns arising from the presence of IERs and the effect, if any, of sample selection bias.

The results suggest that IERs have no influence on the returns to shareholders of Target firms. However, the determinants of returns are influenced by IER state.

For offers involving IERs the significant factors influencing premium were recent share price performance and operating cash flows of the Target firm.

An investigation of sample selection bias and its impact on the determinants of premium produced varied results depending upon the event window.

For event windows with a focus on the pre offer announcement period there is evidence of sample selection bias. Allowance for this bias resulted in additional significant factors influencing premium related to the recent performance of the market and the financial resources of the Target firm.

Chapter 5 sets out the conclusions of the study.

Chapter 2 Characteristics of Target Firms and Modeling Takeover Likelihood

SECTION 2.1 OVERVIEW

The focus of this chapter is on the application of takeover likelihood models in Australia. The approach is similar to previous work undertaken in the USA and the UK (especially Palepu (1986) and Powell (1997)) but incorporates several innovations in terms of methodology and sample definition.

The specific purposes of this chapter are as follows:

- the collation of data relating to takeovers and other corporate transactions in Australia for the ten year period 1997 to 2007
- the development of a takeover likelihood model in order to investigate the influence of firm specific characteristics and firm relative characteristics
- the investigation of the robustness of the model over time

This study investigates successful takeover transactions during the ten year period May 1997 to May 2007 involving medium and large sized companies in all sectors (excluding Financial Institutions and Property).

The findings of the study suggest the following:

- several factors associated with a firm influence the likelihood of a takeover
- the most persistent and significant factors relate to stock price performance and asset efficiency

- the results are consistent with theories addressing the scope for Buyer firms to create value from the acquisition of Target firms
- the results are similar for different measures of stock price performance
- stock price performance increases in significance as the event window approaches the takeover announcement date
- the results are similar for factors reflecting firm specific and firm relative characteristics
- the factors and their influence vary over time

The remainder of this chapter is organized as follows. Section 2.2 sets out background material and a review of previous research into modeling takeover likelihood. Section 2.3 introduces the takeover likelihood model and theories that address Target firm characteristics within the context of value creation for a Buyer firm. Section 2.4 addresses sample construction. Section 2.5 presents the results of the analysis and an investigation of the base case takeover likelihood model in restricted form and for robustness over time. Section 2.6 presents a summary of findings and areas for future research.

SECTION 2.2 BACKGROUND

As noted by Powell (1997), the modeling of takeover likelihood can serve two purposes:

- knowledge of the characteristics of Target firms may improve understanding of the motives underlying takeover activity
- it may provide the basis for an investment strategy seeking to capitalize on positive abnormal returns to shareholders of Target firms

The characteristics of interest can generally be divided into two types – market linked (such as stock price performance) and financial statement linked (such as debt levels). Some characteristics have aspects of both types (such as Tobin's q).

The characteristics of Target firms have been subject to considerable research in the USA and the United Kingdom however the results are not entirely consistent and there has been relatively little recent work (see Powell (1997)).

In the USA, research has primarily focused on market linked characteristics. For example, Martin and McConnell (1991) find that targets of hostile takeovers exhibit poor share price performance prior to the bid. Morck (1989) finds similar results relating to stock price performance and Tobin's q and they identify some firm specific and industry specific effects. Hasbrouck (1985) finds similar results in relation to Tobin's q. Palepu (1986) finds the probability of takeover increases as stock price performance decreases. Ambrose and Megginson (1992) produce results inconsistent with Palepu (1986) albeit for a different period of time.

In considering financial statement linked characteristics of USA targets, Hasbrouck (1985), Palepu (1986) and Ambrose and Megginson (1992) find that increased firm size decreases the likelihood of takeover. Palepu (1986) also finds that Target firms exhibit an imbalance between growth requirements and available resources. Ambrose and Megginson (1992) did not replicate these results but did find a relationship with the proportion of tangible fixed assets to total assets.

In the United Kingdom, Kennedy and Limmack (1996) find a positive relationship between poor share price performance and the likelihood of a takeover but this is inconsistent with work by Franks and Mayer (1996). Levine and Aaronovitch (1981) find firm size to be a significant factor. Powell and Thomas (1994) find firm size, liquidity, profitability and several firm and industry specific variables to be important in explaining takeover likelihood. Powell (1997) separates firms subject to hostile and friendly bids and finds different characteristics for each group. He also finds variation over time and relationships with industry specific characteristics.

Alcalde and Espitia (2003) adopt a similar approach to Powell (1997) in their appraisal of Target firms in Spain. They confirm other findings in relation to size but found Target firms were not characterized by poor profitability or market valuation.[3]

Several studies have investigated the scope to utilize takeover likelihood models as the basis for investment strategies. Evidence is clear that shareholders in Target firms receive positive abnormal returns – so the ability to reliably predict potential targets prior to the announcement of an offer would support an attractive investment strategy.

[3] The applicability of these results to other markets is questionable. As noted by the authors, "the characteristics of the ownership structure, capital markets and governance systems of firms in Spain differ substantially from those of the USA and the United Kingdom". These differences relate to a high concentration of share ownership, the significant incidence of cross share holdings, illiquid share trading and a relatively small number of listed companies.

Research development in this area has been largely in relation to improving methodology related to the identification of likely targets within the market. The refinement of target selection methodology to more accurately simulate market conditions reduced the efficacy of the delivery of excess returns.

Palepu (1986) extends the use of takeover likelihood models to predict takeover targets and therefore provide the basis for an investment strategy seeking to capitalize on positive abnormal returns to shareholders of Target firms. Earlier studies had reported prediction accuracies ranging from 70% to 90% (see for example Simkowitz and Monroe (1971)). Palepu (1986) identifies methodology flaws that bias the results of these earlier studies. He goes on to find that it is difficult to predict targets and that a strategy of investing in firms identified by a takeover likelihood model is found to result in statistically insignificant excess returns.

Powell (2001) extends the earlier work by Palepu (1986) and builds on his own work (Powell (1997)) by introducing a classification rule that results in smaller portfolios with higher average takeover probabilities and applying a more rigorous appraisal of abnormal returns. Powell (2001) claims this approach results in a more powerful test. The findings of Powell (2001) are similar to those of Palepu (1986) and he notes "that developing statistical models to predict takeover targets is unlikely to result in a profitable investment strategy".

In Australia there has been little work done on the characteristics of targets and the modeling of takeover likelihood. Bugeja and Walter (1995) investigate Target firm characteristics but in the context of determining the quantum of the bid premium and they do not investigate factors contributing to the likelihood of an offer.

SECTION 2.3 TAKEOVER LIKELIHOOD MODEL

In this chapter we use a probit model to investigate the relationship between the characteristics of a firm and the likelihood of its acquisition. This approach is similar to that used in previous research (see for example, Palepu (1986), Powell (1997), Powell (2001) and Alcalde and Espitia (2003)), however, these studies used a logit model. The models are similar and produce similar results (see section 2.5.5)[4].

2.3.1 Target firm characteristics

We now consider the characteristics of Target firms within the context of takeovers forming part of a corporate development strategy with the objective of creating wealth for shareholders in Buyer firms.

For wealth creation, the returns to the Buyer firm arising from the takeover must exceed the required returns of the capital providers to the Buyer firm. The returns to the Buyer firm comprise the incremental economic benefits arising from the acquisition less the cost of the acquisition. Note that the cost of the acquisition comprises not only the price paid for the shares in the Target firm but also any liabilities retained by the Target firm. The level of required returns is usually represented by the weighted average cost of capital of the Buyer firm.

[4] See Stewart (2008b and 2008c) for related research into the investigation of sample selection bias in the assessment of returns to shareholders of Target firms. This work uses a probit model for the first stage in Heckman two stage sample selection analysis. Hence the preference in this study for a probit model.

Within the context of equity capital markets and publicly listed companies, the market view on expected returns and changes in expectations is of more relevance than the actual returns delivered over time.

If we focus on the equity interests in the Buyer firm, the shareholders in the Buyer firm benefit to the extent that wealth is created in accordance with the above.

Put simply, to optimize the benefits to the shareholders of a Buyer firm arising from an acquisition made by way of takeover the Buyer firm must minimize the bid price (yet still provide a price that is sufficiently attractive to the Target firm shareholders to procure acceptance) and maximize returns from the assets of the Target firm and maximize any synergistic benefits from the combined assets.

This objective provides some guidance as to what attributes of a firm would characterize it as an attractive acquisition opportunity for potential buyers.

This chapter follows the approach adopted by earlier studies (see for example Powell (1997) and Palepu (1986)) and addresses Target firm characteristics consistent with several theories developed to explain the underlying motivation for takeover activity. The overarching context is the attractiveness of a Target firm based upon the scope for a Buyer firm to create value.

2.3.1.1 Replacement of inefficient management

The underlying premise to this theory is that the market will discipline poor management. The ultimate punishment is the removal of management – either internally (at the discretion of the board by termination) or externally (at

the discretion of a buyer by takeover). Reference is made to Manne (1965) who viewed corporate control as a valuable asset that is traded in the market.

Consequently, according to Manne (1965) the potential threat of takeover provides a strong incentive for management to pursue wealth creation strategies. Failure to do so will result in poor performance relative to relevant benchmarks, a decrease in the share price of the firm and the attraction (due to the decreased share price) of potential buyers.

Within this context we consider two factors as proxies for a measure of management performance - stock price performance and return on assets.

2.3.1.2 Firm size

Several studies find the size of the Target firm to be a significant factor – that is, the larger the firm then the less likely it is to be a target (see for example Levine and Aaronovitch (1981), Palepu (1986), Powell and Thomas (1994)).

Powell (1997) presents the premise that transaction costs of takeovers are related to the size of the Target firm – costs such as responding to a hostile defense and post acquisition integration - and that these "additional" costs impact on expected wealth creation and therefore provide a deterrent to potential buyers.

A simpler explanation is that the number of potential buyers for larger firms is relatively small. Consequently the incidence of successful takeovers for larger firms is relatively less.

In this study we use market capitalization and enterprise value as factors approximating the size of the firm.

2.3.1.3 *Under valuation of the firm*

Firms that exhibit a low market to book ratio could be perceived as attractive acquisitions by firms with relatively higher market to book ratios. This idea is similar to the rationale and application behind Tobin's q – but in this case the imperative for increased investment is acted upon by making an acquisition.

Some studies have involved an examination of Tobin's q (or approximations thereof) for Target firms (see for example Kim, Henderson and Garrison (1993)) but difficulties exist in estimating reliable and consistent replacement values. Kim, Henderson and Garrison (1993) find that Tobin's q for Buyer firms are higher than those for control firms and Tobin's q for Target firms are not significantly different from those for control firms.

In this study we use a market to book ratio approximation of Tobin's q comprising the enterprise value of the firm divided by the total assets of the firm.

2.3.1.4 *Tangible fixed assets*

Potential buyers may be interested in the proportion of tangible fixed assets within a Target firm's total asset base.

Stulz and Johnson (1985) suggest tangible fixed assets as a proxy for debt capacity. A Target firm with relatively high tangible fixed assets could present post acquisition refinancing opportunities to the Buyer firm whereby the assets of the Target firm a used to support increased levels of debt funding – thus decreasing the reliance on equity capital to fund the acquisition.

Ambrose and Megginson (1992) suggest tangible fixed assets as a proxy for asset rich firms operating in industries with weak growth opportunities. This type of firm may be attractive to buyers seeking to rationalize the industry with a view to achieving benefits from asset restructuring and/or redeployment.

In this study we use plant, property and equipment as a proxy for tangible fixed assets.

2.3.1.5 Free cash flow

Jensen (1986) presents a theory of takeovers based upon the principle of agency costs as related to the utilization by management of cash flows. Jensen suggests incentives exist for management to retain surplus cash for funding potential future investments – even where these investments do not produce (or are not expected to produce) value creation for shareholders.

Utilisation of internal cash resources for investment funding requirements decreases the need to raise funds in debt and/or equity capital markets. Arguably this reduces the level of accountability of management.

Powell (1997) notes several measures to proxy free cash flow and sensitivity analysis to different measures undertaken by Lang Stulz and Walkling (1991). Powell (1997) utilizes the ratio of operating cashflow to total assets. Similarly, in this study we use the ratio of EBITDA to total assets.

2.3.1.6 Growth – Resource imbalance

Conceptually, a firm with an imbalance between its growth potential and available financial resources may present an attractive acquisition for a potential buyer with the reverse imbalance.

That is, a firm with significant growth potential and poor financial resources to exploit that potential (such as an emerging firm in the technology sector) may be a target for firms with limited growth potential and strong financial resources (such as an established firm in the industrial sector). The reverse also applies – a firm with limited growth potential and strong financial resources (such as a cashbox) may be a target for firms with strong growth potential and weak financial resources (such as mining exploration firm with highly prospective tenements).

Several studies report the significance of variables related to this imbalance (see for example Ambrose and Megginson (1992)).

The difficulty relates to identifying available financial data that provide useful proxies for "growth potential" and "financial resources".

Similar to Powell (1997) this study makes use of three variables – average sales growth; the ratio of cash to total assets; and, the ratio of net debt to net assets.

2.3.2 Variables

Exhibit 2.1 sets out details of the variables used in the development of the takeover likelihood model. The variable groups correspond to the theories outlined earlier in this chapter. The model uses one variable from each variable group.

Exhibit 2.1 Variables used in takeover likelihood model

Variable Group	Variable	Measure	Comment
Stock returns	RETa to RETf	Returns	See note 1
	ARMa to ARMf	Abnormal returns (market model)	See note 1
	ARCa to ARCf	Abnormal returns (matched clone model)	See note 1
Asset returns	ROAa	Return on assets	
	ROAb	Return on assets (3 year average)	
	ROAc	Return on assets	Relative to peers
	ROAd	Return on assets (3 year average)	Relative to peers
Size	SIZa	Market capitalization	
	SIZb	Natural log market capitalization	
	SIZc	Enterprise value	
	SIZd	Natural log enterprise value	
Value	TBQa	Tobin's q (enterprise value divided by total assets)	
	TBQb	Tobin's q (enterprise value divided by total assets)	Relative to peers
Tangible assets	TANa	PPE divided by total assets (3 year average)	
	TANb	PPE divided by total assets (3 year average)	Relative to peers
Free cash flow	FCFa	EBITDA divided by total assets (3 year average)	
	FCFb	EBITDA divided by total assets (3 year average)	Relative to peers
Growth	GROa	Sales growth per annum (2 year average)	
	GROb	Sales growth per annum (2 year average)	Relative to peers
Liquidity	LIQa	Cash divided by total assets (3 year average)	
	LIQb	Cash divided by total assets (3 year average)	Relative to peers
Leverage	LEVa	Net debt divided by net assets (3 year average)	
	LEVb	Net debt divided by net assets (3 year average)	Relative to peers
Dependent	D1	Dummy variable where D1 = 1 for Target firms and D1 = 0 otherwise	

Notes:

1 Stock returns are measured using an event study. Six different event windows are used for each variable. The event windows are defined with reference to the announcement date of the takeover offer (treated as t = 0) where:

"a" denotes [-360,0) "b" denotes [-180,0)
"c" denotes [-360,-15] "d" denotes [-180,-15]
"e" denotes [-360,-30] "f" denotes [-180,-30]

2.3.3 Returns and abnormal returns

The model investigates the influence of stock performance on takeover likelihood using an event study.

Stock performance is considered over six event windows (where t = 0 equals the offer announcement date):

- [-360,0) and [-180,0)
- [-360,-15] and [-180,-15]
- [-360,-30] and [-180,-30]

Three different measures of stock performance are considered:

- returns
- abnormal returns according to a market model
- abnormal returns according to a matched clone model

The measure "returns" is simply calculated from the stock performance over the event window.

Abnormal returns are measured using two methods.

The first uses the 0,1 market model with the ASX 200 Index as the proxy for the market.

The second follows from Barber and Lyon (1997) where they suggest that abnormal returns determined using a market model suffer from inherent biases. They suggest that a more reliable method is to "match" the firm of interest with similar firms – in particular with reference to firm size and firm market to book ratio.

Barber Lyon and Tsai (1999) investigate several methods to address three sources of bias: new listing or survivorship bias; rebalance bias; and, skewness bias. The context of their work is in assessing long run abnormal returns (for example, over periods of three to five years). However, the event windows used in this study are relatively short.

In this study we match Target firms with similar firms (clones) using three determinants:

- each Target firm is matched with three clone firms
- each clone firm is in the same sector as the Target firm
- the clone firms represent the three firms closest to the Target firm as measured by market capitalisation

From the three clone firms a basket performance index is calculated as the average performance of the clones. The abnormal return of the Target firm is then calculated with reference to its clone index.

The clone firms are also used for the purpose of representing non targets (or controls) in the sample. The abnormal return of each non target is similarly calculated with reference to the relevant clone index.

SECTION 2.4 SAMPLE AND DATA

The estimation sample is drawn from ASX listed companies for the ten year period May 1997 to May 2007 and comprises target and control firms.

Three data bases were utilized in assembling the samples:

- Connect 4
- Aspect Financial Analysis
- Datastream

For the period of interest, the Connect 4 Takeover Report provides a list of all takeovers and schemes of arrangement involving targets that were ASX listed and as reported by the ASX. The report contains, inter alia, target information, bidder information, date of announcement, sector information (GICS classification) and status of the transaction.

In Australia, the two most common methods of acquiring a controlling interest and/or a 100% interest in a Target firm are by way of a takeover or a scheme of arrangement. The relevant regulations are the set out in the Corporations Act. The majority of acquisitions are in the form of a takeover (for the period of interest the report details a total of 770 successful acquisitions of which 560 were takeovers and the remaining 210 were schemes of arrangement).

A scheme of arrangement is similar to a takeover. Notable differences are the involvement of court approval in the process (addressing compliance and equitable treatment of stakeholders) and an outcome determined by resolution at a Special General Meeting of Target firm shareholders.

A resolution setting out the proposed transaction is presented to Target firm shareholders and, when voted upon, for approval must receive supporting

votes representing at least 50% of votes cast and at least 75% of voters. The proposed transaction is as defined in the resolution (and referred documentation) and the outcome is binary – the resolution is carried or it is not carried. There is no scope for revised terms to be considered at the meeting.

Invariably schemes of arrangement are "friendly" (or non-contested) transactions where the buyer seeks to acquire 100% of the Target firm – and involve the support of the board of the Target firm for the proposal.

In contrast, takeovers may be non-contested or contested ("hostile") depending upon the response of the board of the Target firm. The outcome of a takeover is determined by the level of acceptances from shareholders and may result in the buyer acquiring less than a 100% interest in the Target firm. The terms of the offer may be revised by the bidder (in accordance with provisions in the Corporations Act).

This study addresses successful takeovers only. A transaction is considered "successful" if the offer has been declared unconditional and there have been acceptances representing more than 50% of the Target firm shares[5].

Consistent with other similar studies, Financial Institution and Property firms were excluded from the sample. This reduced the number of targets to 328.

A characteristic of the ASX market of listed companies is the presence of a large proportion of relatively small companies. Approximately 65% of ASX listed companies have a market capitalization less than AUD100 million. This characteristic is also evident in the composition of the Target firm list set out in Exhibit 2.2.

[5] This is the same definition as used in the Connect 4 data base.

Exhibit 2.2 Composition of Target firm sample and market by firm size

Firm Size	Target Firm Number	Target Firm Percentage	Market Number	Market Percentage
Larger than AUD5,000 million	4	1.2%	58	3.5%
AUD1,000 million to < AUD5,000 million	20	6.1%	130	7.8%
AUD500 million to < AUD1,000 million	23	7.0%	79	4.7%
AUD250 million to < AUD500 million	30	9.2%	107	6.4%
AUD100 million to < AUD250 million	65	19.8%	225	13.5%
AUD20 million to <AUD100 million	106	32.3%	493	29.5%
< AUD20 million	80	24.4%	578	34.6%
Total	328	100%	1670	100%

Notes:

1 Target firm size is market capitalization as at the most recent financial year end prior to the offer announcement

2 Market Number and Market Percentage refer to firms in the market as at the 2006 financial year end

Data associated with small companies should be viewed with caution. Typically, small companies have low trading volumes (undermining the usefulness of share price information due to unacceptably low levels of liquidity) and their share register is often dominated by a relatively small number of investors with large shareholdings (contributing to low liquidity and decreasing the relevance of public equity capital markets). Arguably, many transactions involving small companies are for the primary purpose of resolving redundant corporate ownership structures.

Due to their large proportion within Target firm numbers, the inclusion of small companies in the sample obfuscates bona fide data from material transactions associated with larger companies and could potentially distort findings.

In this study we have focused on material transactions. Accordingly, Target firms with a market capitalization of less than AUD100 million were excluded from the sample[6].

For each Target firm three control firms (or clones) were selected based upon industry sector (the three control firms have the same GICS classification as the Target firm) and size (the control firms are the three closest in size to the Target firm as measured by market capitalization). Firms with incomplete financial or share price data were excluded from the sample[7].

The estimation sample comprised a total of 238 firms, consisting of 65 Target firms and 173 control firms[8].

[6] An alternative approach would be to include small companies but to weight the variables by market capitalization. However, this method does not address the primary underlying concern of reliability and usefulness of data (especially share price related data). In any event, the weights associated with small companies relative to the sample average market capitalization would result in a close to zero contribution to the models

[7] Financial data for each firm was sourced from Aspect Financial Analysis for the three financial years immediately prior to the offer announcement date. Share price and market data was sourced from Datastream

[8] From Exhibt 2.2, the number of Target firms with a market capitalization above AUD100million is 142. This number was reduced to 65 due to incomplete financial or share price data. With 65 target firms, the number of control firms is 195. This number was reduced to 173 due to incomplete financial or share price data.

SECTION 2.5 RESULTS AND DISCUSSION

This section set out the results of the empirical analysis and is presented in four parts addressing:

- summary of results;
- probit analysis and determination of the model;
- investigation of the model in restricted form;
- investigation of the model for robustness over time.

2.5.1 Summary of results

The Base Case Model involving multivariate probit analysis was developed following a univariate analysis of variables. The Base Case Model comprised nine variables including returns as measured using the matched clone model and the binary dependent variable reflecting whether or not the firm was a Target firm.

Base Case Model:

$$\Pr(\text{Target firm}) = \Phi\,(\beta_0 + \beta_1 ARCd + \beta_2 FCFa + \beta_3 GROa + \beta_4 LEVa + \beta_5 LIQa + \beta_6 ROAb + \beta_7 SIZd + \beta_8 TANa + \beta_9 TBQa)$$

where:

Pr (Target firm)	equals 1 for Target firms and equals 0 otherwise;
ARCd	is abnormal returns measured using the matched clone model for the event window [-180,-15];

FCFa	is free cash flow calculated as EBITDA divided by total assets (three year average);
GROa	is growth calculated as sales growth per annum (three year average);
LEVa	is leverage calculated as net debt divided by net assets (three year average);
LIQa	is liquidity calculated as cash divided by total assets (three year average);
ROAb	is return on assets (three year average);
SIZd	is firm size calculated as natural log enterprise value (net debt plus market capitalization);
TANa	is tangible assets calculated as PPE divided by total assets (three year average);
TBQa	is Tobin's q calculated as enterprise value divided by total assets (three year average).

Using the Base Case Model and the event window [-180, -15], four variables were found to be significant. Positive influences were found with free cash flow, size of the firm and recent stock price performance. A negative influence was found with return on assets. Refer to Exhibit 2.3 for an extract of results from Table 2.2.

For the most part these results are consistent with theories explaining the scope for value creation in the hands of Buyer firms. The positive relationship with recent stock price performance is counter intuitive but may be explained by the response of stock price to internal attempts to improve asset efficiency and/or speculation of a takeover offer – both representing characteristics commonly associated with potential Target firms.

Exhibit 2.3 Extract of results for takeover likelihood model

	Coefficient	P > |z|
ARCd	0.548	0.079 [x]
FCFa	5.197	0.039 [v]
GROa	-0.016	0.676
LEVa	-0.031	0.666
LIQa	-1.576	0.124
ROAb	-4.825	0.057 [x]
SIZd	0.117	0.070 [x]
TANa	-0.071	0.828
TBQa	-0.131	0.192
constant	-1.217	0.002 [v]
P > chi^2		0.010 [v]
Pseudo R^2		0.078

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Similar results were found using three measures of stock price performance: raw performance; abnormal returns calculated using the 0,1 market model; and, abnormal returns calculated using the matched clone model.

A sensitivity analysis to event window closing dates showed increased levels of significance and co-efficient magnitude for the returns variable as the event window closing date approached the offer announcement date. This result is as expected and is consistent with the view that the market pre-empts offers in response to information leaks and takeover speculation.

The Base Case Model was tested in restricted form with six and four variables (excluding variables that were not statistically significant). In both cases the Likelihood Ratio was not significant and consequently we cannot reject the null that the coefficients of the excluded variables equate to nil.

Restricted Base Case Model (six variables):

$$\Pr(\text{Target firm}) = \Phi\ (\beta_0 + \beta_1 ARCd + \beta_2 FCFa + \beta_3 LIQa + \beta_4 ROAb + \beta_5 SIZd + \beta_6 TBQa)$$

Restricted Base Case Model (four variables):

$$\Pr(\text{Target firm}) = \Phi\ (\beta_0 + \beta_1 ARCd + \beta_2 FCFa + \beta_3 ROAb + \beta_4 SIZd)$$

The Base Case Model (unrestricted) was tested for robustness over time using rolling five year panels across the ten year sample period. The results vary considerably across panels suggesting the model is not robust over time. This could indicate a weakness in the model or that different factors influence takeover activity at different points in time.

2.5.2 Probit analysis and determination of the model

2.5.2.1 Univariate analysis

Probit analysis of each variable was undertaken on a univariate basis (see Table 2.1 for summary results).

Statistically significant results were produced for most of the forms of stock return variables where the event window closed on the day before the offer date – that is [-360,0) and [-180,0)[9]. As the closure of the event window

[9] Except for RETa with P > | z| of 0.169 which is above the 10% cut off.

moves back from the offer announcement date the results are not significant except for the event window [-180,-15].

For the [-360,0) event window, the abnormal return variables produce statistically significant and similar results. ARMa has a coefficient of 0.431 (P > | z | of 0.005) and ARCa has a coefficient of 0.468 (P > | z | of 0.004). In contrast, the unadjusted return variable RETa has a coefficient of 0.212 (P > | z | of 0.169).

For the [-180,0) event window, all return variables produce statistically significant results at a 5% level and the coefficients on the abnormal return variables are similar. RETb has a coefficient of 0.781 (P > | z | of 0.005), ARMb has a coefficient of 1.432 (P > | z | of 0.000) and ARCb has a coefficient of 1.533 (P > | z | of 0.000).

For the [-180,-15] event window, all return variables produce statistically significant results at a 10% level and the coefficients on all variables are similar. RETd has a coefficient of 0.466 (P > | z | of 0.100), ARMd has a coefficient of 0.481 (P > | z | of 0.097) and ARCd has a coefficient of 0.502 (P > | z | of 0.090).

The results for all other return variables were not statistically significant.

Other variables to produce statistically significant results were:

- natural log of market capitalization, SIZb, with a coefficient of 0.141 (P > | z | of 0.048)
- natural log of enterprise value, SIZd, with a coefficient of 0.120 (P > | z | of 0.033)
- tangible assets proxy, TANa, with a coefficient of 0.513 (P > | z | of 0.043)

- financial resources proxy (liquidity), LIQa, with a coefficient of –1.507 (P > | z | of 0.039)
- financial resources proxy (liquidity relative to peers), LIQb, with a coefficient of –2.113 (P > | z | of 0.006)

2.5.2.2 Multivariate analysis

A multivariate probit model was then used to investigate combinations of variables representing each of the nine variable groups. The results from the univariate probit analysis were used as an indicator to what variables may be important in the multivariate probit model.

Table 2.2 sets out the results for the Base Case Model multivariate probit analysis.

The nine variables used in the Base Case Model comprise:

- ARCd: abnormal returns measured using the matched clone method for the event window [-180,-15]
- FCFa: free cash flow approximated by EBITDA divided by total assets
- GROa: growth approximated by sales growth per annum (two year average)
- LEVa: financial resources (leverage) approximated by net debt divided by net assets (three year average)
- LIQa: financial resources (liquidity) approximated by cash divided by total assets (three year average)
- ROAb: return on assets (three year average)
- SIZd: natural log of enterprise value
- TANa: PPE divided by total assets
- TBQa: Tobin's q as approximated by enterprise value divided by total assets

The estimated coefficient for one variable was statistically significant at a 5% level:

- FCFa with a coefficient of 2.070 (P > | z | of 0.039)

The estimated coefficients for three variables were statistically significant at a 10% level:

- ARCd with a coefficient of 0.548 (P > | z | of 0.079)
- ROAb with a coefficient of –1.900 (P > | z | of 0.057)
- SIZd with a coefficient of 1.810 (P > | z | of 0.070)

In terms of model significance, the likelihood ratio is 21.71 and this is significant at a 5% level (P > chi^2 of 0.010). However, the model provides relatively poor explanatory power (as indicated by pseudo R^2) at 7.8%.

The signs of the coefficients of the significant variables are partly consistent with expectations.

For ARCd, the positive sign suggests firms with positive stock returns relative to their peers are more likely to be targets[10]. Prima facie, this result is counter intuitive – in terms of attractiveness as a target and the potential for value creation, arguably a relatively weak stock performance would indicate the scope to acquire assets at a discounted price.

However, stock price reflects market expectations of future returns and it may be that the prospect of improved asset performance (possibly under internally initiated new management) and/or the possibility of a takeover offer (resulting in the redeployment of assets under new ownership) are already factored into market expectations.

[10] In variations to the Base Case Model, the coefficients for variables representing alternative measures of stock returns are also positive.

The event window opening is either -360 days or -180 days which is relatively recent in the history of a firm (-180 days for ARCd as used in the Base Case Model). It is possible that poor asset performance associated with poor management was manifested some time earlier. The firm's share price at or around the event opening window may reflect some aspects of price recovery in anticipation of resolution of the performance problem.

For ROAb, the negative sign suggests firms with poor returns on assets are more likely to be targets. This result is consistent with expectations. Firms that generate high returns on assets are less likely to be takeover targets.

Note that this measure is derived from historical accounts and represents performance in the past (and ROAb is the three average return on assets). As such, this variable does not capture market expectations of future performance.

For SIZd, the positive sign suggests larger firms are more likely to be targets. This result is not consistent with Powell (1997) or Palepu (1986) - both found size to be significant but with a negative coefficient. The inconsistency in results may be explained by the use of a size filter in establishing the estimation sample in this study – thus decreasing the relative proportion of smaller firms in the estimation sample.

For this study, given the absence of small firms from the sample and the relatively low number of large firms in the sample, the results suggest that for medium sized firms (that is, for firms with a market capitalization above AUD100 million and less than AUD1,000 million) the likelihood of takeover increases with firm size.

For FCFa, the positive sign suggests firms with surplus cashflows are more likely to be targets. This result is consistent with Powell (1997) and the Free Cash Flow hypothesis of Jensen (1986).

2.5.2.3 Results with alternative measures of returns

Similar and consistent results were obtained using the alternative variables for stock returns as shown in Table 2.3. In this analysis, the stock return variables RETd (raw returns) and ARMd (abnormal returns measured using the 0,1 market model) were substituted in the Base Case Model in lieu of ARCd (abnormal returns measured using the matched clone model).

For each version of the model the variables of significance were the same and comprised stock return (each of RETd, ARMd and ARCd), ROAb, SIZd and FCFa (except that SIZd just failed the 10% significance test in the raw returns model with P > | z | of 0.101).

For these variables the estimated coefficients and significance test statistics are very similar. For example, for ROAb:

- using stock return variable RETd, the estimated coefficient of ROAb is -5.150 (P > | z | of 0.039)
- using stock return variable ARMd, the estimated coefficient of ROAb is -5.142 (P > | z | of 0.041)
- using stock return variable ARCd, the estimated coefficient of ROAb is -4.825 (P > | z | of 0.057)

For each version the overall model characteristics were similar. For RETd, the model has a likelihood ratio of 21.880 (P > chi^2 of 0.009) and pseudo R^2 = 7.8%. For ARMd, the model has a likelihood ratio of 22.030 (P > chi^2 of

0.009) and pseudo R^2 = 7.9%. For ARCd, the model has a likelihood ratio of 21.710 (P > chi^2 of 0.010) and pseudo R^2 = 7.8%.

2.5.2.4 Results with alternative event windows

An investigation was undertaken into the sensitivity of the model to different event window closing dates. Refer to Table 2.4.

In this analysis, three event windows were considered, [-180,-30] and [-180,-15] and [-180,0), for each of the stock return variables RET (raw returns) and ARM (abnormal returns measured using the 0,1 market model) and ARC (abnormal returns measured using the matched clone model). All other variables are as for the Base Case Model.

For each stock return variable, the impact of changes in the event window closing date exhibited the same trends. As the event window closing date moved closer to the announcement date the coefficient of the stock return variable increased, the level of significance of this estimate increased, the level of significance of the model increased and the explanatory power of the model increased.

For example, for ARC:

- with an event window [-180,-30], the stock return variable coefficient is 0.347 (P > | z | of 0.301) and the model has a likelihood ratio of 19.730 (P > chi^2 of 0.020) and pseudo R^2 = 7.1%
- with an event window [-180,-15], the stock return variable coefficient is 0.548 (P > | z | of 0.079) and the model has a likelihood ratio of 21.710 (P > chi^2 of 0.010) and pseudo R^2 = 7.8%

- with an event window [-180,0), the stock return variable coefficient is 0.1.607 (P > | z | of 0.000) and the model has a likelihood ratio of 48.490 (P > chi^2 of 0.000) and pseudo R^2 = 17.4%

These results are as expected. It is common for the share price of a target to increase immediately prior to a takeover announcement – reflecting information "leaks" and market speculation of a potential offer. In the probit model, the presence of any abnormal return of this type is uniquely associated with Target firms. As the event window closure moves back from the offer announcement date this type of abnormal return is less likely to be manifested.

The prediction of takeover offers primarily from abnormal stock price increases in the few days before an offer is announced is outside the scope of this study. For the purpose of this study we have focused on event windows that close at -15 days and -30 days.

2.5.2.5 Results with peer measures of financial variables

An investigation was undertaken into the impact on the model from the use of relative to peer measures of financial variables. Refer to Table 2.5.

In this analysis, the financial variables (that is, all variable groups except stock returns and size) were considered using two measures - firm specific and firm relative to peers. The stock return and size variables (ARCd and SIZd) remained as for the Base Case Model.

The peer group for each target firm comprises its matched clones. For a given firm and a given variable, an average is calculated for the peer group. The calculation of the firm relative to peers variable involves the subtraction of

the average for the peer group from the firm specific variable. This approach is applied to each Target firm and its associated matched clone firms (or controls).

Two versions of the Base Case Model were considered – one with firm specific financial variables and one with firm relative to peers financial variables.

The results are similar for most variables in terms of coefficient sign, magnitude and level of significance. Notable differences occurred for three variables, ROA and FCF and LIQ.

In the relative to peers model ROAd is not a significant variable with a coefficient of –3.394 (P > | z | of 0.309) but is in the firm specific model with a coefficient of -4.825 (P > | z | of 0.057).

In the relative to peers model FCFb is not a significant variable with a coefficient of 2.804 (P > | z | of 0.406) but is in the firm specific model with a coefficient of -5.197 (P > | z | of 0.039).

In the relative to peers model LIQb is a significant variable with a coefficient of –2.345 (P > | z | of 0.017) but is not in the firm specific model with a coefficient of –1.576 (P > | z | of 0.124).

For each version the overall model characteristics were similar. The relative to peers model has a likelihood ratio of 17.900 (P > chi^2 of 0.036) and pseudo R^2 = 6.4%. The firm specific model has a likelihood ratio of 21.710 (P > chi^2 of 0.010) and pseudo R^2 = 7.8%.

Powell (1997) suggests that variables based upon relative to peers measures can be considered as proxies for sector characteristics (as distinct from

variables based upon firm specific measures serving as proxies for firm characteristics).

The validity of this suggestion depends largely upon the extent to which the peer proxy is representative of the sector. For this study, the peer proxy is not intended to represent the sector – it is intended to represent firms with similar characteristics to the Target firm.

Using this approach the results would suggest that the sector characteristic of financial resources (as reflected in cash liquidity) is an important factor in determining takeover likelihood. However, given the purpose and use of the peer proxy within this study, this finding should be viewed as weak.

2.5.3 Investigation of the model in restricted form

The results for the Base Case Model suggest four of the nine variables as being significant. An investigation was undertaken into the impact on the model of reducing the number of variables – that is, a restricted form of the model.

From the unrestricted nine variable Base Case Model, the three variables of least significance were excluded to obtain a restricted six variable model. Similarly, a further two variables were excluded to obtain a restricted four variable model. The results are set out in Table 2.6.

The six variable restricted model has three variables excluded, TANa and GROa and LIQa.

The results for the six variable restricted model are similar to the unrestricted model for most variables in terms of coefficient sign, magnitude and level of significance.

For example, in the six variable restricted model the stock return variable ARCd has a coefficient of 0.573 (P > | z | 0.064). In the unrestricted model the same variable has a coefficient of 0.548 (P > | z | 0.079). In both cases the estimate is significant at a 10% level.

For each version the overall model characteristics were similar. The six variable restricted model has a likelihood ratio of 20.350 (P > chi^2 of 0.002) and pseudo R^2 = 7.3%. The unrestricted model has a likelihood ratio of 21.710 (P > chi^2 of 0.010) and pseudo R^2 = 7.8%.

For the six variable restricted model the Likelihood Ratio[11] equates to 1.363 and, using a chi squared distribution with three degrees of freedom[12], is not significant at the 10% level. Consequently we cannot reject the null that the coefficients of the excluded variables in the six variable restricted model equate to nil.

The four variable restricted model has a further two variables excluded, TBQa and LIQa.

The results for the four variable restricted model differ from the unrestricted model for variables ARCd and ROAb. The other two variables, SIZd and FCFa, produce similar results to the unrestricted model.

[11] Calculated as: Likelihood Ratio = minus 2 times (log likelihood restricted model less log likelihood unrestricted model).
[12] Number of variables in unrestricted model minus number of variables in restricted model – in this case 9 minus 6.

ARCd ceased to be a significant variable with a coefficient of 0.497 (P > | z | 0.101) compared with 0.548 (P > | z | 0.079) for the unrestricted model.

The level of significance of ROAb has decreased with a coefficient of –3.406 (P > | z | 0.088) compared with –4.825 (P > | z | 0.057) for the unrestricted model.

The four variable restricted model has a likelihood ratio of 12.760 (P > chi^2 of 0.013) and pseudo R^2 = 4.6%. Although the model remains significant it has reduced explanatory power.

For the four variable restricted model the Likelihood Ratio equates to 8.95 and, using a chi squared distribution with five degrees of freedom, is not significant at the 10% level. Consequently we cannot reject the null that the coefficients of the excluded variables in the four variable model equate to nil.

2.5.4 Investigation of the model for robustness over time

The estimation sample covers a period of approximately 10 years. It is possible that factors influencing takeover likelihood vary over time. An investigation was undertaken to explore this possibility and the robustness of the model over time.

The estimation sample period was divided into six panels representing five year rolling subsets of sample data (see Exhibit 2.4).

Exhibit 2.4 Sample data presented in five year panels

Panel	Period	Sample size
Panel 1	May 1997 to Dec 2001	94
Panel 2	Jan 1998 to Dec 2002	97
Panel 3	Jan 1999 to Dec 2003	116
Panel 4	Jan 2000 to Dec 2004	139
Panel 5	Jan 2001 to Dec 2005	151
Panel 6	Jan 2002 to May 2007	144

Because the panels represent rolling five year periods, any variation in results should show as a progression across panels. Panel 1 and panel 6 are the two extreme panels and do not contain any common data.

The Base Case Model was then applied to each panel of data. Refer to Table 2.7 for an extract of the results (panels 1 and 4 and 6).

The results vary considerably across panels.

In relation to variables, in most cases the signs of coefficients are consistent. However, the magnitude of the coefficients and the presence of variables of significance vary considerably.

For panel 1 (1997 to 2001) there are no variables of significance. The model has a likelihood ratio of 11.740 ($P > chi^2$ of 0.228) and pseudo R^2 = 10.6% and is not significant at the 10% level.

Similarly, for panel 4 (2000 to 2004) there are no variables of significance. The constant has a coefficient of –1.186 ($P > |z|$ of 0.028). The model has a

likelihood ratio of 11.500 ($P > chi^2$ of 0.243) and pseudo R^2 = 6.6% and is not significant at the 10% level.

For panel 6 (2002 to 2007), the stock returns variable is significant. ARCd has a coefficient of 1.101 ($P > |z|$ of 0.010). The constant has a coefficient of –1.472 ($P > |z|$ of 0.004). The model has a likelihood ratio of 19.540 ($P > chi^2$ of 0.021) and pseudo R^2 = 11.6% and is significant at the 5% level.

The results suggest that the model is not robust over time. This could indicate a weakness in the model itself, whereby important factors are not reflected in the set of variables. Alternatively, it may be that different factors influence takeover activity at different points in time.

2.5.5 Comparison of results from Probit and Logit models

This study uses probit analysis (primarily for consistency with other related research – see for example Stewart (2008b and 2008c)) whereas most previous studies into takeover likelihood use logit analysis.

The two methods are similar and should produce similar results. Consequently, the results from this study can be directly compared with the results of previous studies.

An investigation was undertaken to confirm the expectation of similar results. The Base Case was assessed using probit analysis and logit analysis. Refer to Table 2.8 for the results.

The results show, as expected, the model is essentially unchanged whether probit analysis or logit analysis is used.

All variables have very similar coefficients and levels of significance. Each model produces the same four variables of significance (ARCd and ROAb and SIZd and FCFa).

For example, using logit analysis the stock return variable ARCd has a coefficient of 0.936 (P > | z | 0.078). Using probit analysis the same variable has a coefficient of 0.548 (P > | z | 0.079). In both cases the estimate is significant at a 10% level.

Similarly, using logit analysis the size variable SIZd has a coefficient of 0.192 (P > | z | 0.073). Using probit analysis the same variable has a coefficient of 0.117 (P > | z | 0.070). In both cases the estimate is significant at a 10% level.

For each version the overall model characteristics were almost identical. Using logit analysis the model has a likelihood ratio of 21.320 (P > chi^2 of 0.011) and pseudo R^2 = 7.6%. The probit model has a likelihood ratio of 21.710 (P > chi^2 of 0.010) and pseudo R^2 = 7.8%.

SECTION 2.6 SUMMARY AND RECOMMENDATIONS

The study represents original research in several aspects:

- it is the first study of its type investigating takeover likelihood as applied to the Australian market
- it incorporates market based performance as a factor
- it builds on suggestions by Barber and Lyon (1997) in relation to assessment of abnormal returns and introduces a matched clone index to measure abnormal stock price performance
- it focuses on material transactions involving medium and large size firms, thus eliminating potential distortion of results arising from the presence of a large number of small firms exhibiting spurious performance characteristics
- it comprehensively investigates the robustness of the takeover likelihood model and its findings over time

The results of the study suggest that several factors associated with a firm influence the likelihood of a takeover. The most significant factors relate to stock price performance and asset efficiency.

This finding is consistent with the view that Buyer firms are attracted to acquisitions that exhibit the potential for value creation in the hands of the buyer. One of the theories of takeover activity addresses the replacement of management as a remedy to poorly performing assets – with the objective that under new ownership (and management) the resulting improved asset performance will underpin value creation.

Interestingly, the takeover likelihood model indicates a positive relationship between stock price performance and increased probability of becoming a target. This result is counter intuitive, but may be explained by the duration of

the event windows used in the study, the state of development of any recovery on the part of the firm and/or the extent to which the market is anticipating a takeover.

The study suggests that the model is not robust over time. The extent and identity of significant factors varies across time. As too does the significance of the model itself. An explanation for this result is not clear and represents an area for further research.

Research into takeover likelihood has, for the most part, focused on firm specific factors. It is reasonable to assume that time related macro economic factors (such as market conditions and interest rates) may influence takeover activity and hence the likelihood of firms becoming takeover targets. A revision of the current approach to incorporate other factors may improve the robustness of the model.

Within the Australian context, a significant proportion of acquisitions are undertaken by a Scheme of Arrangement – a type of transaction similar to a takeover but with several important differences. It is incorrect to treat Schemes of Arrangement as takeovers. However, this type of transaction represents an important aspect of market activity and in recent years accounted for approximately 30% of all successful acquisitions of ASX listed companies. Specific investigation into factors associated with Schemes of Arrangement presents another area for further research.

Table 2.1 Results of univariate probit analysis

This table presents selected results of a univariate probit analysis for each variable and contains those variables with significant results. RETa is included to enable a comparison with other return variables using the event window [-360, 0).

The dependent variable equals 1 for Target firms and equals 0 otherwise.

	event window	coefficient	P > |z|
RETa	[-360, 0)	0.212	0.169
ARMa	[-360, 0)	0.431	0.005 [v]
ARCa	[-360, 0)	0.468	0.004 [v]
RETb	[-180, 0)	0.781	0.005 [v]
ARMb	[-180, 0)	1.432	0.000 [v]
ARCb	[-180, 0)	1.533	0.000 [v]
RETd	[-180, -15]	0.466	0.100 [x]
ARMd	[-180, -15]	0.481	0.097 [x]
ARCd	[-180, -15]	0.502	0.090 [x]
SIZb		0.141	0.048 [v]
SIZd		0.120	0.033 [v]
TANa		0.513	0.043 [v]
LIQa		-1.507	0.039 [v]
LIQb		-2.113	0.006 [v]

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.2 Results of multivariate probit analysis

This table presents the results of a multivariate probit analysis using a set of variables representing the Base Case model. Each of the nine variable groups is represented by one variable.

The returns variable, ARCd, is abnormal returns measured using the matched clone method for an event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

Four variables (and the constant) are identified as being significant. The model is highly significant but has relatively low explanatory power.

	Coefficient	Std Error	z	P > |z|	[95% confidence interval]	
ARCd	0.548	0.312	1.750	0.079 [x]	-0.064	1.160
FCFa	5.197	2.517	2.070	0.039 [v]	0.265	10.129
GROa	-0.016	0.039	-0.420	0.676	-0.093	0.060
LEVa	-0.031	0.071	-0.430	0.666	-0.169	0.108
LIQa	-1.576	1.025	-1.540	0.124	-3.585	0.432
ROAb	-4.825	2.538	-1.900	0.057 [x]	-9.800	0.150
SIZd	0.117	0.065	1.810	0.070 [x]	-0.010	0.244
TANa	-0.071	0.328	-0.220	0.828	-0.713	0.571
TBQa	-0.131	0.101	-1.300	0.192	-0.328	0.066
_cons	-1.217	0.394	-3.090	0.002 [v]	-1.989	-0.444

log likelihood	-128.690
LR chi^2 (9)	21.710
P > chi^2	0.010 [v]
Pseudo R^2	0.078

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.3 Results of sensitivity analysis to different measures of return

This table presents results from an analysis investigating the sensitivity of the model to the different methods used to measure stock returns. The table shows the Base Case model for each of the three types of the Stock return variable.

The table shows results for the Stock return variables denoted by RETd (raw returns), ARMd (abnormal returns measured using the 0,1 market model method) and ARCd (abnormal returns measured using the matched clone method). Each Stock return variable is measured over the event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

As the results show, the model is relatively insensitive to the form of Stock return variable used. In each case the same variables are identified as being significant (albeit with small differences in level of significance). The significance of the model and its explanatory power is essentially unchanged.

Event window [-180, -15]

	RETd		ARMd		ARCd	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
Stock return	0.546	0.074 [x]	0.567	0.068 [x]	0.548	0.079 [x]
FCFa	5.504	0.026 [v]	5.530	0.026 [v]	5.197	0.039 [v]
GROa	-0.018	0.653	-0.018	0.646	-0.016	0.676
LEVa	-0.030	0.666	-0.035	0.623	-0.031	0.666
LIQa	-1.579	0.122	-1.540	0.132	-1.576	0.124
ROAb	-5.150	0.039 [v]	-5.142	0.041 [v]	-4.825	0.057 [x]
SIZd	0.106	0.101	0.108	0.095 [x]	0.117	0.070 [x]
TANa	-0.081	0.804	-0.080	0.805	-0.071	0.828
TBQa	-0.141	0.161	-0.142	0.158	-0.131	0.192
constant	-1.147	0.004 [v]	-1.132	0.004 [v]	-1.217	0.002 [v]
LR		21.880		22.030		21.710
P > chi^2		0.009 [v]		0.009 [v]		0.010 [v]
Pseudo R^2		0.078		0.079		0.078

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.4 Results of sensitivity analysis to different event windows

This table presents results from an analysis investigating the sensitivity of the model to the Stock returns variable with different event window closing dates.

This table presents selected output from the Base Case Model for each of the three types of the Stock returns variable for three different event windows.

The table shows results for each of the three Stock returns variables denoted by RET (raw returns), ARM (abnormal returns measured using the 0,1 market model method) and ARC (abnormal returns measured using the matched clone method). Each variable is measured over three event windows namely [-180, -30], [-180, -15] and [-180, 0).

As the event window moves closer to the announcement date (t = 0) the significance of the Stock returns variable (in all three forms) increases. Similarly, the significance of the model and its explanatory power also increases.

Event window	[-180, -30]		[-180, -15]		[-180, 0)	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
RET	0.353	0.272	0.546	0.074 [x]	0.901	0.003 [v]
LR		19.880		21.880		28.140
P > chi^2		0.019 [v]		0.009 [v]		0.001 [v]
Pseudo R^2		0.071		0.078		0.101
ARM	0.369	0.257	0.567	0.068 [x]	1.581	0.000 [v]
LR		19.950		22.030		47.880
P > chi^2		0.018 [v]		0.009 [v]		0.000 [v]
Pseudo R^2		0.072		0.079		0.172
ARC	0.347	0.301	0.548	0.079 [x]	1.607	0.000 [v]
LR		19.730		21.710		48.490
P > chi^2		0.020 [v]		0.010 [v]		0.000 [v]
Pseudo R^2		0.071		0.078		0.174

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.5 Results of sensitivity analysis to variables measured relative to peers

This table presents results from an analysis investigating the sensitivity of the model to financial variables measured for the firm and alternatively measured for the firm relative to its peers. The table shows the Base Case model for firm based measures and firm relative to its peers measures.

The table shows results for the Stock return variable ARC (abnormal returns measured using the matched clone method) measured over the event window [-180, -15]. ROAb is the three year average return on assets, ROAd is the three year average return on assets relative to peers and SIZd is the natural log of enterprise value. The other variables are denoted with the suffixes "a" for firm specific measures and "b" for firm relative to peer group measures.

The peer group for each target firm comprises its matched clones. For a given firm and a given variable, an average is calculated for the peer group. The calculation of the firm relative to peers variable involves the subtraction of the average for the peer group from the firm specific variable. This is applied to each target firm and its associated non target firms (or controls).

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

The firm specific set of variables produces a similar result as the firm relative to peers set of variables. However, there are differences in the coefficients and level of significance of some variables. The significance and explanatory power of each model is similar.

Event window [-180, -15]

Firm			Firm Relative to Peers		
	coefficient	P > |z|		coefficient	P > |z|
ARCd	0.548	0.079 [x]	ARCd	0.612	0.050 [v]
FCFa	5.197	0.039 [v]	FCFb	2.804	0.406
GROa	-0.016	0.676	GROb	-0.001	0.573
LEVa	-0.031	0.666	LEVb	-0.016	0.837
LIQa	-1.576	0.124	LIQb	-2.345	0.017 [v]
ROAb	-4.825	0.057 [x]	ROAd	-3.394	0.309
SIZd	0.117	0.070 [x]	SIZd	0.114	0.055 [x]
TANa	-0.071	0.828	TANb	-0.316	0.441
TBQa	-0.131	0.192	TBQb	-0.027	0.566
constant	-1.217	0.002 [v]	constant	-1.369	0.000 [v]
LR		21.710	LR		17.900
P > chi^2		0.010 [v]	P > chi^2		0.036 [v]
Pseudo R^2		0.078	Pseudo R^2		0.064

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.6 Results of restricted version of model

This table presents results from an analysis investigating restricted variations of the model. The table shows the Base Case Model with nine variables and two variations involving restrictions to six and four variables.

Variables were excluded according to their level of significance (progressing from the least significant).

The table shows results for the Stock return variable ARC (abnormal returns measured using the matched clone method) measured over the event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

As the results show, the model remains significant in both restricted forms but with diminished explanatory power. In comparison with the unrestricted model, the likelihood ratio of each form is not significant at the 10% level so in both cases the null cannot be rejected that the coefficients of the excluded variables equate to nil.

	9 variables		6 variables		4 variables	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
ARCd	0.548	0.079 [x]	0.573	0.064 [x]	0.497	0.101
FCFa	5.197	0.039 [v]	5.036	0.019 [v]	3.911	0.046 [v]
GROa	-0.016	0.676				
LEVa	-0.031	0.666				
LIQa	-1.576	0.124	-1.410	0.126		
ROAb	-4.825	0.057 [x]	-4.705	0.031 [v]	-3.406	0.088 [x]
SIZd	0.117	0.070 [x]	0.106	0.084 [x]	0.113	0.056 [x]
TANa	-0.071	0.828				
TBQa	-0.131	0.192	-0.128	0.193		
constant	-1.217	0.002 [v]	-1.221	0.002 [v]	-1.531	0.000 [v]
log likelihood		-128.690		-129.371		-133.165
LR		21.710		20.350		12.760
P > chi^2		0.010 [v]		0.002 [v]		0.013 [v]
Pseudo R^2		0.078		0.073		0.046
LR delta				1.363		8.95
P > chi^2				>0.100		>0.100

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.7 Results of sensitivity analysis to different sample periods

This table presents results from an analysis investigating the robustness of the model. The table shows the Base Case Model as applied to data within three time periods.

The estimation sample was partitioned into six time panels representing five year rolling periods from 1997 to 2007. The tables shows the two extreme panels (1997 to 2001) and (2002 to 2007) and a mid period panel (2000 to 2004). There is no common data between the two extreme panels.

The table shows results for the Stock return variable ARC (abnormal returns measured using the matched clone method) measured over the event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

As the results show, the model changes substantially for the different panels. Consequently the model should not be considered as robust.

Event window [-180, -15]

	1997 to 2001		2000 to 2004		2002 to 2007	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
ARCd	0.230	0.668	0.524	0.183	1.101	0.010 [v]
FCFa	4.416	0.341	3.968	0.136	4.925	0.128
GROa	-0.573	0.308	-0.003	0.907	-0.003	0.848
LEVa	0.044	0.858	-0.027	0.716	-0.060	0.437
LIQa	-1.787	0.346	-1.378	0.315	-2.028	0.144
ROAb	-3.438	0.523	-3.700	0.170	-4.211	0.186
SIZd	0.167	0.192	0.062	0.447	0.087	0.289
TANa	-0.654	0.220	0.247	0.538	0.532	0.231
TBQa	-0.302	0.193	-0.046	0.631	-0.038	0.777
constant	-0.925	0.208	-1.186	0.028 [v]	-1.472	0.004 [v]
LR		11.740		11.500		19.54
P > chi^2		0.228		0.243		0.021 [v]
Pseudo R^2		0.106		0.066		0.1162
number observations		94		151		144

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 2.8 Comparison of probit and logit results

This table presents results from probit and logit analysis. This study uses probit analysis (primarily for consistency with other related research – see Stewart (2008b and 2008c)) whereas most previous studies into takeover likelihood use logit. The table shows the Base Case Model as applied to the estimation sample using both methods.

The table shows results for the Stock return variable ARC (abnormal returns measured using the matched clone method) measured over the event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

As the results show, the model is essentially unchanged whether probit or logit analysis is used to process the estimation sample.

	probit		logit	
	coefficient	P > |z|	coefficient	P > |z|
ARCd	0.548	0.079 [x]	0.936	0.078 [x]
FCFa	5.197	0.039 [v]	8.521	0.046 [v]
GROa	-0.016	0.676	-0.028	0.692
LEVa	-0.031	0.666	-0.058	0.718
LIQa	-1.576	0.124	-2.738	0.127
ROAb	-4.825	0.057 [x]	-7.896	0.066 [x]
SIZd	0.117	0.070 [x]	0.192	0.073 [x]
TANa	-0.071	0.828	-0.116	0.833
TBQa	-0.131	0.192	-0.221	0.197
constant	-1.217	0.002 [v]	-1.979	0.003 [v]
LR		21.710		21.320
P > chi^2		0.010 [v]		0.011 [v]
Pseudo R^2		0.078		0.076

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Chapter 3 Returns to Shareholders of Target firms

SECTION 3.1 OVERVIEW

The focus of this chapter is on the investigation of returns to shareholders of Target firms in Australia.

The approach builds on early work by Bugeja and Walter (1995) but incorporates several innovations in terms of methodology, sample definition and the investigation of sample selection bias.

The specific purposes of this chapter are as follows:

- the investigation of returns to shareholders of Target firms in Australia
- the investigation of the influence of factors affecting the premium paid to shareholders of Target firms
- the investigation of sample selection bias and its consequences

This study investigates successful takeovers in the ten year period May 1997 to May 2007 involving the acquisition of medium and large sized ASX listed companies.

The findings of the study suggest the following:

The shareholders of Target firms receive significant economic benefits resulting from successful takeover offers. These returns are substantial

whether measured as abnormal returns (using the market model or the matched clone model) or as premium (unadjusted stock price).

The average premium was 26.8% for the event window [-15, +90]. The average premium increased the earlier the start date of the event window.

The effect on premium within four classifications of offers was investigated. The classifications addressed: the form of consideration; the pre bid interest in the Target firm held by the Buyer firm; the sector of the Target firm; and, the recommendation of the board of the Target firm.

Cash offers represented 73.8% of all offers. The premium for cash offers was lower than the premium for non cash offers and equated to 25.3% and 30.9% respectively for the event window [-15, +90].

Offers where the Buyer firm had a pre bid interest in the shares of the Target firm of more than 5% ("toehold") represented 55.4% of all offers. The premium for offers where a toehold existed was lower than the premium for offers where a toehold did not exist and equated to 18.4% and 37.3% respectively for the event window [-15, +90].

Target firms in the materials sector represented 27.7% of all offers. The premium for Target firms in the materials sector was lower than for Target firms not in the materials sector and equated to 23.3% and 28.1% respectively for the event window [-15, +90].

Offers recommended by the boards of Target firms represented 70.8% of all offers. The premium for recommended offers was lower than for other offers and equated 24.2% and 33.2% respectively for the event window [-15, +90].

The classification results varied with different event windows. The findings in relation to the form of consideration and the pre bid interest were consistent, however the findings in relation to the materials sector and the recommendation of the board were not consistent.

Multivariate analysis of the determinants of premium identified several factors of influence. These factors relate to pre bid stock price performance of the Target firm and the pre bid performance of Australian equity markets (both have a negative influence), recent financial performance of the Target firm in terms of cash flow and revenue growth (both have a negative influence), and the ratio of market to book value of the Target firm (a positive influence).

The results are consistent across the short dated event windows.

For long dated event windows, Target firm cash flow is consistently a negative influence, pre bid stock price performance of the Target firm is consistently a positive influence, and the other factors are either no longer significant or have inconsistent results depending upon the event window.

The results of the multivariate analysis were not sensitive to the methods used to measure returns to shareholders of the Target firm.

Heckman sample selection analysis indicated the presence of sample selection bias. Taking into account sample selection bias changes the factors of significance. The revised set of factors relate to the pre bid stock price performance of the Target firm, Target firm cash flow and the size of the Target firm (all with a negative influence). Heckman's Lambda is significant in all versions of the revised multivariate model.

The remainder of this chapter is organized as follows. Section 3.2 sets out background material and an overview of previous research on the returns to shareholders of Target firms. Section 3.3 addresses abnormal returns, premium and their determinants and introduces the matched clone model for measuring abnormal returns. Section 3.4 introduces the use of Heckman sample selection analysis within the context of assessing the determinants of premium in takeovers. Section 3.5 addresses variables and sample construction. Section 3.6 presents the results of the analysis and an investigation of the effect on the determinants of premium of differing event windows, model restrictions and sample selection bias. Section 3.7 presents a summary of findings and areas for future research.

SECTION 3.2 BACKGROUND

The market for corporate control and the wealth effects associated with takeover activities have been subject to extensive research internationally and in Australia.

The context of the research varies. Common areas of interest include issues related to market efficiency, the impact of regulations, the motivation of buyers, and, the scope for and the delivery of value creation.

Most research addresses the wealth effects on the shareholders of Target firms and/or on the shareholders of Buyer firms.

Bruner (2001), in addition to commenting on various research approaches to assessing the performance of takeovers, provides a summary of research undertaken in the USA. In addressing the broad question "does M&A pay" he lists many studies into the wealth effects on the shareholders of Target firms and Buyer firms.

It is clear that the shareholders of Target firms receive positive abnormal returns in the order of 25% to 35% (see for example: Bradley, Desai and Kim (1988) plus 31.8%; Lang, Stulz and Walkling (1989) plus 40.3%; Schwert (1996) plus 26.3%; Mulherin and Boone (2000) plus 21.2%).

Studies that investigate the market in Australia produce results consistent with findings in the USA.

As noted by da Silva Rosa and Walter (2004), "the evidence is unequivocal ..... that Target firm shareholders benefit considerably" and they cite Dodd

(1976); Walter (1984); Bishop, Dodd and Officer (1986); Anderson, Haynes and Heaney (1994); and, Brown and da Silva Rosa (1998) as consistently reporting abnormal returns of approximately 25%.

The focus of this chapter is on the Australian market and the returns to shareholders of Target firms.

This chapter investigates returns to shareholders of Target firms, the premium paid to shareholders of Target firms and the determinants of this premium. The approach is similar to that used by Bugeja and Walter (1995) but incorporates several innovations in methodology and sample selection.

Significantly, this study also investigates sample selection bias and its impact on inferences related to the determinants of the premium paid to shareholders of Target firms. This analysis makes use of the Heckman sample selection model (in two stage form). Whilst the Heckman model is well established and is widely utilized in economics, its application in finance is not so well developed. The author believes this is the first application of the model in the context of investigating returns associated with takeover activity.

SECTION 3.3 ABNORMAL RETURNS, PREMIUM AND DETERMINANTS

Returns to the shareholders of Target firms are assessed using event study analysis.

A series of event windows were investigated addressing two closing dates, 0 and plus 90 days, and six opening dates, minus 360, minus 180, minus 30, minus 15, minus 5 and minus 1 days[13].

Use of the 0 closing date enables investigation of returns in the pre bid period and the possible influence of information leakage and other factors. Use of the plus 90 days closing date enables investigation of returns associated with the offer and its successful conclusion[14].

3.3.1 Abnormal Returns

Abnormal returns are measured using two methods.

The first uses the 0,1 market model with the ASX 200 Index as the proxy for the market.

The second follows from Barber and Lyon (1997) where they suggest that abnormal returns determined using a market model suffer from inherent biases. They suggest that a more reliable method is to "match" the firm of

[13] Day 0 is defined as the date the offer is announced by the Buyer firm to the market.
[14] Under the Corporations Act an offer must remain open for a minimum period of 30 days. However, it is common for offer periods to be extended. Most successful offers are concluded within 90 days and for those that extend beyond this period it is rare for there to be any change in the offer terms (that is, for calculation of returns purposes the stock price at +90 is a reliable proxy for the final price).

interest with similar firms – in particular with reference to firm size and firm market to book ratio.

Barber Lyon and Tsai (1999) investigate several methods to address three sources of bias: new listing or survivorship bias; rebalance bias; and, skewness bias. The context of their work is in assessing long run abnormal returns (for example, over periods of three to five years). However, the event windows in this study are relatively short.

In this study we match Target firms with similar firms (clones) using three determinants:

- each Target firm is matched with three clone firms
- each clone firm is in the same sector as the Target firm
- the clone firms represent the three firms closest to the Target firm as measured by market capitalization

From the three clone firms a basket performance index is calculated as the average performance of the clones (the "clone index"). The abnormal return of the Target firm is then calculated with reference to its clone index.

The clone firms are also used for the purpose of representing non targets (or controls) in the investigation of sample selection bias.

3.3.2 Premium

It is common for offers to be represented as a "premium" to the pre offer stock price of the Target firm. Many market commentators suggest a premium in the order of 20% to 30% as appropriate for an offer to be considered attractive to the shareholders of the Target firm.

Because premium is calculated with reference to the market stock price of the Target firm at some point in time before the offer is announced, the resultant can vary depending upon the selected pre offer period.

The calculation is intended to provide an objective measure of the additional benefit a Buyer firm is offering the shareholders of a Target firm above the prevailing market price. That is, to procure acceptance (usually leading to a change of control and 100% ownership of the Target firm by the Buyer firm) an economic incentive above the pre bid market price (which implicitly represents the market value of the stock to portfolio investors) is necessary.

However, information leakage relating to a proposed offer and/or speculation of a possible offer in the near future can influence the market price of a firm. Several studies of Target firms report evidence of positive abnormal stock performance commencing in the period 20 to 30 days before the offer announcement date (see for example: Keown and Pinkerton (1981); Eger (1983); Mikkelson and Ruback (1985); Dennis and McConnell (1986)).

It is common for takeover documents (such as: Target statement; Bidder statement; Independent Expert Report) to include several calculations of premium coinciding with several pre offer dates.

In this study we calculate premium with reference to six pre offer dates:

- minus 1 day
- minus 5 days
- minus 15 days
- minus 30 days
- minus 180 days
- minus 360 days

The premium is calculated with reference to two closing dates:

- 0 days (the date the offer is announced)
- plus 90 days

That is, premium is calculated for 12 event windows.

3.3.3 Determinants of Premium

Bugeja and Walter (1995) investigate the determinants of differences in the size of the premium paid to shareholders of Target firms in the Australian market for the period 1981 to 1989. The factors considered are broadly associated with several explanations of the possible sources of economic benefit to a buyer arising from the acquisition of a Target firm.

For successful takeovers, their study reports a statistically significant[15] relationship between the size of the premium and five factors (positive influence: the performance of the Buyer firm pre offer, the market value of equity of the Buyer firm, the change in financial slack[16]; and negative influence: cashflow of the Target firm, ratio of market to book value of equity of the Target firm).

In this study we adopt a similar approach to that of Bugeja and Walter (1995) and draw on recent research by Stewart (2008a) into takeover likelihood models. In addition, this study investigates the influence on premium for Target firms subject to four classifications: industry sector; the response of the Target firm board; the form of consideration (cash or scrip); and, the pre bid ownership of the Buyer firm.

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[15] Significant at the 5% level.

[16] Defined as the difference in the net debt ratio between the Buyer firm and the Target firm. As an explanatory factor it is similar to growth resource imbalance (see Stewart 2008a).

SECTION 3.4 SAMPLE SELECTION BIAS

This study also investigates sample selection bias and its impact on inferences related to the determinants of the premium paid to shareholders of Target firms.

The sample of interest (comprising Target firms that were subject to successful takeover offers) is not a random sample representative of the broader population of firms. This sample has been "selected" by decisions by Buyer firms (to make an offer) and by decisions of shareholders of Target firms (to accept the offer). Consequently, inferences related to the determinants of the offer premium may not be reliable due to sample selection bias.

The analysis makes use of the Heckman sample selection model. Whilst the Heckman model is well established and is widely utilized in economics its application in finance is not so well developed. The author believes this is the first application of the model in the context of investigating returns associated with takeover activity.

The Heckman selection model (see Heckman (1976) and Heckman (1979)) assumes the existence of an underlying relationship in the form:

$$Y_j = X_j \cdot \beta_j + \mu 1_j \qquad \text{(regression equation)}$$

The dependent variable, however, is not always observed. The decision to make an offer to acquire a firm sits with the Buyer firm.

The Buyer firm should decide to make an offer for a firm provided it is satisfied that successful completion of the acquisition will result in value

creation for its shareholders. In this case the firm of interest becomes a Target firm and the dependent variable is observed.

In situations where the Buyer firm concludes that nil or negative value creation will result from the proposed acquisition then the Buyer firm should decide to not make an offer. In this case the firm of interest remains a general member of the market and the dependent variable is not observed.

The dependent variable for observation j (associated with the Buyer firm decision to make an offer) can be modeled as:

$$\mathbf{Z}_j * \gamma_j + \mu 2_j > 0 \qquad \text{(selection equation)}$$

Where:

$\mu 1 \sim N(0,\sigma)$
$\mu 2 \sim N(0,1)$
correlation $(\mu 1, \mu 2) = \rho$

When $\rho \neq 0$, standard regression techniques applied to the regression equation produce biased results.

In the Heckman sample selection model, the first step is to estimate the latent (or "hidden") variable by presenting the selection equation in a binary form. Using probit analysis, Heckman's Lambda (the variable denoted "LambdaT" in this chapter) can be obtained.

In this study, the selection equation is based upon a takeover likelihood model developed by Stewart (2008a). The base case version of the model is used with nine variables addressing the following characteristics of Target firms:

- pre bid stock price performance
- return on assets
- firm size
- Tobin's q
- free cashflow
- liquidity
- tangible assets
- growth
- leverage

In the second step, Heckman's Lambda is used as an additional independent variable in the multivariate regression equation. If the estimated coefficient of Heckman's Lambda is statistically significant then sample selection bias exists and inferences relating to the other coefficients should be treated with caution.

The multivariate regression equation is the same as that used elsewhere in this study to investigate the determinants of premium. That is, we investigate factors that address the following characteristics of Target firms:

- pre bid stock performance
- equity market performance over the 12 month period before the bid
- cashflow
- growth resource imbalance
- firm size
- market to book value
- sector classification
- response of the board of the Target firm
- form of consideration (cash or scrip)
- pre bid ownership of Buyer firm

SECTION 3.5 VARIABLES, SAMPLE AND DATA

3.5.1 Variables

We now consider the characteristics of Target firms within the context of takeovers forming part of a corporate development strategy with the objective of creating wealth for shareholders in buyer firms. The preparedness of a buyer to pay a premium to acquire a Target firm is related to the scope for the buyer to create value from the acquisition.

For wealth creation, the returns to the Buyer firm arising from the takeover must exceed the required returns of the capital providers to the Buyer firm. The returns to the Buyer firm comprise the incremental economic benefits arising from the acquisition less the cost of the acquisition. Note that the cost of the acquisition comprises not only the price paid for the shares in the Target firm but also any liabilities retained by the Target firm. The level of required returns is usually represented by the weighted average cost of capital of the Buyer firm.

Within the context of equity capital markets and publicly listed companies, the market view on expected returns and changes in expectations is of more relevance than the actual returns delivered over time.

If we focus on the equity interests in the Buyer firm, the shareholders in the Buyer firm benefit to the extent that wealth is created in accordance with the above.

Put simply, to optimize the benefits to shareholders in a Buyer firm arising from an acquisition made by way of takeover the Buyer firm must minimize the bid price (yet still provide a price that is sufficiently attractive to the Target firm shareholders to procure acceptance) and maximize returns from the

assets of the Target firm and maximize any synergistic benefits from the combined assets.

This objective provides some guidance as to what attributes of a Target firm could be influential in determining the bid price and hence the premium paid to shareholders of the Target firm.

This chapter follows the approach adopted by earlier studies (see for example: Powell (1997); Bugeja and Walter (1995); and, Stewart (2008a)) and addresses Target firm characteristics consistent with several theories developed to explain the underlying motivation for takeover activity. The overarching context is the scope for the Buyer firm to create value arising from the acquisition of the Target firm.

The variables investigated in this chapter can be related to the following six theories that address the scope for value creation.

3.5.1.1 Replacement of Inefficient Management

The underlying premise to this theory is that the market will discipline poor management. The ultimate punishment is the removal of management – either internally (at the discretion of the board by termination) or externally (at the discretion of a buyer by takeover). Reference is made to Manne (1965) who viewed corporate control as a valuable asset that is traded in the market.

Consequently, according to Manne (1965) the potential threat of takeover provides a strong incentive for management to pursue wealth creation strategies. Failure to do so will result in poor performance relative to relevant benchmarks, a decrease in the share price of the firm and the attraction (due to the decreased share price) of potential buyers.

3.5.1.2 Firm Size

Several studies find the size of the Target firm to be significant – that is, the larger the firm then the less likely it is to be a target (see for example: Levine and Aaronovitch (1981); Palepu (1986); and, Powell and Thomas (1994)).

Powell (1997) presents the premise that transaction costs of takeovers are related to the size of the Target firm – costs such as responding to a hostile defense and post acquisition integration - and that these "additional" costs impact on expected wealth creation and therefore provide a deterrent to potential buyers.

A simpler explanation is that the number of potential buyers for larger firms is relatively small. Consequently the incidence of successful takeovers for larger firms is relatively less.

3.5.1.3 Under Valuation of the Firm

Firms that exhibit a low market to book ratio could be perceived as attractive acquisitions by firms with relatively higher market to book ratios. This idea is similar to the rationale and application behind Tobin's q – but in this case the imperative for increased investment is acted upon by making an acquisition.

Some studies have involved an examination of Tobin's q (or approximations thereof) for Target firms (see for example: Kim, Henderson and Garrison (1993)) but difficulties exist in estimating reliable and consistent replacement values. Kim, Henderson and Garrison (1993) find that Tobin's q for Buyer

firms are higher than those for control firms and Tobin's q for Target firms are not significantly different from those for control firms.

3.5.1.4 Tangible Fixed Assets

Potential buyers may be interested in the proportion of tangible fixed assets within a Target firm's total asset base.

Stulz and Johnson (1985) suggest tangible fixed assets as a proxy for debt capacity. A Target firm with relatively high tangible fixed assets could present post acquisition refinancing opportunities to the Buyer firm whereby the assets of the Target firm a used to support increased levels of debt funding – thus decreasing the reliance on equity capital to fund the acquisition.

Ambrose and Megginson (1992) suggest tangible fixed assets as a proxy for asset rich firms operating in industries with weak growth opportunities. This type of firm may be attractive to buyers seeking to rationalize the industry with a view to achieving benefits from asset restructuring and/or redeployment.

3.5.1.5 Free Cash Flow

Jensen (1986) presents a theory of takeovers based upon the principle of agency costs as related to the utilization by management of cash flows. Jensen suggests incentives exist for management to retain surplus cash for funding potential future investments – even where these investments do not produce (or are not expected to produce) value creation for shareholders.

Utilisation of internal cash resources for investment funding requirements decreases the need to raise funds in debt and/or equity capital markets. Arguably this reduces the level of accountability of management.

3.5.1.6 Growth – Resource Imbalance

Conceptually, a firm with an imbalance between its growth potential and available financial resources may present an attractive acquisition for a potential buyer with the reverse imbalance.

That is, a firm with significant growth potential and poor financial resources to exploit that potential (such as an emerging firm in the technology sector) may be a target for firms with limited growth potential and strong financial resources (such as an established firm in the industrial sector). The reverse also applies – a firm with limited growth potential and strong financial resources (such as a cashbox) may be a target for firms with strong growth potential and weak financial resources (such as mining exploration firm with highly prospective tenements).

Several studies report the significance of variables related to this imbalance (see for example: Ambrose and Megginson (1992)).

The difficulty relates to identifying available financial data that provide useful proxies for "growth potential" and "financial resources".

Exhibit 3.1 sets out details of the variables used in this study for univariate analysis, multivariate analysis and probit analysis (Heckman selection equation). As appropriate the associated value theory is denoted for the relevant variable.

Exhibit 3.1 Variables used in model to assess determinants of premium

Value Theory	Variable	Measure
		Multivariate equation
	Returns	
Dependent	ARCi	Abnormal returns (matched clone model event window [-15, +90])
Dependent	ARMi	Abnormal returns (market model event window [-15, +90])
Dependent	PREx	Premium (unadjusted stock return where "x" denotes one of eight event windows)
	Factors	
Management	ARCd	Abnormal returns (matched clone model event window [-180, -15])
Value	ASXa	Performance of ASX200 over previous 12 months
Cash flow	FCFa	EBITDA divided by total assets (3 year average)
Growth	GROa	Sales growth per annum (2 year average)
Resources	LEVa	Net debt divided by net assets (3 year average)
Resources	LIQa	Cash divided by total assets (3 year average)
Size	SIZd	Natural log enterprise value
Value	TBQa	Tobin's q (enterprise value divided by total assets)
	Dummy	
	DSEC	Dummy variable for sector (equals 1 for materials and 0 otherwise)
	DRSP	Dummy variable for response of board of Target firm (equals 1 for accept and 0 otherwise)
	DCSH	Dummy variable for form of consideration (equals 1 for cash and 0 otherwise)
	DTOE	Dummy variable for existence of pre bid interest in Target firm by Buyer firm (equals 1 for more than 5% and 0 otherwise)
		Selection equation
Management	ARCd	Abnormal returns (matched clone model event window [-180, -15])
Cash flow	FCFa	EBITDA divided by total assets (3 year average)
Growth	GROa	Sales growth per annum (2 year average)
Resources	LEVa	Net debt divided by net assets (3 year average)
Resources	LIQa	Cash divided by total assets (3 year average)
Management	ROAb	Return on assets (3 year average)
Size	SIZd	Natural log enterprise value
Assets	TANa	PPE divided by total assets (3 year average)
Value	TBQa	Tobin's q (enterprise value divided by total assets)
Dependent	D1	Dummy variable for Target firm (equals 1 for target firms and 0 otherwise)

3.5.2 Sample and Data

The estimation sample is drawn from ASX listed companies for the ten year period May 1997 to May 2007 and comprises Target firms and control firms.

Three data bases were utilized in assembling the samples:

- Connect 4
- Aspect Financial Analysis
- Datastream

For the period of interest, the Connect 4 Takeover Report provides a list of all takeovers and schemes of arrangement involving targets that were ASX listed and as reported by the ASX. The report contains, inter alia, target information, bidder information, date of announcement, sector information (GICS classification) and status of the transaction.

In Australia, the two most common methods of acquiring a controlling interest and/or a 100% interest in a Target firm are by way of a takeover or a scheme of arrangement. The relevant regulations are the set out in the Corporations Act. The majority of acquisitions are in the form of a takeover (for the period of interest the report details a total of 770 successful acquisitions of which 560 were takeovers and the remaining 210 were schemes of arrangement).

A scheme of arrangement is similar to a takeover. Notable differences are the involvement of court approval in the process (addressing compliance and equitable treatment of stakeholders) and an outcome determined by resolution at a Special General Meeting of Target firm shareholders.

A resolution setting out the proposed transaction is presented to Target firm shareholders and, when voted upon, for approval must receive supporting votes representing at least 50% of votes cast and at least 75% of voters. The

proposed transaction is as defined in the resolution (and referred documentation) and the outcome is binary – the resolution is carried or it is not carried. There is no scope for revised terms to be considered at the meeting.

Invariably schemes of arrangement are "friendly" (or non-contested) transactions where the buyer seeks to acquire 100% of the Target firm – and involve the support of the board of the Target firm for the proposal.

In contrast, takeovers may be non-contested or contested ("hostile") depending upon the response of the board of the Target firm. The outcome of a takeover is determined by the level of acceptances from shareholders and may result in the buyer acquiring less than a 100% interest in the Target firm. The terms of the offer may be revised by the bidder (in accordance with provisions in the Corporations Act).

This study addresses successful takeovers only. A transaction is considered "successful" if the offer has been declared unconditional and there have been acceptances representing more than 50% of the Target firm shares[17].

Consistent with other similar studies, Financial and Property firms were excluded from the sample. This reduced the number of Targets firms from 560 to 328.

A characteristic of the ASX market of listed companies is the presence of a large proportion of relatively small companies. Approximately 65% of ASX listed companies have a market capitalization less than AUD100 million. This characteristic is also evident in the composition of the Target firm list set out in Exhibit 3.2.

[17] This is the same definition as used in the Connect 4 data base.

Exhibit 3.2 Composition of Target firm sample and market by firm size

Firm Size	Target Number	Target Percentage	Market Number	Market Percentage
Larger than AUD5,000 million	4	1.2%	58	3.5%
AUD1,000 million to < AUD5,000 million	20	6.1%	130	7.8%
AUD500 million to < AUD1,000 million	23	7.0%	79	4.7%
AUD250 million to < AUD500 million	30	9.2%	107	6.4%
AUD100 million to < AUD250 million	65	19.8%	225	13.5%
AUD20 million to <AUD100 million	106	32.3%	493	29.5%
< AUD20 million	80	24.4%	578	34.6%
Total	328	100%	1670	100%

Notes:

1 Target firm size is market capitalization as at the most recent financial year end prior to the offer announcement

2 Market Number and Market Percentage refer to the market as at the 2006 financial year end

Data associated with small companies should be viewed with caution. Typically, small companies have low trading volumes (undermining the usefulness of share price information due to unacceptably low levels of liquidity) and their share register is often dominated by a relatively small number of investors with large shareholdings (contributing to low liquidity and decreasing the relevance of public equity capital markets). Arguably, many transactions involving small companies are for the primary purpose of resolving redundant corporate ownership structures.

Due to their large proportion of Target firm numbers, the inclusion of small companies in the sample obfuscates bona fide data from material

transactions associated with larger companies and could potentially distort findings.

In this study we have focused on material transactions. Accordingly, Target firms with a market capitalization of less than AUD100 million were excluded from the sample[18].

For each Target firm three control firms (or clones) were selected based upon industry sector (the three control firms have the same GICS classification as the Target firm) and size (the control firms are the three closest in size to the target firm as measured by market capitalization). Firms with incomplete financial or share price data were excluded from the sample[19].

The estimation sample comprised a total of 238 firms, consisting of 65 Target firms and 173 control firms[20].

[18] An alternative approach would be to include small companies but to weight the variables by market capitalization. However, this method does not address the primary underlying concern of reliability and usefulness of data (especially share price related data). In any event, the weights associated with small companies relative to the sample average market capitalization would result in a close to zero contribution to the models.

[19] Financial data for each firm was sourced from Aspect Financial Analysis for the three financial years immediately prior to the offer announcement date. Share price and market data was sourced from Datastream.

[20] From Exhibit 3.2, the number of Target firms with a market capitalization above AUD100million is 142. This number was reduced to 65 due to incomplete financial or share price data. With 65 Target firms, the number of control firms is 195. This number was reduced to 173 due to incomplete financial or share price data.

SECTION 3.6 RESULTS AND DISCUSSION

This section sets out the results of the empirical analysis and is presented in four parts:

- summary of results
- abnormal returns and premium
    - average returns
    - effect of event window on returns
    - effect of classification of offer on returns
- investigation of determinants of premium
    - univariate analysis
    - multivariate analysis
    - effect of methods to measure returns on determinants
    - effect of event windows on determinants
    - restricted version of multivariate analysis
- investigation of sample selection bias

3.6.1 Summary of Results

The shareholders of Target firms receive significant economic benefits resulting from successful takeover offers. These returns were substantial whether measured as abnormal returns (using the market model or the matched clone model) or as premium (unadjusted stock price).

The average premium was 26.8% for an event window of [-15, +90] and 40.9% for an event window of [-180, +90]. The average premium increased the earlier the start date of the event window. Similar results were obtained using the two measures of abnormal returns.

Four classifications of offers were investigated. The results, with one exception, are not statistically significant and so should be viewed with caution. See Exhibit 3.3 for a summary of results taken from Table 3.3.

Exhibit 3.3 Summary of results of assessment of premium within classifications

Classification	State	% offers	Premium [-15, +90]	Premium [-180, +90]
Sector	materials	27.7%	23.3%	48.0%
	otherwise	72.3%	28.1%	38.2%
Board response	positive	70.8%	24.2%	44.2%
	otherwise	29.2%	33.2%	32.9%
Consideration	cash	73.8%	25.3%	37.1%
	otherwise	26.2%	30.9%	51.9%
Buyer pre bid interest	> 5%	55.4%	18.4%	34.6%
	otherwise	44.6%	37.3%[v]	48.7%

[v] Denotes significance at 5% level

Multivariate analysis of determinants of premium was undertaken using the Base Case Model

Base Case Model:

$$PRE = \alpha + \beta_1 ARCd + \beta_2 ASXa + \beta_3 FCFa + \beta_4 GROa + \beta_5 LEVa + \beta_6 LIQa + \beta_7 SIZd + \beta_8 TBQa$$

where:

PRE is premium measured using unadjusted stock returns and modeled for two event windows [-15,+90] and [-180,+90]

ARCd	is abnormal returns measured using the matched clone model for the event window [-180,-15];
ASXa	is the pre bid performance of the ASX 200 Index for the period [-360,0];
FCFa	is free cash flow calculated as EBITDA divided by total assets (three year average);
GROa	is growth calculated as sales growth per annum (two year average);
LEVa	is leverage calculated as net debt divided by net assets (three year average);
LIQa	is liquidity calculated as cash divided by total assets (three year average);
SIZd	is firm size calculated as natural log enterprise value (net debt plus market capitalization);
TBQa	is Tobin's q calculated as enterprise value divided by total assets (three year average).

Several factors of influence were determined. These factors relate to pre bid stock price performance of the Target firm and pre bid performance of the Australian equity markets (both have a negative influence), recent financial performance of the Target firm in terms of cash flow and revenue growth (both have a negative influence), and the ratio of market equity to book equity of the Target firm (a positive influence). See Exhibit 3.4 for a summary of results taken from Table 3.5.

The results are consistent across the short dated event windows. For long dated event windows the results remain consistent for most factors but some factors are no longer significant and for one factor of significance the sign of the coefficient changes.

Exhibit 3.4 Summary of results of determinants of premium

	[-15, +90] coefficient	[-180, +90] coefficient
ARCd	-0.187 [v]	0.648 [v]
ASXa	-0.531 [x]	not significant
FCFa	-1.371 [v]	-2.406 [v]
GROa	-0.041 [v]	-0.056 [x]
LEVa	not significant	not significant
LIQa	not significant	not significant
SIZd	not significant	not significant
TBQa	0.081 [v]	not significant
Constant	0.548 [v]	0.606 [v]
P > F	0.001 [v]	0.000 [v]
R^2	0.358	0.438

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

The results of the multivariate analysis were not sensitive to the methods used to measure returns to shareholders of the Target firm.

Heckman sample selection analysis was undertaken to test for sample selection bias and its effects (if any). A two stage model was used with the selection equation (stage 1) and regression equation (stage 2) shown below.

Selection equation:

$$\Pr(\text{Target firm}) = \Phi\,(\beta_0 + \beta_1 ARCd + \beta_2 FCFa + \beta_3 GROa + \beta_4 LEVa + \beta_5 LIQa + \beta_6 ROAb + \beta_7 SIZd + \beta_8 TANa + \beta_9 TBQa)$$

where:

Pr (Target firm) equals 1 for Target firms and equals 0 otherwise

Regression equation (Base Case Model):

$$PRE = \alpha + \beta_1 ARCd + \beta_2 ASXa + \beta_3 FCFa + \beta_4 GROa + \beta_5 LEVa + \beta_6 LIQa + \beta_7 SIZd + \beta_8 TBQa + \beta_9 LambdaT$$

This analysis indicated the presence of sample selection bias. Taking into account sample selection bias changes the factors of significance.

The revised set of factors relate to the pre bid stock price performance of the Target firm, Target firm cash flow and the size of the Target firm (all with a negative influence). Heckman's Lambda (LambdaT) is significant in all versions of the revised multivariate model. See Exhibit 3.5 for a summary of results taken from Table 3.5 and Table 3.9.

Exhibit 3.5 Summary of results of Heckman analysis

Factor	Coefficient Standard Analysis	Coefficient Heckman Analysis
ARCd	-0.187 [v]	-0.519 [v]
ASXa	-0.531 [x]	not significant
FCFa	-1.371 [v]	-1.581 [v]
GROa	-0.041 [v]	not significant
LEVa	not significant	not significant
LIQa	not significant	not significant
SIZd	not significant	-0.085 [x]
TBQa	0.081 [v]	not significant
Constant	0.548 [v]	1.701 [v]
LambdaT	not applicable	-0.699 [v]

Event window [-15, +90]

[v] Denotes significance at 5% level

[x] Denotes significance at 10% level

3.6.2 Abnormal returns and premium

3.6.2.1 Average returns

Returns to shareholders of Target firms were investigated using three measures (abnormal returns using the market model, abnormal returns using the matched clone model and premium) and two event windows, [-15, +90] and [-180, +90] (see Table 3.1 for results).

For the [-15, +90] event window, average abnormal returns using the market model and the matched clone model were 23.5% and 22.9% respectively. For the same event window the average premium was 26.8%.

For the [-180, +90] event window, average abnormal returns using the market model and the matched clone model were 31.9% and 37.4% respectively. For the same event window the average premium was 40.9%.

These results are consistent with earlier studies and clearly demonstrate that shareholders of Target firms receive substantial economic benefits.

3.6.2.2 Effect of event window on returns

For each measure the returns are lower for the shorter event window (that is, [-15, +90]). This indicates positive stock price movement of the Target firm leading up to the offer announcement date. This movement may be in response to information leaks and/or market speculation that the Target firm represented an attractive acquisition and an offer was likely (see Stewart (2008a) for more discussion on takeover likelihood).

Further analysis of premium was undertaken incorporating other event windows (see Table 3.2 for results).

This analysis shows premium is lower as the event window shortens. These results are consistent with the view that the market to a large extent anticipates offers.

For the shortest event window, [-1, 0] (that is, premium determined with reference to the stock price one day before the announcement date and the announcement date), the average premium is 11.4%. Premium increases progressively as the event window moves back from the announcement date (for example, the average premium is 37.7% for [-360, 0]).

Analysis of premium with an event window closing at +90 days produces similar but higher results. For [-1, +90] the average premium is 19.3% and for [-360, +90] the average premium is 48.0%.

A higher result for an event window closing at +90 days is as expected.

At t = 0 the outcome of the offer is uncertain. The offer is invariably subject to conditions and if these conditions are not satisfied or waived (by the Buyer firm) then the offer does not proceed. These conditions are independent of the value of the offer and its attractiveness to the shareholders of the Target firm[21].

That is, there is a transaction completion risk to the shareholders of the Target firm. The convergence, or lack thereof, of the market price of the Target firm with the offer price can be interpreted as a guide to the market view on the likelihood of completion of the offer at the prevailing offer price.

[21] The relevance of a condition prescribing a minimum level of acceptances is determined by the perceived attractiveness of the offer. An unattractive offer is unlikely to procure sufficient acceptances to satisfy this condition and vice versa.

Some offers are revised (improved) in order to procure the support of the shareholders of the Target firm[22]. Revisions typically occur late in the offer period and are not manifest at t = 0.

The minimum offer period is 30 days but it is common for offers to be extended and the vast majority of offers conclude[23] within 90 days. The event window closing at +90 will incorporate the market response to any revisions in the offer in this period.

3.6.2.3 Effect of classification of offer on returns

Premium was investigated with offers subject to four classifications: sector (materials sector or otherwise); response of the board of the Target firm (recommended offer or otherwise); form of consideration (cash or otherwise); and, the level of pre bid ownership of the Target firm by the Buyer firm. This analysis was undertaken for the two event windows [-15, +90] and [-180, +90] (see Table 3.3 for results).

Offers for Target firms in the materials sector (mining, oil and gas etc) represented 27.7% of all offers. The premium for Target firms in the materials sector was lower for the [-15, +90] window (23.3% compared with 28.1%) and higher for the [-180, +90] window (48.0% compared with 38.2%).

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[22] This study only addresses successful offers so ultimately the offer terms (revised or not) must have been deemed acceptable by the shareholders.

[23] Most offers conclude for practical purposes when the "compulsory acquisition" provisions of the Corporations Act are satisfied. These provisions enable the Buyer firm to acquire the shares held by dissenting shareholders of the Target firm and are typically activated when the Buyer firm has received acceptances representing in excess of 90% of the number of shares on issue of the target firm. In some cases the formal offer closing date is extended for longer periods in order to facilitate efficient processing of shares that would otherwise be procured under the compulsory acquisition provisions.

Offers for Target firms that were recommended by the board of the Target firm[24] represented 70.8% of all offers. The premium for Target firms with recommended offers was lower for the [-15, +90] window (24.2% compared with 33.2%) and higher for the [-180, +90] window (44.2% compared with 32.9%).

Offers for Target firms where the form of consideration was cash represented 73.8% of all offers. The premium for Target firms with cash offers was lower for both event windows: [-15, +90] window, 25.3% compared with 30.9%; [-180, +90] window, 37.1% compared with 51.9%.

Offers for Target firms where the Buyer firm held more than 5% of the Target firm shares pre bid represented 55.4% of all offers[25]. The premium for Target firms in these circumstances was lower for both event windows: [-15, +90] window, 18.4% compared with 37.3%; [-180, +90] window, 34.6% compared with 48.7%.

However, these results should be viewed with caution. The only result that was statistically significant was in relation to Buyer firm pre bid ownership for the [-15, +90] event window (this result was significant at a 5% level).

[24] As determined by the initial response of the board to the offer. The initial response may subsequently be revised. In situations where the initial response is negative it is not unusual for boards to revise their recommendation to positive following an improvement in the terms of the offer and/or changes in the market environment.

[25] Agreements as between the Buyer firm and a shareholder of the Target firm in relation to transfer of interests in shares in the Target firm were treated as entitling the Buyer firm to those shares pre bid.

3.6.3 Investigation of Determinants of Premium

3.6.3.1 Univariate analysis

A univariate analysis was undertaken of factors as potential determinants of premium and was performed for two event windows, [-15, +90] and [-180, +90] (see Table 3.4 for results).

For the [-15, +90] event window three factors produced results that were statistically significant. ARCd has a coefficient of –0.199 (P > | z | of 0.039), ASXa has a coefficient of –0.610 (P > | z | of 0.31) and FCFa has a coefficient of –0.868 (P > | z | of 0.008).

These results suggest a negative influence on premium arising from: stock price performance (measured as an abnormal return) of the Target firm in the pre bid period [-180, -15]; the performance of equity markets in the 12 months leading up to the bid; and, the level of historical free cashflows.

For the [-180, +90] event window two factors produced results that were statistically significant. ARCd has a coefficient of 0.635 (P > | z | of 0.000) and FCFa has a coefficient of –2.000 (P > | z | of 0.000).

Interestingly, although ARCd is significant for both event windows the sign of the coefficient differs.

The negative coefficient on ARCd is consistent with the view that the market anticipates the offer and as such part of the premium that the Buyer firm was prepared to pay is already captured in the pre bid stock price of the Target firm.

The negative coefficient on ASXa is not as expected. This result suggests a reduction in premium following 12 months of positive performance in equity markets. Arguably, within this environment there would be a larger scope of alternatives available to the shareholders of Target firms – leading to the Buyer firm being required to pay a relatively higher price to procure acceptance.

The negative coefficient on FCFa may be explained by the considering the scope for value creation in the hands of the Buyer firm. A Target firm that generates relatively strong cashflows may provide less opportunity for a new management team to improve performance – hence decreasing the scope for value creation and from this the maximum price a Buyer firm may be prepared to pay.

3.6.3.2 Multivariate analysis

The factors considered in the univariate analysis were then combined in a multivariate analysis of premium.

Table 3.5 presents results for two models, factors only and factors plus dummy variables, and two event windows [-15, +90] and [-180, +90].

For each version of the model the results are similar for a given event window. For the event window [-15, +90] with the factors only model, the statistically significant variables are ARCd, ASXa, FCFa, GROa and TBQa. For the same event window with the factors plus dummy variables model, the statistically significant variables are the same with the addition of SIZd, DCSH and DTOE.

In both models the F statistic is significant ($P > F = 0.001$ and $P > F = 0.000$).

In both models the signs and magnitudes of the coefficients of the statistically significant variables are close to identical. Each of these coefficients has a negative sign (except for TBQa) – that is, an increase in the corresponding variable decreases the premium.

A discussion of the coefficients[26] follows:

For ARCd, with a coefficient of minus 0.193, this result suggests strong pre bid stock performance of the Target firm translates to a decrease in premium. Arguably, during the event window of ARCd [-180, -15] the market has anticipated the forthcoming offer and part of the premium is already incorporated in the pre bid stock price.

For ASXa, with a coefficient of minus 0.531, this result suggests strong equity market performance in the 12 months pre bid translates to a decrease in premium. This result implies that premium is lower following (or within) "bull" markets. Prima facie this result is counter intuitive – in a positive equity market environment surely it should be necessary for a Buyer firm to pay a generous premium to compete with the status quo and to procure acceptance from the shareholders of the Target firm.

We comment on two issues relevant to "generous premium" from the perspective of the Buyer firm – the financial capacity to pay and the preparedness to pay given self interest.

In a "bull" market Buyer firms typically have easier access capital than in a "bear" market:

- earnings performance in "bull" markets is typically strong so internal capital resources should be relatively high. Cash reserves can be used to directly fund acquisitions

[26] For the factors plus dummy model.

- cash reserves can be used to retire debt thus improving the capacity of the firm to raise debt in association with an acquisition
- in "bull" markets investors are more favourably disposed to supporting equity capital raisings

Thus in a "bull" market Buyer firms arguably have the capital capacity to support the payment of relatively higher prices for acquisitions. However, absent competing bids the Buyer should only pay a price sufficient to procure acceptance from the shareholders of the Target firms – and this price (and funding thereof by the Buyer) may not be directly related to the capital capacity of the Buyer firm.

In a "bull" market the scope for the Buyer firm to create value from the acquisition may be diminished – if the stock price of the Target firm has appreciated in line with the overall market. The Buyer firm has a maximum price below which the acquisition is value creating. To the extent that the stock price of the Target firm appreciates then erosion occurs of the gap between the maximum price and the prevailing stock price of the Target firm. Consequently, the scope for the Buyer firm to pay a relatively higher premium diminishes.

For FCFa, with a coefficient of minus 1.286, this result suggests strong cash generation over the three year period pre bid by the Target firm translates to a decrease in premium. This result is consistent with the objective of value creation by the Buyer firm – relatively strong underlying cashflows of the Target firm may decrease the scope for efficiency gains by the Buyer. And consequently the maximum price the Buyer firm is prepared to pay.

For GROa, with a coefficient of minus 0.035, this result suggests strong growth in sales over the two year period pre bid by the Target firm translates to a decrease in premium. If revenue is considered a reasonable proxy for

cash generation, this result is consistent with the result for FCFa and similar comments apply.

For SIZd, with a coefficient of minus 0.041, this result suggests premium decreases as the size of the Target firm increases. This result is consistent with the view that the market for corporate control for larger firms is less competitive than for smaller firms[27]. In a less competitive environment the Buyer is under less pressure to increase the bid price. Absent any competition the Buyer need only pay a price that is deemed attractive by the shareholders of the Target firm with reference to the status quo of remaining a listed firm.

For TBQa, with a coefficient of plus 0.071, this result suggests premium increases as the ratio of market value to book value of the Target firm increases. If a high ratio is viewed as an indication that the firm is "overvalued" in the market then it is difficult to accept that a Buyer firm would pay a generous premium with reference to a stock price that already is inflated.

For DCSH, with a coefficient of minus 0.146, this result suggests premium is lower for cash offers. The univariate results for DCSH show that cash offers are relatively less generous than non cash offers (average cash offer premium 25.3%, average non cash offer 30.9%[28]).

For non cash offers the consideration incorporates scrip issued by the Buyer firm. In the extreme, the total consideration may comprise 100% scrip – although combined cash and scrip offers are relatively common. To the extent that the offer consideration comprises scrip there is a sharing[29] of risks associated with expected value creation arising from the acquisition. In a

[27] Due to the relatively fewer large firms as potential buyers.
[28] For the event window [-15, +90].
[29] As between the Buyer firm and the shareholders of the Target firm.

cash only offer there is no ongoing economic risk to the shareholders of the Target firm.

Within this context it is understandable that a Buyer firm may be prepared to offer a higher price if scrip forms part or all of the consideration.

For DTOE, with a coefficient of minus 0.164, this result suggests that premium is lower if the Buyer firm has a material[30] shareholding in the Target firm pre bid. This result is consistent with the view that the presence of a pre bid shareholding improves the negotiating position of the Buyer firm and hence reduces the pressure on paying a generous premium.

3.6.3.3 Effect of methods to measure returns on determinants

An analysis was undertaken to investigate the consistency of determinants of premium for each of the three methods used to measure returns to shareholders of Target firms. For the event window [-15, +90] the determinants of premium was investigated where premium is measured by abnormal returns (ARM - market model), abnormal returns (ARC – matched clone model) and returns (PRE - unadjusted stock price) (see Table 3.6 for results).

The results for ARM, ARC and PRE are similar. The statistically significant variables are consistent for each model (except ARC[31] where ARCd and ASXa are not significant). The sign and magnitude of the coefficients of the significant variables are close to identical for ARM and PRE and similar for ARC. For each model the F statistic is significant and the R^2 is consistent.

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[30] DTOE equals 1 if the level of pre bid ownership held by the Buyer firm is above 5%.

[31] ARCd is an independent variable in the multivariate regression model used to investigate premium. Further investigation was undertaken on possible correlation between ARCd [-180, -15] and ARCi [-15, +90]. The correlation between these two variables was negligible at minus 0.081.

This result suggests the determinants of premium are not sensitive to the method used to measure returns.

3.6.3.4 Effect of event windows on determinants

An analysis was undertaken to investigate the consistency of the determinants of premium for different event windows. The determinants of premium (PRE – unadjusted stock returns) were investigated for the six event windows [-1, +90], [-5, +90], [-15, +90], [-30, +90], [-180, +90] and [-360, +90] (see Table 3.7 for results).

If we treat the event windows as comprising two groups:

- short windows [-1, +90], [-5, +90], [-15, +90]
- long windows [-30, +90], [-180, +90], [-360, +90]

there is consistency in results within each group. FCFa is significant in all event windows. ARCd, GROa and TBQa are significant in five of the six event windows.

In comparing the short window group with the long window group the major differences relate to ARCd and ASXa.

In the short window group the coefficient of ARCd is negative and ranges from minus 0.187 to minus 0.090. In the long window group the coefficient of ARCd moves from negative to positive and ranges from minus 0.066 to plus 0.648.

ASXa is consistent in all but the [-180, +90] and [-360, +90] event windows – and in these two models the coefficients of ASXa are not significant.

This result suggests that the determinants of premium are consistent when the event window is relatively short. For long event windows any inference should be used with caution.

3.6.3.5 Restricted version of multivariate analysis

An analysis was undertaken to investigate the results of a restricted version of the multivariate regression model. Two versions of the model were considered, without and with dummy variables, and for each of these versions two event windows were considered, [-15, +90] and [-180, +90] (see Table 3.8 for results).

The restricted version excluded the three variables LEVa, LIQa and SIZd (each of which were not significant in the unrestricted model) and the two dummy variables DSEC and DRSP (each of which were not significant in the unrestricted model with dummy variables).

For the model without dummy variables and the [-15, +90] event window, the five variable restricted model the Likelihood Ratio[32] equates to 1.4860 and, using a chi squared distribution with three degrees of freedom[33], is not significant at the 10% level.

For the model with dummy variables and the [-15, +90] event window, the seven variable restricted model the Likelihood Ratio equates to 8.5402 and, using a chi squared distribution with five degrees of freedom, is not significant at the 10% level.

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[32] Calculated as: Likelihood Ratio = minus 2 times (log likelihood restricted model less log likelihood unrestricted model).

[33] Number of variables in unrestricted model minus number of variables in restricted model – in this case 8 minus 5.

Consequently, in both cases we cannot reject the null that the coefficients of the excluded variables in the five variable restricted model equate to nil.

Similar results were obtained for the [-180, +90] event window.

3.6.4 Investigation of Sample Selection Bias

Heckman sample selection analysis was undertaken to investigate sample selection bias and its impact on inferences for factors addressing the determinants of premium (see Table 3.9 and Table 3.10 for results).

The investigation considered the earlier multivariate Base Case Model (the "standard multivariate model") both with and without dummy variables for two event windows [-15, +90] and [-180, +90].

In three of the four scenarios Heckman's Lambda was statistically significant (in the fourth scenario it just failed the 10% significance test with P > | z | of 0.104). These results suggest that sample selection bias exists.

Taking into account sample selection changes the factors of significance.

For the [-15, +90] event window (without dummy variables) the statistically significant variables comprise: ARCd (P > | z | of 0.026); FCFa (P > | z | of 0.014); and, SIZd (P > | z | of 0.078). In comparison with the results for the standard multivariate model, SIZd is an additional variable of significance whilst ASXa, GROa and TBQa are no longer significant.

Similar results were produced for the same event window (with dummy variables). The statistically significant variables comprise: ARCd (P > | z | of 0.017); FCFa (P > | z | of 0.007); SIZd (P > | z | of 0.025); DCSH (P > | z | of 0.002); and, DTOE (P > | z | of 0.000). Each of these variables along with ASXa, GROa and TBQa were significant in the equivalent standard multivariate model.

For the [-180, +90] event window similar results are produced in terms of decreasing the number of significant variables.

The interpretation of coefficients and the effect of statistically significant variables on premium for the decreased set of relevant variables is as previously set out in this chapter for the standard multivariate model. However, we note the material difference in the magnitude of the ARCd coefficient and the constant.

For the [-15, +90] event window (without dummy variables) the ARCd coefficient and constant is minus 0.519 and 1.701 for the Heckman analysis and minus 0.187 and 0.548 for the standard model respectively. Note that the effect on premium associated with the ARCd coefficient in the Heckman analysis is about three times that in the standard model. The LambdaT coefficient is minus 0.699 (P > | z | of 0.057) thus partly explaining the higher constant term. Similar results are produced with the inclusion of dummy variables.

This result suggests that, after allowance for sample selection bias, premium is relatively more sensitive to the pre bid performance of the Target firm.

For the [-180, +90] event window and without dummy variables, the ARCd coefficient and constant is 0.319 and 1.749 for the Heckman analysis and

0.648 and 0.606 for the standard model respectively. In this case the LambdaT coefficient is minus 0.693 (P > | z | of 0.098). Similar results are produced with the inclusion of dummy variables.

Note the sign reversal on the ARCd coefficient as between the two event windows occurs in both the Heckman analysis and the standard model.

SECTION 3.7 SUMMARY AND RECOMMENDATIONS

This study represents original research in several aspects:

- it compiles comprehensive information in relation to returns to shareholders of Target firms in the Australian market for the period 1997 to 2007
- in assessing returns it builds on suggestions by Barber and Lyon (1997) in relation to abnormal returns and introduces a matched clone index to measure abnormal stock price performance
- it focuses on material transactions involving medium and large sized firms, thus eliminating potential distortion of results arising from the presence of a large number of small firms exhibiting spurious performance characteristics
- it utilizes a series of event window start dates to investigate pre bid performance of the Target firm
- it utilizes an event window close date that captures the economic conclusion of successful offers
- it investigates the effect on premium of different classifications of offers
- it investigates the effect on premium of factors associated with the Target firm and the state of equity markets
- it recognizes that the sample of Target firms is not a random sample and investigates sample selection bias

The results of the study confirm the findings of earlier studies that shareholders of Target firms receive significant economic benefits resulting from successful takeover offers. These returns were substantial whether measured as abnormal returns or premium.

The level of return is dependent upon the event window. The earlier the start date and the later the close date of the event window the higher the return.

This finding suggests that the market anticipates takeover offers in response to information leaks and/or the likelihood of takeover given the characteristics of a firm. This finding is also suggests that the market anticipates the outcomes of offers and the immediate post bid stock price of the Target firm incorporates provisions for completion risk and possible improvement in offer terms.

The premium paid to shareholders of Target firms is lower for cash offers and for offers where the Buyer firm holds a pre bid interest in the Target firm of more than 5%.

Multivariate analysis of determinants of premium identified several factors of influence. These factors relate to pre bid stock price performance of the Target firm and the Australian equity markets (both have a negative influence), recent financial performance of the Target firm in terms of cash flow and revenue growth (both have a negative influence), and the ratio of market to book value of the Target firm (a positive influence). These results are consistent across the short dated event windows but do not hold for the long dated event windows.

The influence of these factors can be explained for the most part with reference to the scope for the Buyer firm to create value arising from the acquisition of the Target firm. Value creation is determined by the price paid to acquire the Target firm and the ability of the Buyer firm (as the new owner) to improve asset performance and to capture synergistic benefits. The scope for value creation is diminished by strong stock price performance of the Target firm and strong financial performance of the assets of the Target firm.

Heckman sample selection analysis indicated the presence of sample selection bias. Taking into account sample selection bias changes the factors of significance. The revised set of factors relate to the pre bid stock price

performance of the Target firm, Target firm cash flow and the size of the Target firm (all with a negative influence). Heckman's Lambda is significant in all versions of the revised multivariate model.

Further investigation into the effect of the start date of an event window on premium is warranted. Market commentators routinely appraise offers with reference to premium but, as reported in this study, premium is sensitive to the event window start date. Objective appraisal of premium requires the determination of an appropriate event window start date – and this may or may not be influenced by firm specific characteristics.

The focus of this study is Target firms. Further research into characteristics associated with Buyer firms is warranted.

The clear evidence of sample selection bias in the investigation of determinants of premium suggests interesting topics for further research in relation to takeovers.

Table 3.1 Results of average returns analysis

This table presents the results of returns analysis for two event windows.

The returns variable, ARM, is abnormal returns measured using the market model with the ASX200 index as a proxy for the market. The returns variable, ARC, is abnormal returns measured using the matched clone model. The returns variable, PRE, is returns based upon unadjusted stock price performance. In each case the suffixes "i" and "k" denote the event windows [-15, +90] and [-180, +90] respectively.

For each measure the return is higher for the [-180, +90] event window.

	Mean
Event window [-15, +90]	
ARMi	23.5%
ARCi	22.9%
PREi	26.8%
Event window [-180, +90]	
ARMk	31.9%
ARCk	37.4%
PREk	40.9%

Table 3.2 Results of average returns analysis for different event windows

This table presents the results of returns analysis for premium for twelve event windows.

The returns variable, PRE, is returns calculated from unadjusted stock price performance for the relevant event window.

	Event Window	Mean
PREa	[-1, 0]	11.4%
PREb	[-5, 0]	13.8%
PREc	[-15, 0]	18.3%
PREd	[-30, 0]	21.4%
PREe	[-180, 0]	31.4%
PREf	[-360, 0]	37.7%
PREg	[-1, +90]	19.3%
PREh	[-5, +90]	21.9%
PREi	[-15, +90]	26.8%
PREj	[-30, +90]	29.9%
PREk	[-180, +90]	40.9%
PREl	[-360, +90]	48.0%

Table 3.3 Results of average returns analysis according to classification

This table presents the results of returns analysis for premium for two event windows and grouped according to four classifications.

The returns variable, PRE, is returns based upon unadjusted stock price performance. In each case the suffixes "i" and "k" denote the event windows [-15, +90] and [-180, +90] respectively.

Univariate regression analysis was used with a dummy variable for each of the classifications. Significance tests relate to the coefficient on each dummy variable.

The classifications comprise:

- sector (DSEC = 1 for materials or DSEC = 0 otherwise)
- board response (DRSP = 1 for a recommended offer or DRSP = 0 otherwise)
- consideration (DCSH = 1 for cash or DCSH = 0 otherwise)
- Buyer firm interest in Target firm pre bid (DTOE5 = 1 for above 5% or DTOE = 0 otherwise)

	% of offers	PREi [-15, +90]	PREk [-180, +90]
Sector (DSEC)			
Materials	27.7%	23.3%	48.0%
Otherwise	72.3%	28.1%	38.2%
Intercept		0.281	0.382
DSEC coefficient		-0.048	0.098
P > | z |		0.472	0.400
Board response (DRSP)			
Recommended	70.8%	24.2%	44.2%
Otherwise	29.2%	33.2%	32.9%
Intercept		0.332	0.329
DRSP coefficient		-0.091	0.112
P > | z |		0.161	0.325
Consideration (DCSH)			
Cash	73.8%	25.3%	37.1%
Otherwise	26.2%	30.9%	51.9%
Intercept		0.309	0.519
DCSH coefficient		-0.056	-0.148
P > | z |		0.407	0.209
Buyer firm interest pre bid (DTOE)			
Above 5%	55.4%	18.4%	34.6%
Otherwise	44.6%	37.3%	48.7%
Intercept		0.373	0.487
DTOE coefficient		-0.189	-0.141
P > | z |		0.001 [v]	0.177

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.4 Results of univariate returns analysis

This table presents the results of a univariate analysis for each variable for two event windows [-15, +90] and [-180, +90]. The dependent variable PRE (premium) is returns calculated from unadjusted stock price performance for the relevant event window.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets.

A positive coefficient suggests a positive influence on premium.

	event window	Coefficient	P > |z|
ARCd	[-15, +90]	-0.199	0.039 [v]
ASXa	[-15, +90]	-0.610	0.031 [v]
FCFa	[-15, +90]	-0.868	0.008 [v]
GROa	[-15, +90]	-0.019	0.340
LEVa	[-15, +90]	0.004	0.767
LIQa	[-15, +90]	0.229	0.468
SIZa	[-15, +90]	-0.027	0.237
TBQa	[-15, +90]	0.012	0.733
ARCd	[-180, +90]	0.635	0.000 [v]
ASXa	[-180, +90]	0.216	0.670
FCFa	[-180, +90]	-2.000	0.000 [v]
GROa	[-180, +90]	-0.021	0.545
LEVa	[-180, +90]	-0.025	0.325
LIQa	[-180, +90]	0.782	0.156
SIZa	[-180, +90]	-0.017	0.674
TBQa	[-180, +90]	-0.030	0.625

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.5 Results of multivariate returns analysis

This table presents results of multivariate analysis of determinants of premium. The table shows results for two models – with and without dummy variables. Premium is measured over two event windows [-15, +90] and [-180, +90] and is denoted PREi and PREk respectively.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets. DSEC is a dummy variable =1 for offers for Target firms in the materials sector, DRSP is a dummy variable = 1 for offers recommended by board of the Target firm, DCSH is a dummy variable = 1 for cash offers and DTOE is a dummy variable = 1 for offers where a pre bid toehold is present.

For each version of the model the results for PREi and PREk are similar. In each case, the significant variables have similar coefficients, with the exception of ARCd (which is found to be significant but the sign and magnitude of its coefficient differs).

For each event window the results for each version of the model are close to identical. The presence of the dummy variables has little effect on the significance and magnitude of the coefficients of the independent variables but does increase R^2.

	PREi		PREk	
	coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.187	0.041 [v]	0.648	0.000 [v]
ASXa	-0.531	0.056 [x]	-0.374	0.405
FCFa	-1.371	0.000 [v]	-2.406	0.000 [v]
GROa	-0.041	0.024 [v]	-0.056	0.056 [x]
LEVa	0.009	0.581	0.015	0.551
LIQa	0.106	0.779	0.030	0.961
SIZd	-0.019	0.401	0.004	0.902
TBQa	0.081	0.034 [v]	0.053	0.394
Constant	0.548	0.000 [v]	0.606	0.014 [v]
P > F		0.001 [v]		0.000 [v]
R^2		0.358		0.438
ARCd	-0.193	0.022 [v]	0.589	0.000 [v]
ASXa	-0.540	0.029 [v]	-0.353	0.416
FCFa	-1.286	0.000 [v]	-2.551	0.000 [v]
GROa	-0.035	0.034 [v]	-0.060	0.042 [v]
LEVa	0.014	0.338	0.024	0.342
LIQa	0.295	0.387	0.128	0.834
SIZd	-0.041	0.054 [x]	-0.025	0.496
TBQa	0.071	0.048 [v]	0.071	0.265
DSEC	0.042	0.438	0.118	0.229
DRSP	-0.022	0.693	0.060	0.542
DCSH	-0.146	0.010 [v]	-0.188	0.060 [v]
DTOE	-0.164	0.001 [v]	-0.131	0.132
Constant	0.866	0.000 [v]	0.912	0.002 [v]
P > F		0.000 [v]		0.000 [v]
R^2		0.537		0.514

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.6 Results of sensitivity analysis to different measures of returns

This table presents results from an analysis investigating sensitivity to the different methods used to measure stock returns. The table shows the Base Case Model for each of the three types of the Stock return variable.

The table shows results for the Stock return variables denoted by ARMi (abnormal returns measured using the 0,1 market model method), and ARCi (abnormal returns measured using the matched clone method) and PREi (unadjusted stock returns). Each Stock return variable is measured over the event window
[-15, +90].

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

The results for ARMi and PREi are close to identical. In each case the same variables are identified as being significant (albeit with small differences in level of significance) and the significance of the model and its explanatory power is essentially unchanged. The results for ARCi are similar with the exception of the level of significance for the variables ARCd and ASXa.

Event window [-15, +90]

	ARMi		ARCi		PREi	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.156	0.078 [x]	-0.070	0.538	-0.187	0.041 [v]
ASXa	-0.548	0.043 [v]	-0.411	0.237	-0.531	0.056 [x]
FCFa	-1.377	0.000 [v]	-1.111	0.013 [v]	-1.371	0.000 [v]
GROa	-0.041	0.019 [v]	-0.082	0.001 [v]	-0.041	0.024 [v]
LEVa	0.006	0.672	0.006	0.777	0.009	0.581
LIQa	-0.042	0.908	0.055	0.908	0.106	0.779
SIZd	-0.015	0.489	0.010	0.724	-0.019	0.401
TBQa	0.083	0.026 [v]	0.119	0.015 [v]	0.081	0.034 [v]
constant	0.506	0.001 [v]	0.244	0.191	0.548	0.000 [v]
P > F		0.001 [v]		0.012 [v]		0.001 [v]
R^2		0.352		0.283		0.358

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.7 Results of sensitivity analysis to different event windows

This table presents results from an analysis investigating sensitivity to the different event windows used to measure stock returns. The table shows the Base Case model for each of six event windows.

The dependent variable PRE (premium) is returns calculated from unadjusted stock price performance for the relevant event window.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

If treat the event windows as comprising two groups – short windows (PREg,h,i) and long windows (PREj,k,l) – there is consistency in results within each group. FCFa is significant in all event windows. GROa and TBQa are significant in five of the six event windows.

The F statistic is significant in all event windows.

	PREg [-1, +90]		PREh [-5, +90]		PREi [-15, +90]	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.090	0.203	-0.142	0.064 [x]	-0.187	0.041 [v]
ASXa	-0.665	0.003 [v]	-0.644	0.007 [v]	-0.531	0.056 [x]
FCFa	-0.950	0.001 [v]	-0.965	0.001 [v]	-1.371	0.000 [v]
GROa	-0.036	0.011 [v]	-0.034	0.026 [v]	-0.041	0.024 [v]
LEVa	0.004	0.741	0.000	0.990	0.009	0.581
LIQa	-0.014	0.961	-0.082	0.795	0.106	0.779
SIZd	-0.005	0.765	-0.013	0.489	-0.019	0.401
TBQa	0.079	0.009 [v]	0.087	0.008 [v]	0.081	0.034 [v]
constant	0.352	0.003 [v]	0.428	0.001 [v]	0.548	0.000 [v]
P > F		0.000 [v]		0.001 [v]		0.001 [v]
R^2		0.364		0.356		0.358

	PREj [-30, +90]		PREk [-180, +90]		PREl [-360, +90]	
	coefficient	P > |z|	coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.066	0.489	0.648	0.000 [v]	0.534	0.018 [v]
ASXa	-0.467	0.109	-0.374	0.405	0.487	0.468
FCFa	-1.262	0.001 [v]	-2.406	0.000 [v]	-3.900	0.000 [v]
GROa	-0.038	0.042 [v]	-0.056	0.056 [x]	-0.079	0.072
LEVa	0.023	0.159	0.015	0.551	0.019	0.617
LIQa	0.311	0.434	0.030	0.961	0.587	0.524
SIZd	-0.028	0.239	0.004	0.902	0.031	0.576
TBQa	0.078	0.054 [v]	0.053	0.394	0.289	0.003 [v]
constant	0.577	0.000 [v]	0.606	0.014 [v]	0.292	0.416
P > F		0.006 [v]		0.000 [v]		0.000 [v]
R^2		0.305		0.438		0.434

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.8 Results of restricted version of model

This table presents the results of restricted versions of the multivariate analysis of determinants of premium. The table shows results for two models – with and without dummy variables. Premium is measured over two event windows [-15, +90] and [-180, +90] and is denoted PREi and PREk respectively.

The dependent variable PRE (premium) is returns calculated from unadjusted stock price performance for the relevant event window.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). TBQa is Tobin's q, enterprise value divided by total assets. DCSH is a dummy variable = 1 for cash offers and DTOE is a dummy variable = 1 for offers where a pre bid toehold is present.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

The results for PREi in each version of the model are very similar. For PREi all the variables are significant and have similar coefficients. Similarly for PREk except that ASXa, TBQa and DTOE are not significant variables.

The Likelihood Ratio for all versions of the restricted model is not significant at a 10% level (using a chi squared distribution). Consequently the null cannot be rejected that the coefficients of the excluded variables equate to nil.

	PREi		PREk	
	Coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.181	0.040 [v]	0.638	0.000 [v]
ASXa	-0.599	0.022 [v]	-0.447	0.284
FCFa	-1.376	0.000 [v]	-2.306	0.000 [v]
GROa	-0.040	0.021 [v]	-0.056	0.047 [v]
TBQa	0.083	0.014 [v]	0.053	0.322
Constant	0.453	0.000 [v]	0.636	0.000 [v]
P > F		0.000 [v]		0.000 [v]
R^2		0.343		0.433
Restricted LR	1.4860		0.5362	
ARCd	-0.169	0.038 [v]	0.632	0.000 [v]
ASXa	-0.648	0.007 [v]	-0.499	0.220
FCFa	-1.321	0.000 [v]	-2.356	0.000 [v]
GROa	-0.034	0.033 [v]	-0.052	0.061 [x]
TBQa	0.078	0.012 [v]	0.052	0.323
DCSH	-0.106	0.050 [v]	-0.176	0.060 [x]
DTOE	-0.142	0.004 [v]	-0.107	0.191
Constant	0.611	0.000 [v]	0.839	0.000 [v]
P > F		0.000 [v]		0.000 [v]
R^2		0.472		0.486
Restricted LR	8.5402		3.6656	

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.9 Results of Heckman sample selection analysis

This table presents results of Heckman sample selection analysis of determinants of premium. The table shows results for two models – with and without dummy variables. Premium is measured over two event windows [-15, +90] and [-180, +90] and is denoted PREi and PREk respectively.

The Heckman analysis is undertaken in the two stage form. The selection equation in stage one of the analysis is the Base Case takeover likelihood model developed by Stewart (2008a) (see Table 3.10 for results of the stage one probit analysis)

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets. DSEC is a dummy variable =1 for offers for Target firms in the materials sector, DRSP is a dummy variable = 1 for offers recommended by board of the Target firm, DCSH is a dummy variable = 1 for cash offers and DTOE is a dummy variable = 1 for offers where a pre bid toehold is present. A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

In three of the four cases the Heckman's Lambda (LambdaT) is found to be significant. This suggests that sample selection bias exists. For each version of the model the results for PREi and PREk are similar except for ARCd. In each case, the significant variables have similar coefficients. The exception is ARCd in the [-180, +90] event window where it is no longer significant and the sign of its coefficient differs. For each event window the results for each version of the model are close to identical. The presence of the dummy variables has little effect on the significance and magnitude of the coefficients of the independent variables.

	PREi		PREk	
	Coefficient	P > |z|	coefficient	P > |z|
ARCd	-0.519	0.026 [v]	0.319	0.245
ASXa	-0.266	0.352	-0.111	0.802
FCFa	-1.581	0.014 [v]	-2.614	0.001 [v]
GROa	-0.017	0.439	-0.033	0.296
LEVa	0.029	0.460	0.036	0.416
LIQa	0.741	0.228	0.660	0.399
SIZd	-0.085	0.078 [x]	-0.061	0.296
TBQa	0.078	0.206	0.050	0.514
Constant	1.701	0.007 [v]	1.749	0.018 [v]
LambdaT	-0.699	0.057 [x]	-0.693	0.098 [x]
P > chi^2		0.069 [x]		0.006 [v]
ARCd	-0.492	0.017 [v]	0.278	0.281
ASXa	-0.302	0.218	-0.107	0.795
FCFa	-1.506	0.007 [v]	-2.780	0.000 [v]
GROa	-0.015	0.435	-0.040	0.184
LEVa	0.032	0.355	0.043	0.289
LIQa	0.836	0.125	0.688	0.351
SIZd	-0.096	0.025 [v]	-0.083	0.133
TBQa	0.073	0.181	0.072	0.318
DSEC	0.031	0.597	0.106	0.254
DRSP	0.001	0.978	0.084	0.309
DCSH	-0.132	0.002 [v]	-0.174	0.038 [v]
DTOE	-0.139	0.000 [v]	-0.105	0.149
Constant	1.832	0.001 [v]	1.913	0.006 [v]
LambdaT	-0.618	0.059 [x]	-0.640	0.104
P > chi^2		0.000 [v]		0.001 [v]

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 3.10 Results of selection equation probit analysis in Heckman analysis

This table presents the results of a multivariate probit analysis using a set of variables representing the takeover likelihood model used as the selection equation for Heckman analysis (see Stewart 2008a for the development of the takeover likelihood model).

The returns variable, ARCd, is abnormal returns measured using the matched clone method for an event window [-180, -15]. ROAb is the three year average return on assets and SIZd is the natural log of enterprise value. The other variables are firm specific without adjustment for peer group relativity.

The dependent variable equals 1 for Target firms and equals 0 otherwise.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the likelihood of a takeover.

Four variables (and the constant) are identified as being significant. The model is highly significant but has relatively low explanatory power.

	Coefficient	P > |z|
ARCd	0.548	0.079 [x]
FCFa	5.197	0.039 [v]
GROa	-0.016	0.676
LEVa	-0.031	0.666
LIQa	-1.576	0.124
ROAb	-4.825	0.057 [x]
SIZd	0.117	0.070 [x]
TANa	-0.071	0.828
TBQa	-0.131	0.192
Constant	-1.217	0.002 [v]
log likelihood		-128.690
LR chi^2 (9)		21.710
P > chi^2		0.010 [v]
Pseudo R^2		0.078

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Chapter 4 Independent Expert Reports and the Influence on the Returns to Shareholders of Target firms

SECTION 4.1 OVERVIEW

The focus of this chapter is on the influence of Independent Expert Reports (IERs) on the returns to shareholders of Target firms arising from successful takeover offers.

The Corporations Act contains provisions that govern the conduct of Target firms and Buyer firms within the context of a takeover offer. Some of these provisions relate to the commissioning of IERs by the Target firm and arise from the principle that shareholders of Target firms must be provided with sufficient information to enable them to make an informed decision on whether to accept or reject the offer.

The Target firm must commission an IER if the Buyer firm has voting power in the Target firm of 30% or more and/or the Buyer firm and the Target firm have one or more common directors. These reports are commonly referred to as statutory IERs.

If a statutory IER is not required the Target firm can elect to commission a report. These reports are referred to as voluntary IERs and often form part of the response from Target firms to contested offers.

Consequently, takeover offers can be considered in one of three IER states: offers that involve a voluntary IER; offers that involve a statutory IER; and, offers that do not involve an IER.

The required content of IERs is as prescribed by ASIC and is the same whether statutory or voluntary.

The purpose of an IER is to assess the merits of an offer to the shareholders of the Target firm. It must be prepared by an appropriately credentialed expert that is independent to the parties involved and to the outcome of the offer. The IER must set out an opinion on the test addressing whether the offer is "fair and reasonable".

The approach adopted in this chapter builds on early work by Eddey (1993) and Bugeja (2004) but incorporates several innovations in terms of methodology, sample definition, event windows and the investigation of sample selection bias.

The specific purposes of this chapter are as follows:

- the investigation of the influence of IERs on the returns to shareholders of Target firms in Australia for the ten year period 1997 to 2007
- the investigation of the influence of IERs on the returns to shareholders of Target firms in the post offer announcement period
- the investigation of sample selection bias and its consequences

The findings of the study suggest the following:

About half of the takeovers in Australia involve IERs. For the sample of interest, the three IER states and their proportions comprise: offers that involve a voluntary IER (representing 35% of offers); offers that involve a

statutory IER (representing 22% of offers); and, offers that do not involve an IER (representing 43% of offers).

IERs have no influence on the returns to shareholders of Target firms. Average returns are not sensitive to the IER state of an offer. The premium across the three IER states ranges from 24.7% to 27.5% (average 26.5%) for the event window [-15, +90].

However, the study finds that the determinants of returns are influenced by the IER state (although the quantum of returns is relatively insensitive to the IER state).

Analysis of IER opinions on the "fair and reasonable" test and IER valuations relative to the share price of the Target firm do not provide evidence to support the view that IERs are useful in assisting the board of a Target firm to procure an improved offer.

The conclusion "not fair and not reasonable" represents 51% of IER opinions. Offers where the share price of the Target firm is below the IER valuation range represents 35% of IER valuations. For each of these categories the average return is lower than for relevant alternative categories.

For offers involving IERs the significant factors influencing premium were recent share price performance and operating cash flows of the Target firm.

An investigation of sample selection bias and its impact on the determinants of premium produced varied results depending upon the event window.

For event windows with a focus on the pre offer announcement period there is evidence of sample selection bias. Allowance for this bias resulted in the

significant factors influencing premium increasing to include the recent performance of the market and the financial resources of the Target firm.

A similar investigation into sample selection bias with a focus on the post offer announcement period (using a revised group of variables) resulted in no evidence to suggest sample selection bias.

The remainder of this chapter is organized as follows. Section 4.2 sets out background material on the role and purpose of IERs in Australian financial markets and an overview of previous research. Section 4.3 addresses abnormal returns, premium and their determinants and introduces the matched clone model for measuring abnormal returns. Section 4.4 introduces the use of Heckman sample selection analysis within the context of assessing determinants of returns in takeovers for offers involving IERs. Section 4.5 addresses variables and sample construction. Section 4.6 presents the results of the analysis and Section 4.7 presents a summary of findings and areas for future research.

SECTION 4.2 BACKGROUND

In financial markets in Australia, the documentation for a proposed corporate transaction involving a change in ownership or control of a company and/or its key assets often includes a report on the merits of the transaction for the shareholders of the vendor firm[34]. The report is commissioned by the board of the vendor firm and must be prepared by an accredited expert with relevant credentials, qualifications and experience who is independent of the proposed transaction. These reports are commonly referred to as Independent Expert Reports (IERs).

The primary legislation that governs corporations in Australia is the Corporations Act (2001 - Commonwealth) (Corporations Act). The Corporations Act contains specific provisions in relation to proposed corporate transactions such as takeovers and the sale of key assets. These provisions are intended to help protect the interests of shareholders in the vendor firm.

Broadly, these provisions are consistent with the principles set out by the Eggleston Committee in 1969[35]:

> *"We agree with the general principle that if a natural person or corporation wishes to acquire control of a company by making a general offer to acquire all the shares, or a proportion sufficient to enable him to exercise voting control, limitation should be placed on his freedom of action so far as is necessary to ensure:*
>
> *(i) that his identity is known to the shareholders and directors;*
>
> *(ii) that the shareholders and directors have a reasonable time in which to consider the proposal;*

[34] Within the context of takeover offers, the vendor firm is referred to as the Target firm.
[35] Company Law Advisory Committee, *Second Interim Report,* para 16.

(iii) that the offeror is required to give such information as is necessary to enable the shareholders to form a judgment on the merits of the proposal and, in particular, where the offeror offers shares or interests in a corporation, that the kind of information which would ordinarily be provided in a prospectus is furnished to the offeree shareholders;

(iv) that so far as is practicable, each shareholder should have an equal opportunity to participate in the benefits offered."

The role and purpose of an IER should be viewed within the context of principle (iii) above – that is, it represents information provided to shareholders of the vendor firm to assist them in making an informed decision on whether or not to support the proposed transaction.

The Corporations Act prescribes the commissioning of an IER under certain circumstances (see Exhibit 4.1 for examples). Outside of these circumstances the board of the vendor firm can voluntarily commission an IER at its sole discretion.

As such we observe corporate transactions that involve statutory IERs (commissioned as prescribed by the Corporations Act), voluntary IERs (commissioned voluntarily by the board of the vendor firm) and no IERs (where a report is not required by law and the board of the vendor firm has elected to not commission a report).

Whether statutory or voluntary the requirements for all IERs are the same[36]:

- the report should help shareholders make their decision by clearly disclosing key information
- use one or more valuation methodologies to minimize the risk that the opinion is unreliable

[36] See ASIC Regulatory Guideline 111: Content of Expert Reports 2007.

- be based upon reasonable assumptions with disclosure of all material assumptions
- provide a range of values and that range should be as narrow as possible
- be prepared by an expert with relevant expertise[37]
- the expert must be independent of the parties to the proposed transaction[38]

In recent years the incidence of voluntary IERs associated with takeovers has increased. In large transactions it is now unusual for a Target firm to not commission an IER (even though an IER may not be required pursuant to the Corporations Act).

In contested offers the IER can serve an important purpose in the response strategy of the Target firm – with a view to procuring an improvement in the initial offer terms.

There has been little previous research in relation to IERs in Australian financial markets.

Early work largely addressed the legal aspects of IERs (see for example: Matolcsy (1982), D'Aloisio and Crutchfield (1989), and Green (1991)). These papers were written during a period of evolution in the law governing companies generally and specifically in the context of takeovers.

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[37] In Regulatory Guideline 111, ASIC sets out three expectations in relation to relevant expertise:

- the expert's profession or reputation is relevant to the matters upon which the expert is to report
- the expert holds licences or authorities necessary for providing the type of advice sought
- the expert states in the report its qualifications and experience

[38] See ASIC Regulatory Guideline 112: Independence of Experts 2007.

Exhibit 4.1 Examples of Corporate Transactions involving IERs

Transaction type	Circumstances
Takeover offers	Statutory requirements (Corporations Act section 640) - the Target firm must commission an IER when: - the Buyer firm has voting power in the Target firm of 30% or more; and/or - the Buyer firm and the Target firm have one or more common directors In other circumstances the Target firm may, at its sole discretion, commission an IER. This action is common in contested takeover offers
Schemes of arrangement	Statutory requirements (Corporations Regulations 2001 Commonwealth: regulation 5.1.01 and schedule 8 clauses 8303 and 8306) - the Scheme firm must commission an IER when: - the Buyer firm holds 30% or more of the voting shares in the Scheme firm; and/or - the Buyer firm and the Scheme firm have one or more common directors In other circumstances the Scheme firm may, at its sole discretion, commission an IER. This action is invariably taken when the transaction is complex or effects a takeover
Approved acquisitions	An IER may be commissioned by the firm in order to satisfy the obligation to disclose all material information in relation to a proposed acquisition that is subject to shareholder approval (Corporations Act section 611 item 7(b))
Related party transactions	An IER may be commissioned by the firm and supplied to members as part of the material to accompany the notice of meeting (Corporations Act sections 218, 219, 220 and 221)
Transactions with persons in a position of influence	Notices of meeting for approvals under ASX Listing Rule 10.10 must be accompanied by an IER (ASX Listing Rule 10.10.2)

Source: ASIC Regulatory Guideline 111: Content of expert reports

The Uniform Companies Act (1961) included few provisions for takeovers. Abuse of these provisions prompted regulators to strengthen the law and resulted in the publication in 1969 of the Second Interim Report of the Company Law Advisory Committee (commonly known as the Eggelston Committee) "Disclosure of Substantial Shareholdings and Takeover Bids". This report contained numerous proposals for reform that led to revisions in the act in 1971 (commonly referred to as the Takeovers Code).

Although ongoing revisions addressed defects in the legislation, abuse of the legislation in the market place undermined its efficacy. A major revision was undertaken resulting in the enactment of the Companies Code (Acquisition of Shares) in 1981. This legislation was superceded by Chapter 6 of the Corporations Law in 1991 that was subsequently codified as the Corporations Act (2001)[39].

The establishment of the Corporate Law Economic Reform Program (CLERP) in 1997[40] provided a mechanism for ongoing reform. Takeover provisions were revised as part of CLERP 4 (1999) and CLERP 9 (2004).

Eddey (1993) investigates IERs in takeover offers occurring in the period 1988 to 1991 (with a restricted sample comprising cash offers only). The study finds that the bid premium offered in takeovers where an IER was issued was not significantly lower than bid premium in other takeovers. The study did not differentiate between statutory IERs and voluntary IERs. Premium was calculated for three event windows: four months prior to bid; one month prior to bid; and, two days prior to bid.

[39] See the University of New South Wales LAWS 3091 Corporate Control Transactions: Takeovers Volume 1.
[40] The initial revisions, known as CLERP 1, 2, 3, 4 and 5, were enacted as the *Corporate Law Economic Reform Act 1999* (Commonwealth).

Eddey (1993) also investigates the opinion of experts with reference to the statutory requirement of assessing whether the offer is "fair and reasonable". At the time of the paper there was some conjecture as to whether this test involved one criterion ("fair and reasonable") or two criteria ("fair" and "reasonable"). ASIC has subsequently clarified its requirement that the test be regarded as two distinct criteria[41].

Martin Bugeja builds on the work by Eddey (1993) in his PhD thesis "Independent Expert Reports and Takeovers" (Bugeja (2004)). This study investigates takeovers during the period 1990 to 2000 and resulted in several published papers.

Bugeja (2005) finds that bid premium is lower when a statutory IER is required. Although this result is inconsistent with Eddey (1993) the findings are not directly comparable. Apart from the different periods, Bugeja (2005) uses a sample comprising all offers (whether cash and/or scrip) and differentiates between statutory IERs and voluntary IERs.

Bugeja (2006) investigates allegations of bias in the findings of experts and in particular that the opinion expressed in the IER aligns with the recommendation of the directors of the Target firm. The study finds that in more than 65% of takeovers where directors recommend acceptance of an offer the IER valuation of the Target firm is below the offer price. In takeovers where directors recommend rejection of an offer the study finds "the offer price is adequate in only 5% of cases", and where rejected offers eventually succeed they do so at a substantial discount to the IER valuation, and where rejected offers eventually fail it is rare for the market value of the Target firm to increase to the IER valuation.

[41] See RG 111.9 ASIC Regulatory Guideline 111: Content of Expert Reports 2007.

Bugeja (2006) concludes "that factors including a bias towards the recommendation of directors are driving the valuations produced by experts in rejected bids".

Bugeja (2007) investigates the motivation for the directors of a Target firm to voluntarily commission an IER. The study finds that voluntary IERs are associated with larger firms and those with high proportions of intangible assets and where the offer consideration is non cash. Bugeja (2007) concludes that voluntary IERs are commissioned where the board of the Target firm faces "greater valuation complexity".

The focus of this study is takeovers and the issues associated with IERs and the returns to shareholders of Target firms.

The approach is similar to that used by Eddey (1993) and Bugeja (2004) but incorporates several innovations in methodology and sample selection. The study incorporates earlier work by Stewart (2008a and 2008b) in the determination of abnormal returns (using the market model and the matched clone model) with a focus on successful takeovers that are material within the context of Australian financial markets.

Offers are considered in three groups: those involving a voluntary IER; those involving a statutory IER; and, those involving no IER. Event study windows are selected to more accurately reflect the progression of takeovers over time in accordance with the Corporations Act and as observed in practice.

The study also investigates sample selection bias and its impact on inferences related to IERs. This analysis makes use of the Heckman sample selection model (in two stage form) and incorporates findings by Stewart (2008b) in relation to sample selection bias in assessing returns of Target firms.

SECTION 4.3 ABNORMAL RETURNS, PREMIUM AND DETERMINANTS

Returns to the shareholders of Target firms are assessed using event study analysis. The methodology is the same as that used by Stewart (2008b) but with event windows addressing time periods associated with the decision to commission the preparation of an IER.

Four event windows were investigated[42]: [-15, +90] and [-180, +90] and [-15, +15] and [+15, +90].

Use of the plus 90 days closing date enables investigation of returns associated with the offer and its successful conclusion[43].

Use of the plus 15 opening date enables investigation of returns associated with revisions of the initial offer and/or the emergence of a competing offer.

The announcement of the appointment of an expert to prepare an IER would usually occur within the first two weeks of the offer period. For contested offers that do not require a statutory IER this announcement may be delayed depending upon the defence strategy adopted by the board of the Target firm.

[42] Day 0 is defined as the date the offer is announced by the Buyer to the market.

[43] Under the Corporations Act an offer must remain open for a minimum period of 30 days. However, it is common for offer periods to be extended. Most successful offers are concluded within 90 days and for those that extend beyond this period it is rare for there to be any change in the offer terms (that is, for calculation of returns purposes the stock price at +90 is a reliable proxy for the final price).

4.3.1 Abnormal Returns

Abnormal returns are measured using two methods.

The first uses the 0,1 market model with the ASX 200 Index as the proxy for the market.

The second follows from Barber and Lyon (1997) where they suggest that abnormal returns determined using a market model suffer from inherent biases. They suggest that a more reliable method is to "match" the firm of interest with similar firms – in particular with reference to firm size and firm market to book ratio.

Barber Lyon and Tsai (1999) investigate several methods to address three sources of bias: new listing or survivorship bias; rebalance bias; and, skewness bias. The context of their work is in assessing long run abnormal returns (for example, over periods of three to five years). However, the event windows in this study are relatively short.

In this study we match Target firms with similar firms (clones) using three determinants:

- each Target firm is matched with three clone firms
- each clone firm is in the same sector as the Target firm
- the clone firms represent the three firms closest to the Target firm as measured by market capitalization

From the three clone firms a basket performance index is calculated as the average performance of the clones (the "clone index"). The abnormal return of the Target firm is then calculated with reference to the clone index.

The clone firms are also used for the purpose of representing non targets (or controls) in the investigation of sample selection bias.

4.3.2 Premium

It is common for offers to be represented as a "premium" to the pre offer stock price of the Target firm. Many market commentators suggest a premium in the order of 20% to 30% as appropriate for an offer to be considered attractive to the shareholders of the Target firm.

Premium is calculated with reference to the market stock price of the Target firm at some point in time before the offer is announced.

The calculation is intended to provide an objective measure of the additional benefit a Buyer firm is offering the shareholders of a Target firm above the prevailing market price. That is, to procure acceptance (usually leading to a change of control and 100% ownership of the Target firm by the Buyer firm) an economic incentive above the pre bid market price (which implicitly represents the market value of the stock to portfolio investors) is necessary.

4.3.3 Determinants of Premium

In this study we adopt a similar approach to that of Bugeja (2004), Stewart (2008a) and Stewart (2008b)[44].

Multivariate analysis of premium is undertaken using independent variables as for Stewart (2008b) for three categories of offers: those that do not involve an IER; those that involve a voluntary IER; and, those that involve a statutory IER.

[44] Stewart (2008a) investigates takeover likelihood models and provides a summary of sources of economic benefit associated with takeovers. Stewart (2008b) investigates returns to shareholders of Target firms and their determinants and sample selection bias.

SECTION 4.4 SAMPLE SELECTION BIAS

This study also investigates sample selection bias and its impact on inferences related to the determinants of the premium paid to shareholders of Target firms and the influence of IERs.

The sample of interest (comprising Target firms that were subject to successful takeover offers) is not a random sample representative of the broader population of firms. This sample has been "selected" by decisions by Buyer firms (to make an offer) and by decisions of shareholders of Target firms (to accept the offer). Consequently, inferences related to the determinants of the offer premium may not be reliable due to sample selection bias.

Stewart (2008b) reports evidence of sample selection bias within the abovementioned sample of interest and the "latent variable" data from this analysis has been incorporated into the investigation of IERs in this chapter.

Investigation of sample selection bias is applied in two settings: within the sample comprising all offers with IERs (voluntary IERs and statutory IERs); and, within the sample comprising voluntary IERs.

This analysis makes use of the Heckman sample selection model. Whilst the Heckman model is well established and is widely utilized in economics its application in finance is not so well developed. The author believes this is the first application of the model in the context of investigating returns associated with IERs and takeover activity.

The Heckman selection model (see Heckman (1976)) assumes the existence of an underlying relationship in the form:

$$Y_j = X_j * \beta_j + \mu 1_j \qquad \text{(regression equation)}$$

The dependent variable, however, is not always observed. The decision to commission an IER sits with the board of the Target firm.

As discussed previously, in some circumstances the preparation of an IER is required by statute. The board of the Target firm has no discretion and must commission a report.

In all other circumstances the board of the Target firm determines whether or not a report is commissioned. In making this decision, the board of the Target firm must act in the best interests of its shareholders.

Two issues are relevant to this decision: the provision of sufficient information to shareholders to enable them to make an informed decision on whether or not to accept the offer; and, the role the IER may play in the response of the board of the Target firm to the offer with a view to procuring an improved outcome.

Common to both issues is the maximization of value in the hands of the shareholders of the Target firm.

The board of the Target firm should decide to commission an IER if it is satisfied the report will assist in value creation for its shareholders. In this case a voluntary IER is commissioned and the dependent variable is observed.

In situations where the board of the Target firm is satisfied that the offer at hand represents the best possible value outcome for shareholders then it should decide to not commission an IER. In this case the dependent variable is not observed.

The dependent variable for observation j (associated with the decision of the board of the Target firm to commission an IER) can be modeled as:

$$\mathbf{Z}_j \cdot \gamma_j + \mu 2_j > 0 \qquad \text{(selection equation)}$$

Where:

$\mu 1 \sim N(0,\sigma)$

$\mu 2 \sim N(0,1)$

correlation $(\mu 1, \mu 2) = \rho$

When $\rho \neq 0$, standard regression techniques applied to the regression equation produce biased results.

In the Heckman sample selection model, the first step is to estimate the latent (or "hidden") variable by presenting the selection equation in a binary form. Using probit analysis Heckman's Lambda (the Inverse Mills Ratio) can be obtained.

Drawing upon the findings of Stewart (2008b) the selection equation in this study is based upon the following characteristics of Target firms:

- pre bid abnormal returns (variable ARCd)
- market returns (variable ASXa)
- initial bid premium (variable PREc)
- sector classification (dummy variable DSEC)

- response of the board of the Target firm (dummy variable DRSP)
- form of consideration (cash or scrip) (dummy variable DCSH)
- pre bid ownership of Buyer firm (dummy variable DTOE)

For the full sample the dependent variable (binary outcome) is whether or not an IER is involved in the offer. The selection equation is as follows[45]:

$$NIER\ (0,1) = \alpha + \beta_1*ARCd + \beta_2*ASXa + \beta_3*PREc + \beta_4*DSEC + \beta_5*DRSP + \beta_6*DCSH + \beta_7*DTOE$$

For the reduced sample (comprising offers involving IERs) the dependent variable (binary outcome) is whether or not a voluntary IER is involved in the offer. The selection equation is as follows:

$$VIER\ (0,1) = \alpha + \beta_1*ARCd + \beta_2*ASXa + \beta_3*PREc + \beta_4*DSEC + \beta_5*DRSP + \beta_6*DCSH + \beta_7*DTOE$$

In the second step, Heckman's Lambda is used as an additional independent variable in the multivariate regression equation. If the estimated coefficient of Heckman's Lambda is statistically significant then sample selection bias exists and inferences relating to the other coefficients should be treated with caution.

The multivariate regression equation is the same as that used by Stewart (2008b) to investigate the determinants of premium (variable PREx where x denotes a specific event window). Included in the analysis is the latent variable associated with sample selection bias for Target firms (from Stewart

[45] See Exhibit 4.2 for definitions of variables.

(2008b) and referred to as Heckman's Lambda Target or LambdaT). That is, we investigate factors that address the following characteristics of Target firms:

- pre bid stock performance (variable ARCd)
- market returns (variable ASXa)
- cashflow (variable FCFa)
- growth (variable GROa)
- leverage (variable LEVa)
- liquidity (variable LIQa)
- firm size (variable SIZd)
- market to book value (variable TBQa)
- Heckman's Lambda Target (variable LambdaT)

The multivariate regression equation is as follows (where Heckman's Lambda from the first step analysis is denoted LambdaIER or LambdaVIER respectively for the sample of all offers and for the sample of offers involving an IER):

$$PREx = \alpha + \beta_1*ARCd + \beta_2*ASXa + \beta_3*FCFa + \beta_4*GROa + \beta_5*LEVa + \beta_6*LIQa + \beta_7*SIZd + \beta_8*TBQa + \beta_9*LambdaT + \beta_{10}*LambdaIER$$

SECTION 4.5 VARIABLES, SAMPLE AND DATA

The variables used in this study are as for Stewart (2008a) and Stewart (2008b).

Stewart (2008b) investigates the determinants of returns to shareholders of Target firms. This analysis includes an investigation of sample selection bias using the Heckman sample selection model and draws upon a takeover likelihood model developed by Stewart (2008a).

Exhibit 4.2 sets out details of the variables used in this study for univariate analysis, multivariate analysis and probit analysis (Heckman selection equation). As appropriate the associated value theory is denoted for the relevant variable[46].

Similarly, the sample and data are as for Stewart (2008a) and Stewart (2008b).

In brief, the estimation sample comprises ASX listed companies for the ten year period May 1997 to May 2007 that were subject to successful takeover offers. Target firms with a market capitalization of less than AUD100 million were excluded. The estimation sample comprised a total of 238 firms, consisting of 65 Target firms and 173 control firms[47].

[46] Refer to Stewart (2008a) and Stewart (2008b) for a comprehensive discussion of the motivations for takeover activity, common theories underlying the scope for the Buyer firm to create value arising from acquisitions, and relevant characteristics of Target firms as independent variables.

[47] Refer to Stewart (2008b) for a detailed discussion of sample and data.

Exhibit 4.2 Variables used in IER analysis

Value Theory	Variable	Measure
	Returns	
Dependent	ARCx	Abnormal returns (matched clone model)
Dependent	ARMx	Abnormal returns (market model)
Dependent	PREx	Premium (unadjusted stock return) where "x" denotes one of four event windows as follows: "i": [-15, +90] "k": [-180, +90] "m": [-15, +15] "n": [+15, +90]
	Factors	
Management	ARCd	Abnormal returns (matched clone model event window [-180, -15])
Value	ASXa	Performance of ASX200 over previous 12 months
Cash flow	FCFa	EBITDA divided by total assets (3 year average)
Growth	GROa	Sales growth per annum (2 year average)
Resources	LEVa	Net debt divided by net assets (3 year average)
Resources	LIQa	Cash divided by total assets (3 year average)
Size	SIZd	Natural log enterprise value
Value	TBQa	Tobin's q (enterprise value divided by total assets)
	Dummies	
	DSEC	Dummy variable for sector (equals 1 for materials and 0 otherwise)
	DRSP	Dummy variable for response of board of Target firm (equals 1 for accept and 0 otherwise)
	DCSH	Dummy variable for form of consideration (equals 1 for cash and 0 otherwise)
	DTOE	Dummy variable for existence of pre bid interest in Target firm by Buyer firm (equals 1 for more than 5% and 0 otherwise)
	NIER	Dummy variable for no IER (equals 1 for no IER and 0 otherwise)
	VIER	Dummy variable for voluntary IER (equals 1 for voluntary IER and 0 otherwise)
	SIER	Dummy variable for statutory IER (equals 1 for statutory IER and 0 otherwise)
		Selection equation
	ARCd	Abnormal returns (matched clone model event window [-180, -15])
	ASXa	Performance of ASX200 over previous 12 months
	PREc	Premium (event window [-15, +15])
	DSEC	Sector dummy
	DRSP	Board response dummy
	DCSH	Consideration type dummy
	DTOE	Buyer holding dummy
Dependent (full sample)	NIER	no IER dummy (equals 1 for no IER and 0 otherwise)
Dependent (reduced sample)	VIER	voluntary IER dummy (equals 1 for voluntary IER and 0 otherwise)

SECTION 4.6 RESULTS AND DISCUSSION

This section sets out the results of the empirical analysis and is presented in four parts:

- summary of results
- abnormal returns and premium
    - influence of IER
- investigation of determinants of premium
    - influence of IER
- investigation of sample selection bias
    - influence of IER

4.6.1 Summary of Results

The results of this study provide little evidence to support the view that IERs are a material influence on the returns to shareholders of Target firms. See Exhibit 4.3 for a summary of descriptive statistics.

For the sample under consideration, 43% of offers did not involve an IER, 22% of offers involved a statutory IER and 35% of offers involved a voluntary IER.

Average returns varied depending upon the IER state but the differences were not statistically significant and were not material. For example: for the [-15, +90] event window, average returns measured as premium were 27.3% for no IERs, 24.7% for statutory IERs and 27.5% for voluntary IERs.

Higher returns to shareholders were associated with offers where the IER opinion was "fair and reasonable" and with offers where the share price of the Target firm was above the IER valuation range. These results are not

consistent with expectations based upon the view that IERs present a material influence on returns and suggest factors other than the findings of the IER influence returns to Target firm shareholders.

Analysis of returns for the post offer period [+15, +90] produced similar results. These results are of particular interest because during this period the IER is usually commissioned, prepared and released. Further, revisions (if any) to the offer price also usually occur in this period. There is little evidence to suggest that IERs have an influence on price revisions.

There is evidence to suggest that the IER state does influence the determinants of premium and the variables of significance differ depending upon the IER state.

For the post offer period [+15, +90], a different and smaller group of variables represent significant determinants of premium and are also dependent upon the IER state.

Heckman sample selection analysis indicates the presence of sample selection bias for offers involving IERs associated with the decision of the board of the Target firm to commission an IER. The presence of sample selection bias increases the number of variables of significance.

For the post offer period, using a revised group of variables, there is no evidence to suggest sample selection bias.

Exhibit 4.3 Summary descriptive statistics

IER states	All offers	No IER	Statutory IER	Voluntary IER
% offers	100%	43%	22%	35%
premium [-15, +90]	26.8%	27.3%	24.7%	27.5%
premium [+15, +90]	3.7%	6.5%	1.3%	1.7%
IER opinion		**not fair and not reasonable**	**not fair but reasonable**	**fair and reasonable**
% IERs		53%	8%	39%
premium [-15, +90]		25.2%	8.5%	33.6%
premium [+15, +90]		0.7%	0.8%	2.9%
IER valuation		**share price below range**	**share price within range**	**share price above range**
% IERs		62%	22%	16%
premium [-15, +90]		25.9%	26.6%	28.1%
premium [+15, +90]		1.8%	1.1%	1.1%

4.6.2 Abnormal returns and premium

In this study, analysis was undertaken of abnormal returns and premium. Market commentators and practitioners invariably assess the merits of takeover offers and returns to the shareholders of Target firms with reference to premium. Apart from section 6.2.1 Average Returns, results are discussed for premium only. Full results are set out in the referred Tables.

4.6.2.1 Average Returns

The offers were classified into three groups: those not involving an IER; those involving a statutory IER and those involving a voluntary IER.

Exhibit 4.4 Classification of IERs by state

IER state	Observations	%
No IER	28	43%
Statutory IER	14	22%
Voluntary IER	23	35%
All offers	65	100%

For a given IER state, returns to shareholders of Target firms were investigated using three measures (abnormal returns using the market model, abnormal returns using the clone model and premium) and four event windows, [-15, +90] and [-180, +90] and [-15, +15] and [+15, +15] (see Table 4.1 for results).

For the [-15, +90] event window, average abnormal returns using the market model and clone model were: 24.3% and 24.7% (no IER); 22.3% and 24.0% (statutory IER); and, 24.2% and 20.1% (voluntary IER) respectively. For the same event window the average premium was 27.3% (no IER), 24.7% (statutory IER) and 27.5% (voluntary IER).

For the [-180, +90] event window, average abnormal returns using the market model and clone model were: 41.1% and 49.7% (no IER); 22.3% and 29.6% (statutory IER); and, 26.5% and 27.1% (voluntary IER) respectively. For the same event window the average premium was 51.5% (no IER), 30.4% (statutory IER) and 34.4% (voluntary IER).

These results are consistent with earlier studies and clearly demonstrate that shareholders of Target firms receive significant economic benefits. However, the quantum of the average benefit varies depending upon the involvement of an IER in the offer.

For both measures of abnormal returns, the average return for offers not involving an IER is higher than for offers involving an IER. This result appears inconsistent with the view that an IER is useful to the board of a Target firm for the purpose of procuring an improvement in the offer price. However, the decision to not commission an IER may reflect an initial offer price that, in the opinion of the board of the Target firm, was generous in comparison with the prevailing pre bid market price and likely to be acceptable to shareholders.

For each measure of return for a given IER state the returns are lower for the shorter event window. This result is consistent with Stewart (2008b).

The [+15, +90] event window is of particular interest in relation to the effect of IERs. This event window enables an assessment of revisions to the offer price during the course of the offer (either from improved terms or the emergence of a competing buyer).

For the [+15, +90] event window the average premium is 6.5% (no IER), 1.3% (statutory IER) and 1.7% (voluntary IER). This result is surprising and provides further evidence to challenge the view that an IER is useful to the board of the Target firm for the purpose of procuring an improvement in the offer price.

4.6.2.2 Effect of IER opinion

The offers were classified into three groups corresponding the three available outcomes to the "fair and reasonable" test: not fair and not reasonable; not fair but reasonable; and, fair and reasonable[48].

[48] Under ASIC guidelines it is not possible for an offer to be fair and not reasonable.

Exhibit 4.5 Classification of IERs by opinion

Opinion	Observations	%
Not fair and not reasonable	19	51%
Not fair but reasonable	3	8%
Fair and reasonable	14	38%
Other[49]	1	3%
All offers involving IERs	37	100%

For a given opinion, returns to shareholders of Target firms were investigated using three measures (abnormal returns using the market model, abnormal returns using the clone model and premium) and four event windows, [-15, +90] and [-180, +90] and [-15, +15] and [+15, +90] (see Table 4.2 for results).

For event windows that open pre offer (before t = 0) the returns associated with "fair and reasonable" are consistently higher than the returns associated with "not fair and not reasonable". This result could indicate that the opinion of the expert is not influential in determining offer returns (consistent with a negative opinion not resulting in a higher return) or that a positive opinion is associated with a higher return.

However the interaction (if any) of cause and effect is not clear. The expert is required to assess an offer as presented – and generous offers (equating to relatively higher returns to shareholders) are more likely to support a positive opinion.

[49] One IER reported "fair but not reasonable" so was excluded from the analysis.

Of particular interest is the [+15, +90] event window because the IER would normally be commissioned, prepared and released during this period. And offer revisions (if any) would usually occur during this period.

For the [+15, +90] event window the average premium is 0.7% (not fair and not reasonable), 0.8% (not fair but reasonable) and 2.9% (fair and reasonable). This result is surprising and not consistent with the view that negative findings within an IER are influential in procuring improved offer terms.

However, this result is derived from a sample comprising successful offers only. An IER finding of not fair and not reasonable may be consistent with the opinion of the shareholders of the Target firm and hence the rejection of an offer – in which case the offer would not be included in the sample. That is, the sample contains a subset of offers considered to be "not fair and not reasonable" and this subset may have special characteristics that made them sufficiently attractive to the shareholders of the Target firms to result in a successful offer.

4.6.2.3 Effect of IER valuation

The offers were classified into three groups according to the relationship between the Target firm share price (as at the offer announcement date) and the valuation range for the shares in the Target firm as assessed within the IER.

Exhibit 4.6 Classification of IERs by relative valuation

Valuation state	Observations	%
Share price below IER valuation range	23	62%
Share price within IER valuation range	8	22%
Share price above IER valuation range	6	16%
All offers involving IERs	37	100%

For a given valuation state, returns to shareholders of Target firms were investigated using three measures (abnormal returns using the market model, abnormal returns using the clone model and premium) and four event windows, [-15, +90] and [-180, +90] and [-15, +15] and [+15, +15] (see Table 4.3 for results).

For event windows that open pre offer (before t = 0) the returns associated with offers with a share price above the IER valuation range are consistently higher than the returns associated with offers with a share price below the IER valuation range[50].

Similar to the finding in relation to influence of IER opinion, this result could indicate that IER valuations are not influential in determining offer returns (consistent with a share price below the IER valuation range not resulting in a higher return) or that a share price above the IER valuation range is associated with a higher return. Again, the interaction (if any) of cause and effect is not clear.

For the [+15, +90] event window the average premium is 1.8% (below the IER valuation range), 1.1% (within the IER valuation range) and 1.1% (above the

[50] For eight of the nine outcomes. The exception is ARC for the [-15, +90] event window.

IER valuation range). This result suggests that IER valuations maybe influential in procuring improvements in offers.

4.6.2.4 Effect of other classifications

Premium was investigated for each IER state with offers subject to four classifications: sector (materials sector or otherwise); response of the board of the Target firm (recommended offer or otherwise); form of consideration (cash or otherwise); and, the level of pre bid ownership of the Target firm by the Buyer firm. This analysis was undertaken for abnormal returns and premium in all event windows and results are presented for premium in the event window [+15, +90] (see Table 4.4 for results).

$PREn \mid_{IER\ state} = \alpha + \beta * DSEC$

where DSEC = 1 for materials sector and DSEC = 0 otherwise

$PREn \mid_{IER\ state} = \alpha + \beta * DRSP$

where DRSP = 1 for positive recommendation and DRSP = 0 otherwise

$PREn \mid_{IER\ state} = \alpha + \beta * DCSH$

where DCSH = 1 for cash and DCSH = 0 otherwise

$PREn \mid_{IER\ state} = \alpha + \beta * DTOE$

where DTOE = 1 for Buyer firm interest >5% and DTOE = 0 otherwise

Generally, the results show wide discrepancy across IER states within each given classification. For example, for cash offers the premium is 6.8% (no IER), 0.7% (statutory IER) and minus 2.3% (voluntary IER).

For a given IER state, within a classification there is also wide discrepancy. For example, for voluntary IERs the premium for cash offers is minus 2.3% and for non cash offers is 9.2%.

These results should be viewed with caution. Table 4.5 sets out univariate analysis for each dummy variable. For a relationship to be statistically significant both the constant (α) and the variable co-efficient (β) must satisfy the significance tests. This occurs in only three situations: board response (no IER); cash offer (voluntary IER); and, Buyer firm ownership (voluntary IER).

4.6.3 Investigation of determinants of premium

An investigation of the determinants of premium for a given IER state was undertaken using multivariate analysis and the same variables used in Stewart (2008b) (the "base model") and four event windows [-15, +90] and [-180, +90] and [-15, +15] and [+15, +90] (see Table 4.6 for results).

For the no IER state, the F statistic of the model for each event window is significant. The variables ARCd, FCFa and GROa are significant in three of the four event windows however the sign of the coefficient on ARCd is not consistent[51].

[51] See Stewart (2008b) for a discussion of the coefficients of the variables.

For the statutory IER state few variables are significant and no model has an F statistic of significance.

For the voluntary IER state the results are similar to those for the no IER state.

For ease of comparison, Table 4.7 sets out the results for the event window [-15, +90] only.

For this event window it is clear that the IER state of the offer influences the determinants of premium.

For all offers, four variables are significant (ARCd, ASXa, FCFa and TBQa) and the F statistic of the model is significant (P > F of 0.001). For offers involving no IERs, three variables are significant (FCFa, GROa and TBQa) and the F statistic of the model is significant (P > F of 0.008). For offers involving statutory IERs, no variables are significant and the F statistic of the model is not significant.

For offers involving voluntary IERs, two variables are significant (ARCd and LIQa) and the F statistic of the model is not significant.

4.6.4 Investigation of determinants of premium in the post offer period

As noted earlier, the event window [+15, +90] is of special interest in terms of assessing revisions to an offer post announcement. Arguably, many of the variables used in the base model are not applicable within this context.

A univariate analysis was undertaken of variables for the event window [+15, +90] (see Table 4.8 for results). This analysis identified five variables of significance: ASXa, FCFa, TANa, DTOE and LambdaT[52].

These variables were then incorporated in a multivariate analysis of premium (the "post offer model") for the event window [+15, +90] for all offers and the three IER states (see Table 4.9 for results).

For all offers, there are three variables of significance: ASXa with a coefficient of –0.561 (P > | t | of 0.001); FCFa with a coefficient of –0.884 (P > | t | of 0.000); and, LambdaT with a coefficient of –0.262 (P > | t | of 0.001). The F statistic is significant (P > F = 0.000).

For the no IER state, there are two variables of significance: FCFa with a coefficient of –1.538 (P > | t | of 0.000); and, LambdaT with a coefficient of –0.323 (P > | t | of 0.039). The F statistic is significant (P > F = 0.000).

For the statutory IER state there are no variables of significance and the F statistic is not significant.

For the voluntary IER state, there are three variables of significance: ASXa with a coefficient of –0.621 (P > | t | of 0.027); DTOE with a coefficient of –0.110 (P > | t | of 0.020); and, LambdaT with a coefficient of –0.164 (P > | t | of 0.078). The F statistic is significant (P > F = 0.073).

This result suggests that factors affecting premium in the post offer period are influenced by differences in the IER state.

[52] LambdaT is the latent variable generated by the Heckman selection model as applied to Target firms (see Stewart (2008b)).

4.6.5 Investigation of Sample Selection Bias

Heckman sample selection analysis was undertaken to investigate sample selection bias and its impact on inferences for factors addressing the determinants of premium for offers involving IERs.

An assessment of the determinants of premium using the base model was applied in three settings: to the sample of all offers; to the sample of offers involving an IER; and, to the sample of offers involving a voluntary IER (see Table 4.10 for results[53]).

For offers involving an IER the factors of significance were ARCd ($P > | z |$ of 0.038) and FCFa ($P > | z |$ of 0.087). For offers involving a voluntary IER the factor of significance was LIQa ($P > | z |$ of 0.069).

The two reduced samples are not random – the decision of the board of a Target firm to commission an IER presents an element of self selection.

First step probit analysis used a selection equation as follows:

$$DVAR(0,1) = \alpha + \beta_1 * ARCd + \beta_2 * ASXa + \beta_3 * PREc + \beta_4 * DSEC + \beta_5 * DRSP + \beta_6 * DCSH + \beta_7 * DTOE$$

where:

DVAR is the dependent variable reflecting an offer involving an IER or a voluntary IER depending upon the sample of interest

[53] Results are presented and discussed for the event window [-15, +90]. Similar results were obtained for the event window [-180, +90].

ARCd	is abnormal returns measured using the matched clone model for the period [-180, -15]
ASXa	is the performance of the ASX200 Index for the period [-360, 0]
PREc	is premium for the period [-15, 0]
DSEC	is the dummy variable for materials sector
DRSP	is the dummy variable for positive board response
DCSH	is the dummy variable for cash consideration
DTOE	is the dummy variable for Buyer firm pre bid ownership > 5%

Second step multivariate analysis using the base model regression equation plus the latent variable (Heckman's Lambda) as determined by the probit analysis:

$$PREx = \alpha + \beta_1*ARCd + \beta_2*ASXa + \beta_3*FCFa + \beta_4*GROa + \beta_5*LEVa + \beta_6*LIQa + \beta_7*SIZd + \beta_8*TBQa + \beta_9*LambdaT + \beta_{10}*LambdaIER$$

where:

ARCd	is abnormal returns measured using the matched clone model for the period [-180, -15]
ASXa	is the performance of the ASX200 Index for the period [-360, 0]
FCFa	is free cash flow (EBITDA divided by total assets) (three year average)
GROa	is sales growth per annum (two year average)
LEVa	is net debt divided by net assets (three year average)
LIQa	is cash divided by total assets (three year average)
SIZd	is natural log enterprise value
TBQa	is Tobin's q (enterprise value divided by total assets)
LambdaT	is Heckman's Lambda from selection equation for Target firms

LambdaIER is Heckman's Lambda from selection equation for IERs for all offers (denoted LambdaVIER for the reduced sample comprising all offers involving an IER)

For offers involving IERs, Heckman's Lambda[54] (LambdaIER) was significant (P > | z | of 0.061). Taking into account sample selection bias increases the number of variables of significance in comparison (see Table 4.10 for results). In comparison with the standard model the additional variables of significance are ASXa and LIQa.

For offers involving voluntary IERs, Heckman's Lambda (LambdaVIER) was significant (P > | z | of 0.036). Taking into account sample selection bias changes the variables of significance (see Table 4.10 for results). In comparison with the standard model LIQa is no longer significant and ASXa and LambdaVIER are significant.

Similar analysis for the post offer period [+15, +90] showed no evidence of sample selection bias (LambdaR was not significant).

[54] Note that Heckman sample selection analysis produces, in the first step probit analysis, an estimate for the "hidden" or latent variable associated with selection into the sample – this variable is commonly referred to as Heckman's Lambda. In this study two latent variables are utilized. The latent variable associated with the selection of Target firms (denoted LambdaT) was investigated by Stewart (2008b) and is used in this study as an independent variable in the second step regression analysis. The latent variable associated with the preparation of IERs (denoted LambdaIER or LambdaVIER depending upon the sample of interest) is estimated in this study (from the selection equation) and is also used as an independent variable in the second step regression analysis.

SECTION 4.7 SUMMARY AND RECOMMENDATIONS

This study represents original research in several aspects:

- it compiles comprehensive information in relation to returns to shareholders of Target firms and IERs in the Australian market for the period 1997 to 2007
- it focuses on material transactions involving medium and large sized firms, thus eliminating potential distortion of results arising from the presence of a large number of small firms exhibiting spurious performance characteristics
- it utilizes a series of event window start dates to investigate pre bid performance of the Target firm and an event window closing date that captures the economic conclusion of successful offers
- it uses a post announcement event window to address influences during the progression of an offer
- it differentiates as between different types of IER in accordance with a statutory requirement or a voluntary decision by the board of the Target firm
- it investigates the effect on premium of different IER states, different IER opinions and different IER valuations
- it investigates the effect on premium of factors associated with the Target firm and the state of equity markets
- it recognizes that the sample of Target firms is not a random sample and investigates sample selection bias arising from decisions to commission voluntary IERs

The results of the study suggest that IERs have no influence on the returns to shareholders of Target firms. Average returns are not sensitive to the IER state of an offer. The premium across the three IER states ranges from 24.7% to 27.5% (average 26.5%) for the event window [-15, +90].

Analysis of IER opinions on the "fair and reasonable" test and IER valuations relative to the share price of the Target firm do not provide evidence to support the view that IERs are useful in assisting the board of a Target firm to procure an improved offer.

The study finds that determinants of returns are influenced by the IER state (although the quantum of returns is relatively insensitive to the IER state).

A simplified model to investigate returns in the post offer period [+15, +90] finds that the determinants are influenced by the IER state and confirms the significance of the latent variable associated with Target firm selection by the Buyer firm.

For offers involving IERs the significant factors influencing premium were recent share price performance and operating cash flows of the Target firm.

An investigation of sample selection bias and its impact on the determinants of premium produced varied results depending upon the event window.

For event windows with a focus on the pre offer announcement period there is evidence of sample selection bias. Allowance for this bias resulted in the significant factors influencing premium increasing to include the recent performance of the market and the financial resources of the Target firm.

A similar investigation into sample selection bias with a focus on the post offer announcement period (using a revised group of variables) resulted in no evidence to suggest sample selection bias.

The outcome of offers is determined by events occurring during the post offer period. A focus on this period and the use of corresponding event windows presents interesting opportunities for further research.

Table 4.1 Results of returns analysis presented by IER state

This table presents results of analysis of returns to shareholders of Target firms for the three states of IER. Returns are measured over four event windows [-15, +90], [-180, +90], [-15, +15] and [+15, +90] denoted be the suffices i, k, m and n respectively.

Returns are measured using three methods: the 0,1 market model (denoted ARM); the clone model (denoted ARC) and premium (denoted PRE).

No IER denotes offers where no IER was involved. Statutory IER denotes offers where a compulsory IER was involved (in accordance with the Corporations Act). Voluntary IER denotes offers where a voluntary IER was involved (as decided by the board of the Target firm where there was no requirement for a compulsory IER).

Variable	All Offers	No IER	Statutory IER	Voluntary IER
[-15, +90]				
ARMi	23.8%	24.3%	22.3%	24.2%
ARCi	22.9%	24.7%	24.0%	20.1%
PREi	26.8%	27.3%	24.7%	27.5%
[-180, +90]				
ARMk	31.9%	41.1%	22.3%	26.5%
ARCk	37.3%	49.7%	29.6%	27.1%
PREk	40.9%	51.5%	30.4%	34.4%
[-15, +15]				
ARMm	21.9%	19.8%	22.1%	24.2%
ARCm	22.5%	21.4%	23.0%	23.5%
PREm	22.8%	20.4%	23.1%	25.4%
[+15, +90]				
ARMn	1.6%	4.0%	-0.1%	-0.4%
ARCn	0.1%	2.5%	0.7%	-3.2%
PREn	3.7%	6.5%	1.3%	1.7%
Observations	65	28	14	23

Table 4.2 Results of returns analysis presented by IER opinion

This table presents results of analysis of returns to shareholders of Target firms for the three states of IER opinion. Returns are measured over four event windows [-15, +90], [-180, +90], [-15, +15] and [+15, +90] denoted be the suffices i, k, m and n respectively.

Returns are measured using three methods: the 0,1 market model (denoted ARM); the clone model (denoted ARC) and premium (denoted PRE).

In accordance with the Corporations Act and guidelines issued by ASIC, experts are required to prepare an opinion that addresses the offer in terms of being "fair and reasonable". ASIC prescribes three possible outcomes: not fair and not reasonable; not fair but reasonable; and, fair and reasonable.

Variable	Not fair and not reasonable	Not fair but reasonable	Fair and reasonable
[-15, +90]			
ARMi	21.4%	8.4%	31.2%
ARCi	18.6%	27.7%	24.5%
PREi	25.2%	8.5%	33.6%
[-180, +90]			
ARMk	22.3%	1.5%	34.1%
ARCk	18.4%	31.6%	39.5%
PREk	31.4%	6.8%	41.4%
[-15, +15]			
ARMm	23.2%	8.3%	28.6%
ARCm	21.5%	15.0%	29.0%
PREm	24.7%	7.5%	29.6%
[+15, +90]			
ARMn	-1.7%	-0.1%	1.5%
ARCn	-2.5%	16.1%	-5.8%
PREn	0.7%	0.8%	2.9%
Observations	19	3	14

Note: One IER reported "fair but not reasonable". This outcome is not possible under the ASIC guidelines so is not included in the above analysis.

Table 4.3 Results of returns analysis presented by relative valuation finding

This table presents results of analysis of returns to shareholders of Target firms for three valuation states associated with the IER. Returns are measured over four event windows [-15, +90], [-180, +90], [-15, +15] and [+15, +90] denoted be the suffices i, k, m and n respectively.

Returns are measured using three methods: the 0,1 market model (denoted ARM); the clone model (denoted ARC) and premium (denoted PRE).

"Below range" denotes offers where the share price of the Target is below the IER valuation range. "Within range" denotes offers where the share price of the Target firm is within the IER valuation range. "Above range" denotes offers where the share price of the Target firm is above the valuation range. Share price is as the date of the offer announcement (t = 0).

Variable	Below range	Within range	Above range
[-15, +90]			
ARMi	22.3%	24.0%	27.5%
ARCi	23.6%	16.0%	21.3%
PREi	25.9%	26.6%	28.1%
[-180, +90]			
ARMk	16.3%	25.9%	56.5%
ARCk	17.5%	29.8%	66.1%
PREk	25.9%	36.3%	62.6%
[-15, +15]			
ARMm	23.0%	23.5%	24.6%
ARCm	22.6%	25.2%	23.4%
PREm	24.0%	24.9%	26.1%
[+15, +90]			
ARMn	-0.8%	-0.5%	1.9%
ARCn	1.5%	-9.9%	-3.1%
PREn	1.8%	1.1%	1.1%
Observations	23	8	6

Table 4.4 Results of returns analysis for post offer period

This table presents results of analysis of premium for the post offer event window [+15, +90] denoted PREn for the three IER states.

Offers are classified in accordance with four characteristics. Sector (where DSEC = 1 where the Target firm is in the materials materials sector and DSEC = 0 otherwise). Board response (where DRSP = 1 where the board of the Target firm recommends acceptance of the offer and DRSP = 0 otherwise). Offer consideration (where DCSH = 1 where the offer consideration is cash and DCSH = 0 otherwise). Buyer ownership (where DTOE = 1 where the Buyer holds a pre bid ownership interest in the Target firm of more than 5% and DTOE = 0 otherwise).

	% Offers	No IER PREn	Statutory IER PREn	Voluntary IER PREn
Materials sector				
DSEC = 1	28%	2.7%	4.5%	8.8%
DSEC = 0	72%	8.3%	-0.5%	1.7%
Board response				
DRSP = 1	71%	2.0%	1.3%	5.1%
DRSP = 0	29%	26.9%	1.2%	-2.8%
Offer consideration				
DCSH = 1	74%	6.8%	0.7%	-2.3%
DCSH = 0	26%	5.1%	2.7%	9.2%
Buyer ownership				
DTOE = 1	55%	1.7%	1.7%	-4.8%
DTOE = 0	45%	13.9%	-1.0%	4.5%

Table 4.5 Results of univariate analysis of premium in post offer period

This table presents the results of univariate analysis of classification for premium for the post offer event window [+15, +90] denoted PREn.

Offers are classified in accordance with four characteristics. Sector (where DSEC = 1 where the Target firm is in the materials materials sector and DSEC = 0 otherwise). Board response (where DRSP = 1 where the board of the Target firm recommends acceptance of the offer and DRSP = 0 otherwise). Offer consideration (where DCSH = 1 where the offer consideration is cash and DCSH = 0 otherwise). Buyer ownership (where DTOE = 1 where the Buyer holds a pre bid ownership interest in the Target firm of more than 5% and DTOE = 0 otherwise).

In the univariate analysis α is the constant term and β is the coefficient of the variable. For the relationship to be significant both parameters must satisfy the significance test.

Variable		No IER		Statutory IER		Voluntary IER	
		PREn	P > | t |	PREn	P > | t |	PREn	P > | t |
Materials sector							
DSEC = 0	α	8.3%	0.156	-0.5%	0.080 [x]	1.7%	0.130
	β	-5.6%	0.583	5.0%	0.748	7.1%	0.942
DSEC = 1	$\alpha + \beta$	2.7%		4.5%		8.8%	
Board response							
DRSP = 0	α	26.9%	0.014 [v]	1.2%	0.675	-2.8%	0.377
	β	-24.9%	0.035 [v]	0.1%	0.958	7.9%	0.068 [x]
DRSP = 1	$\alpha + \beta$	2.0%		1.3%		5.1%	
Cash offer							
DCSH = 0	α	5.1%	0.647	2.7%	0.337	9.2%	0.008 [v]
	β	1.7%	0.894	-2.0%	0.551	-11.5%	0.007 [v]
DCSH = 1	$\alpha + \beta$	6.8%		0.7%		-2.3%	
Buyer ownership							
DTOE = 0	α	13.9%	0.067 [x]	-1.0%	0.801	4.5%	0.074 [x]
	β	-12.2%	0.203	2.7%	0.530	-9.3%	0.044 [v]
DTOE = 1	$\alpha + \beta$	1.7%		1.7%		-4.8%	

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.6 Results of multivariate returns analysis presented by IER state

This table presents results of multivariate analysis of determinants of premium for the three states of IER. Premium is measured over four event windows [-15, +90], [-180, +90], [-15, +15] and [+15, +15] and is denoted PREi, PREk, PREm and PREn respectively.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets.

	PREi		PREk		PREm		PREn	
	coefficient	P > | t |	coefficient	P > | t |	coefficient	P > | t |	coefficient	P > | t |
All offers								
ARCd	-0.187	0.041 [v]	0.648	0.000 [v]	-0.264	0.000 [v]	0.073	0.221
ASXa	-0.531	0.056 [x]	-0.374	0.405	0.313	0.123	-0.798	0.000 [v]
FCFa	-1.371	0.000 [v]	-2.406	0.000 [v]	-0.297	0.241	-1.041	0.000 [v]
GROa	-0.041	0.024 [v]	-0.056	0.056 [x]	-0.016	0.224	-0.024	0.043 [v]
LEVa	0.009	0.581	0.015	0.551	0.016	0.155	-0.006	0.546
LIQa	0.106	0.779	0.030	0.961	-0.242	0.382	0.301	0.226
SIZd	-0.019	0.401	0.004	0.902	-0.056	0.001 [v]	0.033	0.026 [v]
TBQa	0.081	0.034 [v]	0.053	0.394	0.040	0.149	0.042	0.095 [x]
Constant	0.548	0.000 [v]	0.606	0.014 [v]	0.571	0.000 [v]	-0.010	0.920
P > F		0.001 [v]		0.000 [v]		0.000 [v]		0.000 [v]
R^2		0.358		0.438		0.384		0.473
No IER								
ARCd	-0.078	0.584	0.592	0.032 [v]	-0.279	0.012 [v]	0.120	0.075 [x]
ASXa	-0.056	0.906	1.175	0.185	0.541	0.123	-0.589	0.112
FCFa	-2.452	0.001 [v]	-4.695	0.000 [v]	-0.369	0.395	-1.986	0.000 [v]
GROa	-0.046	0.021 [v]	-0.063	0.074 [x]	-0.013	0.348	-0.031	0.032 [v]
LEVa	0.062	0.127	0.075	0.303	0.014	0.623	0.041	0.180
LIQa	-0.064	0.905	-0.343	0.727	-0.453	0.249	0.308	0.453
SIZd	-0.015	0.817	0.008	0.947	-0.029	0.545	0.019	0.700
TBQa	0.211	0.027 [v]	0.267	0.114	0.021	0.739	0.171	0.019 [v]
Constant	0.480	0.180	0.587	0.364	0.429	0.100 [x]	0.030	0.909
P > F		0.008 [v]		0.013 [v]		0.099 [x]		0.001 [v]
R^2		0.618		0.593		0.459		0.725

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.6 continued

	PREi		PREk		PREm		PREn	
	coefficient	P > | z |	coefficient	P > | z |	coefficient	P > | z |	coefficient	P > | z |
Statutory IER								
ARCd	-0.495	0.351	1.357	0.031 [v]	-0.634	0.190	0.109	0.421
ASXa	-0.056	0.937	-0.015	0.982	0.178	0.772	-0.191	0.319
FCFa	-3.011	0.317	1.797	0.514	-2.880	0.276	-0.058	0.937
GROa	-0.061	0.743	-0.373	0.076 [x]	0.061	0.709	-0.104	0.071 [x]
LEVa	-0.049	0.665	0.223	0.077 [x]	-0.066	0.510	0.014	0.643
LIQa	-0.505	0.670	0.183	0.869	-0.683	0.514	0.142	0.643
SIZd	-0.108	0.190	-0.036	0.621	-0.110	0.137	0.002	0.900
TBQa	0.149	0.106	-0.072	0.359	0.147	0.075 [x]	0.002	0.921
Constant	1.219	0.142	0.273	0.697	1.170	0.113	0.029	0.877
P > F		0.638		0.191		0.502		0.478
R^2		0.557		0.784		0.627		0.639
Voluntary IER								
ARCd	-0.437	0.038 [v]	0.632	0.058 [x]	-0.278	0.084 [x]	-0.133	0.124
ASXa	-0.944	0.164	-0.725	0.493	-0.026	0.959	-0.811	0.010 [v]
FCFa	-0.848	0.420	-2.132	0.211	0.093	0.909	-0.819	0.079 [x]
GROa	0.057	0.800	-0.299	0.413	0.049	0.778	0.016	0.867
LEVa	-0.016	0.577	0.008	0.861	0.001	0.972	-0.012	0.308
LIQa	2.307	0.050 [v]	1.220	0.492	1.156	0.192	0.965	0.054 [x]
SIZd	0.001	0.974	0.064	0.361	-0.068	0.060 [x]	0.059	0.005 [v]
TBQa	0.070	0.688	0.081	0.773	0.015	0.915	0.045	0.546
Constant	0.325	0.292	0.112	0.817	0.626	0.018 [v]	-0.252	0.066 [x]
P > F		0.124		0.062 [x]		0.044 [v]		0.076 [x]
R^2		0.533		0.590		0.616		0.574

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.7 Results of multivariate returns analysis for the [-15, +90] event window

This table presents results of multivariate analysis of determinants of premium for the three states of IER. Premium is measured over the event window [-15, +90] and is denoted PREi.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets.

	All offers		No IER		Statutory IER		Voluntary IER	
	coefficient	P > | z |	coefficient	P > | z |	coefficient	P > | z |	coefficient	P > | z |
ARCd	-0.187	0.041 [v]	-0.078	0.584	-0.495	0.351	-0.437	0.038 [v]
ASXa	-0.531	0.056 [x]	-0.056	0.906	-0.056	0.937	-0.944	0.164
FCFa	-1.371	0.000 [v]	-2.452	0.001 [v]	-3.011	0.317	-0.848	0.420
GROa	-0.041	0.024 [v]	-0.046	0.021 [v]	-0.061	0.743	0.057	0.800
LEVa	0.009	0.581	0.062	0.127	-0.049	0.665	-0.016	0.577
LIQa	0.106	0.779	-0.064	0.905	-0.505	0.670	2.307	0.050 [v]
SIZd	-0.019	0.401	-0.015	0.817	-0.108	0.190	0.001	0.974
TBQa	0.081	0.034 [v]	0.211	0.027 [v]	0.149	0.106	0.070	0.688
Constant	0.548	0.000 [v]	0.480	0.180	1.219	0.142	0.325	0.292
P > F		0.001 [v]		0.008 [v]		0.638		0.124
R^2		0.358		0.618		0.557		0.533

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.8 Results of univariate analysis of premium for the post offer period

This table presents the results of a univariate analysis for each variable for the event window [+15, +90]. The dependent variable PRE (premium) is returns calculated from unadjusted stock price performance for the event window.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). SIZd is natural log enterprise value. TANa is plant property equipment divided by total assets (3 year average). TBQa is Tobin's q, enterprise value divided by total assets.

DSEC, DRSP, DCSH and DTOE are dummy variables for sector, board response, cash consideration and Buyer pre bid ownership respectively. LambdaT is the latent variable generated by the Heckman selection model as applied to Target firms.

A positive coefficient suggests a positive influence on premium.

	Coefficient	P > | t |
ARCd	0.052	0.469
ASXa	-0.532	0.009 [v]
FCFa	-0.798	0.001 [v]
GROa	-0.006	0.686
LEVa	-0.011	0.280
LIQa	0.368	0.106
SIZd	0.000	0.763
TANa	0.217	0.000 [v]
TBQa	0.009	0.737
DSEC	0.013	0.792
DRSP	-0.031	0.513
DCSH	-0.038	0.439
DTOE	-0.072	0.093 [x]
LambdaT	-0.238	0.004 [v]

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.9 Results of multivariate returns analysis for the post offer period

This table presents results of multivariate analysis of determinants of premium for the event window [+15, +90] for the three different IER states.

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). TANa is plant property equipment divided by total assets. DTOE is a dummy variable = 1 for offers where a pre bid toehold is present. LambdaT is the latent variable generated by the Heckman selection model as applied to Target firms.

	All offers		No IER		Statutory IER		Voluntary IER	
	coefficient	P > | t |	coefficient	P > | t |	coefficient	P > | t |	coefficient	P > | t |
ASXa	-0.561	0.001 [v]	-0.111	0.749	-0.096	0.552	-0.621	0.027 [v]
FCFa	-0.884	0.000 [v]	-1.538	0.000 [v]	0.302	0.534	-0.399	0.117
TANa	0.075	0.176	0.153	0.188	0.044	0.456	-0.039	0.576
DTOE	-0.033	0.297	-0.042	0.478	0.037	0.512	-0.110	0.020 [v]
LambdaT	-0.262	0.001 [v]	-0.323	0.039 [v]	-0.111	0.362	-0.164	0.078 [x]
Constant	0.492	0.000 [v]	0.580	0.019 [v]	0.065	0.655	0.374	0.019 [v]
P > F		0.000 [v]		0.000 [v]		0.821		0.073 [x]
R^2		0.516		0.733		0.209		0.422

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Table 4.10 Results of Heckman analysis for the [-15, +90] event window

This table presents results of Heckman sample selection analysis of determinants of premium. Premium is measured the event window [-15, +90] and is denoted PREi.

ARCd is abnormal returns measured using the clone model for the period [-180, -15]. ASXa is the performance of the ASX200 Index for the period [-360, 0]. FCFa is EBITA divided by total assets (3 year average). GROa is revenue growth per annum (2 year average). LEVa is net debt divided by net assets (3 year average). LIQa is cash divided by total assets (3 year average). PREc is premium for the period [-15, 0]. SIZd is natural log enterprise value. TBQa is Tobin's q, enterprise value divided by total assets. DSEC is a dummy variable =1 for offers for Target firms in the materials sector, DRSP is a dummy variable = 1 for offers recommended by board of the Target firm, DCSH is a dummy variable = 1 for cash offers and DTOE is a dummy variable = 1 for offers where a pre bid toehold is present. LambdaT is the latent variable generated by the Heckman selection model as applied to Target firms (see Stewart (2008b)).

A positive sign on the coefficient indicates that an increase in the corresponding variable increases the level of return as measured.

	All offers		IER only		VIER only	
	coefficient	P > | z |	coefficient	P > | z |	coefficient	P > | z |
base model						
ARCd	-0.519	0.026 [v]	-0.454	0.038 [v]	-0.262	0.411
ASXa	-0.266	0.352	-0.601	0.149	-0.973	0.161
FCFa	-1.581	0.014 [v]	-1.289	0.087 [x]	-0.296	0.820
GROa	-0.017	0.439	-0.030	0.764	0.052	0.820
LEVa	0.029	0.460	0.009	0.709	-0.032	0.389
LIQa	0.741	0.228	1.037	0.120	2.193	0.069 [x]
SIZd	-0.085	0.078 [x]	-0.052	0.289	0.042	0.562
TBQa	0.078	0.206	0.055	0.292	0.054	0.765
LambdaT	1.701	0.007 [v]	-0.415	0.309	0.443	0.480
Constant	-0.699	0.057 [x]	1.200	0.122	-0.456	0.690
selection equation						
ASXa			0.865	0.591	-0.206	0.902
PREc			0.592	0.544	0.234	0.817
DSEC			-0.138	0.703	-0.496	0.246
DRSP			-0.702	0.076 [x]	-0.573	0.136
DCSH			-0.615	0.113	-0.578	0.154
DTOE			-0.085	0.800	-0.948	0.007 [v]
Constant			1.023	0.078 [x]	1.013	0.090 [x]
regression equation						
ARCd			-0.443	0.019 [v]	-0.283	0.239
ASXa			-0.759	0.078 [x]	-1.073	0.092 [x]
FCFa			-1.336	0.025 [v]	-0.379	0.653
GROa			-0.053	0.519	0.076	0.581
LEVa			0.008	0.679	0.014	0.675
LIQa			1.315	0.018 [v]	1.236	0.186
SIZd			-0.047	0.285	-0.015	0.784
TBQa			0.039	0.380	-0.099	0.500
LambdaT			-0.444	0.176	-0.151	0.751
Constant			1.415	0.027 [v]	1.011	0.285
LambdaIER			-0.297	0.061 [x]		
LambdaVIER					-0.298	0.036 [v]
P > chi^2				0.033 [v]		0.071 [x]

[v] Denotes significance at 5% level
[x] Denotes significance at 10% level

Chapter 5 Conclusion

Takeovers represent one part of the market that facilitates change in the corporate ownership of assets and in recent years the level of takeover activity in Australia has been at record highs. Within the context of takeovers, many studies have been undertaken to assess the returns to shareholders of Target firms and of Buyer firms.

These studies provide clear evidence that shareholders of Target firms receive substantial economic benefits. However, there has been little research on the characteristics of Target firms forming the basis of their attraction as acquisitions to Buyer firms or on the determinants of the premium paid by Buyer firms. This absence of research is especially noticeable in the context of Australian financial markets.

The focus of the three papers in this thesis is on Target firms and the returns to their shareholders. The papers address: the characteristics of Target firms and the likelihood of takeover; the determinants of premium paid by the Buyer firm; and, the influence of IERs on premium.

This study represents original research in several aspects.

It compiles comprehensive information in relation to returns to shareholders of Target firms and the involvement of IERs in successful takeovers in the Australian market for the period 1997 to 2007.

It focuses on material transactions involving medium and large sized firms, thus eliminating potential distortion of results arising from the presence of a large number of small firms exhibiting spurious performance characteristics.

In contrast, previous studies in Australia incorporate all Target firms regardless of size. Given the disproportionately high number of small firms within the sample of Target firms (a characteristic consistent with the profile of firms listed on the Australian Securities Exchange) it is important to apply a size filter to the sample to prevent the obfuscation of bona fide data.

It develops a takeover likelihood model representing the first application of this type of analysis in Australia.

It develops an improved method to measure abnormal returns. Following suggestions from Barber and Lyon (1997) intended to address inherent weaknesses in the market model, the matched clone model calculates abnormal returns of Target firms with reference to the performance of three peer companies of similar size within the same sector as the Target firm.

It utilizes Heckman sample selection analysis to investigate the presence and effects of sample selection bias in the determination of factors that influence premium. The author believes this is the first application of Heckman analysis to takeovers and the assessment of returns.

In the first paper (Chapter 2) the analysis suggests several factors associated with a firm influence the likelihood of it becoming a takeover target. The most persistent and significant factors relate to stock price performance and asset efficiency. The results are consistent with theories addressing the scope for Buyer firms to create value from the acquisition of Target firms.

However, the model is not robust over time. The extent and identity of significant factors and the significance of the model itself varies across time. The incorporation of factors not related to the Target firm (such as macroeconomic factors) may improve robustness and represents an area for further research.

The second paper (Chapter 3) addresses an investigation of the returns to shareholders of Target firms and the factors that influence the premium paid by Buyer firms.

The results confirm that shareholders of Target firms receive substantial economic benefits from offers. The average abnormal return for the [-15, +90] event window is 23.5% and 22.9% respectively using the market model and the matched clone model. For the same event window the average premium is 26.8%.

Lower premiums are associated with offers where the consideration is cash and with offers where the Buyer firm has a pre bid interest in the Target firm in excess of 5%.

In relation to factors that influence premium, the results suggest that pre bid financial and stock price performance of the Target firm and equity markets have a negative influence on premium and the ratio of market to book value of the Target firm has a positive influence.

The sample comprising Target firms is not a random sample. Its composition is determined by the decisions of Buyer firms to acquire firms (that become Target firms) by way of a takeover.

Heckman sample selection analysis indicates the presence of sample selection bias. Allowance for this effect changes the variables of significance that influence premium to pre bid stock price performance and cash flow of the Target firm and the size of the Target firm.

The third paper (Chapter 4) addresses the influence of IERs on the returns to shareholders of Target firms.

The results suggest that IERs have no influence on the returns to shareholders of Target firms. This is an interesting result given the regulatory purpose of IERs and, in contested offers, the use of IERs by boards of Target firms as part of their defense strategy intended to improve the outcome for their shareholders.

Although the level of returns is not influenced by the presence of IERs the determinants of returns are influenced by IER state (voluntary IER or statutory IER or no IER).

For offers involving IERs the significant factors influencing premium were recent share price performance and operating cash flows of the Target firm.

The sample comprising Target firms subject to offers involving a voluntary IER is not a random sample. Its composition is determined by the decisions of the boards of Target firms to commission the preparation of an IER.

An investigation of sample selection bias and its impact on the determinants of premium produced varied results depending upon the event window. For event windows with a focus on the pre offer announcement period there is evidence of sample selection bias. Allowance for this bias resulted in additional significant factors influencing premium related to the recent performance of the market and the financial resources of the Target firm.

This thesis makes a significant contribution to the literature on takeovers in Australia. Aspects of the analysis and its innovations are transferable to other markets and this presents opportunities for future research. The results improve our understanding of takeover activity in Australia and also suggest areas for future research within the local market.

References

Alcalde, N. and Espitia, M. (2003), "The characteristics of takeover targets: the Spanish experience 1991 to 1997"*Journal of Management and Governance*, 7, pp1-26

Ambrose, B. W. and Megginson, W. L. (1992), "The role of asset structure, ownership structure, and takeover defences in determining acquisition likelihood" *Journal of Financial and Quantitative Analysis*, 27 (4), pp575-589

Anderson, D., Haynes, A. and Heaney, R. (1994), "Company takeovers and equity returns: the target size effect" *Australian Journal of Management*, 19, pp1-29

Barber, B. M. and Lyon, J. D. (1997), "Detecting long run abnormal stock returns: the empirical power and specification of test statistics" *Journal of Financial Economics*, 43, pp341-372

Barber, B. M., Lyon, J. D. and Tsai, C. (1999), "Improved methods for tests of long run abnormal stock returns" *Journal of Finance*, 54 (1), pp165-201

Bishop, S., Dodd, P. and Officer, R. R. (1987), "Australian takeovers: the evidence" The Centre for Independent Studies St Leonards NSW Australia

Bradley, M., Desai, A. and Kim, E. H. (1988), "Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms" *Journal of Financial Economics*, 21, pp3-40

Brown, P. and da Silva Rosa, R. (1998), "Research method and the long run performance of acquiring firms" *Australian Journal of Management*, 23, pp23-38

Bruner, R. (2001), "Does M&A pay? a survey of evidence for the decision maker" Working Paper Darden Graduate School of Business, University of Virginia

Bugeja, M. (2004), "Independent expert reports and takeovers" PhD thesis, University of Sydney

Bugeja, M. (2005), "Effect of independent expert reports in Australian takeovers" *Accounting and Finance*, 45, pp519-536

Bugeja, M. (2006), "Independent expert valuations in takeovers: are they biased" *Australian Accounting Review*, July, pp19-24

Bugeja, M. (2007), "Voluntary use of independent valuation advice by target firm boards in takeovers" *Pacific Basin Finance Journal*, 15, pp368-387

Bugeja, M. and Walter, T. (1995), "An empirical analysis of some determinants of the target shareholder premium in takeovers" *Accounting and Finance*, November, pp33-60

D'Aloisio, T. and Crutchfield, P. (1989), "The requirements for experts' reports in takeovers and corporate reconstructions" *Company and Securities Law Journal*, August, pp249-261

da Silva Rosa, R. and Walter, T. (2004), "Australian mergers and acquisitions since the 1980s: what do we know and what remains to be done" *Australian Journal of Management*, 29, pp(i)-(xii)

Dennis, D. and McConnell, J. (1986), "Corporate mergers and security returns" *Journal of Financial Economics*, 16, pp143-187

Dodd, P. (1976), "Company takeovers and the Australian equity market" Australian Journal of Management, 12, pp15-35

Eddey, P. H. (1993), "Independent expert's reports in takeover bids" *Accounting and Finance*, May, pp1-18

Eger, E. (1983), "An empirical analysis of the redistribution effect in pure exchange mergers" *Journal of Financial and Quantitative Analysis*, 18, pp547-572

Green, J. (1991), Expert Adviser, Freehill Hollingdale and Page

Franks, J. and Mayer, C. (1996), "Hostile takeovers and the correction for managerial failure" *Journal of Financial Economics*, 40, pp163-181

Hansen, A., Taylor, C. and Licciardello, C. (2006), "Lifting the lid – uncovering hidden returns" Working Paper Chaser Publishing, Sydney

Hasbrouck, J. (1985), "The characteristics of takeover targets: q and other measures" *Journal of Banking and Finance*, 9, pp351-362

Healy, P., Palepu, K. and Ruback, R. (1992), "Does corporate performance improve after mergers" *Journal of Financial Economics*, 31, pp135-175

Heckman, J. (1976), "The common structure of statistical models of truncation, sample selection, and limited dependent variables and a simple estimator for such models" *The Annals of Economic and Social Measurement*, 5, pp475-492

Heckman, J. (1979), "Sample selection bias as a specification error" *Econometrica*, 47, pp153-161

Jensen, M. C. (1986), "Agency costs of free cash flow, corporate finance and takeovers" *American Economic Review*, 76, pp323-329

Kaplan, S. and Weisbach, M. (1992), "The success of acquisitions: evidence from divestitures" *Journal of Finance*, 47, pp107-138

Kennedy, V. A. and Limmack, R. J. (1996), "Takeover activity, CEO turnover, and the market for corporate control" *Journal of Business Finance & Accounting*, 23 (2), pp267-293

Keown, A. and Pinkerton, J. (1981), "Merger announcements and insider trading activity: an empirical investigation" *Journal of Finance*, 36, pp855-869

Kim, K., Henderson, G. V. and Garrison, S. H. (1993), "Examination of Tobin's Q for takeover firms" *Quarterly Journal of Business and Economics*, 32 (1), pp3-27

Lang, L., Stulz, R. and Walkling, R. (1991), "A test of the free cash flow hypothesis: the case of bidder returns" *Journal of Financial Economics*, 29, pp315-335

Levine, P. and Aaronovitch, S. (1981), "The financial characteristics of firms and theories of merger activity" *Journal of Industrial Economics*, 30, pp149-172

Manne, H. G. (1965), "Mergers and the market for corporate control" *Journal of Political Economy*, 73, pp110-120

Martin, K. and McConnell, J. (1991), "Corporate performance, corporate takeovers and management turnover" *Journal of Finance*, 46, pp671-687

Martynova, M. and Renneboog, L. (2005), "Takeover waves: triggers, performance and motives" Working Paper ECGI Finance, Tilburg University

Matolcsy, Z. (1982), "The evaluation of independent expert's advice on takeover offers: an economics finance perspective" *Australian Business Law Review*, April, pp99-104

Mickelson, W. and Ruback, R. (1985), "An empirical analysis of the interfirm equity investment process" *Journal of Financial Economics*, 14, pp523-554

Morck, R. (1989), "Alternative mechanisms for corporate control" *American Economic Review*, 79 (4), pp96-104

Mulherin, J.H. and Boone, A.L. (2000), "Comparing acquisitions and divestitures" *Journal of Corporate Finance*, 6, pp117-139

Palepu, K. G. (1986), "Predicting takeover targets: a methodological and empirical analysis" *Journal of Accounting and Economics*, 8, pp3-35

Powell, R. G. (1997), "Modelling takeover likelihood" *Journal of Business Finance and Accounting*, 24 (7 and 8), pp1009-1030

Powell, R. G. (2001), "Takeover prediction and portfolio performance: a note" *Journal of Business Finance & Accounting*, 28 (7 and 8), pp993-1011

Powell, R. G. and Thomas, H. M. (1994), "Corporate control and takeover prediction" Working Paper Department of Accounting and Financial Management, University of Essex

Rau, R. P. and Vermaelen, T. (1998), "Glamour, value and the post acquisition performance of acquiring firms" *Journal of Financial Economics*, 49, pp223-253

Schwert, G. W. (1996), "Markup pricing in mergers and acquisitions" *Journal of Financial Economics*, 41, pp153-162

Simkowitz, M. and Monroe, R. J. (1971), "A discriminant analysis function for conglomerate targets" *Southern Journal of Business*, November, pp1-16

Smith, R. and Kim, J. (1994), "The combined effects of free cash flow and financial slack on bidder and target stock returns" *Journal of Business*, 67, pp281-310

Stewart, M. J. (2008a), "Characteristics of target firms and modeling takeover likelihood" Chapter 2 PhD thesis School of Finance and Applied Statistics, Australian National University

Stewart, M. J. (2008b), "Returns to shareholders of target firms" Chapter 3 PhD thesis School of Finance and Applied Statistics, Australian National University

Stewart, M. J. (2008c), "Independent expert reports and the influence on returns to shareholders of target firms" Chapter 4 PhD thesis School of Finance and Applied Statistics, Australian National University

Stulz, R. M. and Johnson, H. (1985), "An analysis of unsecured debt" *Journal of Financial Economics*, 14, pp501-521

Walter, T. (1984), "Australian takeovers: capital market efficiency and shareholder risk and return" *Australian Journal of Management*, 9, pp63-118