THE FINANCIAL PROFILES OF TAKEOVER TARGET FIRMS AND THEIR TAKEOVER PREDICTABILITY: AUSTRALIAN EVIDENCE

Shu Wen Cai*, Balasingham Balachandran**, Michael Dempsey*

Abstract

We investigate those features of Australian firms that make them likely takeover targets. To this end, we apply a logit probability model similar to the one developed by Palepu (1986). Our findings reveal that takeovers are most likely to be motivated by market under-valuation combined with high levels of tangible assets. Takeover targets may also be financially distressed with high levels of leverage and low liquidity, and may exhibit declining sales growth with decreasing profitability. Notwithstanding these insights, we find that the prediction models are unable to provide abnormal returns with a high statistical significance, thereby lending support to market efficiency.

Keywords: corporate takeovers, takeover predictability, Palepu model

*Department of Accounting and Finance, Monash University
**Graduate School of Management, La Trobe University
***Department of Accounting and Finance, Monash University, 900 Dandenong Road, Melbourne, VIC 3145, Australia
Tel: (61) 3 9903 4543
Fax: (61) 3 9903 2422
Email: michael.dempsey@monash.edu.au

1. Introduction

Our findings here support Australian findings that takeovers are motivated by firm-specific factors. More specifically, we confirm that market under-valuation of the firm combined with high levels of tangible assets significantly increase the likelihood of receiving a takeover offer. Additionally, takeover targets tend to be financially distressed with high levels of leverage and low liquidity. Target firms tend also to exhibit a trend of declining sales growth and decreasing profitability.

Studies of Australian takeovers suggest an abnormal stock price return for the target firm as high as 25% in the month of the takeover. A second focus of the paper then becomes, Are we able to outperform the market by investing in those firms most likely to become targets on the basis of their characteristics (as determined above)? Palepu (1986) is perhaps the most quoted article in the literature of takeover prediction models. Here, we apply Palepu's model to investigate the characteristics of takeover targets in an Australian context. We also apply the model in combination with Powell's (2001) version aimed at achieving abnormal returns in the Australian stock market. We find that although we generate a quite high positive abnormal return, it is nevertheless without high statistical significance. This is due to the large number of non-target firms incorrectly classified as takeover targets by the model. The fact that the prediction models are unable to provide abnormal returns with statistical significance is interpreted as lending support for market efficiency.

Our paper is also motivated by the fact that much of the academic literature on takeover activity is still disputed. Debate even surrounds the issue of whether takeovers are beneficial. Do they, for example, provide the means by which synergy between firms is acquired, or the mechanics by which underperforming firms are disciplined? Or, alternatively, are they prompted by the self-interests of a minority of managers seeking self-aggrandizement along with financiers seeking immediate financial reward? Our paper is aimed at lending a degree of closure to these questions.

The rest of the paper is organized as follows. The following Section 2 presents a background to the paper in the context of the Australian literature. Section 3 presents the research design and methodology for the paper. Section 4 examines the financial factors that appear to make a firm more likely to be taken over. Section 5 examines the ability of a model based on such factors to earn excess returns. Section 6 concludes.

2. Background

Well-examined motivations for companies engaging in corporate acquisitions include: the exploitation of synergies between firms – for example, providing a complementary fit between targets and acquiring companies where there is a growth and a resource

mismatch (Palepu, 1986; Camerlynck et al. 2005); the takeover as an effective control mechanism that ensures that management that fails to maximise shareholder wealth is replaced (Jensen and Runback, 1983; Palepu, 1986); and managers' pursuance of their own interest, leading to agency problems (Powell and Yawson, 2007). The first two motivations imply that the acquisition is motivated by the target firm revealing itself as a realistic opportunity to the acquiring firm; while the third offers a motive detrimental to the firm. Takeover bids may also be an outcome of the acquiring firm's sense of confidence in its own higher-performance, which it wishes to extend, so that it selects ill-advised targets or over-pays for them. Evidence for such is reported in the Australian markets by Walter (1984), Casey, Dodd and Dolan (1987), Bishop, Dodd and Officer (1987) and da Silva Rosa and Walter (2004) who document that although bidders tend to have been abnormally successful prior to the takeover announcement, positive abnormal returns thereafter actually accrue to the *unsuccessful* bidders. In Bishop, Dodd and Officer's (1987) study, for example, unsuccessful bidders experience large positive abnormal returns well before the takeover offer and, in contrast to successful bidders, continue to earn abnormal returns after the announcement month. Walter (1984) states, "this adjustment is consistent with the hypothesis that identification or confirmation of a firm as an offeror is, on average, viewed as a disappointment" (p. 84).

Roll (1986) indicates that, in contrast to the acquiring firm, target firms *under*-perform in the pre-bid period. This is confirmed in the Australian context by Brown and da Silva Rosa (1998) who consider that a potential reason why target firms under-perform is that their management is not subject to effective oversight by shareholders, perhaps because the shareholders are widely dispersed and individually lack the incentive to expend effort on monitoring. In these cases, takeovers add value by realigning the interests of management and shareholders. This is corroborated by Walter (1984), Bishop, Dodd and Officer (1987), and Da Silva Rosa and Walter (2004) who conclude that takeovers help allocate capital to more valued uses.

The overwhelming weight of evidence is that target shareholders are the ones who gain substantially from a successful takeover. For example, in an early study of corporate takeover activity, Dodd (1976) reports a mean abnormal return of 25% to target firms in the month of announcement that is consistent with the results from later, more comprehensive studies by Walter (1984), Bishop, Dodd and Officer (1986), Anderson, Haynes, and Heaney (1994), Bugeja and Walter (1995) and Brown and da Silva Rosa (1998). Bugeja and Walter (1995) report the average cumulative abnormal return for Australian target firms as 16.0% over the period from sixty days prior to one day after the takeover announcement. Murray (1994) analyzing the trading volume of 60 Australian target firms over the pre-bid period, argues that market speculation surrounding takeovers is responsible for much of the price run-up in the pre-announcement period (as opposed to leakage of insider information as suggested for example by the US study by Keown and Pinkerton, 1981).

Share prices of firms react positively to the takeover announcement itself (for example, Goergen and Renneboog, 2004 in Europe; Keown and Pinkerton, 1981, Gaspar et al. 2005 in the US; Danbolt, 2004 in the UK; and Bugeja, 2005 in Australia), as well as continuing to increase from the takeover announcement through to the deal completion (Jensen and Runback, 1983). The share price premium that accrues to the target shareholders makes the ability to pick takeover targets successfully in advance of the takeover announcement attractive from an investment perspective. A limited number of studies have explored the characteristics (and thereby the determinants) of takeover targets (Hasbrouck, 1985; Higson and Elliott, 1993; Holland and Hodgkinson, 1994; Shleifer and Vishny, 2003; Rossi and Volpin, 2004; Powell and Yawson, 2007). Palepu (1986) proposes a logit probability model with nine independent variables for the estimation of a firm's acquisition likelihood. These variables are specified on the basis of six hypotheses associated with a firm's acquisition, namely, (1) inefficient management, (2) mismatch between growth and financial resources, (3) sector classification, (4) small size, (5) low market equity to book values, and (6) low price to earnings values. A number of empirical studies have built on Palepu's (1986) paradigm to investigate the accuracy of the takeover prediction model, mostly in the context of the US (Ambrose and Megginson, 1992; Walter, 1994; Cudd and Duggal, 2000) and Europe (Brar et al., 2009; in the UK: Powell, 1997, 2001; Barnes, 1999). The evidence, however, is far from reaching a consensus as to either the factors that determine the likelihood of takeover, or the ability of models with trading strategies based on such factors to earn abnormal returns.

A number of Australian studies examine the wealth impact of takeovers on both acquirers and the takeover target firm pre and post acquisition (for example, Bugeja and Walter, 1995; Brown and da Silve Rosa, 1997; Sharma and Ho, 2002; Hyde, 2002; Maheswaran and Pinder, 2005; Le and Schultz, 2007). The determinants of the overall level of takeover activity in Australia have been examined by Finn and Hodgson (2005), who conclude that aggregate takeover activities have typically been driven by fundamental economic factors rather than by speculative behaviors. The likelihood of takeover bid success in Australia has been examined by Henry (2005), who develops a model of share ownership, corporate governance and takeover-offer characteristics in the context of 440 Australian takeover bids during the period 1991-2000. The

variables incorporated in the model (target company size, market-equity-to-book-value ratio and pre-bid performance of target companies) are those typically advanced in the literature as influential to the likelihood of a firm receiving a takeover bid.

3. Research design and method

Our primary source consists of announcements of corporate takeover bids for Australian public companies as listed on the Australian stock exchange in the period 2001-2007. A takeover bid is defined as occurring when a bidding firm attempts to acquire greater than 50% of share ownership in a takeover target post acquisition. The sample of firms in our study constitutes an "estimation" and a "verification" sample. The "estimation" sample is used to estimate the takeover prediction model and consists of those companies that received an ultimately successful takeover bid in the period 2001-2006, together with non-takeover target firms matched on a target firm's size (market capitalization) over the same period; the "verification" sample used to test the model's predictive ability contains the population of target and non-target firms in year 2007.[1]

An initial sample of 177 takeover bids for the period 2001-2006 was obtained from the Zephyr and Bloomberg database. Of these, 103 takeovers were subsequently completed and thus retained in the sample. To estimate the acquisition likelihood model, we require a group of non-target firms. An initial sample of 1,070 non-target firms was identified from the Osiris data base (firms that were incorporated after 2003 were excluded from the sample due to the requirement of up to four years of company sales data prior to the year of takeover announcement). Of these, 263 firms were selected as an outcome of being matched on size with a takeover target firm. The same data bases are used to form the "verification" sample of 41 target and 404 non-target firms.[2] The compositions of the samples are summarized in Table 1.

We employ a logit model consistent with Palepu (1986) to develop an acquisition likelihood model. The functional relationship between the firm characteristics and its acquisition likelihood is:

$$p(i,t) = \frac{1}{1+e^{-\beta.X(i,t)}} \quad (1)$$

Where $p(i,t)$ = the probability that firm i will be acquired in the period t, $X(i,t)$ = a vector of measured attributes of firm i (in the period t), and β = a vector of unknown parameters to be estimated.

The parameters of the model can be estimated against the known probabilities either 0 (a non-target firm) or 1 (a target firm) using a maximum likelihood estimation method as in Eview (Version 6). However, the probability that a firm is selected into the sample is dependent on whether or not it is a takeover target. This clearly leads to biased and incorrect inferences unless correct adjustments are made. Palepu (1986) shows that the correct adjustment to the determination of the β factors is to maximize the function:

$$p^*(i,t) = \frac{1}{1+e^{\ln(\alpha)-\beta.X(i,t)}} \quad (2)$$

where p^* = the probability that firm i is a target (0 or 1) *given its inclusion in the "estimation" sample*, and α = the proportion of non-targets that are retained in the sample (in our case, $\ln(\alpha) = \ln(263/1070) = -1.403$). The vector $X(i,t)$ of firm attributes closely follows Palepu (1986) and is presented in Table 2. These variables are specified on the basis of hypotheses associated with a firm's acquisition, namely, (1) inefficient management, (2) mismatch between growth and financial resources, (3) sector classification as likely subject to either economic or technological impact, (4) small size, (5) low market equity to book values, and (6) low price to earnings values. We consider two versions of the variables, namely the *average* value of the variables, over the period of three years prior to one year prior to the takeover announcement, and the *percentage change* in the value over the same period.

To test the predictive ability of the model, we require a cut-off probability such that firms whose probability of takeover is deemed to be greater that the cut-off are selected as investments. In Palepu (1986), the cut-off probability is determined as the probability that minimizes the overall classification errors, which is obtained by plotting the percentages of both the 103 target and 263 non-target firms in each of ten probability intervals and observing where the two graphs intersect. Probabilities higher than the cut-off probability have increasing higher percentages of the actual target firms and decreasing percentages of the actual non-target firms.

[1] We choose size-matched firms in the first instance to ensure that comparisons of financial attributes across firms are not distorted by an underlying comparison on size (Hasbrouck, 1985). Notwithstanding, the comparisons turn out to be robust to such a possibility, as confirmed below in a robustness test (footnote 8).

[2] To be included in the sample, a firm must have the required accounting data up to three years prior to the year of takeover announcement. Financial firms are excluded so as to avoid distortion by the financial ratios of companies within this sector. We also restrict the study to takeovers that involve listed Australian target firms with deal value exceeding AUD 20 millions. We do not differentiate the deals in our sample into hostile and friendly takeovers. The financial data for all the firms were collected from Fin Analysis, while the share price information was obtained from DataStream.

Table1. Composition of the sample firms

Both the target and non-target firms belonging to the non-financial industries are listed on the Australian stock exchange. Takeovers were identified from Zephyr and Bloomberg databases.

Estimation sample	
Year	**Number of acquired target firms**
2001	11
2002	11
2003	19
2004	19
2005	18
2006	25
Total targets	103
Size-matched firms not acquired	263
Total sample	366
Verification sample	
41 target firms and 404 non-target firms	
Total sample	445

Table 2. Explanatory variables for target takeover firms

(1) Price run-up	The stock return of the firm computed over a period from three years prior to one year prior to the takeover announcement.
(2) Return on equity (ROE)	The firm's ratio of net profit after tax (before abnormal items) to shareholders' equity, averaged over the period of three years prior to one year prior to the takeover announcement.
(3) Earnings per share (EPS)	The firm's ratio of net profit after tax (before abnormal items and less outside equity interests and preference dividends) to number of shares outstanding during the year, averaged over the period of three years prior to one year prior to the takeover announcement.
(4) Sales growth	The annual rate of change in the firm's sales, averaged over a period of three years prior to one year prior to the takeover announcement. The measure is interpreted as a proxy for the firm's overall growth.
(5) Leverage	The average annual long term debt to equity ratio for the firm from three years prior to one year prior to the takeover announcement.
(6) Liquidity ratio	The annual total cash to asset ratio of the firm averaged over the period of three years prior to one year prior to the takeover announcement.
(7) Market-equity-to-book value (MTB)	The market value net of total liability to book value of assets of the firm at the end of the fiscal year immediately preceding the takeover announcement.
(8) Tangible assets ratio	The net total tangible assets (property, plant and equipments) to total assets of the firm at the end of the fiscal year immediately preceding the takeover announcement.
(9) Market capitalization	Market capitalization is the firm's market equity value in the year prior to the takeover announcement, measured in thousands.

Powell (2001) on the other hand, suggests that since the objective of the prediction model is to maximise the abnormal returns of a portfolio, the optimal classification rule should be to maximize the proportion of takeover target firms in the portfolio rather than to minimize the classification errors. This is achieved by ranking the takeover probabilities in ten ascending intervals as in the Palepu method, and computing the *concentration* ratio of takeover targets (number of takeover targets divided by total firms in the interval) within each interval. The optimal minimum cut-off probability is then determined as the lower probability of the probability interval which has the highest concentration ratio.

The investment portfolio is constructed (at start-2007) as those firms with takeover probability greater than the cut-off probability. The buy and hold abnormal return (*BHAR*) obtained by holding this portfolio is calculated over three and twelve months periods as:

$$BHAR = BHR - BHRM \quad (3)$$

where *BHR* is the buy-and-hold return for the portfolio and *BHRM* is the buy-and-hold return for a matching portfolio over the same period, formed on firm size (market capitalization) and market-to-book ratio (following Barber and Lyon, 1997; also, Kothari and Warner, 1997). The 25 size and market-to-book matched control portfolios were formed by intersecting 5 size and 5 market-to-book quintiles from 1,343 selected firms at the financial year end 2006.[3]

4: The financial profiles of likely takeover targets

In this section, we examine the financial attributes of likely takeover targets by making comparisons between the takeover target and non-takeover target samples. To this end, we outline below (i) a direct comparison of firm attributes across the samples, (ii) an analysis of correlations between such attributes, (iii) univariate and multivariate applications of the logit model (equation 2), and (iv) a summary of the tests applied to our approaches.

(i) a comparison of firm attributes across the target and non-target samples

Because of the non-normality of the variables, we use a non-parametric Mann-Whitney test to determine whether the median values of the variables vary significantly between target and non-target firms. Significant differences between the median values for target and non-target firms provide preliminary evidence of the discriminatory ability of the hypothesized takeover determinants.

In Table 3, the positive and significant (*p*-value = 0.000) coefficient of the *tangible asset ratio* variable confirms that takeover targets typically have higher levels of tangible assets in their asset structure. This is consistent with Ambrose and Megginson (1992) (who examined the characteristics of target firms in the US) and Powell and Yawson (2007) (who investigate the takeovers in the UK), who find that firm asset structure is an important factor in determining a firm's takeover likelihood. Stulz and Johnson (1985) and Powell (1997) among others suggest that a typically high proportion of tangible fixed assets for acquired firms can be identified with a greater debt capacity, thereby allowing the acquiring firm to use the target firm's tangible assets as security for debt financing and effectively reducing the cost of acquisition. It is argued also that asset-rich-target firms are attractive to acquirers in those industries where economies of scale in production are important, enabling them to increase their production capacity (Ambrose and Megginson, 1992). Our results provide support for these lines of argument.

The comparison shows also that the takeover target firms have a significantly lower *market-to-book ratio* compared to non-target firms. This reinforces the argument that firms with low *market-to-book* ratio are perceived to be undervalued (the undervaluation hypothesis, for example, Palepu, 1986; Powell and Yawson, 2007). Espahbodi and Espahbodi (2003) argue that target firms are undervalued by the market either due to their low growth potential or the poor performance of the managers.

The results also show that on average, takeover target firms have both significantly lower *average sales growth* and *change in sales growth* values compared to non-target firms. In addition, the takeover target firms also have significantly higher *average leverage* values compared to non-target firms. These observations are consistent with the notion that takeover targets are often financially distressed firms with a high level of leverage.

Finally, the tests suggest that there are no significant differences in the median values of the *average return on equity*, *earnings per share* and *price run-up* variables.[4] Thus we do not have evidence of the inefficient management hypothesis that firms with inefficient management are more likely to be taken over (for example, Brar et al, 2009).[5]

[3] For example, the first control portfolio '1,1' consists of firms with the largest market capitalization and highest market-to-book ratio, and the final portfolio '5,5' consists of firms with smallest market capitalization and smallest market-to-book ratio). An equally weighted buy-and-hold return of all firms in the given portfolio is then calculated so as to provide the appropriate size and market-to-book ratio matched control portfolio.

[4] The *change* in the *earnings per share* variable suggests that target firms have significantly *lower* levels of growth in profitability compared to non-target firms. However, the *mean* values for the *change in EPS* suggest the opposite relationship. It is this latter relationship which is confirmed by the logit regressions analyses below.

[5] We might note that a comparison of the *market capitalisation* variable in Table 3 confirms that there are no significant differences between the size of target and non-target firms, thereby confirming that the non-target firms in our sample have been closely matched with the target firms (and that findings obtained in the study are not indirectly caused by the differences in size between target and non-target firms).

Table 3. Mean and Median values of firm specific variables

The table presents mean and median values of takeover determinants for takeover target and non-target firms. For each variable (except for *price run-up*, *MTB* and *tangible asset ratios*), we measure both the *average* values and *percentage change* over the period of three years prior to one year prior to the takeover announcement year. For a non-target firm, the variables are measured over the same periods as its matching target firm based on market capitalization. Both the target and non-target firms are selected from the period 2001 to 2006. ***, ** and * indicate that values are significantly different from zero at the 1%, 5% and 10% levels respectively.

Factors	Takeover target firms	Non-target firms	Mann-Whitney (*p*-value)
Average Return on equity (*ROE*)			
Mean	0.008	-0.032	
Median	0.064	0.067	(0.656)
Change in *ROE*			
Mean	-0.859	-0.127	
Median	-0.154	-0.081	(0.119)
Price run-up			
Mean	0.692	0.823	
Median	0.118	0.320	(0.180)
Average Earnings per share (*EPS*)			
Mean	7.770	10.931	
Median	3.900	3.800	(0.954)
Change in *EPS*			
Mean	2.867	-0.259	
Median	-0.196	0.141	(0.030)**
Average Sales growth			
Mean	0.620	1.132	
Median	0.122	0.198	(0.043)**
Change in Sales growth			
Mean	-1.238	1.109	
Median	-1.023	-0.678	(0.014)**
Average Liquidity			
Mean	0.144	0.178	
Median	0.093	0.092	(0.147)
Change in Liquidity			
Mean	38.052	9.596	
Median	-0.211	-0.043	(0.232)
Average Leverage			
Mean	0.550	0.342	
Median	0.221	0.042	(0.001)***
Change in Leverage			
Mean	4.224	4.472	
Median	-0.043	-0.153	(0.238)
Market-to-book ratio			
Mean	1.719	2.795	
Median	1.340	1.750	(0.000)***
Tangible asset ratio			
Mean	0.467	0.293	
Median	0.425	0.144	(0.000)***
Market capitalization (thousand)			
Mean	513060.000	727623.600	
Median	94388.770	89151.920	(0.706)

(ii) the correlation matrix

We examined the correlation coefficients between both the estimated *average* values of the variables and the *changes* in the variables.[6] A high correlation signals the potential problem of multicolinearity in our subsequent takeover prediction models. The two variables with highest degree of association are the *average ROE* and *average EPS* variables (0.611), which is not surprising, since both ratios are measuring the performance of the company. We note that the *average liquidity ratio* variable is negatively correlated with the *average leverage* variable (-0.553), and positively correlated with the *market-to-book ratio* variable (0.475), suggesting that an increase in the level of liquidity is associated with a decrease in leverage and an increase in market-to-book ratio. Similar findings pertain for the correlations between the *changes* in variables. We note particularly the high correlations between the *change in EPS* variable and the *price run-up* and *change in ROE* variables, with correlation coefficients 0.457 and 0.490, respectively; suggesting that change in profitability is positively associated with change in stock prices and return on equity.

(iii) univariate and multivariate logit regression models

As a preliminary, we performed a univariate analysis of the dependence of the dichotomous variable p^* in equation 2 (either 0 or 1) on the takeover determinants

[6] The full table is not reported here, but is available on request.

individually. The McFadden R^2 for the individual models remain generally low.[7] Only the *market-to-book ratio* and *tangible asset ratio* variables are noteworthy with explanatory powers 3.6% and 3.4%, respectively. The findings suggest that consistent with the direct comparisons of the target takeover and non-target takeover samples above (Table 3), the likelihood of takeover is negatively related to the *market-to-book ratio* variable (p = 0.001). The negative sign for the *average liquidity* variable (p = 0.083) indicates that firms that are less liquid are more likely to become takeover targets. Powell and Yawson (2007) suggest that takeover targets are typically less liquid as large cash holdings can be used as a deterrent to takeover bids. Similarly, Powell (1997) and Brar et al. (2009) find a negative relation between takeover likelihood and liquidity. The positive sign on the *change in EPS* variable (p-value = 0.024*)* suggests a positive relation between takeover likelihood and increases in profitability.

Table 4 displays the multivariate analysis results of the acquisition likelihood model when we use the full set of financial attributes. Model 1 uses the *average* values for the variables for the period of three years prior to one year prior to the takeover announcement. The *log likelihood statistic* is highly significant (p-value = 0.000). The McFadden R^2 of the model at 10.7% is comparable with the explanatory power of the models developed in Palepu (1986) and Powell (1997, 2001), with values 6.95% and 12.45%, respectively.

Consistent with the univariate regression results, the takeover likelihood is negatively associated with the *market-to-book ratio* variable (p-value = 0.001) and an increase in the *tangible assets ratio* variable (p-value = 0.006). The results for Model 1 further indicate that high *average leverage* implies a higher likelihood of takeover (p-value = 0.036), which reinforces the argument that target firms are often financially distressed companies with a high level of debt. However, neither of the prior *price run-up* or *average return on equity* (*ROE*) variables receives support as a significant takeover determinant. One explanation may be that the inefficient management hypothesis is more likely to be applicable in the case of hostile takeovers, where the motive is to transfer the control of the firm to new management teams who are better able to utilize the company's resources (Powell, 1997). Model 1 suggests a negative relation between takeover likelihood and *average earnings per share (EPS)*, implying that firms which are less profitable are attractive takeover targets.

We note that Model 1 suggests a significant positive association between takeover likelihood and the *liquidity* variable. However, the prior univariate regressions have suggested a negative relation between the level of liquidity and acquisition probability. The inconsistency could be due to the fact that the *liquidity* variable is highly correlated with other variables in the model. To address this issue, in Model 2 of Table 4, two of the variables with the highest correlation with the *liquidity* variable, namely *market-to-book ratio* (r = 0.475) and *average leverage* (r = -0.553) were omitted from the model. The results show that after removing those two highly correlated variables, the sign of the *liquidity* variable changes from positive to negative, consistent with the univariate findings. To investigate the possibility that the association of the *market-to-book ratio* and *average leverage* variables with the *liquidity* variable has affected their sign, the *liquidity* variable was dropped in Model 3 of Table 4. However, the significance level and the sign for both the *market-to-book ratio* and *average leverage* variables remains unchanged from Model 1. The implied association of both low liquidity and high leverage with takeover likelihood is indicative that target firms tend to be lacking financial resources.

In Model 4, we develop the acquisition likelihood model on the set of *percentage changes* of the variables over the period of three years prior to one year prior to the takeover announcement. The *log likelihood statistic* is highly significant (p-value = 0.006), but with a somewhat lower explanatory power compared to Model 1 R^2 of 9.0%, compared to 10.7%). Consistent with Model 1 where averages of variables were used, the rate of decline in the *market-to-book ratio* and the rate of increase in the *tangible asset ratio* are significant takeover determinants. The results also suggest that there is a negative relation between takeover likelihood and *sales growth change* (from three years prior to one year prior to the announcement), implying that firms with decreasing sales growth are attractive takeover targets. Our findings, therefore, do not appear to be aligned with the hypothesis that takeover targets are firms with growth opportunities. Moderating this view, however, we observe that the *change in EPS* variable is significant with a positive sign.[8]

[7] The full table is not reported here, but is available on request.

[8] We investigated the robustness of the results concerning the significance of variables by applying an industry-matching (as opposed to a size-matching) of target and non-target firms. The test thereby represents a control for particular industry effects. The 103 target firms were matched with 178 non-target firms by industry. The results (not reported here) show that the initial assessment based on a size-matching of takeover determinants remains essentially unchanged. We conclude that the firm variables that are likely to affect a firm's takeover likelihood are not unduly influenced by the firm's industry classification. We also allowed for a non-target takeover control sample with equal sample size as the takeover sample (to allow a more accurate matching of target and non-target firms on industry type). Again, we find that the significance of variables is essentially unaltered.

(iv) summary of findings

We summarize our findings for this section as follows. Undervalued firms as measured by low *market-to-book ratio* are associated with a higher takeover likelihood, providing support for the undervaluation hypothesis. In addition, there is strong evidence that a high proportion of *tangible assets* to total assets will significantly increase a firm's probability of receiving a takeover bid, consistent with the tangible assets hypothesis. A higher *average leverage* and lower *average liquidity* also increase a firm's probability of receiving a takeover offer.

The effectiveness of management performance as measured by both the *ROE* and *price run-up* variables remains insignificant. Thus there is only weak evidence that firms with inefficient management are likely takeover targets. However, there is evidence that firms with low *EPS* but increasing *EPS* are associated with higher takeover probability.

Average sale growth was found to be insignificant in determining a firm's takeover likelihood. Consistent with Table 3, however, there is a significant negative relation between the *change in sales growth* variable and takeover likelihood. This indicates that target firms tend to exhibit a pattern of declining sales growth over time. We fail therefore to support the growth-resource mismatch hypothesis that firms with growth opportunities (as indicated by significantly high sales growth) but which lack the financial resources to support their growth are likely to be taken over.

5. The takeover prediction model

This section examines the model's ability to predict takeover targets and achieve abnormal returns. To this end, we (i) determine the optimal form of the prediction model and cut-off probabilities using the test sample, so as to (ii) test the model's predictions in the verification sample and (iii) assess the model's ability to achieve abnormal returns.

(i) determination of the optimal prediction model and cut-off probabilities

In Table 5, we seek an optimal set of explanatory variables for the takeover prediction model with reference to the variables that have significant discriminatory power in Table 4. The distinction between Models 1 and 2 is that the former incorporates the change in EPS whereas the latter incorporates the average of EPS (over the period three years prior to one year prior to the takeover announcement). The McFadden R^2 for Model 1 and Model 2 are 10.9% and 11.4%, respectively. Although the change in ROE and price run-up variables are not significant determinants of takeover in Table 4, we display the outcome of incorporating these two additional variables in as Model 3, so as to observe whether they improve the acquisition model (higher McFadden R^2). Model 4 confirms that when the change in leverage and change in sales growth are omitted, the McFadden R^2 is reduced. Model 3 which has the highest McFadden R^2 (= 13.3%) is therefore the chosen model

Following Palepu (1986), the optimal cut-off probability is derived using the classification rule of minimising the total number of misclassifications. Table 6 shows the takeover probabilities intervals for all the firms in the estimation sample, ranging from 0 to 81.3%. The within-sample discrimination ability within each probability range is also reported in the table. The percentages of actual target firms and non-target firms within each probability interval are plotted in Figure 1. The probability interval where the two graphs intersect is centered on 27.5%, which therefore becomes the assigned cut-off probability of takeover above which a firm is selected into the investment portfolio.

Table 4. Multivariate logit regression models

This table shows the β loading parameters for the input variables $X(i,t)$ (Table 2) in the takeover prediction model (equation 4). In Models 1 - 3, the *average* values of variables over the period of three fiscal years prior to one fiscal year prior to the takeover announcement (excepting *market-to-book (MTB* and *tangible asset ratio*) are used in the model. In Model 2, the *market-to-book (MTB)* ratio and *average leverage* variables are omitted from the model to investigate whether the change in sign of the *liquidity* variable is due to colinearity between the variables. In Model 3, the *average liquidity* variable is omitted to examine whether the *market-to-book* ratio and *average leverage* variables are affected by the correlation with liquidity. In Model 4, *percentage changes* in the variables are used in the takeover prediction model. The McFadden $R^{2,}$ which is an analog to the R^2 reported in linear regression models, provides an indication of the logit model's explanatory power. The likelihood ratio statistic which is similar to the F-statistics in linear regressions models is computed to test the hypothesis that all the parameters in the model are simultaneously equal to zero. *Probability* indicates the statistical significance of the *likelihood ratio statistic*. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively using a two tailed test.

Model	Constant	Average ROE	Change in ROE	Price run-up *t*-3, *t*-1	Average EPS	Change in EPS	MTB $_{t-}$	Liquidity Average	Change in Liquidity	Average Leverage	Change in Leverage	Average Growth	Change in Growth	Tangible asset ratio $_{t-}$	McF R	LR statistic	Probability
1	-0.276	0.291		0.116	-0.012		-0.683	2.225		0.218		-0.024		1.010	0.107	34.564	(0.000)***
	(0.432)	(0.552)		(0.239)	(0.100)*		(0.001)***	(0.075)*		(0.036)**		(0.627)		(0.006)***			
2	-0.760	0.434		0.025	-0.015			-0.643				-0.035		0.679	0.043	13.840	(0.032)**
	(0.010)***	(0.223)		(0.828)	(0.033)**			(0.489)				(0.464)		(0.065)*			
3	-0.097	0.268		0.151	-0.014		-0.551			0.188		-0.022		0.802	0.098	31.617	(0.000)***
	(0.780)	(0.562)		(0.129)	(0.052)*		(0.002)***			(0.037)**		(0.632)		(0.020)**			
4	-0.380		0.006	-0.087		0.008	-0.197		8.83E-5		-0.002		-0.038	0.711	0.090	21.501	(0.006)***
	(0.126)		(0.369)	(0.403)		(0.017)**	(0.079)***		(0.868)		(0.587)		(0.015)**	(0.010)***			

Table 5. Optimization of the multivariate logit regression model

This table shows the β loading parameters for the significant input variables $X(i,t)$, in the takeover prediction model (equation 4). This table presents various versions of the model developed with reference to the variables found to be significant in determining a firm's takeover likelihood in Table 4. Model 1 incorporate *change in EPS*, whereases Model 2 incorporates *average EPS*. In Model 3, two additional variables *change in ROE* and *price run-up* are included in the model. Model 4 is derived from Model 3 by excluding *average leverage* and *change in growth*.

Model	Constant	Average ROE	Change in ROE	Price run-up t-3, t-1	Average EPS	Change in EPS	MTB $_{t-1}$	Average Liquidity	Change in Liquidity	Average Leverage	Change in Leverage	Average Growth	Change Growth	Tangible asset ratio$_{t-1}$	McF R^2	LR statistic	Probability
1	-0.424					0.016	-0.635	1.885		0.233			-0.043	0.905	0.109	36.883	(0.000)***
	(0.244)					(0.165)	(0.001)***	(0.101)		(0.031)**			(0.005)***	(0.019)**			
														0.609			
2	-0.259				-0.004		-0.369	1.003		0.141			-0.027	0.609	0.114	39.097	(0.000)***
	(0.221)				(0.273)		(0.001)***	(0.146)		(0.025)**			(0.005)***	(0.005)***			
3	-0.176		0.009	0.158	-0.012		-0.738	1.553		0.252			-0.053	0.980	0.133	43.656	(0.000)***
	(0.628)		(0.471)	(0.119)	(0.102)		(0.000)***	(0.195)		(0.033)**			(0.003)***	(0.007)***			
4	-0.726		0.006	0.070	-0.012		-0.421	0.969						1.362	0.094	40.812	(0.000)***
	(0.016)**		(0.075)*	(0.370)	(0.054)*		(0.005)***	(0.262)						(0.000)***			

Table 6. Estimated acquisition probabilities for firms in the estimation sample

The acquisition probabilities are computed for the 103 targets and 263 non-targets in the estimation sample using the coefficients estimates of Model 2 in Table 7. The estimated takeover probabilities are divided into ten intervals. *No. of firms* indicates the number of firms in each interval. *Range* is the estimated takeover probability range in each interval. *Mid-value* is the median value of the probability in each interval. The target (non-target) firm number is the number of actual target (non-target) firms in each interval. The *Target %* (*Non-target %*) are calculated by dividing the number of targets (non-targets) in each interval by the total number of target (non-target) firms in the whole sample and expressing the result as a percentage. In Figure 1, the *Target %* and *Non-target* % are plotted against the mid-value of takeover probability within each interval. *Cut-off* is the lowest value of estimated probability in each interval. *Targets* (*Non-targets*) indicate the actual number of target (non-target) firms that are correctly identified by the model using the corresponding cut-off probability in each interval. *Type 1* error indicates the number of *target firms* which are incorrectly classified as a *non-target* using the corresponding cut-off probability. *Type II* error refers to the number of *non-target firms* which are incorrectly classified as takeover *targets* using the corresponding cut-off probability. *% Total correct* refers to the percentage of actual target and non-target firms correctly classified by the model using the corresponding cut-off probability in each interval. It is calculated by dividing the number of targets and non-target firms correctly classified by the total number of firms in the sample (366).

	Estimated acquisition probability			Target firms		Non-target firms		Discrimination within Sample					
Interval	No. of firms	Range	**Mid-value**	Number	**Target %**	Number	**Non-target %**	Cut-off	Targets	Non-targets	Type 1 error	Type 2 error	% Total correct
1	36	0.000-0.106	0.053	2	1.94%	34	12.93%	0.000	103	0	0	263	28.14%
2	37	0.108-0.171	0.138	7	6.80%	30	11.41%	0.108	101	34	2	229	36.89%
3	36	0.174-0.209	0.197	6	5.83%	30	11.41%	0.174	94	64	9	199	43.17%
4	37	0.210-0.236	0.226	3	2.91%	34	12.93%	0.210	88	94	15	169	49.73%
5	37	0.238-0.260	0.249	8	7.77%	29	11.03%	0.238	85	128	18	135	58.20%
6	36	0.260-0.291	0.275	12	11.65%	24	9.13%	0.260	77	157	26	106	63.93%
7	37	0.292-0.330	0.310	12	11.65%	25	9.51%	0.292	65	181	38	82	67.21%
8	36	0.334-0.394	0.365	16	15.53%	20	7.60%	0.334	53	206	50	57	70.77%
9	37	0.394-0.478	0.433	16	15.53%	21	7.98%	0.394	37	226	66	37	71.86%
10	37	0.487-0.813	0.532	21	20.39%	16	6.08%	0.487	21	247	82	16	73.22%
Total	366			103		263		Likelihood Ratio 40.81			McFadden *R* 9.38%		
								Prob (LR statistic) 0.000***					

Figure 1. Optimal cut-off probability

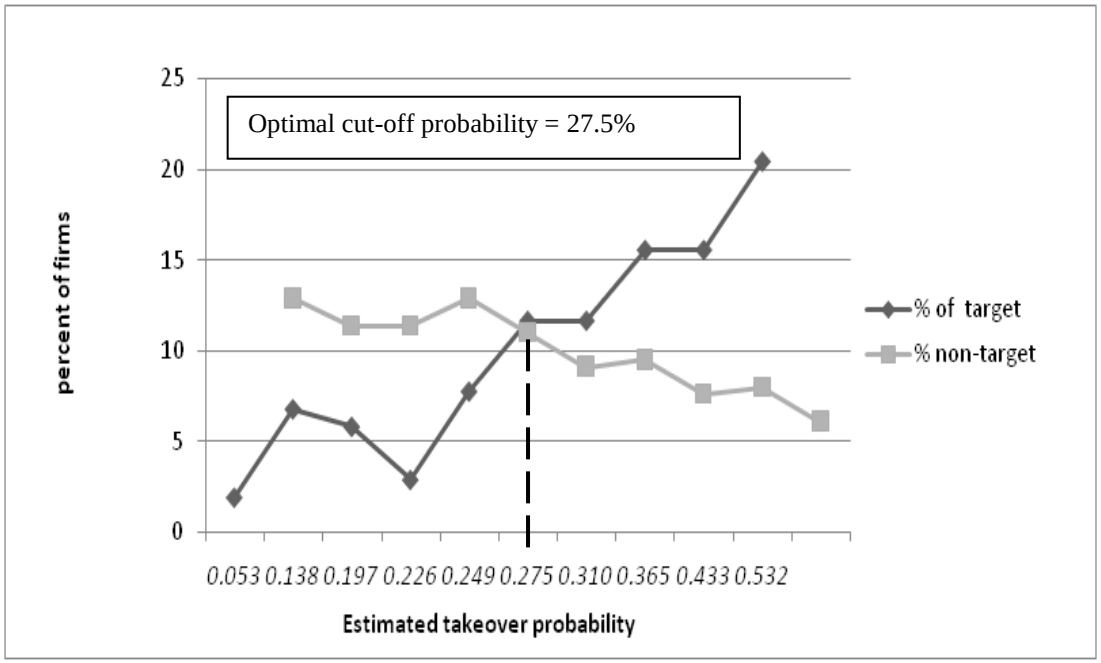


Table 7. Estimated Acquisition probability for targets and non-targets in the estimation sample

The acquisition probabilities are computed for the 103 targets and 263 non-targets in the estimation sample using the coefficients estimates of Model 2 in Table 7. The estimated takeover probabilities are divided into ten intervals. *'No. of firms'* indicates the number of firms in each interval. The range is the estimated takeover probability range in each interval. *'Cut-off'* is the lowest value of estimated probability in each interval. '*Target*' ('*non-target*') indicates the actual number of target (non-target) firms that are correctly identified by the model using the cut-off probability in each interval. The *'Target %'* (*Non-target %*) are calculated by dividing the number of targets (non-targets) in each interval by the total number of firms in the corresponding interval.

	Estimated acquisition probability			Target firms		Non-target	
Interval	No. of firms	Range	Cut-	Number	Target %	Number	Non-target
1	36	0.000-0.106	0.000	2	5.56%	34	94.44%
2	37	0.108-0.171	0.108	7	18.92%	30	81.08%
3	36	0.174-0.209	0.174	6	16.67%	30	83.33%
4	37	0.210-0.236	0.210	3	8.11%	34	91.89%
5	37	0.238-0.260	0.238	8	21.62%	29	78.38%
6	36	0.260-0.291	0.260	12	33.33%	24	66.67%
7	37	0.292-0.330	0.292	12	32.43%	25	67.57%
8	36	0.334-0.394	0.334	16	44.44%	20	55.56%
9	37	0.394-0.478	0.394	16	43.24%	21	56.76%
10	37	0.487-0.813	0.487	21	56.76%	16	43.24%
Total	366		103			263	
				Likelihood Ratio		McFadden R^2	
				Prob(LR		9.38%	
				0.000***			

Powell (2001) on the other hand, suggests that if the objective of the estimated model is to earn abnormal returns, the optimal portfolio selection rule should be to maximise the proportion of target firms in the investment portfolio rather than to minimize the total number of misclassifications. This is achieved by assigning the first takeover probability from the interval which has the highest percentage of target firms (number of targets to the total number of firms in the interval) as the optimal takeover probability (above which probability, firms are selected into the investment portfolio). Table 7 shows the takeover probability range of the firms in the estimation sample. The interval concentrated with the maximum number of target firms (56.76%) is the final interval with the takeover probability range from 0.487 to 0.813. 0.487 (48.7%) therefore becomes the optimal takeover probability under this classification rule. This is much higher than the cut-off probability of 27.5% under the classification rule following Palepu (above).

(ii) the model's predictions in the verification sample

The population of target and non-target firms in year-2007 is used to test the predictive ability of the model. The estimated parameters from Model 3 in Table 5 are used to compute the takeover probability for each of the 445 firms in the verification sample. Table 8 shows the range of the takeover probabilities for firms in the verification sample which range from 0 to 0.99.

Table 8. Estimated takeover probability for the verification sample

The table shows the estimated takeover probability for firms in our verification sample. It consits all the takeover target firms and non-target firms in 2007 which were not used in the estimation sample. *'No. of firms'* indicates the number of firms in each interval. The range is the estimated takeover probability range in each interval. *'Mid-value'* is the median value of the takeover probability in each interval. The target (non-target) firm number is the number of the actual target (non-target) firms in each interval. The *'target %'* (*non-target %*) are calculated by dividing the number of the targets (non-targets) in each interval by the total number of the target (non-target) firms in the whole verification sample and expressing the result as a percentage.

		Estimated acquisition probability				Non-target	
Interval	No. of firms	Range	Mid-value	Number	Target %	Number	Non-target
1	40	0.00-0.07	0.03	2	4.88%	38	9.41%
2	45	0.07-0.15	0.12	5	12.20%	40	9.90%
3	45	0.15-0.21	0.18	6	14.63%	39	9.65%
4	45	0.21-0.24	0.23	4	9.76%	41	10.15%
5	45	0.24-0.26	0.25	2	4.88%	43	10.64%
6	45	0.26-0.29	0.27	5	12.20%	40	9.90%
7	45	0.29-0.32	0.30	2	4.88%	43	10.64%
8	45	0.32-0.35	0.33	7	17.07%	38	9.41%
9	45	0.35-0.41	0.37	5	12.20%	40	9.90%
10	45	0.41-0.99	0.49	3	7.32%	42	10.40%
Total	445			41		404	

Recall that using the classification rule proposed by Powell (2001), 48.7% would be the optimum cut-off probability (Table 7). In this case, 17 firms are identified by the model as potential takeover target firms. However, none of these 17 firms are in fact targets. Our outcomes are therefore similar to those of Powell (1997, 2001) in that of the 96 firms predicted by his 1997-model to be potential takeover targets, only 2 (2%) were in fact acquired; and his 2001-model results remain disappointing and similar to Palepu (1986) .

In contrast, using the classification rule of minimizing the total misclassification error proposed by Palepu (1986), 191 firms have an estimated takeover probability greater than 27.5%, and therefore are identified by the model as potential takeover targets. Of these 191 firms, 19 were in fact acquired in 2007 (10%). Of the remaining 172 firms, an additional three firms were subsequently taken over in 2008 and an additional two firms in 2008 had rumours of either a deal status (indicating that there is an unconfirmed report) or an announced deal with the identity of one of the parties not known. Although the model is able to correctly identify 46.3% of the target firms (19 out of the 41 firms that were actually acquired in 2007), a large number of non-target firms have been incorrectly identified as target firms. This outcome conforms to Palepu's (1986) finding that the information is unable to provide particularly accurate predictions.

(iii) the model's ability to achieve abnormal returns

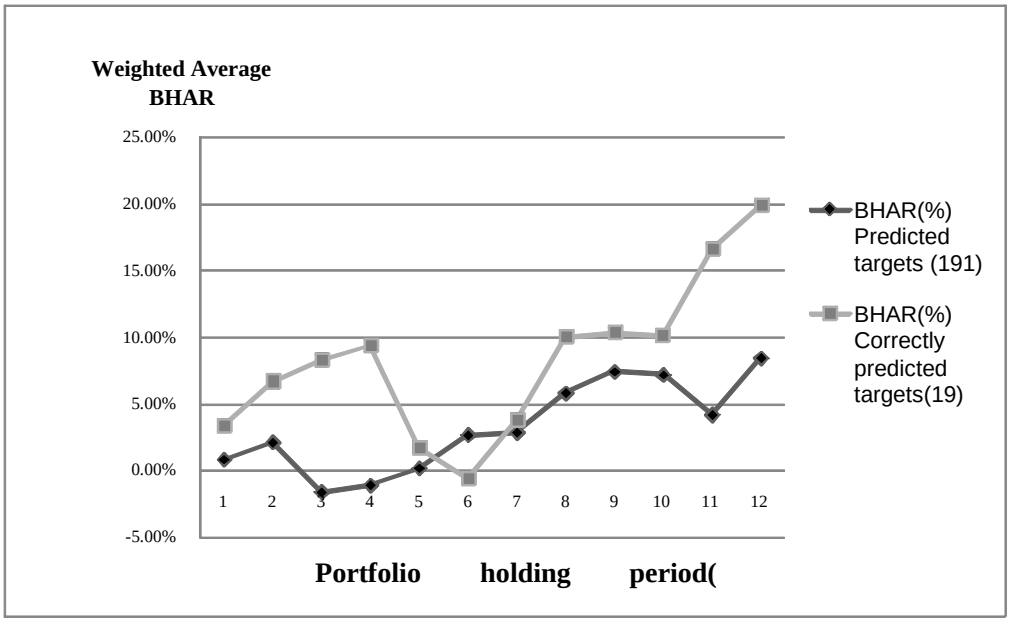
We turn to investigate the ability of the prediction model to provide a successful investment portfolio strategy by analysing the equally-weighted average buy-and-hold abnormal returns from holding the investment portfolio over a three and twelve month holding period. BHARs are calculated as the difference between the buy-and-hold return on a firm and the buy-and-hold return of a control portfolio matched by firm size market capitalization and market-to-book ratio over the same holding period. Figure 2 shows the monthly movement of the equally-weighted average buy-and-hold abnormal returns (BHARs) over a holding period of twelve months beginning 1 January, 2007 for the investment portfolio consisting of the 191 predicted takeover targets following the Palepu method (the equally-weighted BHARs for the group of 19 correctly predicted targets are shown also). Table 9 summarizes the equally-weighted average buy-and-hold abnormal returns (BHARs) for the investment portfolio consisting of the 191 predicted target firms (19 of which became a target during 2007) and for the 254 predicted non-targets (22 of which became targets during 2007).

Table 9. BHARs of the investment portfolio over a three and twelve month holding period

This table reports the equally-weighted average buy-and-hold abnormal returns (BHARs) over a holding period of three and twelve months beginning 1 January, 2007 for the investment portfolio consisting of 191 predicted target firms, 19 of which become target during 2007 and for the 254 predicted non-targets, 22 of which become targets during 2007. The BHAR is calculated as the difference between the buy-and-hold return on a firm and the buy-and-hold return of a control portfolio matched by market capitalization and market-to-book ratio over the same holding period. Numbers in parentheses are the *p*-value of the *t*-statistics. *** ,** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively using a one-tailed test.

	Predicted All firms (191)	Actual targets	Predicted All firms (254)	Actual non-targets
Holding period(Months)	BHAR(%)	BHAR(%)	BHAR(%)	BHAR(%)
3	-1.64%	8.25%	0.27%	8.61%
	(0.25)	(0.08)*	(0.45)	(0.05)**
12	8.43%	19.88%	2.25%	7.50%
	(0.18)	(0.09)*	(0.33)	(0.12)

Figure 2. BHARs of the predicted and correctly predicted takeover targets



The results are unable to confirm that it is possible to earn significant positive abnormal returns over a period of three and twelve months by investing in firms that are identified by the model as potential takeover targets. Holding the investment portfolio of 191 predicted target firms over the period of three months would generate an insignificant negative abnormal return of -1.6% (*p*-value = 0.25). The BHARs improve over the subsequent months and increase with the holding period as revealed in Figure 2. However, the t-test suggests that the high BHAR of 8.4% over the 12-month period is nevertheless not highly significant (*p*-value = 0.18).

In contrast, the BHARs for the sample of 19 actual target firms included in the investment portfolio have generated significant positive returns, of 8.25% (*p*-value = 0.08) and 19.9% (*p*-value = 0.09), respectively, over the three and twelve month periods. This indicates that the insignificant positive returns for the predicted targets over the 12-month holding period are due to the fact that this group consists of 172 firms which are incorrectly classified as takeover targets. We may note also that the BHARs for the predicted targets (191 firms) are not significantly greater than for those of the predicted non-targets (254 firms) (*p*-value = 0.27 for the mean test of differences).[9]

6. Conclusion

Although a good deal of research has examined various aspects of the market for corporate control, evidence on the features of firms that cause them to become takeover targets remains limited, with even less attention having been directed at takeover prediction models in Australia. A strong motivation for studying the characteristics that make firms attractive to corporate acquisitions is that significant abnormal returns accrue to the target firm. In an Australian context, our study has applied Palepu's (1986) model on predictability of takeovers, in combination with Powell's (2001) model, to shed light on the features of takeover targets, the predictive capacity of acquisition likelihood models, and the commensurate ability of such models to earn abnormal returns.

Our findings support the conclusion that takeovers are motivated by attributes of the firm that offer potential gains to the acquirer. Thus, it appears that the firm's undervaluation significantly increases its likelihood of a takeover. The level of tangible assets in a firm's asset structure also significantly enhances the attractiveness of a firm as a potential takeover target. And although the findings do not provide strong support for the notion that firms with inefficient management are more likely to be taken over, the findings do suggest that firms with low profitability (low average *earnings per share*) but with indications of increasing profitability (a positive *change in earnings per share* variable) are more likely to receive a takeover bid. The significantly low *market-to-book ratio* for the target firms may indicate that the market is undervaluing or punishing the company due to the perceived poor performance of the existing management team who fail to maximise the overall value of the firm. There is evidence also that the takeover target firms tend to be financial distressed with high leverage and low liquidity, indicating lack of available financial resources. Taken together, the evidence does not suggest that target firms tend to be high growth firms which lack the available financial resources to support the growth.

In regards to offering predictions of takeover targets so as to profit by investment in such firms, we have been less successful. Although holding the proposed investment portfolio over a 12-month holding period generates an apparently healthy abnormal return of 8.4%, the result does not possess high statistical significance, despite the significant abnormally high returns of the actual target firms included in the investment portfolio. The lack of investment success is due to the large numbers of non-target firms incorrectly judged as targets in our proposed investment portfolio. We therefore accord with Palepu (1986) and Powell (2001) who similarly fail to outperform the market. It is perhaps too soon, however, to conclude that the model apparatus presented is ultimately incapable of "beating the market". Our essential conclusion here is that the variables chosen as representing common acquisition hypotheses do not allow us to beat the market with statistical confidence.

[9] Surprisingly, the BHARs over a 12-month holding period for the group of 22 non-predicted target firms which were taken over in 2007 are insignificant. A closer examination of the 22 actual target firms reveal that five of these firms received a revised takeover bid. It is possible, therefore, that the takeover offers were made known to the market well before the deal announcement date. This is confirmed by significant gains having accrued to the shareholders of these firms at the takeover rumor date with only a moderate increase in stock price at the announcement date. Similarly, an additional four of the 22 firms also enjoyed significant positive price run-ups at the takeover rumor date with the stock price only increasing moderately at the announcement date. We note that for 4 of the 22 actual target firms in the group of predicted non-target firms, the rumor dates were in the year 2006.

References

1. Ambrose, B. W. & Megginson, W. L. 1992. The Role of Asset Structure, Ownership Structure, and Takeover Defenses in Determining Acquisition Likelihood. *Journal of Financial and Quantitative Analysis*, vol. 27(4), pp. 575-589.
2. Anderson, D., Haynes, A. & Heaney, R. 1994. Company takeovers and equity returns: The target size

effect. *Australian Journal of Management*, vol. 19, pp. 1–29.
3. Barber, B. & Lyon, J. 1997. Detecting long-run abnormal stock returns: the empirical power and specification of test statistics. *Journal of Financial Economics*, vol. 43, pp. 341-372.
4. Barnes, P. 1999. Predicting UK takeover targets: some methodological issues and an empirical study. *Review of Quantitative Finance and Accounting*, vol. 12, pp. 283-301.
5. Bishop, S., Dodd, P. & Officer, R. R. 1987. *Australian Takeovers: The Evidence*. The Centre for Independent Studies, St. Leonards, N.S.W.
6. Brar, G., Giamouridis, D, & Liodakis, M., 2009. Predicting European Takeover Targets. *Journal of European Financial Management*, vol. 15 (2), pp. 430-450.
7. Brown, P. & da Silva Rosa, R. 1997. Takeovers: Who wins? *JASSA: The Journal of the Securities institute of Australia*, vol. 4, pp. 2-5.
8. Brown, P. & da Silva Rosa, R. 1998. Research method and the long-run performance of acquiring firms. *Australian Journal of Management*, vol. 23, pp. 23–38.
9. Bugeja, M. 2005. Effect of independent expert reports in Australian takeovers. *Accounting and Finance*, vol. 45 (4), pp. 519-536.
10. Bugeja, M. & Walter, T. 1995. An empirical analysis of some determinants of the target shareholder premium. *Accounting and Finance*, vol. 35(2), pp. 33-60.
11. Camerlynck, J., Ooghe, H. & de Langhe, T. 2005. Pre-Acquisition Profile of Privately Held Companies Involved in Take-Overs: An Empirical Study. *Small Business Economics*, vol. 24 (2), pp. 169-186.
12. Casey, R., Dodd, P. & Dolan, P. 1987. Takeovers and corporate raiders: Empirical evidence for extended event studies. *Australian Journal of Management*, vol. 12, pp. 201-220.
13. Cudd, M. & Duggal R. 2000. Industry distributional characteristics of financial ratios: an acquisition theory and application. *The Financial Review*, vol. 41, pp. 105-120.
14. Da Silva Rosa, R., & Walter, T. 2004. Australian Mergers and Acquisitions Since the 1980s: What Do We Know and What Remains to Be Done? *Australian Journal of Management*, vol. 29, pp. 1-13.
15. Danbolt, J. 2004. Target Company Cross-border Effects in Acquisitions into the UK. *European Financial Management*, vol. 10 (1), pp. 83-108.
16. Dodd, P. 1976. Company takeovers and the Australian equity market. *Australian Journal of Management*, vol. 1, pp. 15–35.
17. Espahbodi, H., & Espahbodi, P. 2003. Binary choice models and corporate takeover. *Journal of Banking and Finance*, vol. 27(4), pp. 549-574.
18. Finn, F., & Hodgson, A. 2005. Takeover activity in Australia: endogenous and exogenous influences. *Accounting and Finance*, vol. 45 (3), pp. 375-394.
19. Gaspar, J. M., Massa, M., & Matos, P. 2005. Shareholder investment horizons and the market for corporate control. *Journal of Financial Economics*, vol. 76 (1), pp. 135-165.
20. Goergen, M., & Renneboog, L. 2004. Shareholder Wealth Effects of European Domestic and Cross-border Takeover Bids. *European Financial Management*, vol. 10 (1), pp. 9-45.
21. Hasbrouck, J. 1985. The characteristics of takeover targets and other measures. *Journal of Banking and Finance*, vol. 9 (3), pp. 351-362.
22. Henry, D. 2005. Directors' Recommendations in Takeovers: An Agency and Governance Analysis. *Journal of Business Finance and Accounting*, vol. 32 (1/2), pp. 129-159.
23. Higson, C. & Elliott, J. 1993. Are acquired Firms Distinctive? The effect of Choice of Control. *IFA Working Paper*, pp. 170-193.
24. Holland, K. M, & Hodgkinson, L. 1994. The pre-announcement share price behavior of UK takeover targets. *Journal of Business Finance and Accounting*, vol. 21(4), pp. 467-490.
25. Hyde, C. E. 2002. Evaluating mergers in the Australian petroleum industry. *The Economic Record*, vol. 78, pp. 299-311.
26. Jensen, M. C. & Ruback, R. S. 1983. The market for corporate control. *Journal of Financial Economics*, vol. 11(1-4), pp. 5-50.
27. Keown, A. J., & Pinkerton, J. M. 1981. Merger Announcements and Insider Trading Activity: An Empirical Investigation. *Journal of Finance*, vol. 36 (4), 855-869.
28. Kothari, S. P. & Warner, J. B. 1997. Measuring Long-Horizon Security Performance. *Journal of Financial Economics*, vol. 43, pp. 301-309.
29. Le, H. T., & Schultz, E. 2007. Toeholds and the Bidder Shareholder Wealth Effects of Takeover Announcements. *Australian Journal of Management*, vol. 32 (2), pp. 315-344.
30. Maheswaran, K., & Pinder, S. 2005. Australian evidence on the determinants and impact of takeover resistance. *Accounting and Finance*, vol. 45 (4), pp. 613-633.
31. Murray, P. G. 1994. Pre-announcement share price run-ups and abnormal trading volume in takeover target shares: A test of the market speculation hypothesis. *Pacific-Basin Finance Journal*, vol. 2, pp. 319-348.
32. Palepu, K. G. 1986. Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics*, vol. 8 (1), pp. 3-35.
33. Powell, R. G. 1997. Modelling Takeover Likelihood. *Journal of Business Finance and Accounting*, vol. 24 (7&8), pp. 1009-1030.
34. Powell, R. G. 2001. Takeover prediction and portfolio performance: A note. *Journal of Business Finance and Accounting*, vol. 28 (7&8), pp. 993-1011.
35. Powell, R., & Yawson, A. 2007. Are Corporate Restructuring Events Driven by Common Factors? Implications for Takeover Prediction. *Journal of Business Finance and Accounting*, vol. 34(7/8), pp. 1169-1192.
36. Roll, R. 1986. The Hubris Hypothesis of Corporate Takeovers. *Journal of Business*, vol. 59(2), pp. 197-216.
37. Rossi, S. & Volpin, P. E. 2004. Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics*, vol. 74, pp. 277-304.
38. Sharma, D. S., & Ho, J. 2002. The Impact of Acquisitions on Operating Performance: Some Australian Evidence. *Journal of Business Finance and Accounting*, vol. 29 (1/2), pp. 155.
39. Shleifer, A & Vishny, R. W. 2003. Stock market driven acquisitions. *Journal of Financial Economics*, vol. 70, pp. 295-311.

40. Stulz, R. M. & Johnson, H. 1985. An analysis of Secured Debt. *Journal of Financial Economics*, vol. 14, pp. 501-521.
41. Walter, T. 1984, Australian takeovers: Capital market efficiency and shareholder risk and return. *Australian Journal of Management*, vol. 9, pp. 63–118.