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**Do Australian firms engaging in
mergers and acquisitions
experience performance
improvements?**

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Abstract

Title: Do Australian firms engaging in mergers and acquisitions experience performance improvements?

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Purpose: To determine if mergers and acquisitions are value creating or destroying in the Australian market, identifying the individual sources of this value creation or destruction, and attempt to relate the post-merger performance to changes in equity prices around the announcement date of the bid.

Key words: Synergies, Mergers and Acquisitions, Australia, Announcement Effect, Post-merger, Operating performance, Value Creation.

Methodology: A quantitative approach comparing pre and post merger firm performance with a median and regression based analysis. An equity market event window study is also conducted by using a regression to calculate market model parameters and then measuring abnormal equity returns around the announcement date.

Theoretical perspective: Mergers are motivated by the possibility of operating and financial synergies, which result in economic value creation. The market is efficient and the equity re-evaluation of the bidder and target firms at the announcement of the merger reflects the expected economic value creation from the merger.

Empirical foundation: A study of mergers and acquisitions during the period 1997-2006 has been empirically studied to obtain the data needed.

Conclusions: In summary, our findings suggest significant post-merger improvement, with improvements in operating efficiency and production efficiency, including capital expenditure reduction and increased sale of PPE from the sale of redundant assets, and also evidence of financial synergies in the form of a lower cost of debt and increased debt capacity. Further, we find positive abnormal equity returns for target firms at the announcement of the merger, and a relationship between combined bidder and target abnormal returns and the post-merger performance improvements.

Contents

1. Introduction	4
1.1 Background	4
1.2 Problem	4
1.3 Purpose	8
2. Theoretical Background	10
2.1 Sources of Benefits	10
2.1.1 Operational Synergies.....	10
2.1.2 Financial Synergies.....	12
2.1.3 Other sources of gains for mergers:	13
2.2 Long-run equity performance.....	13
2.3 Long term operating performance	14
2.4 Cumulative Abnormal Returns.....	15
2.5 Deal and firm characteristics	16
3. Methodology.....	18
3.1 Long Term Operating Performance	18
3.1.1 Performance Measurements	18
3.1.2 Industry Benchmark Construction	21
3.1.3 Abnormal industry-adjusted performance - Models for determining performance improvements.....	22
3.1.4 Identifying individual drivers	25
3.2 Cumulative Abnormal Returns.....	26
3.3 Expected Asset Returns	27
4. Results and Analysis.....	28
4.1 Sample.....	28
4.2 Hypotheses	29
4.3 The Change Method.....	31
4.4 Intercept Method.....	41
4.5 Summary of statistically significant change and intercept method results	44
4.5 Sources of post-merger gains	46
4.6 Cumulative Abnormal Returns.....	49
4.6.1 Stock returns at the announcement of the merger	49

4.6.2 Relating equity returns to performance improvements	50
5. Conclusions	52
5.1 Conclusion	52
5.2 Limitations.....	53
5.3 Further Research.....	54
6. References	55

1. Introduction

The introductory chapter provides a background to the area of mergers and acquisitions and introduces some of the gaps in the relevant literature. It also explains the over-arching goal of the paper and how this paper seeks to add to the literature.

1.1 Background

Economic theory posits mergers are a rational response to market conditions and reflect an efficient allocation of resources. Both practitioners and academics argue that a key motivator for firms to merge is based on the improved operating efficiency that the combined firm can achieve compared to the respective standalone entities (Bernile and Bauguess, 2010). This viewpoint recognises the existence of synergies. There are other views that suggest agency conflicts exist and managers engage in mergers merely for empire building, without regard to economic value creation for shareholders. During the period of 1997 to 2010 there were 686 mergers and acquisitions¹ between firms on the Australian Stock Exchange. The popularity and persistence of mergers suggests it is a sustainable practice with rational motivations.

1.2 Problem

The academic literature provides plenty of evidence that the combined cumulative abnormal returns (CARs) surrounding the announcement of a merger (“announcement effect”) are positive when the bidder and target CARs are aggregated. This draws the implication that the proposed merger generates economic value (Antoniou *et al.* 2008; Kaplan *et al.*, 2000; Healy *et al.* 1992,; Bradley, Desai and Kim 1988). A recent study of management synergy forecasts suggests that the announcement effect is a reflection of the expected synergies of the merger (Bernile and Bauguess, 2010). Bernile and Bauguess further demonstrate that should the market’s forecast of the merger’s economic value creation (as reflected in the announcement date equity revaluation), prove to be inaccurate in the long-run, the market will adjust the stock price accordingly. This indicates that investors use their forecasts of merger economic

¹ Hereafter any reference to mergers means mergers and acquisitions.

value creation (at the announcement of the merger) as a yardstick for their future performance expectations of the combined firm.

When it comes to assessing whether merger value creation manifests in the long-term performance of the combined entity, the academic literature takes a point of departure. There exists a cleavage of opinion on how best to measure long-run performance of merged firms. Firstly, there is the school of thought that seeks to measure long-term abnormal equity returns following the merger (Agrawal *et al.*, 1992; Franks *et al.*, 1991). This measure provides mixed results, with the majority of studies finding negative abnormal returns, indicating mergers are value destroying in the long-term (Gregory, 1997; Agrawal *et al.*, 1992; Limmack, 1991; Asquith, 1983; Firth, 1979). However, there is support that this methodology is very dependent on the benchmark used to assess performance (Fama, 1997). Fama's seminal paper on market efficiency and long-term returns finds that chance generates apparent anomalies that are split randomly between overreaction and under reaction. This may offer an explanation for studies that find long-term abnormal equity returns post-merger. This paper does not seek to further investigate this point.

Secondly, there is the use of post-merger accounting data to measure operating performance and financial improvements. The studies that examine long-term operating performance generally conduct their analyses either by an examination of pre-tax cash flows or with profit measures.² The majority of studies that claim to use pre-tax cash flows will use the Healy *et al.*, 1992 measure of Sales – COGS – SG&A + depreciation + amortization. Whilst the studies that follow this measure such as Ghosh (2001) and Heron and Lie (2002) claim that this measure is superior to other profit based measures which are subject to accounting manipulations. The Healy pre-tax CF measure is not an entirely pure-cash flow measure either. It does not include changes in working capital, thus gains in sales could have been driven by management seeking to meet performance targets and offering favourable credit terms. In order to mitigate entirely the potential for accounting manipulation in the cash flow measure, it has been proposed by some papers such as Martynova (2006)

² Martynova *et al.*, 2006 provide a tabulated overview of the empirical studies on post-acquisition operating performance, exhibiting the pre-tax CF and net income measures as the primary performance measures used, p.23-24

that the change in working capital be subtracted from EBITDA to provide a more pure cash flow measure.

Our study uses operating cash flows, EBITDA and capital cash flows to examine long-term firm performance. Net operating cash flows is taken from the cash flow statement and includes net cash flows from operating activities, interest payments, income tax paid and changes in working capital. Measures such as the Healy et al (1992) pre-tax CF measure and EBITDA could suggest a firm is in good fiscal health, however removing interest, tax and changes in working capital would tell a completely different story. The capital cash flow measure was developed by Kaplan and Ruback (1995) and used in their valuation of management buyouts and leveraged recapitalisations. We apply this in the context of measuring cash flow performance improvements from mergers, as the measure includes the interest tax shield, sale of PPE and capital expenditure, items that are particularly relevant in the post-merger restructuring. The measure is akin to FCF, however it also includes the interest tax shield, which is relevant in cash acquisitions that tend to involve increased levels of debt. As opposed to EBIT x Tax Rate, CCF includes $(EBIT - \text{Interest}) \times \text{Tax Rate}$. The capital cash flows measurement has not been used as a performance measurement in this field before.

There are few studies that seek to identify individual sources of merger value creation. Devos (2009) explores some of the individual sources of merger gains in the context of tax benefits, market power and efficiency improvements in the US using Value Line forecasts of industrial firms. The drawback of this method is that it does not use actual accounting data, it relies on analyst forecasts to draw conclusions. Healy et al. (1992) measure how research & development expenditure and wage expense change in the post-merger period. Our study provides a detailed examination into the various drivers of post-merger performance gains. We apply the methodology previously used to measure cash flow from operations to a host of other measures such as; operating expenses, asset turnover, interest paid, taxes paid, interest coverage, net debt, changes in working capital, sales of PPE, and capital expenditure. This enables us to examine not only how these individual measures change post-merger, but also their explanatory power of the firm performance gains post-merger attributable to the merger.

Further, the operating performance studies primarily focus on industrial firms, excluding firms in industries such as utilities, financial services, telecommunications and mining (Devos, 2009; Ghosh, 2001;), whilst some just exclude financial firms (Martynova 2004; Rahman and Limmack 2000; Healy et al 1992). The oft-cited reason for this exclusion is that these firms are difficult to compare to industrial firms due to their level of regulation. It is thought that their regulated nature insulates profitability from negative market forces and enhances the long-run performance (Ferris and Park, 2001). Ferris and Park test this view in the telecommunications sector (a regulated industry with the most takeover activity) and find long-run equity underperformance, a result in line with much of the literature on long-run equity returns of merged firms. They do not examine long-run operating performance. Sharma and Ho (2002) exclude the mining industry from their Australia study on the basis of the regulatory requirements. Further, it appears that some of the financial databases such as Compustat and Value Line lack detailed accounting data for these industries and so academics exclude them on this basis (Devos *et al* 2009, Ghosh 2001). FinAnalysis³ provides the required accounting data to perform an analysis across all industries.

The previous studies seek to draw conclusions about the value creation of mergers in general by analysing only a subset of mergers and acquisitions, primarily deals in the industrial sector. Our study does not delimit the analysis based on industry. We mitigate the risks associated with analysing regulated industries by a detailed industry-matching approach that compares the merging firm to an equivalent firm in its industry with similar performance and size. We also use cash flow measures to determine the performance, which removes the impact of different accounting practises in regulated industries. Chatterjee and Meeks (1996) demonstrate the accounting method chosen can impact upon profitability measures and distort the results of a merger analysis. Cash flow measures are not impacted upon by the accounting treatment of goodwill, restructuring costs, asset revaluations, thus absolving the chance that performance measures fail to represent the true benefits of the merger.

³ FinAnalysis is a financial database provided by MorningStar.

The previous study conducted in Australia on the impact of mergers and acquisitions on operating performance limited the study to only 36 industrial firms over the period of 1986-1991 and did not find evidence of post-acquisition improvements in operating performance. Their sample is rather small and does not find statistically significant results. Furthermore, the study was conducted using data from over 19 years ago. Our study will increase the sample size of analysis to 99 mergers and acquisitions over the period of 1997 to 2006. The larger sample size increases the statistical strength of our conclusions on the Australian market and provides a more accurate picture of the current merger period.

As the announcement effect is a reflection of the market's expected economic value from the merger, the merging firms should exhibit observable improvements in their operating and/or financial metrics over the long-term. The failure to achieve improvements in operating and financial metrics may indicate motivations for the merger other than synergies, such as hubris, empire building, free cash flow theory (corporate control), market misvaluation and agency theory (Sharma and Ho, 2002).

1.3 Purpose

This paper seeks to add to the literature in the following ways:

1. To contribute to the meagre number of studies performed on the Australian market on the topic of mergers and acquisitions impact on operating performance, with a considerably larger sample than previously used, covering all industries.
2. To determine if mergers are value creating in the Australian market by examining if there is an improvement in merging firms performance by assessing returns adjusted for the performance of industry peers that did not engage in mergers, using cash flow from operations, profitability and capital cash flow measures.
3. To identify the individual sources of value creation using a variety of variables such as; operating expenses, asset turnover, interest paid, taxes paid, interest coverage, net debt, changes in working capital, sales of PPE, and capital expenditure. We also seek to identify which drivers have the strongest

explanatory power of the performance improvements identified in point 2 above.

4. To test whether the cumulative abnormal equity returns at the announcement of the merger/acquisition are related to the post-merger performance improvements as measured by net operating cash flows and capital cash flows.

2. Theoretical Background

Chapter two details the theoretical background taken from previous studies describing theory behind the sources of benefits from synergies, as well as equity performance both in the long-term and at announcement effect and measurement of post-merger operating performance.

2.1 Sources of Benefits

2.1.1 Operational Synergies

Cost Savings

Cost savings is the most often cited justification for mergers as it is the easiest synergy to be achieved. Bernile and Bauguess (2010) find that where management release public statements of synergy forecasts, 87.9% of the cases they are cost savings. The most common rationalisation of the cost savings synergies are based on economies of scale, layoffs, combining production capabilities and administrative functions, increased bargaining power with suppliers, and eliminating redundant R&D expense (Commen and Jarrell, 1995; Kaplan, 1997, 2000). Laying off employees is a common cost saving in mergers as management gets the opportunity to renegotiate labour contracts and lay off redundant employees during the merger restructuring (Rosett, 1990). Ghosh (2001) finds evidence that firms lay off employees following an acquisition compared to matched firms not making acquisitions.

Houston, James and Ryngaert (2001) analyse the banking industry and find that the primary improvements in operating performance are due to cost savings. Bhagat et al. (1990) examine hostile takeovers and find that twenty-five percent of the takeover premium is explained by cost savings in layoffs or pension terminations. Bower (2001) finds evidence of small firms making acquisitions as a substitute to R&D investment.

Production Efficiencies

Production efficiencies are one of the most common justifications of mergers by management. Improved productive efficiency facilitates the reduction in capital investments and/or increased asset sales (Devos, 2008). Healy et al. (1992) cite the

reason for the improvement in operating performance is due to decreased capital expenditure leading to increased asset turnover. Healy et al. (1992) find evidence of an increased level of assets sales following an acquisition, which supports the theory that during the restructuring the assets with a low turnover will be sold.

Market Power

Another reason that mergers can create value is due to increased market power that comes from combining two competing firms (Damodaran, 2005). Kim and Singal (1993) find that in airline mergers, fares on routes affected by the merger were raised significantly in comparison to other routes. Sapienza (2002) finds that banks generally lower interest rates post merger due to production efficiencies, however those with large local market shares tend not to lower interest rates in the combined entity implying the exercise of market power.

Revenue Growth

Another possible motivation for mergers is increased revenue growth. This can come from firms merging with firms that already have an existing distribution network and brand image and increase product sales with these strengths (Damodaran, 2005). Houston (1994) in his study of bank mergers finds cross-selling of products between customers as the primary source of revenue synergies in bank mergers.

Divestitures

Bhagat et al. (1990) suggest that another reason for mergers could be due to the intention to divest particular assets in the business. This could be a motivation for a merger if the targets stock was underpriced, and thus value can be created by unbundling the undervalued divisions, which is supported by LeBaron and Speidell (1987). Another reason stated by Bhagat et al. (1990) is that a merger motivated by divestitures could be value adding if the combined entity sells off particular divisions to a strategic buyer that could exploit a combination with the division, or will overpay for a particular division.

2.1.2 Financial Synergies

Debt

Lewellen (1971) identifies a number of the financial rationales for mergers. Firstly, a bidder can take advantage of a temporary misvaluation of the target and acquire the firm for below its market value, adding value to shareholders when the market values the acquisition at its true value. Secondly, there is a portfolio diversification effect of combining two firms which do not have perfectly correlated income streams. Should this stabilise cash flows comparatively to pre-merger levels, then it may be possible for the combined firm to experience a lower cost of debt. Thirdly, the acquired firm may not have been accessing the lowest cost of debt or utilizing the extent of its debt capacity, which can then be exploited by the combined firm. Fourthly, it is also suggested that the combined firm has better access to capital markets (Levy and Sarnat, 1970). Devos et al. (2009) assess the sources of synergies using Value Line forecasts of the target and bidder prior to the merger, and then comparing these forecasts for the combined entity the quarter after the merger completion.⁴ Using the forecasts for the amount of debt, cost of debt and tax rate, the financial synergies are computed to be 1.64% of the combined equity value.

Tax Benefits

Tax benefits are often considerable sources of value creation for merging firms. Depending on the nature of the tax benefit, management will not always tout the tax benefits as the primary driver for a merger due to tax avoidance provisions. Part IVA of the Income Tax Assessment Act 1936 (Cth) prohibits transactions where the purpose is to avoid tax. An Australian merger involved the elimination of deferred tax liabilities in the amount of AUD\$187m due to the resetting of cost bases in the new combined entity. This transaction could attract the operation of Part IVA should management highlight the tax benefit as a reason for the deal.⁵ Benefits accruing due

⁴ The Value Line forecasts are reported each quarter.

⁵ There is a \$187m tax benefit in the Seven Network and Westrac merger as a new holding company is created which enables both the firms to reset its cost bases for tax purposes. This results in the elimination of a deferred tax liability in the amount of \$187m. "The merger documentation doesn't characterise the potential tax reduction as a benefit to shareholders. In fact it treats the issue in a low-key manner, tucked unobtrusively within the voluminous documentation. No doubt Seven would prefer not to draw attention the matter." See <<http://www.theaustralian.com.au/business/opinion/there-is-a-187m-tax-bonus-in-the-seven-westrac-merger/story-e6frg9if-1225842557707>>, Accessed 20 April 2010.

to an increased debt capacity and thus greater tax shield are legitimate and do not contravene Part IVA. Hayn (1989) conducts a study over 640 acquisitions between 1970 – 1985 finding that there is a positive correlation between the announcement period abnormal returns and the tax attributes of the target. These beneficial attributes include “net operating loss carry-forwards, unused tax credits, and higher depreciation due to the step-up in the basis of the acquired assets”. Auerbach and Reishus (1988) found that tax benefits associated with merging a profitable company with a company with carry forward losses were an important factor in five percent of the cases.

2.1.3 Other sources of gains for mergers:

Market for Corporate Control and Disciplining effect of Debt

An established force at work in the takeovers field is the mechanism whereby underperforming management will be replaced by a more efficient management team that will fully exploit the firm’s full potential. Jensen (1986) articulates this theory as a reason for gains behind mergers on the basis post-acquisition the combined entity will cease investing in negative NPV investments and improve firm performance. When the acquisition is financed with cash and the combined firm has an increased debt load, a spending discipline is imposed on managers which can resolve the agency conflict (Jensen, 1986). Humphery and Powell (2010) study the Australian market for corporate control, and find Australia’s absence of anti-takeover provisions promotes a more effective market for corporate control, eliminating the extent of managerial entrenchment in firms of all sizes. They do not find evidence of empire building, as the merged firms exhibit long-term value creation measured by ROA. Arguably, mergers that were motivated by empire building would not achieve value creation superior to non-merging peers.

2.2 Long-run equity performance

A considerable amount of academic research has been done in the area of post-merger equity performance to test the economic value creation of mergers. From the premise of market efficiency, long-term abnormal equity returns should be zero, save for circumstances whereby the market must rectify its initial assessment of the merger benefits (Fama, 1998; Bernile and Bauguess, 2010).

The weight of evidence in this field is in favour of the view that mergers are wealth reducing in the long run. The primary studies that find mergers are value destroying in the long run are Clark and Ofek (1994), Agrawal, Jaffe and Mandelker (1992), Baker and Limmack (1999), and Gregory (1997). There are studies that find positive abnormal returns in the post-merger period (Loderer and Martin, 1992; Franks, Broyles and Hecht, 1977, Franks and Harris, 1989) and those that find no abnormal returns (Franks, Harris and Titman, 1991). The degree of conflicting papers in this field brings into question the reliability of the findings and has led to a number of papers that seek to address perceived methodological errors arguing that inappropriate benchmark models are used or the sample suffers from selection bias (Healy et al., 1992; Jarrell, 1995; Gregory, 1997). Agrawal et al. (1992) show in their study that the positive results achieved by Healy et al. (1992) were unique to the sample used over their chosen time period.

In 1998 Fama surveyed the entire long run equity performance literature and commented that any anomalies were nothing more than chance results, apparent overreaction of stock prices to information is about as common as under reaction. Assuming efficient capital markets, the post-merger stock returns should rectify the discrepancy between the market's anticipated merger gains (those reflected in the announcement effect) and the benefits that are actually realised. This view posits an explanation for the mixed results in the long-run equity performance of merging firms and conforms to the market efficiency school of thought.

2.3 Long term operating performance

Healy et al. (1992) argue that the long run equity return studies fail to identify whether the abnormal returns at the time of merger announcement are due to economic value added by the merger, market inefficiency, or any other reasons. Accordingly, Healy et al. (1992) seek to identify the gains through analysing pre and post-merger operating performance, using accounting data of the target and bidder firms and the combined entity in the post-merger period. Healy et al. (1992) find positive improvements in operating performance through a comparison of industry-adjusted operating cash flow returns pre and post merger, as well as estimating a cross-sectional regression to determine abnormal operating performance. These results are in line with a number of other studies that also find positive operating

performance improvements following a merger (Kruse et al., 2002; Yeh and Hoshino, 2001; Dickerson et al., 1997; Clark and Ofek, 1994; Rahman and Limmack, 2004, Powell & Stark, 2005; Humphèry and Powell, 2010; Heron and Lie, 2002; Linn and Switzer, 2001; Moeller and Schlingemann, 2004).

Some studies argue that the pre-tax operating cash flow measure originally employed by Healy et al. (1992) is not a true reflection of the operating cash flows as it neglects changes in working capital (increases in A/C Receivables, payables, inventories) (Martynova et al., 2006). Thus, they also include EBITDA- Δ WC as the measure of operating cash flow.

There are a series of papers that find insignificant changes in operating performance post merger (Mueller, 1980; Sharma and Ho, 2002; and Ghosh, 2001). Ghosh's 2001 paper was a significant paper that directly challenged the results of Healy et al. (1992). The primary basis of this criticism was that if merging firms outperform industry-median firms because of permanent factors and temporary factors, that is, both have non-zero expected values, then both the change and intercept models employed by Healy et al. (1992) will give biased results (Ghosh, 2001). To combat this Ghosh proposes peer firms should be matched on the basis of pre-performance as well as industry and size. Applying this methodology Ghosh found that a sample of 315 firms did not improve their operating performance post-merger.

Post-Ghosh papers have applied the matching criteria taking into account prior performance as well as industry and size, and found positive improvements in operating performance contradicting Ghosh's results. Powell & Stark (2005) apply numerous benchmarks and operating performance measures in their study on the UK market, Heron & Lie (2002) do the same on 859 US firms, and both find significant operating performance improvements post-merger.

2.4 Cumulative Abnormal Returns

The abnormal returns surrounding the announcement of a merger are reflective of the market's assessment of the economic value added by the merger. The literature on mergers & acquisitions has different methods of measuring Cumulative Abnormal Returns (CARs) of stocks due to the announcement effect. The main basis for the measurement of these abnormal returns is the Brown event study methodology

(Brown, 1985), which uses a five day window either side of the event. The studies done in the US and UK markets find conclusive evidence of CARs of 15-30% for the target firm shareholders (Healy et al., 1992, Andrade et al., 2001; Brunner, 2002; McCahery et al., 2004). However, the evidence for bidding firms is less conclusive, with results in the range from -5% to 5% (Brukart, 2006). When the results are combined weighted by the bidder and target firms respective market values of equity, positive abnormal announcement returns of 8.8% are found by Healy et al., 1992.

2.5 Deal and firm characteristics

There have been numerous studies that examine the impact of the characteristics of the merging firms and the characteristics of the deal, on the future performance of the merged entity.

(a) Method of payment

The financing of the merger represents a signal to the market regarding the respective values of the target and bidder. The management of the bidder will want to use equity to finance the transaction if they perceive their stock to be overvalued. Further, a bidder will also use stock if the bidder lacks confidence in their valuation of the target. The stock acquisition provides a risk sharing mechanism between the shareholders of the combined entity (Sudarsanam and Mahate, 2003). On the other hand, acquisitions financed with cash represent more of a positive signal to the market. Agency costs are reduced as excess cash is used, and a discipline is imposed on managers to perform, as cash acquisitions are often associated with increased levels of debt (Jensen, 1986). Accordingly, theory suggests cash acquisitions should outperform stock acquisitions in both equity returns and operating performance improvements. This view is supported by Ghosh's analysis which found that cash flows increase significantly following cash acquisitions (Ghosh, 2001). Ghosh argues this is due to better management of the firm's combined resources. A comprehensive study by Linn and Switzer in 2001 finds the change in performance of the merged firms is significantly larger for cases in which cash is used instead of stock. They apply the pre-tax cash flow return method to analyse operating performance. There are a number of studies that consider the method of financing as a subsidiary question

to their analysis and find an insignificant relationship (Martynova et al., 2006; Powell and Stark, 2005; Healy et al., 1992; Sharma and Ho, 2002).

(b) Relative size of the target

Linn and Switzer (2001) find that a small target relative to the bidder will only contribute to the performance of the merged firm in a small way and thus long-run operating performance post-merger may be explained to an extent by the relative size. This result is supported by Asquith et al. (1983) and Peterson and Peterson (1991). The scope for economies of scale is greater the larger the size of the target (Linn and Switzer, 2001; Moeller, 2003). However, the larger the target, the more expensive and difficult the integration task is (Martynova et al, 2006). When the long-run performance is analysed in terms of the relative size of target/bidder, most studies find insignificant results (Powell and Stark, 2005; Moeller et al., 2003; Heron and Lie, 2002; Sharma and Ho, 2002, Healy et al., 1992). However, Humphery and Powell's 2010 study in the Australia market finds that post-takeover operating performance (measured by ROA) increases with acquirer size. This occurrence can be controlled for with the Ghosh (2000) industry-matching criterion that takes into account the size and prior performance of the bidder and targets.

3. Methodology

Chapter three explains exactly how the study is conducted in this paper. It details the measurements used to identify performance improvements, including how performance is adjusted for industry, economy, size and pre-merger performance effects to obtain only the improvement related to the merger. Chapter three also explains how cumulative abnormal returns around announcement date are measured and related to the post-merger performance improvements.

3.1 Long Term Operating Performance

3.1.1 Performance Measurements

In this paper we attempt to explain more accurately how mergers create value. We define operating improvements in four different ways. These measurements are described in the first section of Table 1. Our primary measure is net operating cash flow scaled by book value of assets. In addition we also use EBITDA and EBITDA with changes in working capital subtracted and scale these by the book value of assets. Finally we use Capital Cash Flows (CCF) as described in Kaplan and Ruback (1995) scaled by the book value of assets. We also scale all the measures by sales as a test of robustness.

Net Operating Cash Flows

Net operating cash flows is taken from the cash flow statement and includes net cash flows from operating activities, interest payments, income tax paid and changes in working capital.

EBITDA is earnings before interest, taxes, depreciation and amortization

Capital Cash Flows are calculated for each firm as follows:

- EBIT**
- Corporate Tax [= (EBIT - interest) X tax rate]
- + Depreciation
- + Amortization
- Change in net working capital
- Capital expenditures
- + Sale of PPE
- = **Capital Cash Flows**

The literature accepts that the use of cash flow measures is the best means to measure performance improvements as it mitigates the risk that the data is manipulated with accounting practices to present earnings in a more market friendly manner (Powell and Stark, 2005; Barner and Lyon, 1996; Erickson and Wang, 1999).

In addition to these firm performance measures, we also examine various efficiency and financial measures as detailed in the lower part of table 1.

Table 1 - Performance Measures

	Measure	Elements	Studies employing the measure
Firm Performance Measures	Net Operating Cash Flows	Sales - COGS – SG&A + Depreciation + Amortization – Interest Paid – Tax Paid, scaled by the book value of assets	Bellingham and Cooper, 2010
	EBITDA	EBITDA scaled by book value of assets	Lawson, 1985; Powell and Stark, 2005; Matynova et al., 2006; Sharm and Ho, 2002
	(EBITDA-ΔWC)	EBITDA – Change in Working capital scaled by assets	Lawson, 1985; Powell and Stark, 2005; Matynova et al., 2006; Sharm and Ho, 2002
	Capital Cash Flows	EBIT – Tax [(EBIT-Interest) x Tax Rate] + Depreciation + Amortisation – ΔWC – Capital Expenditures + Sale of PPE, scaled by BV assets	Kaplan and Ruback, 1995
Operating Efficiency Production Efficiency Measures	Operating expenses	COGS + SG&A / BV Assets	Ghosh, 2001; Bernile and Bauguess, 2010
	Asset Turnover	Sales / BV Assets	Bernile and Bauguess, 2010
	Sale of PPE	Cash from sale of PPE / BV Assets	Rahman & Limmack, 2004
	Capital Expenditure	Capex / BV Assets	Rahman & Limmack, 2004
Financial Measures	Cost of debt	Interest Expense/Total Debt	Devos, 2009
	Interest Coverage	EBITDA/ Interest Expense	Bellingham and Cooper, 2010

3.1.2 Industry Benchmark Construction

In order to compute the operating performance that is a product of the merger, the firm performance must be adjusted for the performance of the industry, the economy and a continuation of pre-merger superior performance by the firm. This ensures the returns calculated are attributable to the merger itself, and not to extraneous factors.

The most notable study that measures operating performance over the long-run is Healy et al (1992), however, Ghosh (2001) provides an insightful criticism to their approach of benchmarking with industry-median firms. Ghosh (2001) founds this criticism on the basis that acquiring firms generally make acquisitions following a period of superior performance, and thus their performance will be higher than industry-median firms' performance (Ghosh, 2001). Because of this, he proposes that firms in the sample should be matched to peers based on their pre-merger performance, as well as size and industry.

We apply the Loughran and Ritter (1997) matching criteria⁶, adapted to our merger context and sample. The relevant steps we perform are as follows:

1. Acquire a list of all firms in each Global Industry Classification Standard category from FinAnalysis and obtain their assets and EBITDA for the period in our sample.
2. For each merger in our sample we then:
 - a. Filter the firms in each industry sector with asset size between 25% and 200% for the bidder and target respectively.
 - b. Match the target and bidder to the closest EBITDA/Assets ratio for the filtered list of firms in the respective industry.
3. If a match cannot be found within the industry then a firm is selected on the basis of asset size within the bounds of 90% to 110%, ranked by EBITDA/Assets to find a peer.
4. Further, we check the matched firm has not made an acquisition within 3 years from the date of the merger announcement for the firm being matched.

This is referred to as the industry-adjusted matched method throughout the paper.

⁶ The matching algorithm Loughran and Ritter apply was originally developed by Barber and Lyon (1996).

The industry-median approach involves sorting all firms with the same GICS code by EBITDA/Assets for the year prior to the acquisition, and selecting the median firm as the peer.

We employ both the industry-median approach and matching approach to observe whether the choice of benchmark significantly impacts upon the results.

3.1.3 Abnormal industry-adjusted performance - Models for determining performance improvements

The Change Model

The change in performance is determined by calculating the median value of the performance measure for three years prior to the merger and comparing it to the median value for three years following the merger.

In order to compute the change in performance of the firm pre and post merger, the relevant measure (e.g. operating revenue) is summed for the target and bidder each year, for three years prior to the merger. These measures are then scaled by both BV Assets and sales (BASE in the following equations represents the scaling item). CF refers to the respective measure, for example operating revenue or EBITDA.

We use the Healy et al (1992) methodology as outlined in Martynova (2006). The ‘raw’ performance measure of the combined firm pre-merger is as follows:

$$CF_{firm,t} = \frac{CF_{B,t} + CF_{T,t}}{BASE_{B,t} + BASE_{T,t}}$$

The combined pre-merger performance of the peer target and bidder firms is the weighted average of the CF’s of the target and bidder; with the weights being the BV Assets and sales.

$$CF_{peer,t} = \left(\frac{BASE_{B,t}}{BASE_{B,t} + BASE_{T,t}} \right) X \left[\frac{CF_{peerB,t}}{BASE_{peerB,t}} \right] + \left(\frac{BASE_{T,t}}{BASE_{B,t} + BASE_{T,t}} \right) \left[\frac{CF_{peerT,t}}{BASE_{peerT,t}} \right]$$

For the post-merger period the ‘raw’ performance of the combined firm is as follows:

$$CF_{firm,t} = \frac{CF_{Combined}}{BASE_{Combined}}$$

The combined post-merger performance of the peer target and bidder firms is calculated in the same manner as the pre-merger equation. However, the weights of the combined firms are the pre-acquisition weights.

$$CF_{peer,t} = \left(\frac{BASE_{B,t-1}}{BASE_{B,t-1} + BASE_{T,t-1}} \right) X \left[\frac{CF_{peerB,t}}{BASE_{peerB,t}} \right] + \left(\frac{BASE_{T,t-1}}{BASE_{B,t-1} + BASE_{T,t-1}} \right) \left[\frac{CF_{peerT,t}}{BASE_{peerT,t}} \right]$$

So, the adjusted firm performance is as follows:

1. Industry median method:

$$CF_{ind-adjusted,t} = CF_{firm,t} - CF_{peer(industry-median),t}$$

2. Matched by industry, prior performance and size:

$$CF_{ind,size,perf-adjusted,t} = CF_{firm,t} - CF_{peer(industry,size,perf-matched),t}$$

We calculate the median $CF_{ind-adjusted,t}$ and the median $CF_{ind,size,perf-adjusted,t}$ for the three pre-merger years. This represents the pre-merger performance. We then compute the same median values for the three years following the completion year of the merger. This represents the post-merger performance.

The abnormal level of improvement post-merger is the difference between the post and pre merger median returns for the scaled cash flow. This represents the improvements in the respective measure that can be attributed entirely to the merger.

The Intercept Method (individual regression)

In addition to the change model, we also assess post-merger performance improvements using the intercept method as developed by Healy et al (1992). The intercept of the cross sectional regression provides the abnormal post-merger performance of the regressed measure, taking into account the pre-merger performance.⁷ Accordingly, the result provides the abnormal returns that are attributable to the merger.

⁷ For example, the median CFO/Assets return over the 3 years pre-merger, is regressed against the median CFO/Assets return for the 3 years post-merger.

$$IACR_{post,i} = \alpha + \beta(IACR_{pre,i}) + \varepsilon_i$$

IACR=Industry-adjusted cash flow return. $IACR_{post,i}$ (dependent variable) is the median industry-adjusted (matched method) cash flow return for company i from the post-merger period (the three years after completion year) and $IACR_{pre,i}$ (independent variable) is the pre-merger (the three years before completion year) value for the same company (Healy et al., 1992). The abnormal returns are represented by α , the intercept of the regression equation. β represents any relationship between the pre-merger returns and the post-merger returns.

Our method varies from Healy et al (1992) as we use peers that are matched by size, performance and industry, not industry median firms. We also regress a variety of different performance measures as opposed to Healy et al (1992) who only use one performance measure.

The Deflator/Scaling performance

The raw operating performance measures are scaled by the firm's book value of assets. This facilitates the generation of the pro-forma performance measures of the merged firms, which can then be used as a basis of comparison. Healy et al. (1992) and Ghosh (2001) scale the operating performance by total market value, which they measure as the sum of the total market value of equity and the book value of debt, for the target and bidder. Our study uses book value of assets due to the reasoning stated by Sharma and Ho (2002). Firstly, Australian accounting standards do not provide a choice between the purchase and pooling methods, which may affect asset values. Secondly, the use of market value of assets already includes expected acquisition related gains and would thus affect the measure. Finally, Australian consolidation rules also suggest that assets be recorded at fair market value, which is thus reflected in the book value. It is also noted that Healy et al. (2002) conducted a sensitivity test with market value and book value of assets and found no significant effect on results.

As an additional test we also scale all results by sales as previous studies have done (Ghosh (2001), Martynova (2006), Powell (2003)). We only report the results for asset returns, as whilst sales are a good test of robustness, we are primarily interested in the economic efficiency of the assets in place as a measure of firm performance.

3.1.4 Identifying individual drivers

By applying the change model to the operating efficiency, production efficiency and financial measures outlined in table 1, we are able to identify improvements in these individual variables post-merger.

In addition to identifying the improvement in the individual variables, we also seek to explore the relationship these variables have with the improvements in corporate performance in the context of the changes in the other individual variables. This is achieved with a series of multiple regressions with the improvement in firm performance being the dependent variable in each regression and the various individual drivers being the independent variables.

For operating cash flows we use asset turnover, operating expenses, net debt and interest expense/debt as the most important items. For CCF we include capital expenditure, sale of PPE, EBITDA, net debt and interest expense/debt measures. For EBITDA less change in working capital, we use revenues and expenses as the independent variables, in order to measure improvements in operating performance. The first two regressions allow us to identify both operational and financial synergies, while the third targets operating synergies. We control for the method of financing in all multiple regressions. Thus the regressions are as follows:

$$\begin{aligned} ACFO = & \\ & \alpha + \beta Revenue + \beta Expense + \\ & \beta Net Debt. + \beta Int. Exp. + \beta Method of Financing + \varepsilon \end{aligned}$$

ACFO = The abnormal post-merger CFO returns as calculated by the change model.⁸

$$ACCF = \alpha + \beta EBITDA + \beta Net Debt + \beta Int. Exp. + \beta Capex. + \beta Sale of PPE + \beta Method in Financing + \varepsilon$$

ACCF = The abnormal post-merger CCF returns as calculated by the change model.⁹

$$AEBITDA - \Delta WC = \alpha + \beta Revenue + \beta Expenses + \beta Method of Financing + \varepsilon$$

⁸ The abnormal level of improvement post-merger is the difference between the post and pre merger median returns (combined three years pre and post) for the scaled cash flow.

⁹ *ibid*

AEBITDA- Δ WC = The abnormal post-merger EBITDA- Δ WC returns as calculated by the change model.¹⁰

3.2 Cumulative Abnormal Returns

Cumulative abnormal returns (CARs) are calculated for the target, bidder and combined firm, using the standard event study methodology developed by Brown (1968) and applied by Bradley et al. (1988):

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$$

Where AR_{it} is the abnormal return to firm i on day t , R_{it} is the realised return to firm i on day t , α_i and β_i are the market model parameter estimates and R_{mt} is the return to the value weighted ASX market portfolio on day t .

The combined firm abnormal equity returns around the announcement are calculated by adjusting the returns for the target and bidder by their respective market values of equity five days prior to the announcement (Healy et al., 1992).

The market model parameter estimates for each firm are calculated by taking 240 trading days of daily returns beginning 300 days before the announcement of the first bid for the firm.

The event window that is used to capture the abnormal returns must incorporate any returns that reflect the leakage of information or speculation that the bid is going to be made. Event studies in the context of mergers employ a variety of windows; the most common window appears to be 5 days prior to the announcement date (Healy et al., 1992; Powell and Stark, 2005). We take the announcement date to be the announcement of the first bid, even if this is not the ultimately successful bid. The event window extends to the date of completion of the merger, taken to be the date that the target stock is delisted from the ASX (Healy et al., 1992). This event window should account for any leakage of public information before the announcement of the first bid. Some studies (e.g. Ghosh, 2000, Antoniou, 2008) that apply the Brown event study methodology (Brown, 1985) use an event window based only upon the successful bid. We believe this methodology is inaccurate as the initial bid, even if

¹⁰ *ibid*

unsuccessful, may generate abnormal returns that need to be accounted for as part of the total Cumulative Abnormal Returns associated with the takeover.

3.3 Expected Asset Returns

In order to examine any relation between the announcement effect and the long-term operating cash flow improvement, we first calculate asset returns due to the announcement effect to facilitate comparability between anticipated gains and measured gains. Converting the abnormal equity returns to abnormal asset returns we follow the methodology used in Healy (1992) and Ghosh (2001):

$$\frac{\Delta V}{V} = \frac{\Delta E}{E} \frac{E}{V} + \frac{\Delta D}{D} \frac{D}{V}$$

We follow the assumption that the value of debt does not change at takeover announcements and thus, asset returns equal the equity announcement returns multiplied by the equity-to-assets ratio E/V . Where E is the total market value of equity five days before the first bid, and V is the total market value calculated as “the sum of the market value of equity plus the book value of debt plus the book value of preferred stock for the target and acquirer” (Powell, 2003).

After calculating the abnormal asset returns using the above methodology, following the assumption that that abnormal asset returns reflect stock price returns due to improved future cash flows (Ghosh, 2001) we then run the following regression with abnormal asset returns as the dependent variable:

$$\text{Abnormal asset returns}_i = \alpha + \beta(\Delta \text{Cashflow}_i) + \varepsilon$$

The change in cash flow (independent variable) is the industry-adjusted (size and performance matched) difference between the pre and post merger period median returns for net operating cash flow, EBITA less change in working capital and capital cash flows using the change model.

This relationship demonstrates the extent to which the abnormal returns around the merger announcement are explained by improvements in cash flows three years after the merger. Assuming informational efficiency, we expect the AAR to be a reflection of the future operating performance.

4. Results and Analysis

The results section summarises the results found in the study and provides an interpretation considering the theoretical context. Firstly, seven hypotheses are test regarding firm performance improvements and operational efficiency, production efficiency and financial improvements post-merger, using the change and intercept methods. Secondly, the results for a series of multiple regressions using the change model findings regarding firm performance are presented to identify individual sources of the improved post-merger performance. Lastly, abnormal equity returns at announcement date of merger are reported and compared to post-merger performance improvements found using the change model.

4.1 Sample

The sample in this study consists of all available mergers and acquisitions where both bidder and target were listed on the Australian stock exchange between the years 1997 to 2006 as reported by the Connect 4 database. The acquisitions had to be an acquisition of the targets entire listed equity with the target's shares being de-listed from the stock exchange and a single entity remaining. We also removed firms that engaged in multiple acquisitions (within three years before the merger completion or three years after), and firms that were subsequently acquired during the three year post-merger measurement period. This resulted in a sample of 99 mergers and acquisitions for analysis. The sample includes 31 bids financed by cash, 56 financed by stock and 12 using a mix of cash and stock. When the FinAnalysis database had incomplete information, annual reports for the companies were examined to extract the missing data.

4.2 Hypotheses

The following hypotheses regard the benefits that can be attributed to the merger itself as we adjust returns for the impact of the economy, prior-superior performance and relative size of the target and bidder.

H1: Operating performance in the post-acquisition period is greater than the pre-acquisition period.

H0: Operating performance in the post-acquisition period is equal to or less than the pre-acquisition period.

H2: Asset turnover in the post-acquisition period is greater than in the pre-acquisition period.

H0: Asset turnover in the post-acquisition period is equal to or less than the pre-acquisition period.

H3: Operating expense ratio in the post-acquisition period is less than in the pre-acquisition period.

H0: Operating expense ratio in the post-acquisition period is equal to or more than the pre-acquisition period.

H4: There is a decrease in the level of capital expenditure in the post-acquisition period compared to the pre-acquisition period.

H0: There is no change or an increase in the level of capital expenditure in the post-acquisition period compared to the pre-acquisition period

H5: There is an increase in the sale of PPE in the post-acquisition period compared to the pre-acquisition period.

H0: There is no change in or a decrease of sale of PPE in the post-acquisition period compared to the pre-acquisition period.

H6: Debt capacity in the post-acquisition period is greater compared to the pre-acquisition period.

H0: Debt capacity in the post-acquisition period is equal to or less than the pre acquisition period.

H7: Taxes paid are lower in the post-acquisition period compared to the pre-acquisition period.

H0: Taxes paid in the post-acquisition period are equal to or greater than the pre-acquisition period.

H8: Combined cumulative abnormal returns of the target and bidder at the announcement of the merger are positive.

H0: Combined cumulative abnormal returns of the target and bidder at the announcement of the merger are nil or negative.

H9: The cumulative abnormal announcement returns are a reflection of the firms' actual operating improvements in the years following the merger.

H0: The cumulative abnormal announcement returns have no relation to the firms' actual operating improvements in the years following the merger.

4.3 The Change Method

The following results test the post-merger performance by calculating the pre-merger and post-merger returns with a raw unadjusted measure, an industry-adjusted measure matching performance and size, and an industry median firm adjustment. The three year pre-merger returns create a combined firm out of the target and bidder, and the post-merger results use the returns of the merged firm. The raw results calculate the returns that the merging firms experience without adjusting for the industry or economy wide factors. These results do not provide a basis for determining post-merger performance as the change can be attributed to many non-merger factors such as industry growth, inflation, economic boom/recession. The industry adjustment based on the performance of the firm and size (EBITDA/Assets) selects two firms that operate and perform similarly to the target and bidder respectively. Essentially the methodology creates a benchmark that measures how the bidder and target would have performed without the merger. When the benchmark performance is subtracted from the actual performance of the merged firms then the remaining returns are a product of the merger.

The industry adjustment controlling for prior firm performance matches the merging firms to industry peers with the closest EBITDA/Assets ratio. Assuming a perfect match can be achieved, the pre-merger performance of the firms in the sample when adjusted by the industry peer's performance should be zero on the EBITDA measurements. Table 2 reports that the median pre-merger performance of the merging firms after adjustment for industry peers performance is 0.5% for EBITDA. This result is expected given the sample firms do not have exact matches with the industry peers. However, the majority of pre-merger superior performance is removed with regards to EBITDA and thus effective matching has been achieved. The results indicate that for the other performance measures, the sample firms experience a degree of superior performance to their peers in the pre-merger period. We account for this superior performance persisting in the post-merger period by subtracting the pre-merger performance from the post-merger performance.

Does firm performance on an aggregate level improve post-merger?

(Testing H1)

Table 2 reports the change method results for assessing firm performance over four key measures: net operating cash flows, EBITDA, EBITDA- Δ WC and capital cash flows. The primary results are those reported in column 3 'Industry-adjusted (Matched performance and size).

Table 2 – Firm performance measures using the change model

Median scaled returns of firm performance for 99 combined target and bidder firms in the three years surrounding the merger completion over the period of 1994 to 2009. ¹¹									
Firm Performance Measure	Combined Firm (Unadjusted)			Industry-Adj (Matched performance and size)			Industry-Adj (Industry Median)		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Net operating cash flow	5.5%	5.3%	-0.2%	0.9% ^c	1.5% ^b	0.7%	3.0%	3.0%	-0.1%
EBITDA	11.1%	11.3%	0.2%	0.5% ^a	3.0%	2.5%	5.1%	6.9%	1.8%
EBITDA- Δ Working Capital	9.6%	10.4%	0.8%	1.9% ^a	5.0% ^a	3.1%	3.4%	7.8%	4.4%
Capital Cash Flows	1.0%	3.6%	2.6%	2.2%	2.8%	0.6%	3.3%	9.9%	6.6%

Measures: Net operating cash flows are taken from the cash flow statement and include net cash flows from operating activities, interest payments, income tax paid and changes in working capital. EBITDA is earnings before interest, taxes, depreciation and amortization. Capital cash flows is EBIT - corporate tax [(EBIT – Interest) x Tax Rate] + depreciation + amortization - Δ working capital - capex + sale of PPE.

Methodology: The pre-merger (3 years prior to the completion year) combined firm returns are calculated as the weighted averages of the target and bidder performance measures (e.g. CFO), with the weights being the book value of assets. The post-merger (3 years after the completion year) returns are the returns of the performance measure for the merged firms. The median return for the pre and post merger period is reported. The industry adjustments are the unadjusted raw combined firm return with the industry peer return subtracted. The matched method performance and size adjustment matches the bidder and target to a peer in the same industry with an asset size within the range of 25-200% and closest EBITDA/Assets ratio (see 3.1.2 'Industry Benchmark Construction'). A combined peer is then constructed for each year out of the matched bidder and target peer firms with the performance measure values scaled by the asset weights of the actual bidder and target. The industry-matching approach selects the peer based on the median EBITDA/Assets value for the particular industry.

Results: Industry-adjusted (matched on performance and size) returns are the primary results. The post-merger adjusted returns would represent the abnormal cash flows attributable to the merger, however accounting for persistence in the pre-merger returns, the pre merger values are subtracted from the post merger values and reported in the change column to give the abnormal post-merger performance improvement.

Statistical Significance: Pursuant to previous studies applying this methodology (Healy et al (1992), Martynova (2006)) the 3 year pre merger and 3 year post merger medians are tested for statistical significance using a two-tailed test.

^{a,b,c} Significance at the 1%/5%/10% level is denoted by a,b,c respectively. The tests are carried out on the industry-adj matched method.

Net operating cash flow

Table 2 reports the median net operating cash flow (CFO) returns for the merging firms in our sample. This measure is the preferred means to measure operating performance improvement as net operating cash flow is not affected by accounting treatment or amounts held in working capital, it is a pure cash flow measure. As this measure also includes interest and taxation, this performance measure also captures potential financial synergies. The second column reports a small negative change in raw operating cash flow returns in the post-

¹¹ The results of firm performance measures scaled by sales do not contradict our findings reported in Table 2.

merger period, with 5.5% returns in the pre-merger period and 5.3% in the post-merger period. The raw performance measure incorporates the full effects of the industry and economy, and thus is not an accurate reflection of the post-merger performance attributable to the merger. When the effects of the industry and economy are removed controlling for size and performance with the matched industry-adjustment, the median post-merger operating performance is 1.513% and the pre-merger performance is 0.854% resulting in a post-merger abnormal net operating cash flow return of 0.659%. This result indicates improvements in operating performance following the merger.

The benchmark to determine the abnormal operating performance post-merger depends on whether the results indicate persistence in the pre-merger returns. As the pre-merger returns are significantly different from zero, it appears the pre-merger returns are persistent and the appropriate benchmark for the post-merger industry adjusted returns is the pre-merger median for years -3 to -1, i.e. 0.854% for CFO.

The operating performance returns adjusted by industry median are not statistically different from zero. The industry median approach is not the preferred method of adjustment in this paper as it fails to account for the respective size of the firms and their any superior pre-merger performance. However, it is included as a robustness test of the matching results and to ensure that the EBITDA/Assets matching criteria does not provide misleading results on any performance measures.

Earnings before interest, taxes, depreciation and amortization

Table 2 evaluates operating performance by earnings before interest, taxes, depreciation and amortization scaled by assets, which indicates the firms' profitability. As it does not include interest or taxes it can be regarded as a measure that captures operating performance improvements, i.e. the improvements in operating revenues and expenses. The industry-adjusted (matched for size and performance) results indicate median annual pre-merger returns of 0.5% for -3 to -1 years and 3.0% for the post-merger period. Applying the industry-median adjustment approach yields a higher abnormal post-merger return of 1.8%. However, this is not a pure cash flow measure as it does not include the working capital charge and is thus exposed to the accounting treatment employed by each firm.

Earnings before interest, taxes, depreciation and amortization less changes in working capital

EBITDA does not include the changes in working capital, thus the performance improvements could be subject to manipulation by management. There may be pressure on management to deliver improved earnings in the post-merger period to demonstrate the merger was a success. In order to achieve this management may provide favourable credit terms increasing accounts receivable and withhold payment on current liabilities to manipulate earnings. To account for this we subtracted the changes in working capital to provide a more pure cash flow measure. The results indicate that this is not the case however as industry-adjusted (matched for size and performance) returns for EBITDA - Δ WC are 1.9% in the pre-merger period and 5.0% in the post-merger period (significant at the 1% level), giving an abnormal post-merger return of 3.1%.

Capital Cash Flows

The Capital Cash Flows (CCFs) represent the cash flows to debt and equity holders after corporate taxes [(EBIT-Interest) x Tax Rate]. In addition to capturing the financial synergies i.e. the tax shield from debt and any change in the cost of debt, CCF also captures capital expenditure and assets sales which are hypothesised to alter post-merger as the firm implements restructuring measures. As capital efficiency is expected to increase post-merger the level of capex should decline, and the firm should be able to retire redundant assets. The industry-adjusted (matched) results indicate a 2.2% pre-merger CCF return and a 2.8% return in the post-merger period. The industry-median adjustment method indicates a greater improvement in CCF returns post-merger with 9.9% and 3.3% pre-merger. These results are not statistically significant.

In light of the evidence that the performance measures exhibit post-merger improvements, H1 is accepted.

Conclusion regarding firm performance using the change method

Taking into account the results from table 2 there is strong evidence of operating performance improvements in merging firms when their performance is adjusted for their industry peers (matched criteria) performance. Whilst net operating cash flows reports the lowest returns it is arguably the most accurate measure of improvement in post-merger return as it takes into account the pure cash flows and incorporates the interest payments that are often associated with the financing of an acquisition. From the perspective of firm profitability, EBITDA and

EBITDA- Δ WC provide a valid measure and support our conclusion that firm performance improves post-merger.

Further examination into the individual drivers will identify more accurately the particular sources of mergers gains.

Do merging firms experience operating synergies?

We test for operating synergies with hypotheses 2 to 5.

Table 3 provides the results for the change method on operating revenue, operating expenses, capital expenditure and sale of PPE.

Table 3 - Individual operating performance measures using the change model

Median scaled returns of operating performance for 99 combined target and bidder firms in the three years surrounding the merger completion over the period of 1994 to 2009. ¹²									
Operating Performance Measure	Combined Firm (Unadjusted)			Industry-Adj (Matched performance and size)			Industry-Adj (Industry Median)		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Operating Revenue	74.3%	79.1%	4.8%	-3.1%	1.8%	5.0%	41.1%	28.5%	-12.5%
Operating Expenses ¹³	64.5%	70.5%	-6.0%	3.1%	6.9% ^b	3.8%	28.9%	17.6%	11.3%
Capital Expenditure ¹⁴	-4.9%	-3.3%	1.6%	-1.4% ^a	-0.7% ^b	0.7%	-0.6%	0.1%	0.8%
Sale of PPE	0.18%	0.18%	0.0%	0.07% ^c	0.09% ^c	0.01%	0.21%	0.25%	0.04%

Measures: Operating revenue is scaled by book value of assets and represents asset turnover. Operating expenses is COGS + SG&A.

Methodology: The pre-merger (3 years prior to the completion year) combined firm returns are calculated as the weighted averages of the target and bidder performance measures (e.g. Operating Revenue), with the weights being the book value of assets. The post-merger (3 years after the completion year) returns are the returns of the performance measure for the merged firms. The median return for the pre and post merger period is reported. The industry adjustments are the unadjusted raw combined firm return with the industry peer return subtracted. The matched method performance and size adjustment matches the bidder and target to a peer in the same industry with an asset size within the range of 25-200% and closest EBITDA/Assets ratio (see 3.1.2 'Industry Benchmark Construction'). A combined peer is then constructed for each year out of the matched bidder and target peer firms with the performance measure values scaled by the asset weights of the actual bidder and target. The industry-matching approach selects the peer based on the median EBITDA/Assets value for the particular industry.

Results: Industry-adjusted (matched on performance and size) returns are the primary results. The post-merger adjusted returns would represent the abnormal cash flows attributable to the merger, however accounting for persistence in the pre-merger returns, the pre merger values are subtracted from the post merger values and reported in the change column to give the abnormal post-merger return improvement.

Statistical Significance: Pursuant to previous studies applying this methodology (Healy et al (1992), Martynova (2006)) the 3 year pre merger and 3 year post merger medians are tested for statistical significance using a two-tailed test. ^{a,b,c}Significance at the 1%/5%/10% level is denoted by a,b,c respectively. The tests are carried out on the industry-adj matched method.

¹² The results of the operating performance measures scaled by sales do not contradict our findings reported in Table 3.

¹³ Operating expense is reported as a negative value in the calculations so a decrease in the level of operating expense indicates an increase in the level of operating expenses.

¹⁴ Capital expenditure is reported as a negative value in the calculations so a decrease in the level of capex indicates an increase in the level of capital expenditure.

Does asset turnover improve post-merger?

(Testing H2)

Table 3 provides mixed results as to whether asset turnover (operating revenues scaled by assets) improves post-merger. On the raw performance measure column 1 indicates that there is a 4.8% improvement in asset turnover post merger. This however could be attributable to the overall increase in revenues due to inflation and economic growth. The industry-adjusted (matched) results suggest merging firms underperform their non-merging peers pre-merger and then over-perform their peers post-merger. The change in asset turnover the post merger period attributable to the merger is a statistically insignificant 5.0%

The industry-median adjusted results suggest operating revenues decline post-merger. Upon inspection of the individual results, it appears that the industry-median EBITDA/Assets criteria does not provide an accurate basis to identify a peer combined firm for analysing operating revenues. This is apparent from the 41.1% variance in the pre-merger operating revenues of the sample firm with the peer.

Accordingly, with respect to H2, we cannot reject the null hypothesis.

Do merging firms experience cost savings in the post-merger period?

(Testing H3)

Table 3 reports that on both the industry-adjustment measures, there is an improvement in the operating expense/assets ratio. As operating expenses are recorded as a negative value, the positive return indicates the operating expense ratio improves at a level superior to its peers. The industry-adjusted (matched) results indicate merging firms experience cost savings in the post-merger period of 6.9% (these results are significantly different from zero). This means on an industry-adjusted basis merging firms decrease their operating expense/assets ratio in the post-merger period by 3.8% with the pre-merger operating expense return of 3.1% being used as the benchmark.

On this basis we accept the hypothesis.

Do merging firms spend less on capital investments post-merger?

(Testing H4)

Table 3 reports that merging firms decrease their level of capital expenditure across all three measures. The industry-adjusted (matched) levels of capital expenditure indicate a

statistically significant -1.4% level of pre-merger capital expenditure, and a -0.7% level in the post-merger period, indicating a decrease in the level of capital investment of 0.7% relative to the book value of assets. Note that since capital expenditure is reported as a negative number in the calculations, a decrease in the capital expenditure returns indicates an increase in the level of capital expenditure.

On this basis we accept the hypothesis.

Do merging firms sell off PPE post-merger?

(Testing H5)

While it may be expected that some firms sell off assets after a merger, our results indicate that there is a very small increase in the industry-adjusted level of PPE sales post-merger. The results are significantly different from zero at the 10% level. We propose the reason for this result is due to the use of the median method of measurement. When this method is used, the firms who do sell extremely large PPE items such as a factory will not have as large of an effect on the performance measurement when using the median approach. Upon detailed inspection of the results, there is one industry-matched peer that has such a large value for sale of PPE that the industry-adjusted result for the firm in our sample is -2,700% Removing this outlier from the post-merger sample and calculating the mean for the sample resulted in a pre-merger average industry-adjusted (matched) value of -1.7% and a post-merger value of 7.89% (when it was -9.6% with outlier included). This exemplifies the large values involved in the sale of PPE. Based on the tiny magnitude of the results when using the industry-matched median method we are unable confirm there is increased sale of PPE post merger.

On this basis we cannot reject the null hypothesis.

Conclusion regarding operating synergies using the change method

We find statistically significant evidence of operating expense ratio improvements in post-merger firms measured by operating expenses scaled by assets adjusted for the return of industry peers matched by performance and size. This indicates an improvement in operating efficiency. We also find a statistically significant decrease in the level of capital expenditure by merging firms. This indicates an improvement in asset productivity may explain improvements in corporate performance. In order to identify the extent of the role these improvements play in the overall improvements in firm performance, the multiple regressions will identify their explanatory power when considered in light of the other relevant efficiency, investment and financial variables.

Do merging firms experience financial synergies?

We test for financial synergies with hypotheses 6 to 8.

Table 4 - Individual financial measures using the change model

Median scaled returns of financial measures for 99 combined target and bidder firms in the three years surrounding the merger completion over the period of 1994 to 2009. ¹⁵									
Financial Measures	Combined Firm (Unadjusted)			Industry-Adj (Matched performance and size)			Industry-Adj (Industry Median)		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Interest Coverage	-6.96	-6.54	-0.42	0.17 ^c	0.59 ^c	0.42	-5.51	-5.74	-0.23
Interest Paid	-1.0%	-1.3%	-0.3%	0.2% ^a	0.6% ^a	-0.4%	0.4%	-1.2%	-0.8%
Net Debt	17.1%	19.2%	2.1%	5.6% ^a	8.3% ^a	2.7%	3.9%	10.4%	6.5%
Taxes Paid	-1.3%	-1.1%	0.2%	0.4% ^a	0.4% ^a	0.0%	0.5%	-0.4%	0.1%

Measures: Interest coverage is EBITDA/Interest Expense which indicates the capacity of the firm to carry debt. Interest paid and taxes paid are the actual cash flows associated with the expenses.

Methodology: The pre-merger (3 years prior to the completion year) combined firm returns are calculated as the weighted averages of the target and bidder performance measures (e.g. Interest Paid), with the weights being the book value of assets. The post-merger (3 years after the completion year) returns are the returns of the performance measure for the merged firms. The median return for the pre and post merger period is reported. The industry adjustments are the unadjusted raw combined firm return with the industry peer return subtracted. The matched method performance and size adjustment matches the bidder and target to a peer in the same industry with an asset size within the range of 25-200% and closest EBITDA/Assets ratio (see 3.1.2 'Industry Benchmark Construction'). A combined peer is then constructed for each year out of the matched bidder and target peer firms with the performance measure values scaled by the asset weights of the actual bidder and target. The industry-matching approach selects the peer based on the median EBITDA/Assets value for the particular industry.

Results: Results: Industry-adjusted (matched on performance and size) returns are the primary results. The post-merger adjusted returns would represent the abnormal cash flows attributable to the merger, however accounting for persistence in the pre-merger returns, the pre merger values are subtracted from the post merger values and reported in the change column to give the abnormal post-merger returns improvement.

Statistical Significance: Pursuant to previous studies applying this methodology (Healy et al (1992), Martynova (2006)) the 3 year pre merger and 3 year post merger medians are tested for statistical significance using a two-tailed test. ^{a,b,c}Significance at the 1%/5%/10% level is denoted by a,b,c respectively. The tests are carried out on the industry-adj matched method.

Does debt capacity increase post-merger?

(Testing H6)

Table 4 reports the debt capacity of merging firms by measuring the interest coverage ratio, which is the EBITDA/Interest Expense. As interest expense is recorded as a negative in the calculations, the change from pre-merger ratio of -0.17 to -0.59 post-merger represents an

¹⁵ The results of the financial measures scaled by sales do not contradict our findings reported in Table 4.

increase in the capacity of merged firms to carry their interest expense by 0.42. This result shows that the level of earnings that are available to pay off interest expense improves post-merger and thus debt capacity increases for merging firms.

On this basis H6 is accepted.

Table 4 reports the cash flows associated with interest payments on debt scaled by the level of assets. As interest paid is reported as a negative number, the pre-merger value of -0.2% (industry-adjusted matched) compared to the post-merger value of -0.6% indicates an increase in the relative amount of interest paid. This result is a reflection of the debt financing that is often associated with the cash method of payment for mergers. Further, on all measures the level of net debt (debt – cash) increases post-merger. This result is a combination of the decrease in cash post-merger as it is used to finance the merger, as well as an increase in the level of debt post-merger where the firm takes on additional debt to finance the merger. The result can be further explained by the firm utilising its improved debt capacity post-merger and taking on additional debt to fund restructuring and expansion.

Do merging firms pay less tax?

(Testing H7)

Table 4 reports the cash flows associated with taxes paid by merging firms. On both the industry-adjusted measures the results do not indicate any change in the level of taxes paid (scaled by assets). This result is not surprising given the results for H1 that indicate the merging firms in the sample experience abnormal levels of operating performance pre-merger. As the sources of tax benefits from mergers derive from acquiring targets with losses from operations and tax loss carry-forwards on the books that can be used to offset the bidder's tax liabilities, targets that exhibit strong performance pre-merger will not offer tax benefits.

On this basis the null hypothesis cannot be rejected.

Conclusion regarding financial synergies using the change method

We find statistically significant evidence of an improved interest coverage ratio in post-merger firms adjusted for the return of industry peers matched by performance and size. This represents an increased debt capacity for firms that engage in mergers. We also find statistically significance evidence that merging firms have a higher level of net debt in the post-merger period compared to peers that are not engaging in mergers. As with the operating

synergy evidence identified in the change model, the role these financial variables play in the overall level of firm improvement will be analysed in the multiple regressions.

4.4 Intercept Method

Table 5 provides the results of a cross sectional regression to estimate the abnormal performance measure returns that are attributable to mergers as outlined in the methodology section 3.1.3. Column 2 of Table 4 reports the intercept for the four performance measures used: cash flow from operations, capital cash flows, earnings before interest, taxes, depreciations and amortization (EBITDA) and EBITDA less changes in working capital.

Selection of control variable: The intercept method is calculated using measures that are adjusted for performance and size. This matching criteria mitigates any bias that relative size may introduce. The method of financing has been shown to affect performance (Section 2.5(a)), thus a dummy variable is included in the multivariate regressions, with a value of 1 for cash and 0 for stock/mixed.

Table 5 – Performance measures regressions

Least squares regression of post-merger returns (dependent variable) against pre-merger returns (independent variable) for four key performance measurements								
Performance Measure	α Intercept	P-Value	β : Pre-merger CF	P-Value	β : Control	P- value	R-sqrd	N
CFO								
<i>Individual</i>	2.2%	0.0713	0.196	0.2001			2.1%	81
<i>MOF Controlled</i> ¹⁶	1.2%	0.4178	0.178	0.2460	0.027	0.2837	3.5%	81
CCF								
<i>Individual</i>	9.5%	0.0330	-0.191	0.5010			0.8%	57
<i>MOF Controlled</i> ¹⁷	15.0%	0.0114	-0.2151	0.4454	-0.1247	0.1511	4.6%	57
EBITDA								
<i>Individual</i>	5.3%	0.0049	1.011	0.2749			1.7%	71
<i>MOF Controlled</i> ¹⁸	5.8%	0.0091	1.078	0.2533	-0.014	0.6544	2.0%	71
EBITDA-WC								
<i>Individual</i>	4.0%	0.1086	0.100	0.7326			0.2%	69
<i>MOF Controlled</i> ¹⁹	2.6%	0.4090	0.087	0.7671	0.035	0.4793	0.9%	69
$IACR_{post,i} = \alpha + \beta(IACR_{pre,i}) + \varepsilon_i$ IACR=Industry-adjusted cash flow return [Individual regression] $IACR_{post,i} = \alpha + \beta(IACR_{pre,i}) + \beta(MethodofFinancing) + \varepsilon_i$ [Individual regression with control variable] The industry-adjusted cash flow return is computed as the difference between the median industry adjusted (peer matched on size and performance) post-merger return (1 to 3 years after the completion year) and pre-merger period (1 to 3 years before the completion year) median return scaled by book value of assets. This is the 'change' value taken from the change model results reported in Table 2 for each of the performance measures. The abnormal returns are represented by α , the intercept of the regression in equation. β represents any relationship between the pre-merger returns and the post-merger returns.								

The individual regression of cash flow from operations yields an intercept of 2.2% with a 10% level of significance. This result indicates post-merger firms experience 2.2% abnormal industry-adjusted (matched method) cash flow from operations returns. The pre-merger cash flow beta coefficient of 0.196 indicates there is a degree of persistence of pre-merger returns

¹⁶ MOF = Method of Financing, cash=1, stock/mixed=0

¹⁷ ibid

¹⁸ ibid

¹⁹ ibid

into the post-merger period.²⁰ These results are consistent with our findings with the change model and support our acceptance of H1. When the method of financing is controlled for, the intercept falls slightly to 1.2% and the beta of the control coefficient is 0.027 suggesting a very small relationship with post-merger returns. This result is not statistically significant.

The CCF regression yields a statistically significant 9.5% level of abnormal returns with a beta value of -0.191 (also statistically significant). The intercept is 15% (statistically significant) when the control variable is included with a beta of -0.1247 (not statistically significant).

The EBITDA regression yields abnormal post-merger returns of 5.3% significant at the 1% level and a beta of 1.01 (not statistically significant). Including the control variable increases the abnormal returns to 5.8% (significant at the 1% level).

The EBITDA-WC regression yields abnormal post-merger returns of 4%, with a beta of 0.10. Including the control variable decreases the abnormal returns to 2.6% (not statistically significant). When the change in working capital is removed from the EBITDA measure the returns decline, indicating that some of the improvements come from differences in changes in working capital.

²⁰ These findings are consistent with Healy et al (1992) who find abnormal cash flow returns of 2.8% (scaled by market value of assets) and a beta of 0.37 on pre-merger returns.

4.5 Summary of statistically significant change and intercept method results

Measures of post-merger Performance	Change Method Result	Intercept Method Support
Net operating cash flows	Improvement	Yes
EBITDA	Improvement	Yes
EBITDA-ΔWC	Improvement	Yes
Capital Cash Flows	-	Yes
Asset Turnover	-	
Operating Expenses	Improvement	
Capital Expenditure	Decrease	
Sale PPE	-	
Debt Capacity	Improvement	
Cost of Debt	-	
Tax Paid	Increase	

The above table provides evidence that Australian firms improve their corporate performance following mergers. The intercept model provides unanimous evidence of abnormal performance returns on all four measures, with statistical significance. The change model provides statistical significance for all measures save for capital cash flows. These results demonstrates that Australian mergers are value creating.

The results also offer an insight into the individual variables that explain the improved corporate performance. Merging firms experience a decrease in their operating expense ratio, which evidences an improvement in operating efficiency, which offers an explanation for the increase in post-merger operating performance returns. The change model also indicates that merging firms decrease their level of capital expenditure in the post-merger period. Firms reducing their level of capital expenditure provides evidence of production efficiencies. Healy et al (1992) find the main driver of the improvement in corporate performance post-merger is improved production efficiency through an increase in asset turnover.

The merging firms also exhibit evidence of an increase in their debt capacity and an increased level of debt. These results offer an explanation of the improved performance pursuant to the disciplining effect of debt theory outlined in section 2.1.3.

The change model results provide an indication of what individual variables of performance alter in the post-merger period. Healy et al (1992) who analyse the individual variables of capital expenditure, R&D expenditure, asset turnover and employee growth using the change model, draw inferences from these individual results to explain the improved firm performance. Having drawn inferences from the improvements in our individual variables, we now construct a series of multiple regressions to further explore the role each variable plays in the firm performance improvement measured by capital cash flows, net operating cash flows and EBITDA less the change in working capital. This analysis will enable a more definitive conclusion to be drawn as to which individual variables explain the post-merger improvement.

4.5 Sources of post-merger gains

Table 6 - Multiple regression results of relation of improvement of independent variables to improvements in performance

Multiple regression results of relation of improvement of independent performance variables to improvements of firm performance											
A. Net Cash flows from Operations				B. Capital Cash Flows ²¹				C. EBITDA - Change in Working Capital ²²			
Independent Variable	Scaling Item	Coefficient	p value	Independent Variable	Scaling Item	Coefficient	p value	Independent Variable	Scaling Item	Coefficient	p value
Op. Revenue	Assets	0.07	0.170	EBITDA	Assets	0.90	0.000	Op. Revenue	Assets	0.15	0.248
Op. Expenses	Assets	0.07	0.226	Net Debt	-	0.11	0.256	Op. Expenses	Assets	0.14	0.364
Net Debt		0.11	0.155	Interest Exp	Debt	0.37	0.120	Method of Finance		0.01	0.882
Interest Exp	Debt	0.29	0.040	Capital Expenditure	Assets	0.37	0.328				
Method of finance	-	-0.01	0.737	Sale of PPE	Assets	2.05	0.038				
				Method of Finance	-	-0.02	0.617				
R-Squared	9.12%	Sample	59	R-Squared	52.34%	Sample	57	R-Squared	6.89%	Sample	59
<p>A multiple regression was run to measure the effects of various individual drivers on operating performance improvement measured by net cash flows from operations. The equation for the regression was as follows:</p> $ACFO = \alpha + \beta Revenue + \beta Expense + \beta Net\ Debt. + \beta Int.\ Exp. + \beta Method\ of\ Financing + \varepsilon$ <p>ACFO = The abnormal post-merger CFO returns as calculated by the change model.</p>				<p>A multiple regression was run to measure the effects of various individual drivers on operating performance improvement measured by capital cash flows. The equation for the regression was as follows:</p> $ACCF = \alpha + \beta EBITDA + \beta Net\ Debt + \beta Int.\ Exp. + \beta Capex. + \beta Sale\ of\ PPE + \beta Method\ in\ Financing + \varepsilon$ <p>ACCF = The abnormal post-merger CCF returns as calculated by the change model.</p>				<p>A multiple regression was run to measure the effects of various individual drivers on operating performance improvement measured by EBITDA - ΔWC. The equation for the regression was as follows:</p> $AEBITDA - \Delta WC = \alpha + \beta Revenue + \beta Expenses + \beta Method\ of\ Financing + \varepsilon$ <p>AEBITDA-ΔWC = The abnormal post-merger EBITDA-ΔWC returns as calculated by the change model.</p>			

²¹ Note: These results were adjusted using White's heteroscedasticity method, which led to the results becoming statistically insignificant.

²² Note: These results were adjusted using White's heteroscedasticity method, which led to the results becoming statistically insignificant.

Table 6 reports the results for a series of multiple regressions with the improvements in post-merger performance as the dependent variables, and various performance measures as the independent variables. The regression identifies the individual drivers behind the improvements in post merger performance. For each of the three dependent variables, net operating cash flows, capital cash flows and EBITDA less change in working capital, independent variables are selected that are components of these to examine which have the strongest relationship to the improvements in performance. All multiple regressions are controlled for the method of financing of the bid.

Panel A of the table presents the multiple regression with net operating cash flows as the dependent variable and operating revenue, operating expenses, net debt and interest expense/debt as the independent variables. The results from this regression suggest that the primary driver behind improvements in net operating cash flows is the cost of debt, represented by interest expense/debt, with a positive relationship of 0.29 significant at the 5% level. This implies that firms with improved operating performance as measured by net operating cash flows, have a lower cost of debt compared to that of their peers. The regression was first run using EBITDA as an independent variable in the place of operating revenue and operating expense, and was found to have a statistically significant positive relationship with net operating cash flows. Whilst the results suggest improved asset turnover and improved operating efficiency, they are not statistically significant when measured in this regression on an individual level. Accordingly, we are not of the view that this rules out the role of operating synergies as an explanation for improved net operating cash flows. This model passed the Durbin-Watson test with a statistic of 1.64 showing no signs of autocorrelation and showed no signs of heteroscedasticity.

Capital cash flows was used as a dependent variable in addition to operating cash flows in order to attempt to capture improvements relating to financial synergies (primarily the interest tax shield) and to identify the role of capital expenditure and sale of PPE. EBITDA was used in this regression as opposed to its individual components because the primary purpose behind CCF as an independent variable was to identify any evidence in financial synergies and investment decisions (sale of PPE and capital expenditure). The two variables that show strong statistical significance are EBITDA and sale of PPE. EBITDA shows a positive relation of 0.90 significant at the 1% level, which is to be expected. This shows that firms with improved EBITDA performance will also have improved firm performance as measured by CCF. The other significant result is the sale of PPE, which has a coefficient of

2.05 and is significant at the 5% level. This indicates the sale of redundant assets post-merger contributes to the improved firm performance. The sale of PPE, like a decline in capital expenditure, represents an improvement in production efficiency. Whilst capital expenditure has a positive relationship with CCF in the regression, indicating its decline contributes to the improved firm performance, this result is not statistically significant.

The regression also suggests that a lower cost of debt is related to the abnormal post-merger CCF, however the result is not statistically significant. There was some evidence of heteroscedasticity identified so the multiple regression was run using the White heteroscedasticity method. The Durbin-Watson statistic of 1.93 implies no auto-correlation.

Panel C of table 6 shows a regression of EBITDA less changes in working capital as the dependent variable in order to examine the operating performance measures of operating revenues and operating expenses as the independent variables. The result from this shows that the asset turnover and operating expenses decline, both have a positive relationship with improved firm performance, though not statistically significant. There was evidence of heteroscedasticity in this model and when the regression was conducted using the White Heteroscedasticity consistent method, the p values of the variables became insignificant (0.24 for asset turnover). Due to the insignificance of this result it is not possible to draw a conclusion from this analysis.

4.6 Cumulative Abnormal Returns

4.6.1 Stock returns at the announcement of the merger

(Testing H8: Combined cumulative abnormal returns of the target and bidder at the announcement of the merger are positive.)

Table 7 - Cumulative Abnormal Equity Returns at announcement of merger (outliers removed)

Distribution of cumulative abnormal equity returns around announcement periods for targets, bidders and combined returns from 5 days before the first bid date until completion date (outliers removed) for 90 combined target and bidder firms			
Measurement	(Combined)	(Target)	(Bidder)
Mean	3.36%	22.16%	-0.58%
1 st Quartile	-8.69%	2.01%	-12.30%
Median	3.34%	14.21%	2.01%
3 rd Quartile	14.36%	37.62%	10.66%

Table 7 reports the cumulative abnormal equity returns during the announcement period, beginning at five days before the first bid date, through to the completion date.

The mean abnormal return for bidders is -0.58% and 22.16% for targets. The weighted average of the market-adjusted returns for the target and bidder provides the combined cumulative abnormal return of 3.36%. The target returns are significant at the 1% level, whilst the bidder and combined returns are not significantly different from zero using a two-tailed test.

The results are in line with several previous studies including Healy (1992) and Bradley (1988) who both found that the target firm shareholders experience abnormal equity returns at the announcement of a takeover and that bidder returns are not significantly different from zero.

Due to the methodology used, there were several deals that had large windows between the first bid date and ultimate completion. The mean window for calculating abnormal returns was 100 trading days, with a median of 98, and the largest was 1211 trading days. A large window exposes the results to noise in the determination of abnormal returns attributable to

the merger. Accordingly, Table 7 represents a reduced sample in which all event windows greater than 300 days were removed from the sample. The sample was reduced from 99 to 90.

On this basis the null hypothesis cannot be rejected.

4.6.2 Relating equity returns to performance improvements

(Testing H9: The cumulative abnormal announcement returns are a reflection of the firms' actual operating improvements in the years following the merger.)

Table 8 - Measurement of relationship between abnormal asset returns and performance improvement measures

Individual Regressions results of AAR compared to various performance measures				
Performance Measure	Coefficient	p value	Sample	R-Squared
Net Operating Cash Flows	0.57	0.097	53	5.30%
<i>Controlling for cash/scrip</i>	0.53	0.120	53	8.18%
Capital Cash Flows	0.45	0.095	36	7.99%
<i>Controlling for cash/scrip</i>	0.46	0.084	36	12.33%
EBITDA - ΔWC	0.35	0.051	51	7.57%
<i>Controlling for cash/scrip</i>	0.36	0.046	51	10.46%
The equations used in the regressions to estimate the independent variable coefficients were: $AAR = \alpha + \beta Performance Measure + \varepsilon$				

We examine whether the abnormal equity returns at the merger announcement can be explained by the performance improvements in the post-merger period. Our primary measure of operating performance improvements post-merger is net operating cash flow from operations scaled by assets. In order to determine the explanatory power of the operating cash flow returns when it comes to the announcement equity returns, the abnormal equity returns are converted to abnormal asset returns (AARs). AARs are the abnormal equity returns at announcement multiplied by the equity-to-assets ratio (E/V) (see section 3.3 of Methodology). This calculates the market's perception of asset returns from the announced merger. The results from the regression displayed in table 8 indicate a positive relationship of 0.57 (significant at the 10% level) or 0.53 (p-value=0.120) (when controlling for method of financing) between the post-merger cash flow from operations improvements and the abnormal asset returns at the merger announcement. This relationship is consistent with that of Healy et al. (1992) who also found a statistically significant positive relationship of 0.24. In addition to this measure we tested both capital cash flows and EBITDA less change in working capital. The results for these regressions are also displayed in table 8 and confirm the positive relation between the AAR and net operating cash flows. Capital cash flows return a

Bellingham & Cooper, Do Australian firms engaging in mergers and acquisitions experience performance improvements? 2010

statistically significant (at the 10% level) positive relation of 0.46 and EBITDA less change in working capital gives a result of 0.35 significant at the 10% level. Results are unchanged when controlling for method of payment.

On this basis H9 is accepted

5. Conclusions

This section presents conclusions based on the statistically significant results found in the previous chapter, and also details some limitations of the study and possible areas for further research.

5.1 Conclusion

Our results demonstrate that firms that engage in mergers and acquisitions experience significant improvements in performance following the merger. Post-merger firm performance improvements are supported with statistical significance. The change method shows statistically significant improvements in net operating cash flows, EBITDA, EBITDA- Δ WC. The intercept method confirms the change method results, and in addition finds capital cash flows exhibit abnormal firm performance with statistical significance. Thus, it can be concluded that Australian mergers experience post-merger operating performance and profitability improvements attributable to the merger. These results are contrary to the previous study on the Australian market in the area of post-merger operating performance improvements by Sharma and Ho (2002) which did not find evidence to support a hypothesis of operating performance improvements post merger.

Investigating the sources of the operating performance improvements indicates the existence of both operating and financial synergies. Operating synergies are evidenced by the change model which reports a statistically significant improvement in the operating expenses ratio in the post-merger period. This is confirmed by the CFO and CCF multiple regressions, which find a statistically significant positive relationship with EBITDA (comprised primarily of operating revenue and operating expenses). Further, there is evidence of production efficiency improving as the change model reports a decrease in capital expenditure, and the CCF multiple regression indicates sale of PPE contributes to the improved firm performance (both measures have statistical significance). Accordingly, we propose that Australian merging firms sell off redundant assets post-merger and decrease their level of capital expenditure due to production efficiency improvements post-merger. Further, operating efficiency is improved as firms decrease their operating expense/assets ratio.

Financial synergies are evidenced by the change model in terms of an improvement in interest coverage, which illustrates an increased debt capacity. Cost of debt as measured by interest expense/debt exhibits a statistically significant positive relationship in the multiple regression of cash flow from operations. This relationship also exists in the capital cash flows multiple regression, however it is not statistically significant. This illustrates that firms which experience an industry-adjusted post-merger improvement in cash flow from operations experience a lower cost of debt.

Accordingly, it is apparent that operating and financial synergies are at work driving post-merger gains. In addition, the gains may also be explained by the disciplining effect of the additional debt load the merging firms carry. The change model reports an increase in the level of debt merging firms carry in the post-merger period. The interest burden associated with this increased level of debt will require the management to focus on value enhancing projects to ensure the interest can be covered. The improvement in all the firm performance measures indicates value enhancing projects are implemented.

In summary, our findings suggest significant post-merger improvement, with improvements in operating efficiency and production efficiency, including capital expenditure reduction and increased sale of PPE from the sale of redundant assets, and also evidence of financial synergies in the form of a lower cost of debt and increased debt capacity.

Furthermore, we find statistically significant evidence of positive abnormal equity returns at the announcement of the merger for targets, while insignificant results for bidders and combined targets and bidders. When the abnormal equity returns are converted to asset returns and regressed against the abnormal operating cash flow improvements in the post-merger period there is a positive relationship of statistical significance. This relationship indicates that the post-merger operating performance improvements explain a significant portion of the equity revaluation at the merger announcement.

5.2 Limitations

We have identified a number of limitations relating to our study. The first limitation regards the use of the matching method to adjust for industry, size and performance. As firms are matched by EBITDA to Assets ratio, problems can arise when the peer firm has extraordinary values in certain items. One example of this was seen when looking at the mean for Sale of

PPE, where a peer firm had 2,700% greater sale of PPE than the firm in the sample, causing an extreme outlier. This identifies that such occurrences could limit the accuracy of the results, however the use of the median method attempts to alleviate this.

Secondly, whilst the three year window on either side of the merger completion date is in line with prior research measuring changes in operating performance, there is a chance that the synergies from the merger are not been fully realised within the three year period. This would prevent all the merger related performance gains from being captured.

Lastly, it is not possible to control for any abnormal performance improvements the firm may have undergone despite engaging in the merger.

5.3 Further Research

A potential area for further research is the examination of operating improvements between different industries, to determine whether some industries experience greater post-merger performance improvements than others. This requires an extensive sample over a long analysis period to populate sufficient results across all industry sectors. Another possible area for further research is to attempt to take the post-merger cash flow improvements as a present value and relate this value to the abnormal equity returns around announcement date. This would also require long-term abnormal equity returns to be computed, so they can be used to adjust the abnormal equity returns at announcement should the market re-value their synergy estimates in the post-merger period.

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