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Firm size, takeover profitability, and the effectiveness of the market for corporate control: Does the absence of anti-takeover provisions make a difference?

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ABSTRACT

The market for corporate control is generally regarded as an important disciplinary mechanism in well developed economies. Entrenchment mechanisms commonly used by US firms in the form of anti-takeover provisions (ATPs) may offer some protection from disciplinary action, facilitating entrenchment and value-reducing behavior. One manifestation of entrenchment is poor acquisitions, with the literature reporting significant losses to large acquirers, and to acquirers with a higher number of ATPs. We examine the profitability of acquisitions in Australia, a market where US-style ATPs are prohibited. The results show that unlike their US counterparts, large Australian acquirers earn significant value for their shareholders, both in terms of announcement returns and long-run operating performance improvements. Takeover premiums are also substantially lower than those reported for the US and UK, and do not differ between large and small acquirers. Premiums are also positively correlated with long-run operating performance, indicating that they reflect real synergies, as opposed to hubris or overpayment. We also find that bidders who destroy value in takeovers are likely to be subsequently acquired. However, unlike US evidence, larger acquirers are just as likely to be targeted for takeover as smaller acquirers, indicating that size is not an effective impediment to the disciplining function of the market for corporate control in Australia. The findings are robust to several econometric issues common to the type of models used in our analysis.

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1. Introduction

It is well known that a well functioning market for corporate control helps to discipline poorly performing managers (Manne, 1965; Jensen and Ruback, 1983; Morck et al., 1989; Mitchell and Lehn, 1990), for example, show that bidders who reduce shareholder value through ill conceived takeovers (i.e., 'bad bidders') are likely to be later targeted themselves for takeover. More recently, Offenberg (2009) reports that even large US bidders who destroy shareholder value are not immune to the disciplining forces of the takeover market, suggesting that larger firm size is not an effective protection mechanism for bad bidders from the disciplining forces of the market for corporate control.[1]

Another branch of the takeover literature with a focus on corporate governance argues that impediments to the efficient functioning of the market for corporate control in the form of anti-takeover provisions (ATPs) may facilitate managerial entrenchment, and so undermine the disciplining or 'settling-up' function of the takeover market. Gompers et al. (2003) and

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[1] Interestingly, they find that smaller bad bidders are unlikely to be disciplined by the takeover market. This is surprising, since the takeover prediction literature generally shows that smaller underperforming firms have a higher likelihood of takeover (see, e.g., Palepu, 1986; Morck et al., 1989; Powell, 1997).

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Bebchuk et al. (2009) argue that ATPs free managers to make value-destroying investments, and so reduce firm value.[2] Supporting this view, Masulis et al. (2007) show that acquisitions by firms with entrenched managers, defined as those with a higher than average number of ATPs, are bad bidders since they destroy the most shareholder value. Harford et al. (2010) further show that entrenched managers destroy value by overpaying for targets that have low or negative synergies.[3]

Larger firm size has also been reported to induce value-reducing behavior by managers. For example Moeller et al. (2004) report evidence of a significant size-effect in acquirer returns, indicating that larger acquirer firms are more likely to destroy value in takeovers, suggesting entrenchment. The relationship, however, between entrenchment induced by ATPs and entrenchment caused by larger firm size is unclear. One view is that because ATPs weaken shareholder rights (Bebchuk and Cohen, 2005) bad bidders are entrenched, and will engage in 'empire-building' behavior, including increasing the size of their firms through ill conceived and opportunistic takeovers. In support of this view, Masulis et al. (2007) report a positive and significant correlation between acquirer size and the number of ATPs, indicating that larger firms adopt more ATPs. Also, Harford et al. (2010) report that firms with more ATPs are more likely to be a bidder, indicating that ATPs encourage larger size through takeovers, which are also more likely to be value-reducing. Bauguess and Stegemoller (2008) similarly find that a higher number of ATPs increase bidder likelihood, but unlike Masulis et al. (2007) they fail to find any adverse wealth-effects for bidder shareholders.[4]

If, as the literature suggests, that ATPs encourage empire-building behavior through takeovers, which increase firm size, we hypothesize that the absence of ATPs should, *ceteris paribus*, promote more value-enhancing behavior. This is because without ATPs, shareholders have stronger rights and so more influence over the CEO and the board's actions. Further, the absence of ATPs is likely to expose the firm to the disciplining forces of the takeover market, so encouraging more value-enhancing behavior. To test this hypothesis, we examine the profitability of takeovers and whether a size-effect exists in the absence of ATPs. Specifically, if firms are not allowed to adopt ATPs, thereby removing a significant facilitator to entrenchment, does this promote value-enhancing takeovers?

To test our hypothesis we need to identify a sample of acquiring firms that have no ATPs, and so are more vulnerable to shareholder pressure and the market for corporate control. Since the majority of US firms have adopted ATPs[5] (Bebchuk and Cohen, 2005), it is difficult to empirically test if they impede the effectiveness of the market for corporate control. In fact, no firm covered by the RiskMetrics database (formally, IRRC), which collates ATP data for over 4000 US firms over the period 1990 to 2008, has zero provisions.[6] One approach would be to use US firms from a time period when ATPs did not exist. This is commonly believed to be prior to 1980, since most US firms only adopted ATPs during the hostile merger wave of the 1980s. Consistent with the view that ATPs facilitate larger size and entrenchment, Bradley et al. (1988) fail to find any evidence of a negative size-effect in acquirer returns for the pre-1980s period, when ATPs were not used. In fact, they report that larger acquirers actually performed significantly better than smaller acquirers during the 1963 to 1980 period, and only performed worse during the 1981 to 1984 period in their sample, which happens to coincide with the introduction of ATPs.[7]

An alternative approach, and the one adopted in this paper, would be to use firms from a country with a similarly well developed takeover market as the US, but one that did not allow ATPs.[8] This emphasizes the idea that the legal and regulatory environment influences a firm's performance and behavior (see Gribnau, 2008; Fan et al., 2011).[9] The Australian market meets the criteria of having a well developed takeover market and an absence of ATPs, as reported by Nenova (2006). She developed a takeover regulation index for 50 countries that reflects an average of 12 components characterizing takeover laws, including the use of ATPs.[10] She makes three relevant findings which suggest that Australia would provide an appropriate setting for our empirical tests. First, across 50 countries, Australia ranks as one of the highest in the takeover index, scoring 0.95 (with 1 as the highest score), compared to 0.76 for the US. Second, countries with a higher index score have higher takeover volumes, including

[2] They identify 24 such ATPs, including, e.g., chartered board, poison pills, dual class stock and charter amendments. For a detailed description of all 24 ATPs see Appendix 1 in Gompers et al. (2003).

[3] In related research, entrenched managers defined using ATPs have also been associated with holding excess cash, which is typically wasted on projects that reduce firm performance. Cash holdings of entrenched firms also have lower marginal values (see, e.g., Dittmar and Mahrt-Smith, 2007; Harford et al., 2008).

[4] Since Bauguess and Stegemoller (2008) focus their analysis on S&P500 acquirers, whereas Masulis et al. (2007) examine all publically listed acquirers, they argue that the difference in the wealth effects is likely to be attributable to ATPs having a greater impact on small acquirers.

[5] In fact, most US firms adopt or enshrine some form of ATP in their charter when first listed for public offering. For example, Bebchuk (2003) reports that 82% of IPOs in 2002 had a staggered board in place.

[6] Of the 4000 firms covered by the database, the average number of ATPs adopted by firms over the 1990 to 2006 time period is 9. The minimum (maximum) values are 1 (19).

[7] Another approach would be to compare US firms across states based on the severity of anti-takeover protection (following Shranz, 1993; Cumming and Li, 2010). However, this gives rise to a potential endogeneity issue in that firms can choose their home state in order to best match their corporate governance policies and firm performance (Armour et al., 2010). States may also want to attract managers, whether agency motivated or not, and so allow more ATPs in order to encourage firms to re-locate (Smith, 1991; Chertok, 2006; McCahery and Vermeulen, 2005). Mulherin (2007) indicates that problems of this nature might confound the analysis of the ATP–size relationship, and might undermine the robustness of the results.

[8] Following a similar approach, Eckbo (1986) reports significant and positive returns for a sample of Canadian acquirers over the period 1964 to 1983. Using the same sample, Eckbo and Thorburn (2000) further show that Canadian acquirers generated significantly higher returns than US acquirers of Canadian targets. Unlike Australia, however, Canada does not have a unified Corporations Act, so states have different regulations relating to securities (Carnaghan and Gunz, 2007).

[9] This approach avoids the endogeneity associated with regulatory competition in the US. Bratton and McCahery (1999) indicate that absent a regional economic block, the complex and interdependent nature of national regulation, governance, and law inhibits a US style 'race to the bottom' in corporate law.

[10] See Nenova (2006) Table 2 for a detailed discussion of the 12 factors that comprise the index.

hostile activity, consistent with a more disciplining takeover market. Third, Australia scores a value of 1 in an ATP score, indicating that no ATPs are employed by firms, compared to 0.71 for US firms. Australia also has a unified national Corporations Act,[11] which governs takeovers in all states. By contrast, the US has a myriad of state legislation, which governs takeovers in different ways. Bebchuk (1992) indicates that this induces legal barriers to takeovers, and may allow managers to opportunistically entrench themselves by incorporating in states that promote ATPs. Further, Macey (1988) argues that a unified federal law reduces barriers to takeovers by removing states' capacities to impose anti-takeover legislation.

We examine a sample of 1900 Australian acquisitions between 1993 and 2007. The relevant results are as follows. First, similar to Moeller et al. (2004) we document a size-effect in acquirer returns in that small acquirers earn significantly higher cumulative abnormal returns (CARs) than larger acquirers. We find, however, that our sample of large acquirers make more profitable acquisitions, earning higher dollar returns of between $A5.56 and $A7.97 million, on average. This is in stark contrast to US evidence, where Moeller et al. (2004) reports large dollar losses of $25.2 million on average for large acquirers.[12] Second, while large acquirers are more likely to acquire publicly listed targets, which have been found to destroy the most value in the US (Fuller et al., 2002), we find that Australian large acquirers earn positive abnormal returns on these deals. Further, large acquirers generate positive returns even if they pay with stock, which Travlos (1987) amongst others report should generally destroy the most value. Third, cross-sectional probit regressions predicting value destruction and controlling for firm and deal characteristics show that large acquirers are not more likely to destroy value than smaller acquirers. Fourth, the results suggest that large firms are not more likely to overpay since actual premiums or 'proxy' premiums calculated using Officer's (2007) methodology for private targets do not differ significantly according to acquirer size.[13] Fifth, large acquiring firms generate higher long-run post-takeover operating returns. Further, there is a significant and positive correlation between proxy premium (and actual premiums) and long-run post-takeover operating returns, suggesting that premiums more likely reflect synergies as opposed to overpayment. Lastly, following the approach in Mitchell and Lehn (1990) and Offenberg (2009), we also find that bad bidders are more likely to be later acquired. However, unlike Offenberg (2009), we find that acquirer size has little influence on the disciplining ability of the takeover market in Australia. Our results are robust to a range of issues, including sample selection and other econometric issues related multicollinearity and endogeneity.

Taken together, the results indicate that the absence of ATPs in the Australian market probably goes some way to promoting a more effective market for corporate control, which appears to ameliorate the effects of managerial entrenchment with respect to firm size. The results provide some support for Manne's (1965) view that an efficient market for corporate control provides a useful check on managerial performance. They also complement related evidence on CEO turnover. For example, Lau et al. (2009) report that Australian CEOs have limited scope for hubris or agency conflicts since they find that poorly performing CEOs are significantly more likely to be dismissed, regardless of the level of CEO entrenchment, which they capture using CEO equity ownership.

The remainder of the paper proceeds as follows. Section 2 outlines the data and sample construction and Section 3 reports some descriptive statistics to establish if a size effect exists in our sample. Section 4 examines the profitability of takeovers, including testing for a size-effect in a multivariate setting using cross-sectional regressions. An analysis of US acquirers during the same time period and of comparable size to our Australian sample is also presented. The section also reports tests of the effectiveness of the takeover market in Australia at penalizing bad bidders, which are similar to those used by Mitchell and Lehn (1990) and more recently, Offenberg (2009). Section 5 tests the sensitivity of the results to some robustness tests and Section 6 concludes.

2. Data and sample construction

The paper examines 1900 acquisitions from 1993 to 2007 made by Australian acquirers. Returns data was provided by SIRCA and financial statement data was extracted from Aspect Huntley's FinAnalysis database. Takeover details, including deal terms, method of payment and premiums are extracted from Thomson Financials SDC Platinum Mergers and Acquisitions Database. The sample only includes acquisitions that are completed and for which SDC Platinum contains bidder and deal data. Large (small) acquirers are acquirers that have market capitalization in the year of the takeover in the top 75% (bottom 25%) of the population of Australian listed firms.[14] Table 1 indicates that takeover activity in Australia has increased each year, peaking in 2006, before declining in 2007, which is consistent with the US and UK markets. There is some evidence of clustering by bidder market capitalization, particularly during the years 1995, 1997, 2000–2001, and again during 2005 to 2007. Defining large acquirers as having a market capitalization in the top 75% (or 25%) of all listed firms confirms that more takeovers are by large firms than are by small firms.

[11] *Corporations Act* 2001 (Cth).

[12] We confirm that large US acquirers continue to make significant dollar losses during the time period used in our study. This is discussed further in Section 4.5.

[13] We report average premiums of between 18% and 25%, with insignificant differences between large and small acquirers. Covering a similar time period to this study, Eckbo (2009) shows that US premiums averaged at about 50%, whereas for the UK, Antoniou et al. (2008) report an average of 45% — both substantially higher than in Australia. A cross-country analysis of takeovers during the period 1990–1999 by Rossi and Volpin (2004) shows average premiums of 30% for Australia, 33% for Canada, 46% for the UK, and 44% for the US.

[14] Moeller et al. (2004) define large (small) as those acquirers with a market capitalization in the top 75% (bottom 25%) of NYSE firms. We also adopt alternative cut-offs in defining size dummies as a sensitivity test, including the top 25th and 50th percentiles.

Table 1
Sample composition.

Year	Number of takeovers	% of sample	Average acquirer market value $A(m)	Top 25th (large)	Bottom 75th (small)	Top 75th (large)	Bottom 25th (small)
1993	2	0.11	228	1	1	1	1
1994	7	0.37	174	0	7	5	2
1995	28	1.47	2046	10	18	27	1
1996	38	2.00	696	7	31	35	3
1997	56	2.95	727	9	47	42	14
1998	93	4.89	1222	24	69	87	6
1999	116	6.11	1612	29	87	98	18
2000	108	5.68	2909	35	73	91	17
2001	125	6.58	1915	37	88	101	24
2002	118	6.21	1501	22	96	70	48
2003	188	9.89	1269	41	147	123	65
2004	216	11.37	1519	40	176	142	74
2005	217	11.42	1132	33	184	154	63
2006	309	16.26	2041	60	249	222	87
2007	279	14.68	1854	63	216	199	80
Total	1900	100	1390	411	1489	1397	503

The table reports the number of completed takeovers over the sample period 1990 to 2007, the average acquirer size (converted to 2008 dollars), and the number of large (small) acquirers defined as having a market capitalization equal to or greater (less) than the market capitalization of the 25th or 75th percentile of ASX firms in the same year.

3. Does the market react negatively to large acquirer acquisitions?

The first issue we examine is whether large acquirers earn significantly lower abnormal returns on the announcement of a takeover. Cumulative abnormal returns (CARs) measure the market's initial reaction to the takeover. A firm's CAR is defined as the sum of its abnormal returns over a 3-day event window $(t-1, t+1)$.[15] The event date is the first announcement date of the takeover by the successful acquirer. Abnormal returns are defined as the firm's actual stock return less the return that a market model predicts. The paper estimates the market model using OLS regressions over a period of 200 days spanning day's $t-11$, $t-210$ (consistent with Masulis et al. 2007).[16]

The paper examines the average CARs for the full sample, and for sub-samples of 'large' acquirers and 'small' acquirers using the cut-offs defined in Section 2. We examine three measures of CARs for these sub-samples. First, CARs calculated as the equally weighted average, where every firm in the sub-sample has equal weight. However, Malatesta (1983) and Moeller et al. (2004) indicate that this ignores that a given percentage return has a greater dollar impact for a large firm. This motivates the second measure, DCARs (Dollar CARs). A firm's DCAR is its equally weighted CAR multiplied by its pre-acquisition market capitalization. To ensure comparison between acquisitions the paper inflates the DCAR to 2008 dollar values. The third measure is a value-weighted CAR (VWCAR). This computes the weighted-average CAR for each firm in the sub-sample, where the weight is the acquirer pre-acquisition market capitalization.

The results reported in Table 2 indicate that large acquirers earn positive mean CARs of between 0.56% and 1.08%, but that these CARs are significantly lower when compared to small acquirers (3.13% to 9.46%), so supporting a size-effect in Australia. However, the mean DCARs for larger acquirer's of $A7.97 m (or $A5.56 m) are positive and significantly greater than for small acquirers. This contrasts starkly with Moeller et al. (2004), who find that larger US acquirers generate significant dollar losses of $25.2 million, on average. While the results reported in Table 2 provide some evidence of a size-effect, large acquirers do not lose in takeovers since equally weighed CARs, DCARs and value-weighted CARs (VWCARs) are all positive. Lower median values indicate some skewness in the distribution, but generally confirm that large acquirers do not lose in takeovers. This suggests that large Australian acquirers are less likely to suffer from entrenchment related to firm size. Nevertheless, large acquirers still generate lower equally weighted CARs. To examine whether this persists in the longer-run, Fig. 1 plots the CARs by firm size over longer windows, starting 20 days prior to the takeover announcement to 210 days after the announcement. The positive run-up in acquirers CARs depicted in Fig. 1 has been documented by prior studies (e.g., Schwert, 2000), suggesting acquirers time takeovers during periods of high stock-price performance.[17] More importantly, the graph shows that larger acquirers continue to generate lower equally weighted CARs in the longer-run. This is also confirmed in tests (unreported) of longer-run buy-and-hold abnormal returns, starting either 2 days prior to the takeover announcement or 10 days after, to 500 days post

[15] The results are robust to alternative short-event windows, including $(-1, +1)$, $(-2, +2)$, $(-3, +3)$ and $(-5, +5)$.

[16] To address thin and non-synchronous trading concerns we also use market adjusted returns, as in Fuller et al. (2002). The results are comparable to those reported. We also estimate the market model using GMM in order to ensure unbiased and consistent estimators, and find similar results. Using trade-to-trade returns (e.g., see Maynes and Rumsey, 1993) to compute CARs or an AR (2) procedure also produces qualitatively identical results. This is not too surprising since acquiring firms are generally larger than the average firm, and so returns are less likely to suffer from this issue.

[17] Not surprisingly, we show later in the paper (in Fig. 2) that the run-up is primarily driven by stock financed deals. To control for the positive bias that the run-up would have on the intercept in market-model abnormal returns (resulting in higher expected returns, and a downward drift in abnormal returns), following Schwert (2000), the longer-run CARs depicted in Fig. 1 are calculated as market-adjusted returns.

Table 2
Announcement cumulative abnormal returns (CARs) for large and small acquirers.

	All	Top 25th (large)	Bottom 75th (small)	Diff	Top 75th (large)	Bottom 25th (small)	Diff
$CAR_{(-1,+1)}$ (%)	1.516***	0.561***	3.130***	−2.570***	1.082***	9.459***	−8.378***
	(0.725)***	(−0.005)	(0.948)***	(−0.953)***	(0.508)***	(2.512)***	(−2.003)***
DCARs ($A, millions)	5.302***	7.965***	0.802***	7.163**	5.564***	0.515***	5.049
	(0.598)***	(−0.035)	(0.653)***	(−0.688)*	(0.782)***	(0.409)***	(0.373)
VWCARs (%)	0.168	0.160	1.243	−1.083	0.168	9.430	−9.263
No. of observations	1900	411	1489		1397	503	

The table reports CARs, DCARs, and VWCARs for samples of all, large and small acquirers. Large (small) acquirers are defined as those having a market capitalization equal to or greater (less) than the market capitalization of the 25th or 75th percentile of ASX firms in the same year. CARs are 3-day (−1,+1) cumulative abnormal returns (in percentages) estimated using the market model with the All Ordinaries index used to proxy the market return. DCARs are the average inflation-adjusted (to 2008) abnormal dollar return, calculated for each acquirer as the 3-day CAR times acquirer market capitalization 4 days prior to the takeover announcement. VWCARs are the DCARs divided by the total market capitalization of all firms in the sub-sample. Median values are reported in parentheses.

*** Denotes value is significantly different from zero at 1% level.
** Denotes value is significantly different from zero at 5% level.
* Denotes value is significantly different from zero at 10% level.

announcement. To examine the robustness of the size-effect further, in the next section we use multivariate regressions to control for other firm and deal characteristics.

4. Multivariate regressions

The univariate results indicate that large acquirers make profitable acquisitions on average. However, larger acquirers make acquisitions that generate lower equally weighted CARs. To test whether this is due to other firm and/or deal characteristics, we estimate regression models of CARs on measures of size, deal and bidder characteristics.[18] Size is measure in five ways: the natural log of the bidder's assets (lnTA), the natural log of the bidder's market capitalization (lnMV), and a series of dummy variables that equal one if the bidder's assets are in the top 25% (Top 25th), 50% (Top 50th), and following Moeller et al. (2004) 75% (Top 75th) of all listed ASX firms in the takeover announcement year.

To specifically examine if large acquirers have a higher likelihood of making value-destroying deals, we employ a second model estimated using a probit regression. The dependent variable is an indicator variable, which equals 1 if the acquirer's CAR is positive, and equals 0 otherwise. If large acquirers are more likely to make value-destroying takeovers after controlling for other bidder and deal characteristics, we predict a negative and significant coefficient on our measures of acquirer size.

The bidder characteristics used in the regression models, as defined in the appendix (see Table A1), are fairly standard to the takeover literature. Prior studies find that CARs are lower for firms that generate higher free cash flows, since free cash flows can induce managerial hubris and overpayment (Jensen, 1986). Cash rich firms are also more likely to make value reducing takeovers (Harford, 1999). Low leverage can reduce acquisition profitability since leverage disciplines managers and deters them from making value-destroying decisions (Maloney et al., 1993). We include return on assets to control for managerial quality as in Morck et al. (1990) and Masulis et al. (2007), predicting a positive correlation with CARs. Tobin's q can also influence takeover returns (Dong et al., 2006), however, the literature reveals two competing predictions. Lang et al. (1989) and Servaes (1991) find that q increases takeover returns, indicating that q may reflect growth prospects. On the other hand, Moeller et al. (2004) find that q reduces takeover profitability, indicating that q could reflect bidder overvaluation. Masulis et al. (2007) find no significant relation between q and acquisition returns, highlighting the competing predictions. High tech bidders may have higher abnormal returns if the acquisition represents strong growth prospects through acquiring a smaller high tech target (Loughran and Ritter, 2004). The literature also indicates that serial acquirers earn lower abnormal returns (Fuller et al., 2002). Panel A in Table 3. indicates that the bidder characteristics differ significantly between small and large bidders. Specifically, larger acquirers have higher leverage and return on assets, but lower q and cash-holdings. Larger acquirers also acquire smaller targets, and are more likely to be serial acquirers. They are also less likely to be classified as high tech.

Deal characteristics can also affect the market's reaction to the announcement. Abnormal returns are predicted to be lower if the deal causes diversification across industry or across country (Moeller and Schlingemann, 2005). Further, CARs may be lower if the deal is hostile (Schwert, 2000) and features multiple bidders (Bradley et al., 1988; Lang et al., 1989; Boone and Mulherin, 2003). Method of payment (Travlos, 1987), whether the target is public or private (Fuller et al., 2002), and the interaction thereof is also correlated with abnormal returns. We explore this further in Table 4 below. Premiums, which can reflect expected synergies, or potential overpayment may also be correlated with announcement returns (Eckbo, 2009). The evidence in Table 3 (Panel B) indicates that large bidders are more likely to pursue diversified, cross border and hostile deals, potentially explaining lower CARs. Larger acquirers are also more likely to bid for public targets, and to pay with cash. Surprisingly,

[18] To reduce the impact of extreme values we winsorize CARs, DCARs and all financial characteristics to within 1% and 99% of the distribution. Identifying outliers as those values that have a Cook's D>4/n provides similar results.

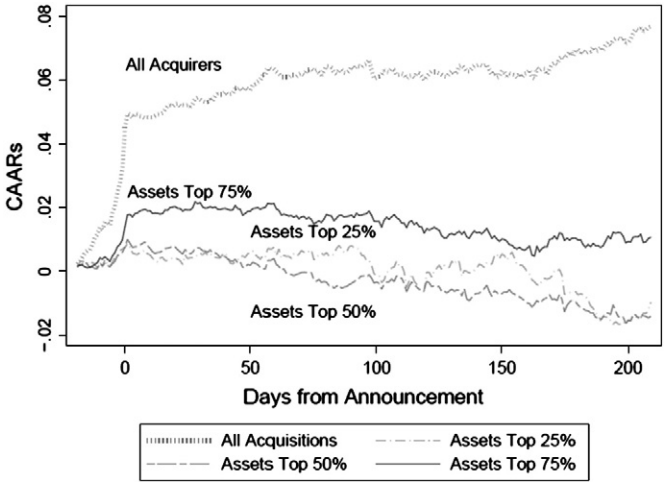


Fig. 1. The graph plots the average acquirer market-adjusted CARs from 20 days before the announcement to 210 days after. The CAR on day t is the cumulative abnormal return between day $t-20$ and day t.

premiums do not differ significantly between large and small — one potential reason why Australian large acquirers do not lose in takeovers.

Table 4 reports the CARs by acquirer size, method of payment and organizational status (i.e., public or private). The most noteworthy finding is that acquirers in Australia generate positive returns in stock deals, which at 3.72% is significantly higher than that generated in cash or mixed deals. While part of this can be explained by the higher returns on private deals financed with stock (4.53%), public deals financed with stock also generate positive and significant returns of 1.71%, which appear to be greater (although not significantly so) for larger acquirers, at 2.25%. The prior literature in Australia generally fail to find any significant differences in acquirer returns by method-of-payment (e.g., Da Silva Rosa et al., 2000; Bugeja and Da Silva Rosa, 2010), although they do not interact method-of-payment with organizational status. Interestingly, using a sample of Canadian mergers completed during 1964–1983, Eckbo and Thorburn (2000) report a similar positive finding for acquirers who use stock to finance mergers. They cite possible lower adverse selection problems compared to the US market as one explanation. However, like the prior Australian papers, they also do not interact method-of-payment with organization status, so it is difficult to rule out the impact of stock-finance private deals as an alternative explanation for their result. Our multivariate regression models reported in Section 4.1 show, however, that only private deals financed with stock win after controlling for other deal and acquirer financial characteristics. This suggests that other factors probably drive the significant positive returns for public deals financed with stock as reported in Table 4.

Also of interest are the differences in returns across large and small acquirers. While small acquirers generate higher returns with any method-of-payment in private deals, large acquirers perform better in stock financed public deals. The findings are different from those reported in the US, which show that large acquirers significantly lose when they acquire public targets financed with stock (Moeller et al., 2004).[19] One possible explanation for the higher observed returns for stock finance public deals in Australia compared to the US is the impact of merger arbitrage, which Mitchell et al. (2004) show accounts for nearly half of the observed downward pressure on bidding firm announcement returns in US stock financed public deals. The downward pressure arises when merger arbitragers' short-sell bidding firm equity in stock deals as a hedge against market risk. If Australia has a less active merger arbitrage market, this could explain the observed positive and significant CARs for our sub-sample of stock only financed deals directed at listed targets.

To explore this further, Fig. 2 plots the CARs by method-of-payment, starting 20 days prior to the takeover announcement to 20 days after.[20] Similar to Fig. 1, we observe a run-up in returns, which is much more prominent in stock acquisitions. More importantly, we observe some immediate downwards pressure on the returns to stock acquisitions, starting from the announcement day, but which persists over the next 20 days. Since we do not observe the same downward pressure in cash deals, this would suggest some evidence of merger arbitrage activity in stock deals, as also reported by Mitchell et al. (2004).[21] Nevertheless, any downward pressure exerted by merger arbitrage is only temporary, since the short positions are reversed on takeover completion. Mitchell et al. (2004) show that even after accounting for merger arbitrage, US stock acquirers continue to generate negative equally weighed CARs, albeit statistically insignificant. In our multivariate regression models we control for method-of-payment and public status by using three method-of-payment dummy variables (cash, stock and mixed) interacted

[19] Additional tests reported in Section 4.5 confirm the findings using a comparable sample of US takeovers. Specifically, we show that US acquirers' worse performance is not simply because US firms are larger on average than Australian acquirers.

[20] Extending the post-announcement period to 200 days, which would cover the merger closing period, does not alter our conclusions.

[21] Unfortunately, we do not have access to short-interest data for our Australian sample, which would have provided clearer evidence of an increase in short-selling post-bid announcement. Maheswaran and Yeoh (2005) do, however, report similar results to Mitchell and Pulvino (2001) on the profitability of merger arbitrage using an Australian sample.

Table 3
Descriptive statistics by acquirer size.

	All firms	Top 25th (large)	Bottom 75th (small)	Top 75th (large)	Bottom 25th (small)
Panel A: Bidder characteristics					
Total Assets ($A, millions)	1319	4812***	152	1753***	13
	(139)	(2805)***	(71)	(310)***	(12)
Market capitalization ($A, millions)	2788	9586***	517	3644***	217
	(299)	(4348)***	(153)	(599)***	(31)
Relative size	0.196	0.077***	0.235	0.154***	0.319
	(0.039)	(0.010)***	(0.054)	(0.028)***	(0.079)
Leverage	0.537	0.633***	0.345	0.518***	0.074
	(0.113)	(0.154)***	(0.043)	(0.117)***	(0.014)
Free cash flow	−0.098	−0.071***	−0.142	−0.087***	−0.289
	(−0.027)	(−0.015)***	(−0.065)	(−0.024)***	(−0.225)
Tobin's q	4.289	2.075***	5.028	3.141***	7.734
	(2.109)	(1.731)***	(2.339)	(1.908)***	(3.206)
Return on assets	0.098	0.211***	0.060	0.210***	−0.239
	(0.177)	(0.197)**	(0.163)	(0.201)***	(0.031)
Cash holdings to assets	0.261	0.138***	0.295	0.200***	0.432
	(0.118)	(0.074)***	(0.145)	(0.093)***	(0.231)
Panel B: Deal characteristics					
Public	0.204	0.276***	0.179	0.237***	0.104
Private	0.796	0.724***	0.821	0.763***	0.896
Cash only	0.189	0.255***	0.168	0.209***	0.132
Stock only	0.125	0.045***	0.151	0.095***	0.214
Mixed	0.686	0.700	0.681	0.696	0.654
Public cash	0.081	0.129***	0.065	0.099***	0.026
Public stock	0.035	0.022	0.039	0.039**	0.024
Public mixed	0.088	0.125***	0.075	0.099**	0.055
Private cash	0.108	0.125	0.103	0.109	0.106
Private stock	0.090	0.024***	0.112	0.056***	0.191
Private mixed	0.598	0.575	0.606	0.598	0.599
Hostile	0.075	0.082	0.073	0.090***	0.029
Tech	0.067	0.022***	0.083	0.046***	0.130
Cross border	0.220	0.343***	0.179	0.241***	0.159
Competed	0.012	0.016	0.010	0.014**	0.004
Conglomerate	0.717	0.776*	0.697	0.725	0.692
Serial1 (>1 takeover)	0.839	0.963***	0.798	0.907***	0.635
Serial2 (≥5 takeovers)	0.459	0.800***	0.345	0.553***	0.177
Serial3 (≥2 takeovers in 2 years)	0.565	0.773***	0.495	0.650***	0.308
Premium (1-day)	0.183	0.187	0.181	0.176	0.242
	(0.117)	(0.114)	(0.120)	(0.114)	(0.158)
Premium (1-week)	0.218	0.230	0.212	0.210*	0.290
	(0.156)	(0.152)	(0.159)	(0.149)	(0.239)
Premium (1-month)	0.248	0.231	0.257	0.240	0.325
	(0.178)	(0.164)	(0.198)	(0.164)*	(0.295)
Officer's (2007) proxy premium	0.242	0.220	0.250	0.227	0.295
	(0.199)	(0.176)	(0.213)	(0.180)	(0.270)

The table reports summary statistics for acquirer financial and deal characteristics. Variable definitions are given in the appendix. Large (small) are defined as those having a market capitalization equal to or greater (less) than the market capitalization of the 25th or 75th percentile of ASX firms in the same year. Median values are given in parentheses.

*** Indicates that the difference between large and small for each variable is statistically different from zero at the 1% level.
** Indicates that the difference between large and small for each variable is statistically different from zero at the 5% level.
* Indicates that the difference between large and small for each variable is statistically different from zero at the 10% level.

with public and private dummies, giving six combinations (i.e., public-cash, public-stock, public-mixed, private-cash, private-stock, and private-mixed). To avoid the dummy variable trap, we exclude private-mixed.

Table 5 reports a correlation matrix for the variables used in our study. Noteworthy is the negative correlation between CARs and measures of size (market capitalization and book assets). Relative size is positive and significant, suggesting that acquiring larger targets generates higher returns. Takeovers directed at private targets financed with stock also generate higher returns, consistent with Fuller et al. (2002), who claim that the market values the addition of a large shareholder, who has the ability and motivation to monitor acquirer managers going forward.

4.1. Multivariate results

The regression results reported in Table 6 confirm a size-effect for Australian acquirers. The coefficient values on all our acquirer size variables are negative (models 1 to 5), confirming that large acquirers generate lower CARs, even after controlling for

Table 4
Announcement abnormal returns (CARs) by acquirer size, method of payment and target organizational status.

	All	Cash only	Stock only	Mixed	Cash-Stock	Cash-Mixed	Stock-Mixed
Panel A							
All	1.516***	0.658*	3.722***	1.364***	−3.063***	−0.706	2.357***
Large (top 25th)	0.561***	0.177	2.186***	0.463**	−2.009***	−0.286	1.723***
Small (bottom 75th)	3.130***	1.759*	5.116***	2.944***	−3.357*	−1.186	2.171*
Large-small	−2.570***	−1.582*	−2.930*	−2.482*			
Panel B: Private targets							
All	1.806***	0.941	4.528***	1.569***	−3.587***	−0.628	2.960***
Large (top 25th)	0.593***	0.314	2.142**	0.505**	−1.827*	−0.191	1.636**
Small (bottom 75th)	3.638***	2.230	6.090***	3.294***	−3.860	−1.064	2.796**
Large-small	−3.044***	−1.915	−3.948*	−2.789***			
Panel C: Public targets							
All	0.395	0.278	1.711*	−0.020	−1.433	0.298	1.731
Large (top 25th)	0.457	0.005	2.251*	0.227	−2.246**	−0.222	2.024
Small (bottom 75th)	0.225	1.001	0.583	−0.795	0.417	1.796	1.379
Large-small	0.231	−0.996	1.667	1.022			

The table reports 3-day cumulative abnormal returns (CARs) based on size method of payment and organization form. Large (small) acquires are defined as those having a market capitalization equal to or greater (less) than the market capitalization of the 25th percentile of ASX firms in the same year. Variable definitions for method of payment types are given in the appendix. Panel A reports the analysis for all firms, and Panel B does likewise for acquirers who target only private targets. Panel C presents the result for acquirers who target only publically listed targets.

*** Indicates that the value is statistically different from zero at the 1% level.
** Indicates that the value is statistically different from zero at the 5% level.
* Indicates that the value is statistically different from zero at the 10% level.

acquirers' financial and deal characteristics.[22] Interestingly, our results indicate that the size-effect is not concentrated in the largest acquirers, defined as those with a market capitalization in the top 25th percentile of ASX firms. While the coefficient value for the top 25th percentile size dummy is negative, it is not statistically significant. This would suggest that larger firms in general perform worse. The control variables are largely consistent with expectations, but two findings are noteworthy. First, relative size is positive and significant in all models, including regressions on small and large acquirers (models 6 to 9). Moeller et al. (2004) found similar results in a regression estimated on all acquirers in their sample, but reports a negative and significant coefficient for a sample of only large acquirers, which they argue suggests possible hubris and overpayment. For our sample, while the coefficient value on relative size is smaller in magnitude for large acquirers than small, it remains positive and significant, indicating that overpayment is unlikely to be an issue for large Australian acquirers. Indeed, the descriptive statistics reported in Table 2 confirm no significant differences in premiums paid by large versus small acquirers. The second noteworthy finding is that private deals financed with stock generate higher returns, confirming the benefits of acquiring a new large concentrated shareholder (Fuller et al., 2002).

While the results reported in Table 6 indicate that large acquirers generate lower CARs, they do not tell us whether larger acquirers make value-destroying deals, after controlling for other factors. To address this question, we report probit regressions, where the dependent variable takes a value of 1 if the acquirer's CAR is positive, and 0 if negative. The results reported in Table 7 indicate that the probability of a value-destroying acquisition does not significantly increase with the acquirer's market capitalization or book-asset value. The results for the other financial and deal characteristics are consistent with those reported in the OLS regressions in Table 6.

Taken together, the OLS and probit regression results suggest that large acquirers are not more likely to destroy value than small acquirers are. However, large acquirers' acquisitions generate lower CARs than small acquirers' acquisitions. Moeller et al. (2004) reports that large US-acquirers lose, which they attribute to possible overpayment. We show, however, that premiums in Australian takeovers are relatively small by international comparisons (e.g., Rossi and Volpin, 2004; Eckbo, 2009). More importantly, premiums paid by large and small acquirers do not differ statistically. Nevertheless, large acquirers could still overpay if the premiums they pay, while no different from smaller acquirers, are used to buy targets that produce low or negative synergies. We investigate this further in the next section.

4.2. Do large acquirers overpay?

To examine overpayment we calculate takeover premiums. Premiums are calculated in two ways. First, it is calculated for all publicly listed targets as the transaction value as reported by Thomson's SDC Platinum database relative to the target's market capitalization, measured 1-day, 1-week and 1-month prior to the takeover announcement. However, requiring takeover premium reduces the sample size significantly since it is only available for publically listed targets. Thus, the second method

[22] Defining CARs using longer windows (i.e., −5,+5, −10,+10, to 50,+50) in the regressions does not alter our findings on the size-effect.

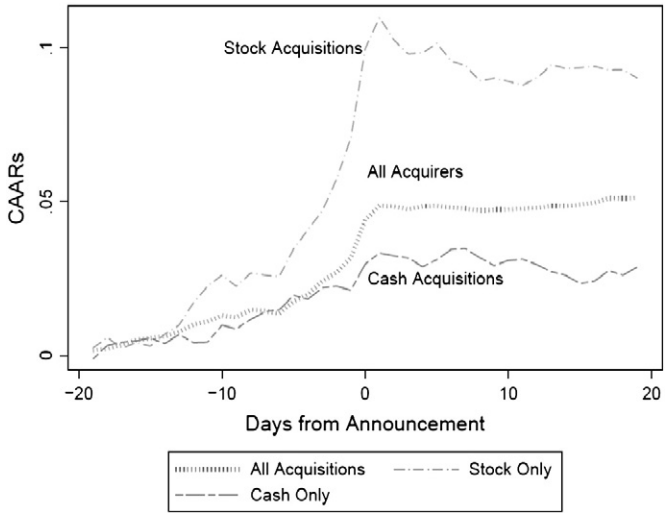


Fig. 2. The graph plots the average acquirer market-adjusted CARs from 20 days before to 20 days after the announcement. CARs are grouped by method of payment — all acquisitions, acquisitions paid for with stock only, and acquisitions paid with cash only.

computes a 'proxy' premium for each acquisition that does not have premium data, i.e., private targets. This value is taken as the average premium for a portfolio of listed targets from the same industry and year as the private target, consistent with Officer (2007).[23]

We first examine whether firm size is correlated with premiums in a multivariate regression, after controlling for other financial and deal characteristics. The premium regressions reported in Table 8 confirm that larger acquirers do not pay higher premiums. In fact, the results suggest the opposite, although the coefficient values on size are not always significant. Interestingly, relative size is negative and significant, suggesting that premiums are generally lower when acquiring larger targets. Also noteworthy, is that higher premiums are required in overseas deals (cross border), those where there is more than one competing bidder (competed) and in hostile deals. On the other hand, conglomerate or diversified deals appear to cost the bidder less. These results are consistent with expectations, and the extant literature.

Since premium is not positively correlated with larger size, it is unlikely to explain the larger returns to smaller acquirers. This is confirmed in unreported regressions similar to those reported in Table 6, but including either actual premium or Officer's (2007) proxy premium. For all regressions, the coefficient value on premium is positive, albeit statistically insignificant. Further, our measures of firm size remain statistically significant, confirming that overpayment does not explain why the market reacts less positively to large firms' acquisitions. This raises the issue of whether large acquirers select targets with low or negative synergies. To test this we examine the combined CARs to bidders and targets. The results reported in Table 9 (Panel A) indicate that all combined acquirer/target CARs are significant and positive, suggesting that the market expects synergies. Consistent with the acquirer CARs reported in Table 2, small acquirers appear to generate higher combined CARs. More importantly, however, large acquirers generate larger dollar CARs (DCARs), indicating that their acquisitions are predicted to be more profitable. Panel B of Table 9 reports the combined CARs and DCARs over longer windows (−20, +20) through (−210, +210). The combined CARs are significant and positive for both small and large acquirers, which persists across all windows. While differences in combined equally weighed CARs are insignificant across longer windows, large acquirers continue to enjoy significantly greater dollar CARs (DCARs) across all windows.

To further examine the determinants of combined CARs, we estimate regression models (unreported) similar to those reported for the acquirer in Table 6, where the dependent variable is the combined CARs to the acquirer and the target.[24] While the sample only contains 241 observations for these models, the results confirm that acquisitions by larger acquirers generate significantly lower combined equally weighted CARs (at the 1% level). Method of payment (cash only or stock only) has no significant impact on combined CARs, but leverage is positive and significant, indicating the presence of some financial synergies for acquirers and targets in public deals.

The results overall indicate that while large bidders generate lower announcement CARs, their deals generate higher dollar CARs or net present values, and so are more profitable than smaller acquirers. This arises because large bidders neither overpay (i.e. do not pay higher premiums) nor make value-destroying takeovers (i.e. takeovers for which combined CARs are negative).

[23] Only 250 acquisitions in our sample have data to calculate takeover premiums. The proxy premium variable increases the sample to 900 acquisitions. Unfortunately, the remaining acquisitions in our sample did not have a sufficiently close comparable acquisition for us to calculate a proxy premium for them.

[24] Since the sample contains only publically listed targets (for which we can calculate CARs), we drop the private method of payment interaction dummies from the models. Note that the public mixed dummy is also excluded to avoid the dummy variable trap.

Table 5
Correlation matrix.

Variable	A	B	C	D	E	F	G	H	I	J
A. CARs	1									
B. Market cap	−0.19*	1								
C. Assets	−0.17*	0.83*	1							
D. Relative size	0.19*	−0.36*	−0.14*	1						
E. Leverage	−0.05	0.19*	0.41*	0.19*	1					
F. Free cash	0.01	0.12*	−0.01	−0.09*	−0.38*	1				
G. Tobin's q	−0.01	0.07*	−0.32*	−0.09*	−0.15*	0.12*	1			
H. ROA	−0.02	0.16*	0.23*	−0.03	0.05*	0.09*	−0.27*	1		
I. Cash to assets	0.05*	−0.18*	−0.30*	0.01	−0.14*	0.03	0.26*	−0.43*	1	
J. Public cash	−0.05*	0.09*	0.13*	0.00	0.05*	0.03	−0.05	0.03	−0.02	1
K. Public stock	0.00	0.01	0.00	0.06*	−0.04*	0.01	−0.02	0.00	0.00	−0.06*
L. Public mixed	−0.06*	0.10	0.10*	−0.02	0.06*	−0.01	−0.03	0.03	0.02	−0.09*
M. Private cash	−0.02	0.02	0.04	−0.03	0.01	−0.01	0.00	−0.01	0.00	−0.10*
N. Private stock	0.11*	−0.22*	−0.25*	0.02	−0.10*	−0.06*	0.03	−0.11*	0.06*	−0.09*
O. Hostile	−0.06*	0.08*	0.08*	0.03	−0.04	0.05*	−0.02	0.02	−0.04	0.35*
P. Tech	0.05*	−0.12*	−0.17*	0.01	−0.09*	0.03	0.10*	−0.07*	0.12*	−0.04*
Q. Cross border	−0.01	0.18*	0.16*	0.01	0.05*	0.03	0.06*	0.02	0.01	−0.02
R. Competed	−0.02	0.00	0.03	0.06*	0.04	0.02	−0.03	0.01	−0.01	0.13*
S. Conglomerate	−0.06*	0.07*	0.06*	−0.07*	0.06*	−0.04*	0.00	−0.03	0.00	0.03
T. Serial2	−0.09*	0.45*	0.44*	−0.11*	0.20*	−0.03	−0.02	0.10*	−0.11*	0.07*

	K	L	M	N	O	P	Q	R	S	T
K. Public stock	1									
L. Public mixed	−0.06*	1								
M. Private cash	−0.07*	−0.11*	1							
N. Private stock	−0.06*	−0.10*	−0.11*	1						
O. Hostile	0.29*	0.15*	−0.05*	−0.04	1					
P. Tech	0.01	−0.04	−0.02	0.10*	−0.03	1				
Q. Cross border	−0.07*	−0.02	0.09*	−0.06*	−0.05*	0.03	1			
R. Competed	0.05*	0.08*	−0.02	−0.03	0.25*	−0.01	−0.01	1		
S. Conglomerate	−0.08*	0.03	0.01	−0.08*	−0.02	−0.14*	−0.03	0.02	1	
T. Serial2	−0.05*	0.04*	0.01	−0.08*	0.04	−0.04	0.07*	0.00	0.02	1

The table reports Pearson pair-wise correlations. Variables are defined in the appendix.
* Denotes significance at the 5% level using a two-tailed test.

4.3. Do large acquirers have worse post-takeover operating performance?

The results so far indicate that large acquirers' takeovers generate value. However, the paper has measured this using the market's short-term reaction to the takeover announcement. In this section we examine if this manifests itself in long-term operating improvements. To assess this, the paper examines the relation between post-takeover return on assets and size, bidder, and deal characteristics. We estimate the following model:

$$IAROA_i = \alpha + \beta \cdot size_i + \delta \cdot bidder_i + \gamma \cdot deal_i + \mu_i \quad (1)$$

IAROA is the bidder's average post-takeover industry-adjusted return on assets for the 3 years after the takeover. For a given firm and year, *IAROA* is the bidder's ROA less the industry-median ROA. ROA is measured as pre-depreciated operating profit scaled by book value of total assets. The variable *size* is the relevant size variable and bidder and deal characteristics are as in our CARs regressions. We retain pre-acquisition operating performance in order to control for auto-correlation in ROA.

Table 10 reports the regression results, which indicate that post-takeover operating performance increases with acquirer size. This holds across all size definitions and is significant at the 1% level. Unsurprisingly, pre-takeover operating performance is positively correlated with post-takeover operating performance, indicating auto-correlation in ROA. In models (3) and (4), we include Officer's (2007) proxy premium, which we find to be positively and significantly correlated with long-run operating performance.[25] This indicates that premiums are more likely to reflect real operating synergies as opposed to hubris and overpayment. Taken together, the results confirm that large acquirers' acquisitions do create real value, and further, the positive correlation with premium suggests that the market correctly anticipated these improvements.

[25] In unreported regressions using a smaller sample of public only deals which have actual premium values we find similar results, although the explanatory power of the models are not as large as those reported in Table 10.

Table 6
Cross-sectional regressions of announcement abnormal returns (CARs).

Variables	Definition of acquirer size								
	Market capitalization (1)	Book assets (2)	Large top 25th (3)	Large top 50th (4)	Large top 75th (5)	Large top 25th (6)	Small bottom 75th (7)	Large top 75th (8)	Small bottom 25th (9)
Acquirer size	−0.424***	−0.423***	−0.405	−1.151***	−1.768***				
	(0.145)	(0.145)	(0.422)	(0.427)	(0.682)				
Relative size	2.648***	2.808***	3.047***	2.976***	2.898***	0.836*	3.437***	1.312***	4.651***
	(0.553)	(0.524)	(0.527)	(0.518)	(0.514)	(0.494)	(0.564)	(0.479)	(0.947)
Leverage	−0.985***	−0.735**	−0.943***	−0.852***	−0.845***	−0.201	−1.641***	−0.341	−1.551
	(0.300)	(0.300)	(0.297)	(0.292)	(0.288)	(0.225)	(0.451)	(0.226)	(1.598)
Free cash flow	1.429	1.314	0.810	0.971	1.103	1.815	0.465	0.870	1.499
	(1.131)	(1.141)	(1.135)	(1.132)	(1.114)	(1.248)	(1.391)	(0.842)	(3.252)
Tobin's q	−0.008	−0.051	−0.021	−0.030	−0.040	−0.218	−0.012	0.034	−0.032
	(0.039)	(0.041)	(0.040)	(0.040)	(0.040)	(0.182)	(0.041)	(0.045)	(0.059)
Return on assets	0.152	0.130	0.096	0.072	0.120	−1.148	0.043	1.185	−0.251
	(0.253)	(0.250)	(0.232)	(0.233)	(0.245)	(1.621)	(0.252)	(0.951)	(0.348)
Cash holdings to assets	0.106	0.104	0.301	0.184	0.182	4.247***	−0.291	0.880**	−1.475
	(0.593)	(0.584)	(0.558)	(0.563)	(0.572)	(1.238)	(0.595)	(0.403)	(1.497)
Public cash	−1.024	−0.975	−1.137*	−1.033	−1.006	−0.842	−1.276	−1.046*	−0.818
	(0.706)	(0.709)	(0.706)	(0.711)	(0.698)	(0.835)	(0.940)	(0.631)	(3.555)
Public stock	0.139	0.144	−0.073	0.021	0.142	−0.023	−0.071	0.215	−0.809
	(1.173)	(1.167)	(1.165)	(1.165)	(1.153)	(1.396)	(1.345)	(1.226)	(3.227)
Public mixed	−1.190*	−1.178	−1.337*	−1.323*	−1.279*	−0.092	−1.999**	−0.880	−4.912*
	(0.735)	(0.734)	(0.727)	(0.730)	(0.730)	(0.566)	(0.988)	(0.705)	(2.697)
Private cash	−0.343	−0.298	−0.324	−0.293	−0.382	1.197**	−0.866	0.116	−1.707
	(0.686)	(0.688)	(0.695)	(0.688)	(0.693)	(0.577)	(0.893)	(0.622)	(1.976)
Private stock	2.012**	1.995**	2.341**	2.204**	2.079**	0.069	2.291**	1.779***	2.242
	(1.033)	(1.032)	(1.038)	(1.040)	(1.0250)	(0.885)	(1.108)	(0.705)	(1.998)
Hostile	−1.618**	−1.669**	−1.759**	−1.683**	−1.655**	−0.226	−2.302**	−1.080	−3.095
	(0.829)	(0.824)	(0.820)	(0.820)	(0.815)	(1.101)	(1.055)	(0.789)	(3.141)
Tech	0.237	0.223	0.459	0.273	0.281	1.719**	0.159	−0.160	0.848
	(1.156)	(1.163)	(1.138)	(1.148)	(1.143)	(0.877)	(1.252)	(0.785)	(2.375)
Cross border	0.488	0.478	0.248	0.370	0.343	0.267	0.141	0.030	1.461
	(0.537)	(0.537)	(0.540)	(0.527)	(0.526)	(0.482)	(0.730)	(0.416)	(1.867)
Competed	−0.673	−0.564	−0.457	−0.529	−0.494	−0.613	0.307	−0.383	−0.531
	(0.992)	(0.977)	(0.970)	(0.979)	(0.980)	(1.361)	(1.192)	(0.838)	(4.846)
Conglomerate	−0.567	−0.573	−0.598	−0.598	−0.611	−0.484	−0.602	−0.664*	−0.822
	(0.481)	(0.481)	(0.484)	(0.481)	(0.481)	(0.567)	(0.584)	(0.395)	(1.423)
Serial2	−0.220	−0.218	−0.695*	−0.524	−0.416	1.432**	−0.995**	−0.547	0.668
(≥5 takeovers)	(0.431)	(0.418)	(0.428)	(0.412)	(0.387)	(0.667)	(0.493)	(0.368)	(1.446)
Constant	7.237***	7.440***	5.288***	5.519***	5.834***	−0.755	8.484***	0.812	7.049**
	(2.251)	(2.078)	(2.123)	(2.083)	(1.929)	(1.330)	(1.512)	(0.765)	(3.277)
F-statistic	3.22***	3.23***	3.24***	3.23***	3.2***	1.9**	4.36***	3.13***	2.37***
Adjusted-R^2	8.59%	8.57%	8.07%	8.32%	8.55%	11.88%	8.85%	5.27%	13.17%
No. of observations	1900	1900	1900	1900	1900	411	1489	1397	503

The table reports OLS regression of CARs on bidder and deal characteristics. The dependent variable is the 3-day market model CAR (in percentages). The independent variables are variables representing size, bidder characteristics and deal characteristics. The size variables in columns 1 and 2 are market capitalization and book value of assets. In columns 3 to 5, a large size dummy is used which equals 1 if the bidder's market capitalization is equal to or greater than the market capitalization of the 25th, 50th or 75th percentile of ASX firms in the same year. Other variable definitions are given in the appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regression control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

4.4. Are large acquirers less likely to be disciplined by the market for corporate control?

Our results indicate that in Australia CEOs and the boards of larger acquiring firms are less inclined to be entrenched. We have hypothesized that this is due to the absence of entrenchment mechanisms in the form of ATPs. Offenberg (2009) finds that large bidders in general are less likely to be targeted, suggesting that firm size is an effective anti-takeover mechanism. Following their approach, we estimate a regression model where the dependent variable is binary taking a value of 1 if an acquirer is targeted for a takeover within 4 years of its last acquisition, and zero otherwise. The independent variables include the announcement acquirer CARs, firm size and control variables for leverage, free cash flow and Tobin's q. We also include a serial dummy variable and a dummy that identifies whether the acquirer belongs to a technology related industry. To test whether CARs of larger firms (as in Offenberg, 2009) provide any incremental predictive power we use interaction terms to denote CARs of large acquirers using our large size dummies.

Table 7
Probit regressions predicting value-enhancing takeovers.

	Definition of acquirer size				
	Market capitalization (1)	Book assets (2)	Large top 25th (3)	Large top 50th (4)	Large top 75th (5)
Acquirer size	−0.03	−0.02	−0.117	−0.094	−0.04
	(0.018)	(0.019)	(0.080)	(0.068)	(0.085)
Relative size	0.233***	0.253***	0.254***	0.257***	0.264***
	(0.066)	(0.065)	(0.065)	(0.065)	(0.066)
Leverage	−0.064	−0.053	−0.052	−0.054	−0.062
	(0.042)	(0.043)	(0.043)	(0.042)	(0.042)
Free cash flow	0.424***	0.401***	0.399***	0.393***	0.381***
	(0.142)	(0.140)	(0.140)	(0.138)	(0.138)
Tobin's q	−0.003	−0.006	−0.005	−0.005	−0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Return on assets	0.028	0.027	0.022	0.023	0.026
	(0.033)	(0.032)	(0.031)	(0.031)	(0.031)
Cash holdings to assets	0.063	0.069	0.073	0.069	0.078
	(0.074)	(0.073)	(0.073)	(0.073)	(0.073)
Public cash	−0.248*	−0.249*	−0.248*	−0.247*	−0.255*
	(0.134)	(0.134)	(0.134)	(0.134)	(0.132)
Public stock	−0.045	−0.05	−0.058	−0.053	−0.056
	(0.176)	(0.175)	(0.175)	(0.175)	(0.174)
Public mixed	−0.299***	−0.303***	−0.303***	−0.308***	−0.310***
	(0.112)	(0.112)	(0.112)	(0.112)	(0.111)
Private cash	−0.029	−0.027	−0.026	−0.025	−0.029
	(0.097)	(0.097)	(0.098)	(0.097)	(0.097)
Private stock	0.222**	0.230**	0.241**	0.234**	0.241**
	(0.110)	(0.110)	(0.108)	(0.108)	(0.109)
Hostile	0.022	0.016	0.009	0.018	0.014
	(0.134)	(0.133)	(0.134)	(0.133)	(0.133)
Tech	−0.06	−0.054	−0.051	−0.06	−0.046
	(0.125)	(0.123)	(0.123)	(0.122)	(0.123)
Cross border	0.01	0.003	0.005	0.004	−0.007
	(0.074)	(0.074)	(0.073)	(0.073)	(0.072)
Competed	−0.432	−0.422	−0.415	−0.423	−0.419
	(0.288)	(0.287)	(0.287)	(0.288)	(0.287)
Conglomerate	−0.127*	−0.128*	−0.126*	−0.129*	−0.129*
	(0.069)	(0.069)	(0.069)	(0.069)	(0.070)
Serial2 (≥5 takeovers)	0.005	−0.008	−0.007	−0.013	−0.027
	(0.072)	(0.071)	(0.068)	(0.067)	(0.066)
Constant	0.36	0.321	0.241	0.241	0.229
	(0.871)	(0.866)	(0.861)	(0.866)	(0.868)
No. of Observations	1900	1900	1900	1900	1900
Wald χ^2	81.09***	79.79***	81.17***	80.97***	78.65***
Pseudo R^2	3.16%	3.10%	3.13%	3.12%	3.06%

The dependent variable is a dummy variable that equals 1 if the acquirer's 3-day CAR is positive (i.e., value-enhancing), and 0 if negative (i.e., value-destroying). The independent variables are variables representing size, bidder characteristics and deal characteristics. The size variables in columns 1 and 2 are market capitalization and book value of assets. In columns 3 to 5, a large size dummy is used which equals 1 if the bidder's market capitalization is equal to or greater than the market capitalization of the 25th, 50th or 75th percentile of ASX firms in the same year. Other variable definitions are given in the appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regression control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

The results reported in Table 11 confirm that bad bidders are more likely to be targeted for takeover, supporting Manne's (1965) view that the market for corporate control is an effective disciplining mechanism. Unlike, Offenberg (2009), however, firm size is not statistically significant for any of the models, indicating that larger firm size does not provide an effective takeover defense. Also, interacting acquirer CARs with different size measures (models 5 to 8) produces insignificant coefficients for all models, except model 6, which captures returns to firms in the top 25th percentile — the largest acquirers in our sample. The sign on the interaction term is positive however, indicating that the largest and most profitable firms are more likely to be targeted. Clearly, these are not disciplining takeovers, but are probably motivated for other reasons. Since our results show that larger acquiring firms generate higher dollar gains on average in takeovers, the evidence points to synergy motivations. However, the positive coefficient on the interaction term combined with the negative coefficient on CARs does suggest that while small bad bidders are likely to be later acquired, some very large bad bidders may escape discipline. The marginal statistical significance (at 10%) of the interaction term and the fact that it becomes insignificant when we use at top 10th percentile to define large (unreported) suggests that size is unlikely to be a significant deterrent to takeover. Taken

Table 8
Premium regressions.

Variables	Definition of acquirer size				
	Market capitalization (1)	Book assets (2)	Large top 25th (3)	Large top 50th (4)	Large top 75th (5)
Acquirer size	−0.881	−0.872	−1.541	−1.535	−6.157**
	(0.576)	(0.585)	(2.948)	(2.309)	(2.762)
Relative size	−2.411**	−2.004*	−1.589	−1.578	−1.991*
	(1.190)	(1.223)	(1.264)	(1.162)	(1.137)
Leverage	−0.946	−0.410	−0.704	−0.726	−0.557
	(0.885)	(0.970)	(0.990)	(0.893)	(0.885)
Free cash flow	3.147	3.014	2.418	2.331	3.099
	(3.390)	(3.290)	(3.357)	(3.371)	(3.242)
Tobin's q	0.323**	0.226	0.296*	0.293*	0.234
	(0.167)	(0.171)	(0.177)	(0.178)	(0.170)
Return on assets	1.790	1.742	1.672	1.689	1.802
	(1.552)	(1.583)	(1.655)	(1.650)	(1.623)
Cash holdings to assets	0.687	0.782	1.095	1.003	0.783
	(1.402)	(1.412)	(1.513)	(1.464)	(1.461)
Public cash	1.952	1.965	1.613	1.646	2.155
	(3.369)	(3.314)	(3.340)	(3.342)	(3.308)
Public stock	−2.146	−2.287	−2.729	−2.622	−1.888
	(3.828)	(3.769)	(3.772)	(3.789)	(3.738)
Public mixed	−5.080	−5.163*	−5.444*	−5.481*	−4.963*
	(3.135)	(3.113)	(3.144)	(3.125)	(3.074)
Private cash	−1.871	−1.842	−1.856	−1.819	−1.846
	(3.261)	(3.257)	(3.236)	(3.229)	(3.297)
Private stock	−1.110	−1.238	−0.473	−0.587	−1.389
	(3.414)	(3.452)	(3.486)	(3.477)	(3.461)
Hostile	9.174***	9.069***	8.960***	8.994***	9.152***
	(2.671)	(2.681)	(2.677)	(2.673)	(2.638)
Tech	−2.666	−2.715	−2.270	−2.377	−2.875
	(4.258)	(4.237)	(4.301)	(4.287)	(4.097)
Cross border	10.192***	10.158***	9.879***	9.889***	10.100***
	(2.699)	(2.677)	(2.639)	(2.679)	(2.662)
Competed	17.837***	17.955***	18.221***	18.153***	18.301***
	(7.058)	(7.041)	(7.050)	(7.028)	(6.818)
Conglomerate	−3.586*	−3.584*	−3.590*	−3.624*	−3.545*
	(2.063)	(2.067)	(2.095)	(2.065)	(2.054)
Serial2 (≥5 takeovers)	−1.438	−1.432	−2.244	−2.226	−1.191
	(2.186)	(2.258)	(2.108)	(2.126)	(2.187)
Constant	27.166***	26.714***	22.511***	23.281***	26.675***
	(8.125)	(8.038)	(7.573)	(7.717)	(7.710)
F-statistic	4.37***	4.51***	4.35***	4.49***	4.57***
Adjusted-R^2	11.21%	11.19%	10.94%	10.96%	11.67%
No. of observations	900	900	900	900	900

The table reports regressions of proxy premiums on acquirer financial and deal characteristics. Proxy premiums are calculated for private targets using Officer's (2007) comparable industry transaction method. The value is taken as the average 1-week premium for a portfolio of listed targets from the same industry and year as the private target. Actual 1-week premiums are used for publically listed targets. The independent variables are variables representing size, bidder characteristics and deal characteristics. The size variables in columns 1 and 2 are market capitalization and book value of assets. In columns 3 to 5, a large size dummy is used which equals 1 if the bidder's market capitalization is equal to or greater than the market capitalization of the 25th, 50th or 75th percentile of ASX firms in the same year. Other variable definitions are given in the appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regressions control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

together, the results suggest that larger size, on average, plays no major role in determining takeover likelihood for bad bidders, and so does not influence the efficient functioning of a disciplining market for corporate control in Australia.

4.5. Do large perform better because large Australian firms are not large by international comparisons?

One possible explanation for the better results reported for large Australian acquirers is that large firms in Australian are simply not large when benchmarked against international standards, particularly the US. Specifically, what we report as 'large' in Australia may merely be 'medium' in the US, suggesting that Australian firms simply do not become large enough to become significantly entrenched. To examine this issue we first extract a sample of US successful takeovers from SDC Platinum over the

Table 9
Combined acquirer and target abnormal returns over different windows.

	All	Large top 25th	Small bottom 75th	Difference	Large top 75th	Small bottom 25th	Difference
Panel A: Short-window							
CARs (−1,+1)	2.224***	1.881***	3.36***	−1.486**	2.126***	6.385***	−4.259**
	(1.160)***	(0.969)***	(2.806)***	(−1.837)***	(1.152)***	(3.982)***	(−2.830)
DCARs ($A, millions)	30.978***	40.708***	4.854**	35.854***	31.751***	10.958**	20.793
	(10.351)***	(13.045)***	(1.917)***	(11.128)***	(10.691)***	(0.970)***	(9.721)
Panel B: Longer-windows							
CARs (days relative to $t=0$)							
−20,+20	17.519***	19.570***	16.784***	2.786	17.133***	21.889***	−4.756
−50,+50	18.786***	21.228***	17.910***	3.318	18.571***	21.216***	−2.645
−125,+125	25.592***	20.335***	27.477***	−7.142	25.705***	24.311***	1.394
−180,+180	25.724***	18.629***	28.269***	−9.640	24.757***	36.663***	−11.906
−210,+210	26.851***	19.256***	29.575***	−10.319	25.531***	41.777***	−16.246*
DCARs ($A, millions)							
−20,+20	46.544***	108.518***	25.025***	83.493***	49.348***	15.350***	33.998***
−50,+50	57.588***	127.812***	33.204***	94.608***	61.321***	16.052**	45.270***
−125,+125	60.046***	102.472***	45.315***	57.157	63.786***	18.438**	45.348***
−180,+180	62.141***	108.341***	46.099***	62.243	65.495***	24.823***	40.672**
−210,+210	64.545***	106.469**	49.988***	56.481	67.948***	26.685***	41.263**

The table reports the combined short-window (Panel A) and longer-window (Panel B) CARs and combined dollar CARs (DCARs) for acquirers and targets over different windows relative to the takeover announcement day, $t=0$. Combined CARs are calculated as the weighted average of the acquirer's and the target's CARs, where the weight is the relative market capitalization of the acquirer/target the day prior to the window start date. DCARs are the average inflation-adjusted (to 2008) abnormal dollar returns, calculated as the combined CARs times the sum of the market capitalization for the acquirer and target the day prior to the window start date. Numbers in parentheses are medians.

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

same time period (1993–2007) and that meet the same data requirements for inclusion in the sample as we applied to our Australian sample. Table 12 (Panel A) reports the breakdown in asset values (taken from Compustat for US acquirers) using various breakpoints to define large and small acquirers. Asset values are in 2008 Australian dollars, which we calculate using the USD/AUD exchange rate on the acquisition announcement date. As expected, large US acquirers are larger than their Australian counterparts by about a factor of 6, which holds across all definitions of large. However, when we compare the relative size of large acquirers to small within each market, Australian large acquirers are just as large as their US counterparts. For example, defining large (small) as the top 10% (bottom 90%), the relative ratios are 21 and 18, respectively for the US and Australia. Defining large (small) as the top 25% (bottom 75%) shows that on a relative basis, large Australian acquirers are actually larger than their US counterparts, with relative ratios of 25 and 21, respectively. Therefore, if size is an effective entrenchment mechanism in the US (which Moeller et al., 2004 shows), it should equally be effective in Australia. The results from our analysis so far suggest otherwise, indicating that the absence of ATPs may have a role to play in promoting value-enhancing behavior.

To examine this issue further, we analyze the CARs and DCARs for our US sample, and a comparable sub-sample, which we define as US acquirers whose total assets in the year of the takeover, in Australian dollar terms, are equal to or below the maximum assets of any Australian acquirer in our sample. If our results are due to the smaller absolute size on average of large Australian acquirers, then there should be no significant size effect in a sample of equivalent US acquirers. Panel B of Table 12 reports the CARs and DCARs. Consistent with Moeller et al. (2004), we report a positive equally weighted CAR of 1.53% for the full sample of acquirers, which increases to about 1.66% for our comparable US sample. The increase in the CARs for the comparable sample is due to excluding some of the largest US acquirers from the sample, which are more likely to be loss making. In line with expectations, the CARs are lower for more extreme definitions of large, with significant differences in CARs between large and small, confirming a size-effect. More importantly, the dollar CARs (DCARs) are negative and statistically significant for large US comparable acquirers, defined as those in the top 10th, 25th or 75th percentiles. This confirms that comparable large US acquirers are, on average, value destroying. We also test whether the size-effect we observe in our comparable US sample holds after controlling for deal and financial characteristics, and estimate regression models similar to those reported in Table 6. The results (unreported) confirm that the size-effect is robust to the inclusion of deal and other acquirer financial characteristics.

5. Additional robustness tests

In this section we examine whether our key findings are robust to some econometric concerns related to multicollinearity and endogeneity.

Table 10
Cross-sectional regressions of acquirer post-takeover operating performance.

Variables	Definition of acquirer size			
	Market capitalization (1)	Book assets (2)	Market capitalization (3)	Book assets (4)
Acquirer size	1.107***	1.043***	1.215***	1.125***
	(0.289)	(0.314)	(0.380)	(0.390)
Relative size	0.035	−0.531	1.182*	0.434
	(0.999)	(0.942)	(0.663)	(0.569)
Leverage	0.580	−0.151	0.814	−0.097
	(0.549)	(0.465)	(0.629)	(0.524)
Free cash flow	2.718*	2.909*	4.106*	4.097*
	(1.534)	(1.565)	(2.133)	(2.146)
Tobin's q	0.075	0.180***	0.088	0.212**
	(0.048)	(0.051)	(0.086)	(0.086)
Return on assets	11.425***	11.630***	11.187***	11.429***
	(2.202)	(2.242)	(2.729)	(2.813)
Cash holdings to assets	−0.939	−1.022	4.242	4.010
	(1.698)	(1.772)	(3.352)	(3.479)
Public cash	1.175	1.189	2.826*	3.069*
	(1.650)	(1.640)	(1.656)	(1.646)
Public stock	−1.759	−1.865	−0.780	−0.647
	(2.179)	(2.204)	(2.401)	(2.407)
Public mixed	0.705	0.730	0.891	1.097
	(1.385)	(1.393)	(1.905)	(1.929)
Private cash	1.837**	1.766**	0.895	1.072
	(0.793)	(0.788)	(1.319)	(1.323)
Private stock	−0.443	−0.444	0.180	0.190
	(1.427)	(1.439)	(2.691)	(2.656)
Hostile	−2.449*	−2.335	−2.302	−2.200
	(1.480)	(1.472)	(1.597)	(1.606)
Tech	−0.921	−0.930	−0.514	−0.679
	(1.555)	(1.562)	(2.484)	(2.458)
Cross border	−1.098	−0.978	−1.692	−1.330
	(1.027)	(1.025)	(1.473)	(1.457)
Competed	3.197	2.812	4.209*	4.001*
	(2.383)	(2.329)	(2.354)	(2.330)
Conglomerate	−2.067**	−1.995**	−1.152	−1.144
	(0.865)	(0.868)	(1.062)	(1.074)
Serial2 (≥5 takeovers)	−1.494	−1.423	−2.683**	−2.632**
	(1.026)	(1.025)	(1.371)	(1.337)
Proxy premium			0.015***	0.015***
			(0.005)	(0.005)
Constant	7.262***	6.370**	−4.384	−3.728
	(2.634)	(3.149)	(3.315)	(3.358)
F-statistic	7.00***	6.37***	4.90***	4.28***
Adjusted-R^2	24.45%	24.20%	32.77%	32.44%
No. of observations	969	969	417	417

The table reports OLS regressions of post-takeover operating performance on bidder and deal characteristics. The dependent variable is the 3-year post-takeover average industry-adjusted operating performance (in percentages), measured as acquirer operating profit to total assets less the industry median. Operating profit is measured as pre-depreciated profit. The independent variables are variables representing size, bidder characteristics and deal characteristics. The size variables in columns 1 (3) and 2 (4) are market capitalization and book value of assets, respectively. Other variable definitions are given in the appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regression control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

The results are robust to multicollinearity concerns. Multicollinearity is a live issue due to possible correlation between the variables. Eigenvalue, VIF, and condition index tests indicate that multicollinearity does not bias the results. The paper further assesses multicollinearity using principal components analysis. This condenses all control variables into six non-collinear principal components. Thereafter, it regresses size (and other applicable independent variables) on CARs, controlling for the principal components. The results are qualitatively the same as those reported in Table 6.

While OLS regression results reported can establish correlation, they may not establish causation (Hayashi, 2000). OLS estimators are biased and inconsistent if the model exhibits endogeneity, omits variables that may explain CARs, or inaccurately measures explanatory variables (Wooldridge, 2002; Greene, 2008). Biased and inconsistent estimators motivate using 2-stage least squares (2SLS) and GMM. Brown and Caylor (2006) suggest using 2SLS to resolve reverse causality. However, 2SLS is

Table 11
Probit models of the likelihood of an acquiring firm becoming a takeover target.

	Definition of acquirer size							
	Market capitalization (1)	Large top 25th (2)	Large top 50th (3)	Large top 75th (4)	Market capitalization (5)	Large top 25th (6)	Large top 50th (7)	Large top 75th (8)
CARs	−0.029***	−0.029***	−0.029***	−0.030***	−0.023***	−0.032***	−0.030***	−0.019**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.007)	(0.008)	(0.008)
Acquirer size	−0.016	−0.096	−0.217	0.246	−0.017	−0.093	−0.216	0.222
	(0.046)	(0.186)	(0.173)	(0.223)	(0.046)	(0.189)	(0.172)	(0.212)
CARs*Acquirer size					−0.002	0.034*	0.004	−0.019
					(0.002)	(0.018)	(0.015)	(0.013)
Return on assets	0.244	0.22	0.234	0.164	0.23	0.242	0.238	0.145
	(0.211)	(0.186)	(0.190)	(0.211)	(0.211)	(0.190)	(0.190)	(0.208)
Tech	−0.264	−0.263	−0.311	−0.231	−0.264	−0.269	−0.313	−0.243
	(0.239)	(0.235)	(0.239)	(0.238)	(0.239)	(0.236)	(0.238)	(0.233)
Leverage	0.037	0.039	0.048	0.024	0.037	0.039	0.048	0.023
	(0.049)	(0.050)	(0.044)	(0.058)	(0.049)	(0.050)	(0.044)	(0.055)
Free cash flow	0.404	0.409	0.452	0.332	0.411	0.395	0.45	0.344
	(0.299)	(0.299)	(0.294)	(0.302)	(0.300)	(0.300)	(0.294)	(0.301)
Serial2 (≥5 takeovers)	0.189	0.197	0.223	0.12	0.19	0.187	0.222	0.115
	(0.185)	(0.163)	(0.171)	(0.162)	(0.185)	(0.165)	(0.170)	(0.163)
Tobin's q	−0.049	−0.049*	−0.054*	−0.041	−0.049	−0.049*	−0.054*	−0.041
	(0.030)	(0.028)	(0.030)	(0.025)	(0.030)	(0.029)	(0.030)	(0.025)
Constant	−6.045***	−6.097***	−6.000***	−6.351***	−6.032***	−6.096***	−6.002***	−6.319***
	(0.448)	(0.381)	(0.394)	(0.445)	(0.449)	(0.468)	(0.393)	(0.493)
No. of observations	1837	1837	1837	1837	1837	1837	1837	1837
Pseudo R^2	10.29%	10.33%	10.71%	10.58%	10.32%	10.58%	10.72%	10.80%

The table reports probit regressions. The dependent variable is an indicator variable that equals one if the acquirer was acquired within four-years of acquiring the original target. The independent variables are variables representing size, bidder characteristics and deal characteristics. The size variable in columns 1 and 5 is the natural logarithm of the acquirer's market capitalization. The size variables in columns 2 to 4 and 6 to 8 are dummy variables that equal one if the acquirer's market capitalization is equal to or greater than the market capitalization of the 25th, 50th, or 75th percentile of all ASX firms in the same year. Models 5 to 8 include an interaction term (CARs*Acquirer size). Other variable definitions are given in the appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regression control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

inefficient due to heteroscedasticity and clustering and is vulnerable to weak instruments (Staiger and Stock, 1997; Wooldridge, 2002). This motivates using GMM, which is argued to be robust to non-normality and more robust to weak instruments (Cliff, 2003).[26] Table A2 in the appendix reports the results of GMM regressions that control for potential endogeneity between the size variable(s) and CARs. Size coefficients remain negative and statistically significant, confirming that large acquirers make acquisitions that generate lower CARs.

6. Conclusion

The main purpose of this paper is to examine if a size effect in acquirer returns exists in a market where ATPs are prohibited, and so managerial entrenchment is more difficult. Using Australian data our results are consistent with the view that a competitive takeover market can ameliorate latent managerial entrenchment. The paper finds that while a size-effect exists, large acquirers actually make more profitable acquisitions, which is in stark contrast to the US literature and results reported in this paper for a comparable US sample covering the same time period as our Australian sample. We find that larger Australian acquirers are less inclined to overpay, and generate larger post-takeover operating performance returns. We also show that the market for corporate control appears to be effective in Australia at disciplining bad bidders. However, unlike US evidence in Offenberg (2009), firm size does not appear to overly influence the disciplining ability of the takeover market. While factors other than the non-existence of ATPs could account for the better performance in takeovers by large Australian acquirers, empirical evidence cited here suggests otherwise. For example, several papers provide support for the view that ATPs facilitate larger size by encouraging empire building

[26] The instrumental variables used include the acquirer's depreciation expense, total debt, net cash from financing, property plant and equipment, and common dividends.

Table 12
A comparative analysis with US acquirers.

Panel A: Size-based analysis	US ($A, millions)	Australia ($A, millions)
Top 10%	29,857.72	4758.94
Bottom 90%	1426.06	267.67
Top 10%/bottom 90%	20.94	17.78
Top 25%	14,931.19	2566.87
Bottom 75%	716.91	101.84
Top 25%/bottom 75%	20.83	25.20
Top 75%	5654.82	952.25
Bottom 25%	111.49	10.45
Top 75%/bottom 25%	50.72	91.12

Panel B: CARs and DCARs

	Average Size ($A, millions)	Average CAR (%)	Average DCAR ($A, millions)	Number
All acquirers	6704.98	1.53***	−5.96**	12,599
Comparable acquirers	1843.74	1.66***	0.02	11,232
Size-based (for comparable acquirers)				
Bottom 25th (small)	102.65	2.401***	1.077***	2848
Bottom 75th (small)	559.56	2.032***	3.018***	8424
Bottom 90th (small)	978.47	1.848***	4.943***	10,109
Top 75th (large)	2425.01	1.357***	−0.201**	6983
Top 25th (large)	5717.41	0.585***	−8.479***	2846
Top 10th (large)	9632.68	0.300*	−32.38***	1137
Differences in CARs and DCARs between large and small				
Top 10th less bottom 90th		−1.54***	−37.32***	
Top 25th less Bottom 75th		−1.45***	−11.41***	
Top 75th less bottom 25th		−1.05***	−1.27**	

Panel A reports the mean total assets for all acquirers in the US and in Australia. The assets are inflated to 2008 $A. Panel B reports 3-day CARs and DCARs for all US acquirers and a comparable size based sample, defined as US acquirers with total assets equal to or below that of the largest Australian acquirer in the takeover year. Differences in mean CARs and DCARs are also reported.

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

behavior through takeovers, which the literature shows are typically value-reducing (see, e.g., Bauguess and Stegemoller, 2008; Harford et al., 2010; Masulis et al., 2007). Also, Bradley et al. (1988) fail to find any evidence of a significant size-effect in US acquirer returns pre-1980, when ATPs did not exist. In fact, he reports that larger acquirers actually performed significantly better than smaller acquirers during this period. Our findings are consistent with the view that in the absence of ATPs, the Australian takeover market probably somewhat resembles the workings of the pre-1980s (i.e., 1963–1980) market in the US — one that was clearly more effective in promoting value-enhancing takeovers by larger firms.

The findings of the paper should be of interest to regulators and policy makers who are interested in the workings of the market for corporate control. Importantly, they at least suggest that a more efficient takeover market can be attained by regulating or prohibiting the use of provisions that may protect self-serving managers who are inclined to destroy shareholder value. The results provide additional support for Manne's (1965) view that a well functioning market for corporate control serves a useful purpose by providing a useful 'check' on managerial performance.

The findings in this paper suggest several avenues for future research. One avenue is to determine whether sovereign governance around the world causes changes in firm-behavior. This could focus on the relation between regulation and governance, and the size–performance relationship. This draws on the observation in Fan et al. (2011) that regulation and governance impact on corporate behavior, especially in emerging markets. Future research could also examine whether corporate mobility influences law reform, especially within regional economic blocks such as the EU (following McCahery, 2006; Bratton et al., 2008). An alternative approach could examine whether actual or apparent corporate governance failings drive sovereign law reform, and whether these forms create value.

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Appendix A

Table A1
Variable definitions.

Variable	Definition
Panel A: Size variables	
Book assets	The natural logarithm of the bidder's net assets (inflated to 2008 dollars).
Market capitalization	The natural logarithm of the bidder's market capitalization 1 day before the acquisition.
Top 25th, 50th, 75th	Dummy variable that equals 1 if the bidder's book assets (inflated to 2008 dollars) are in the top 10%, 25%, 50% and 75% of the sample, respectively.
Panel B: Bidder characteristics	
Leverage	The bidder's book debt over book assets.
Tech	Dummy variable that equals 1 if the bidder is in a SIC high tech industry and equals 0 otherwise. The high-tech industries relate to computer hardware (SIC codes 3571, 3572, 3575, 3577, 3578); communications equipment (3661, 3663, 3669); electronics (3671, 3672, 3674, 3675, 3677, 3678, 3679); navigation (3812); measuring equipment (3823, 3825, 3826, 3827, 3829); medical technology (3841, 3845); telecommunications equipment (4812, 4813); communication services (4899); or software (7371, 7372, 7373, 7374, 7375, 7378, 7379).
Free cash flow	Cash flow from operating activities less capital expenditures scaled by book value of assets
Tobin's q	Market value of assets (market value at accounting year-end prior to bid − book value of equity + total assets) scaled by total assets
Return on assets	Pre-depreciated operating profit scaled by book value of assets
Cash holdings to assets	Cash and marketable securities scaled by book value of assets
Serial (>1 takeover)	Dummy variable that equals 1 if the acquirer completed 1 or more takeovers during the sample period and 0 otherwise.
Serial (≥5 takeovers)	Dummy variable that equals 1 if the acquirer completed 5 or more takeovers during the sample period and 0 otherwise.
Serial (≥2 takeovers in 2 years)	Dummy variable that equals 1 if the acquirer completed 2 or more takeovers within a 2 year period and 0 otherwise.
Panel C: Deal characteristics	
Relative size	Transaction value scaled by acquirer market value year prior to takeover
Public cash	Dummy variable that equals 1 if 100% of the consideration is cash and the target is public; equals 0 otherwise.
Public stock	Dummy variable that equals 1 if 100% of the consideration is stock and target is public; equals 0 otherwise.
Public mixed	Dummy variable that equals 1 if consideration is cash and stock and target is public; equals 0 otherwise.
Private cash	Dummy variable that equals 1 if 100% of the consideration is cash and target is private; equals 0 otherwise.
Private stock	Dummy variable that equals 1 if 100% of the consideration is stock and target is private; equals 0 otherwise.
Hostile	Dummy variable that equals 1 if SDC classifies the deal as hostile or a tender offer and equals 0 otherwise.
Public	Dummy variable that equals 1 if the target lists on an exchange and equals 0 otherwise
Private	Dummy variable that equals 1 if the target is not listed on an exchange and equals 0 otherwise
Cash only	Dummy variable that equals 1 if 100% of the consideration is cash and equals 0 otherwise.
Stock only	Dummy variable that equals 1 if 100% of the consideration is stock and equals 0 otherwise.
Mixed	Dummy variable that equals 1 if consideration is cash and stock and equals 0 otherwise.
Cross border	Dummy variable that equals 1 if the bidder and target are in different countries and equals 0 otherwise.
Competed	Dummy variable that equals 1 if the acquisition features multiple bidders and equals 0 otherwise.
Premium (1-week)	Transaction value scaled by the target's market capitalization measured 1-week prior to the takeover offer, minus 1.
Premium (1-month)	Transaction value scaled by the target's market capitalization measured 1-month prior to the takeover offer, minus 1.
Proxy premium	Premium is computed following Officer (2007). The calculation involves two steps. First, calculate the actual 1-week or 1-month premium for each publically listed target firm, as defined above. Second, for each firm that is not listed (i.e. does not have a market capitalization), proxy the takeover premium as the average premium for that target's industry in that acquisition year.

Table A2
GMM cross-sectional regressions of announcement abnormal returns (CARs).

	Definition of acquirer size				
	Market capitalization (1)	Book assets (2)	Large top 25th (3)	Large top 50th (4)	Large top 75th (5)
Acquirer size	−0.375***	−0.362***	−1.453**	−2.057**	−0.471
	(0.131)	(0.128)	(0.657)	(0.999)	(2.896)
Relative size	0.862**	1.048***	1.074***	1.077***	1.159***
	(0.391)	(0.380)	(0.381)	(0.379)	(0.393)
Leverage	−0.405*	−0.158	−0.208	−0.139	−0.25
	(0.230)	(0.227)	(0.228)	(0.227)	(0.229)
Free cash flow	1.314	1.258	1.265	1.25	0.62
	(0.868)	(0.865)	(0.895)	(0.893)	(0.847)
Tobin's q	0.055*	0.016	0.023	0.017	0.035
	(0.031)	(0.033)	(0.033)	(0.034)	(0.045)
Return on assets	3.014***	3.007***	2.772***	2.711***	2.910***
	(0.666)	(0.725)	(0.752)	(0.762)	(0.772)
Cash holdings to assets	−1.153	−1.199	−0.983	−1.194	−0.852
	(0.743)	(0.750)	(0.715)	(0.760)	(0.816)

Table A2 (*continued*)

	Definition of acquirer size				
	Market capitalization (1)	Book assets (2)	Large top 25th (3)	Large top 50th (4)	Large top 75th (5)
Public cash	−1.542**	−1.618**	−1.634**	−1.604**	−1.764**
	(0.704)	(0.702)	(0.701)	(0.716)	(0.709)
Public stock	0.668	0.596	0.614	0.458	0.501
	(1.599)	(1.595)	(1.587)	(1.597)	(1.607)
Public mixed	−1.594**	−1.654**	−1.654**	−1.686**	−1.782**
	(0.720)	(0.721)	(0.721)	(0.726)	(0.729)
Private cash	−0.152	−0.132	−0.189	−0.149	−0.316
	(0.585)	(0.589)	(0.594)	(0.587)	(0.597)
Private stock	2.284**	2.220**	2.328**	2.290**	2.650**
	(1.108)	(1.108)	(1.105)	(1.114)	(1.157)
Hostile	−0.084	−0.059	−0.179	0.059	−0.039
	(0.760)	(0.758)	(0.760)	(0.766)	(0.769)
Tech	0.312	0.287	0.221	−0.174	0.023
	(0.750)	(0.758)	(0.765)	(0.768)	(0.795)
Cross border	−0.151	−0.136	−0.202	−0.119	−0.367
	(0.446)	(0.447)	(0.446)	(0.466)	(0.485)
Competed	−1.148	−1.093	−0.906	−1.199	−1.086
	(0.896)	(0.905)	(0.917)	(0.917)	(0.896)
Conglomerate	−0.22	−0.174	−0.196	−0.281	−0.368
	(0.414)	(0.414)	(0.417)	(0.410)	(0.409)
Serial2 (≥5 takeovers)	0.048	0.015	−0.034	0.038	−0.461
	(0.411)	(0.411)	(0.430)	(0.448)	(0.539)
Constant	−9.72	−9.863	−9.749	−9.224	−23.004
	(21.582)	(23.196)	(22.757)	(23.328)	(31.756)
No. of observations	1222	1222	1222	1222	1222
Wald χ^2	87.62***	85.76***	80.63***	80.73***	75.72***

The table reports General Method of Moments (GMM) regressions of CARs on bidder and deal characteristics. The dependent variable is the 3-day market model CAR (in percentages). The independent variables are variables representing size, bidder characteristics and deal characteristics. The instrumental variables used include the acquirer's depreciation expense, total debt, net cash from financing, property plant and equipment, and the value of common dividends. The size variables in columns 1 and 2 are market capitalization and book value of assets. In columns 3 to 5, a large size dummy is used which equals 1 if the bidder's market capitalization is equal to or greater than the market capitalization of the 25th, 50th or 75th percentile of ASX firms in the same year. Other variable definitions are given within this appendix. Standard errors denoted in parentheses are adjusted for heteroskedasticity and acquirer clustering. All regression control for year fixed effects (unreported).

*** Denotes significance at 1%.
** Denotes significance at 5%.
* Denotes significance at 10%.

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