AUDIT QUALITY AND POST EARNINGS ANNOUNCEMENT DRIFT

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[A-head] Abstract

This study examines the value of audit quality in the capital markets setting. We argue that higher quality auditors are associated with lower post-earnings announcement drift (PEAD). Results show that clients of brand name auditors exhibit lower PEAD than small auditors, but only weak auditor industry specialist effects are identified. PEAD also differs for clients of individual Big 6/5 auditors, with clients of the smaller Arthur Andersen and Deloittes exhibiting greater PEAD, consistent with the DeAngelo (1981) size hypothesis. Finally, PWC exhibits higher PEAD in 1998, suggesting market uncertainty about quality implications of audit market structural change.

JEL Classification: *M40*

Keywords: *audit quality; post-earnings announcement drift; audit firm mergers*

[A-head] 1. Introduction

In this paper, we address the question of differential audit quality effects within the capital market setting. In particular, we provide evidence on the association between audit quality and post-earnings announcement drift [hereafter PEAD]. PEAD suggests that market participants, in general, underreact to information contained in earnings announcements. We take the view that higher audit quality results in decreased

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information uncertainty associated with unexpected earnings announcements, and hence predict a negative association between audit quality and PEAD.

We contribute to the audit quality literature in a number of important ways. First, relatively few studies address audit quality in the capital markets context (Teoh and Wong (1993), Hackenbrack and Hogan (2002), Gul, Lynn and Tsui (2002)). Further, these studies tend to be based on the pre-earnings announcement period and focus on the relationship between security returns and audit quality. This is one of the first studies with a focus on the post-earnings announcement period.

Second, the prior empirical findings on differential auditor quality effects in the capital market literature are mixed. For example, Teoh and Wong (1993), find evidence of stronger earnings response co-efficients [hereafter ERCs] for firms audited by the Big 8 auditors. Studies examining tighter definitions of auditor quality based on industry specialist effects include Krishnan and Yang (1999) and Hackenbrack and Hogan (2002). Krishnan and Yang find support for added industry specialisation effects in the form of stronger ERCs, whilst Hackenbrack and Hogan using a switching sample do not. Our study provides an additional insight into the market effect of audit quality.

Third, our study is the first in the literature to examine the association between the pattern of security returns and audit quality within Big 6/5 firms. We also extend prior audit quality studies by undertaking tests of the capital market implications of the Coopers and Lybrand and Price Waterhouse merger.[1] Finally, the study contributes by providing out of sample evidence on PEAD from a country other than the United States [hereafter U.S.].

Our results are based on 3,731 earnings announcements during the period of 1994-1998, obtained from the SIRCA Core Research Database.[2] This sample period enables tests of audit quality post the 1989 mergers producing the Big 6. It also covers the period over 1997 – 1998, which facilitates the tests of PWC merger effects. Our key findings are the following. First, we find a significant negative relation between large auditors and PEAD with respect to unexpected good news announcements. Second, we find significantly different PEAD for firms classified on the basis of individual large auditors. Third, we observe capital market reaction around the PWC merger. Last, only weak evidence of PEAD reduction is found for alternative specifications of audit quality such as industry specialists, or industry leaders.

The rest of this paper is organised as follows. In the next section the background is presented and the hypotheses are developed. Section 3 describes the design, whilst the main results and sensitivity tests are reported in Section 4. Section 5 concludes the paper.

[A-head] 2. Background and hypothesis development

Prior literature has documented a relation between auditor size and auditor quality. DeAngelo (1981) argues that larger auditors provide enhanced training resources for staff, commit to higher promotion expenditure and provide opportunities for peer review generating greater reputation capital. Other incentives for larger auditors to provide higher audit quality relate to the substantial personal wealth of partners invested in larger accounting firms, and the lower level of dependence of partner's wealth on any given client. To protect this higher reputation capital, larger auditors have

[1] PricewaterhouseCoopers is denoted by "PWC" throughout the paper.
[2] Security Industry Research Corporation Asia Pacific.

added incentives to identify and report accounting breaches. Thus, larger auditors provide relatively higher audit quality.

Studies have also argued that higher audit quality proxied by auditor size, leads to a better information environment. For example Teoh and Wong (1993) argue that higher audit quality leads to closer concordance of reported earnings with GAAP. Hence these earnings are more informative about value. They provide evidence which suggests higher ERC's for firms audited by larger auditors than those audited by smaller auditors. The credibility of the information argument proposed by Teoh and Wong (1993) is also consistent with the information signalling assertions made by Willenborg (1999) and Weber and Willenborg (2003).[3]

More recently, Gul, Tsui and Lynn (2002) develop Teoh and Wong (2003) by showing that the relationship between improved earnings informativeness for higher quality auditors relates to the mitigation of agency costs where low insider ownership is present. Gul, Tsui and Lynn (2002) also show that the negative association between low management ownership and higher discretionary accruals is weakened in the presence of a higher quality auditor. These results suggest the importance of higher audit quality in constraining earnings management and boosting earnings informativeness in the presence of high agency costs.

Other supporting evidence from the accruals literature indicates that higher quality auditors act to reduce bias in accounting information, and improve the information environment. For example, Francis, Maydew and Sparks (1999) document a reduced magnitude of discretionary accruals for clients of Big 8 auditors compared to clients of non-Big 8 auditors.

We extend the previously identified relation between audit quality and information environment by analysing the relation between PEAD and earnings announcements of firms with differential audit quality. Our framework is built on Chan (1988), who finds that contrarian investment strategies may not lead to significant abnormal returns due to temporary changes in the underlying risks of winners and losers.[4] The implication of Chan (1988) is that information risk associated with earnings announcements leads to a temporary risk adjustment in the underlying stocks. Thus we assume that unexpected earnings news is associated with an initial increase in the uncertainty of investors' perceived distribution of future cash flows. This information risk holds asymmetric implications for good and bad news announcements.

For good news announcements the release of earnings information is likely to produce an under-reaction, since the positive news effect is partially offset by the increase in information risk. As the information environment stabilises, and the risk dissipates, the price increasingly reflects the information, producing PEAD.

For bad news announcements the opposite occurs. Upon the release of bad news, the probability of overreaction for bad news stocks is higher due to the simultaneous release of bad news, coupled with increased risk in the firms' information environment. Under this set of circumstances we would expect that rather than exhibit PEAD, the stock would drift higher due to the initial overreaction. Thus for a bad news portfolio, PEAD may not be present.

Other studies point to an asymmetry in the relative magnitude of information risk for good and bad news stocks, consistent with these predictions. For example, the

[3] Willenborg (1999) documents both an information signalling aspect along with the insurance benefit of high quality audits.

[4] Recently, behavioural explanations have been offered for PEAD such as Liang (2003). These studies explain PEAD in terms of investor bias associated with interpretation of quarterly earnings announcement information (Bernhard and Thomas (1989), (1990)). This study however utilises annual earnings announcements, as quarterly financial reporting is not mandatory in Australia.

management forecasts of earnings literature such as Hutton, Miller and Skinner (2003) find that bad news is always informative, whether it is supplemented by other management discussion or not. In contrast, Hutton, Miller and Skinner find that good news forecasts are only informative when accompanied by verifiable statements from management, suggesting that good news is less believable. Also consistent with these assertions is Jennings (1987), who finds that management earnings forecasts of bad news are more credible. The credibility of bad news *vis-à-vis* good news is also plausible as management compensation is based on good news, giving management incentives to surprise on the upside.[*]

Finally, audit quality is likely to matter more in a good news context due to greater litigation risk attached to good news. Bonner, Palmrose and Young (1998) found that certain types of fraud, principally revenue fraud is associated with higher likelihood of litigation against independent auditors.[†] The risk in good news is also demonstrated in the earnings restatement literature (Palmrose, Richardson and Schulz (2004)).

The above discussion suggests that underreaction to good news has better theoretical support, than underreaction to bad news. Therefore, that is our focus. We argue consistent with Teoh and Wong (1993) that audit quality is related to earnings credibility.[‡] Consequently, unexpected earnings announcements of firms audited by high quality auditors lead to lower initial information uncertainty than earnings announcements of firms audited by lower quality auditors. Lower initial information uncertainty reduces the initial under reaction for good news announcements, hence we predict:

H_1: Firms audited by larger auditors have lower PEAD than firms audited by smaller auditors

Also addressed in this study is the question of whether earnings announcements of firms audited by industry specialist auditors also reduce the initial information uncertainty. The motivation here is to assess whether there are levels of audit quality above and beyond the traditional distinction between Big 8/6/5/4 and non-Big 8/6/5/4 auditors. This test is interesting in light of conflicting findings in the literature regarding the value of industry specialists. For example, Krishnan and Yang (1999) find that firms with specialist auditors have higher ERCs than firms with non-specialists. On the other hand, Hackenbrack and Hogan (2002) find that whilst the market recognises the quality distinction between large and small auditors, they find no incremental effects for auditor specialists based on an audit switch sample.

Auditor industry specialists are defined as Big 6/5 auditors having a 20 % industry share of fees or clients in those industries classified as specialist industries in Ferguson and Stokes (2002). As with prior assertions regarding the ability of higher quality auditors to lower information uncertainty, we test the following hypothesis:

H_2: Firms with industry specialist auditors have lower PEAD than

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[*] We note that the conservatism argument proposed by Basu (1997) may hold implications for asymmetries in bad news (more timely – lower information risk) *vis-à-vis* good news (more persistent – higher information risk) to the extent that there is uncertainty regarding the timing of future good news recognition.

[†] Litigation risk is an important variable that makes bad news important in the U.S. Lower litigation risk in Australia is likely to reduce the information content of bad news in Australia. (We are grateful to our reviewer for this suggestion).

[‡] Implicit in this suggestion is that information quality (environment) is driven by audit quality and that audit quality is not just a signalling mechanism chosen by firms for information quality

firms with non-specialist auditors.

Last, we tighten the definition of an industry specialist auditor still further, and examine auditor industry leaders who are defined as the auditor with the largest market share in each industry (Ferguson, Francis and Stokes (2003)). Auditor industry leadership is arguably a more unequivocal measure of specialisation, since it does not rely on an arbitrary market share threshold such as the specialist test in H2, and is measured across all industries, not just ‘specialist’ industries. Thus H3 becomes:

H_3: Firms with industry leader auditors have lower PEAD than firms with non-leader auditors

We derive all three hypotheses primarily on the basis of the U.S. capital market evidence. Clearly, there are significant differences in the institutional, regulatory and microstructure environments between the U.S. and Australia. These include the relatively small and thin capital market of Australia, the inability to short sell in Australia, the differential corporate regulation leading to different governance mechanisms, disclosure requirements and GAAPs.

[A-head] 3. Design

[B-head] 3.1 Sample

Audit data is obtained from the Ferguson and Stokes (2002) database, whilst earnings announcement dates, stock price, trading volume and All Ordinaries Index data are obtained from SIRCA. Other control variables, such as investor sophistication metrics were obtained from the Aspect Financial Database, Huntleys Datanalysis, Reuters Beacon, the State Library microfiche collection or hardcopy annual reports. Where possible, data was directly obtained from the Ferguson and Stokes data files. The sample includes firms with complete pricing over the 90-day sample window obtained from SIRCA for the years 1994–1998 (both years inclusive). Table 1 reports the distribution of firms.

Table 1
PEAD sample indicating total firms available (column 1) and reduced sample of available equity prices (column 2) by year

	1	2
Year	**Initial Sample**	**Available Prices**
1994	1069	677
1995	1055	905
1996	1046	736
1997	1098	695
1998	1084	718
Total	**5352**	**3731**

Firms with overseas head offices but whose shares are traded on the ASX were removed as these firms are audited by international affiliates of auditors and not by the Australian office. After excluding these firms, and those with missing data, a total of

3731 firm years with pricing available over the event window from CAR1–CAR90 were utilised for the study.

[B-head] 3.2 Model

Hypotheses H_1–H_3 are tested using a pooled cross sectional regression model. Prior PEAD literature has identified risk as a possible explanation of the PEAD phenomena (Ball, Kothari and Watts (1993)). We use a risk proxy (leverage) to control for the "traditional" definition of financial risk in this study.[§]

The transaction cost hypothesis is also an explanation advanced in prior research. Bhushan (1994) classifies transaction costs as either direct or indirect, and finds some empirical evidence to support this as a potential explanation of PEAD. Bhardwaj and Brooks (1992) find evidence that direct costs such as commissions and percent bid-ask spreads are inversely related to share price. Accordingly, we adopt the same proxy for direct transactions costs. Consistent with Bhushan, indirect costs such as price pressure and time delay are proxied for by dollar trading volume. The rationale here is that stocks subject to non-synchronous trading are subject to greater price pressure to fill orders compared to more liquid stocks.

Size is also included as a control variable as prior studies such as Bernard and Thomas (1989, 1990) identify an inverse relationship between firm size and PEAD. The observation of greater PEAD magnitude for smaller stocks is also consistent with the behavioural explanation proposed by Hong and Stein (1999), who suggest that smaller stocks are researched less, have lower press coverage and are less likely to have costly public relations efforts. Consequently, smaller stocks should exhibit greater drift, as diffusion of news is slower in this section of the market.

The ownership level of the top twenty shareholders is chosen as the sophistication proxy. This variable is included in light of Bartov, Radhakrishnan and Krinsky (2000) [hereafter Bartov et al. (2000)], who find a lower PEAD in stocks traded by sophisticated investors. Consistent with Bartov et al., it is assumed that investor sophistication is related to investor size.

However we note that sophistication may have a positive co-efficient if it is associated with institutional book building in stocks post announcement. We suggest institutional re-weighting may have the effect of increasing drift due to excess institutional accumulation or selling in a relatively small market such as Australia. This assertion is also relevant to the trading volume, and share price transaction cost proxies, and so for these variables, we do not specify the direction of the hypothesised sign.

As with prior PEAD literature, unexpected earnings are controlled for in a manner similar to Bhushan (1994) and Bartov et al. (2000).[**] An interaction term is used that controls for the marginal effects of each control variable on the slope of the unexpected earnings variable. The empirical model is specified as follows:

$$CAR_{i,t} = b_0 + b_1 SUE_{i,t} + b_2 SUE * SIZE_{i,t} + b_3 SUE * SOPHIST_{i,t} + b_4 SUE * LEVERAGE_{i,t} + b_5 SUE * SHAREPR_{i,t} + b_6 SUE * TURNOVER_{i,t} + b_7 SUE * AUDITOR_{i,t} + {}_e i$$

[§] We explored the possibility of using beta as our risk control, however, the Centre for Research in Finance at the AGSM requires 4 years of monthly data before a beta can be calculated, which would have resulted in excessive sample attrition.

[**] Unexpected earnings are estimated using the naïve model. Altering the partitioning of the good and bad news portfolios based on deciles of unexpected earnings makes no difference to the results reported in Panel A of Table 2. That is, the good news portfolio depicts significant positive drift, whilst the bad news portfolio shows no consistent evidence of drift.

Where:

CAR	= Daily cumulative abnormal return for firm *i* cumulated over the sub-cumulation periods at the announcement date (CAR1), CAR2, CAR3, CAR4 and CAR5.[††]
SUE	= Unexpected earnings deflated by total assets, formed into deciles and scaled to range between 0 and 1.
SIZE	= Total Assets of firm i, formed into decile portfolios by year, and scaled to range between 0 and 1.
SOPHIST	= The level of share ownership held by the top twenty shareholders, split into deciles by year, and scaled to range between 0 and 1.
LEVERAGE	= Debt to assets ratio, classified into three equal groups.
SHAREPR	= Share price at announcement date, classified into two groups, split at median share price.
TURNOVER	= Classification into deciles based on dollar trading volume: CAR1 – CAR90.

Experimental Variables

AUDITOR: denotes the different gradations of audit quality test variables denoted in tests of H1-H3 as follows.

(i) LARGE: dichotomous variable, 1 for Big 6/5 firm, else 0 for non-Big 6/5 auditor.
(ii) SPECIALIST: dichotomous variable, 1 for Big 6/5 specialist firm, else 0 for non-Big 6/5 auditor, and Big 6/5 non specialist.
(iii) LEADER: dichotomous variable, 1 for Big 6/5 industry leader, else 0 for Big 6/5 non industry leader.

e: error term. **[AQ: confirmed]**

[A-head] 4.0 Results

[B-head] 4.1 Descriptive statistics

Descriptive statistics for the sample of 3731 firm years are reported in Table 2. Panel A provides a summary of mean cumulative abnormal returns over the event window. Panel A indicates that for the sub-sample of 2169 good news announcements, the CARs are positive and significantly different from zero in all cases over the sample period. In contrast, for the sub-sample of 1559 bad news announcements, the CARs are not significant with two exceptions (CAR10, and CAR50). These descriptive statistics are consistent with our prediction of increased information uncertainty associated with good news versus bad news announcements, and similar to descriptives reported in Kinney et al. (2002). Like this study, they report a larger percentage of good news surprises, positive returns for the good news surprises, and weaker negative returns for bad news surprises, which at some time intervals record positive mean return.

[††] We use market adjusted returns consistent with Kinney, Burgstahler and Martin (2002) [hereafter Kinney et al. (2002)].

In Panel B of Table 2, the experimental variable LARGE shows that large auditors accounted for just over 67% of firms. The data for SPECIALIST indicates that of the 1916 large firms able to engage a specialist as per the Ferguson and Stokes (2002) definition, 512 (27%) had contracted with an industry specialist auditor. Of the 2509 firms audited by large auditors, 25% of these were audited by industry leading Big 6/5 auditors (LEADER).

The SIZE variable is measured by firm's total assets in thousands of dollars. The smallest firm has assets of just over $49,000, whilst the largest firm has total assets of $252 billion, indicating the sample has full representation of large and small companies. Median firm SIZE is just over $45 million, with a mean of just under $1.3 billion Australian dollars. **[AQ; please specify currency done]**

Examination of the sophistication proxy, SOPHIST reveals that the average ownership of the top 20 shareholders is 69.38% of ordinary issued capital. The minimum is 7.22% and the maximum is 99.99%.[‡‡] The average debt to total assets ratio is 11% with and median of 4%. The mean share price is $1.94. In keeping with efforts to include as many companies in the initial sample as possible, SHAREPR has a range with a minimum of 1 cent, and has a maximum of $56.00. Finally, the value of trading volume over the 90 day trading window indicates that mean value is $52.39 billion, whilst the median is $1.78 billion Australian dollars[§§]. **[AQ; please specify currency done]**

Table 2
Descriptive statistics – median cumulative abnormal returns (Panel A) by earnings surprise, and independent control variables (Panel B)

Panel A: Partition Based on raw difference in unexpected earnings (N=2169 Good News, N=1559 Bad News)

Good News Portfolio				Bad News Portfolio			
Time	AR	t-Stat	Sig. level	Time	AR	t-Stat	Sig. level
CAR1	.0064	7.470	p=.000	CAR1	.0001	0.104	p=.917
CAR2	.0112	9.309	p=.000	CAR2	-.0022	-1.259	p=.208
CAR3	.0140	9.685	p=.000	CAR3	-.0017	-0.825	p=.410
CAR4	.0141	9.173	p=.000	CAR4	-.0026	-1.170	p=.242
CAR5	.0140	8.300	p=.000	CAR5	-.0025	-1.067	p=.286
CAR10	.0138	6.444	p=.000	CAR10	-.0075	-2.504	p=.012
CAR20	.0164	5.958	p=.000	CAR20	.0009	0.226	p=.821
CAR30	.0151	4.674	p=.000	CAR30	-.0003	-0.052	p=.958
CAR40	.0150	4.225	p=.000	CAR40	.0035	0.644	p=.520
CAR50	.0214	5.120	p=.000	CAR50	.0140	2.234	p=.026
CAR60	.0151	3.299	p=.001	CAR60	.0038	0.558	p=.577
CAR70	.0086	1.762	p=.078	CAR70	-.0050	-0.671	p=.502
CAR80	.0092	1.710	p=.087	CAR80	-.0063	-0.838	p=.402
CAR90	.0168	2.928	p=.003	CAR90	.0109	1.350	p=.177

Panel B: Independent Variables

Variable	**N**	**Mean**	**Standard Deviation**	**Minimum**	**First Quartile**	**Median**	**Third Quartile**	**M**
SUE	3731	-0.02	1.75	-50.95	-0.03	0.01	0.04	
SIZE	3731	1293981	10530294	49.43	11897	45353	189704	25

[‡‡] A firm which was the subject of a takeover.
[§§] As at June 30, 1998 the exchange rate was A$1 = U.S. $0.6135 (Source: Reserve Bank of Australia.)

SOPHIST	3731	69.38	18.04	7.22	57.66	71.87	83.20	
LEVERAGE	3731	0.11	0.18	0.00	0.00	0.04	0.19	
SHAREPR	3731	1.94	3.41	0.01	0.34	0.84	2.35	
TURNOVER	3731	52389526	273216606	0.00	339680	1781368	9982865	5
LARGE	3731	67%						
SPECIALIST	1916	27%						
LEADER	2509	25%						

Note: CARs are % market adjusted cumulative abnormal returns. SUE is based on the naïve model, SIZE is total asse LEVERAGE is debt to assets ratio, SHAREPR is denoted in dollars, TURNOVER is trading value in dollars over the ev LARGE, SPECIALIST and LEADER are % of sample firms.

[B-head] 4.2 Test results

Tests of H1-H3 are initially run over two time periods (CAR1, CAR5) restricting sample selection to the good news portfolio where significant PEAD exists. The results in Table 3 indicate that adjusted R^2s are around .01, similar to the results of Bartov et al. (2000), who report adjusted R^2s of between .01 and .02 in their Table 5.3. Each model is significant with *F* values significant at the *p*<.05 level (two tailed).

Table 3
PEAD regression models for tests of H1 – H3 in the good news portfolio

		CAR (1)	CAR (5)	CAR (1)	CAR (5)	CAR (1)	CAR (5)
Model		Model 1 (H1)	Model 2 (H1)	Model 3 (H2)	Model 4 (H2)	Model 5 (H3)	Model 6 (H3)
Control Variables[a,b,c]	Predicted Sign	2169	2169	1118	1118	1488	1488
Constant		0.01	0.01	0.01	0.01	0.01	0.01
		(0.46)	(0.31)	(1.63)	(1.23)	(0.40)	(0.24)
SUE	+	-0.01	-0.01	-0.02	-0.04	-0.01	-0.01
		(-0.71)	(-0.91)	(-2.10)b	(-2.43)b	(-1.05)	(-1.68)c
SUE * SIZE	-	-0.01	0.01	-0.01	0.01	-0.01	0.01
		(-1.24)	(0.48)	(-0.24)	(0.53)	(-1.16)	(.06)
SUE * SOPHIST	-/+	0.01	0.02	0.01	0.02	0.01	0.02
		(2.76)a	(2.49)b	(1.92)c	(2.05)b	(1.67)c	(2.11)b
SUE * LEVERAGE	+	0.01	0.01	-0.01	0.01	0.01	0.01
		(0.60)	(2.71)a	(-0.57)	(1.06)	(0.06)	(1.88)c
SUE * SHAREPR	-/+	0.01	0.01	0.01	0.01	0.01	0.01
		(2.19)b	(1.40)	(1.37)	(.57)	(1.93)c	(1.28)
SUE * TURNOVER	-/+	0.02	0.02	0.01	0.03	0.01	0.03
		(1.88)b	(1.87)c	(1.54)	(1.61)	(2.34)b	(2.03)b
Experimental Variable							
SUE * LARGE	-	-0.01	-0.01				
		(-1.51)c	(-2.36)a				
SUE * SPECIALIST	-			-0.01	0.01		
				(-.86)	(0.00)		
SUE * LEADER	-					-0.01	-0.01
						(-.48)	(-1.14)
Adjusted R^2		0.01	0.01	0.01	0.01	0.01	0.01
F value		(3.33)a	(5.20)a	(2.08)b	(2.95)a	(2.17)b	(3.82)a

‘a’ Significant at the 1% level

‘b’ Significant at the 5% level

‘c’ Significant at the 10% level

[a] Notes: SUE is the size deflated unexpected earnings by year (naïve model), formed into decile portfolios and scaled to range between 0 and 1. SIZE is the total assets of the firm at the current year-end, formed into deciles by year and scaled to range between 0 and 1. SOPHIST is the percentage of shares owned by the top 20 shareholders. Decile portfolios are formed on a yearly basis, and scaled to range between 0 and 1. LEVERAGE is the Debt to Assets ratio. This variable is classified into three groups, 0 with leverage to 1%, 1 with leverage between 1% and 15%, and 2 with leverage 15% and above. SHAREPR is a binary variable, with above median share prices coded 1, and below median share prices (84 cents) coded 0. TURNOVER is the trading volume multiplied by share price and cumulated from CAR1 – CAR90 formed into deciles. LARGE is the audit quality metric and is simply a binary variable, 0 indicating firm audited by non-big 6/5. SPECIALIST is the auditor industry specialist binary indicator, where 0 indicates a non-specialist large auditor, and 1, a specialist using the CFT definition. LEADER is a binary indicator where 0 is a non-industry leader Big 6/5 auditor and 1 indicates a Big 6/5 industry leader.
[b] To test for potential problems with multicollinearity in the models, Bartov et al. (2000) conduct test of collinearity diagnostics. They identify VIF’s of less than 4. Statistical tests indicate that substantially all of the VIF’s are less than 4 also, indicating no potential problems with multicollinearity in the models. Additional observation of residual scatterplots and probability plots confirm this interpretation.
[c] All control variables significance levels are reported on a two-tailed basis, whilst the experimental variables are reported on a one-tailed basis given the directional hypotheses.

In terms of control variables, the interaction co-efficient for SIZE is not significant in Models 1 - 6. One notable result amongst the control variables is investor sophistication. Contrary to Bartov et al. (2000), the sign of the sophistication co-efficient SOPHIST is positive and significant in each of the models tested. This is consistent with the proposed book-building explanation, that institutional traders have difficulty acquiring large quantities of stock in a relatively small market such as the Australian market. Support for this interpretation is strengthened by the positive co-efficient and significance of TURNOVER and SHAREPR.[***] The risk interaction proxy LEVERAGE, is positively related to PEAD, as expected, and significant in Models 2 and 6 at $p<.05$ (one-tailed).

The first experimental variable LARGE tests the hypothesis (H1) that clients of Big 6/5 auditors have lower PEAD. The evidence in Models 1 (CAR1) and 2 (CAR5) supports this hypothesis, with the test variable negative and significant at $p<.10$, and $p<.01$, respectively. This finding provides perhaps the first evidence in the literature that clients of large auditors exhibit lower PEAD than clients of small auditors.

The test of H2 is the test of the incremental audit quality effect of industry specialisation. To examine whether the industry specialist is also valued, the auditor indicator variable is coded 1 for Big 6/5 industry specialist and 0 for non-specialist Big 6/5 auditors. The results of the OLS regression models are for a reduced sample of 1118 firms, and are shown in Models 3 and 4. Over each time horizon (CAR1, CAR5), the SPECIALIST indicator is not significant. The result implies that the market places no incremental value on the work done by industry specialists *vis-à-vis* the other large auditors.

Finally, results for the test of H3 are depicted in Models 5 and 6. The LEADER indicator variable has a negative sign, as predicted, but is not significant. In summary, Table 3 indicates large auditors are associated with lower PEAD, after controlling for other potential PEAD determinants. However, tests based on the sub-sample of Big 5 firms with auditor industry specialists and industry leaders indicate no significant effects on drift magnitude. In the next section, further sample partitions and sensitivity tests are undertaken.

[***] We note the sign of the control variable for SUE is negative. However, this could be a function of the reluctance of institutions to book build in stocks with high variance earnings.

[B-head] 4.3 Control for self-selection bias, and additional sensitivity tests

To control for self-selection bias, we applied an auditor choice model on the full sample of 3731 firms. Control variables included a selection of those utilised in Clarkson and Simunic (1994). The auditor choice model is specified as follows:

$$AUDITOR_{i,t} = b_0 + b_1 SIZE_{i,t} + b_2 LEVERAGE_{i,t} + b_3 LOSS_{i,t} + b_4 MINING_{i,t} + e_i$$

Where,
AUDITOR = (0,1) variable measuring auditor quality (1=Big 6/5 firm)
SIZE = Log of firm size (total assets)
LEVERAGE = Ratio of total debt to total assets
MINING = (0,1) variable with the value 1 if the firm operated in ASX industry classifications 1-4.
e = error term.

The model results are depicted in Table 4 below:

Table 4
Logistic regression of auditor choice

Variable	Wald Statistic	Significance (two-tailed)
Intercept	177.41	p=.00
Size	10.401	p=.00
Mining	0.54	p=.00
Loss	2.35	p=.46
Leverage	177.414	p=.12
Nagelkerke R^2 = .139		

Table 4 indicates that the model obtains a Nagelkerke R squared of .14, successfully classifying 68.1% of observations. Model predictions were obtained, with the sample providing a total of 231 incorrect good news predictions, comprising 132 non Big 6/5 firms, and 99 Big 6/5 firms. Rerunning the primary regression model over the test period on this sub-sample indicates that where the model is significant, the auditor quality interaction term is negative on all three occasions, and significant at $p<.05$ (two-tailed) on two of three occasions.[†††] Thus we conclude that whilst the above choice model is limited in terms of explanatory power, and its components do not match precisely those adopted in primary tests in Table 3, the bulk of this evidence suggests that results are not driven by self-selection effects.[‡‡‡]

[†††] The primary regression model is significant on CAR3, CAR4, and CAR5. At CAR4 and CAR5 the auditor interaction term is negative and significant at $p<.05$ (two-tailed). At CAR3, the interaction term is negative but only marginal in terms of significance.

[‡‡‡] We undertook sensitivity controls for information quality. We rerun all six regression models in Table 3, including a proxy for information quality (total accruals) as an additional interaction term, consistent with Lang and McNichols (1990). When total accruals as a proxy for information quality is included in the model, results are unchanged by the inclusion of this potential correlated omitted variable.

In an additional sensitivity test, models 1–6 are replicated in the intervening time period between the announcement date (CAR1), and CAR5. In all cases the results are similar, with the following exception. At CAR2 and CAR3, the LEADER indicator is negative and significant at *p*<.05, and *p*<.10 (one tailed) respectively. At time intervals CAR2, CAR3, and CAR4, LARGE is negative and significant also at *p*<.10, *p*<.05 and *p*<.05 respectively.

In terms of partitions on auditee size, we split the sample on size deciles. Analysis for good news stocks in the upper half of auditee size indicates that the audit quality indicator LARGE is no longer significant. However, LARGE is negative and significant at *p*<.05 for smaller sized deciles. This indicates that the value of audit quality, is more pronounced for smaller sized stocks, a finding consistent with the assertions of Willenborg (1999). Willenborg (1999) suggests that the information and insurance signalling attributes of auditing will matter most where information asymmetries abound.[§§§]

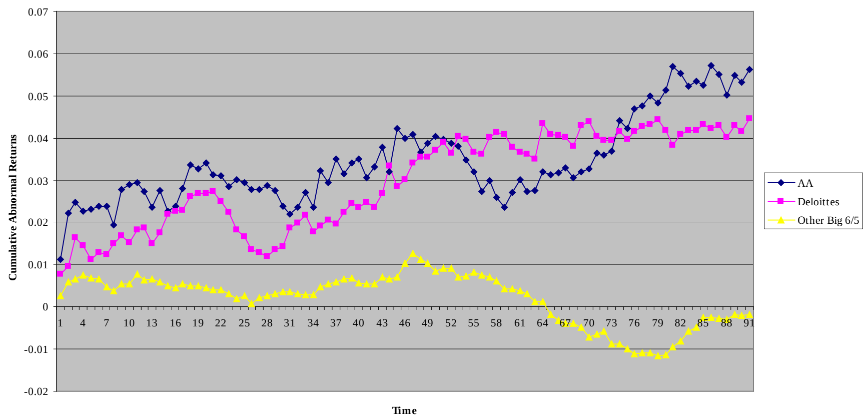
[B-head] 4.4 Within Big 6/5 analysis

In this section, the issue of whether auditor quality differs within the Big 6/5 is examined using the PEAD framework. We pose the following empirical question: is there a variation in the PEAD of companies grouped into portfolios on the basis of their Big 6/5 auditors? To examine this issue, the sample of good news stocks with large auditors is partitioned on clients of each individual audit firm, with a default comparison grouping of the other large auditors. Selected results are depicted in Figure 1, which shows that clients of Arthur Andersen and Deloitte have visually greater PEAD *vis-à-vis* the other Big 5 auditors. A Wilcoxon signed ranks test produces significant differences in median drift to the default comparison group over the period CAR1–CAR90, at *p*<.00 for both these auditors.

Importantly, we control for audit firm clientele effects, by comparing each audit firms client portfolios with other brand name auditors in terms of size and risk. The most notable differences are Deloitte and Pricewaterhouse – whose clients are significantly smaller, and KPMG whose clients are larger. However, we dismiss the possibility that the results depicted in Figure 1 are driven by size considerations for a number of reasons. First, the Arthur Andersen portfolio shows no size differences. Second, since the Deloitte portfolio is smaller, we might expect the Pricewaterhouse (prior to the merger) to behave in a similar fashion, which it doesn't. Last, the size co-efficient is not significant in the multivariate tests. In terms of risk, Ernst & Young clients show higher leverage, whilst Pricewaterhouse lower. Neither of these two auditors however shows differences in terms of PEAD.

[§§§] Further analysis was run including main effects in models 1 and 2. Harmful multicollinearity appeared present in these models with VIF's exceeding bounds suggested by Kennedy (2003). However, we note that the auditor interaction term co-efficients in the model including main effects were of similar magnitudes to those reported in the primary results. We also run a model of main effects for tests of H1 (excluding interaction terms). This model reports similar results to those documented in Table 3.

Figure 1. Pead Profiles - within Big 6 / 5



Interestingly, the results partitioning on each individual audit firm are consistent with the DeAngelo (1981) assertions regarding the relationship between audit quality and auditor size. These results indicate the two smallest Big 6/5 auditors in terms of national market share in audit fees which display the greatest drift.[****] This suggests that greater market uncertainty is associated with smaller auditor size, including partitions within the larger audit firm grouping.

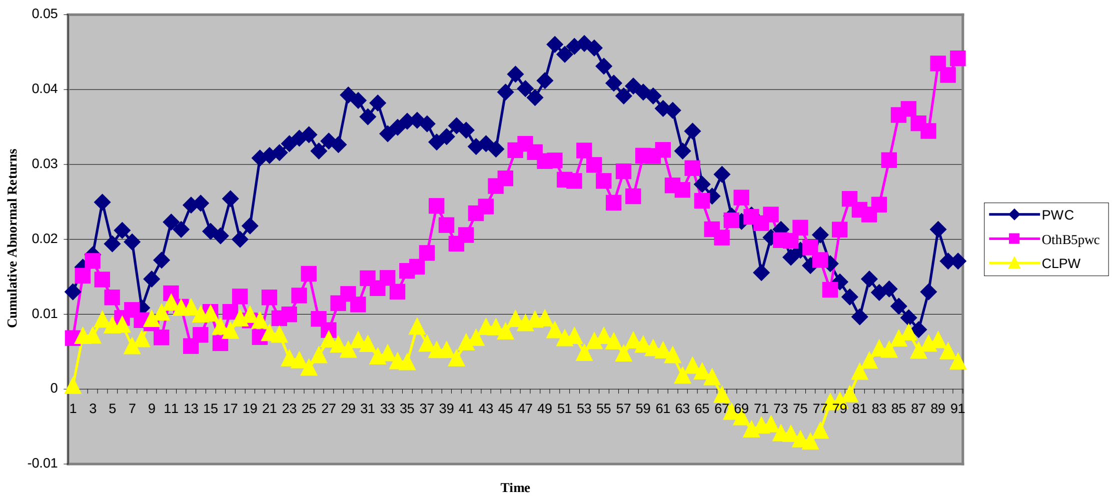
[B-head] 4.5 Audit firm merger effects

In further analysis, tests are conducted on the 1997 audit firm merger participants. This is done two ways with the results depicted in Figure 2. First, a comparison is undertaken between clients of PWC, and other Big 5 auditors in 1998, once again using the good news partition. This comparison indicates that PWC clients experienced greater drift than clients of the other Big 5 post the 1997 merger. Figure 2 depicts greater differences between the newly merged PWC and the other Big 4 closer to the announcement date. This may indicate that structural consolidation in the supply of audit services increases uncertainty in the market around these events.

In a second test, we aim to simulate the client portfolio of PWC in the period pre-merger. To do this, the default comparison grouping is altered to the clients of Coopers and Lybrand, and Price Waterhouse in the sample years prior to the merger. This test examines whether any effects in the preceding analysis maybe related to the observation of higher PEAD for this portfolio in the past. The results depicted in Figure 2 indicate when combined, the clients of Coopers and Lybrand and Price Waterhouse (CLPW) show low levels of drift pre-merger, and significantly lower than PWC clients in 1998 at $p<.00$.

[****] Auditor size measured in terms of total audit fees in 1998.

Figure 2. Audit firm merger effects



[A-head] 5.0 Conclusion

The objective of this study was to provide evidence on the relation between differential auditor quality and PEAD. We argue that audit quality reduces the initial information uncertainty associated with unexpected earnings announcements; hence PEAD should be lower for clients of higher quality auditors. Three distinct tests are undertaken. These include partitions based on auditor size, auditor industry specialisation, and auditor industry leadership.

The sample was based on 3,731 firm years over 1994–98. We find a significant relation between auditor brand name and PEAD. Like Willenborg (1999), the audit quality effect appears to be confined to smaller firms, which is intuitively appealing due to the potentially greater importance of audit quality as a signal for smaller firms. However, evidence is weak on industry specialisation tests, which is consistent with Hackenbrack and Hogan (2002), who find no incremental ERC effects for industry specialists. In addition, tests of a tighter definition of auditor quality, industry leadership report only mixed results.

Finally, examination of PEAD for each individual auditor is undertaken. Significant differences in the profiles of PEAD amongst the Big 6/5 are identified, with smaller auditors amongst the Big 6/5 showing higher levels of observed PEAD. This is consistent with the auditor quality/auditor size hypothesis in DeAngelo (1981). Further tests indicate that the newly merged audit firm, PWC, depicts greater drift than other large auditors. Combined, these results suggest that the capital market prices audit quality.

In summary, this study documents more recent Australian evidence on PEAD, and seeks to address the relative paucity of evidence on PEAD in the Australia context. Whilst it provides an interesting out of US sample test, we acknowledge the limits to generalisability of these results.

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