

# The Pricing of Client Risk by Big N and Non Big N Audit Firms: 1996-2004

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## **Abstract**

Using 8,028 observations from publicly listed companies in Australia over the nine year period 1996-2004, this study provides an investigation into the pricing of client risk by audit firm type (Big N firms as compared to non-Big N firms). The period is specifically chosen as it allows us to examine risk pricing over a period of structural change with the move from the Big 6 (1996-1998) to the Big 5 (1999-2001), and following the demise of Arthur Andersen in 2001, to the Big 4 (2002-2004). Over the period identified, the audit firms also claim to have placed a greater emphasis on the identification of client risk, and professional indemnity insurance costs, an indicator associated with risk, increased substantially in magnitude. For the entire period we find that Big N firms charge higher rates for client risk compared to the non-Big N firms, with the pricing differences between auditor types being most pronounced during the Big 4 era. Over time, both Big N and non-Big N firms appear to have increased their pricing for prior year losses while unexpectedly reducing their pricing of risk associated with current year profit or loss. A significant difference over time between the Big N and non-Big N firms is that the Big N have significantly increased their pricing of risk associated with leverage, a measure of long-term financial risk, while this risk factor was priced on a constant basis for non-Big N firms.

**Key Words:** audit fees, client risk, competition, longitudinal analysis.

**Data Availability:** The data used in this study are publicly available from the sources indicated in the study.

## **I. Introduction**

The long term economic viability and health of the public accounting profession is contingent on its ability to charge sufficient fees to earn a reasonable rate of return in relation to the risks assumed. This study provides an analysis of the pricing of client risks in audit fees and how this has changed over discrete time periods (1996-2004) using Australian data. Further, we compare the pricing of risks by the Big 6/5/4 firms (hereafter referred to as Big N firms) to non-Big N firms. We examine audit pricing over this period because there were a number of significant changes to the audit market, with the move from the Big 6 to the Big 5 in 1998 following the merger of Price Waterhouse and Coopers & Lybrand, and then to the Big 4 following the demise of Arthur Andersen. The reduction in the number of audit firms is likely to have changed the competitive landscape within the audit market. In addition, audit firms claim that the profession faced strong economic challenges during this period because of factors including increased legal liability claims that are alleged to be difficult to recoup through fee increases (Arthur Andersen et al. 1993, ICAA 2002). Either better identification of client risks or acknowledgement of changes in the magnitude of client risks can reasonably be expected to result in audit firms amending their approach to the pricing of risk within audits.

We recognize that there are two ways for audit firms to deal with riskier clients. The first is for a firm to not accept a new client or choose not to continue with an existing client (Jones and Raghunandan, 1998; Francis and Reynolds, 2002; Choi, Doogar and Ganguly, 2004). The second is to be compensated for the incremental risk that a client adds to the firm's client portfolio by pricing this into audit fees. There is some evidence that audit firms screen clients for risk. In particular, Johnstone and Bedard (2004) find

that, for new clients, the firm in their study emphasizes the identification of risky clients and screens them out at the client acceptance stage, as distinct from accepting them and trying to price the risk. For existing clients, Bedard and Johnstone (2004) find that at the planning stage there is a significant positive relationship between risk assessments and planning and pricing decisions. This suggests that firms are attempting to ‘price protect’ by building risk into the pricing of individual audit engagements. The claims of the audit profession, as noted previously, question whether they are able to adequately price for client risk, and as a result legislative action for litigation reforms has occurred. In Australia, this has resulted in the CLERP 9 reforms, which give audit firms permission to incorporate after 2004 and thus afford the protection of limited liability. In addition, capping of liability and proportionate sharing of liability between parties was also introduced into law in Australia at this time.

In this study, we examine the pricing of client risk over the period 1996-2004 and whether Big N and non-Big N audit firms have been able to adapt their pricing for changes in client risk over this period using Australian data. We also examine differences in the pricing approaches of Big N as compared to non-Big N firms. The period of 1996-2004 is specifically chosen as it divides into three equal sub-periods of three years that correspond to the Big 6 (1996-1998), Big 5 (1999-2001) and Big 4 (2002-2004) eras.

Examining the differential pricing between the Big N and non-Big N firms is facilitated in Australia by the fact that the non-Big N firms audit a significant proportion (nearly 40 per cent) of the population of listed clients in this country. In addition, a longitudinal investigation into these issues is facilitated by the use of Australian data where fee disclosures by public companies have existed since the late 1970s. Also, given

many of the major early audit fee studies have been undertaken using Australian data, utilizing this data facilitates comparison with previous studies (e.g. Francis, 1984; Francis & Stokes, 1986; Craswell & Francis, 1999; Ferguson & Stokes, 2002; Ferguson, Francis & Stokes, 2003). Our examination therefore involves consideration of the audit fee model in a longitudinal context, involving categories of determinants widely employed in prior research.

In this study we utilize a large sample (8,028 client-years representing 1,782 distinct clients), which covers nearly all (over 90%) of the non-financial listed companies in Australia over the period of analysis. Our findings indicate that certain elements of client risk are being priced higher over the period examined. Cross-sectionally, we find that, on average, Big N firms are charging more for client risk than non-Big N firms, with significantly higher pricing for risk associated with short term financial liquidity (QUICK), leverage and unprofitable (ROI) firms. Further analyses reveal that the pricing differences between auditor types are most pronounced during the Big 4 era. Longitudinally, the evidence indicates that both Big N and non-Big N firms placed a greater emphasis on prior year losses and a reduced emphasis on current year profitability in risk pricing over time. We also find that Big N firms significantly increased their risk pricing associated with leverage over time, while there was no change in pricing for this risk variable by non-Big N firms over time.

The remainder of the paper is divided into four sections. The next section provides a review of the prior research and identifies the research questions. This section is then followed by a description of the research method, followed by a discussion of the

findings. The final section is devoted to a summary of the major results and their implications for future research and practice.

## **2. Relevant Literature and Research Questions**

### ***Differential pricing for risk***

Over the period of this study, 1996-2004, audit firms claimed to have refined and improved their approach to client risk identification (Bell et al. 1997, 2002, 2005; Winograd et al 2000). This was accompanied by claims of a greater emphasis in both auditing standards and audit practice on the assessment of client risks in the acceptance of new auditor appointments and in continuing engagements (Winograd et al., 2000; Johnstone and Bedard, 2003; Bedard and Johnstone, 2004; Johnstone and Bedard, 2004). As noted, Bedard and Johnstone (2004) and Johnstone and Bedard (2004) find different approaches with regards to the pricing of risk for existing versus prospective clients of one audit firm. For existing clients they find that at the planning stage, there is a significant positive relationship between specific risk assessments and planning and pricing decisions. However, for new clients, they report that the firm emphasizes the identification of risky clients and avoids risky clients by screening them out at the client acceptance stage as distinct from accepting them and trying to adequately price the risk.

### ***Risk in the Australian audit environment***

Not only have there been claims that the identification of client risk by audit firms has improved, but also that the underlying risk in the audit environment has allegedly increased in magnitude over the period of this study. Factors which affect the underlying

risk of audits of listed companies include greater complexities in client operations such as expanded global outreach and increased auditor litigation risk, reputation risk, and costs associated with maintaining appropriate professional indemnity insurance. It is well documented that auditor litigation risks and costs have steadily risen in the U.S., as measured both by frequency and size of lawsuits (see for example, Palmrose, 2000). A similar increase in litigation costs has also occurred in other countries over this period, including Australia. For example, the average size of professional indemnity claims settled in Australia tripled over the period 1998-2002 (ACCC, 2003).<sup>1</sup> In 2002, the profession asserted that “liability claims in Australia on a per capita basis for the accountancy profession are the highest in the world” (ICAA, 2002, page 7) and the cost of professional indemnity insurance to provide protection against such claims has substantially risen in Australia over the period of this study. These increases in costs have occurred not only as a result of increases in the size of potential damages arising from alleged audit failures but also because there has been a reduction in the supply of professional indemnity insurance suppliers in Australia, partially due to the collapse of the large insurance company HIH in 2001. Altogether, these factors have reduced the number of professional indemnity insurance companies from thirty-seven to five and have driven up the cost of such insurance by 100% to 1,000% over a three year period (ICAA, 2002). Given the combination of a high incidence of litigation, increasing insurance costs and a growing uninsurable coverage gap, one might expect that the audit fees for clients with which the audit firm determines it is appropriate to be associated are adjusted to reflect the corresponding elevated level of client risks.

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<sup>1</sup> The current study examines a sample from Australia where the Sarbanes-Oxley Act or no equivalent provisions are currently in effect.

However, in the decade prior to the passage of the Sarbanes-Oxley Act (2002) in the U.S. and a series of high profile audit failures in Australia around the period 2001-2002, audit fees had been relatively flat in real terms, due to competitive pressures in the audit market (in the U.S. see GAO 2003; in Australia see the discussion in the next section and Figure 1). These market conditions raise questions regarding what strategies audit firms might employ to price for client risk whilst remaining competitive. The subsequent section identifies likely pricing strategies in such an environment.

### ***Competition in the Australian audit environment***

Although there are increased client complexities in operations and greater auditor litigation and reputation risk over the period of this study that suggest higher pricing, there was the countervailing influence of strong competition in the Australian audit market. For example, some argued that during the period prior to Sarbanes-Oxley and CLERP 9, the competition for audit services centered on price, whereas after competition was based on reputation (Australian Treasury, 2002, Section 3.5). Evidence of this is provided in the trend and relative amount of audit fees of our sample (to be more fully described in the next section) and is best shown diagrammatically. We present in Figure 1 the mean audit fees (raw and CPI-adjusted) by auditor type over the years 1996-2004.

[Insert Figure 1 here]

What is apparent from the figure is that mean audit fees have remained fairly flat over most of the period, except for a noticeable spike in non-Big N audit fees in 2002, and a pronounced increase in Big N audit fees in 2004. The apparent inability of audit firms to increase audit fees despite the apparently greater client complexity and litigation

risk over the time period is consistent with firms facing a competitive market that prevented them from raising audit fees. However, the demise of Arthur Andersen in 2002 and the increased regulatory environment that followed likely led to an increase in demand for auditor services that afforded greater ability within the audit market to price for client risks.

In all, while greater risks over the 1996-2004 time period would suggest charging higher fees, it remains an empirical question as to whether and how the auditing profession, as a whole and by firm type, altered its audit pricing behavior in light of increasing risk and audit complexity, while simultaneously encountering a competitive market.

The nine year period of 1996-2004 divides neatly into three sub-periods of three years each. During 1996-1998, the Big 6 era ended with the merger of Price Waterhouse and Coopers & Lybrand. The Big 5 era occurred during 1999-2001, which then was followed by the Big 4 for 2002-2004 as a result of the demise of Arthur Andersen. This categorization results in a symmetrical split of the time period.<sup>2</sup> We utilize these discrete time periods to examine the longitudinal differences in the pricing of client risk and address the following research question:

**RQ 1: Has the pricing of client risk by auditing firms changed over the period 1996-2004?**

*Pricing of client risk by the Big N and non-Big N firms*

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<sup>2</sup> There were a very small number of PricewaterhouseCoopers audits signed in 1998 (most Australian firms have a 30 June year end). These were included as Big 6 audits. There was only one Arthur Andersen client signed after 2001. The exclusion of this small number of observations had no effect on the reported results.

The question of whether and how Big N firms charge audit fees differently from non-Big N firms remains unresolved. Early studies on audit fees have documented the existence of a Big N premium by including an auditor type indicator variable to the standard audit fee model estimated using OLS (Francis 1984; Francis and Stokes 1986, Craswell et al. 1995, etc.). Subsequent studies by Ireland and Lennox (2002) and Weber and Willenborg (2003) argue that auditor choice is endogenous, and that a self-selection model would more appropriately capture the difference in, for example, audit fee pricing between auditor types. While Ireland and Lennox (2002) find a significant fixed effect Big N premium for a sample of public U.K. firms, Chaney et al. (2004) do not find any evidence of differential audit fee pricing for a sample of private U.K. firms.

An advantage of conducting our tests on a sample of publicly listed Australian firms is that, similar to the United Kingdom and unlike the United States, a large percentage of the sample firms employ non-Big N firms. This allows us to more reliably examine differences in audit fee pricing across auditor types. Prior research that finds a “premium” paid to Big N firms attribute the fee differential to a number of factors, including greater expertise (audit quality), enhanced independence, and/or more resources to satisfy legal claims than non-Big N firms (e.g., Francis & Stokes 1986, Craswell et al, 1995, Craswell & Francis 1999). However, no prior study has examined whether there are fundamental structural differences in the way that Big N firms price client risk compared to non-Big N firms. This study examines this issue.

Over the period of this study, the Big N firms claim to be the leaders in the identification of client risk (Francis and Reynolds, 2002). In addition, there is evidence in the literature to suggest the Big N firms have more at stake due to their greater resources

to settle claims, larger potential loss of reputation capital, and higher legal liability (Khurana and Raman 2004; Lennox 1999). One could posit that with Big N firms adopting more client risk-focused auditing approaches, we would expect that they would adjust the pricing of increased client risks in recent years to a greater extent than non-Big N firms. This expectation is also supported by the insurance hypothesis, which is a commonly viewed justification for part of the Big N premium. Earlier studies have shown that the costs associated with litigation risk increased over the period of this study (Latham and Linville, 1998; Yu, 2001, Mong and Roebuck, 2005). Since the Big N firms have more reputational capital to maintain and more resources to satisfy legal claims (“deep pockets”), their pricing of risk is likely to differ from the non-Big N (Menon and Williams 1994). Specifically, Big N firms were subject to greater increases in professional indemnity insurance costs over this period than other providers of audit services due to their greater exposure to claims (ICAA, 2002) and one might therefore expect them to charge higher rates.

Further, during the earlier stages of the test period (up to 2001) there is evidence in the United States that Big N firms were encroaching upon the market of the non-Big N, hoping to attract their clients (GAO 2003). While there is no such evidence in Australia, this does raise the question of: what pricing strategies non-Big N firms employ to retain their clients? One strategy would be to lower audit fees and associated premia for client risks. This discussion leads to our second research question:

**RQ 2: Are there differences in the pricing of client risk between Big N firms compared with non-Big N firms?**

### ***Pricing of client risk by the Big N and non-Big N firms over 1996-2004***

Having examined whether there are differences in the pricing of client risk for the three sub-periods and between Big N firms compared with non-Big N firms, we examine next if the differences were due primarily to changes in the pricing of risk by Big N or non-Big N firms (or both). Although Big N firms are likely to have been more affected by the increasing risk environment, particularly over the Big 4 period, the non-Big N firms were more susceptible to the increasing competitive pressure from other non-Big N firms as well as the Big N firms. Either or both factors would cause the Big N and/or non-Big N firms to alter their pricing during the period examined and so we investigate the following research questions.

**RQ 3a: How has the pricing of client risk by Big N firms changed over the period 1996-2004?**

**RQ 3b: How has the pricing of client risk by non Big N firms changed over the period 1996-2004?**

### **3. Research Method and Model**

#### ***Auditor selection model***

The primary objective of this study is to examine empirically if the pricing of risk determinants varies across audit firm types and over time. Recent studies have found that differences in audit fee pricing between Big N and non-Big N firms are inadequately captured by a fixed effects model because auditor selection is likely to be endogenous (Ireland and Lennox 2002; Chaney, et al. 2004). Using ordinary least squares to estimate differences in audit fees by type of auditor may therefore lead to biased estimates.

Consistent with prior studies, we use a two-stage procedure (Heckman 1979) to control

for self-selection and allow for varying coefficients between the Big N and non-Big N firms (Ireland and Lennox 2002; Chaney et al. 2004). In the first stage, we estimate the following probit model of the selection of auditors:

$$\text{BIGN} = \alpha_0 + \alpha_1 \text{SIZE} + \alpha_2 \text{QUICK} + \alpha_3 \text{ROI} + \alpha_4 \text{PYLOSS} + \alpha_5 \text{LEV} + \alpha_6 \text{CATA} + \alpha_7 \text{FORSUB} + \alpha_8 \text{TOTSUBS} + \alpha_9 \text{MINING} + \alpha_{10} \text{AUDCOM} + e \quad (\text{Equation 1})$$

where:

BIGN = indicator variable equal to one if auditor is a Big N auditor, 0 otherwise

SIZE = natural log of total assets (+).

QUICK = ratio of current assets less inventories to current liabilities (-).

ROI = profit before interest and tax to total assets (-).

PYLOSS = indicator variable equal to one if client incurred a loss in the previous year, 0 otherwise.

LEV = book value of total liabilities to total assets (+).

CATA = ratio of current assets to total assets (+)

FORSUBS = percentage of foreign subsidiaries to total subsidiaries; equal to zero if there are no subsidiaries (+)

TOTSUBS = natural log of total subsidiaries (+)

MINING = indicator variable equal to one if client belongs to the mining industry, 0 otherwise.

AUDCOM = indicator variable equal to one if firm has an audit committee; 0 otherwise (+)

The determinants of auditor selection are similar to those found in the literature that have developed audit fee models, with selection of auditors predicted to be primarily a function of client size, risk, complexity. Although strictly unnecessary because of the difference in functional form of our auditor selection and audit fee models, we include unique variables in each of our models to better identify the selectivity bias (Maddala 1983). The unique variable we include for the auditor selection model is the presence of an audit committee, AUDCOM. We argue that clients with audit committees (the formation of which was voluntary in Australia over the period of this study) are more likely to demand the hiring of a Big N auditor than a non-Big N auditor (Pincus et al. 1989; Carson 2002). The selection of a higher quality auditor

will help to address risks perceived by the audit committee and help preserve the reputation capital of the members of the governance structure.

### *Audit fee model*

We then use the results of the auditor selection model to generate the inverse mills ratio (LAMBDA) that is used in the following second stage audit fee model:

$$\text{Log(Total Audit Fees)} = \beta_0 + \beta_1 \text{ SIZE} + \beta_2 \text{ BIGN} + \beta_3 \text{ QUICK} + \beta_4 \text{ ROI} + \beta_5 \text{ PYLOSS} + \beta_6 \text{ LEV} + \beta_7 \text{ OPINION} + \beta_8 \text{ CATA} + \beta_9 \text{ FORSUBS} + \beta_{10} \text{ TOTSUBS} + \beta_{11} \text{ MINING} + \beta_{12} \text{ YREND} + \beta_{13} \text{ CITYCOST} + \beta_{14} \text{ LAMBDA} + \varepsilon \quad (\text{Equation 2})$$

where:

OPINION = indicator variable equal to 1 if the client received a modified opinion, 0 otherwise (+).

YREND = indicator variable equal to 1 if year-end is June, 0 otherwise (+).

CITYCOST = indicator variable equal to 1 if auditor is based in Sydney or Melbourne, 0 otherwise (+).

LAMBDA = inverse mills ratio.

The underlying audit fee model employed in this study captures the primary fee determinants as derived from prior audit fee research. These variables are used to measure the following categories of determinants: client size, client complexity, client risk and auditor characteristics (type).

The client risk measures, our primary variables of interest, are short-term financial risk (QUICK ratio) and current year's financial performance (ROI), which are expected to be negatively related to audit fees, and prior year's loss (PYLOSS) and long-term financial risk (debt to asset ratio, LEV), which are expected to be positively related to audit fees. It is posited that the greater the risk, the higher the audit fees. Greater risk

would be reflected in lower profitability and quick ratios, as well as higher leverage and a prior year's loss.<sup>3</sup>

Client size (SIZE), measured using the log of total assets, is expected to be positively correlated to audit fees. Client complexity is measured in prior studies as number of subsidiaries (TOTSUBS), asset mix<sup>4</sup> (mainly the current assets to total assets ratio, CATA), and number of foreign subsidiaries (FORSUBS), and are all expected to be positively correlated with audit fees.

Auditor characteristics are traditionally measured using the type of auditor (Big N/non-Big N) to capture if there is an auditor quality/reputation factor included in pricing. As discussed earlier, we also estimate the audit fee model separately for the Big N and non-Big N to allow for varying fixed effect and slope coefficients by auditor type (Chaney et al. 2004).

In Australian studies, client industry is also controlled for via a dummy variable for the mining industry, given the unique nature of operations for this type of business. The Australian Stock Exchange distinguishes between industrial and financial (which comprises about two-thirds of listed entities) and mining (which comprises about one-third of listed entities). In prior studies examining Australian firms, mining companies have had a lower percentage of assets in inventory and lower levels of gearing (leverage) than other clients (for example, Jubb et al. 1996). Since inventories

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<sup>3</sup> The measures we have used are traditional financial risk measures which proxy for client financial risk in current financial performance (ROI) and previous financial performance (PYLOSS), as well as short (QUICK) and long term (LEV) financial position. While auditors currently consider business risk (AICPA 2006; IAASB, 2004), there are no publicly available measures of business risk for all the listed companies in Australia. Other risk measures, such as beta risk were considered but were not available for much of the sample due to thin trading.

<sup>4</sup> Others argue that asset mix (measured as inventory to total assets, receivables to total assets or a combination) includes both a client risk and an audit complexity component, for example, Hill et al (1994).

and debt represent significant areas of audit complexity which require extensive amounts of substantive testing, these factors suggest *ceteris paribus* a potential reduction in the scope of audit work for mining companies relative to other clients. For the second-stage audit fee model, the unique variables included are OPINION, YREND and CITYCOST. Due to the increased work tied to modified opinions, we expect fees to be higher for firms that receive modified opinions.<sup>5</sup> Similarly, we expect audit fees to be higher during peak year-ends in June. Ireland and Lennox (2002) and Chaney et al. (2004) argue that auditors based in major cities such as London face higher costs and are likely to charge higher audit fees. Consistent with this, we expect firms that are based in Sydney and Melbourne to incur greater audit fees.<sup>6</sup>

Due to the lengthy period over which the sample is compiled, we adjust for movements in price levels. In particular, we deflate audit fees and total assets for movements in the Australian Consumer Price Index. All other variables are either ratios or indicator variables and do not require price-level adjustments.

### ***Sample description and descriptive statistics***

The sample is obtained from the Aspect Financials database for the years 1996-2004. Audit fee data for the period 1996-1999 is obtained from the Who Audits Australia

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<sup>5</sup> Modified audit opinions in Australia (OPINION) include disagreements with management as well as drawing the attention of the audit report reader to significant issues. Because many of these modifications in Australia relate to modifications which can be removed by the client agreeing with the auditor, the variable is commonly seen as an outcome of a negotiation between the auditor and client.

<sup>6</sup> Audit fee pricing behavior may be different for new clients vis-à-vis existing clients. We examined this in two ways: One, we included a NEWAUDIT variable to identify firms that are in the first year of their audit (665 firm-year observations). The variable was not significant in the audit fee model. Secondly, we eliminated all first-year engagements from our sample and re-ran the tests. Results were very similar to those reported.

database, courtesy of the Faculty of Economics and Business at the University of Sydney, audit fee data for the period 2000-2004 is provided by the Centre for Accounting and Assurance Services Research at the University of New South Wales. Clients based outside Australia or with irregular fiscal year lengths are dropped from the sample. Financial services companies and property trusts are also eliminated, since prior research shows that determinants of audit fees are unique for such companies (Simunic 1980; Firth 1985; Fields et al, 2004).

After imposing the requirement of sufficient financial information in order to estimate the model outlined above, we obtain a sample of 8,028 client-year observations representing 1,782 unique clients. Observations are fairly evenly distributed across the years, with each year representing 9-14% of the sample.

[Insert Table 1 here]

In Table 1, we report sample descriptive statistics of the key variables by period and auditor type. All continuous variables are winsorized at the top and bottom 1%. As mentioned earlier, sub-periods span three years that correspond to the Big 6 (1996-1998), the Big 5 (1999-2001) and the Big 4 (2002-2004) eras. As expected, total assets and audit fees are much higher for Big N than non-Big N clients. The mean (median) client size measured in nominal total assets for Big N clients show a slight increase (decrease) over time. In contrast, both mean and median total assets for non-Big N clients monotonically decline over the period. This is demonstrative of a move toward clearer

segregation of the market, with large audit clients moving toward the Big N audit firms and smaller audit clients moving toward the non-Big N audit firms<sup>7</sup>.

Mean audit fees increased by over 25% from the Big 6 to the Big 4 era for Big N clients compared to only 4% for non-Big N clients. Once we account for inflationary effects over the entire 9-year period by adjusting total audit fees by the Australian Consumer Price Index (CPI), however, the increase drops to less than 8% for the Big N clients and becomes a 10% decrease for the non-Big N clients, consistent with a relatively flat audit fee pricing environment over the period. See also Figure 1 for a graph of mean audit fee trends by year and auditor type.

With respect to the audit fee determinants, we observe that mean (median) Quick and CATA ratios are higher for non-Big N clients while the opposite is true for ROI, Leverage, FORSUBS and TOTSUBS. Trends indicate that for both samples, LEV, CATA and the number of total subsidiaries are increasing over time while ROI is declining. Not surprisingly, due to their size and nature, more of the non-Big N clients have received a modified opinion and experienced a prior year loss than Big N clients. Consistent with the declining ROI, both types of auditor clienteles experienced a large increase in modified opinions (from about 15% for the period 1996-2001 to about 20% from 2002-2004) and losses in the prior financial year (from about 50% for 1996-2001 to about 60% for 2002-2004) during the Big 4 era.

In the last column we report the t-statistics from comparing the Big N to the non-Big N clients for each of the variables. We find statistically significant differences for

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<sup>7</sup> The significant drop in mean total assets for non-Big N firms from \$43.5m for 1999-2001 to \$27.4m in 2002-2004 is the result of the only non-Big N audit client with more than a billion dollar in total assets in 2001 moving to a Big N auditor in 2002.

each of the variables (10% or better, two-tailed test), which suggests that Big N clients in Australia are very different from non-Big N clients.

[Insert Table 1 here]

In Table 2, we provide the Pearson correlation coefficients of the variables we use in both the audit fee and auditor selection models. Not surprisingly, we find relatively high correlations among the following measures which are related to size of client: BIGN, SIZE, TOTSUBS and AUDCOM. We also observe a high degree of correlation between QUICK and LEV, and AUDCOM and MINING ( $\rho = |0.32|$ ). TOTSUBS are also highly negatively correlated with PYLOSS ( $\rho = |0.36|$ ) and highly positively correlated with FORSUB ( $\rho > 0.41$ ). All other correlations are relatively low (less than 0.30).

[Insert Table 2 here]

#### **4. Results**

##### ***First-stage auditor selection model***

We report in Table 3 the parameter estimates from the first-stage auditor selection probit model by each of the 3-year periods. The model is significant in each three year period, with increasing pseudo r-squares ranging from 10-14 percent. Size is consistently, significantly positive (at less than the 1% level, two-tailed test), indicating that large firms are more likely to select Big N firms. ROI is consistently, significantly negative, suggesting that unprofitable firms are more likely to hire non-Big N firms. CATA and MINING are significantly positive for the last two periods, while QUICK and

ROI are significant for only one of the periods. PYLOSS, TOTSUBS and AUDCOM are not significant in any of the periods.<sup>8</sup>

[Insert Table 3 here]

### **Research Question 1 – Pricing of client risk by sub-periods**

Research Question 1 examines whether the pricing of client risk has changed over the sub-periods 1996-1998, 1999-2001, and 2002-2004. In Table 4, we report the results of the second-stage audit fee model for each of the sub-periods and over all years. We include in this second-stage audit fee model the inverse mills ratio (LAMBDA) from the first stage auditor selection probit models (calculated for each three year period). The fee model is highly significant with adjusted r-squares of 0.83-0.84. For the pooled sample, all of the fee determinant variables are significant in the predicted direction with the exception of PYLOSS and YREND. YREND is not significant in any of the sub-periods. PYLOSS and OPINION are insignificant for two of the three periods and MINING is insignificant during the Big 5 era. All other variables are consistently significant in the expected direction in all periods. LAMBDA is significantly positive for all periods (t-statistics ranging from 9.39-12.72), indicating that self-selection bias is likely to be evident. The BIGN variable is significantly positive and increasing over the period. Consistent with Ireland and Lennox (2002), this suggests that even with a control for self-selection, a fixed effect Big N premium still exists.

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<sup>8</sup> As sensitivity analysis, we also conduct our subsequent audit fee model estimates using a “two-part” OLS model, i.e., audit fee parameters are estimated separately for the Big N and non-Big N firms using OLS without a self-selection adjustment. Francis and Lennox (2006) and Manning et al. (1987) argue that self-selection models may be inferior to OLS two-part models when the auditor selection and audit fee model variables are highly collinear. This condition is likely to occur if none of the variables are unique in the first-stage auditor selection model (no exclusion restriction). Our inferences remain similar even with the use of the two-part OLS model.

In the last four columns of Table 4, we report the F-test results derived from comparing the equality of coefficients across the three periods and for matched sub-periods (for brevity, we report only the significant t-statistics for the matched sub-periods). We find that there are significant changes in at least two of the sub-periods and on an overall basis for the coefficients for BIGN, ROI, PYLOSS, CATA and MINING. F-tests further reveal that the audit fee model parameters as a whole are unstable over the three periods as well as between any two periods.

Of interest is the significant increase over time in the BIGN premium which is more than twice the size in the Big 5 Era compared with the Big 6 era, and more than three times the size in the Big 4 era compared with the Big 6 era. There are significant differences over time in two of the client risk variables (ROI and PYLOSS). The decreasing coefficient for ROI suggests that the fee discount offered to profitable firms (and the fee premium for unprofitable firms) has been reduced over the periods. This interpretation must be considered in the light of two other factors. First, the declining coefficient (price per unit) of ROI over time is offset by the increasingly negative mean values (number of units) for ROI (see Table 1). Second, when combined with the changes for PYLOSS (involving a significant move from a negative coefficient for the Big 6 era to a positive coefficient for both the Big 5 and Big 4 eras), this suggests that there is a reduced emphasis in risk pricing over time on current year profitability and a greater emphasis on prior year losses.

While we find that on an overall basis, risk pricing seems to have changed significantly following the Big 6 period, it does not inform us as to whether there have been changes between the different segments of the auditor market (Big N versus non-

Big N), or whether there are differences in pricing of risk which may be hidden as movements in one segment of the market may be offset by opposite movements in risk pricing for the other segment of the market. These changes will be further examined in Research Questions 2 and 3.

### **Research Question 2 - Second-stage Audit Fee Model by Audit Firm Type**

Research Question 2 investigates the pricing of client risk between Big N and non-Big N audit firms. In Table 5, we report the results of the second-stage audit fee model allowing for separate coefficients for the Big N and non-Big N firms. Comparing the coefficients of the Big N to the non-Big N clients, we find that ten out of the thirteen explanatory variables are reliably different. Overall, we easily reject the null that all coefficients are equal for both types of auditors (F-statistic of 34.60, significant at less than the 1% level).

Our findings suggest that Big N firms charge significantly higher rates for risk than non-Big N firms. Specifically, we find evidence that Big N firms have significantly more negative coefficients for QUICK and ROI than non-Big N firms. This indicates that Big N firms are more sensitive to short-term financial liquidity and current year profitability than non-Big N firms, i.e., firms that are higher risk (low quick ratios and unprofitable) will pay a higher rate per unit of risk and therefore a higher audit fee to Big N firms than non-Big N firms. Further, we find that Big N firms charge significantly higher prices for each unit of LEV than do non-Big N firms.

We also find higher rates per unit are charged by Big N firms for SIZE and certain complexity variables (CATA, FORSUB and MINING<sup>9</sup>). While TOTSUBS is significant for both auditor types and OPINION is marginally significant only for non-Big N clients, neither variable is priced differently by the auditors. Interestingly, non-Big N firms price more for clients with June fiscal year-ends and offices located in the major cities.

### **Research Questions 3a and 3b - Second-stage Audit Fee Model by Periods and Auditors**

The results from research questions 1 and 2 (Tables 4 and 5) suggest that the audit fee model parameters vary across time and auditor. In research questions 3a and 3b, we separately investigate the pricing of client risk for Big N and for non-Big N firms over the period 1996-2004. To better isolate the impact of time, we report in Table 6 the results from estimating the second-stage audit fee model by periods and type of auditor (Big N in panel A, non-Big N in panel B) as well as the significant differences in parameter estimates among the Big 6 (1996-1998), the Big 5 (1999-2001) and the Big 4 (2002-2004) periods.

Interestingly, the results of the audit fee model for the Big N and the non-Big N auditors are quite similar. All variables are significant in every period and for every type of auditor, with the exceptions of OPINION and YREND, which are insignificant in every period for both auditor types, and PYLOSS which is significantly negative for both the Big N and Non Big N auditors only in the Big 6 era. Both types of auditors show significant increases in the pricing of prior year losses (PYLOSS) over time offset by

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<sup>9</sup> The less negative co-efficient for MINING indicates that there is a lower discount for clients in this industry classification in the pricing by Big N firms.

significant declines in the pricing of current year profitability (ROI). Thus the overall result we found earlier, that there is a reduced emphasis in risk pricing over time on current year profitability and a greater emphasis on prior year losses, appears to hold for both Big N auditors and non-Big N auditors. Interestingly, we find that the earlier result that there had not been an overall change in the pricing of LEV is masked by the pooling of the Big N auditors and non-Big N auditors. Interestingly, we find that the pricing per unit of leverage was approximately the same for the Big N auditors as the non-Big N auditors in the Big 6 era. While the pricing per unit of leverage has not changed for the non-Big N firms over time, for the Big N firms it has approximately doubled for the Big 5 era compared with the Big 6 era, and tripled for the Big 4 era compared with the Big 6 era, this later result being significantly different. This shows that the Big N firms have significantly increased their pricing of client risk by charging higher rates for LEV, while there has been no such consideration by the non-Big N firms.

Overall, the results show that Big N auditors charge a higher rate than non-Big N firms (i.e., there is a Big N premium). It appears that both types of auditors have changed their risk pricing by increasing their emphasis on prior year losses and reducing their emphasis on current year profitability. It is also clear that the Big N firms have increased their risk pricing related to long term financial position over the periods of this study.

#### **Additional Analysis: Pricing of client complexity by sub-periods and auditor**

The findings thus far focus on the pricing of client risks. However, the analyses undertaken can also inform the question as to whether there have been other changes in pricing over time by either the Big N auditors or the non-Big n auditors. Of particular

interest in interpreting the results for the pricing of risk is whether there is a “substitution effect” occurring where, for example, auditors price client risk higher but then decrease the pricing of other factors, such as client complexity. If such an effect is present, the audit firm is no better off overall in pricing the audit. It is also possible that there is a “complementary effect”. That is, during the later periods, audit firms may have priced both risk and complexity higher to compensate for increased costs and exposure. To explore this issue, we examine whether the pricing of client complexity has changed over the sub-periods 1996-1998, 1999-2001, and 2002-2004. In the last four columns of Table 4, we report the F-test results from comparing the equality of coefficients across the three periods and find that of the three complexity measures (CATA, FORSUB and TOTSUBS), the coefficient for only one (CATA) appears to have increased significantly in the Big 5 and 4 periods when compared to the Big 6 era. The coefficients for the other complexity measures show no significant changes. Of the other variables, the only significant changes are regarding the MINING variable which shows a significant increase between the Big 6 to the Big 5 period, but decrease almost by as much from the Big 5 to the Big 4 eras (with a resultant finding of no significant difference between the Big 6 and the Big 4 eras).

With regards to differences in the pricing of client complexity between Big N and non-Big N audit firms, we find evidence in Table 5 that Big N auditors price complexity higher than the non-Big N audit firms (CATA and FORSUB show higher rates while TOTSUBS is insignificantly different). The time series analyses in Table 6 indicate that both auditor types increased their pricing of CATA during the Big 5 and Big 4 periods relative to the Big 6 era. Although Big N firms offered pricing discounts for YREND

and CITYCOST relative to non-Big N firms, the evidence in Table 6 show no significant changes to their pricing of these components over time. Thus, the findings suggest that a substitution effect was not present, as evidenced by the finding that client complexity was priced more over the period examined.

## **5. Conclusion**

This study investigates whether the pricing of client risks differs over time and between Big N firms compared with non-Big N firms for audits of publicly-listed companies over a 9-year period (1996-2004). The full sample consists of 8,028 client-years, representing more than 90% of the listed non-financial company population in Australia. This period is specifically chosen because of significant changes in the audit market related to the transition from the Big 6 (1996-1998) to the Big 5 (1999-2001) and then to the Big 4 (2002-2004) eras that may impact on how firms price their audit services in general, and client risk in particular. Over the period examined, audit firms also claim to have placed a greater emphasis on the identification of client risk due in part to the substantial increase in litigation risk and related professional indemnity insurance costs. As the Big N firms claimed to have made significant advances in client risk identification over this time and were more adversely affected by the increase in risk in the audit environment, the risk component of audit fees charged by Big N firms is likely to be greater than that of non-Big N firms. This may have increased over the period examined in this study due to changes in the level of competition within the Big N segment of the audit market. compared to non-Big N firms.

We find that Big N firms place greater weight on the pricing of client risk than do non-Big N firms. The analysis shows that three of the four client risk variables, short-term financial risk (QUICK), long-term financial risk (LEV) and current year financial performance (ROI) are weighted more heavily by the Big N compared to the non-Big N firms. With respect to how this has changed over time we find evidence that both Big N and non-Big N firms have increased their pricing for prior year losses while reducing the pricing discount offered to current profitability. We also find that Big N firms have substantially increased the pricing per unit of leverage (LEV) over time, while this has not significantly changed for non-Big N firms. Finally, a substitution effect in the pricing of client risks vis-à-vis complexity was not found in that complexity was also priced more over the period examined.

In interpreting the results, caution must be paid to the extent to which these risk measures fully capture risk in the way the auditor currently thinks of risk. The measures we have used are client financial risk measures which proxy for risk in current and previous profitability as well as short and long term financial positions. It is acknowledged that with the adoption of business risk audit methodologies over the past decade, auditors may be identifying and pricing a broader array of risks than considered in prior research. However, there are no publicly available measures of business risk for the listed company population in Australia. It should also be remembered that the traditional audit fee model (of which the variables we have examined are a part) has not changed significantly over time and that this model continues to explain a very high proportion of the variation in audit fees.

Future research could directly test the veracity of the reasons advanced or other reasons for the differences in the pricing of risk found between Big N and non-Big N firms. Future research can also be directed towards gaining a more in-depth understanding of the creation of audit firm strategy within the Big N group. In addition, this study examines the audit market over a period of competitive audit pricing and significant litigation risk. The impact of recent regulatory changes, such as CLERP 9 in Australia, which took place after 2005 and emphasize audit quality but reduce auditor exposure to litigation risk, may impact the relationships observed in this paper. Since it is likely that the audit market will go through periods of greater (lesser) competitive pressures, this study provides important baseline findings of the pricing of client risk during a period of significant structural change for the audit market.

**Table 1**  
**Descriptive Statistics**  
Mean [Median] (Std Deviation)

	<b>BIG6 (1996-1998)</b>		<b>BIG5 (1999-2001)</b>		<b>BIG4 (2002-2004)</b>		<b>ALL YEARS</b>		<b>t-stat</b>
	<b>BIGN</b>	<b>NBIGN</b>	<b>BIGN</b>	<b>NBIGN</b>	<b>BIGN</b>	<b>NBIGN</b>	<b>BIGN</b>	<b>NBIGN</b>	<b>Big N v NBigN</b>
<b>Total Assets in millions</b>	571.0 [40.3] (2,815.1)	47.9 [11.5] (225.1)	643.1 [38.1] (3,614.2)	43.5 [10.9] (230.8)	660.0 [35.2] (3,498.7)	27.4 [8.4] (60.8)	626.4 [37.6] (3,337.1)	38.0 [9.8] (178.8)	12.38 <sup>a</sup>
<b>Audit Fees in 000</b>	208.5 (49.3) [605.0]	43.6 (22.0) [65.5]	229.8 [58.7] (842.9)	42.0 (24.0) (54.4)	262.3 (77.1) [866.1]	45.2 (25.0) [80.3]	234.8 [61.1] (784.9)	43.8 [24.0] (69.1)	17.02 <sup>a</sup>
<b>Total Assets in millions (CPI adj)</b>	474.3 [33.5] (2,336.3)	39.8 [9.6] (186.8)	507.6 [30.0] (2,835.4)	34.6 [8.7] (186.3)	471.4 [25.0] (2,502.2)	19.6 [5.9] (43.6)	484.0 [29.1] (2,564.5)	29.8 [7.6] (145.5)	12.43 <sup>a</sup>
<b>Audit Fees in 000 (CPI adj)</b>	173.2 [41.0] (502.5)	36.3 [18.2] (54.5)	181.4 [46.6] (669.5)	33.2 [19.0] (43.3)	187.1 [55.3] (617.0)	32.3 [17.8] (58.3)	180.9 [47.8] (601.5)	33.7 [18.2] (53.0)	17.12 <sup>a</sup>
<b>QUICK</b>	4.954 [1.104] (13.159)	8.851 [1.398] (18.616)	5.143 [1.154] (13.560)	8.232 [1.479] (18.343)	5.103 [1.242] (13.409)	7.205 [1.538] (16.058)	5.069 [1.171] (13.377)	7.976 [1.475] (17.516)	-7.89 <sup>a</sup>
<b>ROI</b>	-0.066 [0.035] (0.388)	-0.095 [-0.041] (0.311)	-0.116 [0.021] (0.465)	-0.203 [-0.082] (0.483)	-0.157 [0.007] (0.536)	-0.320 [-0.104] (0.671)	-0.115 [0.024] (0.472)	-0.222 [-0.074] (0.543)	8.99 <sup>a</sup>
<b>LEV</b>	0.400 [0.410] (0.322)	0.336 [0.267] (0.359)	0.409 [0.416] (0.323)	0.355 [0.266] (0.393)	0.429 [0.400] 0.3978	0.388 [0.252] (0.478)	0.413 [0.408] (0.351)	0.363 [0.259] (0.423)	5.50 <sup>a</sup>
<b>CATA</b>	0.374 [0.342] (0.237)	0.392 [0.351] (0.251)	0.417 [0.381] (0.259)	0.423 [0.391] (0.273)	0.445 [0.415] (0.268)	0.446 [0.412] (0.292)	0.414 [0.380] (0.257)	0.424 [0.387] (0.276)	-1.67 <sup>c</sup>
<b>FORSUBS</b>	0.186 [0.029] (0.239)	0.130 [0.000] (0.211)	0.186 [0.067] (0.236)	0.139 [0.000] (0.215)	0.186 [0.052] (0.242)	0.123 [0.000] (0.201)	0.186 [0.056] (0.239)	0.130 [0] (0.208)	11.23 <sup>a</sup>
<b>TOTSUBS</b>	1.986 [1.946] (1.324)	1.391 [1.386] (0.920)	2.013 [1.946] (1.291)	1.432 [1.386] (0.889)	2.057 [1.946] (1.288)	1.431 [1.386] (0.856)	2.020 [1.946] (1.301)	1.420 [1.386] (0.884)	24.58 <sup>a</sup>
<b>OPINION</b>	11.9%	18.0%	11.9%	20.2%	14.1%	26.2%	12.7%	22.1%	-10.61 <sup>a</sup>
<b>MINING</b>	43.3%	52.6%	34.7%	40.0%	33.0%	40.8%	36.8%	43.8%	-6.24 <sup>a</sup>
<b>YREND</b>	78.3%	90.5%	77.3%	91.6%	79.0%	90.9%	78.2%	91.0%	-16.34 <sup>a</sup>
<b>PYLOSS</b>	45.2%	62.5%	45.8%	62.3%	53.9%	73.2%	48.6%	66.9%	-16.57 <sup>a</sup>
<b>CITYCOST</b>	49.1%	50.6%	52.4%	52.2%	53.2%	46.4%	51.6%	49.3%	-2.00 <sup>b</sup>
<b>No. of obs</b>	1,567	854	1,593	941	1,792	1,281	4,952	3,076	

Variable Definitions:

Total Assets in millions.

QUICK = (Cash + Receivables + Short-term Securities)/Current liabilities

ROI = (Earnings before interest and taxes)/Total assets

LEV = Total liabilities/Total assets

CATA = Current assets/Total assets

FORSUBS = Percentage of foreign subsidiaries to total subsidiaries; 0 if total subsidiaries equal zero.

TOTSUBS = Natural log of total subsidiaries.

OPINION = equal to one if opinion is modified; zero otherwise.

MINING = equal to one if firm is a natural resources firm.

YREND = equal to one if fiscal year-end is June; zero otherwise.

PYLOSS = equal to one if prior year operating profit after taxes was negative; zero otherwise.

CITYCOST = equal to one if auditor is based in Sydney or Melbourne; zero otherwise.

**Table 2**  
**Pearson Correlation Matrix of Model Variables**

	<u>SIZE</u>	<u>QUICK</u>	<u>ROI</u>	<u>PYLOSS</u>	<u>LEV</u>	<u>OPINION</u>	<u>CATA</u>	<u>FORSUB</u>	<u>TOTSUBS</u>	<u>MINING</u>	<u>YREND</u>	<u>CITY-COST</u>	<u>AUD-COM</u>
<b>BIGN</b>	0.349	-0.093	0.002	-0.179	0.064	-0.124	-0.019	0.121	0.244	-0.070	-0.166	0.022	0.153
<b>SIZE</b>	1.000	-0.227	0.082	-0.543	0.119	-0.264	-0.199	0.262	0.686	-0.260	-0.206	0.241	0.428
<b>QUICK</b>		1.000	0.005	0.186	-0.311	-0.071	0.257	0-0.090	-0.243	0.193	0.046	-0.115	-0.206
<b>ROI</b>			1.000	-0.047	-0.140	-0.041	-0.051	0.025	0.042	0.000	-0.013	0.007	0.032
<b>PYLOSS</b>				1.000	-0.140	0.262	-0.013	-0.108	-0.361	0.289	0.126	-0.150	-0.289
<b>LEV</b>					1.000	0.177	0.107	0.063	0.236	-0.273	-0.055	0.160	0.186
<b>OPINION</b>						1.000	-0.122	-0.030	-0.103	0.062	0.055	0.007	-0.120
<b>CATA</b>							1.000	0.025	-0.075	-0.238	0.021	0.046	0.028
<b>FORSUB</b>								1.000	0.414	-0.069	-0.117	0.109	0.112
<b>TOTSUBS</b>									1.000	-0.271	-0.136	0.221	0.319
<b>MINING</b>										1.000	0.006	-0.264	-0.316
<b>YREND</b>											1.000	-0.109	-0.085
<b>CITYCOST</b>												1.000	0.279
<b>AUDCOM</b>													1.000

Notes:

(1) Correlations are calculated from 8, 028 firm-year observations from 1996-2004.

(2) AUDCOM = indicator variable equal to one if firm has an audit committee; 0 otherwise. All other variables are defined in Table 1.

**Table 3**  
**First Stage Auditor Selection Probit Model Results**

	<b>Predicted Signs</b>	<b>Big 6 Era 1996-1998</b>	<b>Big 5 Era 1999-2001</b>	<b>Big 4 Era 2002-2004</b>
<b>INTER</b>		-4.391 <sup>a</sup> (-10.43)	-5.638 <sup>a</sup> (-13.15)	-6.145 <sup>a</sup> (-16.34)
<b>SIZE</b>	(+)	0.281 <sup>a</sup> (10.92)	0.338 <sup>a</sup> (13.09)	0.360 <sup>a</sup> (16.08)
<b>QUICK</b>	(+/-)	-0.003 (-1.56)	-0.003 <sup>c</sup> (-1.73)	-0.001 (-0.55)
<b>ROI</b>	(+/-)	-0.631 <sup>a</sup> (-6.50)	-0.309 <sup>a</sup> (-4.61)	-0.276 <sup>a</sup> (-5.42)
<b>PYLOSS</b>	(+/-)	-0.043 (-0.64)	0.074 (1.11)	0.060 (0.98)
<b>LEV</b>	(+/-)	-0.068 (-0.72)	-0.058 (-0.69)	0.016 (0.25)
<b>CATA</b>	(+)	0.013 (0.10)	0.467 <sup>a</sup> (4.07)	0.557 <sup>a</sup> (5.57)
<b>FORSUB</b>	(+)	0.183 (1.34)	0.025 (0.19)	0.261 <sup>b</sup> (2.20)
<b>TOTSUBS</b>	(+)	0.007 (0.18)	-0.003 (-0.09)	-0.007 (-0.21)
<b>MINING</b>	(+/-)	0.063 (0.93)	0.248 <sup>a</sup> (3.80)	0.151 <sup>a</sup> (2.61)
<b>AUDCOM</b>	(+)	-0.001 (-0.02)	-0.019 (-0.29)	0.015 (0.25)
<b>Pseudo-R<sup>2</sup></b>		0.100	0.112	0.141
<b>No. of Obs</b>		2,421	2,534	3,073

(1) Probit regression model estimated by period was:

$$\text{BigN} = \alpha_0 + \alpha_1 \text{SIZE} + \alpha_2 \text{QUICK} + \alpha_3 \text{ROI} + \alpha_4 \text{PYLOSS} + \alpha_5 \text{LEV} + \alpha_6 \text{CATA} + \alpha_7 \text{FORSUB} + \alpha_8 \text{TOTSUBS} + \alpha_9 \text{MINING} + \alpha_{10} \text{AUDCOM} + \varepsilon$$

All variables are defined in Table 1 or 2.

<sup>a</sup> significant at the 1% level, <sup>b</sup> significant at the 5% level, <sup>c</sup> significant at the 10% level, two-tailed tests.

**Table 4**  
**Second Stage Audit Fee Models – By Periods**

	<u>Pred. Signs</u>	<u>All Years</u>	<u>Big 6 Era 1996-1998</u>	<u>Big 5 Era 1999-2001</u>	<u>Big 4 Era 2002-2004</u>	<u>Equality of Coeff.*</u>	<u>Big 6 v. Big 5</u>	<u>Big 5 v. Big 4</u>	<u>Big 6 v. Big 4</u>
<b>INTER</b>		0.075 (0.22)	-1.315 (-1.24)	-2.586 <sup>a</sup> (-2.78)	-0.496 (-0.59)	1.93 (0.145)		<b>1.66<sup>c</sup></b> <b>(0.096)</b>	
<b>BIGN</b>	(+)	0.279 <sup>a</sup> (19.97)	0.123 <sup>a</sup> (4.89)	0.285 <sup>a</sup> (11.59)	0.385 <sup>a</sup> (17.37)	<b>30.38<sup>a</sup></b> <b>(0.000)</b>	<b>4.59<sup>a</sup></b> <b>(0.000)</b>	<b>3.00<sup>a</sup></b> <b>(0.003)</b>	<b>7.78<sup>a</sup></b> <b>(0.000)</b>
<b>SIZE</b>	(+)	0.517 <sup>a</sup> (30.38)	0.594 <sup>a</sup> (11.43)	0.638 <sup>a</sup> (14.44)	0.544 <sup>a</sup> (13.33)	1.65 (0.191)			
<b>QUICK</b>	(-)	-0.009 <sup>a</sup> (-14.87)	-0.009 <sup>a</sup> (-7.61)	-0.010 <sup>a</sup> (-8.31)	-0.009 <sup>a</sup> (-10.55)	0.34 (0.711)			
<b>ROI</b>	(-)	-0.299 <sup>a</sup> (-12.70)	-0.674 <sup>a</sup> (-5.40)	-0.393 <sup>a</sup> (-8.07)	-0.247 <sup>a</sup> (-6.25)	<b>4.82<sup>a</sup></b> <b>(0.008)</b>	<b>2.10<sup>b</sup></b> <b>(0.036)</b>	<b>2.33<sup>b</sup></b> <b>(0.020)</b>	<b>3.26<sup>a</sup></b> <b>(0.001)</b>
<b>PYLOSS</b>	(+)	-0.019 (-1.14)	-0.118 <sup>a</sup> (-3.60)	0.010 (0.34)	0.001 (0.05)	<b>3.27<sup>b</sup></b> <b>(0.038)</b>	<b>0.128<sup>a</sup></b> <b>(2.87)</b>		<b>2.84<sup>a</sup></b> <b>(0.005)</b>
<b>LEV</b>	(+)	0.217 <sup>a</sup> (8.96)	0.159 <sup>a</sup> (3.32)	0.187 <sup>a</sup> (4.37)	0.245 <sup>a</sup> (6.82)	0.58 (0.558)			
<b>OPINION</b>	(+)	0.049 <sup>b</sup> (2.46)	0.071 <sup>b</sup> (1.98)	0.047 (1.29)	0.036 (1.20)	0.00 (0.997)			
<b>CATA</b>	(+)	0.571 <sup>a</sup> (16.18)	0.348 <sup>a</sup> (5.69)	0.813 <sup>a</sup> (9.67)	0.669 <sup>a</sup> (8.69)	<b>10.32<sup>a</sup></b> <b>(0.000)</b>	<b>4.48<sup>a</sup></b> <b>(0.000)</b>		<b>3.27<sup>a</sup></b> <b>(0.001)</b>
<b>FORSUB</b>	(+)	0.631 <sup>a</sup> (19.30)	0.700 <sup>a</sup> (9.14)	0.592 <sup>a</sup> (10.87)	0.685 <sup>a</sup> (12.03)	0.89 (0.411)			
<b>TOTSUBS</b>	(+)	0.274 <sup>a</sup> (28.80)	0.285 <sup>a</sup> (15.10)	0.263 <sup>a</sup> (15.81)	0.247 <sup>a</sup> (16.76)	1.33 (0.264)			
<b>MINING</b>	(-)	-0.194 <sup>a</sup> (-11.37)	-0.191 <sup>a</sup> (-6.26)	-0.046 (-1.09)	-0.225 <sup>a</sup> (-8.14)	<b>6.80<sup>a</sup></b> <b>(0.001)</b>	<b>2.81<sup>a</sup></b> <b>(0.005)</b>	<b>-3.59<sup>a</sup></b> <b>(0.000)</b>	
<b>YREND</b>	(+)	-0.009 (-0.47)	-0.046 (-1.28)	-0.002 (-0.06)	0.022 (0.69)	1.25 (0.287)			
<b>CITYCOST</b>	(+)	0.260 <sup>a</sup> (19.12)	0.225 <sup>a</sup> (9.39)	0.264 <sup>a</sup> (10.59)	0.273 <sup>a</sup> (12.72)	1.34 (0.263)			
<b>LAMBDA</b>		0.942 <sup>a</sup> (10.29)	1.437 <sup>a</sup> (4.18)	1.658 <sup>a</sup> (6.55)	1.094 <sup>a</sup> (5.43)	1.72 (0.179)		<b>-1.74<sup>c</sup></b> <b>(0.081)</b>	
<b>Adjusted R<sup>2</sup></b>		0.829	0.842	0.830	0.829				
<b>No. of Obs</b>		8,028	2,421	2,534	3,073		4,955	5,607	5,494

	<u>All Periods</u>	<b>Big 6 v. Big 5</b>	<b>Big 5 v. Big 4</b>	<b>Big 6 v. Big 4</b>
<b>F-test equality of all coefficients:</b>	7.55 (0.000)	4.19 (0.000)	5.80 (0.000)	12.20 (0.000)
<b>F-test equality of all risk coefficients:</b>	2.94 (0.003)	3.17 (0.013)	1.52 (0.292)	4.76 (0.001)

Notes:

(1) Audit fee model estimated over the period 1996-2004 using robust standard errors was:

$$\text{Log(Total Audit Fees)} = \beta_0 + \beta_1 \text{ SIZE} + \beta_2 \text{ BIGN} + \beta_3 \text{ QUICK} + \beta_4 \text{ ROI} + \beta_5 \text{ PYLOSS} + \beta_6 \text{ LEV} + \beta_7 \text{ OPINION} + \beta_8 \text{ CATA} + \beta_9 \text{ FORSUBS} + \beta_{10} \text{ TOTSUBS} + \beta_{11} \text{ MINING} + \beta_{12} \text{ YREND} + \beta_{13} \text{ CITYCOST} + \beta_{14} \text{ LAMBDA} + \varepsilon$$

(2) LAMBDA = inverse mills ratio obtained from Big N selection model estimated in Table 2. All other variables are defined in Table 1 or 2.

<sup>a</sup> significant at the 1% level, <sup>b</sup> significant at the 5% level, <sup>c</sup> significant at the 10% level, two-tailed tests.

\* F-tests of equality of coefficients.

**Table 5**  
**Second Stage Audit Fee Models – By Auditor**  
**Original Risk Variables (Coefficients and T-statistics)**

	<b>Predicted Signs</b>	<b>BIG N</b>	<b>Non-BIG N</b>	<b>All Years</b>
<b>INTER</b>		-0.991 <sup>b</sup> (-2.30)	1.232 <sup>c</sup> (1.71)	<b>-2.83<sup>a</sup></b> <b>(0.01)</b>
<b>SIZE</b>	(+)	0.572 <sup>a</sup> (27.42)	0.467 <sup>a</sup> (13.52)	<b>2.83<sup>a</sup></b> <b>(0.01)</b>
<b>QUICK</b>	(-)	-0.010 <sup>a</sup> (-13.07)	-0.007 <sup>a</sup> (-7.77)	<b>-2.42<sup>b</sup></b> <b>(0.02)</b>
<b>ROI</b>	(-)	-0.224 <sup>a</sup> (-11.33)	-0.189 <sup>a</sup> (-7.75)	<b>-2.57<sup>a</sup></b> <b>(0.01)</b>
<b>PYLOSS</b>	(+)	0.011 (0.57)	-0.025 (-0.78)	0.59 (0.56)
<b>LEV</b>	(+)	0.259 <sup>a</sup> (7.58)	0.153 <sup>a</sup> (4.44)	<b>2.03<sup>b</sup></b> <b>(0.04)</b>
<b>OPINION</b>	(+)	0.038 (1.48)	0.055 <sup>c</sup> (1.84)	-0.44 (0.66)
<b>CATA</b>	(+)	0.747 <sup>a</sup> (16.27)	0.390 <sup>a</sup> (6.47)	<b>4.66<sup>a</sup></b> <b>(0.00)</b>
<b>FORSUB</b>	(+)	0.700 <sup>a</sup> (17.63)	0.480 <sup>a</sup> (8.59)	<b>3.19<sup>a</sup></b> <b>(0.00)</b>
<b>TOTSUBS</b>	(+)	0.285 <sup>a</sup> (24.09)	0.265 <sup>a</sup> (17.82)	0.89 (0.38)
<b>MINING</b>	(-)	-0.137 <sup>a</sup> (-6.27)	-0.258 <sup>a</sup> (-8.61)	<b>3.32<sup>a</sup></b> <b>(0.00)</b>
<b>YREND</b>	(+)	-0.035 (-1.67)	0.067 (1.50)	<b>-1.89<sup>c</sup></b> <b>(0.06)</b>
<b>CITYCOST</b>	(+)	0.218 <sup>a</sup> (12.89)	0.329 <sup>a</sup> (14.58)	<b>-3.93<sup>a</sup></b> <b>(0.00)</b>
<b>LAMBDA</b>		1.441 <sup>a</sup> (12.08)	0.555 <sup>a</sup> (3.10)	<b>4.22<sup>a</sup></b> <b>(0.00)</b>
<b>Adj R<sup>2</sup></b>		0.841	0.694	-
<b>No. of Obs.</b>		4,952	3,076	-
<b>F-test equality of all coefficients:</b>				<b>34.60</b> <b>(0.00)</b>
<b>F-test equality of all risk coefficients:</b>				<b>4.77</b> <b>(0.00)</b>

Notes:

(1) Audit fee model estimated by auditor type using robust standard errors was:

$$\text{Log(Total Audit Fees)} = \beta_0 + \beta_1 \text{ SIZE} + \beta_2 \text{ QUICK} + \beta_3 \text{ ROI} + \beta_4 \text{ PYLOSS} + \beta_5 \text{ LEV} + \beta_6 \text{ OPINION} + \beta_7 \text{ CATA} + \beta_8 \text{ FORSUBS} + \beta_9 \text{ TOTSUBS} + \beta_{10} \text{ MINING} + \beta_{11} \text{ YREND} + \beta_{12} \text{ CITYCOST} + \beta_{13} \text{ LAMBDA} + \varepsilon$$

(2) All variables are defined in Tables 1, 2 or 3.

\* F-tests of equality of coefficients.

<sup>a</sup> significant at the 1% level, <sup>b</sup> significant at the 5% level, <sup>c</sup> significant at the 10% level, two-tailed tests.

**Table 6 – Panel A**  
**Second-stage Audit Fee Models – by Auditor and Periods**  
**(Coefficients and T-statistics)**

**BIG N AUDIT FIRMS**

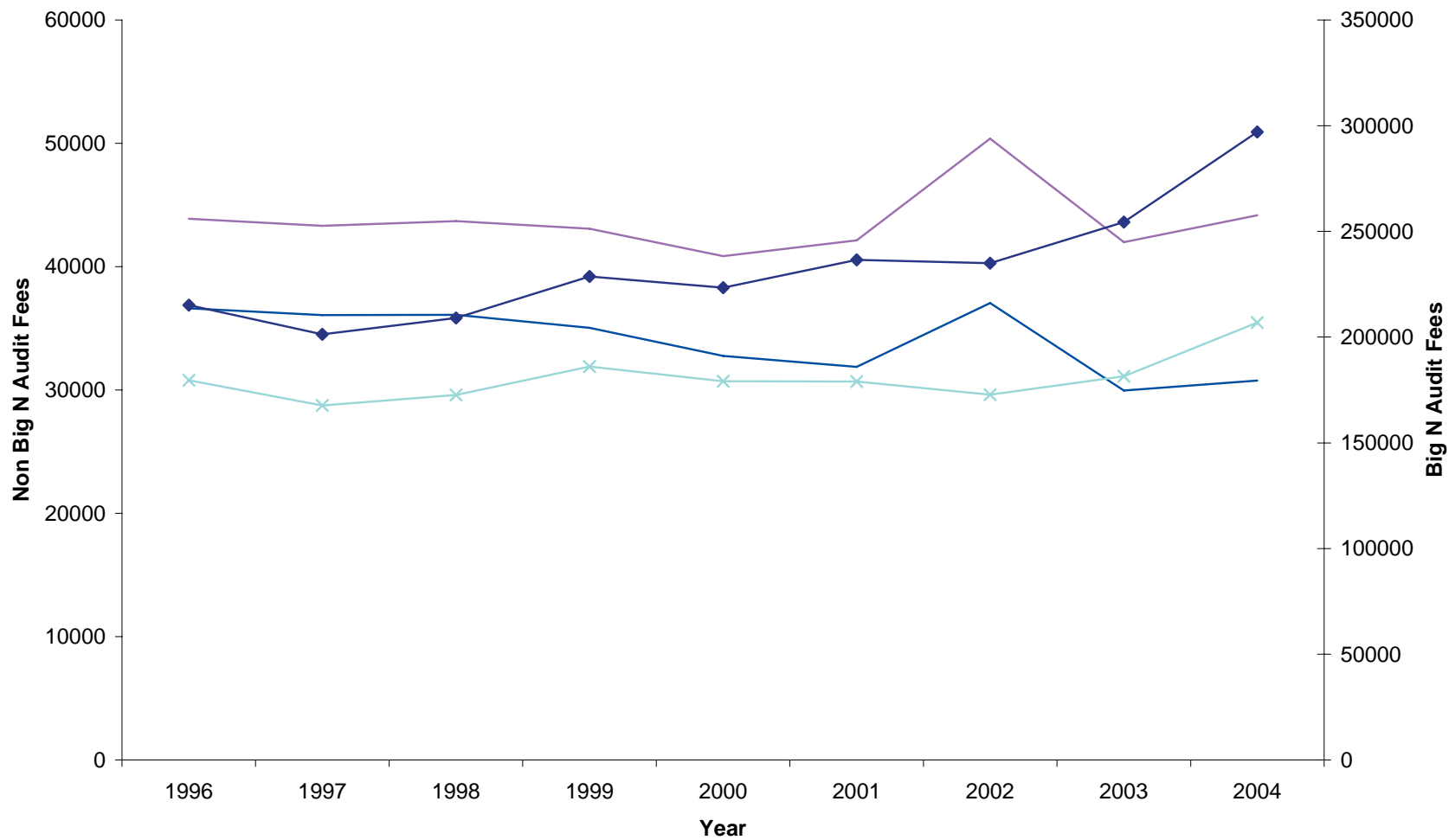
	<u>Pred</u> <u>Sign</u>	<u>BIG 6 era</u> <u>1996-1998</u>	<u>BIG 5 era</u> <u>1999-2001</u>	<u>BIG 4 era</u> <u>2002-2004</u>	<u>Big 6 v.</u> <u>Big 5</u>	<u>Big 5 v.</u> <u>Big 4</u>	<u>Big 6 v.</u> <u>Big 4</u>
<b>INTER</b>		-1.389 (-1.09)	-2.960 <sup>a</sup> (-2.77)	-1.088 (-1.11)			
<b>SIZE</b>	(+)	0.599 <sup>a</sup> (9.69)	0.663 <sup>a</sup> (13.18)	0.586 <sup>a</sup> (12.38)			
<b>QUICK</b>	(-)	-0.010 <sup>a</sup> (-6.39)	-0.010 <sup>a</sup> (-7.91)	-0.011 <sup>a</sup> (-8.32)			
<b>ROI</b>	(-)	-0.651 <sup>a</sup> (-4.72)	-0.404 <sup>a</sup> (-7.59)	-0.268 <sup>a</sup> (-5.53)	<i>1.67<sup>c</sup></i> <i>(0.096)</i>	<i>1.90<sup>c</sup></i> <i>(0.057)</i>	<i>2.62<sup>a</sup></i> <i>(0.009)</i>
<b>PYLOSS</b>	(+)	-0.099 <sup>a</sup> (-2.72)	0.017 (0.49)	0.001 (0.02)	<i>2.28<sup>b</sup></i> <i>(0.022)</i>		<i>2.07<sup>b</sup></i> <i>(0.039)</i>
<b>LEV</b>	(+)	0.129 <sup>b</sup> (2.04)	0.235 <sup>a</sup> (4.35)	0.333 <sup>a</sup> (6.61)			<i>2.52<sup>b</sup></i> <i>(0.012)</i>
<b>OPINION</b>	(+)	0.066 (1.39)	0.026 (0.58)	0.027 (0.71)			
<b>CATA</b>	(+)	0.449 <sup>a</sup> (5.83)	0.912 <sup>a</sup> (9.06)	0.796 <sup>a</sup> (8.54)	<i>3.66<sup>a</sup></i> <i>(0.000)</i>		<i>2.88<sup>a</sup></i> <i>(0.004)</i>
<b>FORSUB</b>	(+)	0.735 <sup>a</sup> (7.73)	0.687 <sup>a</sup> (10.48)	0.742 <sup>a</sup> (11.14)			
<b>TOTSUBS</b>	(+)	0.297 <sup>a</sup> (12.45)	0.281 <sup>a</sup> (13.71)	0.241 <sup>a</sup> (12.94)			<i>-1.86<sup>c</sup></i> <i>(0.063)</i>
<b>MINING</b>	(-)	-0.161 <sup>a</sup> (-4.22)	-0.015 (-0.29)	-0.183 <sup>a</sup> (-5.45)	<i>2.32<sup>b</sup></i> <i>(0.020)</i>	<i>-2.78<sup>a</sup></i> <i>(0.005)</i>	
<b>YREND</b>	(+)	-0.055 (-1.39)	-0.052 (-1.58)	0.011 (0.30)			
<b>CITYCOST</b>	(+)	0.202 <sup>a</sup> (6.75)	0.213 <sup>a</sup> (7.06)	0.227 <sup>a</sup> (8.38)			
<b>LAMBDA</b>		1.553 <sup>a</sup> (3.69)	1.969 <sup>a</sup> (6.60)	1.414 <sup>a</sup> (5.76)			
<b>Adj R<sup>2</sup></b>		0.851	0.851	0.837			
<b>No. of obs.</b>		1,567	1,593	1,792	3,160	3,385	3,359
<b>F-test equality of all coefficients:</b>					<i>3.30</i> <i>(0.000)</i>	<i>5.09</i> <i>(0.000)</i>	<i>10.93</i> <i>(0.000)</i>
<b>F-test equality of all risk coefficients:</b>					<i>2.00</i> <i>(0.092)</i>	<i>1.52</i> <i>(0.194)</i>	<i>4.35</i> <i>(0.002)</i>

**Table 6 – Panel B**  
**Second-stage Audit Fee Models – by Auditor and Periods**  
**(Coefficients and T-statistics)**

**NON BIG N AUDIT FIRMS**

	<u>Pred.</u> <u>Sign</u>	<u>BIG 6 era</u> <u>1996-1998</u>	<u>BIG 5 era</u> <u>1999-2001</u>	<u>BIG 4 era</u> <u>2002-2004</u>	<u>Big 6 v.</u> <u>Big 5</u>	<u>Big 5 v.</u> <u>Big 4</u>	<u>Big 6 v.</u> <u>Big 4</u>
<b>INTER</b>		-6.222 <sup>c</sup> (-1.90)	-3.014 (-1.24)	-5.808 <sup>c</sup> (-1.93)			
<b>SIZE</b>	(+)	0.843 <sup>a</sup> (5.27)	0.664 <sup>a</sup> (5.68)	0.807 <sup>a</sup> (5.53)			
<b>QUICK</b>	(-)	-0.010 <sup>a</sup> (-4.05)	-0.009 <sup>a</sup> (-4.15)	-0.008 <sup>a</sup> (-7.26)			
<b>ROI</b>	(-)	-1.328 <sup>a</sup> (-3.17)	-0.406 <sup>a</sup> (-3.44)	-0.476 <sup>a</sup> (-4.00)	<b>2.12<sup>b</sup></b> <b>(0.034)</b>		<b>1.96<sup>b</sup></b> <b>(0.05)</b>
<b>PYLOSS</b>	(+)	-0.181 <sup>a</sup> (-2.66)	0.040 (0.67)	0.069 (1.25)	<b>2.44<sup>b</sup></b> <b>(0.015)</b>		<b>2.86<sup>a</sup></b> <b>(0.004)</b>
<b>LEV</b>	(+)	0.162 <sup>a</sup> (2.20)	0.124 <sup>c</sup> (1.86)	0.155 <sup>a</sup> (3.27)			
<b>OPINION</b>	(+)	0.065 (1.17)	0.055 (0.96)	0.040 (0.88)			
<b>CATA</b>	(+)	0.164 <sup>c</sup> (1.66)	0.724 <sup>a</sup> (3.91)	0.949 <sup>a</sup> (3.95)	<b>2.67<sup>a</sup></b> <b>(0.008)</b>		<b>3.02<sup>a</sup></b> <b>(0.003)</b>
<b>FORSUB</b>	(+)	0.786 <sup>a</sup> (4.98)	0.431 <sup>a</sup> (4.50)	0.823 <sup>a</sup> (5.84)	<b>-1.92<sup>c</sup></b> <b>(0.054)</b>	<b>2.30<sup>b</sup></b> <b>(0.021)</b>	
<b>TOTSUBS</b>	(+)	0.259 <sup>a</sup> (9.16)	0.245 <sup>a</sup> (9.06)	0.260 <sup>a</sup> (11.23)			
<b>MINING</b>	(-)	-0.198 <sup>a</sup> (-3.15)	-0.055 (-0.60)	-0.162 <sup>b</sup> (-2.32)			
<b>YREND</b>	(+)	-0.027 (-0.34)	0.147 (1.62)	0.077 (1.15)			
<b>CITYCOST</b>	(+)	0.271 <sup>a</sup> (6.67)	0.352 <sup>a</sup> (7.94)	0.353 <sup>a</sup> (10.11)			
<b>LAMBDA</b>		2.760 <sup>a</sup> (2.80)	1.549 <sup>a</sup> (2.52)	2.075 <sup>a</sup> (3.25)			
<b>Adj R<sup>2</sup></b>		0.751	0.677	0.676			
<b>No. of obs.</b>		854	941	1,281	1,795	2,222	2,135
<b>F-test equality of all coefficients:</b>					<b>1.84<sup>b</sup></b> <b>(0.029)</b>	<b>1.67<sup>b</sup></b> <b>(0.056)</b>	<b>1.93<sup>b</sup></b> <b>(0.020)</b>
<b>F-test equality of all risk coefficients:</b>					<b>2.77</b> <b>(0.026)</b>	0.30 (0.880)	<b>2.79<sup>b</sup></b> <b>(0.025)</b>

### Mean Audit Fees in AU\$



— Non Big N Audit Fees — Non-Big N Audit Fees CPI Adjusted —◆— Big N Fees —x— Big N Fees CPI Adjusted

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