

## **The Impact of Deregulation of Audit Markets on Audit Fees**

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## **THE IMPACT OF DEREGULATION OF AUDIT MARKETS ON AUDIT FEES**

### **Abstract**

The purpose of this paper is to examine the impact of certain aspects of regulation and the structure of the audit market on audit fees. New Zealand deregulated advertising by audit firms effective January 1, 1986 and allowed direct solicitation of potential audit clients effective January 1, 1992. We develop a series of models to predict audit fees and then tested whether significant changes in the nature of the models or the prediction residuals occurred at the times of deregulation or thereafter. In general, we observe a general upward drift in fees (in constant dollar terms) from 1970 to 1987, followed by a large jump in 1988 and a fall-off after 1990. An analysis of residuals from the prediction models provides evidence that advertising did not lead to significantly lower fees, but solicitation was followed by significant declines in fees. Using a pooled sample from all years and including dummy variables for the years of the deregulatory events being examined, we found that advertising was associated with a reduction in fees for larger clients of the larger audit firms, and an increase for smaller clients. Solicitation was followed by a decrease in fees for clients of the Big 8/6/5.

Key words: auditing, audit fees, competition, deregulation, advertising, direct solicitation

## **THE IMPACT OF DEREGULATION OF AUDIT MARKETS ON AUDIT FEES**

The cross-sectional empirical properties of audit fees have been studied in depth by many researchers using data from a broad range of countries and time periods. Using various independent variables, numerous general observations have emerged from this broad body of research, e.g., audit fees are related to attributes such as client size, audit complexity and auditor quality. Most of this research emanates from original seminal work by Simunic (1980) based on a production view of the audit process. However, except for a few studies related to auditor concentration and specialization,<sup>1</sup> the impact of the structure of audit markets and professional regulations on audit fees has not been broadly studied.

Only recently has research begun to appear looking at the longitudinal behavior of audit fees. Menon and Williams (2001) examined the long-term behavior of audit fees in the US. Using data from an 18-year period, they reported that the introduction of the “expectation gap” standards in the US had a positive impact on fees but that firm mergers had no long term impact. However, since this study used US data, sample sizes were relatively limited and subject to potential self-selection bias due to the voluntary nature of audit fee disclosures during the period studied. An unpublished working paper by Carson, Simnett, Soo and Wright (2002) reports results for a longitudinal study of Australian audit fees over a 15-year period. In general, they find that the models of audit fees were relatively stable and that fee changes during the period were mostly explained by changes in firm size and growth in nonaudit services.

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<sup>1</sup> See references in Gramling and Stone (2001).

The purpose of this paper is to examine the impact of certain aspects of regulation and the structure of the audit market on audit fees. We first discuss the nature of demand for audit services and how regulation can affect the level of fees observed over time. We use this discussion to formulate testable hypotheses about two market deregulation events: (1) removal of restrictions on advertising related to audit services and (2) the relaxation of rules against solicitation of potential audit clients by accounting firms. To test our hypotheses, we use fee data from New Zealand over a 31-year period. New Zealand data was used for this study because audit fees have been subject to formal disclosure requirements since the 1960's. Furthermore, deregulation of advertising was six years earlier than the deregulation of direct solicitation, allowing separate analysis of each event.<sup>2</sup>

The remainder of this paper is organized as follows: In the next section we present a descriptive analysis of the demand for audits and the potential impact of market deregulation on audit fees. This analysis leads to the specification of hypotheses related to deregulation of advertising and solicitation of clients. In the second section, we describe the research methods used in the paper followed by presentation of our results. The last section discusses implications of the results, potential limitations and future research ideas.

### **Audit Contracting, Audit Fees and Information Asymmetry**

A small but growing body of previous research has examined the impact on audit fees of market conditions such as auditor concentration,<sup>3</sup> audit specialization<sup>4</sup> and auditor

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<sup>2</sup> In contrast, in the US, deregulation of advertising and solicitation occurred at the same time as a comprehensive overhaul of the Code of Professional Ethics in response to antitrust investigations by the US government. These changes were effective March 31, 1979.

<sup>3</sup> See Eichenseher and Danos (1981), Danos and Eichenseher (1982), and Yardley *et al* (1992).

switching.<sup>5</sup> A few researchers have specifically addressed issues of market regulation in different countries. For example, Craswell (1991) examined Australian fee data from 1980 through 1989 and found that increased tendering for audits was followed by a significant decline in fees. Maher *et al* (1992) observed significant fee decreases in the US during the period 1977—1981, a period in which the US profession was under heavy pressure from regulators. Anderson and Zéghal (1994) examined Canadian data in the early 1980's and found no change in fee levels after relaxation of rules allowing increased competition.

We expand on this research by describing a model that can be used to evaluate the potential impact of market deregulation on the contracting and pricing of audit services. In this paper, we assume that the client and the auditor are separate economic agents working under normal economic incentives and that the audit fee is based on a negotiated arrangement between the auditor and the set of stakeholders referred to as the “client”. The resulting audit fee depends on the relationship between the supply and demand for audit services and the extent of information asymmetry between the potential buyer (client) and seller (auditor) of audit services (see Demski 1997). *Ceteris paribus*, basic economic theory would suggest that audit fees would be higher when demand is high and/or supply is low. To some extent this rationale underlies research that has examined the impact on audit fees of firm mergers (e.g., Iyer and Iyer (1996)) and audit market concentration (Yardley *et al* (1992)). The basic finding of much of that literature is that fees are more affected by differences in audit quality (e.g., Big 8/6/5 firms relative to

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<sup>4</sup> See Gramling and Stone (2001), Hogan and Jeter (1999), Palmrose (1986).

<sup>5</sup> See DeAngelo (1981), Craswell and Francis (1999), Pearson and Trompeter (1994)

other firms) than differences in market concentration.<sup>6</sup> As an alternative to the market concentration perspective, in this paper we examine whether changes in information asymmetry between the auditor and client may cause changes in audit fees.

### Basic Contracting Model

To illustrate the impact of information asymmetry, consider a very simple market consisting of one auditor and one client. Due to an exogenously imposed requirement, the client company (CC) must purchase an audit so the only options available are to enter into repeated contracts with the single incumbent auditor (IA), or withdraw from the market entirely. We define  $V$  as the endogenous value of the audit to the client, which reflects the typical benefits of receiving a clean audit report including reduced capital and agency costs.<sup>7</sup>

To facilitate our discussion of information asymmetry, assume that the contract for audit services is based on a set price for each unit of assurance delivered as part of the audit process. Units of assurance can be viewed as reductions in the risk associated with the possibility that financial statements are materially misstated, and in a practical sense could be interpreted as hours devoted to the engagement. Define  $Q_{IA}$  as the number of units of assurance delivered and  $P_{IA}$  as the price per unit charged by the incumbent auditor.  $P_{IA}$  and  $Q_{IA}$  combine to determine the overall fee (i.e.,  $F = P_{IA} \times Q_{IA}$ ).  $P_{IA}$ ,  $Q_{IA}$  and  $F$  are known to both the client and the incumbent auditor. Furthermore, assume that each unit of assurance can be delivered at an expected cost to the auditor of  $K$  (e.g., salaries or other variable costs) and professional standards and existing audit technology dictate a

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<sup>6</sup> The literature examining the relationship between auditor expertise/specialization is mixed. See Gramling and Stone (2001).

<sup>7</sup> See Sundem, Dukes and Elliott (1996). The analysis is simplified if  $V$  is observable by the client and the incumbent auditor, but the following observations do not depend on this assumption.

minimally sufficient audit that can be delivered to the client based on  $Q^*$  units of assurance ( $Q_{IA} = Q^*$ ). The auditor knows  $K$  and  $Q^*$  but the client does not, creating an important source of information asymmetry between the contracting parties.<sup>8</sup>

Two boundary solutions that arise from this contracting scenario are potentially relevant to our analysis. At one extreme, the maximum audit fee is constrained by  $V$  since a fee in excess of  $V$  would cause the client to withdraw from the market. At the other extreme, the minimum audit fee is defined by the auditing firm's unit price ( $P_{IA}$  in this case) multiplied by  $Q^*$ . If the fee is not greater than or equal to  $P_{IA} \times Q^*$ , the auditor will withdraw from the market because the return on the engagement will not compensate for an audit conducted in accordance with professional standards. We will refer to the lower fee boundary as the auditor's reservation fee.<sup>9</sup>

Given that the total audit fee is based on  $Q_{IA}$ , which is directly controlled by the auditor, and that the client cannot observe  $Q^*$  (or  $K$ ), there is a natural incentive for the auditor to provide units of assurance in excess of  $Q^*$ .<sup>10</sup> Under these conditions, the client has no viable alternatives to contracting with the incumbent, so the incumbent auditor can use superior knowledge to negotiate a relatively high fee, i.e., the auditor captures the economic rent associated with a fee of  $F = P_{IA} \times Q_{IA}$  by delivering units of assurance in

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<sup>8</sup>  $Q^*$  depends on the firm's proprietary audit technology, the level of personnel assigned to the engagement, and the firm's interpretation of auditing standards. It is assumed that the client can not observe these factors of the audit process in enough detail to estimate  $Q^*$

<sup>9</sup> Note, the unit price of assurance can vary across firms so the reservation fee is firm-specific. We assume that the costs of performing an engagement with less than  $Q^*$  units of assurance are prohibitive (e.g., due to litigation risk).

<sup>10</sup> The incumbent auditor could also manipulate  $P_{IA}$  but we assume that such an action would be much more readily observable to the client and thus a less effective way for the auditor to maximize the overall audit fee. Price is also much easier for the client to benchmark in situations where information asymmetries are removed (to be discussed).

excess of  $Q^*$  (with  $F$  approaching  $V$ ).<sup>11</sup> Therefore, in a market characterized by high information asymmetry in favor of the seller, audit fees would be expected to gravitate to the high end of the feasible range. Competition could reduce fees towards the reservation fee, but in the presence of information asymmetry that favors the incumbent auditor, it is not clear how fee reduction can be effectively achieved. That is, a client can only take advantage of lower prices from competition if they are aware of the opportunity to replace the incumbent auditor with a lower cost alternative (without loss of quality). The analysis presented in this paper focuses on what happens to audit fees if various restrictions are removed from the negotiation process between the buyer (client) and seller (auditor), thus allowing competitive forces to have a greater impact on fee negotiations.

### Removal of Restrictions on Advertising Audit Services

The first deregulatory event of interest in this paper is the removal of restrictions on advertising. We will now assume that the market for audit services is competitive in the sense that there is more than one potential provider of audit services (e.g., sellers exceed buyers). In addition to the incumbent, the market also contains one or more potential competitor auditors (CA). We will assume that a competitor auditor can observe  $F$  and  $P_{IA}$ , from which they can infer  $Q_{IA}$  (and  $V$  given their understanding of the

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<sup>11</sup> This observation assumes that  $Q^*(P_{IA}-K)>0$ , otherwise the auditor will leave the market. Strictly speaking, the fee will be split between the auditor (i.e.,  $(P_{IA}-K) \times Q_{IA}$ ) and the factors of production for the audit (i.e.,  $K \times Q_{IA}$ ). The relationship between  $K$  and  $P_{IA}$  depends on the market for the factors of production, which is assumed to be exogenous to this analysis.

market conditions).<sup>12</sup> A competitor also knows its charge rate (defined as  $P_{CA}$ ).

However, due to market restrictions, a competitor has no mechanism for communicating  $P_{CA}$  to the client unless specifically asked to do so (i.e., through a request for proposal or bid solicitation). Furthermore, only the incumbent auditor can know  $Q^*$ , so a potential competitor would be unable to assess the extent of economic rents arising from the excess units of assurance ( $Q_{IA} - Q^*$ ) being supplied by the incumbent auditor. It is this excess that provides an opportunity for a competitor to underbid the incumbent, but in the face of significant information asymmetry this may not be reasonably determinable by the client or a potential competitor. These conditions represent the most restricted market for audit services, without either advertising or direct solicitation by competitors.

If restrictions on advertising are removed, the competitor auditor now has a mechanism for increased communication with a prospective client. Gramling and Stone (2001) point out that advertising is a potential market strategy available for accounting firms but has not been examined in much detail by researchers. Since advertising is a one-way communication, it is only possible for the competitor auditor to reveal what is unique to his knowledge base, namely,  $P_{CA}$ . Information held by the client or the incumbent is not shared so a significant source of information asymmetry continues to exist even though advertising restrictions have been eased. Specifically, the extent of excess units of assurance being supplied by the incumbent auditor is still unobservable/indeterminable to other parties. Consequently, the client and competitor auditor would not be able to accurately assess the extent of economic rent accruing to the incumbent and would be severely constrained in determining the extent of any potential

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<sup>12</sup> The inferability of  $V$  is not critical to the analysis since the incumbent's current audit fee establishes an effective maximum for any fee bids proffered by a competitor.

fee reduction.<sup>13</sup> Therefore, our first hypothesis is based on the perception that allowing advertising would not result in adequate reduction of information asymmetry to lead to significant fee concessions.

**Hypothesis 1:** Partial removal of information asymmetry through advertising will not lead to a reduction in audit fees.

### Relaxation of Solicitation Rules

Solicitation of clients is a qualitatively different behavior than advertising in that it facilitates two-way communication that can be instigated by a competitor auditor. The competitor can contact a prospective client to obtain information about the client's service needs and to provide information about the firm's service options and pricing. While the form of the communication can vary, it would be designed to encourage the client and competitor auditor to share information so that the competitor can make an informed assessment of  $Q^*$  based on his own professional experience. Whether or not the competitor shares this insight with the client, it provides a basis for estimating the economic rents available (i.e., the excess units of assurance being supplied by the incumbent auditor). The existence of such rents provides an opportunity for the client and a competitor auditor to negotiate a sharing of those rents that would be associated with a lower audit fee. Whether not the client actually changed auditors, these circumstances would create the potential for a cycle of bids and counter-bids among the contracting parties that could result in a significant decline in the client's audit fee. In the

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<sup>13</sup> The existence of transaction costs related to changing auditors, while not specifically addressed in this paper, would be relevant to assessing the potential for a switch in auditors. If changing auditors was not a viable option due to high transaction costs, there would be little opportunity to obtain fee concessions from the incumbent or competitor auditor. Advertising could affect transaction costs by making it easier for a client to identify alternative suppliers of audit services from which to solicit bids.

limit, the resulting fee would approach the reservation fee of the auditors competing for the engagement.<sup>14</sup>

Solicitation has been examined indirectly in a number of studies. Chaney *et al* (1997) found that auditor switching occurs more frequently in US regional markets (states) where solicitation is allowed. Hackenbrack *et al* (200) studied municipal audit markets in the US and found that fees were higher in states that restricted competition to non-price factors. Additionally, Maher *et al* (1992) documented a significant fee decrease in the US between 1977 and 1981, a period characterized by extensive investigation of the auditing profession by political and regulatory authorities, resulting in numerous changes to the auditing environment and market for audit services. It is during this period that the US profession repealed its rules against advertising and solicitation. However, due to the plethora of overlapping events, Maher *et al* could not identify the specific events that led to the fee declines. Following from the prior research and our discussion of information asymmetry, we specify our second hypothesis:

**Hypothesis 2:** Information sharing arising from relaxation of solicitation rules will lead a reduction in audit fees.

### Market Segmentation

Simunic (1980) pointed out that the degree of competition in the market for audit services may depend on the sub-market being analyzed. He specifically hypothesized that the extent of competition would depend on both the size of the audit firm and the size of the auditee. The most competitive market would be where there were many buyers and many sellers, that is, small firms doing audits for small clients. The least competition

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<sup>14</sup> Again, transaction costs would have an impact on whether an actual auditor change occurred and also suggests that the resulting fee arrangement would be marginally above the reservation fee (for more insight, see DeAngelo, 1981). Solicitation may be expected to affect relative transaction costs by shifting some of the cost of information search from the client to the competitor auditor.

would be observed where large firms were the most dominant, namely, the market for audits of large clients. This argument follows from the observation that a large auditee can only hire a large auditor (mainly due to independence and audit process issues) while a small auditee could hire either a small or large audit firm. A small auditee might favor hiring a large firm if there were perceived quality or cost advantages. Following this logic, we expect that the impact of advertising and solicitation may vary across market segments. *Ceteris paribus*, audit fees would be highest in the large auditor/large auditee market and lowest in the small auditor/small auditee market. Fees in the large auditor/small auditee market would fall between those extremes.<sup>15</sup>

Hypothesis 1 for advertising suggests that there would be no main effect on audit fees due to the deregulation of advertising. However, since advertising is essentially a fixed cost (relative to any specific engagement), large firms will have more resources to spend on advertising and a larger client base over which to amortize the cost. Therefore, larger accounting firms (BIG8) would be better able to use advertising to differentiate their services from other firms. Smaller firms would have fewer resources to devote to advertising, and would not have the same benefit from deregulation. Consequently, it could be expected that the deregulation of advertising would have the most impact on large audit firms. However, the impact may be different in the large and small auditee markets. In the large auditor/large auditee market, *all* large firms can afford to advertise which may work to marginally increase competition in that market, possibly leading to fee reductions. In the small auditee market, however, only large firms may be able to

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<sup>15</sup> An alternative possibility is that large auditors can win small engagements because economies of scale allow them to price small engagements lower than small firms can. For example, Ettredge and Greenberg (1990) observed that companies switching to industry leading audit firms receive larger fee discounts than those switching to other firms. However, Pearson and Trompeter (1994) report that clients can obtain lower fees when switching among market leaders but NOT when switching from a non-leader to a leader.

afford to advertise, allowing them to differentiate their services relative to small firms. This could possibly lead to an increase in audit fees in the large auditor/small auditee market. These observations suggest a possible interaction effect involving size of client and/or size of firm, leading to our next two hypotheses:

**Hypothesis 3A:** Removal of information asymmetry through advertising will lead to a decrease in audit fees for large clients of large auditors.

**Hypothesis 3B:** Removal of information asymmetry through advertising will lead to an increase in audit fees for small clients of large auditors.

Hypothesis 2 for direct solicitation, unlike advertising, is expected to have an across-the board affect on all market segments. However, since the small auditor/small auditee market is the most competitive, it can be expected that there will be less of a reduction in audit fees in that market when compared to markets in which the large firms dominate. That is, markets dominated by large firms are less competitive, have fees that are pushed toward the higher end of the feasible range (i.e.,  $V$ ), and have the most economic rent to give back to clients as information asymmetry that favors the auditor is removed from the market. This leads to our final hypothesis:

**Hypothesis 4:** Removal of information asymmetry through solicitation will lead to larger reductions in audit fees for clients of large auditors.

### **Research Method and Data**

New Zealand deregulated advertising by audit firms effective January 1, 1986 and allowed direct solicitation of potential audit clients effective January 1, 1992. In order to test whether these events had the predicted effect on actual fees, we estimated an audit fee model for each year for the period 1970 through 2001, and for the pooled data for the combined period, and tested whether significant changes in the nature of the models or the prediction residuals occurred at the time of deregulation or thereafter. Based on

previous studies and on the results reported in Hay and Knechel (2001), we specified the following prediction model including measures of size (assets), complexity (number of subsidiaries), inherent risk (inventory and receivables), leverage (level of liabilities), quality of audit firm (Big 8/6/5), profitability (loss) and a change in auditors:

$$\text{LNFEED} = \beta_0 + \beta_1\text{LNSIZE} + \beta_2\text{SQSUBS} + \beta_3\text{INVREC} + \beta_4\text{LTOA} + \beta_5\text{BIG8} + \beta_6\text{LOSS} + \beta_7\text{SWITCH} + \varepsilon$$

where the dependent variable LNFEED is the natural log of audit fees, standardized to June 2000 dollars using the Producers Price Index (compiled by the New Zealand government). The same model was estimated for each year in the sample and for all years pooled together. Independent variables are defined as:<sup>16</sup>

LNSIZE	Log of assets, standardized to June 2000 dollars using the Consumer Price Index for New Zealand.
SQSUBS	Square root of the number of subsidiaries.
INVREC	Ratio of inventory and receivables to total assets
LTOA	Ratio of liabilities to total assets.
BIG8	Dummy variable equal to one if the audit firm was a member of the Big 8/6/5 (depending on time period); zero otherwise.
LOSS	Dummy variable equal to one if the company reported a loss during a the year; zero otherwise.
SWITCH	Dummy variable equal to one if the company changed auditors during the year; zero otherwise.

We obtained audit fees for all publicly traded companies in New Zealand for the period 1970 through 2001. We also obtained basic financial information for each company from the University of Otago NZACCFIN data base, supplemented by review

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<sup>16</sup> We also tested the inclusion of return on assets, current ratio, number of subsidiaries and foreign assets relative to total assets without obtaining significantly different results.

of individual corporate reports and business directories. Descriptive statistics are presented for all variables in Table 1, correlations of variables included in the study are presented in Table 2, and average audit fees and fees/assets are plotted in Figure 1. Note that the audit fee and size variables in Table 1 are reported after deflating for price changes but prior to taking their natural log.

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Insert Tables 1 and 2, and Figure 1 about here  
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In general, we observe a general upward drift in fees (in June 2000 dollars) from 1970 through 1987, followed by a large jump in fees in 1988, and then a fall off after 1990. Of note for the purposes of this paper is the observation that average fees continued to increase after 1986 (deregulation of advertising) but declined after 1992 (deregulation of solicitation). These observations provide some initial evidence in support of our first two hypotheses.

The average size of listed companies increased steadily throughout the time frame before dropping off after 1992. The ratio of receivables and inventory to total assets is generally declining over the time period<sup>17</sup> while liabilities to total assets fluctuated in a relatively narrow range. Companies experiencing losses increased significantly after 1984, reaching peaks in 1990 (30%) and 2001 (31%). The incidence of auditor switches is generally low throughout the period with a high of 8% in 1987 and 1990. Finally, the market share of the Big 8/6/5 increased significantly in the early years, settling above

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<sup>17</sup> Manufacturing companies became a less important component of the population of listed companies over the 25 year time period with an increased presence of service and financial enterprises.

80% after 1980.<sup>18</sup> Another interesting observation is that the number of companies listed on the NZ exchange has varied widely over the years.<sup>19</sup>

## Results

### Annual Fee Models

We estimated a fee model for each year 1970 through 2001. We also estimated models combining data across all years. The coefficients from these models are reported in Table 3. All models are significant at  $p < .001$  with adjusted  $R^2$ 's ranging from .71 (2001) to .87 (1981). Significant coefficients are highlighted based on a one-tail test at a significance level of 5%.

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Insert Table 3 about here  
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The results by individual year indicate a high degree of stability in the independent variables included in the fee models over the 31-year period. Measures of size (LNSIZE), complexity (SQSUBS) and inherent risk (INVREC) are significant and positively associated with audit fees in every year of the analysis. The leverage variable (LTOA) is generally positive but significant in only 17 of the 31 years, and is consistently significant after 1990. The measure of audit quality is generally positive up until 1991, but significant in only 6 of 31 years, and is negative but insignificant in later years. The measure of profitability (LOSS) follows an interesting pattern, often being negative but insignificant in early years, but positive and significant in later years. Finally, it is

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<sup>18</sup> International accounting firms were not allowed to use their international names in New Zealand prior to 1983. Consequently, the Big 8 had affiliates operating under New Zealand names but recognized as part of the international Big 8 firm. Firth (1993) tested whether the relaxation of rules on use of firm names had an effect on audit fees in NZ and found a significant increase in fees in 1983. However, due to the nature of the pooled analysis used in that study, the effects of market changes are confounded with the passage of time (and omitted economic forces).

<sup>19</sup> Given the long time frame of the study, not every listed company is included in the sample due to problems with missing data.

surprising that auditor changes (SWITCH) were significantly related to audit fees in only two of the 25 years, 1979 (-.79) and 2000 (-.47).

The model for the pooled data is computed both using OLS and also with a Random Error Model (REM) that takes into account both the fixed effects (variables applicable to all observations) and random effects (of particular companies and years).<sup>20</sup> The results of both models are similar, and all independent variables are significant except SWITCH. Taken together, these results suggest that the drivers of audit fees have changed slowly over time, although still being dominated by size, complexity and inherent risk. In particular, there appears to be an increased sensitivity to risk associated with unprofitable and highly leveraged firms that may have contributed to the increase in fees in the latter part of the sample period.

#### Tests of Prediction Residuals Using Annual Fee Models

Using the annual fee models estimated in Table 3, we then calculated prediction residuals for each year other than the year on which the model is based. The residuals are computed by subtracting the model prediction from the actual fee for each year. For example, the 1970 model is used to predict fees one period ahead (1971), two periods ahead (1972), etc. We use the models to calculate residuals in comparison to periods before and after the year of the model, e.g., the 1982 model was used to predict fees in 1981 and before, as well as 1983 and afterwards. Prediction residuals for all periods are presented in Table 4. A negative residual implies an overestimate of the fee, a positive

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<sup>20</sup> The REM was estimated using the 'Mixed' procedure in SPSS. This procedure gives the same results as OLS when fixed but not random effects are specified, and gives an REM when random effects for company and year are included in the model. It is described in *Linear mixed-effects modeling in SPSS: An introduction to the Mixed procedure*, SPSS Technical Report, SPSS Inc 2002.

residual implies an underestimate of the fee. The prediction residual method is an extension of the method used by Menon and Williams (2001).

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Insert Figure 2 and Table 4 about here  
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Because we know the two key event years in which advertising and solicitation were deregulated, an indirect test of the impact on audit fees is to examine the prediction residuals for periods after (before) the event date that are computed from a model estimated using data before (after) the event date. If an event in a specific year were to cause a fee decline, look-ahead estimates based on the pre-event prediction models would generally have negative residuals, while look-back estimates from a post-event prediction model would generally have positive residuals. This pattern is illustrated in Figure 2. If the deregulation of advertising in 1986 had led to a significant reduction in audit fees, we should see significant negative residuals after 1986 for prediction models estimated prior to 1986 (indicating over-estimation of later audit fees) and positive residuals for look-back projections based on post-1986 prediction models (indicating under-estimation of earlier audit fees). Therefore, if Hypothesis 1 holds, we would expect to see insignificant residuals, or negative rearward projection and positive forward projection residuals. Similarly, support for Hypothesis 2 would appear as consistently negative residuals after 1992 and positive residuals before 1992, indicative of systematic overestimation of audit fees.

Prediction models prior to deregulation in 1985 (Table 4) yield look-ahead residuals that are generally significant and positive or close to zero, while look-back residuals are generally significant and negative or close to zero. That is, forward

predictions are consistently under-estimated and backward estimates are consistently over-estimated. This pattern is consistent with uniformly rising audit fees and is consistent with H1 since we do not observe negative residuals after 1986. However, the residuals reported in Table 4 are not necessarily consistent with H2 since we do not observe negative residuals after 1992 either.

The results for the estimation models for 1986 through 2001 reflect a more complex story. For prediction models from the period 1986 through 1991 (after the deregulation of advertising and before the deregulation of solicitation), the look-ahead residuals are not significantly negative until after 1994, suggesting no drop in fees due to deregulation of advertising. However, the residuals for these same prediction models are all significantly negative for predictions after 1994, a period where both forms of deregulation apply. This pattern suggests that advertising had no effect on fees but solicitation did, albeit, delayed until 1994.

This observation is further supported by looking at the residuals from the estimation models for 1992 through 2001. These models often have significant negative look-ahead residuals and significant positive look-back residuals—but only back to 1987. In effect, post-solicitation models underestimate fees from the advertising-only period between 1986 and 1992. Estimation models from 1993 and 1994 continue to overestimate future fee levels but this overestimation mostly disappears starting with the 1995 and later models. In short, this pattern of results supports H1 and H2, but the impact of H2 is not observed until 1994 and later.

### Analysis of Hypotheses Using Pooled Model

While the descriptive and prediction residual results suggest a pattern of fee changes consistent with our hypotheses, analysis of one-period prediction residuals may not reveal the true impact of the deregulation. The negotiation of audit service contracts and the impact of market deregulation are quite complex, and the length of the transition period for observing the impact of such changes could be relatively long. In order to more directly test whether audit fees were significantly affected by events in 1986 and 1992, we estimated a pooled model using data from the entire 31 years. We expanded our original estimation model by adding dummy variables for audits after 1986 (D86) and after 1992 (D92). The dummy variables were also crossed with all other independent variables to determine their interaction effect. This model was then estimated using the pooled data from 1970 through 2001 in a simple OLS model and using a panel data approach with REM. The full models and results are reported in Table 5.

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Insert Table 5 about here  
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In almost all cases, the results are the same – the one exception is the coefficient for D92, which is significant and positive in the OLS model (contrary to our prediction) but not significant in the REM. In this case, it is likely that OLS is overstating its significance. In both models, six of the eight original independent variables are significant at the 1% level with coefficients in the expected direction. Only LOSS and SWITCH are insignificant in the pooled model.<sup>21</sup> The dummy variable for 1986 (D86) is significant and positive at the 1% level in both models, suggesting an overall increase in

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<sup>21</sup> LOSS was significant in the pooled model reported in Table 3 but drops out when the dummy and interactive terms are added.

fees after the introduction of advertising, consistent with H1. The dummy variable for 1992 is weakly significant in OLS ( $p = .079$ ) but not in REM. The OLS results suggest an increase in fees was again after 1992, but this is not supported by the panel data analysis using REM.

Examination of the interaction terms indicates that deregulation may be more likely to effect market segments differently. The average audit fees deflated by total assets, classified by market segment and time period, are presented in Table 6. The descriptive results suggest that fees for the large auditor/large auditee market remained stable after deregulation of advertising (1986—1991), but the other three market segments saw fee increases in that period. In the period after deregulation of solicitation (1992-2001) we see that fees went down in the large auditor/large auditee segment but continued to rise in the other three segments.

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Insert Table 6 about here  
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We test the remaining hypotheses by reference to the interaction terms in Table 5. Note that in each case the pooled OLS and REM panel data results are consistent. We test H3A and H3B by considering the D86xLNSIZE and D86xBIG8 interactions in Table 5.<sup>22</sup> D86xLNSIZE is significant and negative, suggesting that large clients benefited from the deregulation of advertising. Since there are only 46 observations of small firms auditing large clients in the period 1986—1991, the significance of D86xLNSIZE is primarily driven by the large auditor/large auditee market. Consequently, this result is consistent with H3A—large clients are generally more sophisticated than small clients

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<sup>22</sup> H3A and H3B could also be jointly tested by including the three-way interaction D86xLNSIZExBIG8 in the model and then examining the related contrasts. When included, the three-way interaction term is not significant so it has been excluded from the model reported in Table 5.

and may be better able to use the information gleaned from advertising messages to obtain a more competitive fee arrangement with their auditors. Advertising may facilitate pitting large accounting firms against each other by large clients.

D86xBIG8 is not significant. However, since fees went down for large auditees of large firms, the lack of significance for D86xBIG8 suggests that there was an offsetting increase in fees in the large auditor/small auditee market. This is observed in Table 6, providing support for H3B.

The interaction of D86xLOSS is significant and positive while D86xLTOA is significant and negative. While not directly related to the hypotheses of interest in this paper, these results suggest that the auditors' sensitivity to certain risks has changed, becoming more sensitive to poor financial performance but less sensitive to financial position. The incidence of losses jumped dramatically starting in 1985, so it may not be surprising that the interaction based on a 1986 dummy variable indicates a significant increase in marginal fees when losses are present. Given a much higher rate of nonprofitable clients, auditors may have responded by marginally increasing fees for poorly performing audit clients.

Moving now to the period after deregulation of solicitation, we test H4 by examining the D92xBIG8 interaction. D92xBIG8 is significant and negative which supports H4, further evidenced by the descriptive results in Table 5 showing a drop in fees in only the large auditor/large auditee market segment. As expected, Big 8/6/5 would have the most to "lose" when clients are able to enter into more informed negotiations since they will have more economic rents to give up or share when being to forced to compete on a more level field with other firms.

Three other interaction terms related to 1992 are significant. D92xLTOA is positive, revealing an increased sensitivity to financial position that is counter to that observed after deregulating advertising, even though overall debt levels did not increase. D92xINVREC is also positive suggesting that auditors became more sensitive to the inherent risk associated with higher levels of inventory and receivable accruals. Finally, D92xSQSUBS is significant and negative, meaning that audit fees were decreasingly sensitive to the number of subsidiaries a client has. This result may be due to the fact that there was a change in the NZ securities law around that time which eliminated the requirement that all subsidiaries be subject to a separate audit report, i.e., only a consolidated audit report was needed after 1993.

### **Summary and Conclusions**

In this paper, we presented a simplified discussion of the impact of information asymmetry on the contracting and pricing of audit services. This discussion provided a conceptual basis for making predictions about how the market for audit services is likely to respond to changes in regulations affecting audit fees, namely, the removal of restrictions on advertising and the relaxation of rules against solicitation of clients. We hypothesized that advertising would not lead to a significant reduction in fees since removing restrictions on advertising alone would not reduce buyer/seller information asymmetries enough to affect contracting between the parties (H1). We also hypothesized that removing restrictions on direct solicitation of clients by auditors would have the effect of eliminating the most critical source of information asymmetry (i.e., the amount of audit effort required) between buyers and sellers and would lead to a uniformly lower level of audit fees (H2). Finally, we predicted that the two deregulation

events could have different effects in different market segments, with advertising leading to lower fees for larger clients (H3A) but higher fees for small clients of large firms (H3B), and direct solicitation leading to lower fees for clients of large r firms (H4).

We estimated audit fee models using data from publicly listed companies in New Zealand during the period 1970 through 2001. In general, we found that audit fees were uniformly increasing until 1993 and then decreasing through to 2001. Fee estimation models were relatively stable over the time period, except for the increasing impact of fiscal problems on audit fees. An analysis of residuals from the prediction models provided evidence that advertising did not lead to significantly lower fees (support for H1) but that solicitation did lead to lower fees (support for H2). Finally, using a pooled sample from all years and including dummy variables for the years of the deregulatory events being examined, we found that advertising led to a decrease in fees paid by large clients of large firms and an increase in fees paid by small clients. Solicitation led to a decrease in fees for clients of the Big 8/6/5. Taken together, we feel that these results provide support for H3A, H3B and H4.

A few limitations should be noted concerning the results we report. First, our hypotheses are based on a simplified analysis of contracting for audit services. Absent a complete analytical model, the hypotheses cannot be rigorously specified. Second, comparing audit fees across a 31-year period raises questions of changes in relative price levels. To the extent that deflation by the Producers Price Index (for fees) and the Consumers Price Index (for assets) does not adequately capture these changes, the results may be biased. Third, the impact of fee deregulation is complex and may not have an immediate effect due to the nature of long term and fixed fee audit contracts that are used

for many engagements. This would reduce the possibility that our tests would be powerful enough to detect the effect we are hypothesizing. Finally, there may be other events affecting the market for audit services in New Zealand that could have an impact on audit fees that we have not considered in our analysis.

Future research could address some of these limitations. Particularly important would be the development of a theoretical model that allows rigorous analysis of the role of information asymmetry in negotiating audit fees. Such a model would have to take into account the long-term nature of audit contracts, the potential for lowballing and the possibility that other types of events could also impact audit fees (e.g., issuance of new audit standards or major mergers among accounting firms). Further refinement of the data and statistical analysis could also be productive avenues of research. Future efforts will increase our insight into the contracting and pricing of audit services by shedding light onto the demand and market forces that can be integrated with our already extensive knowledge of the production characteristics of audit fees.

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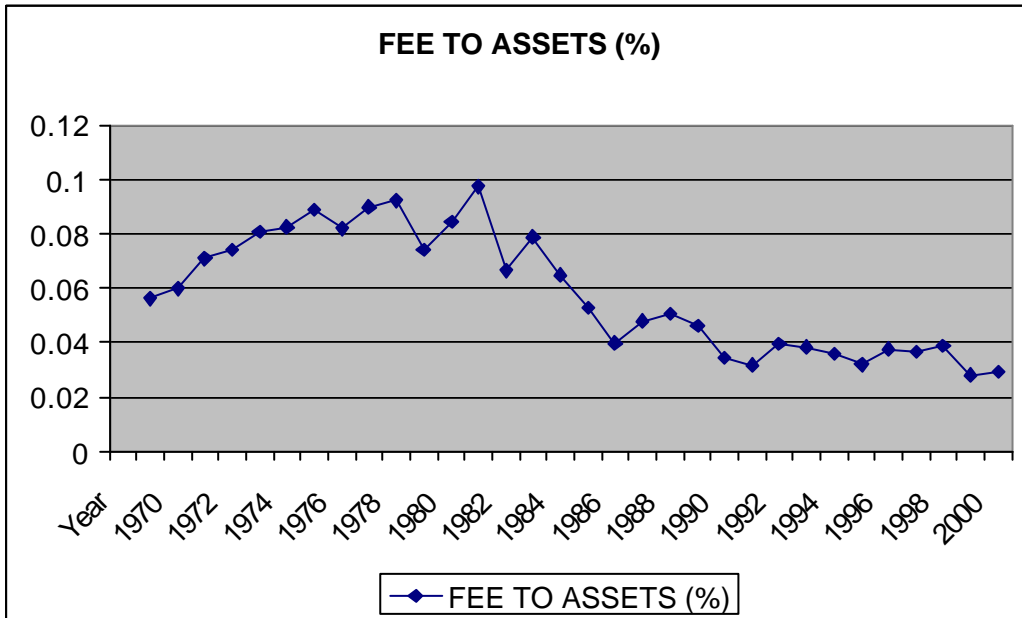
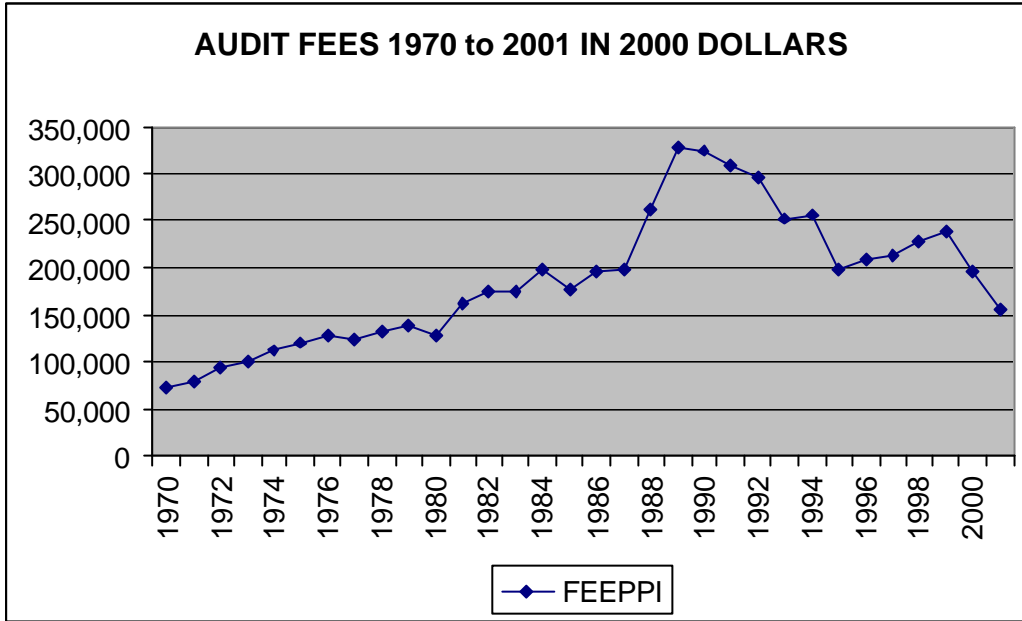
**Table 1**  
**Descriptive Statistics: Means**

Year	FEE	SIZE	SUBS	INVREC	LTOA	BIG8	LOSS	SWITCH	N
1970	73,454	130,683,649	5.61	0.47	0.45	0.16	0.04		113
1971	77,669	129,534,704	5.41	0.47	0.47	0.19	0.05		143
1972	93,609	131,741,849	6.15	0.45	0.46	0.28	0.05	0.01	182
1973	99,516	133,870,578	6.12	0.45	0.46	0.35	0.04	0.02	202
1974	111,508	138,002,834	6.60	0.47	0.49	0.36	0.06	0.02	206
1975	119,755	145,057,707	6.85	0.46	0.54	0.38	0.06	0.03	222
1976	128,268	144,151,528	6.74	0.46	0.50	0.53	0.04	0.01	228
1977	124,830	152,059,156	6.74	0.46	0.50	0.60	0.04	0.02	230
1978	133,393	148,430,204	6.75	0.45	0.48	0.62	0.06	0.01	236
1979	139,485	151,035,024	7.07	0.45	0.48	0.61	0.06	0.02	220
1980	128,851	173,506,859	6.91	0.47	0.52	0.72	0.04	0.02	213
1981	160,893	190,551,729	7.07	0.45	0.49	0.80	0.07	0.02	209
1982	174,762	179,191,962	7.51	0.48	0.49	0.81	0.05	0.02	189
1983	174,521	262,320,331	7.88	0.41	0.47	0.82	0.08	0.04	195
1984	197,924	251,078,627	8.33	0.36	0.46	0.82	0.08	0.03	188
1985	176,853	272,642,227	7.50	0.37	0.48	0.83	0.10	0.04	236
1986	195,984	370,570,711	6.31	0.32	0.49	0.86	0.16	0.05	227
1987	198,751	497,854,730	4.68	0.27	0.45	0.90	0.17	0.08	251
1988	262,326	546,601,479	5.27	0.26	0.47	0.90	0.28	0.06	200
1989	329,064	650,817,527	5.07	0.24	0.52	0.90	0.26	0.07	159
1990	326,183	705,981,565	5.33	0.29	0.53	0.87	0.30	0.08	130
1991	307,935	894,993,886	5.85	0.28	0.69	0.83	0.25	0.03	105
1992	296,397	932,770,274	5.24	0.25	0.45	0.82	0.23	0.06	101
1993	252,854	635,480,341	4.95	0.27	0.41	0.83	0.19	0.04	100
1994	257,013	667,409,364	4.62	0.28	0.55	0.86	0.15	0.06	106
1995	198,342	551,533,184	8.43	0.27	0.44	0.87	0.16	0.04	129
1996	208,323	649,384,327	14.43	0.25	0.39	0.84	0.15	0.05	115
1997	213,218	566,298,198	15.11	0.23	0.39	0.86	0.19	0.05	113
1998	227,524	619,274,584	15.67	0.22	0.42	0.87	0.22	0.03	115
1999	237,410	611,014,932	14.40	0.23	0.44	0.85	0.18	0.06	113
2000	196,536	697,252,629	9.10	0.21	0.44	0.87	0.21	0.07	108
2001	155,276	532,698,457	8.07	0.26	0.43	0.83	0.31	0.04	117
<b>Total</b>	<b>176,592</b>	<b>339,644,644</b>	<b>7.22</b>	<b>0.37</b>	<b>0.48</b>	<b>0.68</b>	<b>0.12</b>	<b>0.03</b>	<b>5401</b>

FEE = audit fee in June 2000 dollars, using the Producers Price Index; SIZE = assets in June 2000 dollars, using the Consumer Price Index; SUBS = number of subsidiaries; INVREC = inventory plus receivables divided by assets; LTOA = liabilities divided by assets; BIG8 = 1 for Big 8 auditor, 0 for other; LOSS = 1 for companies reporting a loss, 0 otherwise; SWITCH = 1 for companies changing auditors this year, 0 otherwise.

**Figure 1**

Plots of Audit Fees and Audit Fees to Total Assets



**Table 2**

Correlation Matrix for Variables in Regression Model

	LNFEF	LNSIZE	SQSUBS	INVREC	LTOA	BIG8	LOSS	SWITCH
LNFEF	1.000							
LNSIZE	.837	1.000						
SQSUBS	.630	.533	1.000					
INVREC	.178	-.035	.133	1.000				
LTOA	.132	.036	.064	.110	1.000			
BIG8	.202	.202	.028	-.130	.026	1.000		
LOSS	-.231	-.287	-.180	-.240	-.045	-.001	1.000	
SWITCH	-.001	-.006	-.030	-.045	.041	.042	.044	1.000

LNFEF = log of audit fee in June 2000 dollars, using the Producers Price Index (dependent variable)

LNSIZE = log of assets in June 2000 dollars, using the Consumer Price Index

SQSUBS = square root of number of subsidiaries

INVREC = inventory plus receivables divided by assets

LTOA = liabilities divided by assets

BIG8 = 1 for Big 8 auditor, 0 for other

LOSS = 1 for companies reporting a loss, 0 otherwise

SWITCH = 1 for companies changing auditors this year, 0 otherwise

**Table 3**  
 Audit Fee Regression Models: 1970—2001 (Dependent variable LNFEF)

Year	Constant	LNSIZE	SQSUBS	INVREC	LTOA	BIG8	LOSSSWITCH		N	Adj. R <sup>2</sup>
1970	-3.53	0.73	0.16	1.28	0.24	0.02	-0.30		113	0.82
1971	-2.11	0.67	0.17	0.97	-0.24	-0.06	0.32		143	0.80
1972	-1.17	0.60	0.24	0.83	0.31	0.06	-0.22	0.45	182	0.83
1973	-1.51	0.63	0.24	0.94	0.16	0.12	-0.35	0.27	202	0.83
1974	-1.29	0.62	0.21	0.74	0.25	0.10	-0.13	0.00	206	0.82
1975	-1.39	0.64	0.17	0.72	0.07	0.15	-0.04	0.21	222	0.83
1976	-1.29	0.63	0.20	0.92	0.30	0.08	-0.12	0.11	228	0.83
1977	-1.34	0.62	0.20	0.85	0.51	0.08	0.21	-0.08	230	0.83
1978	-1.17	0.62	0.19	0.86	0.63	0.07	-0.24	-0.02	236	0.83
1979	-0.66	0.60	0.22	0.72	0.22	0.08	-0.14	-0.58	220	0.84
1980	-1.28	0.62	0.21	0.95	0.24	0.08	0.09	0.12	213	0.85
1981	-1.72	0.64	0.23	1.10	0.33	0.13	-0.15	0.11	209	0.87
1982	-0.51	0.56	0.27	0.93	0.63	0.21	-0.04	-0.06	189	0.83
1983	-0.56	0.59	0.23	1.37	-0.02	-0.03	0.04	0.11	195	0.83
1984	0.49	0.51	0.29	1.28	0.26	0.02	-0.43	0.04	188	0.85
1985	0.08	0.53	0.26	1.40	0.12	0.17	0.20	-0.13	236	0.82
1986	-0.06	0.53	0.24	1.29	0.39	0.26	0.30	0.02	227	0.77
1987	-0.03	0.53	0.24	1.30	0.76	0.27	0.21	-0.17	251	0.79
1988	0.17	0.54	0.27	0.77	0.44	0.39	0.21	0.08	200	0.82
1989	-0.95	0.63	0.20	0.86	0.21	0.18	0.06	0.08	159	0.81
1990	0.90	0.52	0.32	0.87	0.20	0.01	0.34	0.04	130	0.82
1991	1.16	0.49	0.28	1.16	0.08	0.45	0.21	0.55	105	0.86
1992	0.54	0.54	0.26	0.86	0.81	-0.21	0.39	0.07	101	0.86
1993	1.31	0.50	0.30	0.56	0.82	-0.14	0.19	-0.12	100	0.85
1994	0.96	0.52	0.29	1.02	0.20	0.12	0.02	-0.48	106	0.80
1995	0.21	0.52	0.20	1.74	0.57	0.23	0.48	0.49	129	0.77
1996	0.50	0.52	0.13	1.79	0.68	0.00	0.18	0.30	115	0.81
1997	-0.11	0.56	0.10	2.05	0.63	-0.03	0.15	0.24	113	0.80
1998	0.66	0.52	0.10	1.96	0.72	-0.14	0.09	-0.25	115	0.79
1999	-0.17	0.57	0.11	1.64	0.73	-0.12	0.39	0.25	113	0.76
2000	0.74	0.51	0.14	1.84	0.61	-0.20	0.52	-0.47	108	0.72
2001	1.29	0.50	0.11	0.35	0.72	-0.14	0.34	-0.28	117	0.71
Pooled OLS	-0.75	0.59	0.19	1.04	0.22	0.22	0.30	0.07	5401	0.79
REM Panel Data	-0.74	0.59	0.19	1.07	0.24	0.23	0.31	0.06	5389	
Likelihood ratio test statistic										9213

Notes: Shaded cells indicate significance at  $<.05$  (1 tail test).

Observations were excluded from the REM if a change in company balance date had resulted in two observations for the same year.

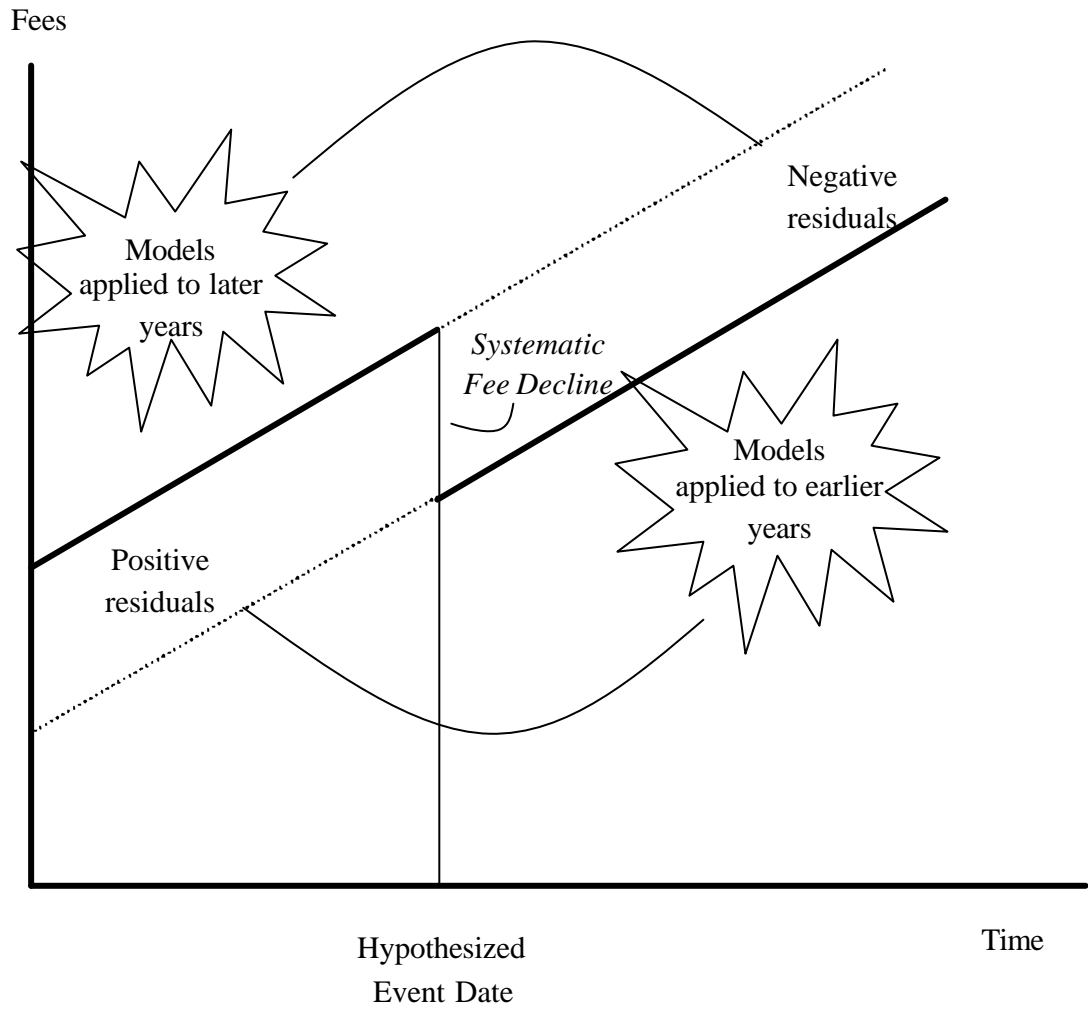
Likelihood ratio test statistic is the difference between the  $-2$  Restricted Log Likelihood for a model with an intercept only and the model as shown. It has a chi-squared distribution.

LNFEED = natural log of audit fee in June 2000 dollars, using the Producers Price Index; LNSIZE = natural log of assets in June 2000 dollars, using the Consumer Price Index; SQSUBS = number of subsidiaries; INVREC = inventory plus receivables divided by assets; LTOA = liabilities divided by assets; BIG8 = 1 for Big 8 auditor, 0 for other; LOSS = 1 for companies reporting a loss, 0 otherwise; SWITCH = 1 for companies changing auditors this year, 0 otherwise.

**Figure 2**

**Figure 2**

Analysis of Prediction Residuals Relative to Deregulation Events



Residual = Actual Fee – Predicted Fee

**Table 4: Mean Prediction Residuals (Fee minus predicted fee for each annual estimation model) 1970—2001**

← Year of Estimation Model →

Data Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	All
1970	0.00	-0.14	-0.20	-0.22	-0.30	-0.35	-0.41	-0.37	-0.48	-0.48	-0.40	-0.41	-0.38	-0.56	-0.52	-0.29	-0.34	-0.52	-0.53	-0.81	-0.94	-0.70	-1.06	-0.99	-0.92	-0.60	-0.79	-0.93	-1.01	-0.82	-0.88	-0.44	-0.38
1971	0.15	0.00	-0.05	-0.07	-0.16	-0.21	-0.27	-0.24	-0.35	-0.34	-0.26	-0.27	-0.25	-0.41	-0.37	-0.14	-0.21	-0.40	-0.40	-0.68	-0.80	-0.56	-0.93	-0.86	-0.78	-0.48	-0.66	-0.80	-0.88	-0.69	-0.75	-0.32	-0.25
1972	0.24	0.08	0.01	-0.02	-0.10	-0.16	-0.20	-0.17	-0.27	-0.27	-0.19	-0.21	-0.20	-0.33	-0.30	-0.09	-0.16	-0.34	-0.38	-0.62	-0.75	-0.56	-0.84	-0.78	-0.73	-0.42	-0.57	-0.69	-0.75	-0.58	-0.62	-0.23	-0.20
1973	0.26	0.12	0.02	-0.01	-0.09	-0.14	-0.18	-0.15	-0.26	-0.26	-0.17	-0.20	-0.19	-0.30	-0.28	-0.08	-0.15	-0.34	-0.39	-0.61	-0.72	-0.57	-0.80	-0.75	-0.71	-0.41	-0.54	-0.66	-0.72	-0.54	-0.58	-0.20	-0.19
1974	0.34	0.19	0.10	0.08	-0.01	-0.06	-0.11	-0.08	-0.18	-0.17	-0.10	-0.12	-0.12	-0.23	-0.21	-0.01	-0.09	-0.28	-0.32	-0.53	-0.66	-0.51	-0.74	-0.68	-0.64	-0.36	-0.49	-0.60	-0.66	-0.49	-0.53	-0.12	-0.12
1975	0.41	0.27	0.16	0.14	0.06	0.01	-0.04	-0.01	-0.11	-0.10	-0.03	-0.06	-0.06	-0.16	-0.14	0.06	-0.03	-0.22	-0.27	-0.47	-0.59	-0.46	-0.67	-0.61	-0.57	-0.31	-0.42	-0.54	-0.59	-0.42	-0.45	-0.04	-0.05
1976	0.47	0.35	0.21	0.18	0.10	0.05	0.01	0.03	-0.08	-0.07	0.01	-0.02	-0.04	-0.10	-0.10	0.08	-0.01	-0.21	-0.27	-0.44	-0.54	-0.46	-0.58	-0.55	-0.55	-0.26	-0.36	-0.46	-0.51	-0.33	-0.36	0.02	-0.02
1977	0.43	0.32	0.19	0.15	0.07	0.01	-0.02	0.00	-0.10	-0.10	-0.02	-0.05	-0.07	-0.12	-0.13	0.05	-0.05	-0.25	-0.31	-0.47	-0.55	-0.51	-0.58	-0.55	-0.57	-0.31	-0.39	-0.50	-0.54	-0.36	-0.39	0.02	-0.06
1978	0.55	0.42	0.28	0.25	0.17	0.11	0.08	0.10	0.00	0.00	0.08	0.05	0.02	-0.03	-0.03	0.13	0.04	-0.16	-0.23	-0.38	-0.47	-0.43	-0.49	-0.46	-0.48	-0.23	-0.29	-0.40	-0.44	-0.26	-0.29	0.10	0.03
1979	0.53	0.40	0.26	0.23	0.15	0.10	0.06	0.09	-0.01	-0.01	0.07	0.03	0.01	-0.04	-0.04	0.13	0.03	-0.16	-0.23	-0.39	-0.48	-0.44	-0.50	-0.47	-0.49	-0.23	-0.29	-0.39	-0.43	-0.26	-0.28	0.11	0.02
1980	0.47	0.36	0.20	0.16	0.09	0.03	0.00	0.03	-0.08	-0.07	0.00	-0.04	-0.07	-0.10	-0.11	0.04	-0.06	-0.26	-0.33	-0.46	-0.54	-0.55	-0.53	-0.51	-0.57	-0.33	-0.38	-0.48	-0.50	-0.32	-0.34	0.07	-0.06
1981	0.52	0.41	0.24	0.20	0.12	0.06	0.04	0.06	-0.04	-0.03	0.04	0.00	-0.04	-0.04	-0.05	0.09	-0.03	-0.22	-0.32	-0.43	-0.50	-0.53	-0.47	-0.45	-0.52	-0.28	-0.30	-0.40	-0.41	-0.25	-0.25	0.12	-0.03
1982	0.55	0.46	0.28	0.23	0.17	0.11	0.08	0.11	0.01	0.02	0.09	0.03	0.00	-0.01	-0.03	0.12	0.01	-0.19	-0.27	-0.38	-0.45	-0.49	-0.42	-0.40	-0.48	-0.25	-0.27	-0.37	-0.38	-0.21	-0.21	0.21	0.02
1983	0.56	0.43	0.26	0.22	0.15	0.07	0.07	0.10	0.00	0.01	0.07	0.03	-0.01	0.00	-0.01	0.14	0.02	-0.17	-0.30	-0.41	-0.48	-0.52	-0.43	-0.43	-0.48	-0.22	-0.22	-0.30	-0.30	-0.17	-0.15	0.17	0.00
1984	0.55	0.39	0.24	0.20	0.12	0.04	0.05	0.06	-0.01	-0.03	0.04	0.01	-0.02	-0.01	0.00	0.13	0.01	-0.17	-0.33	-0.44	-0.51	-0.53	-0.46	-0.46	-0.50	-0.20	-0.19	-0.26	-0.26	-0.16	-0.13	0.13	-0.03
1985	0.45	0.27	0.12	0.10	0.00	-0.08	-0.07	-0.06	-0.14	-0.14	-0.08	-0.10	-0.14	-0.12	-0.10	0.01	-0.12	-0.30	-0.46	-0.56	-0.63	-0.65	-0.59	-0.59	-0.61	-0.35	-0.33	-0.41	-0.41	-0.30	-0.28	-0.03	-0.16
1986	0.55	0.35	0.24	0.21	0.10	-0.01	0.03	0.02	-0.03	-0.03	0.02	0.02	-0.02	0.01	0.07	0.15	-0.01	-0.18	-0.36	-0.48	-0.50	-0.53	-0.48	-0.46	-0.47	-0.24	-0.22	-0.29	-0.28	-0.21	-0.15	0.03	-0.07
1987	0.69	0.46	0.38	0.36	0.23	0.09	0.16	0.16	0.11	0.13	0.15	0.17	0.15	0.18	0.27	0.33	0.16	0.01	-0.22	-0.35	-0.32	-0.38	-0.30	-0.27	-0.28	-0.07	-0.05	-0.12	-0.08	-0.06	0.05	0.14	0.05
1988	1.01	0.72	0.67	0.67	0.51	0.38	0.45	0.39	0.39	0.38	0.42	0.46	0.40	0.45	0.57	0.57	0.39	0.23	0.01	-0.08	-0.11	-0.13	-0.11	-0.08	-0.05	0.16	0.21	0.15	0.17	0.18	0.24	0.33	0.29
1989	1.11	0.84	0.75	0.76	0.59	0.47	0.53	0.48	0.46	0.47	0.51	0.55	0.47	0.56	0.65	0.67	0.48	0.31	0.09	0.01	-0.01	-0.04	-0.03	-0.01	0.05	0.24	0.28	0.23	0.25	0.25	0.34	0.38	0.39
1990	1.14	0.86	0.79	0.81	0.64	0.52	0.57	0.51	0.51	0.54	0.54	0.58	0.51	0.58	0.70	0.69	0.50	0.32	0.13	0.05	0.01	-0.02	-0.03	0.02	0.10	0.22	0.27	0.22	0.25	0.24	0.32	0.44	0.41
1991	1.05	0.89	0.72	0.75	0.57	0.49	0.49	0.40	0.36	0.43	0.48	0.50	0.37	0.56	0.60	0.65	0.43	0.17	0.05	0.00	-0.04	0.00	-0.18	-0.16	0.01	0.16	0.16	0.11	0.09	0.13	0.19	0.30	0.38
1992	1.08	0.80	0.76	0.75	0.60	0.46	0.54	0.50	0.48	0.47	0.51	0.56	0.51	0.54	0.65	0.68	0.52	0.36	0.14	0.02	0.00	0.00	0.00	0.03	0.06	0.29	0.30	0.25	0.26	0.28	0.35	0.42	0.41
1993	0.97	0.70	0.68	0.66	0.51	0.38	0.45	0.44	0.41	0.38	0.44	0.47	0.45	0.45	0.56	0.60	0.46	0.31	0.09	-0.06	-0.06	-0.06	-0.03	0.00	-0.02	0.25	0.26	0.19	0.20	0.24	0.30	0.41	0.34
1994	0.91	0.76	0.65	0.63	0.49	0.37	0.42	0.39	0.32	0.37	0.42	0.42	0.39	0.48	0.55	0.63	0.44	0.23	0.06	-0.08	-0.02	-0.05	-0.08	-0.04	0.00	0.20	0.18	0.11	0.13	0.16	0.27	0.36	0.33
1995	0.77	0.52	0.41	0.39	0.27	0.17	0.22	0.20	0.17	0.13	0.20	0.20	0.15	0.21	0.26	0.34	0.19	0.03	-0.21	-0.30	-0.36	-0.36	-0.30	-0.31	-0.31	0.02	0.08	0.03	0.04	0.07	0.12	0.24	0.12
1996	0.59	0.34	0.24	0.21	0.10	0.00	0.06	0.07	0.03	-0.03	0.04	0.04	0.02	0.04	0.11	0.20	0.08	-0.07	-0.34	-0.46	-0.52	-0.50	-0.42	-0.43	-0.46	-0.07	0.01	-0.05	-0.02	0.00	0.06	0.16	-0.02
1997	0.64	0.35	0.28	0.25	0.13	0.03	0.09	0.08	0.07	0.00	0.06	0.07	0.04	0.08	0.16	0.23	0.09	-0.04	-0.33	-0.44	-0.51	-0.48	-0.41	-0.42	-0.43	-0.05	0.05	0.00	0.03	0.03	0.09	0.18	0.00
1998	0.61	0.32	0.25	0.23	0.10	0.00	0.06	0.03	0.03	-0.05	0.03	0.04	-0.01	0.05	0.14	0.19	0.05	-0.10	-0.38	-0.47	-0.56	-0.50	-0.46	-0.48	-0.48	-0.08	0.03	-0.01	0.01	0.00	0.04	0.13	-0.04
1999	0.60	0.36	0.25	0.23	0.11	0.02	0.07	0.06	0.03	-0.01	0.05	0.05	0.01	0.08	0.15	0.23	0.08	-0.07	-0.34	-0.45	-0.51	-0.47	-0.44	-0.45	-0.43	-0.07	0.02	-0.03	0.00	-0.01	0.07	0.15	-0.01
2000	0.53	0.26	0.17	0.16	0.03	-0.08	-0.01	-0.04	-0.05	-0.08	-0.04	-0.03	-0.06	0.00	0.10	0.16	0.00	-0.15	-0.44	-0.54	-0.59	-0.56	-0.53	-0.53	-0.50	-0.16	-0.06	-0.11	-0.07	-0.10	-0.01	0.04	-0.11
2001	0.57	0.24	0.23	0.22	0.07	-0.04	0.02	-0.04	0.00	-0.06	-0.03	0.01	-0.04	-0.01	0.12	0.12	-0.04	-0.18	-0.42	-0.52	-0.61	-0.57	-0.56	-0.53	-0.51	-0.23	-0.13	-0.19	-0.16	-0.18	-0.14	0.00	-0.12
All	0.57	0.39	0.28	0.26	0.15	0.07	0.08	0.08	0.01	0.01	0.07	0.06	0.03	0.02	0.06	0.18	0.06	-0.12	-0.26	-0.40	-0.47	-0.43	-0.47	-0.45	-0.44	-0.18	-0.20	-0.29	-0.30	-0.20	-0.18	0.08	0.01

KEY: Gray shade/Black letters: Significant increase from earlier year to later year (p<.05, 2-tailed); Dark shade/white letters: Significant decrease from earlier year to later year (p<.05, 2-tailed)

**Table 5**

Pooled Regression Results to Test for Impact of Changes in 1986 and 1992

	OLS			REM		
	Coeff.	t	Sig.	Coeff.	t	Sig.
CONSTANT	-.900	-5.887	.000 ***	-.911	-5.469	.000 ***
LNSIZE	.592	64.010	.000 ***	.594	70.166	.000 ***
SQSUBS	.229	25.333	.000 ***	.228	27.578	.000 ***
INVREC	.974	20.269	.000 ***	.943	21.437	.000 ***
LTOA	.327	5.329	.000 ***	.317	5.597	.000 ***
BIG8	.174	7.660	.000 ***	.178	8.619	.000 ***
LOSS	-.058	-1.078	.281	-0.069	-1.398	.162
SWITCH	-.002	-.026	.980	.001	.176	.860
D86	.730	2.746	.006 ***	.852	3.054	.002 ***
D92	.549	1.759	.079 *	.430	1.268	.205
D86 x LNSIZE	-.026	-1.690	.091 *	-.032	-1.976	.048 **
D86 x SQSUBS	.011	.623	.533	.012	.636	.525
D86 x INVREC	.131	1.338	.181	.132	1.267	.205
D86 x LTOA	-.180	-2.730	.006 ***	-.179	-2.896	.004 ***
D86 x BIG8	.061	.963	.336	.067	.954	.340
D86 x LOSS	.357	4.874	.000 ***	.362	4.859	.000 ***
D86 x SWITCH	-.007	-.068	.946	-.008	-.709	.478
D92 x LNSIZE	-.023	-1.284	.199	-.019	-1.006	.315
D92 x SQSUBS	-.115	-6.394	.000 ***	-.117	-5.968	.000 ***
D92 x INVREC	.548	4.623	.000 ***	.601	4.652	.000 ***
D92 x LTOA	.204	4.951	.000 ***	.247	5.184	.000 ***
D92 x BIG8	-.267	-3.216	.001 ***	-.289	-3.216	.001 ***
D92 x LOSS	-.001	-.017	.987	-.002	-.028	.978
D92 x SWITCH	-.029	-.259	.796	-.007	-.564	.573
Number of observations	5401					
Adjusted R <sup>2</sup>	.807					
F-statistic	981.551		.000 ***			
Likelihood ratio test statistic				10120		.000 ***

- \* Significant at p<.1 (two-tailed test)  
\*\* Significant at p<.05 (two-tailed test)  
\*\*\* Significant at p<.01 (two-tailed test)

Likelihood ratio test statistic is the difference between the -2 Restricted Log Likelihood for a model with an intercept only and the model as shown. It has a chi-squared distribution.

LNFEED = log of audit fee in June 2000 dollars, using Producers Price Index (dependent variable); LNSIZE = log of assets in June 2000 dollars, using the Consumer Price Index; SQSUBS = square root of number of subsidiaries; INVREC = inventory plus receivables divided by assets; LTOA = liabilities divided by assets; BIG8 = 1 for Big 8 auditor, 0 for other; LOSS = 1 for companies reporting a loss, 0 otherwise; SWITCH = 1 for companies changing auditors this year, 0 otherwise; D86 = 1 for observations in 1986 or thereafter, 0 for earlier; D92 = 1 for observations in 1992 or thereafter, 0 for earlier.

**Table 6**

Mean Level of Fees to Assets by Market Segment  
(number of observations in brackets)

Market Segment		Time Period		
Auditor	Auditee	1970—1986	1986—1991	1992—2001
Large	Large	.0010 (988)	.0010 (508)	.0007 (646)
	Small	.0020 (875)	.0028 (458)	.0041 (313)
Small	Large	.0009 (545)	.0010 (46)	.0012 (31)
	Small	.0019 (825)	.0026 (85)	.0031 (135)

Note:

1. Large auditors are defined as members of the Big 8/6/5; otherwise they are considered small.
2. Large auditees are those that are above the median of total assets in a given year; small auditees are below the median in a given year.