

The Impact of Audit Firm Industry Specialization on Fees Charged to Firms Going Public

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Abstract

In this paper we present and test an applied theory of auditor industry specialization. We use our theory to investigate how audit firm industry market share affects fees in the market for IPO assurance services. Our theory suggests that as an audit firm's share of a client industry increases, (a) the audit firm's costs will decrease and (b) service and assurance quality in that industry will increase. Given lower costs and higher quality, the key fee determinant as market share increases is the bargaining power that exists between the audit firm and the client. We believe that an audit firm's industry market share is a reasonable proxy for the firm's ability to differentiate itself from competitors. We further believe that an audit firm's ability to differentiate its services drives its relative bargaining power. Specifically, if a given audit firm does not possess significantly greater industry market share than its competitors, economies of scale-based cost savings are more likely to be passed along to clients. However, if the audit firm dominates an industry it should earn higher fees as the incentives to pass along cost savings dissipate. Our results support these contentions.

Key words: *industry specialization, bargaining power, economies of scale, strategy*

Data Availability: *The data used in this study are available from public sources.*

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1. Introduction

In this paper we present an applied theory of audit firm industry specialization. Our theory hypothesizes that audit firms use industry specialization to differentiate themselves from their competitors. Similar to prior research we assume industry market shares are associated with industry specialization. We argue that an audit firm's market share within client industries potentially differentiates it from audit firms with lower market shares by providing two advantages. First, audit firms with large market shares are able to spread industry-specific training costs over more clients, producing economies of scale that are not easily duplicated by small market share firms. Second, large market share firms are able to develop more industry-specific knowledge and expertise, thereby enabling them to provide higher quality audit and assurance services than small market share firms.

Prior research has found little evidence of fee differentials for industry specialization in the U.S. market and mixed evidence in the Australian market. The lack of support for average fee differentials is not surprising. On one hand, the economies of scale achieved through market share gains should produce lower fees if the savings are passed along to the client. However, the higher audit quality provided by firms with higher industry market shares should enable the audit firms to earn higher fees from their clients. Absent a theory that explains which of these two effects is likely to dominate in a given audit scenario, the impact of increased industry market share on audit fees is ambiguous.

When we refine our basic theory to include the industry specialist's ability to differentiate itself from competitors through market share, we generate unambiguous predictions about the conditions under which the audit firm will earn fee premiums or offer fee discounts. Specifically, when the audit firm does not differentiate itself significantly from competitors, its bargaining power decreases because clients can obtain similar services from the auditor's competitors. Under these circumstances, the audit firm may be required to share its savings from economies of scale

with the client.¹ When the audit firm does differentiate itself significantly from competitors, however, it gains bargaining power and is able to demand a fee premium for its quality-differentiated services. These two scenarios form the basis for our empirical tests.

We test the predictions of our theory by examining accounting fees charged by audit firms to clients selling shares to the public for the first time between 1991 and 1997. We use fees charged in the IPO assurance market to test our theory because the data are available for a large number of firms and, in particular, because the IPO market generates a high level of competition among audit firms. This high level of competition enables us to conduct a powerful test of our theory. We define industry specialization in terms of the audit firm concentration levels in two-digit SIC codes based on both the proportion of square root assets and the number of firms audited (e.g., Hogan and Jeter 1999, Dunn and Mayhew 2001). This method enables us to capture the market share strategy that, we argue, enables audit firms to differentiate themselves from competitors. We estimate accounting fee models that employ control variables identified by previous IPO and audit fee research (e.g., Fargher, Fields and Wilkins 2000, Willenborg 1999, and Simunic 1980). We modify these models both to control for some additional pressures in the IPO market and to capture the dynamics that are likely to influence the bargaining power that exists between industry-specialized audit firms and their clients.

Our results indicate that as audit firm industry market share increases, the accounting fee charged for a given IPO decreases. This result is consistent with the existence of industry economies of scale. However, we also show that audit firms that possess significantly higher market shares than their competitors within an industry earn fee premiums, suggesting that they have successfully differentiated themselves in terms of the quality of the assurance services they provide. Similar to prior research, when we include market share alone without a measure of the differentiation in market share our results are not significant. This finding suggests that our

¹ The fact that the client obtains bargaining power does not mean that the audit firm's specialization strategy will be unprofitable. The audit firm still obtains lower marginal costs through increased market share. However, if the client possesses some bargaining power it is likely to demand a portion of the associated cost savings.

consideration of the ability of the audit firm to differentiate itself from competitors is important in understanding the impact of industry market share on assurance fees.

The remainder of the paper is organized as follows. We present our theory, evidence from prior research and our hypotheses in the next section. The third section describes our data and the fourth section presents our empirical method and results. The final section provides a brief discussion of our findings.

2. Theory, Prior Literature and Hypotheses

2.1 Applied Theory of Audit Firm Industry Specialization

In this section we outline an applied theory of audit firm industry specialization. The theory is based on the notion that audit firms differentiate themselves in order to maximize profitability. In this context, the goal of an audit firm is to identify ways to set itself apart from competitors in serving client needs. By differentiating on dimensions other than price the audit firm creates opportunities to earn economic rents. Our theory is an applied version of the more general theory of Chan et. al. (2001).²

To understand why audit firms form industry specializations, we start with the assumption that all audit clients are unique and that audit firms must adjust to client characteristics in order to meet client needs (Chan et. al. 2001). This assumption creates incentives for audit firms to develop specializations that meet client needs in ways that are not replicated easily by competing audit firms. Stated differently, audit firms differentiate themselves from competitors to better align their services with their clients' unique needs and, as a result, to earn rents on their specialization. Differentiation can take place on many dimensions of client characteristics and related service demands. These dimensions include size, number of segments,

² Our model is not equivalent to Chan et al. (2001), as their model is a formal analytical model with the associated restrictive assumptions. Our model is meant to inform our empirical tests and is inherently limited in operationalizing their restrictive assumptions.

industry membership, regulation, sources of capital, and management/audit personnel relationships.

Industry membership is an important dimension that audit firms can use to align themselves with specific client characteristics.³ Such specialization is particularly valuable because it allows the audit firm to use its differentiation strategy to service a relatively large group of clients possessing the same basic characteristics. Articles in the financial press suggest that the Big 6 accounting firms have put forth considerable effort in establishing industry specializations. For example, the Big 6 firms claim that they have reorganized along industry lines during the last decade to better serve their clients (Berton 1995). Further, empirical research documents that the Big 6 firms with the largest existing industry market shares have expanded their industry market shares over the last twenty years (Hogan and Jeter 1999). Thus, audit market share may act as a differentiation mechanism.

The key to a differentiation strategy is to develop a differentiated service that clients demand and that competitors find difficult to duplicate (Porter 1985). Prior research on audit firm industry specialization and audit fees assumes that audit firms make costly investments to become industry specialists. Implicit in this assumption is the notion that these costs prevent competitors from easily achieving comparable degrees of specialization. As a result, previous fee papers argue that the costly specialist investment requires a correspondingly high return, such that specialists should earn fee premiums over non-specialists (Craswell, Francis, and Taylor 1995, Ferguson and Stokes 2001). The empirical evidence associated with this assertion is mixed.

We allow that firms may make costly specialization investments. However, we suggest that industry market share is the most important differentiation mechanism. In this context, large market share specialist firms gain two distinct advantages over firms with smaller market shares. First, specialist firms supply client hours at a lower average cost than non-specialist firms because

³ In our empirical tests we also implicitly align on source of capital (public equity markets) and, to some degree, size (large). We essentially claim that Big 6 firms specialize in providing services to large publicly traded clients and then further specialize by industry within the large public company market.

they can spread their industry-specific training costs over more client hours. Second, specialist firms with significant industry market share are able to assign their staff exclusively to the target industry's clients. As a result, employees of a specialist firm develop, on average, more industry-specific knowledge and expertise than employees of the non-specialist firm. The development of specialized staff further enhances economies of scale by providing more efficient (as well as more effective) audits.

The cost savings from gaining industry market share are not obvious until one considers that audit standards require audit firms to train their staff to be knowledgeable of the industries they serve (AU section 311.07-08, AICPA 1997). Even audit firms that provide a very small number of client service hours to an industry must provide industry-specific training to the employees assigned to that industry. Obviously, an audit firm with a large industry market share is able to spread these training costs over more client hours.⁴ Based on our discussions with Big 6 audit partners it is not uncommon for audit firms with significant industry market shares to assign audit staff and partners exclusively to a particular industry. The more client hours supplied to an industry, the more degrees of freedom the audit firm has in making sure it can leverage its training costs by maximizing the time it assigns given employees to specific industries. There is also some evidence that audit firms that maximize the portion of employee time spent on a given industry benefit from increased employee efficiency (more production) and better client risk management.⁵

Increased market share also leads to greater quality of service supplied to the industry. That is, it seems reasonable to speculate that an audit employee spending more time in a particular industry is able to gain more knowledge of the industry and apply that knowledge more

⁴ Our discussions with auditors suggest that all of the large accounting firms have industry groups at the national and regional levels and that these groups participate in common training activities.

⁵ Taylor (2000) documents that industry specialist auditors assign lower inherent risk to clients in their industry of specialization than do non-industry specialists. The implication of this finding is that the specialist auditors would need to collect less evidence (i.e. be more efficient) than non-specialists auditors to achieve a given level of audit risk.

effectively than an auditor who spends less time in the industry. We assume that audit firms with a significant presence in a given industry are able to assign a greater percentage of their employees' time to that industry, thereby enabling their audit staff to become industry experts. Behavioral research on individual auditor decision making by Solomon, Shields and Whittington (1999), Owghoso, Messier, and Lynch (1998), and Taylor (2000) supports our claims that greater industry experience leads to more efficient and effective audit-related judgments.

It is also instructive to consider the possibility of industry specialization not associated with increased market share. An audit firm that pursues specialization without capturing or possessing a large market share is vulnerable to rivals on two accounts. First, it does not have the cost advantages that a firm with significant market share enjoys. That is, it has fewer hours over which to spread training costs than does a market share-based specialist. Second, it is not able to match the higher knowledge base of a market share industry specialist without incurring additional costs. At best, the non-market share specialist would have to invest in additional costly training to garner the same level of industry-specialized knowledge possessed by a market share-based specialist and accordingly would be at an even greater cost disadvantage. Thus, industry market share provides a reasonable way to measure the degree of differentiation that exists between audit firms, because the advantage of increased market share is difficult for competitors with less exposure to duplicate.

Finally, our theory about the impact of market shares on cost and quality does not depend on whether market share drives industry specialization or industry specialization drives market share. Our theory and our tests only depend on an association between industry specialization and industry market share. Empirically, the evidence provided by Hogan and Jeter (1999) – that audit firms with large industry market shares appear to have gained additional market penetration over the last twenty years – suggests that specialization leads to market share. But it also appears that firms gain market share through mergers and that the mergers are partially driven by the desire to gain market share in specific industries. In a high profile merger in the early 1990's, for

example, Ernst and Young purchased Kenneth Leventhol, the tenth largest public accounting firm and a highly respected specialist firm in the real estate industry.⁶ Ernst and Young stated that their motivation for the merger was to enhance their own real estate practice. Later in this paper we provide evidence that the PriceWaterhouseCoopers merger may also have been motivated in part by the desire of the combined firm to gain market leader positions in a large number of client industries.

In summary, our theory predicts that industry specialist audit firms with significant industry market shares possess economies of scale and therefore have lower costs than their lower market share rivals. However, because specialists provide higher quality services, the pricing issue becomes one of bargaining power between the audit firm and the client. The bargaining power of the audit firm vis-à-vis the client depends on whether there are close substitutes on the dimensions that the client values. If there are no close substitutes – that is, if the audit firm is clearly the industry leader and if market share, for the reasons highlighted above, is positively correlated with the auditor’s knowledge, expertise and service quality – the audit firm should be able to charge a premium for its services.

2.2 Related Studies of Industry Specialization

Recent studies have examined changes in audit firm industry market shares over time and have provided evidence of quality differences between industry-specialized audit firms and non-industry-specialized audit firms. Hogan and Jeter (1999) provide evidence of increases in industry market shares by industry market leaders over the last 20 years. Their work extends earlier work by Danos and Eichenseher (1982) that argues that audit firms seek to gain industry market shares to obtain economies of scale.

A number of recent papers have investigated whether the documented evidence of quality differentiation between Big 6 and non-Big 6 firms (e.g., Beatty 1989, Teoh and Wong 1993)

⁶ See Erickson, Mayhew and Felix (2000) for a discussion of Kenneth Leventhol’s role in preparing expert testimony before Congress on the Lincoln Savings and Loan failure.

extends further to differentiation between industry specialists within the Big 6 firms. All of these studies report results using industry market share measures similar to the one we use as a proxy for industry specialization. Consistent with our theory, the evidence from this research generally supports a quality difference between industry specialists and non-specialists. Dunn and Mayhew (2001) document a strong correlation between industry specialist audit firms and analyst disclosure quality ratings in unregulated industries.⁷ Gramling, Johnson, and Khurana (2000) show a positive association between industry specialization and the correlation between current net income and next period cash flow, suggesting that the net income audited by specialists is of higher quality. Similarly, Balsam, Krishnan and Yang (2000) find evidence that the earnings response coefficients of firms audited by industry specialists are higher than those of firms audited by non-specialists, suggesting that investors find specialists to be more credible. In sum, the evidence to date appears to support industry specialists as providers of higher quality audits.

Prior evidence with respect to industry specialization and audit fees is mixed.⁸ Palmrose (1986) and Pearson and Trompeter (1994) both document a lack of association between industry specialization and audit fees.⁹ In contrast, Ward, Elder, and Kattelus (1994) provide evidence of a fee premium for audit firm industry specialization in the municipal audit market. These studies utilize small samples taken from single industries (Pearson and Trompeter 1994, and Ward, et. al. 1994) or survey data from multiple industries (Palmrose 1986).

⁷ Dunn and Mayhew (2001) document no association between industry specialization and disclosure quality in regulated industries. They argue that the high level of standardization and external monitoring in regulated industries reduces the value added by a high quality audit firm because regulation provides another monitor (the regulator) and reduces the opportunity to provide value-added disclosure advice.

⁸ Cullinan (1998), Figure 1, provides an overview of the conflicting predictions on the impact of market share on fees when the bargaining power of the firm and client are not considered.

⁹ Pearson and Trompeter (1994) provide an excellent example of what we mean when we say that the specialist audit firm loses bargaining power when it does not differentiate itself from competitors. They look at audit fees charged by specialists in the insurance industry. Three audit firms audit the vast majority of the insurance industry and are considered specialists. However, all three firms have a similar share of the industry. As a result, they are unable to differentiate themselves from each other. Not surprisingly, the authors do not find a fee differential for the specialists.

The two tests of industry specialization and audit fees using Australian data find conflicting results. Craswell, et. al. (1995) document a fee premium based on industry specialization in the Australian audit market, but find that the premium only applies to the large client segment of the market.¹⁰ Ferguson and Stokes (2001) reassess Craswell et al.'s (1995) findings and fail to document a fee premium for industry specialization.

We believe that the bargaining power implications of our theory reconcile the differences between Craswell et. al. (1995) and Ferguson and Stokes (2001). The bargaining power between audit firms and clients in Australia changed between 1987 (Craswell et. al. 1995) and the 1990s (Ferguson and Stokes 2001) due to the consolidation of the Big 8 accounting firms into the Big 6 in 1989. The result of the consolidation was an increase in the number of firms considered to be industry specialists by the second study. Specifically, Ferguson and Stokes (2001) show an increase from an average of 2.2 specialists per industry in which a specialist exists in 1987 to 3.5 specialists per industry in 1990. We believe that the increase in the number of industry specialists resulted in an increase in competition among the specialist firms, thereby decreasing the specialists' bargaining power in negotiating fees. That is, the differentiation between auditors was reduced, giving clients more choice and, accordingly, more relative bargaining power. Therefore, Ferguson and Stokes' failure to find the fee premium previously documented by Craswell, et. al. (1995) may be due to changes in the competitive nature of the market.

2.3 IPO Accounting Fees and Similarities with Audit Fees

The IPO assurance market enables us to conduct a powerful test of our theory due to the high level of competition among audit firms in this market. At the time of the IPO, clients evaluate which audit firm is optimal in terms of price and value-added service (Hogan 1997). As the IPO firms consider their alternatives, even incumbent audit firms face pressure to provide

¹⁰ Table 6 in Craswell et. al. (1995) documents a lack of premium for specialization among the bottom half (in terms of size) of the firms in their sample. They argue that audit quality may not be as important from an agency cost perspective for smaller firms in their sample.

competitive fees and services. Prior research suggests a correlation between a change in capital structure (similar to the change caused by an IPO) and a change in audit firm (Johnson and Lys 1990, Shu 2000). The relatively high level of information asymmetry between management and investors at the time a firm goes public requires that the client also consider the credibility supplied by an audit firm (Simunic and Stein 1987). In support of the importance of credibility, Beatty (1989) finds that higher reputation audit firms add value to their clients by reducing underpricing. As a result, such firms earn higher assurance fees. Finally, our IPO sample facilitates a powerful test of our theory because audit fees of *established companies* may not reflect the same degree of competition due to the transaction costs involved in changing audit firms (DeAngelo 1981) and the lack of impending change in corporate structure.

To gain a better understanding of the types of fees included in the accounting fee disclosure we consulted professional literature on the topic. According to Coopers and Lybrand's *A Guide to Going Public* (1997), the accounting fees that IPO firms can be expected to pay to auditors (and that are disclosed in the registration statement):

“... will vary depending on such factors as the time the accountants must spend reviewing the registration statement, the level of requests from the underwriter for ‘comfort’, the need to review quarterly data, and whether there are significant accounting issues to be resolved. Fees for the (accompanying) audits of the financial statements will vary depending on the size of the company and the number of years audited.”

Given this characterization, we believe that the accounting expenses reported in an IPO filing are highly correlated with “audit fees”. Clearly, the review of quarterly data and the resolution of accounting issues would fall under the scope of audit procedures, as would the audit of the financials themselves. Furthermore, the “comfort” provided to the underwriters involves, in large part, information that is audit-related. Specifically, the comfort letters seek to assure the underwriters that the accountant is independent of the IPO firm, that the audited financials comply with the SEC's accounting requirements, that any unaudited information complies with GAAP, and that there have been no significant negative changes in operating performance after

the most recent unaudited information (that has already been verified to be consistent with GAAP).

Prior research also suggests that U.S. IPO audit fee data provide insights that are similar to those generated from non-IPO data. Beatty (1993) compares his sample of IPO audit fee data to Francis and Simon's (1987) sample collected via survey from non-IPO firms. The comparison of fee models using the different data sources suggests that inferences based on IPO data are very similar to inferences based on survey data from non-IPO firms. Beatty notes that the r-squares from models utilizing IPO fee data are lower than those from fee models based on non-IPO fee data. The lower r-squareds in an IPO context likely reflect the greater variation in audit effort needed to prepare different clients to go to market.¹¹

2.4 Hypotheses

Our primary hypotheses test for the main effect of audit firm industry specialization on accounting fees and for the incremental effect of market share dominance on accounting fees. In general our theory implies that as market share increases the audit firm's costs will decrease.¹² In cases where the audit firm is not able to distinguish itself significantly in market share from its competitors we expect audit firms to pass along these cost savings to clients. However, audit firms that have significantly higher market shares than their competitors may be able to earn higher fees than specialists who do not dominate their industry. We base this prediction on the argument that industry-leading audit firms provide a quality-differentiated product that their clients value highly. When the audit firm does not face competition at the same quality level (i.e.,

¹¹ Our fee information is based on the accounting fees reported in the prospectuses of IPOs, similar to Beatty (1993), Willenborg (1999) and Fargher, Fields and Wilkins (2000). Note that early studies on IPO fees used all miscellaneous fees, including non-accounting related fees (Beatty 1989).

¹² An ideal test of our theory would employ audit cost data from all of the major accounting firms providing services in the IPO assurance market. However, such data is not publicly available. We do not think the inability to use cost data is a significant limitation because prior research using cost data from a major firm suggests that the determinants of costs are very similar to the determinants of fees (O'Keefe, Simunic and Stein (1994) and Stein, Simunic and O'Keefe (1994)).

when it is dominant), it should be able to extract this value in the form of higher fees from its clients. These notions form the basis for H1 and H2:

H1: *Due to the existence of economies of scale, industry specialist audit firms earn lower absolute fees than non-industry specialist audit firms.*

H2: *Industry specialists who have significantly higher industry market shares than their competitors earn higher fees than industry specialists who do not dominate the industry.*

3. Sample and Descriptive Statistics

We used the Securities Data Company (SDC) *Worldwide New Issues* database to identify all initial public equity offerings brought to market between 1991 and 1997. We eliminated best-efforts underwritings, unit offerings, closed end mutual fund offerings, REIT offerings, and offerings associated with firms having missing data on either SDC or COMPUSTAT. We also eliminated offerings occurring in industries with ten or fewer COMPUSTAT observations, consistent with Hogan and Jeter (1999). After applying the methods of Belsley et al. (1980) to identify and eliminate excessively influential observations, our final sample includes 2445 offerings.¹³ Table 1 presents descriptive data for these firms.¹⁴

Panel A of Table 1 summarizes various firm-specific characteristics related to our sample of IPOs. Due to the presence of a few offerings made by very large firms (e.g., Lucent Technologies, Hartford Life, France Telecom), median values are more representative of the sample as a whole and thus will be the focus of our discussion. Median pre-IPO total assets for our sample are roughly \$26 million and the median IPO issue proceeds are \$32.5 million. The median fee earned by accounting firms – approximately 94% of which are Big 6 audit firms – is \$160,000. Based on all three metrics the issues we investigate are considerably larger than those examined by Willenborg (1999) and Lee et al. (2001). This finding is not surprising, however,

¹³ Our hypothesis tests are not influenced by the retention or removal of outlying observations. However, the model's explanatory power is lower if the influential data points are not removed.

¹⁴ Many previous researchers have excluded financial institutions from their analysis of initial public offerings. Our results are not sensitive to the inclusion or exclusion of such firms.

due to the former's emphasis on Development Stage Enterprises and the latter's focus on the Australian IPO market where issues are rather small.

Panel A of Table 1 also presents general information related to audit firm specialization. For the market specialization measure based on total assets, we use the method of Hogan and Jeter (1999). Specifically, we calculate each accounting firm's market share, per year, as the sum of the square root of assets of all firms it audited in a given two-digit SIC code divided by the sum of the square root of assets across all COMPUSTAT firms in the same two-digit SIC code.¹⁵

The following equation describes our measure:

- i = an index of audit firms
- j = an index of client firms
- k = an index of client industries
- I_k = number of audit firms in industry k
- J_{ik} = the number of clients served by audit firm i in industry k.

$$MS_{IK} = \frac{\sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}{\sum_{i=1}^{I_k} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}}$$

Our measure of industry specialization uses the square root of assets to proxy for the audit fees earned in an industry. Prior research suggests that the transformed assets are highly correlated with audit fees. Accordingly, the literature has adopted the use of transformed assets as a better measure of auditor industry concentration than an untransformed measure. For the sake of completeness, however, we also calculate a specialization measure based on volume – the number of firms audited in a given two-digit SIC code divided by the total number of COMPUSTAT firms in the same two-digit SIC code for that year. Both specialization measures produce similar results. The median square root asset share measure is 15.77% and the median volume share measure is 14.67%.

¹⁵ Hogan and Jeter (1999) sum the three largest market shares into a three firm industry concentration ratio for the purposes of their study. Our interest is in industry specialization by individual firms so we use the single firm measure.

Panel B of Table 1 presents median values for selected measures based on audit firm industry specialization. For this analysis we define an accounting firm as being a “specialist” if our market share measure is greater than 20% in the year of the IPO. Because our multivariate model incorporates a continuous measure of specialization the data in Panel B are presented purely for illustrative purposes. In general, it appears that industry specialists – all of which are Big 6 accounting firms – tend to be associated with large offerings made by large firms. Similarly, the issues handled by specialists appear to be less risky than the issues audited by non-specialists based on standard deviation of returns after the issue. Specialization also seems to be more prevalent in regulated industries, consistent with Hogan and Jeter (1999) and Danos and Eichenseher (1982). Finally, Panel B suggests that specialists charge higher fees than nonspecialists. Because this univariate finding likely is attributable to issue size, we examine the potential relationships in a multivariate setting in Section 4.

In Table 2 we present audit firm specialization data and industry-specific IPO data. Panel A shows the distribution of audit specialists over time. For each year between 1991 and 1997 we used the COMPUSTAT tapes to determine the number of times each Big 6 accounting firm had more than a 20% audit market share in any two-digit SIC code. During this time period, Arthur Andersen and Ernst and Young were specialists in more industries than any of the other firms and Coopers and Lybrand and Price Waterhouse had the smallest degree of specialization. We also find, consistent with Neal and Riley (2001), that the individual industries in which firms specialize remains relatively constant over time. The fact that the two firms with the least industry specialization merged just after the end of our sample period suggests that industry specialization may have been a motivating factor in the merger. If all observations for these two accounting firms were combined – effectively creating the PriceWaterhouseCoopers firm for our sample period – the combined firm would have the largest degree of industry specialization (an average of approximately 39 industries per year).

In Panel B of Table 2 we show the distribution of offerings for all industries having more than 50 IPOs between 1991 and 1997. The highest volume IPO industry is two-digit SIC code 73, with 442 issues during the sample period. Of these 442 issues, 236 come from the “prepackaged software” classification (SIC code 7372). The second highest volume industry is two-digit SIC 36, comprising semiconductors, electronic components, communications equipment, and the like. Five industries – two-digit SIC codes of 28, 35, 36, 38, and 73 – account for more than five percent of the total issues individually and over 44% of the total issues as a group. Because these are the industries that are likely to have the greatest growth potential, we control for them in our empirical analysis.

4. Empirical Method and Results

4.1 Empirical Method

Previous research suggests several determinants of the assurance fees that are associated with initial public offerings. The model presented in this study incorporates most of these measures, as well as new variables related to regulation, growth potential, and audit firm specialization. The form of our model is as follows:

$$\begin{aligned}
 ACCTFEE_j = & \gamma_1 + \gamma_2 ASSETS_j + \gamma_3 PROCEEDS_j + \gamma_4 INVREC_j + \gamma_5 DEBT_j + \gamma_6 STDRET_j + \\
 & \gamma_7 FOREIGN_j + \gamma_8 SEGMENTS_j + \gamma_9 BIG6_j + \gamma_{10} SEC20_j + \gamma_{11} LENDING_j + \\
 & \gamma_{12} REG_j + \sum_{j=13,19} \gamma_j YEAR_j + \gamma_{20} TOP5_j + \gamma_{21} SPECIALIST_j + \\
 & \gamma_{22} SPECIALIST*DOMINANT_j + \epsilon_j
 \end{aligned} \tag{1}$$

In equation (1), ACCTFEE is the log of the fees paid to the accounting firm associated with the IPO. Like Willenborg (1999) and Fargher, Fields and Wilkins (2000), we include the log of pre-IPO total assets (ASSETS) to proxy for the effort required in the audit engagement and the log of the issue size (PROCEEDS) to control for the implicit insurance coverage provided by the

audit firm. Both measures also provide a general control for the influence of firm size on fees. The next three variables serve as risk proxies. INVREC (DEBT) represents the firm's inventories and receivables (total liabilities) scaled by total assets in the year prior to the IPO, and STDRET, calculated as the one-year post-IPO standard deviation of common stock returns, is a proxy for the market's perception of IPO firm risk. If audit firms charge a premium for firms with greater levels of risk, the coefficients for these variables should be positive.

We include FOREIGN to control for the complexities associated with IPOs involving newly cross-listed companies (i.e., issues involving ADRs) and/or domestic firms with foreign subsidiaries. FOREIGN is equal to one for IPOs having either of these characteristics and is equal to zero otherwise. Similar to Willenborg (1999) and Fargher, Fields and Wilkins (2000) we expect the coefficient on FOREIGN to be positive. We also include the number of COMPUSTAT industry segments (SEGMENTS) as a further control for the complexity of the issue.

BIG6 captures the audit quality associated with Big 6 audit firms, as has been used in prior studies. It is equal to one (zero) if the accounting firm involved in the IPO is a Big 6 (non-Big 6) firm. Based on previous research, we expect the coefficient for BIG6 to be positive. We also include variables to capture the relationship between IPO assurance fees and commercial bank underwriting. SEC20 is equal to one if the underwriter is a commercial bank Section 20 subsidiary and zero otherwise, and LENDING is equal to one (zero) if the commercial bank underwriter had (did not have) a lending relationship with the IPO firm prior to the public offering. We expect the coefficient for SEC20 to be positive because commercial bank (i.e., less-experienced) underwriters are likely to require more assistance from audit firms in the IPO process. However, the coefficient for LENDING should be negative if the previous lending relationship mitigates the commercial bank underwriter's need for additional assistance (see Fargher, Fields and Wilkins 2000 for details).

We use REG as a control variable. REG is an indicator variable that is equal to one for all IPOs in "regulated" industries, as defined by Hogan and Jeter (1999) (i.e., two digit SIC codes 13,

29, 37, 40, 41, 42, 44, 45, 46, 48, 49, 60, 61, 62, 63, 64, and 67). Prior research has documented higher audit firm concentration levels in regulated industries and has argued that these levels are due to economies of scale (Hogan and Jeter 1999, Danos and Eichenseher 1982). Other studies suggest audit firm quality may be less important in regulated industries due to the regulatory monitoring function (Dunn and Mayhew 2001). Although we include REG purely for control purposes we expect its coefficient to be negative, reflecting the lower cost of audits in regulated industries with standardized reporting.

We include TOP5 as a control variable specifically to address fee issues in the IPO industry. TOP5 is an indicator variable that is equal to one for all IPOs in the industries comprising more than five percent of the IPO observations across the sample period (two digit SIC codes of 28, 35, 36, 38, and 73). Given that these five industries account for over 44% of the total offerings included in our sample, we believe that these are the areas offering the highest fee growth potential. In addition, we anticipate that accounting firms have gained considerable IPO-related experience in these industries. As a result, the marginal costs associated with these offerings should be lower, allowing audit firms to maintain profit margins while reducing the absolute level of their assurance fees. If either or both of these factors (growth potential and economies of scale) are important in IPO pricing, the coefficient should be negative.

Finally, we expect fees to exhibit general inflationary characteristics. We model these effects by including individual year dummy variables (YEAR) to control for time-specific factors occurring across the sample period. We omitted 1991 so that each YEAR coefficient from 1992 through 1997 represents the increase in assurance fees relative to the 1991 level.

The primary variables of interest for our study are SPECIALIST and SPECIALIST*DOMINANT. We use SPECIALIST, defined based on our square root of assets market share measure, to test H1. We include SPECIALIST*DOMINANT in equation (1) to test H2. DOMINANT is equal to 1 if the market share spread between the IPO firm's audit firm and the next highest-ranking audit firm in the IPO firm's two-digit industry during the IPO year is at

least ten percentage points, and is equal to zero otherwise. Practically speaking, the coefficient on SPECIALIST*DOMINANT measures the shift in the relationship between SPECIALIST and LOGFEE that is attributable to the accounting firm's presence as a dominant auditor in the industry.¹⁶ Because any measure of "dominance" could be viewed as subjective, we investigate alternative specifications of DOMINANT in Section 4.3.2.

Our expectations for SPECIALIST and SPECIALIST*DOMINANT are as follows. We predict that assurance fees will be significantly related to an accounting firm's degree of audit specialization in an industry. However, as suggested by H1 and H2, we do not expect a single relationship to hold across the entire range of specialization. For example, audit firms operating under significant, industry-related economies of scale may not have as much of an economic incentive to discount their fees if they are the dominant audit firm. Stated differently, because its market share allows it to offer a quality-differentiated product, a dominant audit firm should possess the bargaining power necessary to retain most if not all of the cost savings that exist due to economies of scale. As a result, while we expect the sign for SPECIALIST to be negative, we predict that the coefficient for SPECIALIST*DOMINANT will be positive (i.e., we expect an upward shift in the fee structure when industry dominance exists).

4.2 Initial Results

Table 3 reveals the same general fee-based relationships documented by Willenborg (1999) and Fargher, Fields and Wilkins (2000).¹⁷ Offerings that are larger, riskier, and more complicated result in higher assurance fees. A fee premium also exists when the IPO firm selects a Big 6 auditor and when the IPO is brought to market by a less-experienced (i.e., commercial bank) underwriter, provided that no previous lending relationship existed between the IPO firm

¹⁶ DOMINANT is not included as a single regressor in equation (1) because audit firms that are dominant are, by definition, specialists.

¹⁷ Although a number of the independent variables are correlated no Variance Inflation Factor exceeds 3. When we remove subsets of the most highly correlated independent variables our inferences regarding the remaining coefficients are unchanged.

and the commercial bank. Furthermore, fees are lower in regulated industries and in the most common IPO industries.

With respect to our hypotheses, the coefficient on SPECIALIST is negative and significant.¹⁸ This result supports H1 and suggests that industry specialist audit firms pass along to their clients a significant portion of the benefits attributable to economies of scale. These findings are also consistent with Johnson and Lys (1990) in that the IPO context may cause audit firms – even specialists – to provide their most competitive fee, given the pending change in both the client’s economic environment and its corporate governance structure.

The data also support H2. The coefficient on SPECIALIST*DOMINANT is positive and significant, suggesting that dominant specialist audit firms earn a fee premium relative to non-dominant specialists. Stated differently, dominant specialists (i.e., significant market share leaders) do not share the benefits of economies of scale with their clients to the same extent that non-dominant specialist audit firms do. The results also suggest that there must be some quality differentiation for dominant audit firms. If there were no quality differentiation, dominant audit firms would be forced to lower their prices to reflect the economies of scale.¹⁹

4.3 Additional Analyses and Sensitivity Tests

4.3.1 Audit Market Dominance

To provide some insight into the DOMINANT metric we investigated the individual cases where we define audit firms as “dominant.” Based on the specification presented in Table 3, 40% percent of the “dominant auditor” IPO observations are associated with Ernst and Young and 23% are associated with Arthur Andersen. These findings are not surprising, given that these

¹⁸ Our inferences regarding SPECIALIST as well as the other variables are unchanged when we use standard errors calculated using the method of White (1980). Furthermore, our conclusions are the same when we use the SPECIALIST metric based on the percentage of firms audited rather than percentage of log square root assets audited.

¹⁹ The alternative is that dominant firms do not achieve economies of scale. Such a conclusion would be difficult to believe given the apparent economies of scale evident for other specialists.

two firms are responsible for bringing the most IPOs to market. What is most interesting is that 75% of the Ernst and Young “dominant” observations occur in IPOs involving Health Services. Clearly, this is an area where Ernst and Young has significance presence, with an audit market share of 32% in 1991 increasing to 37% in 1997. The greatest IPO concentration for Andersen is in Lumber and Wood Products (5 of its 22 dominant issues) and Electric, Gas and Sanitary Services (6 of its 22 dominant issues).

Although the other audit firms were not the “dominant” auditor in the IPO firm industry as often, there are distinct concentrations within these observations. For example, 14 of the 15 issues for which Deloitte was the dominant auditor involved retail – four in General Merchandise, four in Food Stores or Eating and Drinking Places, and six in Apparel and Accessory Stores. Similarly, eight of the nine issues in which KPMG Peat Marwick was the dominant industry auditor involved financial institutions, and all four of the dominant issues associated with Price Waterhouse involved Educational Services.

In sum, while this information does not provide for a great deal of insight into how audit firms *become* industry specialists, it does illustrate that the IPO industries where dominance tends to be most heavily concentrated – e.g., health care organizations and financial services – require a good deal of very specialized knowledge. We maintain that an audit firm’s ability to distinguish itself as the leader in industries such as these should allow it to charge a relative premium for its services (as is evidenced by the significantly positive estimate for SPECIALIST*DOMINANT).

4.3.2 Alternative specifications for DOMINANT

As a less restrictive, alternative measure of audit firm dominance, we defined as DOMINANT any audit firm having a value of SPECIALIST (i.e., market share) in the top 5% of industry market shares across the entire sample period. Our findings with this model are virtually identical to the findings presented in Table 3. We also defined as DOMINANT any audit firm (1) having the largest market share in a given industry/year where the largest audit market share

exceeded 25% or, alternatively, (2) meeting the requirements of (1) and having a market share at least five percentage points greater than that of its closest audit competitor. Again, in both of these tests the results are directly comparable to those presented in Table 3.

As a additional sensitivity test, we also removed SPECIALIST and SPECIALIST*DOMINANT from equation (1) and replaced them with five indicator variables representing increasing levels of audit market share. The indicator variables are equal to 1 if the accounting firm audited between 5% and 10%, 10% and 15%, 15% and 20%, 20% and 25%, or greater than 25% market share variable during the IPO year, and are equal to zero otherwise. In this specification, each coefficient measures the audit fee increment relative to fees earned by accounting firms having less than a 5% share of the audit market. Our purpose with this model is to attempt to determine the point at which the relationship between audit fees and audit market share, as documented in Table 3, begins to change.

Our results indicate no significant fee effect between 5% and 10% market share, but significantly lower audit fees as industry specialization increases to 25%. The relationship reverses, however, beyond 25% market share. Specifically, the coefficient representing 25% and greater market share is less negative ($p < 0.07$) than the coefficient representing 20-25% market share, and is not different from the fixed 0-5% market share effect. These findings, which are perhaps even more informative than those presented in Table 3, illustrate that while economy of scale-based fee discounts increase as specialization increases, most, if not all, of the discount is recaptured when the audit firm dominates an industry.

4.3.3 Large versus Small Clients

In Table 4 we present the results of equation (1) estimated separately for firms comprising the bottom and top halves of the distribution of pre-IPO total assets. Craswell et. al. (1995) show that Australian audit specialists earn a fee premium but that the premium is attributable entirely to large clients. For our sample of U.S. initial public offerings we find

support for both H1 and H2 in both size segments. Specifically, SPECIALIST and SPECIALIST*DOMINANT are significant and appropriately signed in both models. Most of the remaining coefficients are comparable between small and large firms, although the explanatory power for the large firm model is lower and the variables related to risk appear to have a greater impact on fees.

4.3.4 Audit Firm Effects

To investigate the model's sensitivity to the inclusion of non-Big 6 audit firms, we re-estimated equation (1) with all offerings audited by non-Big 6 firms removed (and, obviously, with the BIG6 variable removed as well). The results are virtually identical to those presented in Table 3. Additionally, to ensure that no single, large accounting firm is responsible for our findings, we estimated equation (1) six times with each individual Big 6 audit firm removed. Our results are not materially affected by the inclusion or exclusion of any particular firm. Thus it appears that our findings are not driven by small audit firms nor by individual Big 6 firms. Finally, we estimated a reduced form of equation (1) for specialists only (defined as in Table 2 as audit firms having 20% market share or greater) to ensure that low market share audit firms were not unduly influencing our findings. In this model, like that presented in Table 3, assurance fees were found to be significantly higher when the audit firm was a dominant firm.

5. Discussion

In this paper we propose that audit firms attempt to develop industry specialization to differentiate themselves from competitors. We argue that an audit firm's industry market share provides a measure of the degree to which it has succeeded in differentiating itself from other audit firms. We find that, on average, industry specialist audit firms (measured by industry market share) pass along a significant portion of the economy of scale-based savings to their clients entering the IPO market. However, when audit firms dominate an industry they earn fees

that are significantly higher than non-dominant specialists. These findings suggest that audit firms with significantly higher market shares than their competitors have successfully differentiated themselves in terms of the quality of the assurance services they provide.

Our results provide insight into how the Big 6 accounting firms use industry specialization as a differentiation strategy. This insight may be helpful to regulators and to researchers interested in studying audit fees. Our analysis provides regulators with some insights into the costs and benefits of audit firms obtaining higher market shares within their clients' industries. It demonstrates that when audit firms are not able to differentiate themselves via market share, clients benefit through lower fees. However, market-leading audit firms are able to demand higher fees as compensation for their higher quality services. Our results also suggest that researchers need to consider the degree of differentiation between audit firms and the resulting impact on bargaining power between auditors and clients when conducting audit fee-based research.

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Table 1
Summary Statistics for 2445 Initial Public Offerings (1991-1997)

Panel A: Financial and Market Share Measures

	<u>Mean</u>	<u>Median</u>
IPO Firm Assets (\$ millions)	372.854	25.770
IPO Proceeds (\$ millions)	70.187	32.500
Leverage (Liabilities / Assets)	0.789	0.710
Inventory + Accounts Receivable / Assets	0.389	0.384
Post-IPO 1-year Standard Deviation of Returns	0.041	0.040
Accounting Fees (\$ millions)	0.237	0.160
Share of 2-digit SIC Audit Market (% square root assets)	16.24%	15.77%
Share of 2-digit SIC Audit Market (% volume)	15.05%	14.67%

*Panel B: Specialist vs. Non-Specialist Comparisons**

	Specialists (N=689)	Non-Specialists (N=1756)
Median IPO Firm Assets (\$ millions)	35.226**	22.513
Median IPO Proceeds (\$ millions)	36.000**	31.200
Median Leverage (Liabilities / Assets)	0.719	0.706
Median Inventory + Accounts Receivable / Assets	0.381	0.385
Median Post-IPO 1-year Standard Deviation of Returns	0.037**	0.041
Median Accounting Fees (\$ millions)	0.175**	0.150
% Big 6 Accounting Firms	100.00%**	91.40%
% in Regulated Industries	22.93%**	14.64%
% with International Exposure	32.08%**	27.39%

* In Panel B, an audit firm is defined as a “specialist” if it audited 20% or more of the COMPUSTAT two-digit square root assets (consistent with Hogan and Jeter 1999) in the IPO year. Similar findings obtain when we define specialization in terms of the proportion of total audits, the proportion of assets audited, and the proportion of log assets audited.

** indicates value for Specialists is significantly different ($p < 0.05$) from value for Non-Specialists

Regulated industries include two-digit SIC codes of 13, 29, 37, 40, 41, 42, 44, 45, 46, 48, 49, 60, 61, 62, 63, 64, or 67.

IPOs with “international exposure” refer to issues involving ADRs or issues involving firms with foreign subsidiaries.

Table 2**Audit firm Specialization Data and Industry IPO Data**

*Panel A: Number of COMPUSTAT two-digit industries (not restricted to IPO firms) in which accounting firm has $\geq 20\%$ of asset market share**

<u>Accounting Firm</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Arthur Andersen	22	19	21	19	20	24	25
Coopers and Lybrand	4	5	7	9	6	6	8
Ernst and Young	29	30	27	27	28	30	30
Deloitte and Touche	21	19	16	15	14	14	15
KPMG Peat Marwick	19	19	18	17	18	13	17
Price Waterhouse	10	10	10	9	9	10	12

Panel B: Industries having ≥ 50 initial public offerings between 1991 and 1997

<u>Two-Digit SIC Code</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>Total</u>
28	14	34	20	7	17	29	22	143
35	8	14	29	17	24	22	16	130
36	11	28	42	31	32	37	28	209
37	2	8	14	9	5	9	8	55
38	12	30	21	9	14	54	20	160
48	4	8	24	18	15	35	14	118
50	5	6	12	11	8	16	12	70
59	3	12	11	8	8	12	7	61
61	2	11	5	4	7	16	6	51
73	21	36	34	46	80	148	77	442
80	22	25	10	10	12	16	11	106
87	<u>7</u>	<u>5</u>	<u>8</u>	<u>9</u>	<u>11</u>	<u>19</u>	<u>14</u>	<u>73</u>
Total	111	217	230	179	233	413	235	1618
All Other Industries	<u>59</u>	<u>113</u>	<u>180</u>	<u>126</u>	<u>76</u>	<u>150</u>	<u>123</u>	<u>827</u>
Total Sample IPOs	170	330	410	305	309	563	358	2445

*We omitted all COMPUSTAT industries having fewer than ten observations in any given year, consistent with Hogan and Jeter (1999). There are an average of 61 two-digit industries per year that have more than ten observations. Each industry can have more than one auditor designated as a specialist (i.e. $>20\%$ market share).

Table 3

Results of Audit Fee Model for 2445 Initial Public Offerings between 1991 and 1997

$$ACCTFEE_j = \gamma_1 + \gamma_2 ASSETS_j + \gamma_3 PROCEEDS_j + \gamma_4 INVREC_j + \gamma_5 DEBT_j + \gamma_6 STDRET_j + \gamma_7 FOREIGN_j + \gamma_8 SEGMENTS_j + \gamma_9 BIG6_j + \gamma_{10} SEC20_j + \gamma_{11} LENDING_j + \gamma_{12} REG_j + \sum_{j=13,19} \gamma_j YEAR_j + \gamma_{20} TOP5_j + \gamma_{21} SPECIALIST_j + \gamma_{22} SPECIALIST * DOMINANT_j + \epsilon_j$$

<u>Coefficient</u>	<u>Predicted Sign</u>	<u>Estimate</u>	<u>p-value</u>
Intercept	+	10.410	0.001
ASSETS	+	0.039	0.001
PROCEEDS	+	0.271	0.001
INVREC	+	0.145	0.002
DEBT	+	0.047	0.003
STDRET	+	0.157	0.441
FOREIGN	+	0.146	0.001
SEGMENTS	+	0.021	0.231
BIG6	+	0.384	0.001
SEC20	+	0.138	0.013
LENDING	-	-0.219	0.051
REG	-	-0.098	0.005
YEAR92	+	0.024	0.344
YEAR93	+	0.067	0.122
YEAR94	+	0.203	0.001
YEAR95	+	0.153	0.005
YEAR96	+	0.247	0.001
YEAR97	+	0.391	0.001
TOP5	-	-0.094	0.001
SPECIALIST	-	-0.704	0.001
SPECIALIST*DOMINANT	+	0.738	0.001

Adjusted R-square **0.294**

Because directional predictions are made, p-values are one-tailed.
 ACCTFEE=log of fees paid to the accounting firm associated with the IPO.
 ASSETS = log of pre-IPO total assets
 PROCEEDS = log of IPO issue proceeds
 INVREC = inventory + accounts receivable / assets
 DEBT = total liabilities / total assets
 STDRET = 250-day post-IPO standard deviation of returns
 FOREIGN = 1 if ADR or foreign subsidiary present, =0 otherwise
 SEGMENTS = number of COMPUSTAT industry segments
 BIG6 = 1 if Big 6 audit firm, =0 otherwise
 SEC20 = 1 if commercial bank Section 20 underwriter, =0 otherwise
 LENDING = 1 if previous lending relationship existed, =0 otherwise
 REG = 1 if two-digit SIC code is 13, 29, 37, 40, 41, 42, 44, 45, 46, 48, 49, 60, 61, 62, 63, 64, or 67, = 0 otherwise
 YEAR92-97 = 1 if IPO is 1992-1997 (individually), = 0 otherwise
 TOP5 = 1 if industry accounts for > 5% of total sample IPOs (two-digit SIC of 28, 35, 36, 38, or 73), = 0 otherwise
 SPECIALIST = % of two-digit SIC COMPUSTAT square root of assets audited for the year
 DOMINANT = 1 if the market share spread between the IPO firm's audit firm and the next highest ranking audit firm in the IPO firm's two-digit industry is at least ten percentage points, = 0 otherwise.

Table 4

Audit Fee Model Sensitivity Tests

$$ACCTFEE_j = \gamma_1 + \gamma_2 ASSETS_j + \gamma_3 PROCEEDS_j + \gamma_4 INVREC_j + \gamma_5 DEBT_j + \gamma_6 STDRET_j + \gamma_7 FOREIGN_j + \gamma_8 SEGMENTS_j + \gamma_9 BIG6_j + \gamma_{10} SEC20_j + \gamma_{11} LENDING_j + \gamma_{12} REG_j + \sum_{j=13,19} \gamma_j YEAR_j + \gamma_{20} TOP5_j + \gamma_{21} SPECIALIST_j + \gamma_{22} SPECIALIST*DOMINANT_j + \epsilon_j$$

<u>Coefficient</u>	<u>Below-Median Asset IPO Firms</u>	<u>Above-Median Asset IPO Firms</u>
Intercept	10.259**	10.453**
ASSETS	0.070**	0.029*
PROCEEDS	0.327**	0.255**
INVREC	0.062	0.143**
DEBT	0.055**	0.151**
STDRET	-0.803	2.872*
FOREIGN	0.171**	0.160**
SEGMENTS	0.081	0.036
BIG6	0.399**	0.222**
SEC20	0.238**	0.061
LENDING	-0.576	-0.127
REG	-0.079	-0.087**
YEAR92	-0.031	0.068
YEAR93	-0.013	0.138**
YEAR94	0.170**	0.237**
YEAR95	0.090	0.205**
YEAR96	0.192**	0.287**
YEAR97	0.293**	0.454**
TOP5	-0.134**	-0.037
SPECIALIST	-0.869**	-0.552**
SPECIALIST*DOMINANT	1.481**	0.392*
Adjusted R-square	0.271	0.196

** (*) denotes significance at the 5% (10%) level

ACCTFEE=log of fees paid to the accounting firm associated with the IPO.

ASSETS = log of pre-IPO total assets

PROCEEDS = log of IPO issue proceeds

INVREC = inventory + accounts receivable / assets

DEBT = total liabilities / total assets

STDRET = 250-day post-IPO standard deviation of returns

FOREIGN = 1 if ADR or foreign subsidiary present, =0 otherwise

SEGMENTS = number of COMPUSTAT industry segments

BIG6 = 1 if Big 6 audit firm, =0 otherwise

SEC20 = 1 if commercial bank Section 20 underwriter, =0 otherwise

LENDING = 1 if previous lending relationship existed, =0 otherwise

REG = 1 if two-digit SIC code is 13, 29, 37, 40, 41, 42, 44, 45, 46, 48, 49, 60, 61, 62, 63, 64, or 67, = 0 otherwise

YEAR92-97 = 1 if IPO is 1992-1997 (individually), = 0 otherwise

TOP5 = 1 if industry accounts for > 5% of total sample IPOs (two-digit SIC of 28, 35, 36, 38, or 73), =0 otherwise

SPECIALIST = % of two-digit SIC COMPUSTAT square root of assets audited for the year

DOMINANT = 1 if the market share spread between the IPO firm's audit firm and the next highest ranking audit firm in the IPO firm's two-digit industry is at least ten percentage points, = 0 otherwise.