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Audit Firm Industry Specialization as a Differentiation Strategy: Evidence from Fees Charged to Firms Going Public

Brian W. Mayhew

Michael S. Wilkins
Trinity University, mike.wilkins@trinity.edu

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SUMMARY: This paper examines IPO audit fees to assess the use of industry specialization as a differentiation strategy by audit firms. We extend existing theory on the impact of industry specialization on audit fees by incorporating Porter's (1985) theory of competition and differentiation. We suggest that market share enables audit firms to gain competitive advantages in terms of cost and service. However, the impact of such advantages on fees depends on whether the audit firm has successfully differentiated itself from competitors within client industries. Our results indicate that as audit firm industry market share increases without a differentiation in market share, the audit fee charged for a given IPO decreases. In the context of Porter (1985), this result suggests that the client is able to bargain for a portion of the auditor's cost savings because the audit firm has not successfully differentiated itself from competitors. In contrast, we show that audit firms that possess significantly higher market shares than their industry competitors earn fee premiums, suggesting that audit firms that have successfully differentiated themselves retain a stronger bargaining position with their clients.

Keywords: industry specialization; economies of scale; strategy; audit fees; initial public offerings.

Data Availability: All data used in this study can be drawn from publicly available sources.

INTRODUCTION

This paper uses IPO audit fees to assess the use of industry specialization as a differentiation strategy among audit firms. Similar to prior research (e.g., Hogan and Jeter 1999) we assume that 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 distinct 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 services than small market share firms.

Brian W. Mayhew is an Assistant Professor at the University of Wisconsin–Madison, and Michael S. Wilkins is an Associate Professor at Texas A&M University.

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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 clients. However, if audit firms with higher industry market shares provide higher service quality, they should be able to charge a relative fee premium. These competing effects make it difficult to predict how audit fees will be related to industry specialization (Willenborg 2002).

We use Porter's (1985) analysis of competitive forces to explain how an industry specialist is able to differentiate itself from competitors through market share. By incorporating Porter's arguments into existing audit fee theory, we generate predictions about the conditions under which the audit firm will earn fee premiums or offer fee discounts. Specifically, when an audit firm obtains a significantly higher market share than its competitors—thereby differentiating itself—its bargaining power increases because clients cannot obtain similar quality services from competing audit firms. Under these circumstances, the audit firm may be able to earn a fee premium for its differentiated services. When the audit firm does not differentiate itself significantly from competitors, it loses bargaining power with the client; as a result, competitive pressures will require the audit firm to share its market share-driven cost savings with the client.[1] These two scenarios form the basis for our empirical tests.

We test our theory by examining 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 U.S. IPO audit market to test our theory because the data are available for a large number of U.S. firms across multiple years and because the IPO market generates a high level of competition among audit firms. (See also Hogan 1997; Willenborg 1999; Fargher et al. 2000.) This high level of competition enables us to conduct a powerful test of our theory. The use of U.S. data is also important because prior large sample industry specialization research relies solely on Australian data.

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 2002). We estimate audit fee models that employ control variables identified by recent IPO fee researchers (e.g., Fargher et al. 2000; Willenborg 1999). We modify these models 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 audit fee charged for a given IPO decreases. This result is consistent with the existence of industry-based economies of scale. However, we also show that industry-leading audit firms that possess significantly higher market shares than their competitors earn fee premiums, suggesting that they have successfully differentiated themselves in terms of the audit services they provide. Like previous researchers, when we include a single measure of industry market share without a measure of quality differentiation, we do not find that industry leadership produces a fee premium. This finding suggests that our consideration of the ability of the audit firm to differentiate itself from competitors is critical in understanding the impact of industry market share on audit 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 fifth section provides a series of sensitivity tests and the final section provides a brief discussion of our findings.

[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.

THEORY, PRIOR LITERATURE, AND HYPOTHESES

Applied Theory of Audit Firm Industry Specialization

In this section we outline an applied theory of audit firm industry specialization that builds on the ideas presented in Porter (1985). In Porter's context, the goal of an audit firm is to identify ways to set itself apart from competitors in serving client needs such that profitability is maximized. By differentiating on dimensions other than price, the audit firm creates opportunities to meet unique client demands and to earn economic rents.

Porter's Five Forces model describes five forces that determine the return on investment in an industry—potential entrants, substitutes, competitors, bargaining power of suppliers, and bargaining power of customers. Potential entrants and substitutes are not regarded as important issues for the market for public company audits because the SEC has given CPAs the exclusive right to perform public company audits. Furthermore, an audit firm's main supplier is its labor force. The most significant component of the labor force is the partners, who are residual claimants in the audit firm. As a result, we avoid significant discussion of the role of the suppliers in our analysis. The main "forces" relevant to an audit firm, therefore, are the bargaining power of the client and competition from other audit firms.

Why Do Auditors Specialize in Industries?

Porter's (1985) analysis suggests that audit firms have incentives to supply specialized services 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, industry membership, regulation, sources of capital, and management/audit personnel relationships (Chan et al. 2001).

We argue that client industry membership is an important dimension that audit firms can use to align themselves with specific client characteristics and service needs.[2] Industry 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 (now Big 4) accounting firms have put forth considerable effort in establishing client 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 market shares over the last 20 years (Hogan and Jeter 1999). We therefore argue that audit firm industry market share reflects efforts made by auditors to specialize according to client industries.

The Impact of Industry Specialization

We start with the assertion that industry specialization will increase the audit firm's market share in the target industry because clients demand the auditor's specialized services. (See also Palmrose 1986; Craswell et al. 1995; Ferguson and Stokes 2002.) The increase in market share produces two competitive advantages for the audit firm: (1) the auditor's cost of performing the audit decreases, and (2) the service value provided to the client increases. Porter (1985) notes that it is unusual to be able to differentiate based on a cost advantage and product differentiation, but that it is possible. We outline below how we believe both types of differentiation are related to the auditor's industry market share.

[2] 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 relatively large, publicly traded clients and then further specialize by industry within the large public company market.

The auditor's cost decreases for two distinct reasons. First, the audit firm develops personnel with industry-specific knowledge and expertise. Because these personnel are often assigned exclusively to the industry they serve, they become very adept at identifying and addressing industry-specific audit issues. As a result, the audit firm is able to perform more efficient audits.[3] (See Solomon et al. (1999), Owhoso et al. (2002), and Taylor (2000) for behavioral evidence consistent with this assertion.) Second, the auditor is able to spread industry-specific personnel training costs over more client hours. Basic industry training is required for all staff serving a particular industry (AU section 311.07-08, AICPA 1997) and the more clients or client hours the staff covers in that industry, the lower the training costs allocated to each client. The converse is also true, in that an auditor serving very few clients in an industry will be forced to allocate a higher portion of training costs to jobs in that industry.

An industry specialist audit firm also provides a differentiated service by providing a greater value proposition to its clients. To understand the value proposition, the audit must be viewed as a process and not simply as a standardized report. The process view reveals two factors that are often ignored. First, the audit itself requires the efforts of both the client and auditor. The effort put forth by the client should clearly be part of the client's cost-benefit analysis in selecting an auditor. An industry specialist auditor should reduce the effort required by the client in the audit process because the client will be required to spend much less time explaining industry-specific practices and industry trends to the auditor. In support of this view, a survey by Behn et al. (1997) suggests that industry specialization is a key determinant of client satisfaction. Second, the audit process does not simply produce the audit opinion; it also produces the audited financial statements. Research provides evidence that auditors have a substantial impact on the audited financial statements (Kinney and Martin 1994; Nelson et al. 2002). It is reasonable to speculate that an industry specialist auditor will have a positive incremental impact on the underlying financial statements relative to a nonspecialist auditor. Indeed, a number of studies provide evidence consistent with industry specialists (measured by industry market share) producing higher quality audits (Balsam et al. 2000; Gramling et al. 2000; Carcello and Nagy 2002). There is also evidence that industry specialists are a part of a client's overall disclosure strategy and are associated with higher analyst evaluations of disclosure quality (Dunn and Mayhew 2002). In total, these studies suggest that both clients and users may benefit when firms hire industry specialist auditors.

Limits to the Demand for Industry Specialists

The above discussion suggests significant advantages to clients who hire industry specialists. This begs the question: Why don't all clients hire industry specialists? First, industry specialization is not the only way in which auditors differentiate themselves from competitors and may not be the most important differentiation mechanism for every client. For example, we know that Big 5 (now Big 4) firms specialize in serving publicly traded clients as evidenced by the fact that they audit over 85 percent of public companies. Another example is client size. Small clients may prefer personalized relationships with an audit firm having a small client base, rather than with a firm that offers general industry specialization. This scenario often obtains in the banking industry. KPMG is the clear leader in financial services audits; however, approximately 30 percent of the banks investigated by Fields et al. (2002)—many of them smaller, publicly traded banks—use smaller, regional audit firms.

[3] Note that an audit firm's specialized staff cannot easily extract the profit created by their specialized skills, because their continued expertise depends on the experiences they gain from working a large number of hours in the same industry each year. If the specialized staff moved to a nonspecialist firm with fewer clients, it would be more difficult to maintain their specialized skills due to the reduction in industry contact time. Nonetheless, it would be very interesting to examine the salaries of specialized auditors within an audit firm and the rate at which specialists leave for other competing audit firms.

In other cases, the threat of information transfer to competitors may induce a client to avoid an auditor who audits its competitors. For example, when Ernst & Whinney and Arthur Young merged in 1989, the merged firm temporarily became the auditor of both Coca Cola and Pepsi. Both clients found this arrangement unacceptable. As a result, Pepsi hired a new auditor (Kwon 1996). In summary, industry specialization is not the only dimension important to clients. As a result, it is unlikely that a single audit firm will completely dominate an industry.

Hypotheses Based on Implications of Industry Specialization for Audit Fees

The previous sections explain why customers might demand industry specialized services and how industry market share creates a competitive advantage—lower costs and higher service quality—for an audit firm. Because these two factors impact audit fees in different directions, our analysis considers the interaction between competition and client bargaining power.

Our main insight into the fees charged by industry specialists is that fees will depend on the degree of differentiation from competitors. We argue above that market share provides a competitive advantage to an auditor; as a result, fees will depend on the degree of differentiation between audit firms. An audit firm that successfully differentiates itself will gain bargaining power with clients who demand the correspondingly higher quality services. Clients simply will not have an alternative of the same quality level. An audit firm that cannot separate itself from competitors will gain cost advantages as its market share increases, but clients will be able to bargain for a portion of the cost savings by threatening to utilize another audit firm with a similar market share. That is, auditors with similar market shares will have similar quality services and will be forced to share their cost benefits with clients due to price competition. Alternatively, when an audit firm is able to differentiate itself from competitors by enhancing its relative value proposition, it will be able to retain its cost savings and possibly charge a premium for its services.

Our hypotheses test for the direct effect of audit firm market share on IPO audit fees, and for the incremental effect of market share differentiation on fees. In general our theory implies that as market share increases the audit firm's costs will decrease.[4] In cases where the audit firm is not able to distinguish itself significantly 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 differentiate within their industry. These notions form the basis for H1 and H2:

H1: When there is no clear market leader, an audit firm earns lower fees as its industry market share increases.

H2: Audit firms that have significantly higher industry market shares than their competitors earn higher fees than other audit firms.

Relationship to Prior Studies of Industry Specialization

Two studies examine industry specialization and audit fees using large samples. Both use Australian data and appear to document conflicting results. Craswell et al. (1995) document a fee premium based on industry specialization in the 1987 Australian audit market, but find that the

[4] 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 et al. 1994; Stein et al. 1994).

premium only applies to the large client segment of the market.[5] Ferguson and Stokes (2002) reassess Craswell et al.'s (1995) findings and claim not to document a fee premium for industry specialization using 1990, 1992, 1994, and 1998 data.[6]

Our theory based on Porter (1985) reconciles the differences between Craswell et al. (1995) and Ferguson and Stokes (2002). The competition between audit firms and clients in Australia changed between 1987 (Craswell et al. 1995) and the 1990s (Ferguson and Stokes 2002) due to the consolidation of the Big 8 accounting firms into the Big 6 in 1989. The result of this consolidation was an increase in the number of firms considered to be industry specialists by the second study. Specifically, Ferguson and Stokes (2002) 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 using a 10 percent market share cutoff. 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 the value offered across auditors was reduced, giving clients more choice and, accordingly, more relative bargaining power. Therefore, Ferguson and Stokes' (2002) failure to find the fee premium previously documented by Craswell et al. (1985) may be due to changes in the competitive nature of the market.

Our paper examines fees using U.S. IPO data. We believe that while basic economic principles are unlikely to differ between the U.S. and Australian markets, the structure of the audit markets is notably different between the two countries, making generalizations from one market to the other tenuous. For example, the structure of the two markets differs with respect to auditing public clients. Non-Big 5 auditors audit 35–40 percent of publicly traded Australian companies whereas in the U.S. the non-Big 5 audit less than 15 percent of public companies. Furthermore, the average size (audit fee) of public clients in the U.S. audit market far exceeds that of the average Australian client. These differences imply a potentially different competitive landscape across the two countries.

Prior evidence with respect to industry specialization and U.S. audit fees in restricted samples is mixed.[7] Palmrose (1986) and Pearson and Trompeter (1994) both document a lack of association between industry specialization and audit fees. Pearson and Trompeter (1994) is particularly relevant to our study, given our argument that a specialist audit firm loses bargaining power when it does not differentiate itself from competitors. Pearson and Trompeter (1994) examine audit fees charged by specialists in the insurance industry. Three audit firms audit the vast majority of companies in the insurance industry and are considered specialists (during the time period they examine). However, all three audit firms have a similar share of the industry; as a result, they are unable to differentiate themselves from each other. That is, while they may supply services that are superior to those offered by lower market share auditors, they supply services that are similar to each other. Not surprisingly, the authors do not find a fee differential for the "specialists" and find some evidence of lower fees for clients switching among the undifferentiated high market share auditors.

[5] 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.

[6] Ferguson and Stokes (2002) do not find a premium for industry specialization using a 10 percent market share cut-off to define specialists. However, Willenborg (2002) notes that the use of the same cutoff as Craswell et al. (1995) who examine 1987 data (prior to the Big 8 merger into the Big 6) seems inappropriate. A 15 percent cutoff seems more reasonable, and in Table 5 of Ferguson and Stokes (2002) it appears that the 15 percent cutoff produces a significant premium in all four years examined.

[7] 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.

IPO Audit Fees

The IPO audit 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 competitive fees and services. Prior research (e.g., Johnson and Lys 1990; Shu 2000) suggests a correlation between a change in capital structure (similar to the change caused by an IPO) and a change in audit firm. 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 audit fees. Finally, the IPO setting 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 & 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 fall under the scope of audit procedures. 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 fees 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 (1993) notes that the R^2s from models utilizing IPO fee data are lower than those from fee models based on non-IPO fee data. The lower R^2s in an IPO context likely reflect the greater variation in audit effort needed in preparing a wide range of young firms for the public equity market.[8] We acknowledge that while IPO fees and audit fees appear similar based on prior research, our results may not generalize to audit fees charged to established companies.

[8] Our fee information is based on the accounting fees reported in the prospectuses of IPOs, similar to Beatty (1993), Willenborg (1999), and Fargher et al. (2000). Note that early studies involving IPO fees used all miscellaneous fees, including nonaccounting related fees (Beatty 1989).

SAMPLE AND DESCRIPTIVE STATISTICS

Sample Selection and Summary Data

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. Our initial sample of 3,602 observations includes firms having nonmissing SDC records for IPO accounting fees and IPO auditor and excludes, consistent with previous research, best-efforts underwritings, unit offerings, closed-end mutual fund offerings, and REIT offerings. We were unable to use 1,150 firms for which Compustat reported missing data for the variables in our regression analysis. We also eliminated offerings occurring in industries with ten or fewer Compustat observations, consistent with Hogan and Jeter (1999), and offerings handled by non-Big 6 firms, reducing our sample to 2,301 observations.[9] After applying the methods of Belsley et al. (1980) to identify and eliminate excessively influential observations, our final sample includes 2,294 offerings.[10]

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 $27 million and the median IPO issue proceeds are roughly $33 million. The median fee earned by accounting firms is $170,000. 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, 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.[11] The following equation describes our measure:

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

where:

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;
A_{iik} = total client assets for audit by auditor i of client j in industry k; and
MS_{ik} = market share of auditor i in industry k.

[9] First, our results are not sensitive to more restrictive cutoffs (20, 30, 40, or 50 firm industry minimums). We use the ten-firm cutoff to maximize the number of retained observations. Second, over 94 percent of the IPOs in our initial sample were audited by Big 6 firms. Consistent with previous research, we do find a fee premium associated with Big 6 auditors. However, because the relationship between fees and client-specific measures of risk and complexity may depend on audit quality (and because the small number of non-Big 6 auditors precludes effective modeling of such differences), our tests exclude issues handled by non-Big 6 auditors.

[10] 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.

[11] Hogan and Jeter (1999) sum the three largest market shares into a three-firm industry concentration ratio for the purposes of their study. Because we are investigating industry specialization by individual firms, we use a single-firm measure.

TABLE 1
Summary Statistics for 2,294 Initial Public Offerings (1991–1997) Audited by Big 6 Audit Firms

Panel A: Financial and Market Share Measures

	Mean	Median
IPO Firm Assets ($ millions)	391.769	26.800
IPO Proceeds ($ millions)	72.648	33.306
Inventory + Accounts Receivable/Assets	0.386	0.381
Debt (Liabilities/Assets)	0.789	0.710
Post-IPO 1-year Standard Deviation of Returns	0.041	0.039
Industry Segments	1.085	1.000
Accounting Fees ($ millions)	0.242	0.170
Share of Two-digit SIC Audit Market (% square root assets)	17.13%	15.97%
Share of Two-digit SIC Audit Market (% volume)	15.60%	15.00%

Panel B: Comparison of Characteristics of IPOs Audited by Specialist versus Nonspecialists[a]

	Specialists (n = 689)	Nonspecialists (n = 1,605)
Median IPO Firm Assets ($ millions)	35.226	23.902**
Median IPO Proceeds ($ millions)	36.000	32.500**
Median Debt (Liabilities/Assets)	0.719	0.699
Median Inventory + Accounts Receivable/Assets	0.381	0.381
Median Post-IPO 1-year Standard Deviation of Returns	0.037	0.041**
Median Accounting Fees ($ millions)	0.175	0.160
% with International Exposure[b]	32.08%	28.04%**

** Indicates value for Specialists is significantly different ($p < 0.05$) from value for Nonspecialists using a Wilcoxon Sign-Rank Test.

[a] In Panel B, an audit firm is defined as a "specialist" if it audited 20 percent 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.

[b] IPOs with "international exposure" refer to issues involving ADRs or issues involving firms with foreign subsidiaries.

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 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 15.97 percent and the median volume share measure is 15.00 percent.

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 industry market share measure is greater than 20 percent in the year of the IPO. However, it is important to note that Panel B is presented purely for illustrative purposes. Unlike prior industry specialization research that uses a market share cutoff to define specialists, our multivariate model incorporates a continuous market share measure because our theory suggests that fees are decreasing in market share unless differentiation exists. Panel B illustrates that industry specialists tend to be associated with large offerings made by large firms. The issues handled by specialists appear to be similar in risk to issues audited by nonspecialists. Each is comparably leveraged and has comparable inventory

and receivables as a percentage of total assets, but specialist-audited firms have lower returns variance after the issue. Finally, Panel B suggests that specialists, on average, do not earn fee premiums relative to nonspecialists. We examine this relationship more fully in our multivariate analysis.

Industry Specialization and IPO Statistics

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 firm had more than a 20 percent audit market share (again, based on percent square root of assets) in any two-digit SIC code. During this time period, Arthur Andersen and Ernst &Young were specialists in more industries than any of the other firms and Coopers & 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 remain relatively constant over time. Furthermore, the fact that the two firms with the least degree of 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 5 percent of the total issues individually and over 45 percent 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 explicitly in our empirical analysis.

Audit Firm Differentiation

In Table 3 we present a breakdown of audit firm differentiation by industry. For the purposes of both this table and our multivariate tests, we define an audit firm as "differentiated" if it had the highest audit market share in the industry (two-digit SIC) during the IPO year and if its market share was at least ten percentage points higher than the nearest audit competitor in that industry. Table 3 shows that only a few audit firms in our IPO sample are classified as "differentiated" in every sample year. However, it is not the case that audit firms drop in and out of this classification at random. In some cases, the audit firm is the industry leader in every sample year, but does not always have a 10 percent lead over its nearest competitor. Ernst & Young, for example, was the industry-leading audit firm in SIC 14 throughout the sample period. However, they were not classified as differentiated in 1997 because their decreasing market share only gave them a five-point lead over their nearest competitor. In other cases, the audit firm steadily gains both clients and market share over time until it is classified as differentiated. For example, Arthur Andersen only audited 5 percent of the market share in SIC 17 in the early 1990s, but increased its share to 35 percent (29 percent of the available clients) by the mid-1990s. As a result, it was the differentiated auditor for this industry for the last two years of our sample period.

Based on our specification, 40 percent of the differentiated auditor IPO observations are associated with Ernst & Young and 23 percent are associated with Arthur Andersen. These findings are not surprising, given that these two firms are responsible for bringing the most IPOs to market. What is

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 > = 20 percent of Square Root of Assets Market Share[a]

Accounting Firm	1991	1992	1993	1994	1995	1996	1997
Arthur Andersen	22	19	21	19	20	24	25
Coopers & Lybrand	4	5	7	9	6	6	8
Ernst & Young	29	30	27	27	28	30	30
Deloitte & 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

Two-Digit SIC Code	1991	1992	1993	1994	1995	1996	1997	Total
28 – Chemicals and Allied Products	13	32	20	6	17	26	21	135
35 – Industrial and Commercial Machinery	8	12	29	17	24	19	15	124
36 – Electrical Equipment	11	26	42	26	32	35	27	199
37 – Transportation Equipment	2	7	13	8	5	7	8	50
38 – Measuring/Photographic Equipment	11	29	21	9	14	54	19	157
48 – Communications	4	8	22	17	15	32	14	112
50 – Durable Goods: Wholesale	5	6	11	9	7	15	12	65
59 – Miscellaneous Retail	3	12	10	7	5	12	7	56
73 – Business Services	21	36	32	45	76	143	69	422
80 – Health Services	22	25	10	10	12	15	9	103
87 – Engineering/Accounting Services	7	5	7	8	10	18	14	69
Total	107	198	217	162	217	376	215	1492
All Other Industries	57	114	170	117	77	151	116	802
Total Sample IPOs	164	312	387	279	294	527	331	2294

[a] We omitted all Compustat industries having fewer than ten observations in any given year, consistent with Hogan and Jeter (1999). We tested more restrictive cutoffs for inclusion (20, 30, 40, and 50 firm minimums) with no impact on the significance of our treatment variables. 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 percent market share).

most interesting is that 75 percent of the differentiated Ernst & Young observations occur in IPOs involving Health Services. The greatest IPO concentration for Andersen is in Lumber and Wood Products (5 of its 22 differentiated issues) and Electric, Gas, and Sanitary Services (6 of its 22 differentiated issues). Although the remaining firms were not differentiated as frequently, there are distinct concentrations within these observations as well. For example, 14 of the 15 issues for which Deloitte & Touche was the differentiated 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 differentiated industry auditor involved financial institutions, and all four of the differentiated issues associated with Price Waterhouse involved Educational Services. In sum, while this information does not answer the question of how

TABLE 3
Audit Firm Differentiation among IPOs Occurring between 1991 and 1997

Audit Firm	Industry	SIC	# IPOs	Mean Audit Market Share[a]
Arthur Andersen	Electric, Gas and Sanitary Services[b]	49	6	0.354
	Lumber and Wood Products[b]	24	5	0.520
	Amusements, Recreation	79	4	0.436
	Hotels, Other Lodging Places	70	3	0.373
	Special Trade Construction	17	2	0.377
	Auto Dealers/Gas Stations	55	1	0.295
	Engineering/Accounting Services	87	1	0.272
Coopers & Lybrand	Communications	48	5	0.334
	Heavy Construction	16	1	0.351
	Tobacco Products	21	1	0.797
	Personal Services	72	1	0.382
Ernst & Young	Health Services[b]	80	30	0.342
	Textile Mill Products	22	4	0.359
	Mining, Quarry Nonmetal Minerals	14	2	0.496
	Transportation Services	47	2	0.457
	Motor Freight Warehouses	42	1	0.431
Deloitte & Touche	Apparel and Accessory Stores	56	6	0.321
	General Merchandise Stores	53	4	0.329
	Food Stores	54	2	0.345
	Eating and Drinking Places	58	2	0.341
	Security and Commodity Brokers	62	1	0.338
KPMG Peat Marwick	Nondepository Credit Institutions	61	7	0.330
	Depository Institutions	60	1	0.706
	Furniture and Fixtures	25	1	0.353
Price Waterhouse	Educational Services	82	4	0.414

"Differentiated" audit firms are audit firms having both the highest two-digit SIC audit market share (defined in terms of square root percent of assets) and a market share lead of at least ten percentage points over the closest audit competitor in the year of the IPO.

[a] Mean audit market share is calculated as the simple mean of the audit firm's two-digit SIC audit market share (based on Compustat) across all represented IPO years. For example, Ernst & Young was the differentiated auditor in 30 health services IPOs between 1991 and 1997. The mean audit market share of 0.342 reported above is the average Ernst & Young audit market share across all sample years, weighted by the proportion of its total health services IPOs occurring in each sample year. Ernst & Young's simple average health services audit market share across the sample period is 0.344.

[b] Identifies audit firms that are "differentiated" (as defined above) in the given industry in all seven sample years.

audit firms *become* industry specialists, it does illustrate that the IPO industries where differentiation 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 premium for its services.

EMPIRICAL METHOD AND RESULTS

Empirical Method

Previous research suggests several determinants of audit fees that are associated with initial public offerings. The model presented in this study builds directly from the model estimated by Fargher et al. (2000), adding new variables related to growth potential, auditor industry specialization, and the ability of an audit firm to differentiate itself from competitors.[12] The form of our model is as follows:

$$\begin{aligned} ACCTFEE_j = {} & \gamma_1 + \gamma_2\, ASSETS_j + \gamma_3\, PROCEEDS_j + \gamma_4\, INVREC_j + \gamma_5\, DEBT_j + \gamma_6 STDRET_j \\ & + \gamma_7\, FOREIGN_j + \gamma_8\, SEGMENTS_j + \gamma_9\, SEC20_j + \gamma_{10}\, LENDING_j \\ & + \gamma_{11}\text{–}\gamma_{16}\, YEAR_j + \gamma_{17}\, TOP5_j + \gamma_{18}\, AUDSHR_j + \gamma_{19} DIFFERENTIATED_j + \varepsilon_j. \end{aligned} \quad (1)$$

In Equation (1), *ACCTFEE* is the log of the fees paid to the accounting firm associated with the IPO. 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 (Willenborg 1999). 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.[13] If audit firms charge a premium for clients 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 (proxied by the presence of foreign income taxes). *FOREIGN* is equal to 1 for IPOs having either of these characteristics and is equal to 0 otherwise. Similar to Willenborg (1999) and Fargher et al. (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.

We include two variables aimed at capturing the relationship between IPO audit fees and commercial bank underwriting. (See Fargher et al. 2000 for details.) *SEC20* is equal to 1 if the underwriter is a commercial bank Section 20 subsidiary and 0 otherwise, and *LENDING* is equal to 1 (0) 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.

We include *TOP5* as a control variable to address fee issues that are present in high-growth IPO industries. *TOP5* is an indicator variable that identifies all IPOs in the industries comprising more than 5 percent of the IPO observations across the sample period (SIC codes of 28, 35, 36, 38, and 73—see Table 2 for details). Given that these five industries account for over 45 percent 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

[12] Our set of control variables is also directly comparable to those used by Beatty (1993) and Copley and Douthett (2002). The only differences involve the omission of a variable identifying firms with qualified audit opinions (this variable is insignificant in both previous studies), and our implementation of *FOREIGN* and *SEGMENTS*. We use a Compustat-based proxy for *FOREIGN* and we use *SEGMENTS*, rather than the number of subsidiaries, as a control for complexity. Our use of these measures, which are valid proxies for both constructs, is based on data availability.

[13] The use of *STDRET* as a risk factor assumes that auditors can estimate future equity risk before the IPO occurs. This assumption does not seem to be unreasonable, and is implicit in the use of this and comparable variables—e.g., market model residual variance and market model root mean square error—in other IPO studies (e.g., Copley and Douthett 2002; Fargher et al. 2000; Clarkson and Simunic 1994).

be lower, allowing audit firms to maintain profit margins while reducing the absolute level of their audit fees. If either or both of these factors (growth potential and/or IPO-related 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 sequential 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 audit fees relative to the 1991 level.[14]

The primary variables of interest for our study are *AUDSHR* and *DIFFERENTIATED*. We use *AUDSHR*, defined as the audit firm's percent square root of assets audited in the client's industry during the IPO year, to test H1. We include *DIFFERENTIATED* in Equation (1) to test H2. As discussed previously, *DIFFERENTIATED* is equal to 1 if the audit firm had the highest market share in the industry (two-digit SIC) during the IPO year and if its market share was at least ten percentage points higher than the nearest audit competitor in that industry. Practically speaking, the coefficient on *DIFFERENTIATED* measures the fee premium relative to nondifferentiated auditors that is attributable to the accounting firm being the clear market leader. Because any measure of "differentiation" could be viewed as subjective, we investigate alternative specifications of *DIFFERENTIATED* in our sensitivity tests.

We expect the following for *AUDSHR* and *DIFFERENTIATED*. We predict that audit fees will be significantly related to an accounting firm's market share in an industry. However, as suggested by H1 and H2, we do not expect a single relationship to hold across all ranges of industry specialization. For example, audit firms operating under significant, industry-related economies of scale may not have as much of an incentive to discount their fees if they have a clear lead over competing audit firms. Stated differently, because its market share allows it to offer a quality-differentiated product, a differentiated audit firm should possess the bargaining power necessary to charge more for its services. As a result, while we expect the sign for *AUDSHR* to be negative, we predict that the coefficient for *DIFFERENTIATED* will be positive (i.e., we expect a fee premium when differentiation exists).

Results

Table 4 reveals the same general fee-based relationships documented in prior research.[15] Offerings that are larger, riskier, and more complex result in higher audit fees. A fee premium also exists when a less experienced (i.e., commercial bank) underwriter brings the IPO to market. We find that fees are lower in the most common IPO industries, suggesting the presence either of economies of scale attributable to typical IPO-related duties or a discount afforded to firms in the highest-volume industries. Our adjusted R^2 of 0.263 is smaller than what typically is reported in research dealing with annual audit fees, but is directly comparable to values associated with other IPO fee models (e.g., Fargher et al. 2000; Willenborg 1999).

With respect to our hypotheses, the coefficient on *AUDSHR* is negative and significant.[16] This result supports H1 and suggests that as industry market share (i.e., specialization) increases, 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

[14] We also included a single, continuous measure of *YEAR* (taking values between 1991 and 1997) in Equation (1) and, alternatively, estimated the pooled model across two and three different subperiods. Our findings are not sensitive to any of these specifications.

[15] 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.

[16] Our model does not show evidence of significant heteroskedasticity. However, inferences regarding our test variables are unchanged when we use standard errors calculated using the method of White (1980).

TABLE 4
Results of Audit Fee Model for 2,294 Initial Public Offerings between 1991 and 1997

$$ACCTFEE_j = \gamma_1 + \gamma_2\, ASSETS_j + \gamma_3\, PROCEEDS_j + \gamma_4\, INVREC_j + \gamma_5\, DEBT_j + \gamma_6\, STDRET_j + \gamma_7\, FOREIGN_j + \gamma_8\, SEGMENTS_j + \gamma_9\, SEC20_j + \gamma_{10}\, LENDING_j + \gamma_{11}\text{–}\gamma_{16}\, YEAR_j + \gamma_{17}\, TOP5_j + \gamma_{18}\, AUDSHR_j + \gamma_{19}\, DIFFERENTIATED_j + \varepsilon_j$$

Coefficient	Predicted Sign	Estimate	p-value
Intercept	+	8.628	0.001
ASSETS	+	0.031	0.006
PROCEEDS	+	0.277	0.001
INVREC	+	0.163	0.001
DEBT	+	0.045	0.006
STDRET	+	0.498	0.327
FOREIGN	+	0.131	0.001
SEGMENTS	+	0.016	0.294
SEC20	+	0.127	0.023
LENDING	–	–0.152	0.133
YEAR92	+	0.012	0.424
YEAR93	+	0.064	0.140
YEAR94	+	0.212	0.001
YEAR95	+	0.158	0.005
YEAR96	+	0.241	0.001
YEAR97	+	0.392	0.001
TOP5	–	–0.079	0.004
AUDSHR	–	–0.616	0.003
DIFFERENTIATED	+	0.253	0.001
Adj. R^2		0.263	

Because directional predictions are made, p-values are one-tailed.

ACCTFEE = ln of fees paid to the accounting firm associated with the IPO;
ASSETS = ln of pre-IPO total assets;
PROCEEDS = ln 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;
SEC20 = 1 if commercial bank Section 20 underwriter, 0 otherwise;
LENDING = 1 if previous lending relationship existed, 0 otherwise;
YEAR92–97 = 1 if IPO is 1992–1997 (individually), 0 otherwise;
TOP5 = 1 if industry accounts for > 5 percent of total sample IPOs (two-digit SIC of 28, 35, 36, 38, or 73), 0 otherwise;
AUDSHR = percent of two-digit SIC Compustat square root of assets audited for the year; and
DIFFERENTIATED = 1 if the IPO firm's auditor has the largest audit market share in the IPO firm's two-digit industry during the IPO year and if the auditor has a market share lead of at least ten percentage points over its closest competitor, 0 otherwise.

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.[17]

The data also support H2. The coefficient on *DIFFERENTIATED* is positive and significant, suggesting that differentiated audit firms earn a fee premium relative to other audit firms.[18] Equation (1) is linear in logarithms, so the antilog of *DIFFERENTIATED*'s coefficient minus 1 represents the percentage effect of a differentiated auditor on audit fees (Willenborg 1999; Halverson and Palmquist 1980). The 0.253 coefficient for *DIFFERENTIATED* (natural log) translates into a 28.79 percent average premium for audit firms that successfully differentiate themselves from competitors.[19] This premium suggests that differentiated audit firms supply services and/or value to their clients that audit firms with lesser market shares in the same industry cannot readily supply. If there were no differences in the services offered in terms of quality or value, differentiated audit firms would be forced to lower their prices to reflect the economies of scale that they certainly possess.

ADDITIONAL ANALYSES AND SENSITIVITY TESTS

Alternative Specifications for Differentiation

As an alternative measure of differentiation, we defined as *DIFFERENTIATED* any audit firm having a 15 (as opposed to 10) percentage point lead over its closest audit competitor. We also defined as *DIFFERENTIATED* audit firms having an industry audit market share in the top 5 percent of industry audit market shares across all industry-years covered by our sample period (practically speaking, all auditors with greater than 30.4 percent industry market share). Finally, we defined as *DIFFERENTIATED* only those IPO observations in which the audit firm was the differentiated auditor in every sample year (i.e., those marked with asterisks in Table 3). Our findings with all of these alternative specifications are virtually identical to the findings presented in Table 4. That is, specialists that dominate their industries are able to charge a significant premium for their services.

We then tried three specifications that broaden the differentiation definition. Our purpose in this analysis is to illustrate that a specialist audit firm must be the clear industry leader in order to earn a fee premium. First, we defined as *DIFFERENTIATED* any industry-leading audit firm having a market share at least 7.5 percentage points (again, rather than 10 percentage points) greater than that of its closest audit competitor. With this specification the coefficient for *DIFFERENTIATED* remains positive, but is only marginally significant ($p < 0.09$). This finding suggests that the line dividing differentiated auditors from nondifferentiated auditors begins to blur below a 10 percent market share lead.

We then leveled the playing field further by decreasing the required market share lead to five percentage points and then, alternatively, defining as *DIFFERENTIATED* any audit firm simply

[17] Higher market share auditors tend to be involved with IPOs that have lower standard deviation in returns (see Table 1); as a result, it is possible that *AUDSHR* is capturing an omitted risk factor. However, our model captures a variety of other client-specific risk factors: firm size, balance sheet risk, and equity risk. Furthermore, standard deviation of returns is insignificant in the fee model suggesting that it does not play an important role in fees.

[18] Relative to a model that does not include *AUDSHR* and *DIFFERENTIATED*, the joint inclusion of these two variables offers a significant improvement ($p < 0.01$) in the model's explanatory power. Also, when we define *AUDSHR* as a binary variable identifying observations where the audit firm had a market share of at least 20 percent during the IPO year, our results are qualitatively unchanged—*AUDHSR* remains negative and significant and *DIFFERENTIATED* remains positive and significant.

[19] For example, if we ignore the effect of the *YEAR* variable, the *TOP5* variable and the variables dealing with Section 20 underwriting, a non-*DIFFERENTIATED* firm having the median value of all other independent variables would have a predicted IPO accounting fee of $141,604. If the same client hired a *DIFFERENTIATED* audit firm, its predicted IPO accounting fee would be $182,366. Note that this assumes the same level of market share when comparing a *DIFFERENTIATED* audit firm to a non-*DIFFERENTIATED* audit firm. Some of the premium would be offset by the impact of the increased market share when moving to the *DIFFERENTIATED* position. For example: a firm that moved from 20 percent to 30 percent market share and became a *DIFFERENTIATED* audit firm would have the premium offset by 10 percent * .616 = .0616 or about 6.3 percent.

having the highest market share in its industry (irrespective of competitors, as in Ferguson and Stokes [2002]). With both of these specifications the coefficient for *DIFFERENTIATED* is insignificant. These findings suggest that an audit firm's market share lead relative to its competitors is extremely important in determining its relative bargaining power. Stated differently, a "small" market share lead does not equate to significant perceived differentiation; as a result, it is less likely that fee premiums can be earned.

Large versus Small Clients

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 estimate separate models for small (below median assets) and large (above median assets) clients and find general support for H1 and H2 in both size segments. Specifically, *AUDSHR* and *DIFFERENTIATED* are appropriately signed in both models. Furthermore, the p-values are very similar to those presented in Table 4, with the exception of *DIFFERENTIATED* in the large firm segment ($p < 0.12$). Coefficients for the measures of balance sheet risk and complexity are significant in both models.

The weaker results for *DIFFERENTIATED* in the large firm segment may be related to model specification issues. Of the 50 financial institution IPOs in the complete sample, 47 involve large clients. When these observations are excluded from the analysis (a practice relatively common in the fee literature) the coefficients for *AUDSHR* and *DIFFERENTIATED* in the large client model are directly comparable to those in the small firm model ($p < 0.03$ in all cases).[20] We retain financial institutions in the overall model because their inclusion or exclusion does not affect our results. An alternative explanation is that the weaker finding for *DIFFERENTIATED* among large clients may indicate that large clients have more bargaining power with auditors than do small clients.

Industry Effects

Table 3 shows that the health services industry makes up approximately 30 percent of the differentiated observations. To ensure that *DIFFERENTIATED* is not simply capturing a fee premium attributable to a particular industry in which a number of nonstandard audit issues likely exist, we included an additional indicator variable (*HEALTH*) defining firms in this industry. Although the coefficient for *HEALTH* is positive and significant ($p < 0.02$), the coefficients for both *AUDSHR* and *DIFFERENTIATED* remain significant as well ($p < 0.01$). Similar findings obtain when we include an indicator variable defining financial institutions; that is, the relationship between fees and both audit market share and differentiation remain statistically significant after accounting for the fixed effects of these highly specialized industries.

As a more general control for industry effects, we removed *TOP5* from Equation (1) and re-estimated the model with indicator variables for each industry represented in the sample.[21] Both *AUDSHR* and *DIFFERENTIATED* remain appropriately signed and statistically significant ($p < 0.01$ and $p < 0.04$, respectively) in this panel data model. Thus, both dynamics are important drivers of IPO accounting fees, even after controlling for time- and industry-specific fee factors.

[20] Because *AUDHSR* is based on percent square root assets audited as opposed to percent of total audit fees, it measures audit market share with error. To the extent that *DIFFERENTIATED* is correlated with high levels of *AUDSHR*, it is conceivable that *DIFFERENTIATED* is picking up some of the measurement error in *AUDSHR*. The significance of both variables in both the small and large client subsamples, however, leads us to believe that the measurement error in *AUDSHR* is not a significant empirical issue for our set of IPO firms.

[21] Because *TOP5* is a linear combination of five industry-specific dummy variables, it cannot be included in a complete fixed-effects model.

Audit Firm Effects

To ensure that no single 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 affected by the inclusion or exclusion of any particular firm. Finally, we estimated a reduced form of Equation (1) for specialists only (defined as in Table 2 as audit firms having 20 percent market share or greater) to ensure that low market share audit firms are not unduly influencing our findings. In this model, like that presented in Table 4, audit fees are significantly higher ($p < 0.01$) when the audit firm is a differentiated firm.

DISCUSSION

In this paper, we apply Porter's (1985) analysis to an audit setting. Specifically, we propose that audit firms have an incentive to develop industry specializations in order to differentiate themselves from competitors; if successful, we suggest that such differentiation can lead to higher audit firm profitability. 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 differentiate themselves from industry competitors they earn fee premiums.

Consistent with most previous on audit or audit fees, data constraints prevent us from directly examining cost advantages and many other important aspects of market differentiation. We also acknowledge that our results are based on empirical proxies for audit fees and auditor specialization (i.e., IPO accounting fees and asset-based market share, respectively) rather than on the underlying measures themselves. With respect to this particular limitation, additional survey-based studies in the spirit of Behn et al. (1997) may be able to address many of the remaining questions regarding the pros and cons of industry specialization for both audit firms and clients.

Our findings do provide insights into how the Big 6 accounting firms use industry specialization as a differentiation strategy. Our results may be helpful to regulators as they consider the costs and benefits associated with varying levels of audit market concentration. Specifically, the findings presented in this paper demonstrate 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. Along these same lines, our results 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. As data allow, future researchers may wish to examine more directly the impact of Porter's Five Forces on the nature of client-auditor relationships and on the influence of these relationships on the provision of audit and nonaudit services.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 1997. *Codification of Statements on Auditing Standards.* New York, NY: AICPA.

Balsam, S., J. Krishnan, and J. S. Yang. 2000. Auditor industry specialization and the earnings response coefficient. Working paper, Temple University.

Beatty, R. P. 1989. Auditor reputation and the pricing of initial public offerings. *The Accounting Review* 64: 693–709.

———. 1993. Economic determinants of auditor compensation. *Journal of Accounting Research* 31: 294–302.

Behn, B. K, J. V. Carcello, D. R. Hermanson, and R. H. Hermanson. 1997. The determinants of audit client satisfaction among clients of Big 6 firms. *Accounting Horizons* 11: 7–24.

Belsley, D. A., E. Kuh, and R. E. Welsch. 1980. *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity.* New York, NY: John Wiley.

Berton, L. 1995. Price Waterhouse managers realign to cover specialized industry lines. *Wall Street Journal* (June 28): B5.

Carcello, J., and A. Nagy. 2002. Auditor industry specialization and fraudulent financial reporting. Working paper, University of Tennessee.

Chan, D. K., A. Ferguson, D. A. Simunic, and D. Stokes. 2001. A spatial analysis and test of oligopolistic competition in the market for assurance services. Working paper, University of British Columbia.

Clarkson, P. M., and D. A. Simunic. 1994. The association between audit quality, retained ownership, and firm-specific risk in U.S. vs. Canadian IPO markets. *Journal of Accounting and Economics* 17: 207–228.

Coopers & Lybrand. 1997. *A Guide to Going Public*. Second edition. New York, NY: Coopers & Lybrand.

Copley, P. A., and E. B. Douthett. 2002. The association between audit quality, ownership retained, and earnings disclosure by firms making initial public offerings. *Contemporary Accounting Research* 19 (1): 49–75.

Craswell, A.T., J. R. Francis, and S. L. Taylor. 1995. Auditor brand name reputations and industry specializations. *Journal of Accounting and Economics* 20: 297–322.

Cullinan, C. P. 1998. Evidence of non-Big 6 market specialization and pricing power in a niche assurance service market. *Auditing: A Journal of Practice & Theory* 17: 47–57.

DeAngelo, E. 1981. Auditor independence, low-balling, and disclosure regulation. *Journal of Accounting and Economics* 3: 113–127.

Dunn, K. A., and B. W. Mayhew. 2002. Disclosure quality and auditor choice. Working paper, University of Wisconsin–Madison.

Fargher, N. L., L. P. Fields, and M. S. Wilkins. 2000. The impact on IPO assurance fees of commercial bank entry into the equity underwriting market. *Auditing: A Journal of Practice & Theory* 19: 23–35.

Ferguson, A., and D. Stokes. 2002. Brand name audit pricing, industry specialization and industry leadership premiums post Big 8 and Big 6 mergers. *Contemporary Accounting Research* 19: 77–110.

Fields, L. P., D. Fraser, and M. S. Wilkins. 2002. An investigation of the pricing of risk in bank audits. Working paper, Texas A&M University.

Francis, J. R., and D. T. Simon. 1987. A test of audit pricing in the small-client segment of the U.S. audit market. *The Accounting Review* 62: 145–157

Gramling, A. A., V. E. Johnson, and I. K. Khurana. 2000. The association between audit firm industry experience and financial reporting quality. Working paper, Georgia State University.

Halversen, R., and R. Palmquist. 1980. The interpretation of dummy variables in semilogarithmic equations. *American Economic Review*: 474–75.

Hogan, C. 1997. Costs and benefits of audit quality in the IPO market: A self-selection analysis. *The Accounting Review* 72: 67–86.

———, and D. C. Jeter. 1999. Industry specialization by auditors. *Auditing: A Journal of Practice & Theory* 18: 1–17.

Johnson, B., and T. Lys. 1990. The market for audit services: Evidence from voluntary auditor changes. *Journal of Accounting and Economics* 12: 281–308.

Kinney, W. R., and R. D. Martin. 1994. Does auditing reduce bias in financial reporting? A review of audit-related adjustment studies. *Auditing: A Journal of Practice & Theory* 13: 149–156.

Kwon, S. Y. 1996. The impact of competition within the client's industry on the auditor selection decision. *Auditing: A Journal of Practice & Theory* 15: 53–70.

Lee, P., D. Stokes, S. Taylor, and T. Walter. 2001. The association between audit quality, accounting disclosures and firm-specific risk: Evidence from the Australian IPO market. Working paper, University of Sydney.

Neal, T. L., and R. R. Riley. 2001. Audit specialist designations: measurement considerations. Working paper, University of Kentucky.

Nelson, M. W., J. A. Elliot, and R. L. Tarpley. 2002. Evidence from auditors about managers' and auditors' earnings-management decisions. *The Accounting Review* 77 (Supplement): 175–202.

O'Keefe, T., D. Simunic, and M. Stein. 1994. The production of audit services: Evidence from a major public accounting firm. *Journal of Accounting Research* 32: 241–261.

Owhoso, V. E., W. F. Messier, and J. Lynch. 2002. Error detection by industry-specialized teams during sequential audit review. *Journal of Accounting Research* 40: 883–900.

Palmrose, Z-V. 1986. Audit fees and auditor size: Further evidence. *Journal of Accounting Research* 24: 97–110.

Pearson, T., and G. Trompeter. 1994. Competition in the market for audit services: The effect of supplier concentration on audit fees. *Contemporary Accounting Research* 11: 115–135.

Porter, M. E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance.* New York, NY: Free Press.

Shu, S. Z. 2000. Auditor resignations: Clientele effects and legal liability. *Journal of Accounting and Economics* 29: 173–206.

Simunic, D., and M. Stein. 1987. *Product Differentiation in Auditing: Auditor Choice in the Market of Unseasoned New Issues.* Vancouver, BC: Canadian Certified General Accountants' Research Foundation.

Solomon, I., M. Shields, and O. R. Whittington. 1999. What do industry auditors know? *Journal of Accounting Research* 37: 191–208.

Stein, M., D. Simunic, and T. O'Keefe. 1994. Industry differences in the production of audit services. *Auditing: A Journal of Practice & Theory* 13: 128–143.

Taylor, M. 2000. Bounded rationality, uncertainty, and competence: The effects of industry specialization on auditors' inherent risk assessments. *Contemporary Accounting Research* 17: 693–712.

White, H. 1980. A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica* 48: 817–838.

Willenborg, M. 1999. Empirical analysis of the economic demand for auditing in the initial public offerings market. *Journal of Accounting Research* 37: 225–238.

———. 2002. Discussion of brand name audit pricing, industry specialization and industry leadership premiums post Big 8 and Big 6 mergers. *Contemporary Accounting Research* 19: 111–117.