

Audit Service Production and Pricing:  
Evidence From Auditor Switches

by

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**ABSTRACT:** The purpose of the study is to examine the nature of competition in the audit service market, emphasizing the motives and consequences of auditor switching. We examine empirically the role of engagement profitability on client retention and the consequence of auditor switching on auditor labor utilization. We find (1) the likelihood of client retention increases with engagement profitability, (2) auditees, over time, should expect to pay roughly the same audit fee and be subject to the same mix of auditor labor resources when switching among Big 6 firms, and (3) auditees, over time, should expect to pay a lower audit fee and be subject to a very different mix of auditor labor when switching from a Big 6 firm to a non-Big 6 firm. The emerging view is an audit service market characterized by multiple service levels, with audit firms managing their client portfolios with profitability in mind.

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## **Audit Service Production and Pricing: Evidence From Auditor Switches**

### **1. Introduction**

From inception, auditors and auditees expect their relationship to evolve into a stable long-term relationship. Long-term agreements are infeasible, and consequently, the parties negotiate a series of short-term contracts. Theories of exchange frequently characterize such relationships in terms of sellers learning to provide a service at a lower cost as they learn about the buyer, with one party willing to make concessions in the early part of the relationship in expectation of reaping profits later, reminiscent of lowballing (Lewis and Yildirim 2000). This raises issues about the efficiency of exchange in audit service markets where there is no guarantee the most productive matches will occur in the first place, and where parties tend to become locked in, trading with each other exclusively as their relationship matures.<sup>1</sup>

One criterion to judge whether an auditor-auditee pairing is fitting is whether the demanded level of service/assurance is produced in the least cost manner (Scherer and Ross 1990). Our focus is the labor resources auditors commit to individual engagements. An audit firm well suited for a particular engagement uses the fewest resources vis-a-vis rival audit firms to produce the demanded level of service, and so is cost advantaged for that engagement. When price competition ensues, the cost advantaged firm has a competitive advantage retaining the client or attracting the client away from the incumbent. We examine whether an audit firm's presumed cost (dis)advantage is associated with client (loss) retention, and then whether lost clients switched to audit firms that used fewer labor resources. If an auditor-auditee pairing is a good match in terms of the auditor developing a cost advantage, the

relationship should endure. Poor matches in this framework are a waste of a scarce resource, auditor labor, so should not endure.

A characterization of the audit service market that influenced our quasi-experimental design and interpretation of the data are the spatial models developed in Chan (1995) and Chan, Feltham, and Simunic (1998). These are models of audit firm specialization, wherein audit firms make strategic investments in technology and human capital in order to gain a cost advantage over rival firms for select types of audit clients. Because audit clients purchase the demanded service level from the least-cost provider, the cost advantaged firm maintains a degree of pricing power in their chosen niches and charges an audit fee slightly less than the marginal cost of the next most cost advantaged audit firm. Two consequences of this market structure are relevant to this study. First, the presumed pricing strategy allows within-firm, engagement-level profitability to vary directly with the firm's cost (dis)advantage. Second, it motivates the matching of companies with the audit firm able to provide the desired level of service with the fewest resources, a hallmark of good market performance (Scherer and Ross 1990).

We began with audit fee, hours charged by grade of labor (partner, manager, in-charge, and staff), and numerous engagement characteristics for a sample of 222 fiscal 1991 U.S. audit engagements of one Big 6 public accounting firm, then identified the 54 sample clients the incumbent lost through fiscal 1996, and then collected comparable fiscal 1996 data for 24 retained clients and 30 lost clients. We found that the likelihood of client loss decreases with engagement profitability; in other words, the likelihood of client loss increases when the incumbent was not able to collect an audit fee commensurate with the labor resources used to produce the audit service. Looking across the switch

event, inflation-adjusted audit fees remained flat for non-switchers and clients switching to another Big 6 firm, but decreased significantly for clients switching to a non-Big 6 firm. The pattern of labor allocations by grade of labor is identical between the non-switchers and switchers to another Big 6 firm -- there is no significant difference in partner, manager, and in-charge hours from 1991 to 1996, but staff hours decreased. The pattern of labor allocations is not identical between the non-switchers and switchers to a non-Big 6 firm -- partner hours increased from 1991 to 1996, but manager, in-charge, and staff hours decreased.

Our evidence indicates auditees, over time, should expect to pay roughly the same audit fee and be subject to the same mix of auditor resources when switching among Big 6 firms, i.e., homogeneity among the Big 6 in audit service production and pricing. There does not appear to be specialization among the Big 6 in selecting and combining inputs to produce standard level of service, at least not at our level of analysis. Nor does it appear cost advantages accrue to the incumbent as the auditor-auditee relationship matures, contrary to the desirable improvements in auditor efficiency sometimes attributed to client-specific, auditor experience (e.g., DeAngelo 1981). Consequently, price competition that favors the least cost provider does not explain the observed negative association between the likelihood of client loss and engagement profitability for auditees that switched to another Big 6 firm. It is more likely the predecessor firm managed its portfolio with profitability in mind, making the benefit, if any, to the successor firm not obvious at this level of analysis since our data indicates such engagements are equally (un)profitable after the switch.

Clients willingly paying higher fees for Big 6 audits is commonly argued to be evidence of service differentiation (Simunic and Stein 1995). In our sample, both large and small audit firms can do

the audit, yet in all cases companies that switched to a non-Big 6 firm paid a lower audit fee even several years after the switch and were subject to a very different labor mix. We conclude that non-Big 6 firms specialize in a different (unobservable) service level, a service level switchers demand but could not get from the 1991 Big 6 auditor constrained to offer a limited range of service (O'Keefe and Westort 1992; O'Keefe, Simunic, and Stein 1994). Questions concerning which rival used the more efficient labor mix cannot be addressed in this segment of the data since we cannot comfortably maintain the service level produced by the successor non-Big 6 firms is the same as that produced by the predecessor Big 6 firm. Differences in the resource mix are expected when different service levels are produced.

We follow a random sample of 222 engagements from one firm over a five year period wherein 25% of clients switched to another audit firm, and the pre- post-switch analyses are confined to a sample of 54 of these 222 engagements. Thus, care must be exercised generalizing beyond our admittedly limited (albeit distinctive) sample. That said, the emerging view is an audit service market characterized by multiple service levels with tiers of firms specializing in one service level. That is, specialization in different levels of output as opposed to specialization selecting and combining inputs to attain the same level of output.

The remainder of the paper is organized as follows. Auditor suitability and client loss are discussed in section 2 and associated data are analyzed in section 3. Evidence on predecessor and successor auditor effort levels and fees is presented in section 4. Summary remarks are offered in section 5.

## 2.0 Auditor Suitability and Client Loss

### 2.1 Spatial Framework

A number of formal models have been developed to analyze competition among heterogeneous buyers and suppliers (e.g., Hotelling 1929 and Lederer and Hurter 1986).<sup>2</sup> Equilibrium solutions and their properties are described for models in which the distribution of customers is exogenous and relatively few suppliers strategically choose how to organize production and then choose price schedules. This perspective has been adapted recently to analyze specialization in banking services (Das and Nanda 1998) and competition in the audit service market (Chan 1995). A primary value of the spatial perspective is to provide a way of thinking about competition among the rival audit firms (Chan et al. 1998).

In the spatial model, audit firms make strategic investments in technology and human capital in order to gain a cost advantage over rival firms for select types of clients. Specialization might take place at the firm level and, perhaps more importantly, at the regional or office level.<sup>3</sup> By virtue of firms' specialization choices, some firms are better suited than others in terms of using the fewest resources to produce the desired level of service within their chosen niches.<sup>4</sup> All rivals adhere to professional standards and produce demanded service levels. Consequently, rivals compete for clients on price. A firm's pricing power is derived from this cost advantage. When two or more firms' expected costs for a particular engagement are equal, the winning firm earns a normal return. But when one firm has a cost advantage over its rivals, it can charge an audit fee slightly less than the fee that allows the next lowest cost competitor to earn a normal return on that engagement (reminiscent of Doogar and Easley 1998), and thus can earn an above-normal return on that engagement. Consequently, across a firm's portfolio

of clients, engagement-level returns vary in part as a function of the audit production costs of rival firms on a client-by-client basis.

Price competition favors the cost advantaged firm since that firm can quote the lowest audit fee. As long as the incumbent firm maintains a cost advantage over rival firms, little fee pressure exists (the client pays the lowest available audit fee for the demanded service level even though the firm earns an above-normal return), and little pressure exists for the client to switch to a rival firm. But when the incumbent loses its cost advantage, price competition favors the now least-cost rival firm and the likelihood increases that the incumbent firm will lose the client. An incumbent's cost advantage can erode when, for example, a company fundamentally changes its operations such that the incumbent auditor is no longer as well suited vis-a-vis its rivals as it once was (Johnson and Lys 1990; Gigler and Penno 1995). As the incumbent's cost advantage erodes, so too does the return on the engagement as the incumbent is not able to match the downward fee pressure with reductions in its cost while maintaining the demanded service level.

In the next section, we describe how we measure engagement-level returns. Later, we examine whether our proxy for engagement-level returns is associated with client loss, and then whether the successor auditor used fewer labor resources (our proxy for cost) to produce what we assume is a level of service equivalent to that provided by the predecessor firm.

## **2.2 Measuring Engagement Profitability**

A primary measure of engagement-level returns is the realization rate. A realization rate is the ratio of the audit fee billed to the audit fee that would have been billed had the hours reported been billed at the firm's standard billing rates. We decompose the engagement-level realization rate into two

components -- a baseline component and a resource component. The baseline component is a firm's average realization rate plus (or minus) pricing effects unrelated to resource needs, like offering a lower audit fee if the fieldwork is done in August instead of February. The resource component is the remainder, the below or above baseline returns associated with the incumbent's cost (dis)advantage. The resource component would, for example, be negative when the incumbent is cost disadvantaged, i.e., engagement profitability suffers when the incumbent commits more resources than rivals would for the same audit fee. Empirically, we regress engagement-level realization rates on proxies for known and suspected pricing effects. The predicted value is our estimate of the baseline component. The regression residual is our estimate of the resource component. Later, we examine whether our estimate of the resource component is associated with client loss (and then whether the successor auditor used fewer labor resources than the predecessor auditor). Next, we discuss each component in turn.

The cross-sectional variability in the baseline component is driven by pricing effects all firms experience. Examples of pricing effects include price cutting that likely occurs in early years of the auditor-auditee relationship (Simon and Francis 1988; Dopuch et al. 1998; Craswell and Francis 1999); when prices for otherwise identical services vary with the seasonality of the public accounting industry; when a company's ability or willingness to pay is low as in the case of not-for-profit organizations or is high like when non-audit services are also sold to an audit client (Simunic 1984; Palmrose 1986; Dopuch et al. 1998) or the company is large or complex (Simunic and Stein 1996; Dopuch et al. 1998); when knowledge spillovers from the joint provision of consulting services makes the audit team more efficient (Solomon 1990; cf. Hackenbrack and Knechel 1997); or when firms adjust billing rates to reflect differences in third-party litigation or business risk among clients (Bell,

Landsman, and Shackelford 1995; Morgan and Stocken 1998; cf. Simunic and Stein 1996). Such effects reflect industry-wide pricing practices, they do not indicate whether the incumbent auditor is cost (dis)advantaged.

A maintained hypothesis at this point in the paper is that the cross-sectional variability in the resource component (the regression residual) is driven, in large part, by the incumbent's cost (dis)advantage. From the spatial perspective, rival firms' costs establish a ceiling on audit fees, limiting the incumbent's price setting capacity (the numerator), and standards of due care and client demand a floor on the mix of labor used, and hence the standard fee (the denominator). As the incumbent's cost advantage increases (decreases), the gap between this ceiling and floor widens (narrows), and the engagement-level realization rate increases (decreases). The regression residual (the realization rate less the baseline component) measures, admittedly with noise, the extent of this gap, a gap that is positively associated with the incumbent's cost advantage.<sup>5</sup>

In the next section we regress realization rates on proxies for pricing effects to generate estimates of the baseline component (the predicted value) and the resource component (the regression residual), and examine whether the resource component is associated with client loss. In section four we analyze predecessor/successor audit fees and auditor labor hours.

### **3. Empirical Analysis of Engagement Profitability and Client Loss**

#### **3.1 Overview of the Data Gathering Process**

The initial source of data is a survey developed and administered by an international public accounting firm. The survey data includes the fiscal 1991 audit fee, the hours charged by grade of labor, and numerous client and engagement characteristics. The firm subsequently identified which

sample companies remained an audit client through the fiscal 1996 audit, and for sample companies in one region of its U.S. practice, the 1996 audit fee, the hours charged by grade of labor, and selected client and engagement characteristics. All survey items are documented in the firm's audit work papers. We collected from public sources or company personnel 1991 revenue data, whether the company was a public company in 1991 and 1996, whether the company was involved in merger or acquisition activity between 1991 or 1996, and the identity of the 1996 audit firm. We then surveyed all successor firms. That survey data includes the fiscal 1996 audit fee, the hours charged by grade of labor, whether the purchase of the sample company by an existing client of the successor firm played a role in the auditor change, and selected client and engagement characteristics. The year 1996 was the latest year data was available when data collection for this project began.

### **3.2 Descriptive Statistics for 1991 Audit Engagements**

Descriptive statistics are presented in Table 1. The data set contains 222 observations.<sup>6</sup> The characteristics of our sample are comparable to those of samples used in prior non-municipal audit fee and audit labor hour studies. The audit fee and auditor labor hour distributions are skewed. The mean billed audit fee for the sample is \$131,810 (median \$69,250) with an interquartile range of \$26,555 to \$169,434. The mean number of hours to complete a sample engagement was 1620 (median 1143) with an interquartile range of 425 to 2019, with partners, managers, in-charge, and staff charging on average 90, 230, 556, and 744 hours, respectively. Seventy-two percent of the sample companies had more than \$20 million in revenue. Financial services companies (insurance, banks, and thrifts) represent approximately one-third of the sample, not-for-profit companies (charity, government, and education) twenty-one percent, and others (manufacturing, health care, high technology, and merchandising) the

remaining forty-three percent. The 1991 audit firm had provided audit services an average of 9.5 consecutive years. Fifty-four of the 222 1991 sample companies changed auditors by 1996, were viable entities in 1996, and switched auditors for reasons unrelated to merger or acquisition activity.

### 3.3 Empirical Model

In this section, we test whether our proxy for the client-specific mark-up is associated with client loss, after controlling for other factors posited to affect client loss. We use two-stage maximum likelihood estimation of a “realization rate” regression and “client loss” binomial probit model.

$$RR = \alpha_0 + \alpha_1 BUSY + \alpha_2 NFP + \alpha_3 DELAY + \alpha_4 SIZE + \alpha_5 CONSULT + \alpha_6 PUBLIC + u,$$

and

$$LOSS = \beta_0 + \beta_1 SIZE + \beta_2 CONSULT + \beta_3 PUBLIC + \beta_4 TENURE + \beta_5 u + v$$

where

RR is the 1991 engagement-level realization rate,

LOSS (0,1) where one denotes the audit firm lost the client between fiscal 1991 and fiscal 1996,

BUSY (0,1) where one denotes the fiscal 1991 audit report date is January, February, or March,

NFP (0,1) where one denotes the company is a not-for-profit entity in 1991,

DELAY (0,1) where one denotes the audit firm experienced significant client delays during the fiscal 1991 audit,

SIZE (0,1) where one denotes the company's revenue exceeds \$20 million in fiscal 1991,

CONSULT (0,1) where one denotes the audit firm provided management consulting services during fiscal 1991,

PUBLIC (0,1) where one denotes the client was publicly-traded in 1991,

TENURE (0,1) where one denotes the company engaged the 1991 audit firm less than four consecutive years, and

$u$  (the regression residual) is our proxy for the fiscal 1991 resource component of the engagement-level realization rate.

Descriptive statistics on the dependent variables are presented in Table 2. Similar to prior studies, the mean (median) engagement-level realization rate for our sample of fiscal year 1991 engagements is 73% (70%) with a standard deviation of 23%, an interquartile range of 55% to 89%, and range of 22% to 144%. Twenty-five (46%) and 19 (35%) of the 54 client losses were to a Big 6 firm and a non-Big 6 firm, respectively. We are not able to identify the 1996 auditor for the other 10 (18%) lost clients.

The mean value of the independent variables as of 1991 for the non-switch and switch companies are presented in panel B. Non-switchers were more likely to be busy-season engagements, relatively large in terms of reported revenue, source audit and non-audit services with the incumbent firm, and be a publicly traded company. Switchers were more likely to be not-for-profit entities and engage the 1991 auditor fewer consecutive years.<sup>7</sup> Non-switchers and switchers were just as likely to cause significant delays.

### **3.4 Empirical Results**

#### **3.4.1 Realization Rate Regression**

The estimation results are presented in Table 3. The model goodness-of-fit measures compare favorably to those reported elsewhere and with alternate model specifications we tried, and diagnostic tests reveal the parameter estimates and associated p-values are not unduly influenced by

heteroscedasticity, influential observations, or multicollinearity. All reported p-values throughout the paper are for two-sided tests.

The realization rate regression provides evidence that cross-sectional differences in audit fees reflect more than differences in the cost of providing the audit service and are associated with observable client characteristics. By definition, this is third-degree price discrimination (Pigou 1920), the type of price discrimination associated with spatial models (Philips 1983). The coefficient on “busy season” is positive at  $p=.04$ , evidence consistent with prices being used to balance utilization of the incumbent’s capacity across the traditional busy and non-busy seasons. The coefficient on “not-for-profit” is negative ( $p=.03$ ), perhaps reflecting companies' inability to pay or the audit firm's community service and practice development efforts. Realization rates are lower on engagements where the firm experienced significant “client delay” than when it did not ( $p=.01$ ). The fixed fee spirit of audit contracts coupled with the unanticipated nature of client delays might make it difficult for auditors to increase fees sufficiently when clients fail to provide expected levels of cooperation, thus lowering the realization rate due to an increase in audit hours.

Consistent with results documented in Simunic and Stein (1996) and Dopuch et al. (1998), the characteristics “client size” and “other services” are positively associated with realization rates (each at  $p=.01$ ).<sup>8</sup> But contrary to those studies, “public” does have a systematic effect on realization rates, with publicly traded companies associated with larger realization rates than small companies ( $p=.01$ ). If the variable “public” is a proxy for business/litigation risk, this identified increased unit price might reflect risk-based pricing (Morgan and Stocken 1998; Bell et al. 1995; cf. Simunic and Stein 1996). Alternatively, the variable “public,” like “client size,” might reflect a clients' willingness to pay. Large,

public companies would tend to place a relatively high value on the audit service and would tend to have relatively fewer auditor choices, consistent with oligopolistic price discrimination.<sup>9</sup>

### **3.4.2 Client Loss Model**

Most studies that examine the client characteristics associated with auditor change focus on changes to a particular type of auditor, e.g., Big 6 or non-Big 6.<sup>10</sup> Unlike those studies, our focus is a Big 6 firm's loss of clients within a five year period.

The negative association between "client size" and "client loss" in our sample of predominately private companies is weaker ( $p=.15$ ) than that documented elsewhere for samples of larger, public companies (Levinthal and Fichman 1988).<sup>11</sup> The significant negative coefficient on "other services" ( $p=.02$ ) is consistent with the building of relationship-specific capital (e.g., communication patterns, trust, and knowledge) when firms provide management consulting services to their audit clients. It also suggests clients do not view the joint production of audit and non-audit services a threat to the value third-parties' attach to the audit opinion, and are willing to pay the (hourly) fee premium associated with simultaneously providing audit and non-audit service document in section 3.4.1 and elsewhere (Dopuch et al. 1998; Simon 1985; Simunic 1984). The negative coefficient on "public" is significant ( $p=.05$ ), perhaps reflecting that the cost of switching is higher for public than private companies, similar to what one would expect for large companies.<sup>12</sup> The likelihood of client loss is negatively associated with the length of the auditor-auditee relationship, consistent with relationships having an initial period during which both parties determine if there are opportunities to build relationship-specific capital (Levinthal and Fichman 1988).

The coefficient on the resource component proxy,  $u$ , is -1.43 and statistically significant at  $p=.01$ .<sup>13</sup> The conditional probability of losing a typical sample client for a one standard deviation decrease in  $u$  increased to 32.2% from 23.7%.<sup>14</sup> These switches might have been initiated by the auditor, the auditee, or both. We do not know. Perhaps the incumbent ceded to price competition that favors a more efficient audit firm. Or perhaps the incumbent managed its portfolio of clients with profitability in mind by not working hard to sustain relationships or by simply terminating relationships with low profitable clients within segments of its portfolio. Evidence on the plausibility of these explanations is presented in the next section.

#### **4. Predecessor/Successor Audit Fees and Auditor Labor Hours<sup>15</sup>**

##### **4.1 Descriptive Statistics for 1996 Audit Engagements**

We have the audit fee, the hours charged by grade of labor, and several engagement characteristics for a sample of 54 fiscal 1996 engagements as follows: 24 of the 30 continuing clients (80%) in one region of the 1991 audit firm's U.S. practice, 17 of the 25 clients (68%) we know switched to a Big 6 firm, and 13 of the 19 companies (68%) we know switched to a non-Big 6 firm. We include the continuing client sub-sample to control for possible industry-wide changes in audit methodologies during the sample period. (Note: The 54 client losses in section 3 overlap but are not the same 54 engagements examined here. That the sample sizes are the same is a coincidence.) Five of the Big 6 firms and 12 non-Big 6 firms are represented in the sample. Descriptive statistics are presented in Table 4. The distributions of audit fees and revenue are similar to those presented in Table 1. Audit hours decreased from 1991 to 1996 (an overall median decrease of 23%,  $p=.01$ ), and not-

for-profit companies represent a larger portion of the 1996 sample than the 1991 sample (39% from 21%).

Descriptive statistics by sub-sample are presented in Table 5. Neither client size, ownership, nor industry affiliation individually differ statistically across the three sub-samples of non-switchers, switch-Big 6, and switch-non-Big 6.<sup>16</sup> (Industry affiliation is also independent of firm type within the two switch sub-samples ( $p=.26$ )).<sup>17</sup> That said, there does appear to be a clustering of public company switchers with six out of seven of them moving to a Big 6 firm. None of the private companies went public between 1991 and 1996. The average auditor tenure is approximately two and one-half years in each of the two switch sub-samples. None were first year engagements in 1996. The median percentage change in inflation-adjusted audit fees over the five year window 1991 to 1996 is roughly zero for both the non-switch and switch-Big 6 sub-samples, which is significantly higher than the 38% decrease in fees for companies that moved to a non-Big 6 firm ( $p=.01$ ). Roughly 43% of both non-switchers and switchers to Big 6 firms experienced a fee increase whereas 100% of companies that switched to a non-Big 6 firm experienced a fee decrease. Total reported audit hours tended to decrease, regardless of whether the company switched or the type of firm.

#### **4.2 Auditor Labor Hours by Grade of Labor**

The pattern of percentage change in hours during the period 1991 to 1996 by grade of labor and sub-sample are presented in Table 6. Several words of caution before discussing these results. First, we use a difference in differences design. Though univariate in nature (audit firm type is controlled), an inherent aspect of this design is that companies' histories act as a control for potential confounds and for company-specific measurement errors. Omitted covariates would only be important

if the unmeasured engagement characteristic changed significantly between 1991 and 1996 *and* such changes were significantly different between the sub-samples. Second, analyzing percentage changes by rank masks the fact that partner, manager, in-charge, and staff commitments account for 7%, 17%, 33%, and 43% of the hours charged to the 1991 engagements, respectively. Substitution effects among ranks are treated casually. Third, by design, we have confounded audit tenure with treatment, i.e., engagements in the switch sub-samples are predominately in their second or third year whereas the engagements in the non-switch sub-sample are on average in their thirteenth year, much further along the learning curve. Interestingly, the incumbent's additional eleven years of experience with the client yields no savings in total labor hours committed to an engagement ( $p=.43$ ), contrary to the desirable improvements in auditor efficiency sometimes attributed to client-specific, auditor experience (e.g., DeAngelo 1981).

In Table 6, there is no discernable difference between the mix of labor committed to an engagement between the non-switch sub-sample and switch-Big 6 sub-sample. Partner, manager, and in-charge hours are level from 1991 to 1996, and staff hours declined 41.7% ( $p=.03$ ) and 27.5% ( $p=.01$ ) for the non-switch and switch Big 6 sub-samples, respectively. When interpreted in light of the audit fee evidence reported in Table 5, our data suggests auditees, over a relatively short time horizon, should expect to pay roughly the same audit fee and be subject to the same mix of auditor labor resources when switching among Big 6 firms. In other words, homogeneity among the Big 6 in audit service production and pricing. Specialization in audit service production among the Big 6 is not evident at our level of analysis.

Consequently, price competition that favors the least cost provider does not explain the observed negative association between the likelihood of client loss and engagement profitability (the resource component, Table 3) for auditees that switched to another Big 6 firm. It is more likely the predecessor firm managed its portfolio with profitability in mind by not working hard to sustain these relationships or by simply terminating relationships with less profitable clients within segments of its portfolio. If so, the benefit, if any, to the successor firm is not obvious at this level of analysis since our data indicates the audit engagement will likely be equally (un)profitable after the switch.<sup>18</sup> The benefit to an auditee of switching to another Big 6 firm, if any, in light of the homogeneity of audit service production and pricing is likely the availability of non-audit services, personalities, and so on.

A different pattern of labor utilization is evident for switches to non-Big 6 firms, where significant differences between sub-samples are evident in the labor categories partner, manager, and in-charge (but not staff ( $p=.91$ )). In all instances when a company switched to a non-Big 6 firm, partner hours increased with the magnitude of the increase in the range 107% to 246% for the middle half of the sample ( $p=.01$ ). A result of this magnitude suggests the engagement-level responsibilities of partners vary by firm type. The manager and in-charge commitment declined 23% ( $p=.03$ ) and 37% ( $p=.01$ ), respectively. The percentage change in each labor category is significantly different than the percentage change in the two Big 6 sub-samples ( $p=.05$  and  $.01$ , respectively), indicating that even early in the auditor-auditee relationship, non-Big 6 firms place much less reliance on manager and in-charge labor than Big 6 firms.

This quite different pattern of labor utilization between Big 6 and non-Big 6 firms likely reflects a demand-side motive for switching to one of the non-Big 6 (as opposed to the supply-side motive

provided by cost advantage perspective). Consider the audit fee results presented in Table 5 in light of audit pricing studies where evidence of clients willingly paying higher fees for Big 6 audits is commonly argued to be evidence of service differentiation (Francis and Simon 1987; Simunic and Stein 1995; Craswell et al. 1995). In our sample, both large and small audit firms can do the audit, yet companies switched to a non-Big 6 firm and in all cases paid a lower audit fee even several years after the switch. Couple this result with the fact that the non-Big 6 firm used a very different labor mix, and we conclude that non-Big 6 firms specialize in a different (unobservable) service level, a service level switchers demand but could not get from the 1991 auditor constrained to offer a limited range of service (O'Keefe and Westort 1992; O'Keefe, Simunic, and Stein 1994). This result complements pricing studies (e.g., Craswell, et al. 1995), stock price reaction studies (e.g., Teoh and Wong 1993), earnings management studies (e.g., Becker, Defond, Jiambalvo, and Subramanyam 1998), and auditor choice studies (e.g., Simunic and Stein 1987) by providing more direct evidence on service differentiation than previously presented.

## **5. Summary**

We began with audit fee, hours charged by grade of labor (partner, manager, in-charge, and staff), and numerous engagement characteristics for a sample of 222 fiscal 1991 U.S. audit engagements of one Big 6 public accounting firm. We then identified the 54 sample clients the incumbent lost through fiscal 1996, and collected comparable fiscal 1996 data for 24 retained clients and 30 lost clients. We found that the likelihood of client loss decreased with engagement profitability; in other words, the likelihood of client loss increased when the incumbent was not able to collect an audit fee commensurate with the labor resources used to produce the audit service. Looking across the

switch event, inflation-adjusted audit fees remained flat for non-switchers and clients switching to another Big 6 firm, but decreased significantly for clients switching to a non-Big 6 firm. The pattern of labor allocations by grade of labor is identical between the non-switchers and switchers to another Big 6 firm -- there is no difference in partner, manager, and in-charge hours from 1991 to 1996, but staff hours decreased. The pattern of labor allocations is not identical between the non-switchers and switchers to a non-Big 6 firm -- partner hours increased from 1991 to 1996, but manager, in-charge, and staff hours decreased.

The emerging view is an audit service market characterized by multiple service levels with tiers of firms specializing in a single service level. Our evidence indicates auditees, over time, should expect to pay roughly the same audit fee and be subject to the same mix of auditor resources when switching among Big 6 firms, i.e., homogeneity among the Big 6 in audit service production and pricing. There does not appear to be specialization among the Big 6 in selecting and combining inputs to produce standard level of service, at least not at our level of analysis. Nor does it appear cost advantages accrue to incumbent as the auditor-auditee relationship matures. Our evidence indicates auditees, over time, should expect to pay a lower audit fee and be subject to a very different labor mix when switching from a Big 6 to a non-Big 6 firm. We conclude that non-Big 6 firms specialize in a different (unobservable) service level, a service level switchers demand but could not get from the 1991 Big 6 auditor constrained to offer a limited range of service.

Important caveats are in order. One, discussed elsewhere and reiterated here, is a consequence of the proprietary nature of the data. We follow a random sample of 222 engagements from one firm over a five year period wherein 25% of clients switched to another audit firm, and the

pre- post-switch analyses are confined to a sample of 54 of these 222 engagements. Thus, care must be exercised generalizing beyond our admittedly limited, but distinctive, sample. Second, we conclude our evidence is consistent with service differentiation. Though such characterizations are common, little agreement exists as to what the output of an audit is, let alone how to measure it (Simunic and Stein 1987). Third, substitution effects among grades of auditor labor and considerations of the marginal product of different grades of labor in achieving a given service level are treated casually. Fourth, both the auditor and auditee contribute to the production of assurance. We focus solely on the auditor's contribution, and only on the labor component of the audit cost function.

## Endnotes

1. Efficiency is the use of the fewest resources to attain a given output. In this paper, resources are grades of auditor labor (partner, manager, in-charge, and staff) and output an unobservable level of service/assurance. Non-labor audit firm resources like the intensity of proprietary, computer-assisted techniques are ignored; we consider them second-order importance. A firm well suited for a particular engagement is efficient relative to rival audit firms.
2. Audit clients and audit firms are heterogenous buyers and suppliers, respectively. All audit clients are unique to some extent, in that they operate in different industries, employ different business strategies, face different risks and opportunities, have different control structures, and so on. Audit firms too are unique to some extent with firms organized to specialize by industry even within the Big 5 (Hogan and Jeter 1999), and are rewarded for such specialization with relatively high audit fees in industry market niches (Craswell, Francis and Taylor 1995).
3. While the assumption that specialization creates cost differences is intuitively compelling and consistent with the organizational structure of dominant firms (Hogan and Jeter 1999; Bell, Marrs, Solomon, and Thomas 1997), direct evidence is sketchy.
4. A cost advantage can accrue to a firm as a result of its specialization choices and as a result of economies of learning. The spatial perspective emphasizes the role of specialization and the cited theory of exchange learning-by-doing. Thus, one firm is cost advantaged vis-a-vis another when the present value of the expected cost of a sequence of engagements is less than cost the rival would incur performing the same engagements. This view was first expressed by DeAngelo (1981) and subsequently by others (e.g., Dye 1991).
5. The source of production efficiency differences can be both within and between audit firms. Our view assumes the latter has the greater effect on audit service production and assume management control systems in public accounting firms are sufficiently strong such that systematic, within-firm inefficiency is negligible. Dopuch, Gupta, Simunic, and Stein (1998) find no evidence of within-firm production inefficiencies in the use of partner, manager, senior, or staff hours.
6. Of the 327 responses received (a 73% response rate), 222 are used in the analyses. Of the responses not used, 17 are nonaudit engagements, a disclaimer was issued on one engagement, four are influential observations, and 66 have missing values. We excluded observations with realization rates less than ten percent (three observations) or greater than 150% (five observations) because audit firm charity is not consistent with the view of profit maximization that motivates the study and our concern very large realization rates are a source of measurement error (e.g., billing management advisory services through the audit service billing process). We also excluded nine client losses resulting from company dissolution or acquisition activity because they do not represent market driven auditor-auditee realignments.

7. In Table 2, panel B, univariate tests of the difference in the variables BUSY and NFP by SWITCH are statistically significant but are not conditionally significant when added to the probit model in Table 3.
8. Our use of an indicator variable for client size reflects Dopuch et al.'s (1998) finding that realization rates vary between large versus small companies but not within the two size groups. And like Dopuch et al., the value of the coefficient on SIZE suggests an average realization rate for large companies 6% to 8% higher than for small companies. When we replace the categorical size variable with a continuous measure, the continuous measure is not significant ( $p=.30$ ). Sensitivity analyses reveal our partition at \$20 million accounts for more cross-sectional variability in realization rates than other partitions.
9. We ran the realization rate regression adding three versions of auditor tenure: number of years, an indicator variable for first year engagements, and an indicator variable for relationships lasting less than four years. All were inconsequential.
10. Haskins and Williams (1990) describe the principal client-related, auditor-change factors found in the literature and, like Schwartz and Menon (1985), find company financial distress is positively associated with auditor changes. While we have limited financial statement data so we cannot replicate their results, we do have auditor assessments of client sophistication and extent of client delays. Neither are significant at  $p=.20$ . Client-related factors associated with switches to larger auditors include changes in external financing, changes in cash flow performance, growth in assets, changes in times-interest-earned (e.g., Johnson and Lys 1990). We can safely ignore these control variables because we are not modeling switches to larger auditors -- all 1991 audits were performed by a Big 6 firm.
11. We analyzed hazard rates for a sample of 5,587 auditor-auditee relationships between 1974 and 1998 drawn from Compustat. When the sample is cut into thirds by client size (assets) and a log logistic accelerated failure time model is fit to each third separately, client size is not significant in the small company sub-sample but is in the large company sub-sample.
12. The coefficient on "client size" is  $-.406$  ( $p=.06$ ) when the variable "public" is excluded. All other variables are significant at  $p=.01$ .
13. We also estimated the probit model adding the square and absolute value of the resource component,  $u$ , to examine whether auditor switches occur for both large positive and large negative residuals. Neither is significant at  $p=.68$ . We also estimated the model replacing the resource component with the engagement-level realization rate. The coefficient on the realization rate variable is significantly negative ( $p=.01$ ), the model likelihood is  $-106$ , and the variable PUBLIC is no longer significant ( $p=.57$ ).

14. A typical client reports more than \$20 million in revenue (SIZE=1), did not purchase management consulting services from the 1991 auditor (CONSULT=0), is a private company (PUBLIC=0), and engaged the 1991 auditor more than three consecutive years (TENURE=0).

15. Throughout most of section 4 we report medians instead of means and nonparametric instead of parametric tests. The samples tend to be characterized by a few very large values making medians a better description of central tendency. The single difference between a parametric and nonparametric test result is described in footnote 1, Table 6.

16. Change in client size too is independent of subsample. Four of the nonswitchers decreased in size, 11 had no change, and 9 increased in size; 15 of the switch-Big 6 clients had no change in size and 2 increased in size; 1 of the switch-non-Big 6 decreased in size, 7 had no change, and 5 increased in size.

17. The p-values for the audit fee and auditor labor location tests reported in the last column of Tables 5 and 6 do not change when industry affiliation is added to the analyses, and the null hypothesis of equal percentage change by industry affiliation is not rejected in Table 5 for audit fee ( $p=.35$ ) and total hours ( $p=.32$ ) nor in Table 6 for partner hours ( $p=.22$ ), manager hours ( $p=.98$ ), and in-charge hours ( $p=.57$ ). The percentage change in staff hours does vary by industry affiliation ( $p=.05$ ). Consequently, industry affiliation does not confound the reported results.

18. Our conception of profitability is quite narrow, focusing only on audit fees and labor resources. We ignore changes in factor prices, the opportunity cost of labor in local markets, litigation related costs, etc.

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TABLE 1  
Descriptive Statistics, 1991 (n=222)

	Mean / Median	Standard Deviation / Interquartile Range
Audit Fee Billed	\$131,810 / \$69,250	\$186,975 / \$26, 555 to \$169,434
Hours Charged to the Engagement		
Partner Hours	90 / 46	129 / 18 to 110
Manager Hours	230 / 131	321 / 62 to 271
In-charge Hours	556 / 352	620 / 160 to 867
Staff Hours	744 / 520	852 / 155 to 948
Range of Total Revenue	Percent	
< \$500,000	1%	
\$500,001 to \$1,000,000	3%	
\$1,000,001 to \$2,500,000	5%	
\$2,500,001 to \$5,000,000	5%	
\$5,000,001 to \$10,000,000	5%	
\$10,000,001 to \$20,000,000	9%	
\$20,000,001 to \$50,000,000	16%	
\$50,000,001 to \$100,000,000	12%	
\$100,000,001 to \$500,000,000	24%	
\$500,000,001 to \$1,000,000,000	6%	
> \$1,000,000,000	14%	
Industry <sup>1</sup>		
Financial Services	36%	
Not-For-Profit	21%	
Other	43%	

<sup>1</sup> Industry: Percent of companies in financial services (insurance, banks, and thrifts), not-for-profit (charity, government, and education), and other industries.

TABLE 2  
 Client Loss Analyses  
 Variable Names, Definitions, and Descriptive Statistics (n=222)

Panel A: Dependent Variables

	Percentage
1991 Engagement-level Realization Rate	
Mean / Median	73% / 70%
Standard Deviation / Interquartile Range	23% / 55% to 89%
Range	22% to 144%
	Number (Percentage) of Cases Where Value = 1
Loss: (0,1) where one denotes the firm lost the client between 1991 and 1996	54 (24%)
To a Big6 Firm	25
To a non-Big6 Firm	19
Unable to identify 1996 auditor	10

TABLE 2, continued  
Client Loss Analyses  
Variable Names, Definitions, and Descriptive Statistics (n=222)

Panel B: Independent Variables, measured as of 1991

Variable Name and Definition	Non-switchers (n=168)	Switchers (n=54)	Test of Association
BUSY: (0,1) where one denotes the audit report date is January, February, or March	49% <sup>1</sup>	32%	$P^2 = 4.6$ (p=.03)
NFP: (0,1) where one denotes the company is a not-for-profit entity <sup>2</sup>	17%	34%	$P^2 = 7.3$ (p=.01)
DELAY: (0,1) where one denotes the auditor reported experiencing significant client delays	33%	40%	$P^2 = .7$ (p=.40)
SIZE: (0,1) where one denotes the company's revenue exceeds \$20 million	77%	57%	$P^2 = 8.7$ (p=.01)
CONSULT: (0,1) where one denotes the audit firm provided the company both audit and non-audit services	45%	21%	$P^2 = 9.7$ (p=.01)
PUBLIC: (0,1) where one denotes the company was publicly traded	33%	17%	$P^2 = 4.7$ (p=.03)
TENURE: (0,1) where one denotes the company engaged the 1991 auditor less than four consecutive years	19%	40%	$P^2 = 9.4$ (p=.01)
RESOURCE: ( <i>u</i> ) the regression residual	mean = .016 std. dev. = .186	mean = -.051 std. dev. = .162	$t = 2.5$ (p=.01)

<sup>1</sup> Percentage of observations where value equals one.

<sup>2</sup> Not-for-profit includes charity, government, and education.

TABLE 3  
Two Step Maximum Likelihood Estimation  
of Auditor Switch on the Residual Realization Rate and Selected Variables (n=222) <sup>1</sup>

Independent Variable	Dependent Variable	
	Realization Rate	Switch
Intercept	.612 (p=.01)	-.398 (p=.04)
Busy Season (BUSY)	.061 (p=.04)	--
Not-for-Profit (NFP)	-.074 (p=.03)	--
Client Delay (DELAY)	-.094 (p=.01)	--
Client Size (SIZE)	.075 (p=.01)	-.320 (p=.15)
Other Services (CONSULT)	.075 (p=.01)	-.498 (p=.02)
Public (PUBLIC)	.175 (p=.01)	-.484 (p=.05)
Auditor Tenure (TENURE)	--	.588 (p=.01)
Resource Component ( <i>u</i> )	--	-1.428 (p=.01)
Adjusted R <sup>2</sup>	.37	--
Log-Likelihood	63.0	-107.6
Concordance	--	78.6%

Table 2 contains variable names, definitions, and related descriptive statistics.

<sup>1</sup> Table entries are parameter estimates and two-sided p-values for the null hypothesis the parameter estimate equals zero.

TABLE 4  
Descriptive Statistics, 1996 (n=54)<sup>1</sup>

	Mean / Median	Standard Deviation / Interquartile Range
Audit Fee Billed, in 1991 dollars	\$119,334 / \$50,956	\$225,822 / \$19,098 to \$128,474
Hours Charged to the Engagement		
Partner Hours	81 / 50	120 / 21 to 93
Manager Hours	206 / 122	371 / 40 to 185
In-charge Hours	407 / 228	532 / 120 to 520
Staff Hours	489 / 350	695 / 108 to 600
Range of Total Revenue	Percent	
< \$500,000	2%	
\$500,001 to \$1,000,000	2%	
\$1,000,001 to \$2,500,000	4%	
\$2,500,001 to \$5,000,000	6%	
\$5,000,001 to \$10,000,000	4%	
\$10,000,001 to \$20,000,000	16%	
\$20,000,001 to \$50,000,000	9%	
\$50,000,001 to \$100,000,000	13%	
\$100,000,001 to \$500,000,000	26%	
\$500,000,001 to \$1,000,000,000	2%	
> \$1,000,000,000	16%	
Industry <sup>2</sup>		
Financial Services	28%	
Not-For-Profit	39%	
Other	33%	

<sup>1</sup> The 54 observations include 24 non-switchers, 17 clients switching to another Big 6 firm, and 13 clients switching to a non-Big 6 firm.

<sup>2</sup> Industry: Percent of companies in financial services (insurance, banks, and thrifts), not-for-profit (charity, government, and education), and other industries.

TABLE 5  
Predecessor/Successor Analyses  
Descriptive Statistics, 1996 Engagements (n=54)

Variable <sup>1</sup>	Switchers			Association Test
	Non-switchers (n=24)	Big6 Firm (n=17)	non-Big6 Firm (n=13)	
Client Size, 1996	76.2%	62.5%	46.2%	P <sup>2</sup> = 3.2 (p=.21)
Public, 1991 and 1996	37.5%	35.8%	7.7%	P <sup>2</sup> = 3.9 (p=.14)
Industry, 1991 and 1996				
Financial	33.3%	23.5%	23.1%	P <sup>2</sup> = 4.5 (p=.34)
Not-For-Profit	29.2%	35.3%	61.5%	
Other	37.5%	41.2%	15.4%	
Auditor Tenure, 1996	13.5	2.5	2.6	P <sup>2</sup> = 29.9 (p=.01)
Audit Fee, 1991 to 1996				
Percent Increasing	45.8%	41.2%	0%	P <sup>2</sup> = 29.9 <sup>3</sup> (p=.01)
Median / Interquartile	-2.1% /	-3.5% /	-37.7% /	
Percentage Change	-10% to 39% (p=.22) <sup>2</sup>	-35% to 50% (p=.64)	-48% to -29% (p=.01)	
Total Hours, 1991 to 1996				
Percent Increasing	37.5%	23.5%	15.4%	P <sup>2</sup> = .7 <sup>3</sup> (p=.71)
Median / Interquartile	-19.6% /	-23.2% /	-25.6% /	
Percentage Change	-36% to 20% (p=.27)	-45% to -3% (p=.04)	-35% to -16% (p=.01)	

<sup>1</sup> Size: Percent of companies with revenue greater than \$20 million. Public: Percent of companies publicly traded. Industry: Percent of companies in financial services (insurance, banks, and thrifts), not-for-profit (charity, government, and education), and other industries. Change in audit fees and total audit hours measured between 1991 and 1996 with 1991 the base year. 1996 dollars restated to 1991 dollars.

<sup>2</sup> Two-sided p-value for a signed-rank test under the null hypothesis the median percentage change equals zero.

<sup>3</sup> Kruskal-Wallis test under the null of equal median percentage change (two-sided p-value).

TABLE 6  
Predecessor/Successor Analyses  
Change in Auditor Labor Hours, 1991 to 1996 (n=54)

	Switchers			Kruskal-Wallis Test <sup>2</sup>
	Non-switchers (n=24)	Big 6 Firm (n=17)	non-Big 6 Firm (n=13)	
<b>Partner</b>				
Percent Increasing	46%	29%	100%	
Median/Interquartile	-3.3% /	-27.3% /	144.4% /	P <sup>2</sup> = 16.3 (p=.01)
Percentage Change	-23% to 108% (p=.34) <sup>1</sup>	-44% to 12% (p=.71)	107% to 246% (p=.01)	
<b>Manager</b>				
Percent Increasing	54%	41%	23%	
Median/Interquartile	3.1% /	-20.8% /	-23.1% /	P <sup>2</sup> = 5.8 (p=.05)
Percentage Change	-25% to 125% (p=.26)	-32% to 33% (p=.89)	-47 to -10 (p=.03)	
<b>In-charge</b>				
Percent Increasing	38%	53%	8%	
Median/Interquartile	-4.1% /	3.7% /	-37.2% /	P <sup>2</sup> = 8.2 (p=.02)
Percentage Change	-37% to 50% (p=.95)	-32% to 15% (p=.89)	-40% to -24% (p=.01)	
<b>Staff</b>				
Percent Increasing	29%	18%	23%	
Median/Interquartile	-41.7% /	-27.5% /	-38.8% /	P <sup>2</sup> = .2 (p=.91)
Percentage Change	-51% to 12% (p=.03)	-46% to -8% (p=.01)	-44% to -2% (p=.01)	

<sup>1</sup> Two-sided p-value for a signed-rank test under the null hypothesis the median percentage change equals zero. (Note: T-tests yield the same pattern of statistical significance except partner and staff in the non-switch sample where p=.08 and .30, respectively.)

<sup>2</sup> Null hypothesis is equal median percentage change in hours (two-sided p-value).