The Joint Determination of Audit Fees, Non-Audit Fees, and Abnormal Accruals

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March 31, 2004

We thank the American Accounting Association for financial support through an Auditor Independence Grant and participants in the University of Cyprus, Massachusetts Institute of Technology, New York University, Oklahoma State University, Rutgers University, Vanderbilt University seminars and the 2003 European Accounting Association Annual Meeting for helpful comments. Much of the data used in this paper has been jointly purchased by the authors and the Yale International Center for Finance. Use of the data is subject to the restrictions of the agreements with the data suppliers and the Yale International Center for Finance. Corresponding author: Gans Narayanamoorthy, Yale School of Management, Box 208200, New Haven, CT 06520-8200

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Abstract

Prior research has estimated piece-meal the determinants of audit fees, non-audit fees and abnormal accruals. Intuition, informal analysis, and a variety of theories suggest that audit fees, non-audit fees, and abnormal accruals are jointly determined. We address this endogeneity issue by modeling the confluence of audit fees, fees for non-audit services and abnormal accruals in a system of simultaneous equations.

Our joint estimation provides a starting point to look simultaneously at several competing theories. Using audit and non-audit fee data from the UK for 1994-2000, we find evidence consistent with knowledge spillovers (or economies of scope) from auditing to non-audit services and from non-audit services to auditing. While knowledge spillovers from non-audit services to auditing have been found in prior research [e.g. see Simunic 1984], the presence of knowledge spillovers from auditing to non-audit services is a new result. Contrary to recent results in Ferguson et al. (2001) and Frankel et al. (2002), we do not find support for the assertion that fees for non-audit services increase abnormal accruals. In fact, contrary to the results in Ashbaugh et al. (2003) and Chung and Kallapur (2003), we find that non-audit fees *decrease* abnormal accruals, which we attribute to the productive effects of non-audit services. We also find evidence that audit fees increase abnormal accruals, consistent with behavioral theories of unconscious influence or bias in the auditor-client relation. The findings are robust to tests with US data.

Keywords: auditing, auditor independence, earnings management, abnormal accruals, economies of scope, endogeneity

JEL Classification: C30, M40, M41, M49

1. Introduction

This research seeks a better understanding of audit fees, non-audit fees, and abnormal accruals by treating them as endogenously determined in a system of three equations. Recent research has examined piece-meal the relations between these variables, not fully considering the endogeneity of a company's services acquired from its auditors and its financial reporting. For instance, Frankel et al. (2002) and Ashbaugh et al. (2003) examine the relation between fees and financial reporting, not accounting for endogeneity of the firm's financial reporting and its decisions to purchase services from auditors.[1] We estimate a general formulation of possible relations among the variables, thus providing a more comprehensive analysis of the complex nature of the auditor-client relation.

Theories connecting audit fees, non-audit fees, and abnormal accruals are partial and incomplete. For instance, theories about economies of scope suggest connections between audit and non-audit fees (Antle and Demski 1991, Beck et al. 1988a, Simunic 1984) leading to an economic bond between auditor and client. Bargaining theories (Antle and Nalebuff 1991) imply a relation between accounting firm fees and the characteristics of financial reports, such as abnormal accruals. Behaviorists advance the theory that close ties between auditors and their clients generate bias in auditors, perhaps being reflected in financial reporting (Moore Lowenstein and Bazerman 2002). Basic economic theory implies that supply and demand factors influence the acquisition of services while productive effects of services provided could also be observed.

Consistent with inferences of economic bonding, a common assertion in the popular press is that fees for non-audit services are an inducement to auditors that allow clients to get away with accounting chicanery, at least part of which might be reflected in abnormal accruals.[2] The

possibility that high audit fees might have the same effect is less frequently mentioned, but no less plausible. These arguments imply that abnormal accruals and audit and non-audit fees are endogenously determined and should be estimated in a system that allows for many directions of effects among the variables.

Moreover, prior research indicates that audit fees, non-audit fees, and abnormal accruals are related to many of the same factors. For example, variables that attempt to capture agency costs, past performance, and client characteristics such as amounts of receivables and inventories have been used in studies of both audit and non-audit fees (Ashbaugh et al. 2003, Frankel et al. 2002, Firth 1997; Parkash and Venable 1993, Palmrose 1986, Simunic 1984). Therefore, prior research also suggests a system of equations containing many of the same exogenous variables.

In this research, we offer the following four main contributions. First, we rely on formal theory and informal analysis to more fully describe and analyze the auditor-client relation. While prior studies investigated possible auditor bias and economies of scope, we expand the set of factors that likely influences the auditor-client relation to pricing games, productive effects and demand and supply of services. With this expanded set of factors, we offer additional insights into the auditor-client relation. Second, our research design allows us to better investigate the source of auditor bias. As Frankel et al. (2002) note, the cause of auditor bias differs in agency literature versus behavioral literature. Agency literature characterizes auditor bias as deliberate whereas behavioral literature suggests that psychological heuristics unconsciously lead auditors to bias judgements. Both agency and behavioral causes, though, would lead to finding a relation between auditor fees and earnings management. In single equation models like ones used by Frankel et al. (2002) and Ashbaugh et al. (2003), it is not possible to distinguish the source of auditor bias. Identifying the source of auditor bias, if it exists, would better allow regulators,

educators and the profession to offer recommendations to improve auditing. An advantage of a system of equation is the two effects can be differentiated because they have different directions. Third, our formal endogeneity tests clearly show that audit fees, non-audit fees, and abnormal accruals are endogenously determined. Hence, as detailed later in this section, we gain by moving from a single equation to a joint estimation of a set of equations. Fourth, we document that failure to control for the joint determination of these variables leads to different inferences about underlying auditor-client relations.

To reflect the joint determination of the variables, we estimate a set of three simultaneous equations, one for each of audit fees, non-audit fees and abnormal accruals. We estimate the joint model using data from audit clients (firms) in both the United Kingdom[3] (UK) and the United States (US). There are two advantages in using UK data over US data. First, UK GAAP have mandated the disclosure of audit fees and non-audit fees since 1992, while in the US such disclosures have been mandatory only since 2000. Therefore, we have several years of UK data available to verify the robustness of results. Second, the disclosure requirements in the US were added at a time of potential increased scrutiny of non-audit services.[4] This potential increased scrutiny, among other things, could affect the relation between abnormal accruals and non-audit fees. A benefit of using UK data is having several years beyond when reporting requirements were first mandated. While the UK and US accounting and auditing environments share many similarities, they also exhibit differences.[5] The influence of these on the relation between non-audit fees and earnings management in the UK and in the US is unclear and is an important caveat of inferences drawn in our study. The robustness of our results, however, across the jurisdictions (US and UK) gives us added confidence in them.

Our findings differ from the single equation results of Frankel et al. (2002) and Ashbaugh et al. (2003).[6] Contrary to Ashbaugh et al. (2003), we find a significant, positive effect of audit fees on abnormal accruals in both the US and UK. Our results are consistent with higher audit fees leading to more acceptances of abnormal accruals, and support the Moore et al. (2002) theory, which posits that close ties between auditors and clients can generate bias in auditors. Also, we find no significant effect of abnormal accruals on audit fees. This finding is *not* consistent with clients using audit fees as inducements to obtain favorable treatment on abnormal accruals. That is, we find no evidence of deliberate auditor bias related to audit fees. In contrast, we find weak results that are sensitive to variable specification of an effect of abnormal accruals on non-audit fees, consistent with deliberate auditor bias related to non-audit fees. Additionally, consistent with a productive effect of non-audit services, we find a significant, negative effect of non-audit fees on abnormal accruals in the UK.[7] This result contrasts with Frankel et al. (2002) who conclude that non-audit fees appear to increase abnormal accruals.[8] We also find evidence consistent with economies of scope (or knowledge spillovers) running in both directions between audit and non-audit services in the US and UK. While knowledge spillovers from non-audit services to auditing is a known result (Simunic 1984), we do not know of any other paper documenting positive knowledge spillovers from auditing to non-audit services. Since the presence of auditor bias suggests economic bonding, finding economies of scope (which implies an economic bond between auditor and client) supports and reinforces our auditor bias findings.

The use of simultaneous equations to model the auditor-client relation allows us to more fully model the theoretical relations between audit fees, non-audit fees and abnormal accruals. We validate our joint estimation approach through statistical tests for endogeneity and overidentification restrictions. Given the strong empirical evidence of endogeneity between audit

fees, non-audit fees and abnormal accruals from Hausman tests, joint estimation, unlike single equation estimation, will lead to consistent estimates. Still, the benefits of joint estimation have to be weighed against our lack of understanding of small sample properties and the proper model specification in the joint estimation. In our regressions, we have over two thousand observations. As such, we believe small sample issues are not problematic. Since we rely on prior literature for variables to include in our models, we also do not view misspecification as problematic. At a minimum, our different joint estimation results suggest caution in accepting the conclusions of prior studies using single equations.

The remainder of the paper is organized as follows: First, we discuss in Section 2 why it is appropriate to model audit fees, non-audit fees, and abnormal accruals as simultaneously determined and we examine several theories linking these variables. In Section 3 we present our model and our approach to estimating audit quality. In Section 4, we discuss the data sources, description of control variables and the summary statistics. In Section 5 we present the results of estimating the regressions and we conclude in Section 6.

2. The relations between accounting firms' fees and abnormal accruals

In this section, our aims are to identify and review factors that relate abnormal accruals to accounting firm fees and to gain insights about their implications for observable variables. While there are many explanations for the relations, they are often conflicting leading to different predictions. Because we will estimate a system of equations, we want to understand both the signs and the directions of relations among the variables. The factors we consider are:

- Economies of scope
- Pricing "games" played by accounting firms
- Demand and supply for services
- Bribery

- Unconscious influence
- Productive effects

These factors are not mutually exclusive, nor is the list necessarily exhaustive. Empirical research in accounting has addressed piece-meal economies of scope from consulting to auditing and auditor influence, which we separate into unconscious influence and bribery. The other theories remain untested. Our joint estimation approach provides a useful starting point to test the above theories. Figure 1 contains a summary of the effects of the forces we identify. The dotted line around abnormal audit and non-audit fees suggests that the same firm receives both types of fees, and the split may not be meaningful. Of course, it is possible that we find no relations between audit fees (AF), non-audit fees (NAF) and abnormal accruals (AA). Finding no effects relating to bribery, unconscious influence, economies of scope or pricing games would be consistent with auditor incentives to maintain their reputation or limit their legal liability (Antle Griffin Teece and Williamson 1997).

Before we examine each factor in detail, we first discuss the variables and the assumptions we make. We assume that abnormal accruals are observable. Accounting firm profits are not observable, and are very likely different per dollar of fees for audit and non-audit services. We will not try to distinguish fees and profits, but it is worth noting that available evidence suggests that profitability differs between the two types of services.

Economies of scope

Typically, economies of scope are believed to arise from information effects, thought of as knowledge spillovers (Antle and Demski 1991, Beck, Frecka and Solomon 1988a, Dopuch and King 1991). Theories about economies of scope suggest connections between audit and non-audit fees leading to an economic bond between auditor and client. Economies of scope exist

when one service has a favorable effect on the other. The effect might be felt through either revenues or costs. For example, supplying audit services might enable the firm to better identify consulting opportunities. Or, delivering non-audit services could help lower audit costs by making auditors more familiar with client systems. Another possibility is that delivering audit services lowers the cost of providing non-audit services, perhaps through lowering the costs of marketing those services to an audit client.

Academic literature that empirically investigates the effects of potential economies of scope on audit fees offers mixed evidence. Using survey data from US companies, Palmrose (1986) and Simunic (1984) report a positive association between audit fees and non-audit fees. However, other studies using different US data and different research designs (Whisenant et al. 2003, Davis at al. 1993, Abdel-Khalik 1990) do not find evidence consistent with knowledge spillovers. Several studies investigating economies of scope using publicly disclosed fee data from Australia, the United Kingdom and Norway (Barkess and Simnett 1994, Craswell et al. 1985, Ezzamel et al. 1996, Firth, 1997) find a positive association between audit fees and non-audit fees. In the UK, Firth (2002) finds no evidence of an association between audit fees and non-audit fees after controlling for several factors believed to be associated with the demand for non-audit services. Therefore, debate continues on the presence of economies of scope.

Like other empirical studies, we only observe fees, not costs; therefore, we must consider effects economies of scope have on fees. If economies of scope felt through revenues show up directly in audit and non-audit fees, we expect to see a positive relation between audit and non-audit fees. At best, economies of scope felt through costs show up indirectly in fees. It is difficult to specify the sign of the relation between abnormal audit and non-audit fees that arise from a cost effect. Lower costs might induce clients to buy more services, or enable a firm to reduce

prices for non-audit services, and lead to a reduction in fees. So, the effects of economies of scope could be positive or negative in either direction: from AF to NAF or from NAF to AF, or both. There seems no particular reason why economies of scope should be related to abnormal accruals, ceteris paribus.

Pricing games played by accounting firms

It has been alleged that audit and non-audit fees are related because of pricing games played by accounting firms. The typical contention is that audit prices are lowered so the firm can get a foot in the door in order to sell non-audit services. That is, auditing is a "loss leader". If true, pricing games would lead to lower audit fees causing higher non-audit fees or vice versa. Therefore, we expect a negative relation from audit fees to non-audit fees or from non-audit fees to audit fees or both.

Demand and supply of service

Applying basic economic theory of demand and supply links fees to accruals. Abnormal accruals can cause the firm to demand additional audit and non-audit services. For example, a run up in inventory can cause a client to purchase supply-chain management services from its accounting firm. It also can cause an additional demand for audit services applied to those items. In either case, it would seem the effect should be positive. We do not know of any empirical research studying the effect of these demand factors.

Abnormal accruals might cause auditors to supply additional services. The presence of abnormal accruals might cause the accounting firm to undertake additional audit procedures to mitigate audit risk. We expect abnormal accruals to exert a positive effect on audit and non-audit fees. Again, we are not aware of empirical research addressing the effect of this supply factor.

Because we only have fee data (not the level of services) and because both supply and demand factors work in the same direction it is not possible to separately observe their effects. Still, it is meaningful to consider these factors in the overall audit-client relation.

Bribery

Deliberate bias towards a client, which we refer to as bribery, is consistent with predictions of agency theory and economic bonding between an auditor and client. An auditor concerned about the possible loss of fee revenue is less likely to object to management's accounting choices if being dismissed as auditor makes it less likely the auditor will be hired to provide non-audit services. Although rarely explicitly mentioned before, after the Enron accounting fiasco, there are now several references to bribery. For example, the New York Times of January 22, 2003, while talking about proposed rules on accounting firms has the following quote:

> "The rules are intended to address concerns that auditors may too easily approve financial disclosures to win valuable consulting contracts."

Bribery through fees is likely to lead to a positive connection between abnormal accruals and accounting firm fees. This type of inducement is also the apparent motivation for researchers looking at the link between abnormal accruals and fees to auditors (Ashbaugh et al. 2003, Frankel et al. 2002, Gore et al. 2001). For instance, Frankel at al. (2002) operationalize the economic bond between auditors and their clients by using the proportion of non-audit fees to audit fees,[9] and find that this proportion is positively related to companies' abnormal accruals for income increasing accruals. They conclude that the provision of non-audit services strengthens the economic bond, implying audit independence is compromised.

Ashbaugh et al. (2003) replicate and extend Frankel et al. (2002) finding conflicting results. When they repeat tests using the proportion of non-audit fees to audit fees, they find that

only income decreasing performance adjusted accruals are significantly related to the ratio of non-audit fees to audit fees and the relation is negative, which they attribute to auditor conservatism. Ashbaugh et al. (2003) also use total fees to represent the economic bond between audit and client, and find similar results, again implying auditor conservatism. Chung and Kallapur (2002), operationalizing the client's importance to the audit firm as the proportion of client fees to the audit firm's total US revenues, do not find a link between audit fees and abnormal accruals.

These authors interpret their findings as (lack of) evidence that audit quality is (not) impaired as the magnitude of non-audit services increase. However, a basic problem with their approaches is that, under the maintained hypothesis that clients are using (or not using) their purchases of non-audit services to get favorable treatment from their auditors, the fees for these non-audit services and the abnormal accruals are jointly determined.

Further, it seems needlessly restrictive to envision that a client that wants to bribe his auditor would do so only with a contract for the supply of non-audit services. Alternatively, the client could simply pay an extraordinarily large audit fee. This possibility has not been taken very seriously by academic literature to date, possibly because of extant rhetoric about audits being "loss leaders" used simply to gain access to the sale of "lucrative" consulting contracts. Antle and Gitenstein (2000) present data from the Big Five in the US that shows that auditing is a profitable business. Additionally, it would seem more effective to bribe an accounting firm through audit fees than through fees for non-audit services. Non-audit fees would have to be shared with non-audit partners, or would at least entail transactions costs of bargaining with them. Bribing an auditor through non-audit fees would entail involving non-audit partners, if the bill for non-audit services was padded, or would entail the performance of additional services, if

the bribe is in the form of an undeserved yet profitable contract for non-audit services. However, even though it seems inefficient to bribe auditors using non-audit fees, we cannot rule it out a priori. If bribery, or an inducement for favorable financial reporting, links fees and abnormal accruals, we expect a positive relation between abnormal accruals and both audit and non-audit fees.

A link between fees and abnormal accruals due to bribery should only be observed when management has incentives to play financial reporting games. We further examine the effects of incentives by using an alternative measure of abnormal accruals. See Appendix A for details.

Influence or bias

Unconscious influence or auditor bias is also possible. Close ties between auditors and their clients can generate bias in auditors, perhaps even in ways of which auditors themselves are unaware (Moore, Lowenstein and Bazerman 2002). This bias could be created by both audit and non-audit fees, and would make it easier for clients to get auditors to accept abnormal accruals. While the effects of unconscious influence or bias and bribery on the financial statements could be similar, unconscious influence or bias is perhaps perceived as less deliberate and egregious. The implication for regulations aimed at improving auditing will also be different.

The direction of the effect would run from audit and non-audit fees to discretionary accruals, and we expect the effect to be positive. The effects might be different for one dollar of audit or non-audit fees if the bias is created by the profits in a relationship instead of revenues. In a single equation model like ones used by Ashbaugh et al. (2003) and Frankel et al. (2002), it is not possible to distinguish between bribery and influence or bias. An advantage of a system of equation is the two effects can be differentiated because they have different directions.

Productive effects

Companies often seek non-audit services to improve operating performance or effectiveness. For example, suppose a client hires its accounting firm to install an inventory control system. If the system is effective, these non-audit services could lead to lower abnormal accruals. Productive effects resulting from non-audit services suggest that non-audit fees lead to negative abnormal accruals.

Possible effects of combinations of factors, direct effects and indirect effects

The factors discussed above suggest a web of relations among audit fees, non-audit fees, and abnormal accruals, summarized in Figure 1. Arrows among audit fees, non-audit fees and abnormal accruals, give the possible directions of effects. The hypothesized signs are shown next to the notation for the effects.

The factors are not mutually exclusive. In fact, it seems quite the reverse: the presence of none of the factors appears to rule out any of the others. Empirically, this implies that we will only observe their net effects. Figure 1 suggests, however, that it is still possible to differentiate among the factors. For example, under the economy of scope hypothesis, increased audit fees could be positively related to non-audit fees, whereas the pricing games hypothesis implies an inverse relation. Also, the bias and productive effects hypothesis predict opposite signs on the coefficient of non-audit fees in the abnormal accruals equation. Of course, a positive coefficient on non-audit fees in the abnormal accruals equation does not imply that there is no productive effect, only that it is outweighed by the bias effect.

Figure 1 about here

3. Modeling the endogeneity of companies' demand for audit services, non-audit services and financial reporting

In this section, we discuss our research design which models audit fees, non-audit fees, and abnormal accruals in a system of simultaneous equations. Following from the previous discussion, we view audit fees, non-audit fees, and abnormal accruals as being jointly determined, where the general form of their relation is as follows (firm and year subscripts omitted):

$$\text{AF} = \alpha_{AF0} + \alpha_{AF1}\text{NAF} + \alpha_{AF2}\ \text{AA} + \sum\nolimits_{p} \alpha_{AFp}\ \text{Control Variables} + \text{e}_{\text{AF}} \qquad (1a)$$

$$\text{NAF} = \alpha_{NAF0} + \alpha_{NAF1}\text{AF} + \alpha_{NAF2}\ \text{AA} + \sum\nolimits_{q} \alpha_{NAFq}\ \text{Control Variables} + \text{e}_{\text{NAF}} \qquad (1b)$$

$$\text{AA} = \alpha_{AA0} + \alpha_{AA1}\text{AF} + \alpha_{AA2}\ \text{NAF} + \sum\nolimits_{r} \alpha_{AAr}\ \text{Control Variables} + \text{e}_{\text{AA}} \qquad (1c)$$

Where:

AF = audit fees
NAF = non-audit fees
AA = abnormal accruals

Based on our previous discussion we interpret results as being consistent or not consistent with the factors identified. For instance, in the audit fee equation, a significant coefficient, either positive or negative, on NAF implies economies of scope derived from non-audit services. A negative coefficient on NAF may also suggest pricing games in the determination of audit fees. A positive coefficient on AA in the audit fee equation is consistent with demand factors, supply factors or bribery influencing the audit fees.

In the non-audit fee equation, a significant coefficient on AF implies either economies of scope from the provision of the audit services or pricing games played by the auditor. While a positive coefficient on AA in the non-audit fee equation suggests demand factors, supply factors or bribery influencing the non-audit fees.

In the abnormal accruals equation, a positive coefficient on AF or NAF suggests influence or bias on the auditor's part in the determination of abnormal accruals. Additionally, a negative coefficient on NAF indicates productive effects related to the provision of non-audit services.

In the audit fee equation, we introduce a variable to control for peak pricing in audit fees. December fiscal year-ends are busy times for auditors and we expect this to be reflected in their pricing policies. The variable, FISDEC, is an indicator variable taking the value of one for firms with a December fiscal year-end and zero otherwise.[10] Other variables in the audit fee equation control for agency costs, risk, audit effort, auditor characteristics, financial distress, past performance and company size, as described in prior research (Simunic 1984, Palmrose 1986, Firth 1997). We include leverage (LEV) as a variable to capture agency costs. Risk variables, which are expected to be positively associated with audit fees, are the quick ratio (QUICK), market-to-book ratio at the beginning of the year (BMB), and whether the firm reported a loss in the previous year (LOSS). LEV and LOSS also proxy for financial distress. We include a variable, LITI, to capture potential litigation risk for firms in those industries defined in Francis et al. (1994). An additional risk variable we include is whether a firm received a qualified audit opinion, QUAL. However, we do not have an ex-ante expectation of the sign of the coefficient on QUAL. To the extent a qualified opinion is a measure of firm risk, we expect audit fees to rise in QUAL. Alternatively, to the extent the existence of a qualified opinion lowers risk for the auditor, QUAL can serve to reduce audit fees.

To control for audit effort and complexity, we include accounts receivable (LOGAR) and inventory (LOGINV). Higher levels of accounts receivable and inventory are expected to require greater audit effort and be associated with higher audit fees. We introduce variables to control for

auditor characteristics: Big Six audit firm (BIG) and auditor's retention (RETAIN). We expect a positive relation between Big Six audit firms and audit fees because Big Six audit firms can charge a premium as high quality auditors (DeAngelo 1981). We do not have an ex-ante prediction for the sign on the retention variable since two competing hypotheses lead to different expected signs. A positive sign on the retention coefficient is expected if entrenched auditors can charge higher fees. Alternatively, retained auditors have the benefit of prior knowledge and experience, which can lead to lower fees. Besides LOSS, we also include lagged return on assets (LROA) to control for past performance.

Finally we control for firm size (BLOGTA) and lagged abnormal accruals. Because firm size could capture many factors such as complexity and risk, we do not have an expectation on the sign of the coefficient. We include lagged abnormal accruals because audit fees are typically determined before the end of the year. In such a scenario, it is possible managers and auditors do not have the flexibility to adjust the audit fee depending on the extent of earnings manipulation. Hence it is possible that earnings manipulation influences the next period's audit fees. As such, we include lagged abnormal accruals (LAA) in our model for the demand for audit fees.

In the non-audit fee equation, we include taxes paid to capture potential non-audit services related to tax consulting. We expect that non-audit tax consulting services to firms is a component of non-audit services although UK GAAP does not require the disclosure of non-audit fees by tax related fees and non-tax fees. We approximate the demand for non-audit tax related services with the variable, LOGTAX. In selecting tax expense, we relied on a survey of US companies we are conducting in a separate but related research project.[11] In the survey we found that approximately 58% of respondents purchased tax related non-audit services from their auditors. Further, in the survey sample, the correlation between the log of non-audit fees and the

log of tax expense is significant with a p-value of 0.003, suggesting tax expense is a variable that significantly affects the provision of non-audit services.[12] Other variables in the non-audit fee equation control for agency costs, risk, auditor characteristics, financial distress, past performance and company size, similar to the audit fee equation. We also retain LOGINV as a proxy for non-audit service demand. When inventory is high, the firm is more likely to purchase consulting services such as supply chain management services.

In the abnormal accruals equation, we include risk, auditor characteristics and firm size variables plus scaled operating cash flows, SOCF, to control for operating performance. Riskier firms could be more prone to making abnormal accruals, but may be subject to greater scrutiny as a result. The net effect is uncertain. If the Big Six auditors are more conservative than non-Big Six auditors, we should see a negative coefficient on BIG. We do not predict the sign on RETAIN, as retention might indicate greater knowledge of the client or an entrenched auditor. We include scaled operating cash flows to control for operating performance and other unidentified determinants of abnormal accruals. We expect that this variable is related to abnormal accruals but not audit fees or non-audit fees.

In the audit fee equation, we exclude two exogenous variables: LOGTAX and SOCF. In the non-audit fee equation, we exclude three exogenous variables: FISDEC, LOGAR and SOCF. In the abnormal accruals equation, we exclude four exogenous variables: FISDEC, LOGAR, LOGINV and LOGTAX. The audit fee equation is exactly identified, while the other two are overidentified. We conduct Basmann tests for the two overidentified equations to ensure that the overidentifying restrictions are not rejected as further discussed in the results section.

The estimation of abnormal accruals itself has been the subject of extensive research.[13] In the results presented in the paper, we estimate abnormal accruals using a variation of the

modified-Jones model that is advocated by Dechow et al. (1995). Like Ferguson et al. (2000), we focus on working capital accruals. The model used to estimate normal working capital accruals is:

$$WCA/TA = \alpha(1/TA) + \beta[\Delta REV - \Delta REC)/TA] + \varepsilon \qquad (1)$$

Where:

WCA = current working capital accruals of the company
TA = total assets of the company at the beginning of the year
ΔREV = the current change in revenue
ΔREC = the current change in receivables

We estimate the model separately for each industry. Abnormal working capital accruals are then calculated as the error term in the above regression.

To summarize, to assess the joint determination of audit fees, non-audit fees and abnormal accruals, we estimate the following systems of simultaneous equations:

$$\begin{aligned} LOGAF = {} & a_{AF0} + a_{AF1}\,LOGNAF + a_{AF2}\,AA + a_{AF3}\,FISDEC + a_{AF4}\,LEV + a_{AF5}\,QUICK \\ & + a_{AF6}\,BMB + a_{AF7}\,LOSS + a_{AF8}\,LITI + a_{AF9}\,QUAL + a_{AF10}\,LOGAR \\ & + a_{AF11}\,LOGINV + a_{AF12}\,BIG + a_{AF13}\,RETAIN + a_{AF14}\,BLOGTA + a_{AF15}\,LAA \\ & + a_{AF16}\,LROA + \varepsilon_{AF} \end{aligned} \qquad (2a)$$

$$\begin{aligned} LOGNAF = {} & a_{NAF0} + a_{NAF1}\,LOGAF + a_{NAF2}\,AA + a_{NAF3}\,LOGTAX + a_{NAF4}\,LEV \\ & + a_{NAF5}\,QUICK + a_{NAF6}\,BMB + a_{NAF7}\,LOSS + a_{NAF8}\,LITI + a_{NAF9}\,QUAL \\ & + a_{NAF10}\,BIG + a_{NAF11}\,RETAIN + a_{NAF12}\,BLOGTA + a_{NAF13}\,LAA + a_{NAF14}\,LOGINV \\ & + a_{NAF15}\,LROA + \varepsilon_{NAF} \end{aligned} \qquad (2b)$$

$$\begin{aligned} AA = {} & a_{AA0} + a_{AA1}\,LOGAF + a_{AA2}\,LOGNAF + a_{AA3}\,SOCF + a_{AA4}\,LOSS + a_{AA5}\,LITI \\ & + a_{AA6}\,QUAL + a_{AA7}\,BIG + a_{AA8}\,RETAIN + a_{AA9}\,BLOGTA + a_{AA10}\,LAA \\ & + a_{AA11}\,QUICK + a_{AA12}\,LEV + a_{AA13}\,BMB + a_{AA14}\,LROA + \varepsilon_{AA} \end{aligned} \qquad (2c)$$

Where:

FISDEC = Indicator variable equal to one if fiscal year end is in December, and zero otherwise
LEV = Leverage ratio
QUICK = Quick ratio

BMB = Market value of equity divided by book value of equity (at beginning of year)
LOSS = Indicator variable equal to one if the previous year's net income was negative and zero otherwise
LITI = Indicator variable equal to one if firm is in a is high litigation risk industry and zero otherwise
QUAL = Indicator variable equal to one if opinion was qualified and zero otherwise
LOGAR = Natural logarithm of (accounts receivable + 1)
LOGINV = Natural logarithm of (inventory + 1)
BIG = Indicator variable equal to one if auditor was Big Six Firm identified as Arthur Anderson, Coopers & Lybrand, Deloitte & Touche, Ernst &Young, KPMG or Price Waterhouse
RETAIN = Indicator variable equal to one if the auditor was not changed during the current fiscal year and zero otherwise
LAA = Lagged abnormal accruals
BLOGTA = Natural logarithm of (total assets of the firm at the beginning of the fiscal year)
LOGTAX = Natural logarithm of [income taxes plus absolute value of minimum income taxes (negative) plus one]
SOCF = Operating cash flows, scaled by beginning of period total assets
LROA= Lagged Return on Total Assets

4. Data

We study data from both the United Kingdom (UK) and the United States (US). UK data on audit and non-audit fees are available over a longer period of time than US data, and provide an opportunity to diversify away time-specific effects. As discussed in Appendix B, the economic and legal systems of the two countries share similarities so that analyses done on one might bear on the other. We develop our empirical model on UK data, and provide comparative analyses of the US data.

Audit fees and non-audit fees have been mandatorily disclosed in UK annual reports since 1992. We have acquired this data spanning 1994 to 2000 from Financial Times. Other data for the UK have been obtained from Global Vantage.

Audit and non-audit fees have been mandatorily disclosed in the US beginning in 2000. We acquired data on these US fees from the Investor Responsibility Resource Center (IRRC).

Each year, the IRRC designates 4,000 firms about which it will collect and distribute information. The designation reflects both the size of the firm and the likelihood that it is involved in activities of interest to social activists.

We began with 4,145 UK firm years with valid Financial Times and Global Vantage data. After we estimate abnormal accruals using the three approaches outlined in Appendix A, the sample was reduced to 2,294 UK firm years. Table 2 Panel A provides the distribution of sample firms by year. They are not clustered in any particular year and are well spread out. There are fewer observations in 2000, primarily due to data availability in Global Vantage and because we purchased Financial Times data in the summer of 2001. Panel B provides the distribution of sample firms by industry. The largest group is in retail and that is less than 15% of the sample indicating the dispersed nature of the sample.

We obtained fee data on 3,196 US firms from the IRRC. 1,626 of these firms did not have sufficient Compustat data, resulting in a sample of 1,570 US firms for fiscal year 2000.

Table 3 provides the summary statistics of audit and non-audit fees for our sample. Panel A shows the average (median) audit fees paid was about £450 thousand (£140 thousand) This variation is comparable to US firms where we find the average (median) audit fees were about $600 thousand ($280 thousand). The average (median) non-audit fees paid in the UK sample was £500 thousand (£280 thousand) with. This variation is again comparable to US firms where we find an average (median) of $1.28 million ($324 thousand).[14]

Table 3 also presents other key summary statistics describing our final sample. The average beginning total assets was £1.23 billion. About 82% of the sample used a Big Six auditor. 11.8 % of the sample reported a loss in the previous year.

5. Results

The system of simultaneous equations (eq. 2a, 2b and 2c) is estimated using two-stage least squares. We present results in the subsection 5.1 with the description and interpretation of our main findings on UK data. We also perform a number of other analyses aimed at understanding the robustness of our findings and comparing our work to previous literature in a step-by-step fashion. Subsection 5.2 discusses the relation between the joint estimation and OLS estimation of each equation separately. Subsection 5.3 compares the results of the joint estimation of the abnormal accruals equation with an OLS estimation using the ratio of non-audit to total fees as an explanatory variable. Subsection 5.4 presents US results and compares them to those from the UK.

5.1 Results of Joint Estimation on UK Data

The two-stage least squares estimation of the system of simultaneous equations (eq. 2a, 2b and 2c), along with OLS estimation of each equation separately, is presented in Table 4. Hausman endogeneity test yields a statistic of 103.52 rejecting exogeneity at the 0.0001 probability level for the audit fee equation. Similarly Hausman test results for the other two equations also reject exogeneity. Thus, the variables are endogenous. The audit fee equation is exactly identified, while the other two are overidentified. We conduct Basmann tests for the two overidentified equations, and the results indicate that for both the non-audit fee equation and the abnormal accrual equation, the overidentifying restrictions are not rejected.

Audit fees: Equation (2a)

In the audit fees equation, the coefficient on abnormal accruals is not significant, inconsistent with demand factors, supply factors or bribery. The coefficient on the non-audit fee variable is

positive and significant, consistent with an economy of scope between non-audit services and audit services. Of the control variables, LITI, LOGAR, LOGINV and BIG are significant. The coefficients on LOGAR and LOGINV are positive and significant, indicating audit prices are higher for more complex audits. Also, it is worth noting that the coefficient on the BIG variable is negative, indicating perhaps that the Big Six enjoy cost advantages that are passed on to their clients.

Non-audit fees: Equation (2b)

The coefficient on LOGAF (audit fees) is significantly positive, suggesting knowledge spillovers from the auditing to the non-auditing services. The coefficient on abnormal accruals is marginally significant and positive consistent with demand factors, supply factors or bribery. Importantly, in contrast to the other results reported, this result is not robust to the choice of lagged market value (instead of lagged total assets) as deflator, weakening the evidence of demand factors, supply factors or bribery leading to a relation between abnormal accruals and non-audit fees.

The coefficient on LOGTAX is positive and significant, indicating that a significant portion of the non-audit fees is tax related and hence, probably non-discretionary. The coefficient on BIG is positive indicating (though insignificant) that it is more expensive to have non-audit services performed by Big Six auditors.[15] If Big Six auditors' services are more value-added than non Big Six auditors' services, it can lead to a positive coefficient on BIG. The coefficient on past performance (LOSS) is significantly positive, implying that a firm contracts for more non-audit services when its past performance has been poor. The coefficient on size (BLOGTA) is also significantly positive suggesting bigger firms purchase more non-auditing services. Finally, the coefficient on LOGINV is negative and significant indicating lower inventory levels,

possibly due to supply chain management services rendered by the auditors, is consistent with the productive effects discussed earlier.

Abnormal accruals: Equation (2c)

In this equation, we find that the coefficient on audit fees is positive, which is consistent with the influence or bias by the auditor. The coefficient on non-audit fees, however, is negative which is inconsistent with influence or bias, but is consistent with non-audit services having a productive effect in lowering accruals.

Scaled operating cash flows, which controls for operating performance and other unidentified determinants of abnormal accruals, is significantly negative. BIG has a positive coefficient, indicating that clients of Big Six auditors have higher abnormal accruals than clients of other auditors. The controls for past performance (LROA) and lagged abnormal accruals (LAA) are also positive.

Robustness Tests

As robustness checks we examine the sensitivity of results to estimating annual regressions, to the choice of deflator and to the model of abnormal accruals. To address the possibility that a particular year was driving the pooled regression results, we estimate annual regressions and get similar results (not reported).[16] We examine the sensitivity of results to the choice of lagged market value as the deflator. When we deflate by lagged market value, results are similar except that the coefficient on abnormal accruals in the non-audit fee equation is no longer significant as already mentioned. To address the concern of autocorrelated errors from using pooled data, we sum up absolute value of abnormal accruals by firm, for all years of data

and run one regression. Thus, each firm is only included once. The coefficient signs are unchanged from the pooled regression.

Appendix A presents the models and results for three alternative definitions of abnormal accruals: 1) the absolute value of abnormal accruals estimated using the modified Jones model, 2) abnormal accruals using the modified-Jones Model adjusted for earnings management incentives and 3) scaled working capital accruals. Results using the alternative definitions of abnormal accruals indicate that our main findings relating to audit fees, non-audit fees and abnormal accruals are fairly consistent across all definitions of abnormal accruals.

Figure 2 visually summarizes of our main results in terms of their relation to the effects of the several factors given in section 3. Thus, Figure 2 is the "estimated" version of Figure 1.

Insert Figure 2 about here

5.2 Comparison of Joint Estimation with Separate OLS Estimation

Since Hausman tests indicate endogeneity, OLS coefficients are biased and inconsistent. To determine the benefit of the joint estimation, Table 4 also reports the results of separate OLS estimate of each equation in the system. The signs of the coefficients for the audit fee equation are remarkably similar, except for the coefficients on firm size (BLOGTA) and LOSS, AA, FISDEC, LEV and QUICK also become insignificant. The results for non-audit fee equation are virtually identical. The same variables are significant, all their signs are the same, and even their magnitudes are extremely close. The only exception is AA which is marginally significant in the joint estimation, but insignificant in OLS

The major differences in the results of the system approach to the OLS estimation are in the abnormal accruals equation. OLS estimation shows neither audit fees nor non-audit fees as

significant. Additionally, BIG is not significant in the OLS estimation, whereas it is in the system estimation. LITI is significant in OLS, but not in the joint estimation. The coefficient on size is positive in OLS, but negative in the joint estimation.

5.3 Comparison of Abnormal Accrual Equation Estimation Using Separate OLS Estimation and Ratio of Fees as an Explanatory Variable

Prior literature (Firth 1997, Frankel et al. 2002) used the ratio of non-audit to audit fees or to total fees to study economic bonding in the auditor-client relation. To compare to these prior studies, we also examine the sensitivity to this research design choice. Table 5 contains results of using the ratio of non-audit fees to audit fee as the dependent variable in our analysis. To facilitate comparison to Frankel et al. (2002), we use the absolute value of abnormal accruals. The ratio specification indicates that the coefficient on AA is positive, consistent with Frankel et al. (2002). However, we should note that use of the ratio masks the differing effects of the audit fee and non-audit fee variables. In Appendix A (Table A2), we also present OLS results using AF and NAF as separate independent variables (not as a ratio). The coefficient on NAF is positive and significant while the coefficient on AF is negative.

5.4 US Results and Comparison with UK Results

US data on audit and non-audit fees have been available since February 2001. In order to determine if our UK results are generalizable to the US, we ran preliminary replications of our tests on the limited US data available. Table 6 shows the joint estimation of the audit fee, non-audit fee and abnormal accruals regressions with US data for the year 2000. Comparing with the UK results in Table 4, the relations between the endogenous variables are similar in the UK and the US. In the audit fee regression, similar to the UK, we continue to see a significant coefficient

for non-audit fees. In the non-audit fee regression also, similar to the UK, the coefficient on audit fees is positive and significant. The coefficient on abnormal accruals is positive in both regressions even though it is marginally significant in UK and not significant in the US. Mirroring the UK results, in the abnormal accrual regression, the sign of the coefficient on non-audit fees is negative (but not significant) and the sign of the coefficient on audit fees is positive. There are, however, some differences in the coefficients on some of the control variables across the US and the UK. For example, the coefficient on inventory (LOGINV) in the audit fee regression is positive (similar to UK), but insignificant while in the UK it is strongly significant.

Thus, a preliminary replication of our tests using US data indicates that main results for the UK outlined earlier are robust when extended to the US.

6. Conclusion

This paper investigates the relations among audit fees, non-audit fees and abnormal accruals through estimating a simultaneous set of equations. We offer four main contributions to existing literature. First, we rely on formal theory and informal analysis to more fully describe and analyze the auditor-client relation. We expand the set of factors that likely influences the auditor-client relation beyond possible auditor bias and economies of scope previously studied to pricing games, productive effects and demand and supply of services. Second, our research design allows us to better investigate the source of auditor bias characterized differently in the agency and behaviorial literature. Third, our formal endogeneity tests clearly show that audit fees, non-audit fees, and abnormal accruals are endogenously determined. Hence, we gain by moving from a single equation to a joint estimation of a set of equations. Fourth, we document that failure to control for the joint determination of these variables leads to different inferences about underlying auditor-client relations.

By recognizing and incorporating in the research design the simultaneity of the decision to acquire services from auditors and the financial reporting our study avoids four main weaknesses with prior approaches. One weakness is that prior research treats audit fees and non-audit fees as exogenous in the estimation of abnormal accruals. Another is some studies find knowledge spillovers between the provision of audit and non-audit services. Thus audit and non-audit fees are jointly determined. A third weakness is that the studies linking abnormal accruals to non-audit services often use the ratio of non-audit to audit fees as a proxy for the extent of non-audit services. In such a linkage, it is not clear whether it is non-audit fees or audit fees that drive the reported relation. Finally, piece-meal estimation does not adequately address the multitude of theories of the relations between the variables.

Our main sample is UK firms from 1994 through 2000, but we verified the robustness of these results using US data. We find a significant, positive and robust effect of audit fees on abnormal accruals in both the US and UK. This finding is consistent with higher audit fees leading to more acceptances of abnormal accruals and supports the unconscious influence or bias theory in the behavioral literature. On the other hand, we find no evidence of deliberate auditor bias related to audit fees and only weak and unstable evidence of deliberate auditor bias related to non-audit fees. Finding unconscious influence or bias in audit fees supports increased measures to deter close ties between auditors and clients in the audit function. For instance, increased education and training can make auditors aware of unconscious bias and provide potential ways to avoid it. Or, regulatory avenues can deter close relationships between auditors and clients.

We also find evidence consistent with economies of scope (or knowledge spillovers) running in both directions between audit and non-audit services in the US and UK. While

knowledge spillovers from non-audit services to auditing is a known result (Simunic 1984), we do not know of any other paper documenting knowledge spillovers from auditing to non-audit services. Since the presence of auditor bias suggests economic bonding, finding economies of scope (which implies an economic bond between auditor and client) supports and reinforces our auditor bias findings.

Our results are robust across jurisdictions (UK and US), under alternative definitions of abnormal accruals, with an alternative deflator (except for abnormal accruals in the non-audit fee equation) and in yearly regressions. While our tests using US data are consistent with the UK findings, our robustness checks indicate that a closer examination of US data is warranted. However, the availability of future data is uncertain, since there may be drastic changes in the structure of accounting firms and the regulations that apply to them. Refining the approach to more explicitly incorporate earnings management incentives would seem at this point to be a surer avenue for future research.

Endnotes

[1] Whisenant et al. (2003) address the joint determination of audit and non-audit fees but do not examine financial reporting.

[2] See, for example, "Lone Ranger of Auditors Fell Slowly Out of Saddle," *The New York Times*, Business Day, April 20, 2002, page C1.

[3] A concurrent study by Gore et al (2001) also examines issues similar to the ones addressed here using UK data. Also see endnote 8.

[4] For example, the SEC held hearings on July 26, 2000 regarding its proposed rule, "Revision of the Commission's Auditor Independence Requirements", at which one of the authors of this paper testified.

[5] A detailed discussion of the similarities and differences are presented in Appendix B.

[6] The differences are not simply a function of sample selection. We replicated the single equation models from these papers using our data and got similar results. Therefore, the differences in findings are attributable to the joint estimation framework.

[7] The sign of the effect is the same in the US, but the coefficient is not statistically significant.

[8] Gore et al. (2001) is another paper using data from UK to address the issue of whether non-audit fees affect abnormal accruals. Similar to Frankel et al. (2002), they run regressions of abnormal accruals against the ratio of non-audit to audit fees. Across three different earnings management incentive partitions, they find firms with non-Big five auditors exhibit a positive association between abnormal accruals and the ratio of non-audit to audit fees. For their sample of firms audited by Big Five firms, however, their results are mixed across the partitions. Given that nearly 82% of our sample is audited by Big Five firms, the latter is a more meaningful comparison.

[9] This is similar to Firth (1997).

[10] While we expect the audit fees to increase in FISDEC, there is recent research in economics [eg. Chevalier et al (2001)] showing that prices are not necessarily the highest during periods of peak demand.

[11] We surveyed US companies to ascertain the types of non-audit services demanded and whether they were supplied internally, by their independent accountants or by some other service provider. Our survey was for fiscal year 2001 and 64 companies responded with sufficient data to summarize (about 5% of companies surveyed).

[12] Additionally, for U.S. data, we included two other possible proxies for non-audit services acquired from auditors. We find that our results are robust to inclusion whether or not a company is involved in M&A activity and the amount spent on information technology services acquired from auditors.

[13] E.g., see Dechow et al. (1995), Guay et al. (1996), Subrahmanyam (1996), Thomas and Zhang (2000). Also see the section titled 'Robustness Tests' and Appendix A1 for additional tests using alternative definitions of abnormal accruals.

[14] Frankel et al.(2000) report an average (median) audit fee of $ 511,000 ($191,000), a minimum of $5,000 and a maximum of $ 48 million from 2001 proxies. They report an average (median) non-audit fee of $1.26 million ($221,000), a minimum of zero and a maximum of $79.7 million.

[15] However, due to limited requirements for the disclosure of types of non-audit services provided, like other studies we cannot control for the nature of non-audit services.

[16] Since there are six endogenous coefficients in our regressions, we estimate forty-two total yearly coefficients in the seven annual regressions. The signs and significance of thirty-nine of the coefficients are similar to the pooled results, demonstrating that the pooled results are robust.

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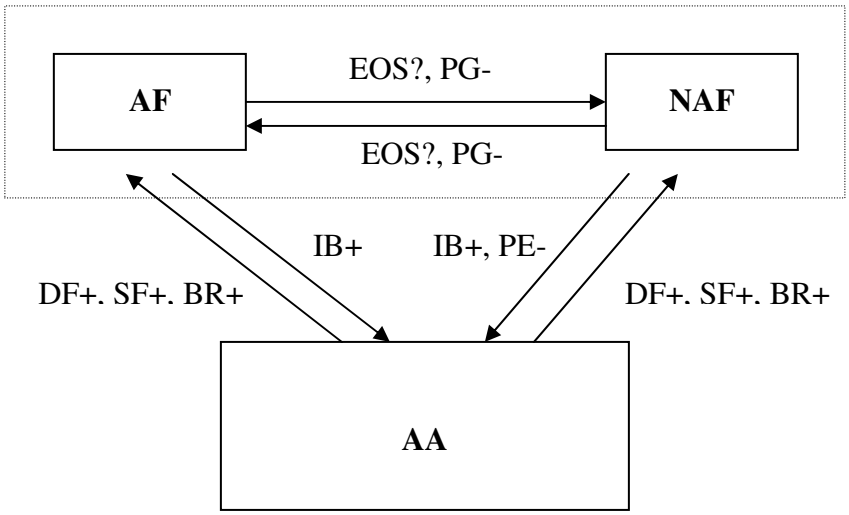
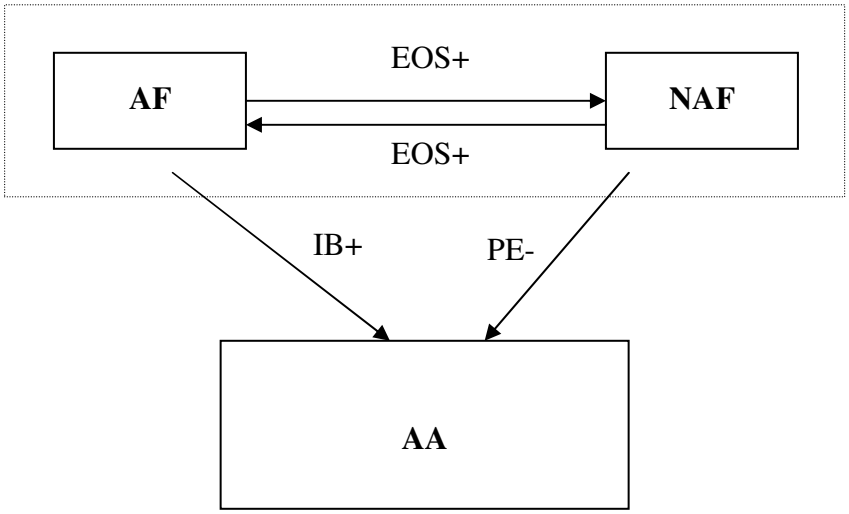
Figure 1: Effects possible from a number of factors



Definitions:

BR	Bribery	Arrow indicates direction of effect
DF	Demand factors	? indicates unknown sign of effect
EOS	Economies of scope	+ indicates positive effect
IB	Influence or bias	- indicates negative effect
PE	Productive effects	
PG	Pricing games	
SF	Supply factors	

Figure 2: Summary of estimated effects



Definitions:

EOS	Economies of scope	Arrow indicates direction of effect
IB	Influence or bias	+ indicates positive effect
PE	Productive effects	- indicates negative effect

Table 1
Variable Definitions

Variable	Description
AA	Abnormal accruals estimated using the modified Jones model
AF	Audit fees
BIG	Indicator variable equal to one for a Big Six auditor (Arthur Anderson, Coopers & Lybrand, Deloitte & Touche, Ernst &Young, KPMG or Price Waterhouse) and zero otherwise
BLOGTA	Log of the beginning of period total assets
BMB	Ratio of market value of common equity at the end of the prior period to book value of common equity at the end of the prior period
FISDEC	Indicator variable equal to one if the fiscal year end is December and zero otherwise
LAA	Lagged abnormal accruals
LEV	Leverage ratio
LITI	Indicator variable which is one for certain industries defined in Francis et al. (1994) for industries in which firms are more likely to beat earnings benchmarks, zero otherwise
LOGAF	Natural logarithm of (AF plus 1)
LOGAR	Natural logarithm of (accounts receivable plus 1)
LOGINV	Natural logarithm of (inventory plus 1)
LOGNAF	Natural logarithm of (non-audit fees plus 1)
LOGTAX	Natural logarithm of [income taxes plus absolute value of minimum income taxes (negative) plus 1]
LOSS	Indicator variable equal to one if previous year's reported earnings are negative, and zero otherwise
NAF	Fees for non-audit services
QUAL	Indicator variable equal to one if audit opinion was qualified, and zero otherwise
QUICK	Quick ratio
RATIO	Fees for non-audit services paid to the audit firm divided by audit fees
REV	Revenue
REC	Receivables
SOCF	Operating cash flow, scaled by beginning total assets
RETAIN	Indicator variable equal to one if auditor is same as in prior year, and zero otherwise
SWCA	Working capital accruals, scaled by beginning total assets
WCA	Working capital accruals

Δ denotes change in the variable.

Table 2
Characteristics of the Sample

Panel A: Sample Distribution by Year

	UK		US	
Year	Frequency	Percent	Frequency	Percent
1994	303	13.21		
1995	326	14.21		
1996	306	13.34		
1997	322	14.04		
1998	357	15.56		
1999	495	21.58		
2000	185	8.06	1,570	100
Total	2,294	100.00%	1,570	100.00%

Panel B: Sample Distribution by Industry

	UK		US	
Industry*	Frequency	Percent	Frequency	Percent
agriculture and forestry	11	0.48	5	0.32
amusement	66	2.88	22	1.4
business services	178	7.76	285	18.15
chemical	129	5.62	164	10.45
construction	163	7.11	12	0.76
electrical machinery	173	7.54	249	15.86
fabricated metal	40	1.74	28	1.78
food and tobacco	113	4.93	33	2.1
furniture	31	1.35	23	1.46
health, education & other services	114	4.97	85	5.41
manufacturing machinery	118	5.14	120	7.64
mining	23	1.00	11	0.7
misc manufacturing	32	1.39	15	0.96
oil and gas extraction	29	1.26	62	3.95
paper	130	5.67	57	3.63
personal services and repair	60	2.62	17	1.08
primary metal	64	2.79	37	2.36
real estate and investment	38	1.66	12	0.76
retail	300	13.08	148	9.43
rubber and leather	36	1.57	24	1.53
stone, clay etc	86	3.75	14	0.89
textile	113	4.93	25	1.59
transit	35	1.53	19	1.21
transportation equipment	70	3.05	39	2.48
wholesale	142	6.19	64	4.08
Total	2,294	100%	1,570	100%

Table 3
Summary Statistics

	UK			US		
Variable	Mean	Median	Std Dev	Mean	Median	Std Dev
AF	0.452	0.141	1.263	0.599	0.280	1.046
NAF	0.500	0.093	2.098	1.287	0.324	3.651
AA	0.010	0.008	0.062	-0.007	0.006	0.188
FISDEC	0.403	0	0.491	0.750	1	0.433
LEV	0.122	0.077	0.137	0.184	0.076	0.235
QUICK	1.075	0.864	1.459	2.437	1.326	4.020
BMB	4.185	2.112	15.451	7.070	2.764	25.726
LOSS	0.118	0	0.322	0.276	0	0.447
LITI	0.234	0	0.424	0.410	0	0.492
QUAL	0.012	0	0.110	0.134	0	0.341
AR	216.069	37.394	818.719	243.774	55.484	682.894
INV	164.508	25.755	478.574	189.382	27.278	540.467
BIG	0.819	1	0.385	0.960	1	0.196
RETAIN	0.889	1	0.314	0.936	1	0.244
LAA	0.008	0.006	0.067	-0.016	0.005	0.243
TA (*beginning of the year)*	1234.960	179.570	4698.800	1556.640	325.145	3774.280
TAXES	38.857	5.312	166.102	53.523	8.393	181.767
SOCF	0.136	0.133	0.127	0.046	0.082	0.250
LROA	0.053	0.065	0.111	-0.002	0.040	0.203

Notes:
See table 1 for variable definitions.
Amounts reported in millions are millions of pounds in the United Kingdom and dollars in the United States.

Table 4
Joint estimation and OLS estimation of audit fee, non-audit fees and abnormal accruals

	Joint Estimation		OLS Estimation	
	coefficient	t-stat	coefficient	t-stat
Dependent variable: LOGAF				
Intercept	-0.064	-2.37 **	-0.257	-13.51 **
LOGNAF	0.751	24.62 **	0.425	35.26 **
AA	-0.262	-1.58	-0.226	-3.79 **
FISDEC	0.011	1.25	0.029	3.75 **
LEV	-0.024	-0.74	-0.083	-2.97 **
QUICK	0.004	1.4	0.007	2.6 **
BMB	0.000	0.02	0.000	1.33
LOSS	-0.024	-1.36	0.013	0.85
LITI	-0.030	-2.97 **	-0.035	-3.99 **
QUAL	-0.046	-1.22	-0.024	-0.74
LOGAR	0.028	5.33 **	0.051	11.95 **
LOGINV	0.025	6.44 **	0.021	6.37 **
BIG	-0.020	-1.76 *	-0.029	-2.95 **
RETAIN	0.009	0.68	0.004	0.31
BLOGTA	-0.003	-0.41	0.035	7.23 **
LAA	-0.020	-0.31	-0.083	-1.5
LROA	-0.051	-1	-0.043	-0.98
Hausman F-test	103.52 (p<0.0001, DF=2, 2275)		Adj. R^2	0.775
Dependent variable: LOGNAF				
Intercept	-1.426	-5.21 **	-1.877	-12.47 **
LOGAF	0.846	11.56 **	0.706	28.89 **
AA	0.345	1.75 *	0.031	0.38
LOGTAX	0.241	5.32 **	0.313	11.57 **
LEV	0.023	0.61	0.015	0.39
QUICK	-0.002	-0.47	-0.001	-0.16
BMB	0.000	0.55	0.000	0.98
LOSS	0.061	2.85 **	0.070	3.36 **
LITI	0.014	1.05	0.000	-0.03
QUAL	0.050	1.09	0.043	0.96
BIG	0.015	1.08	0.013	0.93
RETAIN	-0.009	-0.55	-0.007	-0.47
BLOGTA	0.026	2.78 **	0.038	6.58 **
LAA	-0.048	-0.62	-0.040	-0.53
LOGINV	-0.027	-5.69 **	-0.022	-5.03 **
LROA	0.056	0.93	0.062	1.02
Hausman F-test	4.60 (p=0.0101, DF=2, 2276)		Adj. R^2	0.682
Basmann F-test	1.97(p=0.1602, DF=1, 2277)			

Table 4
Joint estimation and OLS estimation of audit fee, non-audit fees and abnormal accruals
(continued)

	Joint Estimation		OLS Estimation	
	coefficient	t-stat	coefficient	t-stat
Dependent variable: AA				
Intercept	0.059	6.96 **	0.031	4.84 **
LOGAF	0.132	3.88 **	-0.009	-1.37
LOGNAF	-0.085	-2.93 **	0.000	-0.02
SOCF	-0.246	-20.13 **	-0.239	-21.75 **
LOSS	-0.001	-0.1	-0.002	-0.43
LITI	0.000	0.08	-0.006	-2.28 **
QUAL	-0.001	-0.05	-0.007	-0.62
BIG	0.007	1.85 *	0.004	1.1
RETAIN	0.001	0.21	0.001	0.17
BLOGTA	-0.007	-3.52 **	0.003	2.28 **
LAA	0.062	3.16 **	0.061	3.47 **
QUICK	-0.005	-5.05 **	-0.004	-5.16 **
LEV	-0.030	-3.02 **	-0.038	-4.2 *
BMB	0.000	1.79 *	0.000	2.19 **
LROA	0.136	7.87 **	0.127	8.24 **
Hausman F-test	24.83 (p<0.0001, DF=2, 2277)		Adj. R^2	0.184
Basmann F-test	1.80 (p=0.1655, DF=2, 2277)			

Notes:
See table 1 for variable definitions.
**, * denote significant at the 5% and 10% levels, respectively.

Table 5
OLS estimation of AA equation using ratio of non-audit to audit fees

	OLS with Ratio Variable	
	coefficient	t-stat
Dependent variable: Abs(AA)		
INTERCEPT	0.068	15.12 **
RATIO	0.002	2.47 **
SOCF	-0.088	-10.68 **
LOSS	0.002	0.43
LITI	0.004	2.04 **
QUAL	-0.002	-0.2
BIG	0.002	0.75
RETAIN	0.004	1.47
BLOGTA	-0.005	-9.34 **
LAA	0.212	12.4 **
QUICK	-0.001	-2.18 **
LEV	-0.030	-4.42 **
BMB	0.000	1.28
LROA	0.036	3.09 **
	Adj. R^2	0.186

Notes:
See table 1 for variable definitions.
AA refers to absolute value of abnormal accruals
**, * denote significant at the 5% and 10% levels, respectively.

Table 6
US results

	US 2000	
	coefficient	t-stat
Dependent variable: LOGAF		
Intercept	0.115	0.9
LOGNAF	0.635	7.02 **
AA	-0.117	-0.37
FISDEC	-0.008	-0.53
LEV	0.133	2.66 **
QUICK	0.000	-0.14
BMB	-0.001	-2.56 **
LOSS	0.008	0.35
LITI	-0.015	-0.91
QUAL	0.014	0.71
LOGAR	0.019	2.17 **
LOGINV	0.005	1.00
BIG	-0.042	-1.22
RETAIN	-0.029	-1.09
BLOGTA	-0.017	-0.64
LAA	-0.004	-0.07
LROA	-0.043	-0.37
Dependent variable: LOGNAF		
Intercept	-1.123	-2.46 **
LOGAF	0.982	4.02 **
AA	0.779	1.38
LOGTAX	0.098	1.77 *
LEV	-0.254	-4.55 **
QUICK	-0.001	-0.38
BMB	0.001	3.05 **
LOSS	-0.013	-0.38
LITI	0.047	2.04 **
QUAL^	0.009	0.31
BIG	0.088	1.67 *
RETAIN	0.004	0.07
BLOGTA	0.110	2.29 **
LAA	-0.097	-0.96
LOGINV	-0.008	-1.04
LROA	-0.254	-1.16

Table 6
US results (continued)

	US 2000		
	coefficient	t-stat	
Dependent variable: AA			
Intercept	-0.001	-0.01	
LOGAF	0.995	1.74	*
LOGNAF	-0.568	-1.31	
SOCF	-0.164	-2.96	**
LOSS	0.029	1.35	
LITI	0.002	0.09	
QUAL	-0.006	-0.3	
BIG	0.008	0.18	
RETAIN	0.061	1.73	*
BLOGTA	-0.024	-0.87	
LAA	0.171	5.24	**
QUICK	0.003	1.57	
LEV	-0.096	-0.86	
BMB	0.000	0.77	
LROA	0.515	6.64	**

Notes:
See table 1 for variable definitions.
**, * denote significant at the 5% and 10% levels, respectively.

APPENDIX A

Alternative Definitions of Abnormal Accruals

In this appendix we investigate the sensitivity of our results to the estimation of abnormal accruals. To estimate abnormal accruals in the paper, we use a variation of the modified-Jones model that is advocated by Dechow et al. (1995). We use three alternative definitions of abnormal accruals to check the sensitivity: 1) the absolute value of abnormal accruals estimated using the modified Jones model, 2) abnormal accruals using the modified-Jones Model adjusted for earnings management incentives and 3) scaled working capital accruals.

Results of the tests, presented in Table A1, indicate that our findings relating to audit fees, non-audit fees and abnormal accruals are fairly consistent across all definitions of abnormal accruals. In the audit fee equation, the coefficient on non-audit fees is positive while the coefficients on abnormal accruals are not significant under each alternative abnormal accrual definition, consistent with our main findings in the simultaneous equation estimates in Table 4 of the paper. In the non-audit fee equation, the coefficient on audit fees is positive while the coefficient on abnormal accruals is marginally significant under second definition of abnormal accruals (abnormal accruals using the modified-Jones Model adjusted for earnings management incentives) also consistent with our main finding in the Table 4 of the paper. In two of the three abnormal accruals equations findings of a positive relation with audit fees and a negative relation with non-audit fees are significant and consistent with main findings in the paper.

To compare the results to related literature, we also estimate an OLS regression with the absolute value of abnormal accruals as the dependent variable. The results, presented in Table A2, show a positive coefficient on non-audit fees and a negative coefficient on LOGAF [similar to Frankel et al. (2002)]. Similar to our findings in the OLS regressions in Table 4, these results

suggest that not controlling for the endogeneity of audit fees, non-audit fees and abnormal accruals leads to inaccurate conclusions.[1]

Below, we discuss the approach used to calculate abnormal accruals under each of the three alternative definitions of abnormal accruals.

Approach 1: Absolute value of abnormal accruals estimated using the modified Jones model

We use a variation of the modified-Jones model that is advocated by Dechow et al. (1995). Like Ferguson et al. (2000), we focus on working capital accruals. The model used to estimate normal working capital accruals is:

$$WCA/TA = \alpha(1/TA) + \beta[\Delta REV - \Delta REC)/TA] + \varepsilon \qquad (1)$$

Where:

WCA is the current working capital accruals of the company
TA is the total assets of the company in the previous year
ΔREV is the current change in revenue
ΔREC is the current change in receivables

We estimate the model separately for each industry. Abnormal working capital accruals are then calculated as the absolute value of the error term in the above regression.

Approach 2: Modified-Jones model adjusted for earnings management incentives

We recognize that tests using abnormal accrual measures are likely to have low power since they look at the relation between earnings management proxies and auditors' services without considering earnings management incentives. In order to improve the power of these tests, we consider capital markets incentives and bonus plans.

Burgstahler and Dichev (1997) find that managers manipulate earnings to avoid losses and earnings decreases. The strongest incentive to manipulate accruals for earnings management exists when earnings (or earnings changes) before abnormal accruals are negative, but with

abnormal accruals they become positive. We incorporate this incentive by first estimating a regression of abnormal accruals on a indicator for earnings before abnormal accruals being negative and including abnormal accruals being positive. We also include all the control variables discussed before. We obtain a fitted value for abnormal accruals, which we use in regression against audit and non-audit fees (and the control variables).

To obtain fitted values for abnormal accruals, ABACHAT, we estimate the following regression (firm and year subscripts omitted):

$$AA = a_0 + a_1 D + a_2 SOCF + a_3 LAA + a_4 LOSS + a_5 BLOGTA + a_6 RETAIN + a_7 QUAL + a_8 BIG + a_9 LROA + a_{10} BMB + a_{11} LEV + a_{12} QUICK + a_{13} LITI + \varepsilon \quad (2)$$

Where:

AA is a measure of abnormal accruals. It is the residual from equation (1).

D is indicator variable equal to one if reported earnings (or change in reported earnings) are positive and earnings before abnormal accruals (or change in earnings before abnormal accruals) are negative, zero otherwise

All other variable definitions are similar to Table 1.

Approach 3: Scaled working capital accruals (SWCA)

We assume all of the working capital accruals (scaled by lagged total assets) to be abnormal. This is a modified version of Healy (1985), who assumed that total (as opposed to working capital) accruals are abnormal.

Table A1
Joint estimation on UK data using alternative definitions of abnormal accruals

	AA= |ABAC|		AA=ABACHAT		AA=SWCA	
	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat
Dependent variable: LOGAF						
Intercept	-0.006	-0.14	-0.066	-2.44 **	-0.068	-2.2 **
LOGNAF	0.756	24.53 **	0.749	24.57 **	0.742	21.14 **
AA	-0.641	-1.43	-0.266	-1.58	-0.227	-1.44
FISDEC	0.009	0.98	0.011	1.25	0.008	0.78
LEV	-0.038	-1.12	-0.025	-0.76	0.026	0.52
QUICK	0.004	1.45	0.004	1.42	0.004	1.29
BMB	0.000	0.31	0.000	0.06	0.000	-0.12
LOSS	-0.020	-1.11	-0.024	-1.34	-0.023	-1.14
LITI	-0.022	-2.06 **	-0.031	-3.02 **	-0.034	-2.83 **
QUAL	-0.047	-1.23	-0.046	-1.22	-0.048	-1.12
LOGAR	0.031	5.53 **	0.027	5.18 **	0.029	4.72 **
LOGINV	0.026	6.46 **	0.025	6.44 **	0.023	5.4 **
BIG	-0.019	-1.62	-0.020	-1.75 *	-0.033	-2.08 **
RETAIN	0.012	0.86	0.009	0.67	0.009	0.61
BLOGTA	-0.012	-1.37	-0.002	-0.26	0.001	0.11
LAA	-0.104	-0.83	-0.020	-0.31	0.028	1.26
LROA	-0.060	-1.15	-0.050	-0.98	-0.034	-0.57
Dependent variable: LOGNAF						
Intercept	-1.531	-5.35 **	-1.378	-5.09 **	-1.401	-4.68 **
LOGAF	0.821	10.79 **	0.865	11.96 **	0.862	10.85 **
AA	0.598	1.18	0.368	1.83 *	0.221	1.25
LOGTAX	0.249	5.46 **	0.234	5.2 **	0.238	4.79 **
LEV	0.033	0.83	0.025	0.64	-0.027	-0.49
QUICK	-0.002	-0.52	-0.002	-0.52	-0.002	-0.55
BMB	0.000	0.35	0.000	0.49	0.000	0.59
LOSS	0.060	2.79 **	0.060	2.8 **	0.061	2.6 **
LITI	0.006	0.4	0.016	1.17	0.019	1.24
QUAL	0.048	1.07	0.050	1.1	0.051	1.03
BIG	0.013	0.94	0.015	1.1	0.028	1.54
RETAIN	-0.010	-0.62	-0.009	-0.56	-0.008	-0.48
BLOGTA	0.034	2.99 **	0.024	2.62 **	0.021	2.14 **
LAA	0.069	0.46	-0.047	-0.6	-0.031	-1.23
LOGINV	-0.027	-5.77 **	-0.028	-5.74 **	-0.026	-5.07 **
LROA	0.059	0.98	0.056	0.91	0.037	0.54

Table A1
Joint estimation on UK data using alternative definitions of abnormal accruals (continued)

	AA= |ABAC|		AA=ABACHAT		AA=SWCA	
	coefficient	t-stat	coefficient	t-stat	coefficient	t-stat
Dependent variable: AA						
Intercept	0.088	13.03 **	0.046	9.93 **	0.046	0.65
LOGAF	0.113	4.41 **	0.094	5.13 **	0.004	0.02
LOGNAF	-0.071	-3.23 **	-0.072	-4.6 **	-0.016	-0.07
SOCF	-0.093	-9.81 **	-0.243	36.92 **	-0.276	-2.73 **
LOSS	0.004	0.86	0.000	0.06	-0.002	-0.05
LITI	0.010	3.76 **	-0.002	-1.11	-0.026	-0.95
QUAL	0.004	0.38	-0.002	-0.25	-0.015	-0.15
BIG	0.005	1.61	0.006	2.88 **	-0.051	-1.7 *
RETAIN	0.004	1.37	0.001	0.27	0.002	0.06
BLOGTA	-0.012	-8.17 **	-0.003	-2.57 **	0.007	0.43
LAA	0.228	11.48 **	0.060	5.68 **	0.130	6.45 **
QUICK	-0.002	-2.11 **	-0.004	-8.95 **	-0.003	-0.39
LEV	-0.024	-3.04 **	-0.034	-6.28 **	0.183	2.2 **
BMB	0.000	0.9	0.000	3.67 **	0.000	0.07
LROA	0.042	3.18 **	0.134	14.38 **	0.234	1.64

Notes:
**, * denote significant at the 5% and 10% levels, respectively.
Variables are defined as follows: AA is one of three estimates of abnormal accruals: ABAC is abnormal accruals estimated using the modified Jones model; ABACHAT is the fitted value of abnormal accruals calculated using the modified Jones model adjusted for incentives; SWCA is working capital accruals, scaled by lagged total assets. The other variables are as defined in Table 1.

Table A2
OLS estimation of absolute abnormal accruals

Dependent variable: AA

	coefficient	t-stat	
Intercept	0.071	14.07	**
LOGAF	(-0.005)	(1.06)	
LOGNAF	0.009	2.51	**
SOCF	(0.088)	(10.68)	**
LOSS	0.002	0.42	
LITI	0.005	2.19	**
QUAL	(0.002)	(0.26)	
BIG	0.002	0.89	
TENURE	0.004	1.52	
BLOGTA	(0.006)	(6.75)	**
LAA	0.212	12.40	**
QUICK	(0.001)	(2.09)	**
LEV	(0.029)	(4.27)	**
BMB	0.000	1.18	
LROA	0.036	3.06	**
Adjusted R^2	0.186		

Notes: AA is the absolute value of abnormal accruals. LAA is lagged AA. See Table A1 for other variable definitions

Endnotes to Appendix A

[1] Frankel et al. (2002) use the ratio of non-audit fees to audit fees in some of their analyses. When we use the ratio measure along with the absolute value of abnormal accruals we find a positive coefficient on ratio in the OLS (similar to Frankel et. al.). However, we find a significant negative coefficient on non-audit fees in the joint estimation.

APPENDIX B

Brief comparison of UK and US audit environments

In this section we discuss similarities and differences in the US and UK environments that potentially effect the relations among audit fees, non-audit fees and abnormal accruals in the two countries. To the extent that the two are similar, we can make comparisons and draw inferences from results using UK data to the US. However, there are differences in the environments that could influence the relations and limit the inferences we make to the US.

Both common law countries, the US and the UK share similar institutional characteristics such as the nature of financing, the size and complexity of businesses and capital markets, tax laws, disperse ownership, strong investor protection and large stock markets that have influenced the development and practice of accounting and auditing. As Frost and Ramin (1996) observe, these factors lead to shareholders' needs significantly influencing financial statements and independent audits, and private-sector bodies strongly affecting both accounting and audit standard setting. The audit profession is well established in both countries, with overlap in the largest audit firms. Both countries share a tradition of auditor independence and have similar definitions of independence. Similar to the US, auditors in the UK are appointed by the board of directors and paid by the company.

Since private firms do auditing, auditors also share similar economic incentives to increase profitability and limit liability. However, the UK is viewed as less litigious and therefore may be a less risky country for auditors to operate. In both countries there is concern about whether the provision of non-audit services impairs an auditor's objectivity. This concern leads to the requirement that non-audit fees be disclosed in the UK much earlier than in the US. The Cadbury Report, issued in December 1991, considered recommending a prohibition of

auditor's providing other services to clients but instead suggested disclosure of non-audit fees. In light of significant changes in auditing and oversight under the Sarbannes-Oxley, Britain's Department of Trade and Industry is proposing new rules for the country's auditing industry. However, unlike in the US it is not expected to ban a company's auditors from providing some non-audit services.[1]

Despite these similarities in accounting and auditing, some differences in practice exist. UK accounting and auditing standards are viewed as more principles-based than rules based. In contrast, US accounting and audit standards are viewed as highly specific and comprehensive (Frost and Ramin, 1996; FASB, October 2002). Although the accounting profession has played an important role in developing audit standards in both countries, UK audit opinion comments on compliance with the Companies Act, as well as giving an opinion on whether the financial statements present a true and fair view. If applying UK GAAP results in a presentation that that does represent the underlying economics, then UK auditors are expected to override GAAP and issue an unqualified opinion. In contrast, the US audit opinion comments on whether financial statements present fairly in accordance with generally accepted accounting principles, but does not comment on legal compliance. In the US, auditors are not allowed to override GAAP unless they issue a qualified opinion.[2]

To gauge the magnitude of audit and non-audit fees, we compare them between countries. In our sample of companies, both the mean and median of audit fees as a percent of market value are not significantly different in the UK and US in 2000 (untabulated). This suggests some similarity in the auditor's production function, effort or profitability of audit services between countries. We also find that the mean of non-audit fees as a percent of market

value is not significantly different but the median is lower in the UK (with probability 0.02) (untabulated) indicating somewhat higher demand for these services from auditors in the US.

The influence of the factors discussed above on differences in the relations among audit fees, non-audit fees and abnormal accruals between the US and UK is difficult to access. Research based on generic earnings management measures (Leuz et al. 2002) indicates that the US and UK are generally similar in terms of opportunities and incentives for earnings management. They put forth that shared institutional characteristics of the two countries such as disperse ownership, strong investor protection and large stock markets, which are the factors that influence accounting and auditing, also lead to similar incentives to manage earnings. Executive compensation in the UK also generates the incentive for earnings management, similar to the US. Although compensation of UK executives is typically less than that in the US (Canyon and Murphy 2000), executive pay including components of salary, bonus, and share options is significantly tied to stock price in the UK (McKnight and Tomkins 1999).

While the incentives to manage earnings in both countries are similar, the relation between earnings management and audit fees and non-audit fees could vary due to principles-based versus rules-based accounting. For instance, US companies could hire their auditor to assess whether a transaction is structured so as to pass "bright-line" tests. In the UK this guidance would take a different form. The UK auditor would be engaged to assess whether the transaction is in accordance with guiding principles, which could require more or less auditor involvement.[3] "Bright lines" can be seen and adjusted to -- principles are less easy to avoid and often harder to argue. Therefore, it is then difficult to assess whether fees will be higher or lower. In support of the involvement of auditors in a principles-based system, Sir David Tweedie, chairman of the International Accounting Standards Board (IASC), explained the IASC's

principles-based approach in testimony before the US Senate Committee on Banking, Housing and Urban Affairs:

> We favour an approach that requires the company and its auditor to take a step back and consider whether the accounting suggested is consistent with the underlying principle. This is not a soft option. Our approach requires both companies and their auditors to exercise professional judgment in the public interest. Our approach requires a strong commitment from preparers to financial statements that provide a faithful representation of all transactions and a strong commitment from auditors to resist client pressures. It will not work without those commitments. There will be more individual transactions and structures that are not explicitly addressed. We hope that a clear statement of the underlying principles will allow companies and auditors to deal with those situations without resorting to detailed rules. [February 14, 2002]

While the UK and US environments share many similarities, they also exhibit differences. The influence of these on the relation between non-audit fees and earnings management in the UK than in the US is unclear and is an important caveat of inferences drawn in our study. However, The robustness of our results across the jurisdictions (US and UK) gives us added confidence in them.

Endnotes to Appendix B

[1] Wall Street Journal, "Deals & Deal Makers: UK to Propose New Set of Rules For Audit Industry," January 28, 2003, page C5.

[2] Factors that give rise to qualified opinions differ in the US and UK. In the US, a qualified opinion is issued if there are material departures from generally accepted accounting principles. In the UK, both a departure from generally accepted accounting principles and auditor disagreement with whether the departure represents a true and fair view (or is not adequately disclosed) leads to a qualified audit opinion.

[3] The UK also has detailed and specific accounting rules in certain areas.