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Non-Audit Services, Auditor Independence and Earnings Management

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Non-audit services, auditor independence and earnings management

ABSTRACT

We predict that the provision of non-audit services by auditors to their audit clients will impair independence more severely for smaller auditors than for larger auditors. We report evidence that client earnings management activity to avoid losses and earnings decreases is positively associated with the ratio of non-audit fees to total fees for non-Big 5 auditors but not for Big 5 auditors. Earnings management to meet analysts' forecasts varies positively with the non-audit fee ratio for both Big 5 and non-Big 5 auditors. Further, the difference in the effectiveness of Big 5 and non-Big 5 auditors in constraining earnings management widens as the non-audit fee ratio increases. These results suggest that, when the provision of non-audit services is relatively high, smaller auditors are less able to resist aggressive accounting by their clients.

Key words: *Non-audit services; Auditor independence; Audit quality; Earnings management; Discretionary accruals.*

Data availability: *Data are available from the public or commercial sources identified in the paper.*

I. INTRODUCTION

The question of whether auditor independence is impaired when auditors provide non-audit services (NAS) to their clients has engaged attention for several decades. This attention has resulted in considerable comment by regulators (Barr 1959; Levitt 2000), governmental enquiry (Metcalf Subcommittee 1977; GAO 1996), and academic discussion (Mautz and Sharaf 1961; Arruñada 1999). The extent to which audit clients are permitted to purchase NAS from their auditor varies considerably between countries (Arruñada 1999), emphasizing the lack of consensus over the expected impact of NAS on auditor independence. In this paper, we provide empirical evidence on the links between the effects of NAS on auditor independence and earnings management by audit clients, an issue that has been the focus of recent commentary by the SEC Chairman (Levitt 1998, 2000).

Despite theoretical and regulatory interest in the relationship between NAS and auditor independence, empirical research on this relationship has historically been hindered by limited data availability. In the U.S., the only publicly available NAS data is on the type and amount of NAS relative to audit fees reported under the SEC's ASR 250. However, this regulation only applied to proxy statements filed between September 1978 and January 1982, after which firms have not been required to report NAS publicly.[1] ASR 250 data has been used to examine the impact of NAS on audit opinions (Pringle and Buchman 1996). The influence of NAS on audit opinions has also been addressed using U.K. (Lennox 1999) and Australian (Barkess and Simnett 1994; Wines 1994; Craswell 1999) data, public disclosure of NAS being compulsory in these countries. Apart from studies of audit opinion decisions, the empirical literature is dominated by research using surveys or experimental settings to examine whether auditor decisions or perceptions of auditor independence are affected by NAS. Pringle and Buchman (1996) and Arruñada (1999) provide reviews of the survey and experimental literature.

In this paper, we argue that the independence impairment effect of NAS is a function of auditor size. Specifically, we suggest that larger auditors are less likely to compromise their independence than smaller auditors. We test for links between NAS and the effectiveness with which auditors constrain earnings management by audit clients by focusing on a large sample of U.K. firm-years where the incentive to manage earnings upwards is high. We predict that earnings management activity will be more positively associated with NAS when the auditor is non-Big 5 (NB5) than when it is Big 5 (B5).[2] The empirical evidence generally confirms our prediction. We also document that the distinction between NB5 and B5 auditor effectiveness in constraining earnings management increases as NAS increase. This is further evidence in support of the prediction that NAS impair the independence of smaller auditors more severely than that of larger auditors.

Our findings are relevant to regulatory deliberations on whether NAS impair auditor independence and impact on the quality of financial reporting through audit quality. They suggest that there is a direct causal link between NAS, audit reporting and financial reporting quality. Our evidence also contributes to research on the economic impact of NAS and the determinants of auditor independence and audit quality. By addressing the NAS effect on auditor independence in the context of earnings management, the results we report also contribute to the literature examining corporate governance constraints against earnings management.

The paper is organized as follows. In Section II we review the relevant theory and prior empirical evidence. In Section III we specify the hypothesis to be tested. Section IV describes the research design, sample and data. We report our results in Section V. Finally, Section VI contains our conclusions.

II. LITERATURE REVIEW

Prior research on NAS and auditor independence

Carmichael and Swieringa (1968) and the Panel on Audit Effectiveness (2000) summarize arguments against, and in favor of, the provision of NAS by auditors to their auditees. The main arguments they list against NAS include, firstly, the assertion that auditors providing NAS might be auditing their own work. Secondly, it is suggested that NAS might cause auditors to develop mutual interests with management. Thirdly, it is suggested that auditors might suffer fiduciary conflicts of interests since their audit client would be the firm's shareholders but their NAS client would be the firm's management. Simunic (1984) offers additional reasons why NAS might be predicted to impair auditor independence. He suggests that the incentive for the auditor to report truthfully might be reduced when dismissal as auditor will result in loss of NAS revenue, and when it is costly to reallocate specialized resources engaged in NAS contracts.

Goldman and Barlev (1974) counter-argue that the purchase of NAS by the auditee from the auditor increases auditee dependence on the auditor. They suggest that this reduces the credibility of the auditee threat to dismiss the auditor in event of conflict. As a result, Goldman and Barlev (1974) suggest that NAS can increase auditor independence by increasing auditee dependence. Nichols and Price (1976) challenge this argument on the basis that the shift in power balance suggested by Goldman and Barlev (1974) only occurs when there are no alternative suppliers of NAS. Overall, theory is unclear on the direction of the impact of NAS on auditor independence.

The empirical evidence on whether NAS actually impair auditor independence is similarly inconclusive. The evidence primarily comprises studies relating auditor opinion decisions to NAS. Recent examples include Pringle and Buchman (1996), Craswell (1999) and Lennox (1999). Pringle and Buchman (1996) compare failed firms receiving unqualified and qualified audit opinions prior to failure. They predict that the former group will purchase a higher proportion of NAS from their

auditors than the latter and test this prediction on a U.S. sample, using ASR 250 disclosures. They fail to find a difference in NAS across the two opinion groups.

Craswell (1999) and Lennox (1999) similarly test whether the incidence of audit qualifications is associated with NAS, but using Australian and U.K. data respectively. Neither finds a significant association between audit qualifications and NAS. Lennox (1999) observes a positive but insignificant association between the incidence of audit qualifications and NAS. He interprets this as being consistent with the NAS impairment effect on auditor independence being more than offset by an increase in auditor detection of client problems as a result of NAS.

Thus the previous empirical literature does not provide any clear indication that NAS actually impair auditor independence. However, none of these studies consider the possibility that the NAS effect on auditor independence might depend on auditor size.

Auditor size and the NAS effect on auditor independence

Auditee-specific quasi rents

DeAngelo (1981) argues that auditor incentive to compromise audit quality is a reducing function of the number of auditees held by the auditor. She elaborates that the auditor's incentive to compromise an audit increases with the present value of the auditee-specific quasi-rents liable to be lost if the auditor reports truthfully and is dismissed. The countervailing disincentive to compromise the audit increases with the expected loss in quasi-rents from all other auditees that would be suffered should the auditor compromise an audit and be discovered. It follows logically that larger auditors with more diversified clienteles have, on balance, lower incentives to compromise audit quality.

Arruñada (1999) uses similar arguments in his model of the impact of NAS on auditor independence. He finds that independence is not necessarily impaired by the provision of NAS and

that it might, in fact, be enhanced where the auditor has diversified clientele. Arruñada (1999) argues that the provision of NAS might increase auditee-specific quasi-rents, but that this does not necessarily increase auditor dependence on individual auditees. Auditors providing NAS to large and diversified clienteles become more dependent on all their auditees collectively but more independent of each auditee individually. Intuitively, the widespread provision of NAS diversifies the auditor's revenue base and reduces auditor dependence on individual auditees. On this basis, Arruñada (1999) concludes that the provision of NAS enhances the independence of auditors with diversified clientele and impairs the independence of auditors with undiversified clientele.

Auditor resource mobility

Simunic (1984) argues that the incentive for an auditor to report the result of an audit truthfully reduces when auditor resources engaged in NAS contracts cannot be reallocated costlessly. Auditor resource mobility is likely to vary positively with auditor reputation and clientele size. Thus, larger auditors are less likely than smaller auditors to suffer impaired independence as a consequence of resource immobility.

Similarly, Arruñada (1999) argues that firms providing a single line of service to clients, such as audit, will have greater difficulty reallocating resources in the event of a loss in market. Auditors supplying only audit services will be less able to divert their resources should they lose an audit. Such auditors therefore have increased incentives to compromise independence, relative to auditors supplying diversified lines of service. Resource reallocation is likely to be less costly for the latter class of auditors. This argument implies that the incentive to compromise auditor independence is lower for auditors providing a more diversified range of services. In practice, larger firms of auditors typically supply a wider range of services and, therefore, suffer less resource immobility. As a result,

larger auditors can be predicted to be less susceptible to compromise their independence in the event of an audit conflict.

Auditor wealth

Arruñada (1999) also suggests that the provision of NAS increases auditee-specific assets controlled by the auditor. These assets will lose value in the event of audit failure. This creates an incentive for auditors to maintain the level of audit quality consistent with their reputation. This argument is consistent with previous theoretical research, such as Dye (1993), linking audit quality and auditor wealth. Dye (1993) suggests that wealthier auditors suffer greater potential liability in event of audit failure and, therefore, have greater incentives to provide a higher quality of audit.

Political costs

Watts and Zimmerman (1986) discuss the role of political costs in influencing accounting choices. They suggest that larger firms are more sensitive politically and, therefore, are more likely to be conservative in making accounting choices. This argument applies to auditors in two ways. Firstly, larger firms of auditors are more visible and potentially suffer higher costs if audit failure is detected. This implies that larger auditors have higher incentives to avoid compromising the quality of audits they perform, and is consistent with auditor conservatism increasing with auditor size.

Secondly, auditor switches attract public attention, more so when the pre-switch auditor is a large firm. Such attention is likely to be associated with increased scrutiny of the auditee by market participants. This means that a switch or dismissal threat made by an auditee as a result of audit conflict is less likely to be credible when the pre-switch auditor is larger. As a result, the likelihood of auditors compromising independence as a consequence of a switch threat reduces as auditor size increases.

Internal organizational structures

Watts and Zimmerman (1981) suggest that larger firms of auditors exist because such firms have comparative advantages in monitoring individual auditor behavior. Watts and Zimmerman (1986) develop this point further by pointing out that mutual monitoring is stronger in larger firms of auditors. They argue that each partner has an incentive to monitor other partners. This incentive arises from the fact that, in the event of audit failure committed by an individual partner, other partners are jointly and severally liable to suffer losses, e.g., to the value of their human capital. The effectiveness of this mutual monitoring mechanisms is likely to increase with auditor size.

In addition, as pointed out by DeAngelo (1981), the sensitivity of an individual audit partner's wealth to whether or not a specific audit contract is retained reduces as the number of auditees increases. This implies that individual partners of audit firms have lower incentives to compromise audits when the number of auditees for which they are responsible is larger.

A number of other practical reasons also suggest that larger auditors are less likely to be susceptible to compromising independence as a result of NAS. Larger auditors are more likely to be organized along functional lines. This means that, in practice, the audit function is typically discharged and supervised by different divisions or personnel from those involved in NAS. In addition, larger auditors are more likely to have more structured and stronger internal controls over audit integrity. This would imply a lower likelihood that auditor independence will be compromised when auditors are larger.

Thus, there are strong theoretical bases for predicting that, *ceteris paribus*, the independence impairment effect of NAS increases as auditor size reduces. However, there is to date no empirical evidence that larger auditors are less likely to compromise their independence than small auditors due to NAS provision. Our study aims to address this gap in the literature by examining whether

NAS impact non-Big 5 auditors differently from Big 5 auditors in terms of their effectiveness in constraining earnings management.

The audit constraint on earnings management

The employment of an independent external auditor to verify accounting numbers reported by managers is a market-induced mechanism to reduce agency costs (Jensen and Meckling 1976; Watts and Zimmerman 1983). Wallace (1980) points out that audits are demanded at least partly because they reduce noise and bias in financial reporting. Kinney and Martin (1994) conclude from a review of previous studies that auditing reduces positive bias in accounting numbers. Thus, an important economic role played by the audit is to monitor and control earnings management.

A number of recent empirical studies commence from this basic theoretical premise and investigate the determinants of auditor effectiveness in constraining earnings management. Becker et al. (1998) and Francis et al. (1999) test the DeAngelo (1981) theory relating audit quality and auditor size, by studying whether earnings management is more tightly constrained by larger auditors than by smaller auditors. Becker et al. (1998) predict and confirm that auditee discretionary accruals are positively related with the presence of NB5 auditors. Similarly, Francis et al. (1999) predict and confirm that the amount of auditee discretionary accruals is negatively related with the presence of B5 auditors. Other studies reporting evidence of a relationship between earnings management and auditor size include DeFond and Jiambalvo (1991, 1993). The former report that, excluding fraudulent firms, the incidence of accounting errors is negatively associated with the presence of B5 auditors. The latter find that audit conflicts over income-increasing accounting choices are positively associated with the presence of B5 auditors.

There is, therefore, evidence that the effectiveness with which earnings management is constrained is determined at least partly by audit quality or auditor independence as proxied by

auditor size. This paper tests whether NAS influence the effectiveness with which auditors constrain earnings management and, in particular, whether this influence varies with auditor size.

III. EMPIRICAL PREDICTIONS

As discussed in Section II, theory suggests that auditors play a role in constraining earnings management. However, the extent to which auditors are likely to constrain earnings management depends on the direction in which auditees seek to manage earnings. Where there is an incentive to manage earnings upwards, conservatism is the rational response by auditors (Antle and Nalebuff 1991). Antle and Nalebuff (1991) point out that, in practice, they expect that auditors' loss functions will be asymmetric. In particular, they expect that auditors will be more concerned about verifying positive claims than negative claims. They also state that understating profits is less dangerous to the auditor than overstating profits, given that the likelihood of litigation is highest in the event of unanticipated bankruptcy. This is confirmed by empirical evidence showing that auditors are more likely to be sued as a result of upward rather than downward earnings management (St. Pierre and Anderson 1984; Lys and Watts 1994; Heninger 2001). As a result, we expect the audit constraint to be most observable in the presence of an incentive for earnings to be managed upwards.

In order to isolate the presence of such an incentive, we focus on firms where non-discretionary (or unmanaged) earnings (NDE) is below basic targets. Burgstahler and Dichev (1997) and Degeorge et al. (1999) review theoretical arguments on the incentives of firms to achieve basic earnings targets. They also provide empirical evidence confirming that firms appear to manage earnings to transform small deficits into small surpluses relative to targets, and with such frequency as to distort the distribution of earnings relative to targets. Gore et al. (2001) confirm that the distribution of earnings for U.K. firms displays similar discontinuities. They document evidence that firms with NDE below basic targets tend to manage earnings upwards to meet targets using

discretionary accruals. We therefore assume that firms have incentives to manage earnings upwards when NDE is below basic targets. The targets we use for this purpose are zero earnings level, zero earnings change and zero surprise relative to analysts' forecasts.

The earnings management proxy we use is abnormal (or discretionary) working capital accruals (DACC). Working capital accruals are potentially attractive as an earnings management device because they do not having direct cash flow consequences and they are relatively difficult to observe. Our definition of DACC as the discretionary component of working capital accruals contrasts with Jones (1991), who uses total accruals including, most prominently, depreciation. DeFond and Jiambalvo (1994) point out that working capital accruals are more susceptible to manipulation than non-working capital accruals. In addition, Beneish (1998) suggests that manipulation of long term accruals, such as depreciation, is transparent and economically implausible. We expect firm-years with NDE below basic targets to have an incentive to use DACC to manage earnings upwards. We also expect independent auditors to constrain such income-increasing manipulation.

As stated earlier, our specific interest is in testing whether NAS impair auditor independence in a manner that varies negatively with auditor size. In the light of theoretical uncertainty as to the impact of NAS on auditor independence, we do not make a general prediction on the direction of this impact. We do, however, note that theory is unambiguous that NAS are expected to impact the independence of smaller auditors more adversely than for larger auditors. In particular, theory suggests that auditor incentives to compromise audit quality vary negatively with auditor size (DeAngelo 1981; Dye 1993). Further, Arruñada (1999) specifically suggests that NAS impair auditor independence more severely when auditor clientele is smaller or less diversified. Thus, we make the following empirical prediction:

H1: *In the presence of an incentive to manage earnings upwards, earnings management is more positively associated with the ratio of non-audit services to total auditor remuneration when the auditor is non-Big 5 than when the auditor is Big 5.*

IV. RESEARCH DESIGN

Measuring earnings management

In order to measure DACC, we use the simple Jones (1991) model as applied cross-sectionally to working capital accruals by Peasnell et al. (2000b). Peasnell et al. (2000b) document that, in this formulation, the simple Jones (1991) model is almost indistinguishable from the Dechow et al. (1995) modified version, in terms of power in detecting plausible levels of earnings management.

We measure total working capital accruals (WCA) as the change in non-cash working capital.[3] Thus, WCA=Δ(CA-CASH)-Δ(CL-CBORR), where CA (Datastream item #376), CASH (#375), CL (#389) and CBORR (#309) are total current assets, cash and cash equivalent, current liabilities and borrowings repayable in one year respectively. We then estimate the following cross-sectional OLS regression for each Datastream level-6 industry-year, using all valid firm-years with available data but requiring a minimum of six observations per regression:[4]

$$WCA_{ijt} / TA_{ijt-1} = \beta_{0jt} + \beta_{1jt}\Delta REV_{ijt} / TA_{ijt-1} + \varepsilon_{ijt} \quad (1)$$

where TA (#392) is total assets, REV (#104) is total sales, and i, j and t are firm, industry and time subscripts, respectively. This regression facilitates partitioning of WCA into non-discretionary accruals (NDACC) and discretionary accruals (DACC). NDACC are measured as the predicted component of WCA and DACC as the residual resulting from this regression. Thus:

$$\begin{aligned} DACC_{ijt} &= WCA_{ijt} / TA_{ijt-1} - NDACC_{ijt} \\ &= WCA_{ijt} / TA_{ijt-1} - (\hat{\beta}_{0jt} + \hat{\beta}_{1jt}\Delta REV_{ijt} / TA_{ijt-1}) \end{aligned} \quad (2)$$

where $\hat{\beta}_0$ and $\hat{\beta}_1$ are the industry-year OLS parameters estimated from equation (1).

Model specification

Having estimated DACC as above, our main analysis uses standard OLS multivariate modeling to test our prediction. In order to obtain assurance on the robustness of our conclusions, we use a number of alternative empirical specifications. Our prediction is that NAS impair the independence of NB5 auditors more severely than for B5 auditors. We predict that as a consequence B5 auditors constrain earnings management more effectively than NB5 auditors. Specifically, we expect that when NAS are high, there will be a larger disparity between the constraining influence of B5 and NB5 auditors than when NAS are low. Thus, we estimate the following model for each earnings target sample, forming portfolios by NAS rank:

$$\begin{aligned} DACC_{it} = {} & \beta_0 + \beta_1 D_{it} + \beta_2 B5_{it} + \beta_3 B5_{it} * D_{it} + \beta_4 BDIND_{it} + \beta_5 BDIND_{it} * D_{it} \\ & \beta_6 GEAR_{it} + \beta_7 LOGMV_{it} + \beta_8 CFO_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

In equation (3), D_{it} is a dummy variable equal to 1 if NDE_{it} is below target and 0 otherwise. For the purposes of the earnings level and earnings change samples, we measure earnings (EARN) as before extraordinary items (#625), scaled earnings (E) as $EARN_t/TA_{t-1}$, NDE as E-DACC, scaled earnings change (ΔE) as $(EARN_t\text{-}EARN_{t-1})/TA_{t-1}$ and non-discretionary earnings change (NDΔE) as ΔE-DACC.[5] For our earnings surprise sample, we obtain actual and forecasted EPS data from I/B/E/S. We restrict this sample to those observations of consensus or median forecasts based on at least three individual forecasts. We impose this requirement because we wish the median forecast to be a representative indicator of average expected earnings. We then measure the earnings surprise as actual earnings minus the latest median forecast available before the earnings announcement. For consistency, we scale the earnings surprise by opening total assets, and measure non-discretionary earnings surprise (NDES) as the scaled earnings surprise (ES) minus DACC.

The empirical tests based on equation (3) reference three basic targets and we employ a different measure of D corresponding to each target. We set D1 equal to one when NDE is negative, and equal to 0 otherwise. We set D2 equal to one when NDΔE is negative, and equal to zero otherwise. Finally, we set D3 equal to one if NDES is negative, and equal to zero otherwise. B5 is a dummy variable equal to 1 if the auditor is B5 and 0 otherwise. BDIND (#243/#242) is the ratio of non-executive directors to the total number of directors on the board. GEAR (#731/100) is capital gearing. LOGMV is the log of market value (#MV). CFO (≡EARN+DEPR+AMORT-WCA or EARN+#402+#562-WCA scaled by opening TA) is cash flow from operations.

Equation (3) models DACC as a function of incentives for and constraints against earnings management. D captures the incentive to manage earnings upwards when NDE is below target. Thus, we expect $\hat{\beta}_1$ to be positive. We expect DACC to be constrained by the presence of high quality auditors (Becker et al. 1998; Francis et al. 1999) and independent boards (Peasnell et al. 2000a) where there is an incentive to manage earnings upwards. However, it is theoretically unclear that auditors and boards will constrain earnings management where the incentive to manage earnings is low or where there is an incentive to manage earnings downwards. Thus, we do not predict the signs of $\hat{\beta}_2$ and $\hat{\beta}_4$, but we predict that $\hat{\beta}_2 + \hat{\beta}_3$ and $\hat{\beta}_4 + \hat{\beta}_5$ will be negative. Our main coefficient of interest is $\hat{\beta}_2 + \hat{\beta}_3$, which we expect to increase in magnitude as NAS increases. Such an increase would be consistent with the extent to which NB5 auditors are less effective than B5 auditors being greater at higher levels of NAS.

We control for GEAR, given that earnings management activity can be related to indebtedness. High gearing might indicate proximity to debt covenants, implying a positive association between DACC and GEAR. Alternatively, high GEAR could signal financial distress, which is often accompanied by contractual renegotiations and income-decreasing accruals. Thus, we

do not predict the sign of $\hat{\beta}_6$. Similarly, we control for size proxied by LOGMV. Political costs would suggest that larger firms would be associated with less upward earnings management. However, larger firms would have greater capacity to generate accruals. Thus, we do not predict the sign of $\hat{\beta}_7$. Finally, we control for CFO, which indicates a measure of underlying performance. We expect that earnings management would be negatively associated with CFO.

The second test specification we use is based on partitioning the sample by B5. We estimate the following multivariate model by auditor type:

$$\begin{aligned} DACC_{it} = {} & \beta_0 + \beta_1 D_{it} + \beta_2 NAS_{it} + \beta_3 NAS_{it} * D_{it} + \beta_4 BDIND_{it} + \beta_5 BDIND_{it} * D_{it} \\ & \beta_6 GEAR_{it} + \beta_7 LOGMV_{it} + \beta_8 CFO_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

Our prediction is that the association between DACC and NAS is higher, or more positive, for NB5 auditors than for B5 auditors when there is an incentive to manage earnings upwards. Thus, our main coefficient of interest is $\hat{\beta}_2 + \hat{\beta}_3$. Specifically, we wish to ascertain whether the $\hat{\beta}_2 + \hat{\beta}_3$ estimate generated on the NB5 sub-sample is higher than the $\hat{\beta}_2 + \hat{\beta}_3$ estimate generated on the B5 sub-sample. We formally test this by estimating a regression on the pooled sample, allowing each coefficient to vary by auditor type.

Finally, we restrict the samples to those observations with NDE below target and estimate the following regression by auditor type:

$$DACC_{it} = \beta_0 + \beta_1 NAS_{it} + \beta_2 BDIND_{it} + \beta_3 GEAR_{it} + \beta_4 LOGMV_{it} + \beta_5 CFO_{it} + \varepsilon_{it} \quad (5)$$

As before, our interest is in whether the coefficient of NAS is significantly higher when the auditor is NB5 than when it is B5. We formally test this in a similar manner as done with respect to equation (4). We estimate an expanded version of equation (5) on the pooled sample comprising both auditor types, but allowing each coefficient to vary by auditor type. This enables us to test the significance of the difference between the B5 and NB5 NAS coefficients.

V. EMPIRICAL EVIDENCE

Data

The empirical tests are based on a large sample of U.K. firms. The U.K. context is particularly interesting and appropriate for a number of reasons. Firstly, the mandated disclosure of audit and NAS fees under the Companies Act 1985 (Disclosure of Remuneration for Non-Audit Work) Regulations 1991 facilitates the availability of large samples of suitable data. These regulations apply to financial years commencing on or after 1 October 1991. They require "the aggregate of the remuneration … of the company's auditors (and of any) associate of the company's auditors … for services other than those of the auditors in their capacity as such" to be disclosed in the notes to the annual accounts.[6] Given the wide definition of associates employed by the regulations, we are able to observe NAS even when provided by auditors through separate but related corporate entities.

As discussed in Section IV, we use three basic earnings targets to test our prediction. Consequently, we conduct our tests on three separate sub-samples corresponding to these targets. The three samples are generated from a main sample as follows. Firstly, we collect from Datastream the annual accounting numbers, required for estimating DACC, for all U.K. quoted non-financial firms over the years 1992 to 1998.[7] We exclude financial firms because of our interest in working capital accruals. The accrual generating process in financial firms is fundamentally different from that in industrial and commercial firms. We also exclude all accounting periods that are less than 350 or more than 380 days in duration. We impose this requirement because accounting flow variables such as earnings are incomparable if they relate to accounting periods of different duration. We then estimate DACC using the method described above. Having estimated DACC, we collect all other variables required for the multivariate tests. All variables are obtained from Datastream, except the

identity of the firm's auditor and the proportion of non-audit fees to total auditor remuneration.[8] We obtain the former from Worldscope and the latter from Extel Company Analysis.[9]

At this stage, we delete all firm-years ending before 1 October 1992 to exclude the possibility of self-selection bias relating to voluntary disclosure of NAS. Our earnings level (change, surprise) sub-sample therefore comprises all observations for which the above data requirements are met, after deleting the extreme percentiles of DACC, E (ΔE, ES), NDE (NDΔE, NDES), GEAR, CFO, MV, TA and NAS.[10] These procedures result in an earnings level (change, surprise) sub-sample of 4,779 (4,765, 2,435) firm-years.

(INSERT TABLE 1 ABOUT HERE)

Table 1 provides descriptive statistics on these samples. Average DACC tends to be close to zero in the earnings level and change samples. This suggests that these samples are representative of the population, given that average DACC for the population is an OLS residual and therefore zero by construction. However, average DACC is less close to zero in the earnings surprise sample. Additional evidence on the representativeness of the samples is provided by the mean of the B5 variable. The proportion of B5 firm-years is 0.766 (0.755) in the earnings level (change) sample, but is noticeably higher at 0.878 in the earnings surprise sample. This is consistent with I/B/E/S coverage being biased towards larger firms and suggests that some caution must be exercised in generalizing the results of tests using the earnings surprise sample.

Graphical evidence

Our empirical prediction is that, when NDE is below target, there is a stronger or more positive association between auditee DACC and NAS in the presence of NB5 auditors than in the

presence of B5 auditors. Figure 1 presents a simple graphical test of this prediction. This test is conducted as follows. We restrict our earnings level (change, surprise) sample to those observations where NDE (NDΔE, NDES) is negative. We then partition the three samples by auditor type, resulting in six sub-samples. We sort each sub-sample into decile portfolios based on ranked NAS. Figure 1 plots median DACC against median NAS for the ten portfolios within each sub-sample, thus summarizing the relationship between DACC and NAS by auditor type when NDE is below target.

(INSERT FIGURE 1 ABOUT HERE)

Panels A and B illustrate the relationship between DACC and NAS for those firm-years with negative NDE and NB5 and B5 auditors respectively. It is clear from these panels that the association between DACC and NAS is more positive for NB5 auditors than for B5 auditors. For NB5 firm-years, the lowest (highest) NAS portfolio has median DACC of 0.039 (0.077). When the auditor is B5, the lowest (highest) NAS portfolio has median DACC of 0.053 (0.035). While the NB5 sub-sample suggests an obvious positive relationship between NAS and DACC, the B5 sub-sample suggests a slight negative relationship between NAS and DACC.

Panels C and D present similar plots relating to firm-years with negative NDΔE. In the case of NB5 firm-years, the lowest (highest) NAS portfolio has median DACC of 0.041 (0.068). The corresponding median DACC reported by B5 firm-years is 0.034 (0.034). Similarly, in the case of NB5 firm-years with negative NDES shown in Panel E, the lowest (highest) NAS portfolio has median DACC of 0.042 (0.076). In the case of B5 firm-years, shown in Panel F, the corresponding median DACC are 0.025 (0.031). The clear impression conveyed by Panels C to F is that there is a

stronger positive relationship between DACC and NAS when the auditor is NB5 than when the auditor is B5.

We do not formally test the difference in the NB5 and B5 slopes shown in Figure 1 because of the basic univariate nature of the plots and because the visual impression is clear. The graphical evidence is consistent with our prediction that there is a stronger positive relationship between DACC and NAS for NB5 auditors than for B5 auditors, suggesting that NAS impair NB5 auditor independence more severely than B5 auditor independence.

Univariate tests

Table 2 reports the results of univariate statistical tests we conduct to determine whether DACC varies with NAS within specified sub-samples. Within each of our earnings level, change and surprise samples, we classify each observation as being high (low) NAS depending on whether the observation is greater than or equal to (less than) the sample NAS median. We then extract two sub-samples from each of our three samples. These two sub-samples comprise the NB5 and B5 firm-years, respectively, with negative NDE (NDΔE, NDES). We compute and compare the mean and median DACC relating to the high and low NAS observations within each of these six sub-samples. We conduct these comparisons using parametric *t* tests and non-parametric Wilcoxon rank sum tests.

(INSERT TABLE 2 ABOUT HERE)

Table 2 Panel A shows that, within the sub-sample of firm-years with negative NDE and NB5 auditors, high NAS observations have mean (median) DACC of 0.068 (0.068) compared with 0.057 (0.055) for low NAS firm-years. Average DACC is higher at high levels of NAS than at low levels, but the difference is statistically insignificant. Panel B conducts a similar comparison for B5

firm-years with negative NDE. In this sub-sample, high NAS firm-years have mean (median) DACC of 0.052 (0.050). This is insignificantly different from the 0.058 (0.051) relating to low NAS firm-years. Thus, DACC appear to have a weak negative relationship with NAS in firm-years with negative NDE and B5 auditors, and a weak positive relationship with NAS in firm-years with negative NDE and NB5 auditors. This result is broadly consistent with the impression conveyed by Figure 1.

Panel C reports mean and median DACC for firm-years with negative NDΔE and NB5 auditors depending on whether NAS is high or low. In this panel, high NAS firm-years have mean (median) DACC of 0.060 (0.048), while low NAS firm-years have mean (median) DACC of 0.049 (0.041). The parametric test confirms that mean DACC is significantly higher when NAS are high than when NAS are low. The non-parametric test reports a consistent result, although the significance level is marginal. In contrast, Panel D reports that when NDΔE is negative and the auditor is B5, DACC for high NAS firm-years are not different from low NAS firm-years. This is consistent with our prediction that, where there is an incentive to manage earnings upwards, NAS will impair the independence of NB5 auditors more severely than that of B5 auditors.

In Panel E, we analyze the sub-sample comprising firm-years with negative NDES and NB5 auditors. In this sub-sample, high NAS firm-years report mean (median) DACC of 0.051 (0.039), while low NAS firm-years report mean (median) DACC of 0.038 (0.028). The parametric test confirms that mean DACC is significantly higher when NAS is high than when they are low. Panel F reports results relating to negative NDES firm-years with B5 auditors. In this sub-sample, high NAS firm-years have higher mean (median) DACC of 0.043 (0.031) than low NAS firm-years, which have mean (median) DACC of 0.038 (0.029). The difference between mean DACC of high and low NAS firm-years is greater in magnitude and statistical significance when the auditor is NB5 than when it is B5, consistent with our prediction.

Thus, univariate comparisons of DACC across sub-samples with relatively high and low NAS are consistent with our prediction of a stronger positive association between DACC and NAS with NB5 auditors than with B5 auditors.

Multivariate tests

As discussed above, simple graphical and statistical univariate tests suggest that NAS affect smaller auditors more adversely than larger auditors in terms of their effectiveness in constraining income increasing earnings management. However, these tests do not control for other potential determinants of earnings management.

(INSERT TABLE 3 ABOUT HERE)

Table 3 reports estimates of equation (3) which models DACC as a function of determinants of earnings management previously documented in the literature. Most importantly for our purposes, we allow DACC to be associated with a dummy variable indicating whether or not the auditor is B5, and we allow the coefficient of this variable to vary depending on whether NDE is below target. Where NDE is below target, we expect firms to have an incentive to manage earnings upwards and for B5 auditors be more effective than NB5 auditors in constraining income-increasing DACC.

The sum of the coefficients on B5 and B5*D captures the extent to which B5 auditors are more effective than NB5 auditors in constraining income-increasing DACC, given that NDE is below target. Specifically, if this implied coefficient is negative and significant, B5 auditors are significantly more effective than NB5 auditors. We expect that the magnitude of this implied coefficient will increase as NAS increases, if the NAS independence impairment effect is negatively associated with auditor size.

Table 3 Panel A estimates equation (3) for sub-samples of our earnings level sample formed by ranking NAS into quartiles. The estimated intercepts are consistently negative and significant. This suggests that after all other factors are controlled for, firms with NDE above zero use income-decreasing DACC on average. The consistently positive and significant coefficient on D1 indicates that firms with NDE below zero use significantly more income-increasing DACC than firms with NDE above zero. DACC are insignificantly associated with BDIND when D1 is 0, i.e. when NDE is positive. This is consistent with board composition not serving to constrain DACC when NDE is above target. However, the marginal association between DACC and BDIND when NDE is below target, as reflected by the coefficient on BDIND*D1, is consistently negative and significant. We also control for GEAR, LOGMV and CFO, all of which have significant coefficients.

Table 3 Panel A confirms that our test coefficient behaves in the predicted manner. Specifically, the implied distinction between B5 and NB5 auditors in constraining income-increasing DACC when NDE is negative increases steadily as NAS increase. In the lower two quartiles of NAS, NB5 auditor effectiveness is statistically indistinguishable from B5 auditor effectiveness. However, B5 auditors are significantly more effective than NB5 auditors in the upper two quartiles of NAS.

Panel B conducts the same analysis, but using the earnings change sample. As in the previous panel, the intercept is generally negative and significant, while the D2 coefficient is generally positive and significant. Also as in the previous panel, the main effect coefficient on BDIND is insignificant. However, the marginal effect BDIND coefficient is negative and significant in two out of four groups. The control variables have the same signs as in the previous panel. Our test variable, the implied association between DACC and the presence of a B5 auditor when NDΔE is below target, behaves in the predicted manner. Specifically, in the lower two NAS quartiles, B5 auditors are not significantly more effective than NB5 auditors in constraining DACC. In the upper two NAS quartiles, the difference between B5 and NB5 auditors is statistically significant. The magnitude and

significance of the difference between B5 and NB5 effectiveness increases steadily as NAS increase, consistent with our prediction.

We conduct a similar analysis on our earnings surprise sample in Panel C. The intercept, D3, BDIND and control variable coefficients are all broadly consistent with those reported in the previous two panels. In addition, the implied coefficient on B5 when NDES is negative behaves in a manner generally consistent with our prediction. Specifically, except for the lowest NAS quartile, the magnitude and significance of the difference between B5 and NB5 effectiveness increases as NAS increases. Only in the highest NAS quartile are B5 auditors found to be significantly more effective than NB5 in constraining earnings management. Thus, Table 3 provides evidence that the extent to which B5 auditors constrain earnings management more effectively than NB5 auditors increases as NAS increase. This is consistent with the auditor independence impairment effect of NAS varying negatively with auditor size.

However, the above evidence is not a direct test of our prediction. We predict that DACC are more positively associated with NAS when the auditor is NB5 than when it is B5. In order to test whether DACC are associated with NAS, and determine whether this association varies with auditor size, we estimate equation (4) by auditor type. The results are reported in Table 4. We expect that when NDE is below target, the DACC association with NAS will be more positive for NB5 firm-years than B5 firm-years. In other words, we expect that the implied coefficient of NAS+NAS*D will be higher for NB5 firm-years than B5 firm-years.

(INSERT TABLE 4 ABOUT HERE)

Table 4 Panel A reports the estimates for our earnings level sample. In this panel, DACC are shown to be positively associated with NAS when NDE is negative and the auditor is NB5.

However, the statistical significance of this implied coefficient is only marginal. In contrast, DACC are negatively and significantly associated with NAS when NDE is negative and the auditor is B5. This is consistent with previous univariate evidence on this sub-sample. Our test of whether the implied NAS coefficient is higher when the auditor is NB5 than when it is B5 confirms this to be the case at highly significant levels.

Panel B conducts the same test on our earnings change sample. When NDΔE is negative and the auditor is NB5, DACC have a significant positive association with NAS. In contrast, when the auditor is B5, DACC have a negative and insignificant association with NAS. Thus, both our earnings level and change samples confirm that the association between DACC and NAS is significantly more positive in the presence of smaller auditors.

In Panel C, we examine the association between DACC and NAS in our earnings surprise sample. In this case, we find that the implied coefficient on NAS is significantly positive for both NB5 and B5 auditors. Consistent with our prediction, the NB5 coefficient is of larger magnitude than the B5 coefficient, with the former being almost twice the latter. However, the difference between the two coefficients is statistically insignificant.

(INSERT TABLE 5 ABOUT HERE)

As a final test of our prediction, we restrict our earnings level, change and surprise samples to those firm-years with NDE below target, and estimate equation (5). We are interested in the association between DACC and NAS and, in particular, whether this association is higher for NB5 firm-years than B5 firm-years. Table 5 Panel A reports our estimates for the earnings level sample. This panel indicates that, when the auditor is NB5, the association between DACC and NAS is positive and weakly significant. However, when the auditor is B5, the association between DACC

and NAS is negative and statistically insignificant. This suggests that NAS impair NB5 auditor independence but not B5 auditor independence. Our test of whether the DACC association with NAS is higher for NB5 auditors confirms this to be the case at statistically significant levels.

Panel B reports the results of the corresponding analysis relating to our earnings change sample. Consistent with our earlier findings, the analysis of this sample indicates that DACC are positively and significantly associated with NAS when the auditor is NB5 but insignificantly associated with NAS when the auditor is B5. Consistent with our prediction, we find that the DACC association with NAS is significantly higher when the auditor is NB5 than when it is B5. In other words, when the auditor is NB5, NAS impair auditor effectiveness more severely than when the auditor is B5.

We also conduct a similar analysis on our earnings surprise sample. Panel C indicates that DACC are positively associated with NAS irrespective of auditor type. Consistent with prediction and findings reported in Table 4, the NB5 association between DACC and NAS is almost twice the magnitude of the B5 association. However, also consistent with Table 4, the difference between the NB5 and B5 associations is statistically insignificant.

Thus, our empirical tests suggest that, when NDE or NDΔE is negative, DACC are significantly more highly associated with NAS in the presence of NB5 auditors than in the presence of B5 auditors. We also find that, when NDES is negative, DACC are more highly associated with NAS in the presence of NB5 auditors than in the presence of B5 auditors. However, in this case, the difference across auditor type is statistically insignificant.

There are a number of potential reasons why we might observe a statistically insignificant difference between the NAS effect on B5 and NB5 auditors in our earnings surprise sample. One possible reason, already alluded to, is the fact that the earnings surprise sample might be unrepresentative and lacking in variation. Because analysts typically follow larger firms, earnings

forecasts are more widely available for larger firms. Thus, the proportion of NB5 firm-years in our earnings surprise sample is unusually low.

Our results in the earnings surprise sample might also be insignificant if analyst forecasts proxy poorly as an earnings target. Given that forecasts can and are known to be managed (Burgstahler and Eames 1999), firms have the choice between earnings and forecasts as potential objects through which to manage earnings surprises. The choice between these two objects is likely to be a function of the governance constraints against manipulation of both objects. High quality auditors are likely to constrain earnings management but not forecast management. Thus, one possible confounding factor in our earnings surprise sample might be forecast endogeneity. We regard the issue of choice among earnings surprise management objects as beyond the scope of the current paper, but as an interesting issue for further research.

VI. CONCLUSIONS

We predict that the extent to which non-audit services impair auditor independence will vary negatively with auditor size. Specifically, we expect auditee earnings management activity to have a stronger positive association with non-audit services when the auditor is non-Big 5 than when it is Big 5. Our empirical tests confirm this to be the case. In samples of firm-years with negative non-discretionary earnings levels or changes and with non-Big 5 auditors, we find that auditee discretionary accruals are positively associated with the ratio of non-audit services to total auditor remuneration. However, in similar samples but with Big 5 auditors, we find that auditee discretionary accruals are insignificantly associated with the non-audit services ratio. Further, in both cases, the association between discretionary accruals and the non-audit ratio is significantly higher when the auditor is non-Big 5 than when it is Big 5. Similarly, in a sample comprising firm-years with negative non-discretionary earnings surprises, we find that the association between discretionary accruals and

non-audit services is greater when the auditor is non-Big 5 than when it is Big 5. However, in this case, the difference between the non-Big 5 and Big 5 associations is statistically insignificant.

We also analyze the extent to which earnings management is constrained more effectively by Big 5 auditors than by non-Big 5 auditors. We expect, in general, that Big 5 auditors will be more effective than non-Big 5 auditors. More specifically, we expect the extent to which Big 5 auditors are more effective than non-Big 5 auditors to increase as non-audit services increase. This would reflect the independence of non-Big 5 auditors being more severely impaired in the presence of higher non-audit services. Our empirical tests confirm that Big 5 auditors constrain earnings management more effectively than non-Big 5 auditors to a greater extent as non-audit services increase.

There are a number of ways in which the analysis we conduct in this paper can be extended. It is possible that in specific circumstances, some auditors constrain earnings management more than others. Modeling differences in auditor conservatism with respect to earnings management in terms of the potential economic consequences for the auditor raises interesting possibilities. Such economic consequences might include the incidence of auditor switches, the likelihood of litigation and the level of present and future audit and non-audit fee premia.

FOOTNOTES

[1] Read and Raghunandan (1998) describe the background to issuance and eventual rescission of ASR 250. As pointed out by the Panel on Audit Effectiveness (2000), other (non-public) disclosures of NAS are required by various extant regulations. AICPA members of the SEC Practice Section (SECPS) must report to the audit committee of each SEC auditee the amount and nature of NAS supplied to that auditee, and SECPS members must include data on NAS supplied to their SEC auditees in their annual reports to SECPS.

[2] We use the abbreviations B5 and NB5 throughout, including when we refer to studies that were conducted when the Big 5 were 6 or 8. In addition, we use the term NAS in the narrative to refer to non-audit services in general. In our empirical tests, we measure NAS as the ratio of non-audit fees to total auditor remuneration.

[3] Collins and Hribar (1999) express concern that measuring accruals as the change in balance sheet accounts introduces measurement error into total accruals, primarily as a result of mergers, acquisitions and discontinued operations. They state that the error in total accruals measured through the balance sheet approach is unlikely to be correlated with the assumed drivers of accruals in the Jones (1991) model, resulting in the measurement error being captured entirely by the residual or discretionary accruals estimate. We believe their conjecture on the correlation between the measurement error and change in revenue, in particular, is counter-intuitive. Change in total consolidated revenue is, *a priori*, no less susceptible to influence by mergers, acquisitions and discontinued operations than change in working capital balances. In any case, measuring total accruals using the cash flow statement, which is the approach preferred by Collins and Hribar (1999), is itself not unproblematic. The difference between operating profit and operating cash flow usually includes a number of idiosyncratic accruals that cannot be classified systematically as either discretionary or non-discretionary.

[4] DeFond and Jiambalvo (1994) also require a minimum of six observations in estimating DACC.

[5] In post-FRS 3 firm-years we adjust earnings to remove from ordinary earnings those non-operating exceptional items that could have been extraordinary pre-FRS 3. Thus, in post-FRS 3 firm-years, we measure earnings as before extraordinary and non-operating exceptional items (#625-#1083+#1094+#1097).

[6] These regulations also provide detailed definitions of remuneration and of associates. The definition of associates was subsequently subject to minor amendment by the Companies Act 1985 (Disclosure of Remuneration for Non-Audit Work) (Amendment) Regulations 1995.

[7] We use Datastream live and dead U.K. equity lists, UKQI and DEADUK. These lists are based on issued securities and include a number of instances where individual firms are listed more than once as a result of multiple issues. We identify these cases and retain in the sample only one equity class per firm-year.

[8] Datastream reports the identity of the current auditor, but does not report this data for historical years. Regarding auditor remuneration data, Datastream reports audit fees (#118), but not non-audit fees.

[9] Where the identity of the firm's auditor is missing, we manually collect this variable from financial statements obtained either from Disclosure or from the ICRA (International Centre for Research in Accounting) microfiche archive. On Extel Company Analysis, audit and non-audit fees are items #te2.af and #te2.oaf respectively. Where the observation relates to an accounting period for which NAS disclosure was mandatory and Extel reports audit but not non-audit fees we set non-audit fees to zero.

[10] We delete the upper- and lower-most percentiles to avoid undue influence by extreme observations or potential data errors.

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TABLE 1
Descriptive statistics

Panel A
Earnings level sample
N=4779

	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
DACC	0.001	0.000	0.037	-0.036	0.073
NAS	0.368	0.365	0.500	0.224	0.198
B5	0.766	1.000	1.000	1.000	0.424
BDIND	0.419	0.429	0.500	0.333	0.155
E	0.054	0.062	0.098	0.025	0.093
LOSS	0.140	0.000	0.000	0.000	0.347
NDE	0.053	0.059	0.114	0.002	0.113
D1	0.245	0.000	0.000	0.000	0.430
GEAR	0.316	0.270	0.422	0.119	0.292
CFO	0.089	0.092	0.151	0.033	0.119
LOGMV	10.988	10.899	12.264	9.563	1.866

Panel B
Earnings change sample
N=4765

	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
DACC	0.001	0.000	0.037	-0.036	0.072
NAS	0.368	0.365	0.500	0.223	0.198
B5	0.765	1.000	1.000	1.000	0.424
BDIND	0.419	0.429	0.500	0.333	0.154
ΔE	0.011	0.011	0.030	-0.008	0.062
DECR	0.317	0.000	1.000	0.000	0.465
NDΔE	0.010	0.008	0.055	-0.040	0.093
D2	0.452	0.000	1.000	0.000	0.498
GEAR	0.312	0.269	0.419	0.118	0.287
CFO	0.090	0.093	0.152	0.034	0.120
LOGMV	11.003	10.919	12.270	9.585	1.862

Panel C Earnings surprise sample N=2435					
	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
DACC	-0.002	-0.001	0.028	-0.033	0.057
NAS	0.380	0.381	0.510	0.242	0.193
B5	0.878	1.000	1.000	1.000	0.327
BDIND	0.431	0.429	0.500	0.333	0.134
ES	0.001	0.001	0.004	-0.001	0.011
NEGES	0.327	0.000	1.000	0.000	0.469
NDES	0.003	0.002	0.035	-0.029	0.058
D3	0.480	0.000	1.000	0.000	0.500
GEAR	0.313	0.282	0.415	0.156	0.247
CFO	0.119	0.112	0.165	0.066	0.094
LOGMV	12.284	12.122	13.249	11.217	1.474

a

DACC	=	Discretionary working capital accruals
NAS	=	Ratio of non-audit fee to total auditor remuneration
B5	=	Binary variable equal to 1 when auditor is Big 5 and equal to 0 otherwise
BDIND	=	Ratio of non-executive directors on the board
E	=	Earnings scaled by opening total assets
LOSS	=	Binary variable equal to 1 when E is less than or equal to zero and equal to 0 otherwise
NDE	=	Non-discretionary earnings scaled by opening total assets
D1	=	Binary variable equal to 1 when NDE is less than 0 and equal to 1 otherwise
ΔE	=	Change in earnings scaled by opening total assets
DECR	=	Binary variable equal to 1 when ΔE is less than or equal to zero and equal to 0 otherwise
NDΔE	=	Non-discretionary earnings change scaled by opening total assets
D2	=	Binary variable equal to 1 when NDΔE is less than 0 and equal to 1 otherwise
ES	=	Earnings surprise scaled by opening total assets
NEGES	=	Binary variable equal to 1 when ES is less than zero and equal to 0 otherwise
NDES	=	Non-discretionary earnings surprise scaled by opening total assets
D3	=	Binary variable equal to 1 when NDES is less than 0 and equal to 1 otherwise
GEAR	=	Capital gearing
CFO	=	Cash flow from operations
LOGMV	=	Natural log of market value

TABLE 2
Univariate comparison of average discretionary accruals conditional on whether the non-audit services ratio is high or low

Panel A
Earnings level sample; Comparison of DACC across NAS level where $NDE_t<0$ and B5=0

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	147	0.068	0.068	0.092
Low NAS	170	0.057	0.055	0.071
t stat.		1.150		
Z stat.			1.201	
p value		*0.253*	*0.230*	

Panel B
Earnings level sample; Comparison of DACC across NAS level where $NDE_t<0$ and B5=1

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	475	0.052	0.050	0.087
Low NAS	380	0.058	0.051	0.076
t stat.		-0.920		
Z stat.			0.660	
p value		*0.357*	*0.509*	

Panel C
Earnings change sample; Comparison of DACC across NAS level where $ND\Delta E_t<0$ and B5=0

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	226	0.060	0.048	0.069
Low NAS	313	0.049	0.041	0.055
t stat.		1.980		
Z stat.			1.611	
p value		*0.048*	*0.107*	

Panel D
Earnings change sample; Comparison of DACC across NAS level where $ND\Delta E_t<0$ and B5=1

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	852	0.047	0.039	0.061
Low NAS	764	0.044	0.033	0.056
t stat.		0.950		
Z stat.			-1.580	
p value		*0.343*	*0.114*	

Panel E

Earnings surprise sample; Comparison of DACC across NAS level where $NDES_t<0$ and B5=0

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	64	0.051	0.039	0.046
Low NAS	91	0.038	0.028	0.035
t stat.		1.950		
Z stat.			1.561	
p value		*0.053*	*0.119*	

Panel F

Earnings surprise sample; Comparison of DACC across NAS level where $NDES_t<0$ and B5=1

	$DACC_t$			
	N	*Mean*	*Median*	*Std. Dev.*
High NAS	512	0.043	0.031	0.039
Low NAS	502	0.038	0.029	0.036
t stat.		1.790		
Z stat.			-1.628	
p value		*0.073*	*0.104*	

a Observations are classified as High (Low) NAS if they are greater than or equal to (less than) their industry-year median within the sample being tested.

b The *t* statistic relates to *t* tests comparing the means. The *Z* statistics relate to Wilcoxon rank sum tests. All *p* values are two-tailed.

TABLE 3
Regressions by sample quartiles of non-audit services ratio

Panel A
Earnings level sample; Regressions by NAS rank

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D1*	*B5*	*B5*D1*	*BDIND*	*BDIND*D1*	*GEAR*	*LOGMV*	*CFO*	*B5+B5*D1*		
Pred. Sign	?	+	?	-	?	-	?	?	-	-		
Rank 1	-0.035	0.055	-0.014	0.017	0.003	-0.050	-0.019	0.006	-0.215	**0.004**	1194	0.278
	0.002	*0.000*	*0.002*	*0.050*	*0.817*	*0.041*	*0.001*	*0.000*	*0.000*	***0.654***		
Rank 2	-0.034	0.069	0.000	-0.007	-0.017	-0.047	-0.016	0.005	-0.250	**-0.007**	1194	0.366
	0.001	*0.000*	*0.928*	*0.385*	*0.179*	*0.073*	*0.006*	*0.000*	*0.000*	***0.338***		
Rank 3	-0.048	0.089	-0.005	-0.012	0.015	-0.100	-0.037	0.006	-0.240	**-0.017**	1198	0.275
	0.000	*0.000*	*0.369*	*0.197*	*0.263*	*0.000*	*0.000*	*0.000*	*0.000*	***0.032***		
Rank 4	-0.043	0.087	-0.019	-0.006	0.013	-0.087	-0.030	0.006	-0.225	**-0.025**	1193	0.293
	0.004	*0.000*	*0.003*	*0.591*	*0.420*	*0.003*	*0.000*	*0.000*	*0.000*	***0.006***		

Panel B
Earnings change sample; Regressions by NAS rank

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D2*	*B5*	*B5*D2*	*BDIND*	*BDIND*D2*	*GEAR*	*LOGMV*	*CFO*	*B5+B5*D2*		
Pred. Sign	?	+	?	-	?	-	?	?	-	-		
Rank 1	-0.041	0.083	-0.010	0.007	0.009	-0.045	-0.007	0.003	-0.172	**-0.003**	1191	0.440
	0.000	*0.000*	*0.029*	*0.298*	*0.450*	*0.013*	*0.192*	*0.000*	*0.000*	***0.514***		
Rank 2	-0.044	0.080	0.006	-0.014	-0.009	-0.021	0.002	0.003	-0.212	**-0.008**	1191	0.454
	0.000	*0.000*	*0.245*	*0.050*	*0.503*	*0.312*	*0.763*	*0.001*	*0.000*	***0.126***		
Rank 3	-0.050	0.098	0.006	-0.017	0.012	-0.043	-0.021	0.003	-0.173	**-0.011**	1194	0.411
	0.000	*0.000*	*0.309*	*0.029*	*0.383*	*0.038*	*0.000*	*0.000*	*0.000*	***0.047***		
Rank 4	-0.053	0.092	-0.009	-0.009	0.015	-0.030	-0.015	0.004	-0.171	**-0.018**	1189	0.395
	0.000	*0.000*	*0.168*	*0.361*	*0.365*	*0.221*	*0.016*	*0.000*	*0.000*	***0.009***		

Panel C
Earnings surprise sample; Regressions by NAS rank

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D3*	*B5*	*B5*D3*	*BDIND*	*BDIND*D3*	*GEAR*	*LOGMV*	*CFO*	*B5+B5*D3*		
Pred. Sign	?	+	?	-	?	-	?	?	-	-		
Rank 1	-0.035	0.082	-0.005	-0.001	0.027	-0.039	-0.010	0.001	-0.167	**-0.006**	608	0.583
	0.014	*0.000*	*0.395*	*0.862*	*0.078*	*0.062*	*0.148*	*0.200*	*0.000*	***0.292***		
Rank 2	0.001	0.063	0.008	-0.009	-0.021	0.020	-0.011	0.000	-0.210	**-0.001**	609	0.640
	0.928	*0.000*	*0.162*	*0.240*	*0.148*	*0.338*	*0.041*	*0.682*	*0.000*	***0.842***		
Rank 3	-0.037	0.092	0.006	-0.012	0.008	-0.023	-0.017	0.001	-0.151	**-0.006**	609	0.589
	0.006	*0.000*	*0.378*	*0.230*	*0.582*	*0.301*	*0.003*	*0.183*	*0.000*	***0.421***		
Rank 4	-0.044	0.102	-0.003	-0.012	0.033	-0.029	0.006	0.001	-0.169	**-0.015**	609	0.595
	0.008	*0.000*	*0.705*	*0.307*	*0.055*	*0.255*	*0.306*	*0.415*	*0.000*	***0.058***		

a Bold text indicates the main column of interest. This column shows the implied association between discretionary accruals and the presence of a Big 5 auditor when non-discretionary earnings is below target.

b All *p* values are two-tailed.

TABLE 4
Regressions by auditor type

Panel A
Earnings level sample; Regressions by auditor type

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D1*	*NAS*	*NAS*D1*	*BDIND*	*BDIND*D1*	*GEAR*	*LOGMV*	*CFO*	*NAS+NAS*D1*		
Pred. Sign	?	+	?	?	?	-	?	?	-	?		
NB5	-0.077	0.044	-0.007	0.036	-0.003	-0.018	-0.023	0.010	-0.238	**0.029**	1120	0.322
	0.000	*0.001*	*0.542*	*0.094*	*0.826*	*0.477*	*0.002*	*0.000*	*0.000*	***0.111***		
B5	-0.042	0.092	-0.001	-0.027	0.006	-0.094	-0.026	0.005	-0.232	**-0.028**	3659	0.296
	0.000	*0.000*	*0.852*	*0.025*	*0.406*	*0.000*	*0.000*	*0.000*	*0.000*	***0.008***		
Diff.	0.035	0.049	0.006	-0.062	0.009	-0.076	-0.003	-0.005	0.007	**-0.056**		
	0.026	*0.001*	*0.635*	*0.008*	*0.534*	*0.010*	*0.745*	*0.000*	*0.766*	***0.005***		

Panel B
Earnings change sample; Regressions by auditor type

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D2*	*NAS*	*NAS*D2*	*BDIND*	*BDIND*D2*	*GEAR*	*LOGMV*	*CFO*	*NAS+NAS*D2*		
Pred. Sign	?	+	?	?	?	-	?	?	-	?		
NB5	-0.081	0.066	-0.015	0.037	0.011	-0.011	-0.011	0.007	-0.191	**0.022**	1119	0.447
	0.000	*0.000*	*0.225*	*0.031*	*0.457*	*0.606*	*0.106*	*0.000*	*0.000*	***0.069***		
B5	-0.043	0.087	0.002	-0.006	0.006	-0.046	-0.010	0.003	-0.179	**-0.004**	3646	0.414
	0.000	*0.000*	*0.711*	*0.508*	*0.433*	*0.000*	*0.001*	*0.000*	*0.000*	***0.580***		
Diff.	0.038	0.021	0.017	-0.043	-0.004	-0.035	0.001	-0.005	0.012	**-0.026**		
	0.008	*0.069*	*0.196*	*0.022*	*0.786*	*0.124*	*0.894*	*0.000*	*0.500*	***0.056***		

Panel C
Earnings surprise sample; Regressions by auditor type

	Estimated and Implied Coefficients *p value*										N	Adj. R^2
	Intercept	*D3*	*NAS*	*NAS*D3*	*BDIND*	*BDIND*D3*	*GEAR*	*LOGMV*	*CFO*	*NAS+NAS*D3*		
Pred. Sign	?	+	?	?	?	-	?	?	-	?		
NB5	-0.068	0.069	-0.014	0.046	0.012	-0.013	-0.016	0.004	-0.148	**0.031**	297	0.580
	0.013	*0.000*	*0.409*	*0.050*	*0.659*	*0.721*	*0.164*	*0.032*	*0.000*	***0.047***		
B5	-0.022	0.067	-0.010	0.026	0.013	-0.020	-0.007	0.001	-0.176	**0.016**	2138	0.602
	0.003	*0.000*	*0.065*	*0.001*	*0.105*	*0.085*	*0.030*	*0.233*	*0.000*	***0.007***		
Diff.	0.046	-0.001	0.004	-0.019	0.001	-0.006	0.009	-0.004	-0.028	**-0.015**		
	0.074	*0.936*	*0.811*	*0.391*	*0.977*	*0.861*	*0.406*	*0.050*	*0.278*	***0.322***		

a Bold text indicates the main column of interest. This column shows the implied association between discretionary accruals and the non-audit-services ratio when non-discretionary earnings is below target.

b All *p* values are two-tailed.

TABLE 5
Regressions by auditor type with samples restricted to observations where non-discretionary earnings is below target

Panel A
Earnings level sample where NDE<0; Regressions by auditor type

	Estimated Coefficients *p value*						N	Adj. R^2
	Intercept	*NAS*	*BDIND*	*GEAR*	*LOGMV*	*CFO*		
Pred. Sign	?	?	-	?	?	-		
NB5	-0.067	**0.035**	0.002	-0.027	0.013	-0.034	317	0.057
	0.080	***0.118***	*0.956*	*0.057*	*0.000*	*0.455*		
B5	0.067	**-0.018**	-0.083	-0.028	0.004	-0.095	855	0.051
	0.001	***0.195***	*0.000*	*0.000*	*0.030*	*0.000*		
Diff.	0.134	**-0.054**	-0.084	-0.001	-0.010	-0.061		
	0.002	***0.045***	*0.012*	*0.968*	*0.018*	*0.247*		

Panel B
Earnings change sample where NDΔE<0; Regressions by auditor type

	Estimated Coefficients *p value*						N	Adj. R^2
	Intercept	*NAS*	*BDIND*	*GEAR*	*LOGMV*	*CFO*		
Pred. Sign	?	?	-	?	?	-		
NB5	-0.004	**0.026**	0.005	-0.019	0.006	-0.155	539	0.075
	0.851	***0.042***	*0.769*	*0.058*	*0.002*	*0.000*		
B5	0.074	**-0.002**	-0.036	-0.009	0.000	-0.132	1616	0.069
	0.000	***0.786***	*0.000*	*0.075*	*0.620*	*0.000*		
Diff.	0.077	**-0.028**	-0.040	0.010	-0.006	0.023		
	0.000	***0.052***	*0.025*	*0.360*	*0.002*	*0.424*		

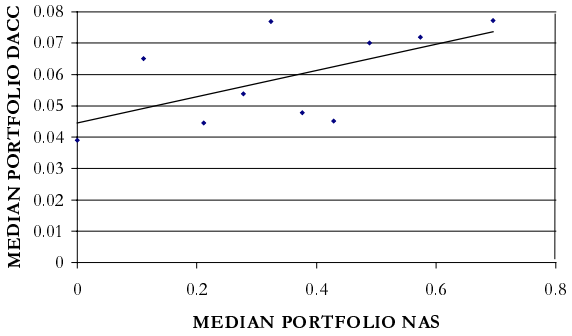
Panel C
Earnings surprise sample where NDES<0; Regressions by auditor type

	Estimated Coefficients *p value*						N	Adj. R^2
	Intercept	*NAS*	*BDIND*	*GEAR*	*LOGMV*	*CFO*		
Pred. Sign	?	?	-	?	?	-		
NB5	0.002 *0.956*	**0.033** ***0.032***	0.000 *0.991*	-0.029 *0.042*	0.005 *0.104*	-0.160 *0.000*	155	0.115
B5	0.077 *0.000*	**0.016** ***0.007***	-0.002 *0.845*	-0.010 *0.029*	-0.002 *0.006*	-0.166 *0.000*	1014	0.147
Diff.	0.075 *0.021*	**-0.017** ***0.273***	-0.002 *0.938*	0.019 *0.182*	-0.007 *0.016*	-0.007 *0.865*		

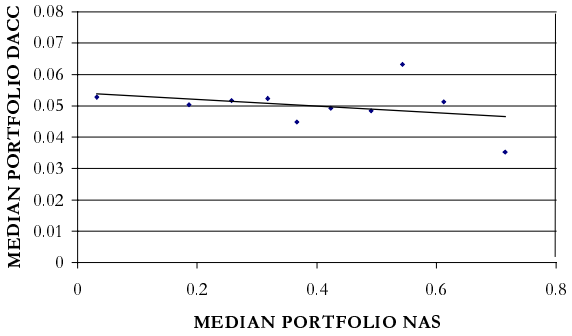
a Bold text indicates the main column of interest. This column shows the implied association between discretionary accruals and the non-audit-services ratio
b All *p* values are two-tailed.

FIGURE 1
Median DACC plotted against median NAS by auditor type for sub-samples with negative NDE, NDΔE and NDES

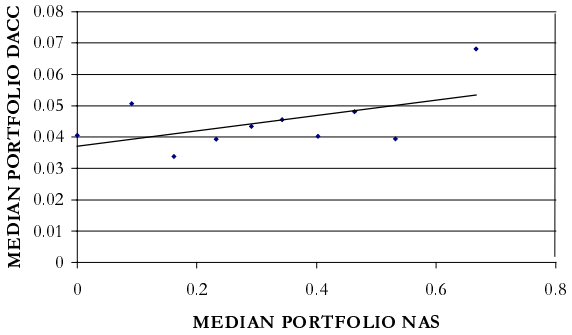
NB5 auditors
Panel A
Earnings level sample where NDE<0
N=317



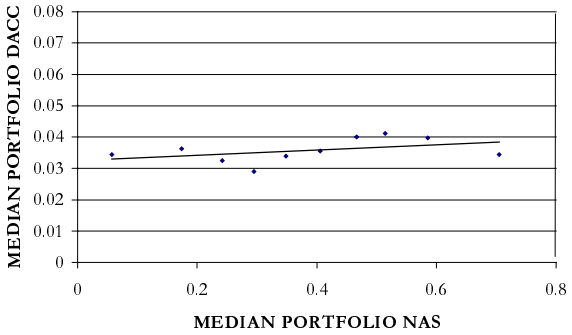
B5 auditors
Panel B
Earnings level sample where NDE<0
N=855



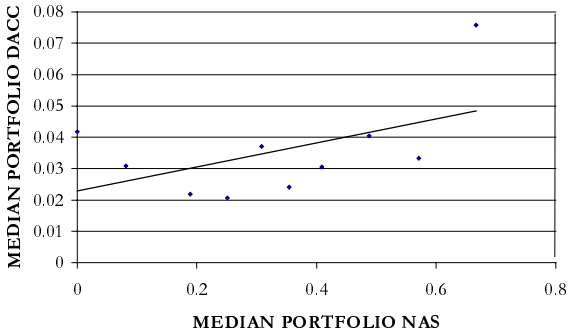
Panel C
Earnings change sample where NDΔE<0
N=539



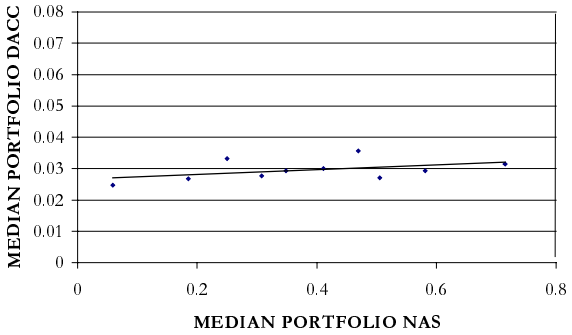
Panel D
Earnings change sample where NDΔE<0
N=1616



Panel E
Earnings surprise sample where NDES<0
N=155



Panel F
Earnings surprise sample where NDES<0
N=1014



a Each data point in the plots represents one of ten equal-sized portfolios based on ranked NAS within the sub-sample concerned.