The Effect of Audit Quality on Earnings Management*

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Abstract

This study examines the relation between audit quality and earnings management. Consistent with prior research, we treat audit quality as a dichotomous variable and assume that Big Six auditors are of higher quality than non–Big Six auditors. Earnings management is captured by discretionary accruals that are estimated using a cross-sectional version of the Jones 1991 model. Prior literature suggests that auditors are more likely to object to management's accounting choices that increase earnings (as opposed to decrease earnings) and that auditors are more likely to be sued when they are associated with financial statements that overstate earnings (as compared to understate earnings). Therefore, we hypothesize that clients of non–Big Six auditors report discretionary accruals that increase income relatively more than the discretionary accruals reported by clients of Big Six auditors. This hypothesis is supported by evidence from a sample of 10,379 Big Six and 2,179 non–Big Six firm years. Specifically, clients of non–Big Six auditors report discretionary accruals that are, on average, 1.5–2.1 percent of total assets higher than the discretionary accruals reported by clients of Big Six auditors. Also, consistent with earnings management, we find that the mean and median of the absolute value of discretionary accruals are greater for firms with non–Big Six auditors. This result also indicates that lower audit quality is associated with more "accounting flexibility".

Condensé

Les auteurs s'intéressent à l'incidence de la qualité de la vérification sur la propension des gestionnaires à procéder à l'ajustement recherché des bénéfices (ou gestion des résultats) par l'intermédiaire de régularisations (éléments discrétionnaires). Les gestionnaires ont intérêt à « aménager » les bénéfices de manière à maximiser la richesse de l'entreprise ou leur propre richesse. Cet intérêt provient des contrats *explicitement* basés sur les bénéfices publiés (par exemple, les régimes de rémunération des cadres et les contrats d'emprunt) ; des contrats *implicitement* basés sur les bénéfices publiés (par exemple, les contrats

implicites entre l'entreprise et ses clients et fournisseurs) ; et des diverses situations (comme la négociation de mesures de restriction à l'importation, les rachats d'entreprises par les cadres et les courses aux procurations) dans lesquelles les bénéfices publiés jouent un rôle important. La majorité des études portant sur l'ajustement des bénéfices sont centrées sur cet intérêt et reposent sur l'hypothèse selon laquelle la possibilité pour la direction de procéder à des ajustements comptables pour des motifs opportunistes est identique dans toutes les entreprises. Or, cette hypothèse est peu probable. Parmi les facteurs qui varient selon les entreprises et qui gênent ou limitent la capacité des gestionnaires d'ajuster les bénéfices figurent la structure de régie interne de l'entreprise (Dechow, Sloan et Sweeney, 1996), les décisions comptables prises antérieurement par la société qui limitent le pouvoir discrétionnaire ultérieur des gestionnaires (Sweeney, 1994) et les coûts qu'entraînerait pour la société la divulgation de l'ajustement des bénéfices. Dans leur rapport, les auteurs s'intéressant particulièrement à l'un de ces facteurs : la qualité du vérificateur externe.

La vérification réduit l'asymétrie de l'information qui existe entre les gestionnaires et les partenaires de l'entreprise, en permettant à des tiers de vérifier la validité des états financiers. L'efficacité de la vérification et la propriété qu'elle a de restreindre l'ajustement des bénéfices devraient varier avec la qualité du vérificateur. Dans leurs recherches empiriques, les auteurs traitent la qualité de la vérification comme une variable dichotomique et supposent que les vérificateurs des « Six Grands » cabinets d'experts-comptables offrent des services de meilleure qualité que les vérificateurs des autres cabinets, ce qui est conforme aux travaux précédents (dont ceux de Nichols et Smith, 1983 ; Simunic et Stein, 1987 ; Palmrose, 1988 ; Francis et Wilson, 1988 ; DeFond, 1992 ; DeFond et Jiambalvo, 1991 et 1993 ; et Davidson et Neu, 1993).

Selon l'hypothèse des auteurs, les vérificateurs qui n'appartiennent pas aux Six Grands admettent davantage les ajustements ayant pour conséquence de hausser les bénéfices, par l'intermédiaire des éléments discrétionnaires, que ne les admettent les vérificateurs appartenant aux Six Grands. Les auteurs s'intéressent particulièrement aux choix discrétionnaires qui entraînent une hausse des bénéfices pour deux raisons. Premièrement, les faits donnent à penser qu'il est plus probable que les gestionnaires aient tendance à surestimer les bénéfices plutôt que de les sous-estimer (DeFond et Jiambalvo, 1991 et 1993 ; Kinney et Martin, 1994). Deuxièmement, les faits démontrent que les vérificateurs qui font l'objet de poursuites sont habituellement accusés d'avoir autorisé un ajustement des bénéfices qui se soldait par la hausse les bénéfices publiés, tandis que rien n'indique qu'ils aient été poursuivis pour avoir autorisé un ajustement des bénéfices qui se soldait par la sous-estimation des bénéfices (St. Pierre et Anderson, 1984). Les auteurs mesurent les éléments discrétionnaires en utilisant la version transversale du modèle d'estimation de Jones (1991), décrit dans DeFond et Jiambalvo (1994) et dans DeFond et Subramanyam (1996). Ce dernier (1996) constate que les modèles transversaux de Jones sont généralement plus précis que leurs séries chronologiques homologues.

Les données qu'utilisent les auteurs pour effectuer leurs tests sont celles des entreprises figurant dans la base de données Compustat 1993, pour la période allant de 1989 à 1992. Après avoir appliqué divers filtres visant à éliminer les entreprises au sujet desquelles les données sont insuffisantes pour calculer les éléments discrétionnaires et à améliorer la comparabilité des sous-échantillons des vérificateurs appartenant et n'appartenant pas aux Six Grands, les auteurs obtiennent un échantillon de 10 397 observations entreprise-année vérifiées par les vérificateurs des Six Grands et un échantillon de 2 179 observations entreprise-année vérifiées par des vérificateurs n'appartenant pas aux Six Grands.

La première analyse réalisée par les auteurs est un test à plusieurs variables destiné à contrôler les différences potentielles entre les sous-échantillons qui pourraient brouiller les comparaisons simples à une seule variable. Dans cette analyse, les auteurs effectuent une régression des éléments discrétionnaires par rapport à une variable auxiliaire indiquant la catégorie à laquelle appartient le vérificateur et diverses variables de contrôle. Les tests révèlent l'existence d'une différence dans les flux de trésorerie provenant de l'exploitation et dans la taille de l'entreprise, entre les sous-échantillons. C'est pourquoi les flux de trésorerie provenant de l'exploitation et le logarithme des actifs totaux (une mesure substitut de la taille) entrent dans la régression à plusieurs variables. Le niveau d'endettement peut aussi être associé aux éléments discrétionnaires. L'on a constaté l'existence d'un lien entre le niveau élevé d'endettement et la quasi-transgression des clauses restrictives des contrats de prêt (Press et Weintrop, 1990), ainsi qu'entre la transgression de ces clauses et le choix relatif aux éléments discrétionnaires (DeFond et Jiambalvo, 1994). Afin de contrôler l'incidence possible du niveau élevé de l'endettement sur les résultats de leur analyse, les auteurs intègrent une variable auxiliaire qui permet de déterminer si oui ou non l'entreprise de l'échantillon se classe dans le décile supérieur en ce qui a trait à l'endettement, pour les entreprises Compustat appartenant au même secteur d'activité durant l'année étudiée.

Un autre facteur susceptible de brouiller l'analyse à une seule variable est le potentiel de génération d'éléments discrétionnaires de l'entreprise cliente. Pour contrôler la possibilité que les entreprises dont le total des éléments discrétionnaires (une mesure substitut du potentiel de génération d'éléments discrétionnaires) est plus important, en valeur absolue, présentent aussi des éléments discrétionnaires plus grands, et compte tenu du fait que la valeur absolue du total des éléments discrétionnaires diffère entre les sous-échantillons, les auteurs incluent la valeur absolue du total des éléments discrétionnaires à titre de variable de contrôle dans leur test à plusieurs variables.

Selon Beneish (1997), les gestionnaires devraient ajuster le bénéfice à la haússe en raison des incitatifs que crée la vente de participations personnelles dans le cadre ou à la suite d'émissions d'actions. Cette prévision est conforme aux faits relevés par Teoh, Welch et Wong (1996) qui démontrent que les bénéfices sont ajustés pour tenir compte d'émissions d'actions qui ont fait leurs preuves dans le passé. De plus, il est concevable que les gestionnaires soient enclins à ajuster les bénéfices à la baisse lors de rachats d'actions. C'est pourquoi, afin de cerner les motivations reliées aux opérations sur actions, les auteurs intègrent des variables auxiliaires indiquant si les actions en circulation ont augmenté ou diminué de 10 pour cent ou plus.

Dans une étude récente, DeFond et Subramanyam (1997) ont constaté que les entreprises qui changent de vérificateur ont tendance à faire état d'éléments discrétionnaires négatifs au cours de l'exercice qui précède le changement de vérificateur et de l'exercice qui le suit. Dans la période de quatre ans étudiée par les auteurs (1989 à 1992), les entreprises qui ont changé de vérificateur ont été exclues. À titre de contrôle supplémentaire, les auteurs intègrent une variable auxiliaire égale à 1 si le premier exercice de l'échantillon est celui de l'arrivée d'un nouveau vérificateur dans l'entreprise. Ils intègrent également une variable auxiliaire égale à 1 si le dernier exercice de l'échantillon est suivi d'un changement de vérificateur.

L'analyse à plusieurs variables est réalisée grâce à l'estimation des coefficients de l'équation de régression suivante :

$$Da_{it} = \beta_0 + \beta_1 NB6_{it} + \beta_2 OCF_{it} + \beta_3 Assets_{it} + \beta_4 HiLev_{it} + \beta_5 AbsAccr_{it}$$
$$+ \beta_6 ShareDecr_{it} + \beta_7 ShareIncr_{it} + \beta_8 OldAud_{it} + \beta_9 NewAud_{it} + e_{it}$$

où :

Da_{it} = éléments discrétionnaires estimés ;

$NB6_{it}$ = variable auxiliaire égale à 1 si le vérificateur n'appartient pas aux Six Grands ;

OCF_{it} = flux de trésorerie provenant de l'exploitation ;

$Assets_{it}$ = logarithme naturel des actifs totaux ;

$HiLev_{it}$ = variable auxiliaire indiquant si l'entreprise se classe dans le décile supérieur en ce qui a trait à l'endettement, selon l'année et le secteur d'activités ;

$AbsAccr_{it}$ = valeur absolue du total des éléments discrétionnaires ;

$ShareDecr_{it}$ = variable auxiliaire égale à 1 si le total des actions en circulation a diminué de plus de 10 pour cent au cours de l'exercice ;

$ShareIncr_{it}$ = variable auxiliaire égale à 1 si le total des actions en circulation a augmenté de plus de 10 pour cent au cours de l'exercice ;

$OldAud_{it}$ = variable auxiliaire égale à 1 si le dernier exercice de l'échantillon est suivi d'un changement de vérificateur ;

$NewAud_{it}$ = variable auxiliaire égale à 1 si le premier exercice de l'échantillon est celui de l'arrivée d'un nouveau vérificateur.

L'estimation de cette équation donne un coefficient significatif de 0,015 pour la variable auxiliaire des vérificateurs n'appartenant pas aux Six Grands (c'est-à-dire $NB6_{it}$). Ce résultat indique que l'échantillon des entreprises dont les vérificateurs n'appartiennent pas aux Six Grands fait état d'éléments discrétionnaires plus élevés que ceux de l'échantillon des entreprises dont les vérificateurs appartiennent aux Six Grands, l'écart étant, en moyenne, de 1,5 pour cent des actifs. Afin d'atténuer l'incidence de toute corrélation transversale dans les termes d'erreur de la régression, les auteurs estiment l'équation séparément pour chacune des quatre années de l'échantillon et calculent la statistique t en utilisant la variabilité dans les estimations annuelles du coefficient, comme dans Bernard (1987). Le coefficient moyen de $NB6_{it}$ dans les quatre estimations annuelles est égal à 0,019 et statistiquement significatif. Par conséquent, par rapport aux entreprises dont les vérificateurs appartiennent aux Six Grands, celles dont les vérificateurs n'appartiennent pas aux Six Grands présentent des éléments discrétionnaires supérieurs, l'écart étant de 1,9 pour cent des actifs totaux.

Bien que leur hypothèse soit centrée sur les éléments discrétionnaires qui entraînent une hausse des bénéfices, les auteurs examinent également la valeur absolue des éléments discrétionnaires comme une indication du degré de discrétion dont jouit la direction dans la communication de l'information relative aux bénéfices. Des tests de signification indiquent que la moyenne et la médiane de la valeur absolue des éléments discrétionnaires sont plus élevées parmi les entreprises dont les vérificateurs n'appartiennent pas aux Six

Grands. Étant donné que les observations dans ces tests groupés ne sont pas indépendantes, les auteurs ont également calculé les moyennes (médianes) de chaque année et comparé les quatre moyennes (médianes) annuelles des entreprises de l'échantillon dont les vérificateurs appartiennent aux Six Grands aux quatre moyennes (médianes) annuelles des entreprises de l'échantillon dont les vérificateurs n'appartiennent pas aux Six Grands (test de signes et de rangs). Les résultats se sont révélés significatifs, ce qui appuie fortement les résultats de l'analyse groupée.

Les constatations des auteurs viennent alimenter les travaux sur la qualité de la vérification (par exemple, DeAngelo, 1981 ; Simunic et Stein, 1987 ; Francis et Wilson, 1988 ; Palmrose, 1988 ; DeFond, 1992 ; Teoh et Wong, 1993 ; et Craswell *et al.*, 1996), en démontrant l'existence d'une relation entre une mesure substitut de la qualité de la vérification et une mesure directe de l'ajustement des bénéfices — par l'intermédiaire des éléments discrétionnaires. Les études précédentes portaient généralement sur les caractéristiques secondaires découlant des différents niveaux d'ajustement des bénéfices (par exemple, les taux de litige, l'établissement du prix des services et les coefficients de réaction des bénéfices). La présente étude contribue également aux travaux sur les choix comptables (voir Watts et Zimmerman, 1990). Plus précisément, les résultats obtenus confirment le fait que le vérificateur externe exerce une contrainte sur les méthodes comptables que choisit la direction, l'efficacité de cette contrainte dépendant de la qualité de la vérification. En ce qui a trait aux études portant sur les éléments discrétionnaires (par exemple, Healy, 1985 ; DeAngelo, 1986 ; Jones, 1991 ; DeFond et Jiambalvo, 1994 ; Dechow, Sloan et Sweeney, 1995 ; et Subramanyam, 1996), les résultats obtenus ici donnent à penser que la puissance des tests pourrait être supérieure s'ils permettaient de contrôler la variation transversale dans la qualité de la vérification.

Les auteurs concluent que les résultats de leur étude confirment l'hypothèse relative à la relation entre la qualité de la vérification et l'ajustement des bénéfices. Ils reconnaissent toutefois qu'une importante mise en garde s'impose. En supposant que les données soient accessibles, la qualité de l'analyse serait meilleure encore si l'on pouvait examiner les données *antérieures à la vérification* afin de déterminer la proportion des éléments discrétionnaires injustifiés redressés par chaque catégorie de vérificateurs. Il serait ensuite possible de conclure que la catégorie de vérificateurs qui présente la proportion de redressements la plus élevée est de qualité supérieure. Il se peut que les vérificateurs qui n'appartiennent pas aux Six Grands soient ceux qui présentent la proportion la plus élevée de redressements d'éléments discrétionnaires injustifiés, mais force est de constater que leurs entreprises clientes affichent des niveaux relativement plus élevés d'ajustement des bénéfices *antérieurs à la vérification*. Cependant, compte tenu du fait que l'ajustement des bénéfices *avant la vérification* n'est pas directement observable et qu'il est difficile à estimer, les auteurs croient que l'étude de cette possibilité devra faire l'objet de nouvelles recherches.

1. Introduction

The purpose of this study is to examine the effect of audit quality on earnings management through discretionary accruals. Managers have incentives to "adjust" earnings to maximize firm and/or manager wealth. These incentives are created by contracts that are "explicitly" based on reported earnings (e.g., management compensation plans and debt agreements); contracts that are "implicitly" based on reported earnings (e.g., implicit contracts between the firm

and its customers and suppliers); and various situations (such as import relief negotiations, management buyouts, and proxy contests) where reported earnings play an important role.[1] Most studies investigating earnings management focus on these incentives and assume that management's ability to make accounting adjustments for opportunistic reasons is the same across firms. However, this is unlikely to be the case. Factors that vary across firms and that constrain or limit management's ability to manage earnings include the firm's internal governance structure (Dechow, Sloan, and Sweeney 1996), previous accounting decisions made by the firm that limit future discretionary choices (Sweeney 1994), and the costs imposed on the firm should earnings management be revealed.[2] In our paper, we focus on one of these factors — the quality of the external auditor.

Auditing reduces information asymmetries that exist between managers and firm stakeholders by allowing outsiders to verify the validity of financial statements. The effectiveness of auditing, and its ability to constrain the management of earnings, is expected to vary with the quality of the auditor. In comparison to low-quality auditors, high-quality auditors are more likely to detect questionable accounting practices and, when detected, to object to their use and/or to qualify the audit report. Thus, high-quality auditing acts as an effective deterrent to earnings management because management's reputation is likely to be damaged and firm value reduced if misreporting is detected and revealed.[3] Therefore, we predict earnings management is greater in firms with lower-quality auditors than in firms with higher-quality auditors.[4]

Numerous studies have investigated the notion that Big Six auditors provide higher-quality audits than non–Big Six auditors. Theoretical support for such a quality differentiation is provided in DeAngelo 1981, who demonstrates analytically that larger audit firms have greater incentives to detect and reveal management misreporting. Because Big Six firms are larger than their competitors, it follows from DeAngelo's analysis that they are of higher quality. Several empirical studies have documented evidence consistent with DeAngelo's analysis. Teoh and Wong (1993) document higher earnings response coefficients for clients of Big Six auditors as compared to clients of non–Big Six auditors. Several studies have also documented an audit fee premium attributed to Big Six auditors (e.g., Craswell, Francis, and Taylor 1995). In addition, St. Pierre and Anderson (1984) find a lower incidence of litigation among Big Six auditors compared with non–Big Six auditors. DeFond and Jiambalvo (1991) consider errors and irregularities as a form of earnings management and hypothesize that clients of Big Six firms are less likely to have errors or irregularities. Results support the hypothesis only when fraudulent firms are excluded from their sample. DeFond and Jiambalvo (1993) show that auditor-client disagreements result from incentives to manage earnings and are more likely to occur when firms have Big Six auditors.

We hypothesize that non–Big Six auditors allow more income-increasing earnings management, via discretionary accruals, than Big Six auditors. We focus on income-increasing discretionary choices for two reasons. First, evidence suggests that managers are more likely to overstate than understate earnings

(DeFond and Jiambalvo 1991, 1993; Kinney and Martin 1994). Second, while there is evidence that auditors are routinely sued for allegedly allowing earnings management that overstates earnings, there is no evidence they are sued for earnings management that understates earnings (St. Pierre and Anderson 1984).

We test our hypothesis in a multivariate setting using a sample of over 10,000 firm year observations. Discretionary accruals are estimated using a cross-sectional version of a model developed in Jones 1991. The results support our prediction. We find that companies with non–Big Six auditors report discretionary accruals that are significantly greater than the discretionary accruals of companies with Big Six auditors. While our hypothesis focuses on income-increasing accruals, we also examine the variation in discretionary accruals. Such variation reflects the "accounting flexibility" that the auditor has allowed. We find that companies with non–Big Six auditors have significantly larger variation in discretionary accruals compared to companies with Big Six auditors.

Our results add to the literature on audit quality (e.g., DeAngelo 1981; Simunic and Stein 1987; Francis and Wilson 1988; Palmrose 1988; DeFond 1992; Teoh and Wong 1993; and Craswell et al. 1996) by demonstrating a relation between a proxy for audit quality and a direct measure of earnings management — discretionary accruals. Prior studies have generally focused on secondary characteristics that follow from differential levels of earnings management (e.g., litigation rates, pricing of services, and earnings response coefficients). Our study also contributes to the literature on accounting choice (see Watts and Zimmerman 1990). Specifically, our results are consistent with the external auditor acting as a constraint on management's choice of accounting procedures, with the effectiveness of the constraint depending on audit quality. With respect to studies that examine discretionary accruals (e.g., Healy 1985; DeAngelo 1986; Jones 1991; DeFond and Jiambalvo 1994; Dechow, Sloan, and Sweeney 1995; Subramanyam 1996), our results suggest that tests may be more powerful if they control for cross-sectional variation in audit quality.

We conclude that our results support our hypothesis regarding the relation between audit quality and earnings management. However, we also acknowledge an important caveat. In the absence of data constraints, our analysis might appropriately include an examination of "preaudited" data to determine the proportion of unwarranted accruals actually prevented by each auditor type. We could then conclude that the auditor type that thwarts the highest proportion is of higher quality. It is possible that non–Big Six auditors are preventing a higher proportion of unwarranted accruals, but their clients have relatively higher levels of preaudit earnings management. However, because preaudited earnings management is not directly observable and is difficult to estimate, we leave investigation of this alternative to future research.

The remainder of the paper is organized as follows. In the next section we provide additional motivation for our hypothesis. In section three we discuss sample selection and research design. Results are presented in section four and conclusions are presented in the final section of the paper.

2. Development of hypothesis

Auditing is a valuable form of monitoring used by firms to reduce agency costs with debt holders and stockholders (Jensen and Meckling 1976; Watts and Zimmerman 1983). The value of auditing arises, in part, because auditing reduces the misreporting of accounting information. Based on a review of nine studies, Kinney and Martin (1994) conclude that auditing reduces positive bias in preaudit net earnings and net assets. Hirst (1994) finds that auditors are sensitive to earnings management and tend to concentrate on managerial incentives to overstate earnings.

While auditing is valuable in controlling managerial discretion, its value is expected to vary with the quality of the audit firm. Drawing on Watts and Zimmerman 1980, DeAngelo (1981) defines audit quality as the joint probability of detecting and reporting financial statement errors, which will partially depend on the auditor's independence. Higher-quality auditors are expected to be less willing to accept questionable accounting methods and are more likely to detect and report errors and irregularities. The most common proxy for audit quality is a dummy variable for Big Six/non–Big Six membership, and several studies have found support for this surrogate (Nichols and Smith 1983; Simunic and Stein 1987; Palmrose 1988; Francis and Wilson 1988; DeFond 1992; DeFond and Jiambalvo 1991, 1993; Davidson and Neu 1993).[5] This proxy is used because the Big Six are the largest audit firms in the U.S.A., and theory suggests that audit firm size is a proxy for audit quality (DeAngelo 1981; Dopuch and Simunic 1982).[6] Their larger client base means Big Six auditors have more to lose in the event of a loss of reputation. This larger potential loss results in a relatively greater incentive to be independent compared to non–Big Six firms that have a much smaller client base.[7]

The higher quality of Big Six auditors will tend to reduce the incidence of income-increasing earnings management. As noted in section one, auditors are more likely to focus on income-increasing earnings management if, as evidence suggests, managers are more likely to overstate than understate earnings (DeFond and Jiambalvo 1991, 1993; Kinney and Martin 1994). Kinney and Martin analyze the errors and irregularities detected and corrected in more than 1,500 audits. They find that audit-related adjustments are overwhelmingly negative (i.e., the adjustments required by the auditor reduce preaudited earnings). Further, St. Pierre and Anderson (1984) report that while they find auditors are frequently sued for allowing income overstatements, they find no cases of auditors being sued for allowing income understatements. Thus, the risk of Big Six auditors damaging their brand-name reputation is greater for income-increasing discretionary accrual choices. Based on these arguments and results, we hypothesize (in alternative form) as follows:

> HYPOTHESIS: *Ceteris paribus, firms with non–Big Six auditors report relatively higher discretionary accruals compared to firms with Big Six auditors.*

While prior research suggests that earnings overstatements are more frequent and of greater concern to auditors, high quality auditing should also, ceteris paribus, be a greater deterrent to earnings understatements. Results in Warfield, Wild, and Wild (1995) indicate that the absolute value of discretionary accruals is a good proxy for the combined effect of income-increasing and income-decreasing earnings management decisions. We also analyze differences in this measure for firms with Big Six and non–Big Six auditors.

3. Sample selection and descriptive statistics

Sample selection
Using data from the 1993 COMPUSTAT database, our tests compare the discretionary accruals of a sample of firms with non–Big Six auditors to those of a sample of firms with Big Six auditors. We exclude financial institutions with Standard Industrial Classifications (SICs) between 6000 and 6999 because computing discretionary accruals for these firms is problematic. Utility companies (SICs between 4000 and 4999) are excluded because regulation may make the incentives to manage earnings different from the incentives in unregulated industries. To maintain independence between the sample with Big Six auditors and the sample with non–Big Six auditors, we require each firm's auditor type to remain constant over the period analyzed. In other words, we impose the constraint that sample firms audited by non–Big Six firms do not change to Big Six auditors over the period analyzed and vice versa. Because many firms eventually switch auditor type, this restriction creates a trade-off between the length of the period analyzed and the number of observations. Specifically, the longer the period analyzed, the fewer the observations that meet the criterion. Considering this trade-off, we choose 1989 through 1992 as our test period.[8] As well as allowing for a reasonable sample size, this period also coincides with the period immediately following the implementation of the so-called "expectations gap" auditing standards. Therefore, to the extent that Big Six and non–Big Six auditors and their clients are differentially impacted by these new standards, this test period has the desirable quality of a homogeneous auditing standards regime.

We also eliminate firms with insufficient data to compute discretionary accruals and firms that change fiscal year-ends during the period of analysis. Finally, in an attempt to increase comparability, we eliminate Big Six (non–Big Six) clients that do not have at least one non–Big Six (Big Six) counterpart in the same year, industry, and decile of operating cash flows. Comparability across years and industry is desirable because discretionary accruals are likely to vary across time and by industry. Comparability across cash flow deciles is desirable because the model in Jones (1991), which we use to estimate discretionary accruals, may be sensitive to extreme measures of cash flows (Dechow et al. 1995). This sample selection procedure yields a sample of 10,397 firm year observations audited by Big Six auditors and 2,179 firm year observations audited by non–Big Six auditors.[9]

Descriptive statistics

Table 1 presents financial variables describing our sample firms. Columns (A) and (B) present variables for the Big Six and non–Big Six firms, respectively, and column (C) presents the results of parametric and nonparametric tests comparing the two groups. In general, Table 1 suggests that the Big Six sample firms tend to be substantially larger and more profitable than the non–Big Six sample firms. Specifically, assets, earnings and operating cash flows are significantly larger among the Big Six sample. The median of the log of assets for the Big Six sample is $4.123 million compared to $1.830 million for the non–Big Six sample, and median earnings are 2.8 percent of total assets for the Big Six sample compared to 0.7 percent of total assets for the non–Big Six sample. Despite requiring comparable cash flow population deciles in our sample selection procedure, median cash flows for the Big Six group (6.7 percent of assets) are significantly larger than cash flows for the non–Big Six sample (3.1 percent of assets).[10] Statistically, leverage is not significantly different across the groups.

While mean total accruals are not significantly different across the two samples, the nonparametric test indicates total accruals are less negative among the non–Big Six sample at $p = 0.039$. The mean and median absolute values of total accruals scaled by assets are statistically larger among the firms audited by non–Big Six auditors.[11]

In conclusion, Table 1 reports differences between the Big Six and non–Big Six samples with respect to size, operating cash flows, earnings, and the absolute value of discretionary accruals. Therefore, in addition to a univariate test of our hypothesis, we also perform a multivariate test that includes control variables for the log of assets, operating cash flows, and the absolute value of discretionary accruals. We do not include a control variable for earnings in the multivariate tests because discretionary accruals are a component of earnings.

4. Research design

Estimation of discretionary accruals

Prior studies have used various methodologies to detect the effects of accounting choices on reported earnings. McNichols and Wilson (1988) examined the estimation of an individual account, bad debt reserves, and Sweeney (1994) examined changes in specific accounting method choices. Accounting choices that potentially impact reported earnings include a portfolio of both accruals estimations and specific method choices (Schipper 1989). In an attempt to capture the net effect of all accounting choices that impact reported income, we choose to examine the behavior of total discretionary accruals.

We measure discretionary accruals using the cross-sectional variation of the Jones 1991 accruals estimation model reported in DeFond and Jiambalvo 1994 and DeFond and Subramanyam 1997. Subramanyam (1996) finds that the cross-sectional Jones models are generally better specified than their time- series counterparts. The model we use estimates "normal" accruals as a function of the change in revenue and the level of property, plant, and equipment. These

TABLE 1
Descriptive statistics for sample firms*

	Section A Observations with Big Six auditors (n = 10,397)			Section B Observations with non–Big Six auditors (n = 2,179)			Section C Tests of null† (A = B)	
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	t-statistic (p-value)	Z-statistic (p-value)
Natural log of assets (millions of dollars)	4.266	4.123	2.240	2.049	1.830	1.802	49.912 (0.000)	41.648 (0.000)
Income before extraordinary items/total assets	−0.049	0.028	0.526	−0.183	0.007	2.433	2.560 (0.010)	9.575 (0.000)
Operating cash flows/total assets	0.007	0.067	1.172	−0.115	0.031	2.440	2.296 (0.021)	11.301 (0.000)
Total liabilities/total assets	0.530	0.522	0.262	0.527	0.524	0.291	0.406 (0.682)	0.463 (0.643)
Total accruals/total assets	−0.054	−0.053	0.931	−0.062	−0.046	1.412	0.259 (0.795)	2.069 (0.039)
Absolute value of (total accruals/total assets)	0.136	0.075	0.923	0.221	0.088	1.396	−2.733 (0.006)	−6.439 (0.000)

See NOTES on following page

variables control for changes in accruals that are due to changes in the firm's economic condition (as opposed to accruals manipulation). The change in revenue is included because changes in working capital accounts, part of total accruals, depend on changes in revenue. Property, plant, and equipment is used to control for the portion of total accruals related to nondiscretionary depreciation expense. The portion of total accruals unexplained by normal operating activities is discretionary accruals.

Specifically, discretionary accruals are estimated from the following model:

$$TA_{ijt}/A_{ijt-1} = \alpha_{jt}[1/A_{ijt-1}] + \beta_{1jt}[\Delta REV_{ijt}/A_{ijt-1}] + \beta_{2jt}[PPE_{ijt}/A_{ijt-1}] + e_{ijt} \qquad (1)$$

where:

TA_{ijt} = total accruals for sample firm i in industry j for year t;
A_{ijt-1} = total assets for sample firm i in industry j for year $t-1$;
ΔREV_{ijt} = change in net revenues for sample firm i in industry j for year t;
PPE_{ijt} = gross property plant and equipment for sample firm i in industry j for year t;
e_{ijt} = error term for sample firm i in industry j for year t;

Total accruals are measured using COMPUSTAT data and defined as income before extraordinary items minus operating cash flows. Industry membership is assessed using two-digit SIC codes, and ordinary least squares is used to obtain industry-specific estimates (a_{jt}, b_{1jt}, and b_{2jt}) of the coefficients in equation (1). As in Subramanyam 1996 and DeFond and Park 1997, discretionary accruals are defined as the error term from the above regression.

Approach to testing
The purpose of our analysis is a comparison of discretionary accruals across our Big Six and non–Big Six samples. While we conduct a number of univariate tests, our primary analysis is a multivariate test that controls for potential differences across the sample groups that may confound simple univariate

comparisons. In our multivariate analysis, discretionary accruals are regressed on a dummy variable indicating auditor type and several control variables.

The descriptive data in Table 1 indicate that there is a difference in operating cash flows across the two samples. Therefore, operating cash flows are included in the multivariate regression. Table 1 also indicates size differences across the two groups. Because size may surrogate for numerous omitted variables, we also include the log of total assets to control for the potential effects of size on the choice of discretionary accruals.

Leverage may also be associated with discretionary accruals. High leverage has been found to be associated with closeness to the violation of debt covenants (Press and Weintrop 1990), and debt covenant violation has been found to be associated with discretionary accrual choice (DeFond and Jiambalvo 1994). To avoid debt covenant violation, managers of highly leveraged firms have incentives to make income-increasing discretionary accruals. However, high leverage is also associated with financial distress (Beneish and Press 1995; Ohlson 1980). According to DeAngelo, DeAngelo, and Skinner 1994, troubled companies have large negative accruals related to contractual renegotiations that provide incentives to reduce earnings. Therefore, to control for the possible effects (either positive or negative) of high leverage on our results, we include a dummy variable that measures whether or not the sample firm falls in the highest decile of leverage for COMPUSTAT firms in the same industry during the year of interest.

Another factor that potentially confounds a univariate analysis is the client-firm's accruals-generating potential. Francis, Maydew, and Sparks (1996) argue that firms with greater endogenous accruals-generating potential have greater uncertainty about reported earnings because of the difficulty that outsiders have in distinguishing discretionary and nondiscretionary accruals. These firms have the most to gain from signaling that earnings management is being constrained by the presence of a Big Six auditor. Thus, ex ante, firms with the greatest accruals-generating potential are more likely to hire Big Six auditors. We argue that once the choice of auditor is made, expectations as set forth in Francis et al. will be realized and "discretionary" accruals will be more conservative, ex post, among firms that have chosen Big Six auditors.[12] However, to control for the possibility that firms with larger absolute values of total accruals also have larger discretionary accruals, and because the absolute value of total accruals differs across our samples (see Table 1), we include the absolute value of total accruals as a control variable in our multivariate test.

Beneish (1997) suggests that managers will manage earnings upward in response to incentives related to selling personal holdings as part of and subsequent to equity offerings. This finding is consistent with the observations of Teoh, Welch, and Wong 1996, who find evidence of earnings management in response to seasoned equity offerings. In addition, it is conceivable that managers have incentives to manage earnings downward in response to share repurchases. Therefore, to capture incentives related to stock transactions, we include dummy

variables indicating whether the outstanding shares have increased or decreased by 10 percent or more.[13]

Lastly, DeFond and Subramanyam (1997) find that firms that change auditors tend to report negative discretionary accruals during the last year with their predecessor auditor and the first year with their successor auditor. Recall that in the four-year period we examine (1989 through 1992), firms with auditor changes are excluded. As a further control, we include a dummy variable equal to one if the first sample year is the first year with a new auditor. We also include a dummy variable equal to one if the last sample year is followed by an auditor change.

The multivariate analysis is performed by estimating the coefficients in the following regression model:

$$DA_{it} = \beta_0 + \beta_1 NB6_{it} + \beta_2 OCF_{it} + \beta_3 Assets_{it} + \beta_4 HiLev_{it} + \beta_5 AbsAccr_{it}$$

$$+ \beta_6 ShareDecr_{it} + \beta_7 ShareIncr_{it} + \beta_8 OldAud_{it} + \beta_9 NewAud_{it} + e_{it} \qquad (2)$$

where:

Da_{it}	= estimated discretionary accruals;
$NB6_{it}$	= dummy variable equal to one if auditor is non–Big Six;
OCF_{it}	= operating cash flows;
$Assets_{it}$	= natural logarithm of total assets;
$HiLev_{it}$	= dummy variable indicating whether firm is among the highest decile of leverage, by year and industry;
$AbsAccr_{it}$	= the absolute value of total accruals;
$ShareDecr_{it}$	= dummy variable equal to 1 if there is a decline of more than 10 percent of the total outstanding shares during the year;
$ShareIncr_{it}$	= dummy variable equal to 1 if there is an increase of more than 10 percent of the total outstanding shares during the year;
$OldAud_{it}$	= dummy variable equal to 1 if the last sample year is followed by an auditor change;
$NewAud_{it}$	= dummy variable equal to 1 if first sample year is the first year with a new auditor.

Discretionary accruals are estimated as described earlier in this section. The remaining variables are computed from the COMPUSTAT database. Observations with information not available are dropped from the analysis.

4. Empirical results

Univariate results
Table 2 presents the univariate analysis of discretionary accruals pooled across years. Mean and median discretionary accruals and the absolute value of discretionary accruals are presented for the Big Six and non–Big Six samples in

sections A and B, respectively. Section C presents the differences from sub-tracting the means and medians reported in section A from those in section B, along with the results of *t*-tests and Wilcoxon two-sample tests of the differences between the two samples. Section A indicates that clients of Big Six auditors report mean (median) discretionary accruals of –2.9 percent (–0.9 percent) of total assets. Both *t*-tests and signed rank tests indicate that the central tendency is significantly negative. As indicated in section B, clients of non–Big Six auditors have mean (median) discretionary accruals of –0.8 percent (0.4 percent) of total assets. Both central tendency measures are not significantly different from zero. Section C indicates that clients of non–Big Six auditors report discretionary accruals that are, on average, 2.1 percent of assets higher than the discretionary accruals reported by the clients of Big Six firms. The difference in median discretionary accruals between the two groups is 1.3 percent of assets. Differences in both the means and the medians are in the direction suggested by our hypothesis, and section C indicates that the differences are statistically significant.[14]

The absolute value of discretionary accruals is an additional indicator of the degree to which management is allowed to exercise discretion in reporting earnings. Sections A and B of Table 2 indicate that the mean and median values of the absolute value of discretionary accruals are largest among the clients of non–Big Six auditors. Section C indicates that the difference between Big Six and non–Big Six clients is statistically significant. Therefore, as with the analysis of discretionary accruals, these findings are consistent with non–Big Six auditors allowing greater flexibility in management's choice of discretionary accruals.

The observations in the univariate tests are not independent because of repeated measures for the same firm across years. To address this problem, we calculated sample means (medians) by year and compared the four annual means (medians) of the Big Six sample to the four annual means (medians) of the non–Big Six sample via *t*-tests (signed rank tests). Results for this conservative procedure were significant at the 0.369 (0.194) level for the two-tailed comparisons of mean (median) discretionary accruals. A possible reason for the lack of significance at conventional levels is the presence of correlated omitted variables, a factor that is addressed in the multivariate test reported next. With respect to the absolute value of discretionary accruals, results were significant at the 0.032 (0.021) level for two-tailed comparisons of mean (median) absolute values. These latter results provide strong support for the conclusions based on the pooled analysis.

Multivariate results
A limitation of the analysis thus far is that it ignores a number of variables that potentially confound our results. Therefore, in Table 3 we present the results of a multivariate analysis with the control variables discussed in the research design section.[15] The first coefficient in the regression in Table 3 relates to a dummy variable representing membership in the sample audited by non–Big Six auditors. The coefficient is significant at less than the five percent level. The value of the

TABLE 2

Discretionary accruals, absolute value of discretionary accruals, and standard deviation of discretionary accruals for a sample of Big Six and non–Big Six auditors during 1989–92.*

	Section A Observations with Big Six auditors			Section B Observations with non–Big Six auditors			Section C Differences across samples (B–A)	
	Observations	Mean	Median	Observations	Mean	Median	Mean	Median
Discretionary accruals (DAC) (two-tailed p-value)†	10,397	-0.029 (0.001)	-0.009 (0.001)	2,179	-0.008 (0.207)	0.004 (0.911)	0.021 (0.002)	0.013 (0.000)
Absolute value of DAC (two-tailed p-value)†	10,397	0.129 (0.001)	0.063 (0.001)	2,179	0.170 (0.000)	0.088 (0.000)	0.041 (0.000)	0.025 (0.000)

Notes:

* The samples consist of 2,179 non–Big Six and 10,379 Big Six firm year observations of COMPUSTAT firms from 1989–92. Sample firms are excluded if they change auditor type during the period of analysis and we eliminate Big Six (non–Big Six) clients that do not have at least one non–Big Six (Big Six) counterpart in the same year, industry, and decile of operating cash flows. Discretionary accruals are computed as the error term from the following regression:

$$TA_{ijt}/A_{ijt-1} = a_{jt}[1/A_{ijt-1}] + b_{1jt}[\Delta REV_{ijt}/A_{ijt-1}] + b_{2jt}[PPE_{ijt}/A_{ijt}] + e_{ijt}$$

where:

TA_{ijt} = total accruals for sample firm i in industry j for year t;

A_{ijt-1} = total assets for sample firm i in industry j for year $t-1$;

ΔREV_{ijt} = change in net revenues for sample firm i in industry j for year t;

PPE_{ijt} = gross property plant and equipment for sample firm i in industry j for year t;

e_{ijt} = error term for sample firm i in industry j during year t;

† In sections A and B, p-values for the means are from t-tests and p-values for medians are from signed rank tests. In section C, p-values for means are from t-tests and p-values for medians are from Wilcoxon two-sample tests.

coefficient is consistent with the univariate comparison. In Table 2, mean discretionary accruals of the non–Big Six sample exceeded those of the Big Six sample by 2.1 percent of assets. In Table 3, the coefficient on the non–Big Six dummy variable indicates the non–Big Six sample reports discretionary accruals that are higher than the Big Six sample by an average of 1.5 percent of assets. Thus, while the inclusion of control variables in the multivariate analysis attenuates the difference, the results continue to support our hypothesis.

Several of the control variables in the multivariate regression in Table 3 are significantly associated with discretionary accruals. The negative coefficient on the operating cash flow variable is consistent with the Dechow et al. 1995 finding that discretionary accruals are negatively correlated with operating cash flows. The negative coefficient on the leverage dummy variable is consistent with an association of high leverage and financial distress, with distress leading to contractual renegotiations that provide incentives to reduce earnings (DeAngelo et al. 1994). While the negative coefficient on the absolute value of total accruals suggests that managers of firms with large positive or negative accruals tend to suppress earnings, this result may be mechanically driven. Nondiscretionary accruals tend to be negative due to depreciation. Therefore, negative discretionary accruals increase the absolute value of the sum of nondiscretionary and discretionary accruals (i.e., total accruals). On the other hand, positive discretionary accruals decrease the absolute value. This result induces a negative relation between discretionary accruals and the absolute value of total accruals which may explain the finding in Table 3.

To mitigate the effect of any cross-sectional correlation in the regression error terms, we estimate the model in equation (2) separately for each of the four years in our sample and calculate t-statistics using the variability in the annual coefficient estimates as in Bernard (1987). The mean coefficients for the four annual estimations are presented in the second column of Table 3 along with related t-statistics. The results are consistent with the pooled estimation. In particular, the coefficient on the non–Big Six dummy variable is statistically significant and equal to 0.019. Thus, compared to clients with Big Six auditors, clients with non–Big Six auditors have discretionary accruals that are higher by 1.9 percent of total assets.

5. Summary and conclusions

Although a considerable body of research has examined management's incentives to "adjust" earnings, relatively little work has examined factors that constrain earnings management. This study focuses on one such factor — the quality of the external auditor. In comparison to low-quality auditors, high-quality auditors are more likely to detect questionable accounting practices and object to their use or qualify the audit report. As in prior work, we use a dichotomous measure of audit quality with Big Six firms classified as being of higher quality than non–Big Six firms. Earnings management is measured in terms of discretionary accruals estimated using a cross-sectional version of the Jones 1991 model. We hypothesize that firms with non–Big Six auditors will

TABLE 3
OLS regression of discretionary accruals on non–Big Six membership
and control variables

Independent variable	Pooled estimate (t-statistic)*	Mean of four annual estimations 1989–92 (t-statistic)[†]
Intercept	−0.033 (−5.415)	−0.014 (−0.432)
Non–Big Six auditor (dummy)	0.015 (2.216)	0.019 (2.681)
Operating cash flows/total assets	−.015 (−7.602)	−0.112 (−2.988)
Log of total assets	0.001 (1.243)	0.002 (0.313)
Highest 10% of leverage by industry and year (dummy)	−0.043 (−5.720)	−0.039 (−5.521)
Absolute value of total accruals/total assets	−0.006 (−2.128)	−0.133 (−1.644)
Greater than 10% decrease in shares outstanding (dummy)	0.009 (0.851)	0.000 (0.037)
Greater than 10% increase in shares outstanding (dummy)	0.005 (0.850)	−0.005 (−1.120)
Last sample year followed by auditor change (dummy)	0.007 (1.092)	−0.018 (−2.545)
First sample year is first year with new auditor (dummy)	−0.015 (−1.775)	−0.012 (−2.761)
Adjusted R-squared	1 %	
F-statistic	12.118	
Number of observations	10,881	
Average adjusted R-squared for four annual estimates		8 %

Notes:
* Due to missing data, the number of observations in the multivariate analysis equals 10,881 (9,035 + 1,846). The sample consists of all firms on the COMPUSTAT database with complete data from 1989–92. Sample firms are excluded if they change auditor type during the period of analysis and we eliminate Big Six (non–Big Six) clients that do not have at least one non–Big Six (Big Six) counterpart in the same year, industry and decile of operating cash flows.
† The coefficients are the mean of four annual estimations (1989–92). The t-statistics are calculated using the variability in the annual coefficient estimates as in Bernard 1987.

report discretionary accruals that increase income in comparison to firms with Big Six auditors.

Our multivariate sample consists of 9,035 firm years associated with Big Six auditors and 1,846 firm years associated with non–Big Six auditors. A pooled regression indicates that, ceteris paribus, discretionary accruals of firms with non–Big Six auditors are 1.5 percent of assets higher than the discretionary accruals of firms with Big Six auditors. A statistical test using annual estimates to mitigate the effect of cross-sectional correlation also supports the conclusion that the discretionary accruals of firms with non–Big Six auditors are higher than the discretionary accruals of firms with Big Six auditors. Because strategic accounting choices may include both income-increasing and income-decreasing choices, we also examine the absolute value of discretionary accruals for the two groups. Univariate tests indicate that firms with non–Big Six auditors have significantly larger mean and median absolute values of discretionary accruals.

We interpret our results as supporting the conclusion that Big Six auditors are of higher quality than non–Big Six auditors, but an important caveat is needed. Ideally, we should examine the proportion of unwarranted accruals prevented by each auditor group and conclude that the auditor type with the higher proportion is of higher quality. Conceivably, non–Big Six auditors are preventing a higher proportion of unwarranted accruals, but their clients have relatively high levels of preaudit earnings management. Given this scenario, our conclusion that Big Six auditors are of higher quality would not be appropriate. Because preaudit earnings management is not observable and is difficult to estimate, we have left this intriguing possibility to future research.

These results add to the literature on audit quality by demonstrating a direct relation between audit quality and earnings management. Prior studies typically assume a relation between audit quality and earnings management and then test for a relation between audit quality and an observable that is related to earnings management (e.g., litigation rates, pricing of services, and earnings response coefficients). The results also contribute to the growing literature examining discretionary accruals. In particular, our study suggests that tests involving discretionary accruals will be more powerful if they control for cross-sectional differences in audit quality.

Endnotes

1. Examples of studies examining the effects of explicit contracts on accounting choice include Hagerman and Zmijewski 1979, 1981; Bowen, Noreen, and Lacey 1981; Daley and Vigeland 1983; Healy 1985; McNichols and Wilson 1988; and DeFond and Jiambalvo 1994. Bowen, DuCharme, and Shores (1995) and DeFond and Park (1997) are studies examining the effects of implicit contracting on accounting choice. Studies examining earnings management during specific situations include Jones 1991 and DeAngelo 1986, 1988. Watts and Zimmerman (1990) provide a summary of this literature.
2. See Jiambalvo 1996 for a discussion of constraints on earnings management.
3. Dechow, Sloan and Sweeney (1996) report that stock prices decline on average by 9 percent following disclosure of earnings management resulting in an

Accounting and Auditing Enforcement Release by the Securities and Exchange Commission.

4. We do not specifically address how firms choose the level of audit quality to employ. Instead, we take the choice of auditor quality as given and examine whether differences in quality affect the level of earnings management across firms. However, it is important to consider why a firm would choose to hire a low-quality auditor. Given that the choice of auditor is observable, outsiders can price protect themselves against the higher expected earnings management of firms employing low-quality auditors. Thus, it would appear that a strategy of employing a low-quality auditor to have more discretion would unravel. However, selecting a low-quality auditor can be a rational choice. The incremental cost of employing a high-quality auditor can be substantial. Numerous prior studies have documented that a brand name price premium exists for Big Six auditors (Simon and Francis 1988; Francis 1984; Francis and Stokes 1987; Palmrose 1986; Rubin 1988). Therefore, a firm will trade off the costs of employing a Big Six auditor with the expected costs of not employing such an auditor. See Francis, Maydew, and Sparks 1996 for a more complete discussion of auditor selection.

5. Prior to the merger of Touche Ross and Deloitte, Haskins and Sells and the merger of Ernst & Whinney and Arthur Young in 1989, the current Big Six was referred to as the Big Eight. For convenience, throughout the paper we refer only to the Big Six.

6. In a recent study of the association between firm size and audit quality in a Canadian setting, Davidson and Neu (1993) report that the Canadian Big Eight is the same as the U.S. Big Eight with one exception — in Canada, Doane Raymond, which is internationally known as Grant Thorton, replaces Arthur Andersen. Davidson and Neu refer to the Big Eight rather than the Big Six because they classify firms prior to the mergers that reduced the Big Eight to the Big Six.

7. The Big Six also devote more resources to staff training and the development of industry expertise (Crasswell, Francis, and Taylor 1996; DeFond, Francis, and Wong 1997).

8. Our sample period does not include 1993 because this year is used to identify firms that change auditors after the last sample year. DeFond and Subramanyam (1997) find that firms that change auditors tend to report negative discretionary accruals during the last year with their predecessor auditor.

9. We emphasize that our sample selection procedure is not a matched sample design. Rather, the constraints on year, industry, and cash flow are employed in an attempt to induce a reasonable amount of comparability across the Big Six and non–Big Six samples. Because Big Six clients vastly outnumber non–Big Six clients in the COMPUSTAT database, a one-to-one match does not yield a sample that is reflective of the population. Our main result (that Big Six auditors have lower discretionary accruals) is not dependent on the sample selection procedure. Our results hold even when we use the population of COMPUSTAT firms.

10. Operating cash flows are computed as COMPUSTAT Item 380 (cash flow from operations) for firms with cash flow statements and as Item 110 (working capital from operations) – change in Item 4 (current assets) + change in Item 5 (current liabilities) + change in Item 1 (cash) – change in Item 34 (debt included in cur-

rent liabilities) for firms using the funds flow statement. This measure is consistent with measures used in previous research, including DeAngelo et al. 1994 and DeFond and Jiambalvo 1994.

11. Finding a larger absolute value of total accruals among non–Big Six auditors appears somewhat inconsistent with the findings in Francis et al. 1996. In contrast to our univariate finding, they report a positive association between the absolute value of total accruals and auditor size in their multivariate analyses. However, research design differences make it difficult to directly compare their study with ours. For example, Francis et al. report only multivariate tests and use a measure of total accruals that is disaggregated into long-term and short-term components. To reconcile our results with theirs, we replicated their multivariate tests and accruals measures using our sample firms. While not reported, the results of this further analysis are qualitatively identical to those reported in Francis et al. with respect to the association between the absolute value of total accruals and auditor size. Thus, the association between auditor size and the absolute value of discretionary accruals appears sensitive to variations in research design. However, because all of our conclusions follow from our findings with respect to "discretionary" accruals, there are no important implications resulting from the differences between univariate and multivariate results for the absolute value of total accruals.

12. While their research design differs from ours, Francis et al. (1996) also find that earnings management, as reflected in discretionary accruals, is greater among clients with non–Big Six auditors.

13. Our multivariate results are insensitive to the inclusion of the variable indicating share decreases.

14. While the difference in discretionary accruals is consistent with our hypothesis, recall that mean and median discretionary accruals are not significantly different from zero for non–Big Six firms. It may be that while central tendency is close to zero, individual firms have large positive and negative discretionary accruals that offset. This supposition is supported by the analysis for the absolute value of discretionary accruals reported in the next section.

15. The sum of the Big Six and non–Big Six firms used in the univariate tests equals 12,558 (10,379 + 2,179). Due to missing data, the number of observations in the multivariate analysis equals 10,881 (9,035 + 1,846).

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