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Factors Affecting Auditors' Assessments of Planning Materiality

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SUMMARY: This study investigates the planning materiality values used by auditors in The Netherlands for a sample of engagements performed by Big 5 and non-Big 5 firms in 1998–99. We find that, consistent with archival evidence from KPMG in Elliott (1983), planning materiality is not a constant percentage of a base, but increases at a decreasing rate with client size. In addition, we find that planning materiality values increase with the quality of the client's control environment and the magnitude of the client's rate of return on assets, while decreasing with the complexity of the client. We also find that Big 5 firms use lower planning materiality values than non-Big 5 firms, *ceteris paribus*, which is consistent with the production of relatively higher audit quality levels by the Big 5. Finally, we find that auditors use lower materiality values in situations where earnings might be managed to show a small profit or a small loss.

Keywords: planning materiality; archival data; Dutch audits.

Data Availability: Data are derived from a survey of public accounting firms and are confidential. Questionnaire is available from the authors.

INTRODUCTION

The determination of Planning Materiality (PM) is an important judgment made by the auditor when designing an audit program, since the extent of "auditor effort" in performing the examination will vary inversely with the level of PM. However, professional guidelines for setting the level of PM are purposefully nonprescriptive. For example, the U.S. *Statements on Auditing Standards* (AU §312.06, AICPA 1998) provide the following guidance:

> The auditor's consideration of materiality is a matter of professional judgment and is influenced by his or her perception of the needs of a reasonable person who will rely on the financial statements. [and] ... materiality judgments are made in light of surrounding circumstances and necessarily involve both quantitative and qualitative considerations.

Similarly, the *International Standards on Auditing* (International Federation of Accountants ISA 320.04-05, IFAC 1997) state:

> The assessment of what is material is a matter of professional judgment. In designing the audit plan, the auditor establishes an acceptable materiality level so as to detect quantitatively material misstatements. However, both the amount (quantity) and nature (quality) of misstatements need to be considered.

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Because of the importance of the materiality judgment to audit program design and the fact that planning materiality is a quantitative threshold or cut-off value, auditing texts and practice guidebooks provide a number of rules-of-thumb for determining PM. For example, a commonly used rule-of-thumb is that misstatements less than 5 percent of normalized operating income before taxes are likely immaterial, misstatements greater than 10 percent of normalized operating income before taxes are likely material, while the materiality of amounts in the intermediate range depends on the specific circumstances (Holstrum and Messier 1982).

Given the vagueness of the guidance and the importance of the materiality judgment, studying *actual* materiality judgments by auditors in practice can provide useful insights into the audit process and audit quality. However, due to limited data availability, there have been few archival studies of this aspect of auditor decision making. We are aware of only two studies that utilized archival data to provide estimates of PM, Elliot (1983) and Warren and Elliot (1986 [cited in Icerman and Hillison 1991]). Both of these studies used data from a single large audit firm (KPMG).

In this paper, we estimate several empirical models of PM based on data from a sample of 108 audits of companies in The Netherlands performed by 13 different public accounting firms (including all of the Big 5 firms) during either 1998 or 1999. Our sample is restricted to a relatively homogeneous set of industries with the audits characterized by diversity in client size, control environment, complexity, and audit approach.[1] We find that an empirical model of PM using the client's size, the absolute value of the client's rate of return on assets, assessed strength of the control environment, and assessed level of client complexity provides a good cross-sectional fit. We also find that, *ceteris paribus*, Big 5 auditors assess PM at smaller amounts than non-Big 5 auditors, and that consistent with the results reported in Elliot (1983) and Warren and Elliot (1986), the relationship between planning materiality and client size increases at a decreasing rate. This finding is inconsistent with a "constant percentage of some base" rule-of-thumb for setting PM. Interestingly, the evidence also suggests auditors decrease PM for firms with small absolute reported earnings (i.e., close to break-even). This result is consistent with a rational auditor response to potential earnings management by clients.

The remainder of the paper is organized as follows. First, we describe the data, and then examine the relationship between the level of planning materiality and client size. Next, we investigate additional factors (beyond client size) that are related to the PMs observed in our sample, and contrast the predicted PMs from our model to results obtained using the KPMG "gauge" function (Elliott 1983). We then analyze the relationship between assessed PMs and small absolute earnings. Finally, we test the audit-firm-specific sensitivity of our findings. The last section summarizes and concludes the paper.

DATA

The data were obtained by a survey, conducted under the auspices of the Limperg Instituut in Amsterdam, sent to contact persons within each participating public accounting firm. The survey instructions requested that the auditor with appropriate decision-making responsibility complete the document. The survey primarily obtained information on a number of audit-production-related issues not covered in this research, as well as the variables discussed below. The contact person in each audit firm was asked to randomly select clients subject to the following criteria:

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[1] Audits in The Netherlands are performed in accordance with Dutch auditing standards, which are essentially the same as the International Standards on Auditing issued by the International Federation of Accountants.

- The engagement is for a complete audit of a separate Dutch legal entity for the year 1998 or 1999.
- The client is a medium- or large-sized company operating in merchandising, manufacturing, or a service industry that is "for profit" and neither a financial institution nor a governmental organization.

The identities of the clients included in the sample were not made available to the researchers. The data were screened extensively to identify errors. In a few cases, follow-up contacts with the participating auditors were made to ensure that the reported data were correct.

We received 110 usable responses that included a stated amount for planning materiality. After initial model formulation, we deleted two observations for having large influence statistics. In both cases, the amount of planning materiality seemed implausibly small given the size and other characteristics of the client. The final sample consists of 108 clients distributed across 13 audit firms. Definitions of the variables used in the study are listed in Table 1. Table 2 provides descriptive statistics.

TABLE 1
Definitions of Variables

Category	Variable	Definition
Other	*Planning Materiality*[a]	Auditor's value of Planning Materiality in nlg[b]
	NIBT	Net Income before Taxes
	Gauge	KPMG, Gauge = 1.6 * Max[Assets, Sales]$^{.667}$
	Gauge 2	Warren and Elliot, Gauge2 = .038657 Sales$^{.867203}$
Size	*Total Assets*[a]	Total Assets
	Sales[a]	Annual Turnover
	Size[a]	Square root (Total Assets × Sales)
Risk	*ROA*	NIBT/Total Assets
	Controls	Assessment of overall Control Environment quality: 1 = very low to 7 = very high
	Current ratio	Current Assets/Current Liabilities
	Inherent Risk	Assessment of overall Inherent Risk: 1 = very low to 7 = very high
	Illegal Acts	Risk of Illegal Acts: 1 = very low to 7 = very high
	Leverage	Leverage: (Total Assets – Total Liabilities)/Total Assets
	Loss	1 if a net loss, 0 otherwise
Complexity	*Complexity*	Assessment of complexity: 1 = simple to 7 = very complex entity
	Listed	1 = listed on Amsterdam Exchange, 2 = not listed
Auditor	*Tenure*	Number of years the audit firm has been auditing the client
	Big 5 Auditor	1 if Big 5 auditor, 0 otherwise
	Risk Approach	Did the auditor use a risk-based approach, rather than a procedures-based approach: 1 = yes, 0 = no

[a] 1000s nlg, where 1 nlg = U.S. $0.50.
[b] nlg = Netherlands Guilders.

TABLE 2
Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Planning Materiality[a]	108	773	1,417	20	10,000
Total Assets[a]	108	172,832	393,311	2,695	2,100,000
Sales[a]	108	212,579	399,018	4,898	2,789,426
Size[a]	108	177,377	360,941	5,815	2,223,250
|*ROA*|	108	.0996	.095	.00155	.564
Controls	108	4.889	1.088	2	7
Current ratio	108	1.747	2.344	0.103	21.698
Inherent Risk	108	3.287	1.311	1	6
Illegal Acts	108	2.194	0.942	1	5
Leverage	108	0.672	0.240	0.054	1.429
Complexity	108	3.500	1.115	1	6
Listed	108	0.287	NA	0	1
Loss	108	.157	NA	0	1
Tenure	108	11.667	9.068	1	50
Big 5 Auditor	108	0.620	NA	0	1
Risk Approach	108	.981	NA	0	1

[a] 1000s nlg, where 1 ngl = U.S. $0.50.

HEURISTICS AND THE RELATIONSHIP OF PM TO CLIENT SIZE

Auditing standards avoid prescribing benchmarks for planning materiality, however auditing guides and text books (e.g., Kinney 2000, Chapter 7; Guy and Carmichael 2000) frequently suggest that planning materiality ranges from 5 percent to 10 percent of Net Income before Taxes (NIBT) or 0.5 percent to 1.5 percent of Total Assets or Revenues. These heuristics imply that PM is commonly conceived as a fixed percentage of some base,[2] within a range that varies with various nonquantitative aspects[3] of the client's financial statements.

In our data, a substantial number of observations fall outside the range of the commonly suggested heuristics. For example, only 31 percent of our observations of the ratio, PM/NIBT, lie within the 5 percent to 10 percent range. Alternatively, if we use the ratio PM/|NIBT| to account for negative income then 33 percent of the observations fall in the 5 percent to 10 percent interval. Similarly, approximately 44 percent of our sample is in the 0.5 percent to 1.5 percent interval for the ratio, PM/Assets.

It has been observed by Elliot (1983) that for KPMG clients the ratio, PM/Total Assets, (or PM/Sales) decreases as client size increases. That is, the rate of increase in PM is less than the rate of increase for Total Assets. While this relationship is plausible, it has not been documented in the archival literature except for KPMG audits. To formalize the question we first define the ratio, PM/Assets, as a linear function of Total Assets:

$$\frac{PM_i}{Assets_i} = \beta_0 + \beta_1 \, Assets_i$$

[2] One of the few quantitative guidelines offered by the AICPA appears in their Auditing Practice Release, *Audit Sampling* (AICPA 1999). This document includes a table that relates planning materiality to the greater of total assets or total revenues. We estimate that the table is closely based on the formula: Planning Materiality $\approx$ 0.824 Assets $^{0.66189}$. Interestingly, this formula is nonlinear. However, we note that the guidance is not authoritative and given in a document mostly concerned with statistical sampling. We thank the editor for pointing out this document to us.

[3] In the U.S., SAB No. 99 (SEC 1999) makes it clear that it is not acceptable for auditors to rely solely on quantitative benchmarks in assessing materiality. International auditing standards also recognize the importance of qualitative factors when assessing materiality for an engagement.

Now a linear regression of the form:

$$PM_i = \delta_0 + \delta_1 Assets_i + \varepsilon_i \qquad (1)$$

must have $\delta_0 = 0$, if the ratio, PM/Assets, is constant. This can easily be seen after dividing Equation (1) by $Assets_i$:

$$\frac{PM_i}{Assets_i} = \frac{\delta_0}{Assets_i} + \delta \ .$$

As Table 3, Panel A Model (1) shows, the regression of PM on Assets in our data has both δ_0 and δ_1 significantly positive. This implies that the ratio, PM/Assets, systematically decreases as Assets increase.

TABLE 3

Tests of Linear versus Log-Linear Relationship between Planning Materiality and Assets

Panel A: Test of H_0 Linear Model versus H_1 Log-Linear Model

$$PM_i = \delta_0 + \delta_1 Assets_i + \delta_2 (\ln \hat{PM} - \ln[\hat{PM}]) + \varepsilon_i$$

where:

PM = planning materiality;
$Assets$ = total assets; and
$Test\ linear = (\hat{PM} - \exp[\ln \hat{PM}])$.

	(1) Basic Model	(2) Test for Linearity
Assets	.0029	.0027
	(13.64)	(12.75)
	0.00	0.000
Test linear		392.6
		(2.052)
		0.043
Constant	276.14	−2231.06
	(3.06)	(−1.821)
	.003	0.071
Adj R^2	0.6372	.64
n	108	108

Panel B: H_0 Log-Linear Model versus H_1 Linear Model

$$\ln PM_i = \gamma_0 + \gamma_1 \ln Assets_i + \gamma_2 (PM - \exp[\ln \hat{PM}]) + \upsilon_i$$

where:

PM = planning materiality;
$Assets$ = total assets; and
$Test\ non\text{-}linear = (\hat{PM} - \exp[\ln \hat{PM}])$.

	(1) Basic Model	(2) Test for Linearity
Assets	.686[a]	.674
	(14.84)	(7.636)
	0.000	0.000
Test non-linear		$-2.61 \times 10^{-.08}$
		(−.172)
		.863
Constant	.581	.792
	(.709)	(.536)
	.48	.593
Adj R^2	.672	.67
Number of obs.	108	108

[a] An F-test that $\gamma_1 = 1$ has a statistic of $F(1, 106) = 45.90$, which can be rejected at the 0.0001 level.
Table shows regression coefficients, (t-values), and statistical significance levels.

The above analysis assumes that the relationship between PM and Assets is linear. Of course, a decrease in the ratio, PM/Assets, could occur if the basic relationship between PM and Assets (or Sales) is nonlinear. We test the linearity of the relationship against a log-linear specification using the P_E test described in Davidson and MacKinnon (1993). In this test, we estimate the following two regression models and use the predicted values from the estimations.

$$PM_i = \delta_0 + \delta_1\ Assets_i + \varepsilon_i. \qquad (2)$$

$$\ln PM_i = \gamma_0 + \gamma_1 \ln Assets_i + u_i. \qquad (3)$$

We let $\hat{PM}$ represent the predicted values from the linear regression, Equation (2), and $\ln\hat{PM}$ the predicted values from the log-linear regression, Equation (3). Then, following Davidson and MacKinnon (1993), a test of the linear model against the log-linear specification is the t-test on the coefficient, δ_2, in the following regression model:[4]

$$PM_i = \delta_0 + \delta_1 Assets_i + \delta_2(\ln\hat{PM} - \ln[\hat{PM}]) + \varepsilon_i\,. \qquad (4)$$

A symmetric test of the log-linear model versus the linear model is provided by:

$$\ln PM_i = \gamma_0 + \gamma_1 \ln Assets_i + \gamma_2(\hat{PM} - \exp[\ln \hat{PM}]) + \upsilon_i\ . \qquad (5)$$

The regression results for the relevant coefficients from these models are $\delta_2 = 392.6239$ with a t-value of 2.052 (p-value = 0.043) and $= \gamma_2 -2.61 \times 10^{-08}$ with a t-value of –0.172 (p-value = 0.863) (see Table 3, Panel A Model 2 and Panel B Model 2). These two tests together imply that we can reject the null hypothesis of a linear model in favor of the log-linear model (the significant coefficient on δ_2), but cannot reject the null hypothesis of a log-linear model in favor of the linear specification (the insignificant coefficient on γ_2). In other words, the relationship between PM and Total Assets is best described by the log-linear specification. Further, if the coefficient on ln Assets is less than 1 (but not 0), then the relationship between PM and Assets is nonlinear and the *ratio* PM/Assets decreases as client size increases.

To see the nonlinearity, start with the log-linear specification in Equation (3), take anti-logs and divide by assets. This results in the following equation (ignoring the error term):

$$PM_i / Assets_i = e^{\gamma_0} Assets_i^{\ \gamma_1 - 1}. \qquad (6)$$

The derivative of Equation (6) with respect to Assets is negative when $0<\gamma_1<1$. As reported in Table 3 (Panel B Model 1), tests of significance support the estimate of γ_1 as less than 1 and greater than 0 ($\delta_1 = .686$). From these tests, we conclude that a nonlinear relationship (as described above) between planning materiality and client size is a general feature of auditing methods employed by the profession in The Netherlands.

BUILDING A DESCRIPTIVE MODEL OF PLANNING MATERIALITY

Auditing standards in the U.S. (SAB No. 99, SEC 1999) and internationally (ISA 320.5, IFAC 1997) state that PM should reflect qualitative as well as quantitative factors. Therefore, an empirical model of PM could include a number of client and auditor characteristics that proxy for these qualitative factors. Clearly, the size of the client is a first-order and primarily quantitative consideration. However, the standards cited above make it clear that not only quantitative measures come into play in assessing materiality. SAB No. 99 identifies intentional errors, small losses that change

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[4] The intuition behind the P_E test used in Equations (4) and (5) is whether the alternative model specification adds information to the current "base" model. For example, in Equation (4), the base model is the linear specification, $PM_i = \delta_0 + \delta_1\ Assets_i + \varepsilon_i$. To this model is added a term based on the difference between the natural log of the predicted values from the linear model, Equation (2), and the predicted values from the log-linear model, Equation (3). The predicted values from Equations (2) and (3) summarize the information contained by the respective specifications. Once they are put in a common scale (i.e., the predicted values from the linear model are logged) the difference term represents the difference in information between the two specifications. A significant coefficient on this difference term in Equation (4), for example, indicates the alternative specification, Equation (3), provides information not contained in the base specification, Equation (2). A similar interpretation can be given to Equation (5).

into gains (and vice versa), compliance with regulations or contractual requirements, among others as examples of other client characteristics that could influence the auditor's assessment of PM. To operationalize this diverse set of conditions we tested the effect on PM of the various client risk and complexity measures listed in Table 1. Further, since one of the primary uses of PM is to determine the nature and amount of evidentiary matter acquired during the audit, we conjecture that the auditor's experience, target level of assurance, and audit approach could also influence the assessment of PM.

Since prior research suggests a strong relationship between PM and Assets or Sales (i.e., Elliot 1983; Warren and Elliot 1986), our first step is to define an appropriate client size measure. Regressions (results not reported) of ln*PM* on ln*Assets*, ln*PM* on ln*Sales*, and ln*PM* on both ln*Assets* and ln*Sales*, all performed reasonably well, with acceptable levels of explained variance and no significant violations of OLS assumptions. In our sample, the explanatory variable, ln*Assets*, was superior to ln *Sales*. Including both explanatory variables outperformed either separately. We found the best size measure in our sample to be a constructed variable, ln*Size*, defined as:

$$\ln Size = \ln\left[(assets \bullet sales)^{.5}\right].$$

Note that this is simply the natural log of the geometric mean of *Assets* and *Sales*. This construct outperformed the model in which both ln*Assets* and ln*Sales* were included as separate explanatory variables (results not reported).

We next consider which of the available proxies for nonquantitative materiality factors to include in our model. We divided the variables of potential interest into three categories: client risk measures, client complexity measures, and auditor characteristics. Table 1 shows the variables that we considered from each of these categories. Initial analysis indicated that several of these variables (current ratio, inherent risk, illegal acts, leverage, listed, tenure, and risk approach) were not significantly related to PM. Thus, the final (full) model is specified as follows:

$$\ln PM_i = \beta_0 + \beta_1 \ln Size_i + \beta_2\, Big\ 5 + \beta_3\, Controls + \beta_4\, |ROA| + \beta_5\, Complexity + \varepsilon_i.$$

As can be seen, this model includes a size measure, an auditor characteristic, two client risk measures, and a client complexity measure. Table 4 shows the regression results for this model.

TABLE 4
Basic Planning Materiality Equation

$$\ln PM_i = \beta_0 + \beta_1 \ln Size_i + \beta_2\, Big\ 5 + \beta_3\, Controls + \beta_4\, |ROA| + \beta_5\, Complexity + \varepsilon_i$$

where:

Size = square root (assets × sales);
Big 5 = 1 if auditor is a Big 5 firm, 0 otherwise;
Controls = assessed level of the quality of control environment;
|ROA| = absolute value of return on assets; and
Complexity = assessed level of entity complexity.

	Coef.	t	p>|t|
ln*Size*	0.8559	15.462	0
Big 5	–0.2681	–1.836	0.069
Controls	0.1280	2.166	0.033
|ROA|	2.7430	4.159	0
Complexity	–0.1034	–1.72	0.089
Constant	–3.0263	–3.348	0.001
Adj R^2	0.7551		
F(5, 102)	66.97		
n	108		

Regression diagnostics for specification, heteroskedasticity, and multicollinearity are all satisfactory. A likelihood ratio test comparing the full and reduced models (i.e., ln*PM* regressed on a constant + ln*Size*) can reject the null hypothesis of equivalence of the two models (χ^2= (4 d.f.) = 27.16, p = 0.000).

Interpretation of the full model is relatively straightforward. The estimated equation for PM is (see Table 4):

$$\ln PM_i = -3.0263 + 0.856 \ln Size_i - 0.268\ Big\ 5 + 0.1280\ Controls + 2.7430\ |ROA| - 0.1034\ Complexity.$$

Therefore, PM *increases* with client size, |*ROA*|, and the auditor's assessment of the quality of the control environment, while it *decreases* with client complexity (though this effect is only significant in a one-tail test) and given a Big 5 auditor who, *ceteris paribus*, appear to assess materiality at a lower level than non-Big 5 auditors. The coefficient of –0.268 on the *Big 5* variable implies that Big 5 auditors in our sample assess PM at a level that is 76 percent of the amount used by non-Big 5 auditors. This is consistent with the large body of research evidence that Big 5 audits are of systematically higher quality than audits by non-Big 5 firms.

Comparison with KPMG Gauge Function

The only prior archival estimates of PM were reported by Elliot (1983) and Elliot and Warren (1986). Their estimates, based on KPMG audits performed in the U.S., resulted in a model they termed the gauge function. The two formulae reported by these researchers are:

Gauge 1 = PM = 1.6 Max [Assets, Sales]$^{.667}$

Gauge 2 = PM = .038657 Sales$^{.867203}$

Since the gauge measures were estimated using the judgments of a single Big 5 audit firm and are out of sample with respect to our data, we would not expect either gauge measure to fit as well as the model we estimated. Nonetheless, it is useful to compare our results with KPMG gauge since it is a well-known heuristic.[5] The correlation matrix in Table 5 shows that all three measures are highly correlated.

In order to provide a rough comparison of the KPMG gauge estimates of PM with those we estimated, Table 6 reports the results of a pair of comparator regressions. In each pair, a regression of ln*PM* on ln*Gauge* is compared with a regression of ln*PM* on ln*Gauge* plus the other variables included in our full model. The pairs differ only in the form of KPMG gauge used. As can be seen from the table either gauge measure provides a good first approximation to PM. However, in our sample, adjustments for the control environment and the |*ROA*| add significantly to the explanatory

TABLE 5
Correlation Matrix of Materiality Measures

	ln*Gauge 1*	ln*Gauge 2*	ln*PM*
ln*Gauge 2*	0.9654		
ln*PM*	0.8256	0.7916	
ln*Predicted PM*	0.9569	0.9341	0.8625

Gauge 1 KPMG, Gauge 1 = 1.6 Max[Assets, Sales]$^{.667}$
Gauge 2 Warren and Elliot, Gauge 2 = .038657 Sales$^{.867203}$
PM Actual PM from the sample
Predicted PM Predicted PM based on OLS model

[5] It is perhaps worth commenting upon that the Gauge 1 formula is surprisingly similar to the formula we estimated from the AICPA table discussed in footnote 2.

TABLE 6
Comparison of KPMG Gauge and Full Model

	Gauge 1	Gauge 1+	Gauge 2	Gauge 2 +
ln*Gauge*	1.1273	1.19	0.8606	0.89
	(15.065)	(13.87)	(13.338)	(11.87)
Big 5		−0.17		−0.08
		(−1.12)		(−0.45)
Controls		0.14		0.15
		(2.24)		(2.21)
|*ROA*|		2.18		1.94
		(3.09)		(2.51)
Complexity		−0.07		−0.08
		(−1.04)		(−1.08)
Constant	−1.6303	−3.05	1.8883	0.83
	(−1.712)	(−3.04)	(2.325)	(0.96)
Adj. R^2	0.6786	0.7163	0.6231	0.6561
$\chi^2(4)$		33.48		50.7

power of the models, as evidenced both by the increases in R^2 and by the significance of the likelihood ratio tests comparing the full and reduced models. From these tests we conclude that the materiality judgments of auditors in our sample incorporate information not included in the KPMG gauge measures.

A Check for Audit Firm Effects

As a sensitivity check of our results, we ran two additional analyses. One analysis was the full model plus a Big 5 interaction term with each of the other independent variables, and the second analysis was a series of regressions using the full model in which we delete observations from each audit firm. The purpose behind the first sensitivity test was to check if there were more complex differences between the PM judgments of large and small auditors than can be captured by a simple dummy variable. The second procedure was to see whether our results were driven by a particular audit firm's PM judgments. The results (not reported here) did not indicate any obvious structural problems with the model nor a dependence of our findings upon the policies of a single audit firm.

MATERIALITY AND EARNINGS MANAGEMENT

Recently, the literature on earnings management (Burgstahler and Dichev 1997) has noted that there are unusually large numbers of small positive earnings and unusually small numbers of small negative earnings reported by companies in the U.S. This empirical finding is interpreted as being consistent with managers manipulating earnings to avoid reporting losses. If moving reported earnings from a small loss to a small profit (or vice versa) is considered a qualitatively material fact (for example, see SAB No. 99), then we would expect auditors to audit more intensively, *ceteris paribus*, when firms report small profits (losses). To operationalize this conjecture, we add an indicator variable, *Small |ROA|* to our full model. Table 7 reports the results when *Small |ROA|* falls between ± 3 percent (24 firms), ± 4 percent (36 firms), or ± 5 percent (42 firms).

The estimated regression coefficient of this variable is negative and statistically significant for

TABLE 7
Planning Materiality and Earnings Management

$$\ln PM_i = \beta_0 + \beta_1 \ln Size_i + \beta_2\, Big\ 5 + \beta_3\, Controls + \beta_4\, |ROA| + \beta_5\, Complexity + \beta_5\, Small\ |ROA| + \varepsilon_i$$

where:

Size = square root (assets * sales);
Big 5 = 1 if auditor is a Big 5 firm, 0 otherwise;
Controls = assessed level of the quality of control environment;
|ROA| = absolute value of return on assets;
Complexity = assessed level of entity complexity; and
Small |ROA| = 1 if 0 < *|ROA|* < x, and 0 otherwise, where x = {.03. .04, .05}.

	Coef.	**t**	**p>|t|**	**Adj. R^2**	**F(6, 101)**	**Chi-Squared**	**p-value**
Small |ROA| < .03				0.7704	60.85	8.06	.0045
ln*Size*	0.8635	16.092	0				
Big 5	–0.2316	–1.631	0.106				
Controls	0.1198	2.093	0.039				
|ROA|	1.8485	2.589	0.011				
Complexity	–0.0942	–1.615	0.109				
Small |ROA|	–0.4557	–2.798	0.006				
Constant	–2.9871	–3.413	0.001				
Small |ROA| < .04				.7724	61.23	9.01	.0027
ln*Size*	0.8599	16.112	0				
Big 5	–0.2522	–1.79	0.077				
Controls	0.1406	2.461	0.016				
|ROA|	1.4538	1.888	0.062				
Complexity	–0.0847	–1.452	0.15				
Small |ROA|	–0.4592	–2.965	0.004				
Constant	–2.9537	–3.389	0.001				
Small |ROA| < .05				.7758	62.73	10.64	.0011
ln*Size*	0.8663	16.329	0				
Big 5	–0.2779	–1.988	0.05				
Controls	0.1463	2.574	0.011				
|ROA|	1.1664	1.463	0.147				
Complexity	–0.0831	–1.436	0.154				
Small |ROA|	–0.5038	–3.234	0.002				
Constant	–3.0131	–3.484	0.001				

The Chi-square test refers to a test of the model with *Small |ROA|* included in the model to a model without *Small |ROA|*.

each of the cut-offs used.[6] This result is consistent with auditors in The Netherlands decreasing PM incrementally for clients who report relatively small profits (losses), which is a rational response to a situation that may be indicative of a higher than usual risk of earnings management by the client.

[6] Adding the *Small |ROA|* variable does appear to reduce the affect of the *|ROA|* variable. As a consequence, we ran a Variance Inflation Factor diagnostic, but found no indication of multicollinearity.

CONCLUSION

In this paper, we examine archival evidence (obtained via survey) on the planning materiality values used by auditors in The Netherlands for a sample of 108 recent audit engagements. Our sample includes audits by each of the (then) Big 5 firms (62 percent), as well as audits performed by non-Big 5 firms (38 percent). Specification of planning materiality is a very important audit judgment since the degree of "auditor effort" on an engagement varies inversely with the planning materiality value. Our research objective is to examine the determinants of planning materiality values and the functional relations among these variables. Prior to this study, the only archival evidence on planning materiality came from KPMG audits in the U.S. One interesting feature of that evidence is that KPMG planning materiality ("gauge") increases at a decreasing rate with client size, while some commonly espoused rules-of-thumb suggest that planning materiality will be a constant percentage of client size or profitability. Our results indicate that the nonlinear relation between planning materiality and client size is, in fact, common to the profession in The Netherlands. We also find that the best measure of client size to explain materiality levels is the log of the geometric mean of client assets and client sales rather than either size measure taken individually. More interestingly, we find that other specific characteristics of the client are systematically related to planning materiality levels. Specifically, PM increases with the quality of the client's control environment and the magnitude of the client's rate of return on assets, while PM decreases with the complexity of the client. All of these relations are plausible and reasonable if these variables proxy for the qualitative aspects of the planning materiality judgment. In addition, we find that, *ceteris paribus*, Big 5 audit firms set materiality levels that are significantly lower than the planning materiality levels of non-Big 5 firms. This is consistent with the large body of empirical evidence that Big 5 audits are of systematically higher quality than non-Big 5 audits. Finally, we find that when reported earnings are around zero, auditors use lower PM levels. This is consistent with the recent literature on earnings management that suggests that clients prefer to report a small profit rather than a small loss. Thus, auditors appear to respond rationally to small profit or loss situations by decreasing PM, and thereby exerting more effort in performing the audit.

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