The Effect of Audit Specialists on Financial Reporting and Market Pricing

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ABSTRACT

Prior literature finds evidence that clients of industry specialists have a lower level of discretionary accruals compared with non-specialists. This finding suggests that industry specialists constrain the use of discretionary accruals. However, in addition to opportunistic reasons, managers can also use discretionary accruals to make earnings more informative. We examine the market pricing of discretionary accruals of clients of specialist and non-specialist auditors. If industry specialists constrain opportunistic discretionary accruals but allow informative discretionary accruals, we expect a stronger relation between discretionary accruals and returns for clients of specialists. We use two different analyses based on Subramanyam (1996) and Tucker and Zarowin (2006) to investigate this issue. We find no evidence that the discretionary accruals of clients of industry specialists are more informative or more value relevant.

1. Introduction

Industry specialization has been cited by clients as being an important factor in selecting an auditor. For example, in a 2003 General Accounting Office (GAO) survey, 80 percent of the responding companies rated industry specialization or expertise as being of "great" or "very great" importance when choosing an auditor (GAO [2003]). In fact, specialization was ranked behind only service quality and auditor reputation in importance for clients choosing an auditor. The GAO concluded that the large accounting firms have incentives to "build industry-specific expertise" (GAO [2003, 4]), and the GAO suggested that industry specialization is, at least, partly responsible for the high levels of auditor concentration that are apparent in many industries (GAO [2003, 53]).

Krishnan (2003b) and Balsam et al. (2003) find that clients of industry specialist auditors have lower levels of discretionary accruals than clients of non-specialist auditors, which suggests that managers are less likely to manipulate earnings when audited by a specialist. This finding is consistent with the view that clients of industry specialists have higher earnings quality than clients of non-specialists and that auditor specialists are effective in constraining aggressive and potentially opportunistic reporting of accruals.

A limitation of using discretionary accruals to measure audit quality is that this approach assumes that all discretionary accruals are used for opportunistic reasons. However, discretionary accruals can also be used to efficiently communicate the manager's private information about future earnings (e.g., Healy & Palepu [1993], Subramanyam [1996], Tucker & Zarowin [2006]). To the extent that industry specialists have specialized knowledge about the earnings generation process in those industries where they specialize, specialists should be able to distinguish between opportunistic and informative discretionary accruals more readily than non-specialists. Since informative discretionary accruals are value-adding, we expect that specialist auditors will allow their clients to use discretionary accruals for information reasons.

Thus, rather than examining the *level* of discretionary accruals as in Krishnan (2003b) and Balsam et al. (2003), we extend the prior research by examining the *type* of discretionary accruals that industry specialists allow. On one hand, extending DeAngelo (1981), we expect that specialists will constrain the use of discretionary accruals used for opportunistic reasons because specialists have more incentives to be independent and to resist these earnings management attempts. On the other hand, we expect that specialists will permit informative discretionary accruals because they improve earnings quality. On balance, we expect that, *ceteris paribus*, the discretionary accruals of clients of specialist auditors will be more informative than the discretionary accruals of clients of non-specialists.

We test this hypothesis using two approaches. First, following Subramanyam (1996), we regress current stock returns on contemporaneous operating cash flows (CFO), nondiscretionary accruals, and discretionary accruals, but we include an indicator variable for industry specialist and the interactions between this variable and CFO, nondiscretionary accruals, and discretionary accruals. We expect that the coefficient for the interaction between our specialist indicator variable and discretionary accruals will be positive if specialists allow more informative discretionary accruals. Second, we use the approach of Tucker and Zarowin (2006). They find that the relation between current stock prices and future earnings (the future earnings response coefficient or FERC) is stronger when earnings have been smoothed using discretionary accruals. This suggests that managers use discretionary accruals to efficiently communicate their private information. We examine whether the relation between current stock prices and the FERC is stronger when earnings are smoothed *and* the firm is audited by a specialist auditor. Our tests under both approaches control for the self-selection of industry specialist auditors.

While we find that CFO, nondiscretionary accruals, and discretionary accruals are related to returns similar to Subramanyam (1996), we find no evidence that the relation between discretionary accruals and returns is more positive for clients of industry specialist auditors. Additionally, while we find that current stock prices contain more information about future earnings when earnings have been smoothed, consistent with Tucker and Zarowin (2006), we do not find that this relation is different for clients of specialists and non-specialists auditors.

Our results generally remain robust to five alternative measures of industry specialisation. Because of concerns about the Jones (1991) model (e.g., Bernard & Skinner [1996], Guay et al. [1996]), we also estimate our models using a two-stage method where we regress discretionary accruals on various firm characteristics, and then we use the residuals in our primary regressions. Further, we replicate our tests using performance adjusted discretionary accruals based on Francis et al. (2005). In addition, we conduct several non-Jones model based tests. Specifically, we re-estimate our Tucker and Zarowin (2006) regression using alternative measures of income smoothing that are not based on discretionary accruals from the Jones model, i.e., the variability of changes in net income, the ratio of the variability of changes in net income to the variability of changes in cash flows, and the negative correlation between changes in total accruals and changes in operating cash flows based on Lang et al. (2006). Overall, we do not find support for the hypothesis that industry specialists are more likely to allow informative accruals.

Our results should be interpreted in conjunction with Krishnan (2003b) and Balsam et al. (2003). Combined with their results, our findings suggest that even though specialists may constrain discretionary accruals, they are no better than non-specialists in separating opportunistic and informative discretionary accruals. Thus, specialists seem to be more concerned about the *level* of earnings management than the *underlying motive* for earnings management. Since identifying the underlying motive for discretionary accruals is likely to be more costly and more uncertain than constraining all discretionary accruals (regardless of the motive), this may be a rational response on the part of specialists.

Gramling and Stone (2001) point out that there is limited evidence on the audit quality of industry specialists. Our study contributes to the existing auditor industry specialization research in several ways. First, we extend Krishnan (2003b) and Balsam et al. (2003) to examine whether specialists treat discretionary accruals differently based on the manager's underlying motive. In doing so, we examine whether specialists are able to enhance the informative part of earnings and limit the garbling part of earnings.

Second, we provide a test that complements Balsam et al.'s (2003) earnings response coefficient (ERC) tests. They find that the ERC is larger for clients of specialist auditors. While this suggests that *total* earnings of clients of specialist auditors have greater information content, they do not examine whether the discretionary part of earnings is actually more informative. Our tests focus directly on the informativeness of discretionary part of earnings.

Third, in contrast to the approach adopted in prior studies that have examined the influence of industry specialists on various aspects of financial reporting quality, our results are obtained after controlling for the effect of self-selection bias. In the process, our study provides evidence on which firm characteristics play a role in the self-selection of industry specialist auditors. To the best of our knowledge, we are not ware of any prior study that has provided evidence on the self-selection of industry specialists.

Fourth, we add to the debate on discretion vs. rigidity in accounting methods. Dye and Verrecchia (1995) show that when agency problems with current and prospective shareholders are considered, rigidity is preferred to discretion. However, discretion can be desirable (since it can be informative) when the effectiveness of the auditing system is observable as this sets a limit on how much discretion is allowed (also, see Sankar & Subramanyam [2001]). As Dye and Verrechhia (1995, 407) point out, this "effect may explain why the professional literature has recently proposed forcing firms to disclose information about the quality of the system of their internal controls." Similarly, using a specialist auditor could provide a signal about the quality of the audit system.

Our tests examine whether investors view a specialist auditor as a useful signal when assessing the informativeness of the discretionary part of earnings.

The next section discusses the prior literature and develops the hypothesis. Section 3 describes the research methodology and data. Section 4 contains the results and Section 5 provides additional analyses. Section 6 concludes.

2. Background and Hypothesis

Prior literature suggests that Big 6 auditors provide a higher quality audit than non-Big 6 auditors. For example, clients of Big 6 auditors have higher earnings quality (e.g., Becker et al. [1998], Reynolds & Francis [2000], Francis et al. [1999], Kim et al. [2003]).[1] Also, Mansi, Maxwell, and Miller (2006) find that clients of Big 6 auditors have a lower cost of debt. An assumption of this literature is that audit quality is homogeneous for Big 6 auditors. However, in addition to the Big 6 classification, auditor specialization may also affect audit quality (e.g., Danos & Eichenseher [1982]).

Numerous studies empirically examine the effects of auditor specialization. These studies suggest that the earnings quality of clients of specialist auditors is higher than the earnings quality of clients of non-specialist auditors. For example, clients of industry-specialists are less likely to be associated with SEC enforcement actions (e.g., Carcello & Nagy [2004]) and exhibit a stronger correlation between current net income and year ahead cash flows (e.g., Gramling et al. [2001]). Further, Krishnan (2003b) and Balsam et al. (2003) find that the absolute value of discretionary accruals is smaller for

[1] This study covers a time period (1989-1997) following the merger of the Big 8 firms but before the merger of Price Waterhouse and Coopers & Lybrand and the demise of Arthur Andersen. For convenience and to reflect the situation at the time of our study, we refer to the big international audit firms as the Big 6 throughout the study.

clients of industry specialist auditors than for clients of non-specialist auditors while Krishnan (2005) finds that specialists are associated with more timely reporting of economic losses (i.e., conservatism). Jointly, these studies suggest that specialists are effective in constraining the aggressive and opportunistic reporting of accruals.

Less clear is whether investors value earnings audited by specialists more highly that earnings audited by non-specialists. We are aware of only one study that examines this issue. Balsam et al. (2003) find that, compared to clients of non-specialists, clients of industry specialist auditors have a higher ERC where the ERC measures the association between unexpected earnings and the cumulative abnormal return measured around the earnings announcement date. They interpret their finding as evidence that the unexpected earnings of clients of specialist are viewed as being more credible and less affected by managerial discretion.

However, Balsam et al.'s (2003) results are consistent with two interpretations which have two different implications for how specialists improve earnings quality. First, investors could view earnings audited by specialists as more credible because specialists reduce all discretionary accruals whether they are opportunistic or informative. In other words, specialists reduce opportunism but, at the same time, constrain the manager's ability to use accruals to reveal their private information. Second, investors could view earnings audited by specialists as more credible because specialists reduce the garbled (i.e., opportunistic) part of earnings *and* enhance the information part of earnings by allowing managers more discretion to efficiently communicate their private information. The first explanation suggests that specialists are only concerned with the *level* of discretionary accruals. The second explanation suggests that specialists are concerned with the *underlying motive* for the discretionary accruals. Since Balsam et al. (2003) do not directly examine how investors respond to the discretionary part of earnings, their tests do not shed light on these two explanations.[2]

In this study, we extend Balsam et al. (2003) by examining the informativeness of the discretionary component of earnings. This allows us to differentiate between these two competing views. If specialists affect the quality of earnings by improving its informativeness, we expect that the positive relation between the discretionary part of earnings and current returns is more pronounced for industry specialist clients. If specialists affect the quality of earnings by imposing more rigidity (i.e., they constrain both opportunistic and informative discretionary accruals), we expect the relation between the discretionary part of earnings and current returns to be no different or less pronounced for specialist clients. A less pronounced relation could arise if specialist auditors reduce the informative part of earnings by more than they reduce the opportunistic part.

If specialists enhance the informativeness of the discretionary part of earnings more than non-specialists, two conditions must be met: (1) specialists must be more capable than non-specialists in distinguishing between earnings management attempts that are motivated by opportunism and efficiency, and (2) specialists must have greater

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[2] As a practical matter, it would be difficult to use Balsam et al.'s (2003) ERC approach to examine the informativeness of the discretionary part of earnings because this would require an estimate of the unexpected portion of discretionary earnings. Since analysts do not provide forecasts for the discretionary part of earnings, an estimate of the unexpected (surprise) portion of discretionary earnings cannot be easily determined.

incentives than non-specialists to reign in opportunism. The first condition relates to the specialist's competence, and the second condition relates to the specialist's independence.

Regarding competence, O'Keefe et al. (1994) recognize that to conduct an audit, the auditor requires industry-specific knowledge in addition to general knowledge (e.g., knowledge about GAAP and GAAS) and client-specific knowledge. One way industry-specific knowledge is acquired is by auditing other firms in the same industry. Beck and Wu (2006) show analytically that learning through experience improves the auditor's understanding of a client's earnings distribution which reduces audit judgement errors and increases audit quality. Extending Beck and Wu (2006), since industry-specific knowledge can be transferred within the industry, auditors with more industry-specific experience should have a better understanding of the earnings distribution of other firms in the same industry and should be able to deliver a higher quality audit for all its clients in that industry.

Experimental auditing studies provide more detailed evidence on how experience affects auditors' decision making. For example, Bedard and Biggs (1991) find that the ability to identify errors seeded in data for a manufacturing client increases with experience in auditing manufacturing firms. Industry experience also has been found to improve fraud detection (Johnson et al. [1991]). Similarly, auditors with greater retail industry experience are better at assessing risk, generating hypotheses, and identifying retailing errors (Wright & Wright [1997]).

Other studies focus on auditors who are designated as industry specialists. Taylor (2000) finds that industry specialists assign lower inherent risk when asked to assess industry-specific accounts. Taylor (2000) also finds that industry-specialist auditor have less uncertainty. Solomon et al. (1999) find that industry-specific knowledge leads to more accurate non-error frequency knowledge. As Solomon et al. (1999) point out, this is important because clients are likely to suggest that unexpected ratio fluctuations are due to reasons other than errors. Additionally, Owhoso et al. (2002) find that industry specialists are better at detecting errors; Low (2004) finds specialists provide superior risk assessment and audit planning decisions; Carcello and Nagy (2004) find specialists are better at detecting and deterring financial fraud; and O'Keefe et al. (1994) find specialists are more like to require compliance with auditing standards.

Combined, the analytical and experimental literature suggests that specialist auditors should have a better understanding of the underlying earnings distribution in an industry and should be better at detecting deviations from that distribution whether caused by errors or non-errors. Since specialists have a better understanding of the origin of the deviations, they should be more competent at identifying the underlying motivation when deviations occur, i.e., whether they are motivated by opportunism or efficiency.

Regarding independence, industry specialists are likely to have greater incentives to disallow earnings management attempts that are motivated by opportunism. Following DeAngelo (1981), investments in industry-specific knowledge create industry-specific quasi-rents that give the specialist incentives to be less independent (i.e., 'cheat'). This occurs because the auditor does not want to sacrifice the future stream of quasi-rents that is associated with the client. However, the auditor's incentives to cheat will be inversely related to the auditor's share of the industry. An auditor with a large share of the industry has more to lose from cheating (i.e., compromising independence) since that auditor's other clients might leave the auditor if the cheating is detected. In other words, the specialist's other clients serve as collateral against the specialist acting opportunistically. Thus, the specialist has more incentives to remain independent, and this leads to a higher audit quality. In sum, specialists not only have the competence to detect opportunistic earnings management attempts, but they also have incentives to disallow these attempts.

Sankar and Subramanyam (2001) show analytically that when there is a GAAP constraint, managers who possess private information about future earnings will bias current earnings by smoothing income in order to reveal that information. Furthermore, rational markets will anticipate this smoothing and will price the firm's shares higher than if no smoothing had occurred. Subramanyam (1996) and Tucker and Zarowin (2006) provide empirical evidence that managers use their discretion to make earnings more informative. We expect that specialists are able to enforce the GAAP constraint more consistently and uniformly since they are better able to separate opportunistic violations of GAAP from genuine attempts to convey private information. Put differently, specialists should be associated with more informative earnings.

We focus on discretionary accruals because, by definition, they represent the part of accruals that the manager can influence. Discretionary accruals can be used opportunistically to distort earnings for the manager's own benefit (e.g., Healy & Palepu [1993]) or they can be used by managers to make earnings more informative by smoothing the time profile of earnings to make it less variable (e.g., Fudenberg & Tirole [1995]). Regarding the latter, income smoothing can reduce the inconsistency of earnings and makes it more predictable by outsiders (e.g., Chaney et al. [1996], Hunt et al. [1995]). Subramanyam (1996) and Tucker and Zarowin (2006) specifically focus on income smoothing.

Francis et al. (2005) argue that accruals can introduce a systematic information risk which is priced by the market (i.e., investors require higher rate of return to compensate them for their higher risk). They find that higher quality accruals reduce information risk and lead to a lower cost of capital. If earnings of clients of specialist auditors contain less opportunistic discretionary accruals than those of non-specialist auditors, the discretionary accruals of clients of specialists should be better predictors of future cash flows, and this should be reflected in current stock returns (e.g., DeFond & Park [1996]). Thus, we hypothesize:

H1: Discretionary accruals of clients of industry specialist auditors are more positively related to current stock returns than discretionary accruals of clients of non-industry specialist auditors.

3. Method and Data

3.1 Method

We test H1 using two different tests based on the methodology employed in Subramanyam (1996) and Tucker and Zarowin (2006), respectively. The essence of our approach is to examine whether the positive effect of earnings and its components (e.g., discretionary accruals) on current stock returns is more pronounced for firms that are clients of industry specialists auditors. However, similar to the research design employed in prior studies on industry specialists, the above-mentioned analysis assumes that a firm's choice of an industry specialist auditor is exogenously given. This is problematic as it is possible that firms do not randomly recruit industry specialist auditors but rather self-select industry specialists based on their own characteristics. This suggests that current stock returns and the presence of industry specialist auditors may be endogenous.

From an econometric perspective, the failure to control for any self-selection would introduce a bias in our analysis, yielding inconsistent parameter estimates (Maddala [1983]). To address this potential self-selection issue, we adopt the two-stage treatment effects procedure of Heckman (1979) and Lee (1979). In the first stage, we estimate a self-selection probit regression that evaluates whether the presence of an industry specialist auditor is related to certain firm characteristics. The parameter estimates from these explanatory variables are then used to compute the inverse Mills ratio. In the second stage, we implement our adaptation of the Subramanyam (1996) and Tucker and Zarowin (2006) tests, after including the computed inverse Mills ratio from the first stage as an additional independent variable to account for potential self-selection bias.

3.1.1 Self-Selection Model

We are not aware of any prior studies that provide evidence on which firm characteristics motivate firms to self-select industry specialist auditors. However, several studies including Francis et al. (1999), Kim et al. (2003), and Chaney et al. (2004) have established associations between various firm characteristics and the demand for higher audit quality in the form of brand-name auditors (i.e., Big 8, 6, 5, 4). Accordingly, we adopt the explanatory variables from these studies to evaluate whether the same variables are able to predict the demand for the services of industry specialist auditors over other brand-name auditor clients. More specifically, we propose that likelihood of firms possessing industry specialist auditors is increasing in firm size (*SIZE*), capital intensity (*CAPINT*), operating cycle (*OPCYCLE*), price to earnings ratio (*P/E*), significant increase in outstanding shares (*ISSUE*), current ratio (*CURR*), quick ratio (*QUICK*), employee numbers (*SQRTEMP*), and membership in regulated industries (*REG*). We also control for reporting of significant losses (*LOSS*), leverage (*LEV*), and asset turnover (*ATURN*) as prior studies have found these variables to be negatively associated with the demand for higher audit quality. Thus, our self-selection model is given as:

$$SPEC_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CAPINT_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ISSUE_{i,t} + \beta_5 LOSS_{i,t} + \beta_6 CYCLE_{i,t} + \beta_7 P/E_{i,t} + \beta_8 SQRTEMP_{i,t} + \beta_9 ATURN_{i,t} + \beta_{10} CURR_{i,t} + \beta_{11} QUICK_{i,t} + \beta_{12} REG_{i,t} + \varepsilon_{i,t} \quad (1)$$

where

$SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise,
$SIZE_{i,t}$ = natural logarithm of sales for firm *i* in year *t*,
$CAPINT_{i,t}$ = gross property, plant and equipment, scaled by sales for firm *i* in year *t*.
$ISSUE_{i,t}$ = 1 if number of outstanding shares in firm *i* increases by more than 10 percent during year *t*, and 0 otherwise,
$LOSS_{i,t}$ = 1 if net income scaled by lagged assets for firm *i* in year *t* is negative and the absolute value of change in net income scaled by lagged assets during year *t* is greater than 10 percent, and 0 otherwise,
$CYCLE_{i,t}$ = day's sales in inventory and receivables, divided by 30 for firm *i* in year *t*,
$P/E_{i,t}$ = price / earnings ratio for firm *i* in year *t*,
$SQRTEMP_{i,t}$ = square root of the number of employees in firm *i* in year *t*,
$ATURN_{i,t}$ = asset turnover for firm *i* in year *t*, calculated as sales divided by total assets,
$CURR_{i,t}$ = current ratio for firm *i* in year *t*, calculated as current assets divided by total assets,
$QUICK_{i,t}$ = quick ratio for firm *i* in year *t*, calculated as current assets (minus inventory) divided by current liabilities,
$REG_{i,t}$ = 1 if firm *i* is a member of a regulated industry in year *t*, and 0 otherwise.

As mentioned earlier, the parameter estimates from the estimation of equation (1) are used to compute the inverse Mills ratio, *IMR*, and the *IMR* is then used to control for self-selection bias in our adaptations of the the Subramanyam (1996) and Tucker and Zarowin (2006) tests.

3.1.2 Subramanyam (1996)

Subramanyam (1996) regresses current stock returns on the components of net income (i.e., CFO, non-discretionary accruals, and discretionary accruals) and finds that the coefficients for all three components are positive and significant. This indicates that discretionary accruals are priced by the market, and he interprets this as evidence that managers use these accruals to improve the informativeness of earnings (i.e., for efficiency reasons). We employ two modifications to Subramanyam's (1996) methodology. First, to our set of independent variables we add a specialist indicator, *SPEC*, and interact *SPEC* with the three components of net income.[3] Second, we include *IMR* estimates from our self-selection model to control for self-selection bias. More formally, we estimate the following model:

$$RET_{i,t} = \alpha_0 + \alpha_1 CFO_{i,t} + \alpha_2 NDA_{i,t} + \alpha_3 DA_{i,t} + \alpha_4 SPEC_{i,t} + \alpha_5 CFO_{i,t}*SPEC_{i,t} + \alpha_6 NDA_{i,t}*SPEC_{i,t} + \alpha_7 DA_{i,t}*SPEC_{i,t} + \alpha_8 IMR_{i,t} + \varepsilon_{i,t} \quad (2)$$

where

$RET_{i,t}$ = stock return for firm *i* in year *t* calculated over a 12-month period ending three months after the fiscal year end for year *t*,

$CFO_{i,t}$ = cash flow from operations scaled by lagged total assets for firm *i* in year *t*,

$NDA_{i,t}$ = non-discretionary accruals for firm *i* in year *t*,

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[3] Krishnan (2003a) uses a similar model to examine differential informativeness of discretionary accruals of clients of Big 6 and non-Big 6 auditors.

$DA_{i,t}$ = discretionary accruals for firm i in year t,
$IMR_{i,t}$ = inverse Mills ratio from the estimation of the self-selection equation (1).

In equation (2), our interest is in the interaction between *SPEC* and *DA* – if the discretionary accruals of specialist clients are more informative, we expect that α_7 will have a positive and significant coefficient. Consistent with Krishnan (2003a), we estimate equation (2) using indicator variables to capture time effects. Since our tests involve data from nine years, we include eight year indicator indicators.

Following Subramanyam (1996), we use the cross-sectional variation of the Jones (1991) model to estimate non-discretionary and discretionary accruals. This model performs better than the time-series model in detecting earning management, uses a larger sample size, and lowers the risk of survivorship bias. We estimate the following model on a cross-sectional basis for each two-digit SIC and year combination with at least eight observations:

$$TA1_{i,t} = \gamma_0 + \gamma_1 \Delta Sales_{i,t} + \gamma_2 PPE_{i,t} + \varepsilon_{i,t} \quad (3)$$

where

$TA1_{i,t}$ = total accruals for firm i in year t, computed as the difference between operating cash flows and EBIT,
$\Delta Sales_{i,t}$ = the change in sales from the preceding year for firm i in year *1*,
$PPE_{i,t}$ = the gross plant, property and equipment for firm i in year t.[4]

All variables are deflated by the average of total assets using assets from the start and end of year t. Consistent with prior research, the predicted value from the estimation of equation (3) represents non-discretionary accruals while the residual value provides the estimate for discretionary accruals.

[4] We obtain similar results when we use the modified Jones model based on Dechow et al. (1995).

While the Jones (1991) model is widely used in the literature, we recognize that various authors (e.g., Bernard and Skinner 1996, Guay et al. 1996) express concerns about the measurement error in the discretionary accruals proxy. Accordingly, in additional analyses, we conduct further tests to address these concerns.

3.1.3 Tucker and Zarowin (2006)

Tucker and Zarowin (2006) examine the informativeness of earnings that have been smoothed through discretionary accruals using a model based on Collins et al. (1994) and Lundholm and Myers (2002). More specifically, Tucker and Zarowin (2006) regress current returns on past, current, and future earnings and future returns. They are interested in the relation between current returns and future earnings, which they refer to as the FERC. If current earnings provide information about future earnings, this information should be reflected in current stock prices, indicating a positive FERC. However, they are also interested in whether managers use their discretion to increase the informativeness of current earnings by smoothing income. Consequently, they include a measure of income smoothing, *IS*, and they interact *IS* with future earnings (as well as past earnings, current earnings, and future returns). Tucker and Zarowin's (2006, 257) model is as follows:

$$R_{i,t} = \beta_0 + \beta_1 X_{i,t-1} + \beta_2 X_{i,t} + \beta_3 X_{i,t3} + \beta_4 R_{i,t3} + \beta_5 IS_{i,t} + \beta_6 IS_{i,t} * X_{i,t-1} + \beta_7 IS_{i,t} * X_{i,t} + \beta_8 IS_{i,t} * X_{i,t3} + \beta_9 IS_{i,t} * R_{i,t3} + \varepsilon_{i,t} \quad (4)$$

where

$R_{i,t}$ = the ex-dividend stock return for firm *i* in year *t*,
$X_{i,t-1}$ = the split-adjusted earnings per share before extraordinary items for firm *i* in year *t*-1, deflated by the stock price at the beginning of year *t*,

$X_{i,t}$	= the split-adjusted earnings per share before extraordinary items for firm i in year t, deflated by the stock price at the beginning of year t,
$X_{i,t3}$	= the sum of split-adjusted earnings per share before extraordinary items for firm i in years t+1, t+2, and t+3, deflated by the stock price at the beginning of year t,
$R_{i,t3}$	= the annually compounded stock return for firm i for years t+1 through t+3.
$IS_{i,t}$	= the income smoothing measure for firm i in year t, computed as the reversed fractional ranking of the Pearson correlation between the year t and past four years' (years $t-4$ to $t-1$) change in discretionary accruals and change in pre-managed income.[5]

In their model, the coefficient on $X_{i,t3}$, i.e., β_3 or the FERC, measures the extent to which the information about future earnings is reflected in current stock price. A higher coefficient on $X_{i,t3}$ indicates higher earnings informativeness. Tucker and Zarowin (2006) focus on whether income smoothing increases the FERC or earnings informativeness, and consistent with their expectations, they find that the coefficient for the interaction between $IS_{i,t}$ and $X_{i,t3}$ (i.e., β_8) is positive and significant.

In the current study, we are interested in whether the positive interaction between income smoothing and FERC is more pronounced in the presence of an industry specialist auditor. Thus, we modify Tucker and Zarowin's (2006) model by including $SPEC_{i,t}$ and a three-way interaction between $SPEC_{i,t}$, $X_{i,t3}$ and $IS_{i,t}$ as additional independent variables. We also include IMR estimates from equation (1) to control for self-selection bias:

$$R_{i,t} = \beta_0 + \beta_1 X_{i,t-1} + \beta_2 X_{i,t} + \beta_3 X_{i,t3} + \beta_4 R_{i,t3} + \beta_5 IS_{i,t} + \beta_6 IS_{i,t}*X_{i,t-1} + \beta_7 IS_{i,t}*X_{i,t} + \beta_8 IS_{i,t}*X_{i,t3} + \beta_9 IS_{i,t}*R_{i,t3} + \beta_{10} SPEC_t + \beta_{11} SPEC_t*IS_t*X_{t3} + \beta_{12} IMR_{i,t} + \varepsilon_{i,t} \quad (5)$$

[5] Pre-managed income is defined as net income minus discretionary accruals.

In equation (5), we use β_{11} to test whether income smoothing is more informative for clients of specialist auditors. If so, we expect β_{11} to be positive and significant.

Consistent with Tucker and Zarowin (2006), we use the cross-sectional variation of the Jones (1991) model, as modified by Kothari et al. (2005), to estimate the discretionary accruals used in computing our income smoothing measure. This model is estimated for each two-digit SIC and year combination with at least eight observations:

$$TA2_{i,t} = \gamma_0 + \gamma_1 \Delta Sales_{i,t} + \gamma_2 PPE_{i,t} + \gamma_3 ROA_{i,t} + \varepsilon_{i,t} \qquad (6)$$

where

$ROA_{i,t}$ = return on assets of firm i in year t.[6]

The residual value from the estimation of equation (6) is the proxy for discretionary accruals for the Tucker and Zarowin (2006) tests. As discussed earlier under our Subramanyan (1996) based test, we conduct an additional analysis to address concerns about the measurement error in the discretionary accruals proxy.

3.2 Measure of Industry Specialization

Prior studies use several measures for industry specialization. These measures try to capture the market share held by the industry-specialist auditor because of the assumption that undertaking a greater volume of work in a particular industry increases the level of expertise and knowledge of the auditor because of a greater level of exposure and repetition of similar tasks (e.g., Bedard and Biggs [1991], Low [2004]).[7]

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6 We recognize that Subramanyam (1996) and Tucker and Zarowin (2006) use slightly different models to estimate discretionary accruals. We have adopted their original definitions, but the two measures will be highly correlated.

7 Debate has centered on the use of national-level rather than city-level data in determining auditor specialization. However, the fact that certain auditors may have many local clients in certain industries due

Commonly, the choice of an industry specialization measure involves several decisions. First, the market share can be defined either within an auditor (portfolio share) or within an industry (industry market share).[8] Second, the market shares can be measured using sales or the number of clients.

Recently, Neal and Riley (2004) argue that the industry market and portfolio share measures each capture different attributes of specialization. They also provide a new measure that combines the industry market share and auditor portfolio measures by multiplying the proportion of market share and proportion of portfolio share for each auditor within each industry-year combination. For our main tests, we adopt Neal and Riley's (2004) measure based on sales (rather than client numbers).

It is important to note that the Neal and Riley (2004) measure provides a continuous measure of industry specialization. However, our research design suggests that a dichotomous measure is suitable for the current study. This is because our methodology entails building a self-selection model of industry specialists (equation 1) and interpreting a complex three-way interaction term involving industry specialists (equation 5). Where a discrete measure of industry specialization is warranted, Neal and Riley (2004) prescribe a minimum score of 0.00435 on their composite measure, for an

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to reputational influences are likely to be restricted to non-Big 6 auditors (e.g., Balsam et al. [2003]). Moreover, the cost limitations given the existing limited data sources available can outweigh the benefits of collecting localised data (e.g., Ferguson et al. [2003]). Also, the fact that the culture, training and information systems of the big audit firms are national should reduce the impact of city-level effects.

8 In keeping with Krishnan (2003b) and Balsam et al. (2003), industries are defined according to two-digit SIC codes.

auditor to qualify as a specialist.[9] Accordingly, we code our industry specialization variable (*SPEC*) 1 where an auditor's Neal and Riley (2004) score equals or exceeds 0.00435, and 0 otherwise.

In subsequent tests, we re-run our analysis using other specialization measures, including Neal and Riley's (2004) measure based on client numbers and the four other measures based on different combinations of the two choices (i.e., market share vs. portfolio share, sales vs. clients).

3.3 Data

We employ data from 1989-1997, which is the period where there were the Big 6 audit firms.[10] Having a fixed number of brand-name audit firms throughout the study eliminates the difficulty of trying to assess industry specialization in the case of a merger between audit firms.

Data are collected from Compustat and CRSP. We use all available observations with sufficient data to estimate our empirical models. Since we are interested in industry specialization of the Big 6 auditors, we exclude firms that were audited by non-Big 6 audit firms. In addition, we exclude financial institutions (SICs between 6000 and 6999), firms that changed fiscal year-ends during the period of analysis, and firms that changed auditors during the period of analysis. This yields 17,718 firm-year observations representing 3,818 firms for our tests based on Subramanyam (1996). Table 1 shows the

[9] Under this approach, an auditor with a 10 percent market share in an industry (market share proportion = 0.10) will require that industry to contribute 4.35 percent towards its total portfolio (portfolio share proportion 0.0435), for the auditor to qualify as an industry specialist.

[10] The Big 6 from 1989 till 1998 were Arthur Anderson, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick and Price Waterhouse.

distribution of observations by industry for the Subramanyam (1996) tests. There are six industries that collectively contribute more than 43 percent of the observations in our sample: electrical (8.30 percent), industrial (7.99 percent), utilities (7.27 percent), chemicals (6.65 percent), instruments (6.50 percent) and business services (6.39 percent).

Insert Table 1

As outlined in Table 1, the same six industries also contribute more than 43 percent of the observations used in our Tucker and Zarowin (2006) tests. However, our analysis here is conducted using a smaller sample of 10,074 firm-year observations from 2,557 firms. The smaller sample size, for this part of our analysis, is driven by the fact that constructing the income smoothing measure for the Tucker and Zarowin (2006) test requires four years of lagged data from the statement of cash flows, and since cash flow data is only available starting in 1988, our analysis for the Tucker and Zarowin (2006) test is restricted to the period 1992-1997.

4. Results

4.1 Results from the Industry Specialist Auditor Self-Selection Analysis

Table 2 reports the descriptive statistics on the independent variables employed to predict firms who are clients of industry specialist auditors. We report statistics separately for firms who are clients of specialists and non-specialists.

Insert Table 2

Parametric and non-parametric tests reveal significant differences between the mean and median values of the independent variables cross the two sub-samples. More importantly, a large proportion of the observed differences are also in the expected direction. While these findings provide strong support for the premise that firms self-select industry specialists based on certain firm characteristics, the univariate tests should be interpreted cautiously since they do not control for the effects of the other variables.

Table 3 reports the Pearson correlation matrix for the independent variables used to predict industry specialist clients. While we find that all but three of the correlation coefficients are significant at the 5 percent level, the coefficients are not large enough to prohibit the use of a multivariate logistic regression analysis.[11]

Insert Table 3

Table 4 presents the results from the logistic regression analysis on the self-selection of industry specialist auditors. In line with our expectations and earlier-reported descriptive statistics, the results indicate that clients of industry specialist clients have: larger sales, more capital intensity, lower financial leverage, longer operating cycles, lower asset turnover, larger current ratios, and larger quick ratios. Industry specialist clients are also more likely to operate in regulated industries. These results are significant at the 1 percent level. While we also find that industry specialist clients have a higher incidence of financial losses (at the 1 percent level), this finding is not in the expected direction. Overall, the significant findings from the self-selection analysis provide strong support for our choice to control for self-selection in the study's main analyses. As discussed earlier, this is achieved by using the parameter estimates from

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[11] There could still be a possibility of each independent variable being collectively correlated with the other independent variables. The matrix of bivariate correlation in Table 3 does not help detect such multiple correlations. In such instances, the use of variance inflation factors helps determine the multiple correlations between an independent variable and the rest of the independent variables (Berry and Feldman 1985). We compute and examine the variance inflation factors for the independent variables but find no signs of any such correlation problems.

Table 4 to compute *IMR*, which is employed as an independent variable in our subsequent Subramanyam (1996) and Tucker and Zarowin (2006) based tests. The results from these analyses are discussed next.

Insert Table 4

4.2 Results from the Subramanyam (1996) Based Analysis

Panel A of Table 5 presents descriptive statistics for variables used to estimate equation (2) which is based on Subramanyam (1996).

Insert Table 5

The mean (median) value of *RET* is 0.163 (0.150). This suggests that during our sample period, on average, the shareholders of the firms in our study earned positive returns which is consistent with Krishnan (2003a) who finds that firms audited by Big 6 auditors also have positive returns (with a mean of 15.7). Moreover, mean and median values for *NDA* are negative due to depreciation and are similar to results reported in Subramanyam (1996) and Krishnan (2003a). On the other hand, our *DA* is positive (mean of 0.012) whereas Subramanyam (1996) and Krishnan (2003a) report discretionary accruals that are slightly negative (means of -0.004 and -0.007, respectively). Panel B of Table 5 shows that *RET* is positively correlated to *CFO*, *NDA*, and *DA* as expected.

Table 6 reports the results for equation (2) along with its two restricted models where we use either total earnings or *CFO* and total accruals in place of *CFO*, *NDA*, and *DA*. We report the results of the restricted models because finding similar results for these models would reduce concerns about measurement error in our discretionary accruals proxy.

Insert Table 6

Consistent with prior research, results from our restricted equation (2A) indicate that *Earnings* is positively related to *RET*. Further, we also find a positive relationship between *IMR* and *RET*. This finding highlights the importance of controlling for self-selection bias when investigating how industry specialist auditors influence stock performance, as regressions that fail to account for the self-selection bias will yield biased results. The results for *SPEC* and the *SPEC*Earnings* are insignificant indicating that clients of industry specialist auditors do not earn higher stock returns. A similar finding is observed from the results of the second restricted equation (2B), which focuses on the cash flow (*CFO*) and total accruals (*Accruals*) component of earnings. We find that both earnings components are positively related to *RET*. In contrast to the result obtained for equation (2A), we find a positive, albeit weak (at the 10 percent level), relationship between *RET* and *SPEC*. Thus, *ceteris paribus*, clients of specialist auditors appear to have higher returns than clients of non-specialists (consistent with the Pearson correlation in panel B of Table 5). The exact reason for this is unclear. For example, hiring a specialist could be seen as enhancing firm value (e.g., Knechel, Naiker, & Pacheco [2007]) or better performing firms may hire specialists. However, the interactions of *SPEC* with *CFO* and *Accruals* are insignificant, indicating that effect of the two earnings components on stock performance is no more pronounced for industry specialist clients. The result for *IMR* remains significant.

Similar to Krishnan (2003a) and Subramanyam (1996), results from the estimation of equation (2) indicate that *CFO* and the two components of total accruals, *NDA* and DA, are positively related to *RET*, and these relations are highly significant (at the 1 percent level). Hence, this indicates that, on average, the market prices discretionary accruals which suggests that they are informative. However, we find that the interactions of the three earnings components with *SPEC* are all insignificant, indicating that the discretionary accruals (and also cash flows and non-discretionary accruals) of clients of industry specialist auditors are no more positively related to current stock returns than the discretionary accruals of clients of non-specialists. Thus, we find no support for H1, i.e., we find no evidence that the market views discretionary accruals of clients of specialists more positively, or as being more informative, than the discretionary accruals of non-specialist clients. The results for *SPEC* and *IMR* remain unchanged from those reported for the second restricted model.

The adjusted R^2 for the three equations reported in Table 5 shows that the models explain between 6.7 percent to 6.3 percent of the variation in returns. This is slightly superior to Krishnan (2003a) who reports an R^2 of around 5.4% for his model. It is important to note that Krishnan's (2003a) tests examine whether the relation between *RET* and *DA* is different for clients of Big 6 and non-Big 6 audit firms whereas we compare this relation for clients of specialist Big 6 firms versus non-specialist Big 6 firms.

4.3 Results from the Tucker and Zarowin (2006) Based Analysis

Panel A of Table 7 presents descriptive statistics for variables used to estimate equation (5), which is based on Tucker and Zarowin (2006). The mean (median) value of ex-divided stock return ($R_{i,t}$) is 0.162 (0.058) and is similar to the positive returns document by Tucker and Zarowin (2006), who document a mean $R_{i,t}$ of 0.153 for their sample firms. Moreover, mean and median values for the three earnings per share variables ($X_{i,t-1}$, $X_{i,t}$, $X_{i,t3}$) and the annually compounded future stock returns ($R_{i,t3}$) are also similar to those reported in Tucker and Zarowin (2006). In line with our expectations, panel B of Table 7 shows that $R_{i,t}$ is negatively correlated with $X_{i,t-1}$, $R_{i,t3}$ and $IS_{i,t}$, and positively correlated with $X_{i,t}$ and $X_{i,t3}$.

Insert Table 7

Table 8 reports the results for equation (5) and a baseline model (equation 4), which restricts the set of independent variables to those employed by Tucker and Zarowin (2006). Consistent with the correlation coefficients reported in panel B of Table 7, results from the estimation of equation (4) indicate that current stock returns is: (1) negatively related to past earnings ($X_{i,t-1}$), future stock returns ($R_{i,t3}$) and the income smoothing measure ($IS_{i,t}$), and (2) positively related to current earnings ($X_{i,t}$) and future earnings ($X_{i,t3}$) where the coefficient for the latter represents the FERC. We also find significant positive (negative) parameter estimates on variables capturing the interaction of the income smoothing measure with current and future earnings (past earnings). The result for the interaction of the income smoothing measure with future earnings indicates that income smoothing enhances the future earnings response coefficients (FERC). Again, the above findings are consistent with the results reported in Tucker and Zarowin (2006). The adjusted R^2 for equation (4) is 0.132 and higher than the adjusted R^2 of 0.072, reported by Tucker and Zarowin (2006).

Insert Table 8

The results for the above-mentioned variables remain unchanged when we estimate equation (5), our expanded version of equation (4). Similar to our Subramanyam (1996) based analysis, the results for equation (5) also indicate a positive relation between *IMR* and current stock returns, confirming the importance of controlling for self-selection in our research setting. Further, we find that the coefficient for the three-way interaction term ($SPEC_{i,t}*IS_{i,t}*X_{i,t3}$) is insignificant, indicating that the positive interaction between income smoothing and the FERC is no more pronounced for clients of industry specialist auditors. Hence, similar to our earlier-reported findings, we find no support for H1, i.e., discretionary accruals of industry specialist clients do not appear to be more informative. The adjusted R^2 for equation (5) is 0.140 and higher than the adjusted R^2 reported for equation (4).

5. Sensitivity Analyses

5.1 Alternative Industry Specialization Measures

For our main test, we use a combined specialization score based on sales. However, the calculation of this score can be undertaken using the number of clients rather than sales. Balsam et al. (2003) suggest that this measure avoids the bias toward large clients that is implied by using a measure based on sales. Accordingly, we replicate our Subramanyam (1996) based analysis using the number of clients to derive the Neal and Riley (2004) auditor specialization measure (*SPEC1*).

Further, since prior literature has generally not used a composite industry specialization measure as we do, we also replicate our analysis using four other specialization measures. Our next two alternative measures are dichotomous industry measures based on sales (*SPEC2*) and client numbers (*SPEC3*), respectively, where a 20 percent threshold is required for industry specialization. The two remaining measures are dichotomous measures based on share of sales (*SPEC4*) and client numbers (*SPEC5*) on a portfolio basis where, similar to Krishnan (2003b), we code an auditing firm's top three portfolio industry shares as the auditor's speciality industries (see Krishnan 2003b).

The results from the employment of the five industry specialization measures are conflicting. We find a significant positive parameter estimate (at the 1 percent level) on the variable capturing the interaction between *DA* and *SPEC2*. On the other hand, we find significant negative parameter estimates on variables capturing the interaction between *DA* and the three specialization measures, *SPEC1* (at the 1 percent level), *SPEC3* (at the 5 percent level) and *SPEC5* (at the 10 percent level). Interestingly, all of these measures are fully or partially based on client numbers. This suggest that, if anything, specialists may actually be too restrictive in the discretionary accruals that they allow for clients operating in industries where they have many clients. This is contrary to H1.

We also evaluate the sensitively of our Tucker and Zarowin (2006) based analysis to the five alternative industry specialization measures described above. The results indicate that the variables capturing the three-way interaction between income smoothing, *FERC* and the five specialization measures (i.e., β_{11} in equation (5)) are insignificant in all cases, indicating that the positive interaction between income smoothing and *FERC* is no more pronounced for clients of industry specialist auditors. Hence, using these alternative specialization measures, we still find no support for H1 from our Tucker and Zarowin (2006) analysis.

Overall, across all our analyses (including our main analyses), we only find support for H1 in one case (for *SPEC2* in our Subramanyan (1996) analysis) while H1 is not supported in our other 11 analyses (i.e., five Subramanyam (1996) tests and six Tucker and Zarowin (2006) tests). Thus, on balance, H1 is not supported.

5.2 Alternative Discretionary Accruals and Income Smoothing Measures

We also replicate our analyses using alternative discretionary accruals measures. First, we use performance-adjusted discretionary accruals based on Francis et al. (2005) and find that our results remain unchanged from those reported earlier. Second, to address measurement concerns surrounding our discretionary accrual models (Bernard and Skinner 1996, Guay et al. 1996), we also replicate our analyses using a two-stage methodology. In the first stage, we regress the discretionary accruals measures used in our main analyses on various firm characteristics previously found to be related to discretionary accruals.[12] In the second stage, we replicate our main analyses after measuring discretionary accruals as the residuals from the first-stage regression analysis described above. Again, we find our findings are insensitive to use of this discretionary accruals proxy.

We also replicate our Tucker and Zarowin (2006) based tests using three alternative income smoothing measures. More specifically, following Lang et al. (2006),

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[12] More specifically, our list of discretionary accruals determinants is derived from Ashbaugh et al. (2003), Menon and Williams (2004), Cahan and Zhang (2006), and Geiger and North (2006), includes firm size, market-to-book ratio, leverage, profitability, debt issuance, equity issuance, mergers and acquisition, operating cash flows, sales growth and membership in high-litigation risk industries.

we measure income smoothing as the: (1) variability of changes in net income, (2) ratio of changes in net income to the variability of changes in cash flows, and (3) negative correlation between changes in total accruals and changes in operating cash flows. The results after employing the alternative income smoothing measures are qualitatively similar to those reported earlier.

5.3 Other Tests

Following Krishnan (2003a), we replicate our analyses by estimating each of our models on a year-by-year basis, and averaging the coefficients and t-statistics across the sample period. Further, to ensure that our results are not affected by winsorizing our data, we replicate our analyses after adding the extreme values back into our sample. However, our results still indicate no support for H1.

In summary, our results remain robust when we use alternative definitions of industry specialization, alternative discretionary accruals and income smoothing measures, estimate our models on a year-by-year basis, and include the most extreme values.

6. Summary and Conclusions

In this study, we investigate whether audit specialists are better at constraining opportunistic discretionary accruals. Specifically, since specialist auditors have industry specific expertise, they should be better at separating opportunistic and informative discretionary accruals. Further, since excessive earnings management can increase the auditor's litigation risk, auditors have incentives to constrain those accruals that are being used be used by managers for opportunistic reasons. This suggests that any discretionary accruals that are allowed are permitted intentionally by the specialists because they are informative and lead to higher quality earnings. This leads to the expectation that the discretionary accruals of clients of industry specialists will be more value relevant and priced more positively than the discretionary accruals of clients of non-specialists.

To the contrary, we do not find that the discretionary accruals of clients of specialist auditors – where specialization is measured using a combined measure based on client sales – are more highly related to stock returns. These results hold even when alternative measures of discretionary accruals and industry specialization are used. Thus, we find no support for the view that specialist auditors are better at identifying and constraining opportunistic discretionary accruals.

Our results should be interpreted in conjunction with Krishnan (2003b). He finds that industry specialists constrain discretionary accruals. Combined with his results, our results suggest that while specialists may constrain discretionary accruals, they are no better than non-specialists in constraining opportunistic discretionary accruals relative to informative discretionary accruals.

We also provide a few caveats. First, while we use various different measures of specialization, specialization is not easily measured so our measures may still suffer from measurement error. Second, our tests depend on the adequacy of the decomposition of total accruals into the nondiscretionary and discretionary components, but the Jones-based models used in our main tests are incomplete so our discretionary accruals measures are likely to be measured with noise. Third, it is possible that specialist auditors do constrain opportunistic discretionary accruals, but investors ignore this or are too naïve to recognize the higher quality of discretionary accruals of these clients.

Since the GAO (2003) report identifies industry specialization as being particularly important to clients, further research on the effects of specialization is warranted. Future research could replicate our models in different environments. For example, researchers could examine whether the Sarbanes-Oxley Act has affected the incentives of specialists to constrain opportunistic discretionary accruals. Alternatively, it would be interesting to extend our analysis to other countries to see if the impact of industry specialization varies around the world.

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TABLE 1
Industry Composition of the Sample

	Subramanyan (1996) Tests				*Tucker and Zarowin (2006) Tests*		
SIC Code	Industry	Obs.	%	SIC Code	Industry	Obs.	%
36	Electrical	1,471	8.30%	36	Electrical	946	9.39%
35	Industrial	1,416	7.99%	35	Industrial	777	7.71%
49	Utilities	1,288	7.27%	28	Chemicals	751	7.45%
28	Chemicals	1,178	6.65%	49	Utilities	670	6.65%
38	Instruments	1,151	6.50%	38	Instruments	661	6.56%
73	Business Services	1,133	6.39%	73	Business Services	559	5.55%
13	Oil & Gas	621	3.50%	13	Oil & Gas	372	3.69%
48	Communications	586	3.31%	37	Transport- Equipment	324	3.22%
50	Durables – Wholesale	557	3.14%	33	Metal Work - Basic	306	3.04%
33	Metal Work - Basic	544	3.07%	50	Durables – Wholesale	306	3.04%
37	Transport- Equipment	510	2.88%	20	Food	279	2.77%
20	Food	510	2.88%	48	Communications	253	2.51%
80	Health	434	2.45%	34	Metal Work – Fabrication	214	2.12%
59	Misc. Retail	396	2.24%	26	Paper	213	2.11%
34	Metal Work – Fabrication	378	2.13%	58	Eating	205	2.03%
58	Eating	341	1.92%	59	Misc. Retail	204	2.03%
26	Paper	337	1.90%	80	Health	195	1.94%
30	Rubber	321	1.81%	30	Rubber	183	1.82%
27	Printing	314	1.77%	27	Printing	182	1.81%
51	Nondurables – Wholesale	257	1.45%	87	Engineering – Retail	148	1.47%
29	Petroleum	247	1.39%	29	Petroleum	144	1.43%
87	Engineering – Retail	233	1.32%	51	Nondurables – Wholesale	135	1.34%
39	Misc. Manufacturing	205	1.16%	54	Food Stores	124	1.23%
54	Food Stores	193	1.09%	25	Furniture	121	1.20%
32	Stone	192	1.08%	56	Apparel - Retail	116	1.15%
45	Air Transport	187	1.06%	23	Apparel	112	1.11%
56	Apparel - Retail	183	1.03%	32	Stone	105	1.04%
22	Textile mill	182	1.03%	53	General Stores	104	1.03%
53	General Stores	173	0.98%	22	Textile mill	103	1.02%
25	Furniture	166	0.94%	45	Air Transport	102	1.01%
	Other Industries	2,014	11.37%		Other Industries	1,160	11.51%
		17,718				10,074	

TABLE 2
Descriptive Statistics on Variables Used to Estimate the Industry Specialist Auditor Self-Selection Model

		Total Sample	Industry Specialist Sample	Non-Industry Specialist Sample	*t*-statistic *Wilcoxon Z*
Panel A: Continuous Variables					
SIZE	Mean	4.980	5.352	4.733	29.11***
	(Median)	(4.883)	(5.192)	(4.722)	*24.92****
CAPINT	Mean	1.049	1.147	0.983	8.62***
	(Median)	(0.431)	(0.474)	(0.400)	*15.92****
LEV	Mean	0.220	0.214	0.224	-5.02***
	(Median)	(0.188)	(0.188)	(0.187)	*2.04***
CYCLE	Mean	4.828	4.889	4.788	2.54***
	(Median)	(3.933)	(4.052)	(3.852)	*8.77****
P/E	Mean	8.154	6.927	8.970	-3.58***
	(Median)	(12.316)	(12.586)	(12.132)	*0.36*
SQRTEMP	Mean	1.658	1.965	1.454	25.43***
	(Median)	(0.963)	(1.024)	(0.924)	*12.75****
ATURN	Mean	1.197	1.134	1.239	-13.08***
	(Median)	(1.072)	(1.006)	(1.120)	*-14.56****
CURR	Mean	0.507	0.508	0.507	0.21
	(Median)	(0.533)	(0.527)	(0.538)	*-0.38****
QUICK	Mean	1.526	1.611	1.469	7.22***
	(Median)	(1.020)	(1.031)	(1.011)	*9.07****
Panel B: Dichotomous Variables					
ISSUE		0.232	0.235	0.230	1.15
LOSS		0.161	0.151	0.168	-4.37***
REG		0.058	0.078	0.045	14.27***

(***), (**) and (*) denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Industry specialist sample consists of firms that clients of industry specialist auditors; and Non- Industry specialist sample consists of firms that are clients of other Big 6 auditors who are not industry specialists.

Variable definitions:

$SIZE_{i,t}$ = natural logarithm of sales for firm *i* in year *t*, $CAPINT_{i,t}$ = gross property, plant and equipment, scaled by sales for firm *i* in year *t*, $ISSUE_{i,t}$ = 1 if number of outstanding shares in firm *i* increases by more than 10 percent during year *t*, and 0 otherwise, $LOSS_{i,t}$ = 1 if net income scaled by lagged assets for firm *i* in year *t* is negative and the absolute value of change in net income scaled by lagged assets during year *t* is greater than 10 percent, and 0 otherwise, $CYCLE_{i,t}$ = Day's sales in inventory and receivables, divided by 30 for firm *i* in year *t*, $P/E_{i,t}$ = price / earnings ratio for firm *i* in year *t*, $SQRTEMP_{i,t}$ = square root of the number of employees in firm *i* in year *t*, $ATURN_{i,t}$ = asset turnover for firm *i* in year *t*, calculated as sales divided by total assets, $CURR_{i,t}$ = current ratio for firm *i* in year *t*, calculated as current assets divided by total assets, $QUICK_{i,t}$ = quick ratio for firm *i* in year *t*, calculated as current assets (minus inventory) divided by current liabilities, and $REG_{i,t}$ = 1 if firm *i* is a member of a regulated industry in year *t*, and 0 otherwise.

TABLE 3
Correlation Matrix of the Independent Variables Employed in the Industry Specialist Auditor Self-Selection Model

	SIZE	*CAPINT*	*LEV*	*ISSUE*	*LOSS*	*CYCLE*	*P/E*	*SQRTEMP*	*ATURN*	*CURR*	*QUICK*	*REG*
SIZE	**1.000**											
CAPINT	**-0.105**	**1.000**										
LEV	**0.126**	**0.147**	**1.000**									
ISSUE	**-0.079**	**0.053**	**-0.032**	**1.000**								
LOSS	**-0.310**	**0.092**	-0.005	**0.095**	**1.000**							
CYCLE	**-0.179**	**0.067**	**-0.099**	**-0.013**	**0.116**	**1.000**						
P/E	**0.028**	**-0.099**	**-0.061**	**0.024**	**-0.175**	-0.006	**1.000**					
SQRTEMP	**0.696**	**-0.077**	**0.071**	**-0.054**	**-0.197**	**-0.130**	**0.012**	**1.000**				
ATURN	**0.161**	**-0.446**	**-0.138**	**-0.076**	**-0.069**	**-0.252**	**0.049**	**0.076**	**1.000**			
CURR	**-0.285**	**-0.348**	**-0.433**	**0.033**	**0.115**	**0.192**	**0.078**	**-0.269**	**0.342**	**1.000**		
QUICK	**-0.238**	**-0.037**	**-0.191**	**0.043**	0.003	**0.171**	**0.032**	**-0.186**	**-0.166**	**0.362**	**1.000**	
REG	**0.139**	**0.094**	**0.121**	**-0.013**	**-0.049**	**-0.140**	**-0.117**	**0.119**	**-0.093**	**-0.254**	**-0.091**	**1.000**

Pearson Correlations significant at the 5% level are in bold figures.

Variable definitions:

$SIZE_{i,t}$ = natural logarithm of sales for firm *i* in year *t*, $CAPINT_{i,t}$ = gross property, plant and equipment, scaled by sales for firm *i* in year *t*, $ISSUE_{i,t}$ = 1 if number of outstanding shares in firm *i* increases by more than 10 percent during year *t*, and 0 otherwise, $LOSS_{i,t}$ = 1 if net income scaled by lagged assets for firm *i* in year *t* is negative and the absolute value of change in net income scaled by lagged assets during year *t* is greater than 10 percent, and 0 otherwise, $CYCLE_{i,t}$ = Day's sales in inventory and receivables, divided by 30 for firm *i* in year *t*, $P/E_{i,t}$ = price / earnings ratio for firm *i* in year *t*, $SQRTEMP_{i,t}$ = square root of the number of employees in firm *i* in year *t*, $ATURN_{i,t}$ = asset turnover for firm *i* in year *t*, calculated as sales divided by total assets, $CURR_{i,t}$ = current ratio for firm *i* in year *t*, calculated as current assets divided by total assets, $QUICK_{i,t}$ = quick ratio for firm *i* in year *t*, calculated as current assets (minus inventory) divided by current liabilities, and $REG_{i,t}$ = 1 if firm *i* is a member of a regulated industry in year *t*, and 0 otherwise.

TABLE 4
Logistic Regression Results on the Demand for Industry Specialist Auditors

$$SPEC_{i,t} = \beta_0 + \beta_1 SIZE_{i,t} + \beta_2 CAPINT_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ISSUE_{i,t} + \beta_5 LOSS_{i,t} + \beta_6 CYCLE_{i,t} + \beta_7 P/E_{i,t} + \beta_8 SQRTEMP_{i,t} + \beta_9 ATURN_{i,t} + \beta_{10} CURR_{i,t} + \beta_{11} QUICK_{i,t} + \beta_{12} REG_{i,t} + \varepsilon_{i,t} \quad (1)$$

	Expected Sign	Coefficient	Wald Chi-square
Intercept	?	-1.7551	551.811***
SIZE	+	0.2138	386.641***
CAPINT	+	0.1436	164.107***
LEV	-	-0.5797	61.889***
ISSUE	+	0.0384	1.719*
LOSS	-	0.1256	10.736***
CYCLE	+	0.0119	8.098***
P/E	+	-0.0003	1.691*
SQRTEMP	+	0.0107	1.157
ATURN	-	-0.2287	106.842***
CURR	+	0.7295	88.208***
QUICK	+	0.0399	16.089***
REG	+	0.4765	85.976***

Max-rescaled R^2 = 0.070

(***), (**) and (*) denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Variable definitions:

$SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise., $SIZE_{i,t}$ = natural logarithm of sales for firm *i* in year *t*, $CAPINT_{i,t}$ = gross property, plant and equipment, scaled by sales for firm *i* in year *t*, $ISSUE_{i,t}$ = 1 if number of outstanding shares in firm *i* increases by more than 10 percent during year *t*, and 0 otherwise, $LOSS_{i,t}$ = 1 if net income scaled by lagged assets for firm *i* in year *t* is negative and the absolute value of change in net income scaled by lagged assets during year *t* is greater than 10 percent, and 0 otherwise, $CYCLE_{i,t}$ = Day's sales in inventory and receivables, divided by 30 for firm *i* in year *t*, $P/E_{i,t}$ = price / earnings ratio for firm *i* in year *t*, $SQRTEMP_{i,t}$ = square root of the number of employees in firm *i* in year *t*, $ATURN_{i,t}$ = asset turnover for firm *i* in year *t*, calculated as sales divided by total assets, $CURR_{i,t}$ = current ratio for firm *i* in year *t*, calculated as current assets divided by total assets, $QUICK_{i,t}$ = quick ratio for firm *i* in year *t*, calculated as current assets (minus inventory) divided by current liabilities, and $REG_{i,t}$ = 1 if firm *i* is a member of a regulated industry in year *t*, and 0 otherwise.

TABLE 5
Descriptive Statistics for the Independent Variables Used for the Test Based on the Subramanyam (1996) Method and the Correlation Matrix of the Independent Variables

Panel A: Descriptive statistics for the independent variables

	Mean	Std. Dev.	Minimum	Median	Maximum
RET	0.163	0.420	-1.205	0.150	1.805
CFO	0.074	0..133	-2.148	0.085	0.510
NDA	-0.062	0.061	-0.956	-0.057	0.390
DA	0.012	0.110	-1.776	0.013	0.847
SPEC	0.419	0.493	0.000	0.000	1.000

Panel B: Correlation matrix of the independent variables

	RET	*CFO*	*NDA*	*DA*	*SPEC*
RET	1.000				
CFO	**0.202**	1.000			
NDA	**0.144**	**-0.199**	1.000		
DA	**0.053**	**-0.280**	**-0.237**	1.000	
SPEC	**0.015**	**0.015**	-0.002	0.012	1.000

Pearson Correlations significant at the 5% level are in bold figures.

Variable definitions:

$RET_{i,t}$ = stock return for firm *i* in year *t* calculated over a 12-month period ending three months after the fiscal year end for year *t*, $CFO_{i,t}$ = cash flow from operations scaled by lagged total assets for firm *i* in year *t*, $NDA_{i,t}$ = non-discretionary accruals for firm *i* in year *t*, $DA_{i,t}$ = discretionary accruals for firm *i* in year *t*, and $SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise.

TABLE 6
Results for Analysis Based on Subramanyam (1996)

$$RET_{i,t} = \alpha_0 + \alpha_1 Earnings_{i,t} + \alpha_2 Earnings_{i,t}*SPEC_{i,t} + \alpha_3 IMR_{i,t} + \varepsilon_{i,t} \quad \text{(Restricted Eq. 2A)}$$

$$RET_{i,t} = \alpha_0 + \alpha\, CFO_{i,t} + \alpha_2 CFO_{i,t}*SPEC_{i,t} + \alpha_3 Accruals_{i,t} + \alpha_4 Accruals_{i,t}*SPEC_{i,t} + \alpha_5 IMR_{i,t} + \varepsilon_{i,t} \quad \text{(Restricted Eq. 2B)}$$

$$RET_{i,t} = \alpha_0 + \alpha_1 CFO_{i,t} + \alpha_2 NDA_{i,t} + \alpha_3 DA_{i,t} + \alpha_4 SPEC_{i,t} + \alpha_5 CFO_{i,t}*SPEC_{i,t} + \alpha_6 NDA_{i,t}*SPEC_{i,t} + \alpha_7 DA_{i,t}*SPEC_{i,t} + \alpha_8 IMR_{i,t} + \varepsilon_{i,t} \quad (2)$$

Variables	Expected Sign	*Restricted Equation (2A)* Coefficient (*t*-statistic)	*Restricted Equation (2B)* Coefficient (*t*-statistic)	*Equation (2)* Coefficient (*t*-statistic)
Intercept		0.081***	0.073***	0.081***
		(4.67)	(4.14)	(4.49)
Earnings		0.914***		
	+	(27.15)		
*Earnings*SPEC*		0.035		
	?	(0.66)		
CFO			0.842***	0.847***
	+		(25.81)	(25.82)
*CFO*SPEC*			0.001	0.001
	?		(0.02)	(0.02)
Accruals			0.595***	
	+		(15.82)	
*Accruals*SPEC*			0.021	
	?		(0.36)	
NDA				0.686***
	+			(10.20)
*NDA*SPEC*				0.091
	?			(0.80)
DA				0.578***
	+			(14.83)
*DA *SPEC*				0.015
	+			(0.24)
SPEC		0.011	0.013*	0.010*
	?	(1.63)	(1.86)	(1.92)
IMR	?	0.054***	0.055***	0.052***
		(3.17)	(3.18)	(3.04)
Year indicators		Included	Included	Included
Adj. R^2		0.067	0.063	0.063
F-statistic		316.85	200.01	150.90

(***), (**) and (*) denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Variable definitions:

$RET_{i,t}$ = stock return for firm *i* in year *t* calculated over a 12-month period ending three months after the fiscal year end for year *t*, $CFO_{i,t}$ = cash flow from operations scaled by lagged total assets for firm *i* in year *t*, $NDA_{i,t}$ = non-discretionary accruals for firm *i* in year *t*, $DA_{i,t}$ = discretionary accruals for firm *i* in year *t*, $SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise, and $IMR_{i,t}$ = inverse mills ratio from the estimation of the self-selection equation (1)

TABLE 7
Descriptive Statistics for the Independent Variables Used for the Test Based on the Tucker and Zarowin (2006) Method and the Correlation Matrix of the Independent Variables

Panel A: Descriptive statistics for the independent variables

	Mean	Std. Dev.	Minimum	Median	Maximum
$R_{i,t}$	0.162	0.598	-0.685	0.058	3.429
$X_{i,t-1}$	-0.003	0.191	-1.240	0.047	0.203
$X_{i,t}$	0.019	0.156	-0.956	0.050	0.360
$X_{i,t3}$	0.082	0.498	-2.920	0.140	1.589
$R_{i,t3}$	0.293	1.181	-0.949	0.116	6.800
$IS_{i,t}$	0.543	0.282	0.003	0.559	1.000
$SPEC_{i,t}$	0.432	0.495	0	0	1.000

Panel B: Correlation matrix of the independent variables

	$R_{i,t}$	$X_{i,t-1}$	$X_{i,t}$	$X_{i,t3}$	$R_{i,t3}$	$IS_{i,t}$	$SPEC_{i,t}$
$R_{i,t}$	1.000						
$X_{i,t-1}$	**-0.142**	1.000					
$X_{i,t}$	**0.176**	**0.457**	1.000				
$X_{i,t3}$	**0.078**	**0.250**	**0.384**	1.000			
$R_{i,t3}$	**-0.118**	**-0.166**	**-0.160**	**0.175**	1.000		
$IS_{i,t}$	**-0.058**	**0.244**	**0.165**	**0.091**	**-0.082**	1.000	
$SPEC_{i,t}$	-0.005	**0.053**	**0.048**	**0.054**	0.008	**0.025**	1.000

Pearson Correlations significant at the 5% level are in bold figures

Variable definitions:

$R_{i,t}$ = the ex-dividend stock return for firm *i* in year *t*, $X_{i,t-1}$ = the split-adjusted earnings per share before extraordinary items for firm *i* in year *t*-1, deflated by the stock price at the beginning of year *t*, $X_{i,t}$ = the split-adjusted earnings per share before extraordinary items for firm *i* in year t, deflated by the stock price at the beginning of year *t*, $X_{i,t3}$ = the sum of split-adjusted earnings per share before extraordinary items for firm *i* in years *t*+1, *t*+2, and *t*+3, deflated by the stock price at the beginning of year *t*, $R_{i,t3}$ = the annually compounded stock return for firm *i* for years *t*+1 through *t*+3, $IS_{i,t}$ = the income smoothing measure for firm *i* in year *t*, computed as the reversed fractional ranking of the Pearson correlation between the year *t* and past four years' (years *t-4* to *t-1*) change in discretionary accruals and change in pre-managed income, and $SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise.

TABLE 8
Results for Analysis based on Tucker and Zarowin (2006)

$$R_{i,t} = \beta_0 + \beta_1 X_{i,t-1} + \beta_2 X_{i,t} + \beta_3 X_{i,t3} + \beta_4 R_{i,t3} + \beta_5 IS_{i,t} + \beta_6 IS_{i,t} * X_{i,t-1} + \beta_7 IS_{i,t} * X_{i,t} + \beta_8 IS_{i,t} * X_{i,t3} + \beta_9 IS_{i,t} * R_{i,t3} + \varepsilon_t \quad (4)$$

$$R_{i,t} = \beta_0 + \beta_1 X_{i,t-1} + \beta_2 X_{i,t} + \beta_3 X_{i,t3} + \beta_4 R_{i,t3} + \beta_5 IS_{i,t} + \beta_6 IS_{i,t} * X_{i,t-1} + \beta_7 IS_{i,t} * X_{i,t} + \beta_8 IS_{i,t} * X_{i,t3} + \beta_9 IS_{i,t} * R_{i,t3} + \beta_{10} SPEC_{i,t} + \beta_{11} SPEC_{i,t} * IS_{i,t} * X_{i,t3} + \beta_{12} IMR_{i,t} \;\; \varepsilon_t \quad (5)$$

Variables	Predicted sign	*Equation 4* Coefficient (*t*-statistic)	*Equation 5* Coefficient (*t*-statistic)
Intercept		0.201***	-0.090***
		(16.20)	(-2.72)
$X_{i,t-1}$	-	-0.631***	-0.583***
		(-13.65)	(-12.47)
$X_{i,t}$	+	0.847***	0.849***
		(15.39)	(15.46)
$X_{i,t3}$	+	0.100***	0.105***
		(5.54)	(5.63)
$R_{i,t3}$	-	-0.149***	-0.151***
		(-10.86)	(-11.01)
$IS_{i,t}$	?	-0.113***	-0.105***
		(-5.54)	(-5.15)
$IS_{i,t} * X_{i,t-1}$	?	-0.769***	-0.789***
		(-9.26)	(-9.38)
$IS_{i,t} * X_{i,t}$	+	0.438***	0.444***
		(6.03)	(6.10)
$IS_{i,t} * X_{i,t3}$	+	0.064***	0.063**
		(2.81)	(2.11)
$IS_{i,t} * R_{i,t3}$	?	0.029	0.025
		(1.28)	(1.10)
$SPEC_{i,t}$	?		0.028**
			(2.41)
$SPEC_{i,t} * IS_{i,t} * X_{i,t3}$	+		-0.002
			(-0.06)
$IMR_{i,t}$	?		0.296***
			(9.59)
Year indicators		Included	Included
Adj. R^2		0.132	0.140
F-statistic		171.05	137.08

(***), (**) and (*) denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Variable definitions:

$R_{i,t}$ = the ex-dividend stock return for firm *i* in year *t*, $X_{i,t-1}$ = the split-adjusted earnings per share before extraordinary items for firm *i* in year *t*-1, deflated by the stock price at the beginning of year *t*, $X_{i,t}$ = the split-adjusted earnings per share before extraordinary items for firm *i* in year t, deflated by the stock price at the beginning of year *t*, $X_{i,t3}$ = the sum of split-adjusted earnings per share before extraordinary items for firm *i* in years *t*+1, *t*+2, and *t*+3, deflated by the stock price at the beginning of year *t*, $R_{i,t3}$ = the annually compounded stock return for firm *i* for years *t*+1 through *t*+3, $IS_{i,t}$ = the income smoothing measure for firm *i* in year *t*, computed as the reversed fractional ranking of the Pearson correlation between the year *t* and past four years' (years *t-4* to *t-1*) change in discretionary accruals and change in pre-managed income, $SPEC_{i,t}$ = 1 if firm *i* is an industry specialist client in year *t*, and 0 otherwise., and $IMR_{i,t}$ = inverse mills ratio from the estimation of the self-selection equation (1).