EVALUATING THE EFFECT OF INDUSTRY SPECIALIST DURATION ON AUDIT QUALITY

Abstract

This study examines whether auditor industry specialist duration (*i.e.*, the cumulative number of years an audit firm can be deemed an industry specialist) affects audit quality. Using a sample of 17,570 observations during the period 2006 to 2014, we find that audits performed by firms with longer industry specialist durations at the national level are associated with better audit quality, as proxied by the absolute value of discretionary accruals. This finding enhances the industry specialization literature by showing that, in the long run, specialist auditors constrain the accrual management activities of their clients. On the other hand, we also find that audits performed by firms with longer industry specialist durations at the city level are associated with greater levels of *real* earnings management. In turn, this result is consistent with real earnings management surfacing as an unintended consequence of specialist auditors being able to better constrain the accrual management activities of their clients (Chi, Lisic, & Pevsner, 2011).

Keywords: *audit quality; auditor tenure; industry specialist; industry specialist duration.*

JEL descriptors: *M40; M41; M42; M49*

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

Introduction

This study investigates the role of time relative to industry specialization and auditor performance. Specifically, we examine whether auditor industry specialist duration (i.e., the cumulative number of years an audit firm can be deemed an industry specialist) affects audit quality. Obtaining a better understanding of the impact specialist duration has on audit quality is important due to the tacit and transient nature of industry expertise. While prior studies recognize that it takes time to develop an expertise (Bonner & Lewis, 1990; Bonner & Walker, 1994; Goodwin & Wu, 2014), this critical component of the auditor "seasoning" process has been largely ignored by most preceding studies based on market share dominance (Gaver & Utke, 2017). Furthermore, several elements of the expertise puzzle, such as the dynamic environment of the audit profession and the challenges/opportunities associated with prolonged auditor-client engagements, further accentuate the importance of time as determinant of the relation between industry specialization and auditor performance.

In this study, we distinguish between industry specialist *duration* (i.e., specialist tenure) and the *current status* of audit firms as industry specialists. We posit that there are two possible outcomes regarding the impact of specialist duration on audit quality. The first prospect is a positive association between duration and audit quality. This would suggest that an audit firm's history as an industry specialist provides its staff with additional insights about its clients' operations and industry, leading to more effective audits. That is, auditors with large or dominant market shares in an industry benefit from greater exposure to clients from that industry over time. This prediction is based on the notion that industry expertise follows market share dominance and, in turn, it attempts to address a common methodological limitation in prior studies where under certain conditions audit firms can receive a specialist designation by default (Gaver & Utke, 2017).

Alternatively, the second prospect is a negative association between industry specialist duration and audit quality. This would indicate that an audit firm's tenure as a specialist eventually translates into less effective audits. Similar to the views in Lim and Tan (2010), this is consistent with auditors performing subpar audits as a means to improve client retention in industries in which they are considered industry specialists.

Using a sample of 17,570 observations during the period of 2006 to 2014, we find that audits performed by firms with longer industry specialist durations at the national level are associated with better audit quality, as proxied by the absolute value of discretionary accruals. This finding enhances the industry specialization literature by showing that, in the long run, specialist auditors constrain the accrual management activities of their clients. The results for current period specialists are also consistent with lower levels of accruals management, indicating that firms with a specialist designation during the current period perform better quality audits. On the other hand, find that auditors with longer industry specialist durations at the city level are associated with greater levels of *real* earnings management. This result is consistent with real earnings management surfacing as an unintended consequence of specialist auditors being able to better constrain the accrual management activities of their clients (Chi et al., 2011). Our real earnings management tests for current period specialists also express evidence consistent with greater levels of real earnings management among audits performed by industry specialists. Taking the results of our tests in conjunction, we conclude that auditor specialist duration is a relevant earnings management deterrent.

This study contributes to the auditor specialization literature in several ways. To the best of our knowledge, our analyses are among the first to explore the long term effects of industry specialization on auditor performance.[1] A common attribute amid prior industry specialization studies is that their metrics focus on audit firms' immediate industry leadership status, ignoring the trajectory of the audit firm as an industry specialist. Such focus could avert researchers from being able to properly capture the complexities of industry expertise, leading to incorrect or incomplete inferences about the relationship between audit quality and industry specialization (Audousset-Coulier, Jeny, & Jiang, 2016). In a search to better comprehend the intricacies of expertise, the methods in this study take a more inclusive approach by observing the long-term effects of industry specialization on auditor performance. As a result, this study responds to a need for more research to explain cross-industry variations in specialization (Cahan, Godfrey, Hamilton, & Jeter, 2008; Craswell, Francis, & Taylor, 1995).

With respect to the practical implications of the results of this study, if mandatory audit firm rotations were to be implemented, the mechanics of them system would most likely limit audit firms' ability to develop and sustain larger market shares in certain industries. This situation is compounded by the fact that companies avoid to be audited by the same firm as their close competitors due to concerns about accidental transfers of information (Kwon, 1996). While the United States is no longer considering the implementation of mandatory auditor rotations (Chasan, 2014), other countries appear to be moving in a different direction. For instance, Italy and Brazil have required audit firm rotations for years, while the European Union recently started to require rotations for public interest entities (Cameran, Francis, Marra, & Pettinicchio, 2015; EPC, 2006).

[1] In a closely related study, Gaver and Utke (2017) (G&U) investigate the association between audit quality and auditor industry specialist tenure. Our study differs from that of G&U in several ways. First, our regression models investigate specialist duration at both, the city and national levels. This responds to prior research emphasizing the importance of studying auditing phenomena at the city-specific level (Francis et al., 1999). In contrast, G&U only considers national-level effects in their analyses. Second, our analysis includes accrual-based and real earnings management proxies. Similar to Chi et al. (2011), this allows us to uncover interesting dynamics about to the relation between these two different forms of earnings management. Lastly, we operationalize our measure of auditor specialist duration as a discrete variable. In contrast, G&U operationalize their specialist tenure measure as a dichotomous variable, which reduces the amount of information incorporated into the regression model.

In addition, the United Kingdom recently implemented an audit tender requirement that could easily lead to the full establishment of term limits for auditors (FRC, 2011; FRC, 2017). Another contribution of practical significance is that the results of this study provide some evidence that earnings manipulations are pervasive among managers, irrespective of the performance of auditors.

The remainder of this study is organized as follows. First, we provide a brief review of the literature concerning the nature of expertise and that of auditor industry specialization. Next, we explain the research methods. The results and their implications are then considered. The last section presents our conclusions and the limitations of this study.

Literature Review and Hypotheses

Research on the nature of expertise mainly originates from the experiments of Adrian deGroot, a Dutch master chess player and psychologist who conducted some of the most renowned studies on the game of chess to date. In his 1966 study, deGroot employed protocol analysis to better understand the decision making processes and strategies of master chess players. Specifically, he asked knowledgeable players of different skill levels to speak out their next move for several chessboard positions, which allowed him to analyze the various components of their game playing protocols. A surprising finding from his study is that, although master players consistently selected better moves, there were no particular differences in the game playing protocols of the subjects in his experiment (e.g., all players first familiarized themselves with the position of the pieces on the chessboard and took about 10 minutes to decide on a move). Interestingly, deGroot (1966) also asked players to reproduce the position of chess pieces after a short visual exposure to the chessboard of a partially completed master's game. He found that master players had the ability to recall the positions of almost all the displayed pieces, whereas other players were only able to recall the position of a portion of them. While on the surface these differences in memory could be perceived as evidence that master players have better memory in general, the findings from deGroot (1966) marked the beginning of a stream of research in cognitive psychology showing that experts are able to more easily recall data clusters that have been arranged in an order that is meaningful or familiar to them (Chase & Simon, 1973; Posner, 1983/1988; Reicher, 1969).

DeGroot (1966) and the many experimental studies that followed, particularly Chase and Simon (1973), are part of an extensive body of evidence in the cognitive psychology literature indicating that the superior performance of experts appears to be driven by the recognition and reproduction of familiar patterns. This notion recently gained popularity among business professionals with the release of the book *Outliers*, which is based on the premise that a person needs a minimum of 10,000 hours of practice to become a true expert on a particular skill (Gladwell, 2008). As stated by Posner 1983/1988, the development of expertise requires exposure to a sufficiently large number of trials, which in turn allows the performance of complex tasks to become automated.

In the specific context of auditing research, one of the major streams in the auditor specialization literature has focused on understanding the performance of auditors deemed to be industry specialists. Studies from this research stream generally find a positive association between audit firms designated as specialists and audit quality (e.g., Ashton, 1991; Balsam, Krishnan, & Yang, 2003; Bonner & Lewis, 1990; Dunn & Mayhew, 2004; Krishnan, 2003; Reichelt & Wang, 2010; Solomon, Shields, & Whittington, 1999). For instance, Krishnan (2003) found that audits performed by industry specialists are associated with lower discretionary accruals when compared to audits performed by non-specialist auditors. Similarly, Balsam et al. (2003) showed that companies audited by industry specialists have lower absolute discretionary accruals and higher earnings response coefficients. Dunn and Mayhew (2004) suggested that companies select industry specialist auditors to signal their intention to provide quality financial statements. In addition, Gul, Fung, and Jaggi (2009) reported that initial audit engagements where industry specialist auditors are present have higher earnings quality compared to initial engagements that employ non-specialist auditors. In sum, the findings from prior studies are consistent with audit firms identified as industry specialists being able to perform more effective audits than non-specialist firms.

Prior studies have also found evidence that reporting quality improves with the length of the audit engagement. This line of research reinforces the importance of time in the acquisition of knowledge and, consequently, the development of expertise. For instance, Johnson, Kurana, and Reynolds (2002) found that quality of earnings is lower among companies with shorter auditor-client relationships, as evidenced by two different accrual measures. Similarly, Myers, Myers, and Omer (2003) investigated the sign and dispersion of accruals and found that longer auditor tenures are associated with higher earnings quality. Lee, Mande, and Son (2009) found that the length of the audit report lag decreases with the length of auditors' tenure, an effect that could be attributed to longer tenures giving auditors a more in-depth knowledge of the operations of their clients. Lastly, using financial restatements as a proxy for reporting quality, Stanley and DeZoort (2007) found a negative relation between the length of auditors' tenure and the likelihood of restatement.

The findings from the two research streams discussed above have greatly enhanced our understanding of specialization and tenure on audit quality. However, additional research is needed on factors related to the nature of industry expertise *per se*, particularly when considering that prior studies have largely ignored the impact of time on the auditor "seasoning" process (Gaver and

Utke, 2017). Following the precepts of seminal studies from the cognitive psychology literature (e.g., Chase & Simon, 1973; DeGroot, 1966), this study builds on the premise that the accumulation of market share in an industry is not a sufficient condition for true expertise. The successful provision of audit services requires audit firms and their individual auditors to develop general knowledge, client-specific knowledge, and industry-specific knowledge (O'Keefe, King, & Gaver, 1994); cultivating these knowledge bases requires a significant investment of resources and time (Frederick & Libby, 1986; Goodwin & Wu, 2014). For instance, instruction on technical topics is not normally enough to create procedural knowledge (Bonner & Walker, 1994). In addition, the transferability of knowledge is often difficult (Bonner & Walker, 1994; Chow, Ho, & Vera-Muñoz, 2008; Goodwin & Wu, 2014; Vera-Muñoz, Ho, & Chow, 2006). These factors underscore the tacit and transient nature of industry expertise.

In sum, we investigate whether the duration of audit firms as industry specialists affects audit quality. We posit that duration is likely to manifest itself in the form of superior auditor performance because audit firms with longer tenures as specialists receive greater exposure to industry-specific knowledge, allowing them to become "seasoned." On the other hand, it is important to also consider that firms with longer durations as specialists could instead find themselves producing lower quality audits. This, in turn, could be the result of economic pressures leading to the performance of subpar audits as a means to improve client retention in industries in which the firm is considered an industry leader.[2] As a result, we do not offer a directional

[2] Prior research shows evidence supporting the notion that economic pressures can lead to impaired auditor independence. For instance, Choi, Kim, and Zang (2010) found that clients paying abnormally high audit fees are associated with lower audit quality. There is also evidence that indicating that auditors are more likely to acquiesce to clients' demands in order to lower the risk of dismissal (Geiger & Raghunandan, 2002). Other studies have found that audit quality can deteriorate with the length of auditors' tenure (e.g., Carey & Simnet, 2006; Davis, Soo, & Trompeter, 2009; Lim & Tan, 2010).

expectation regarding the association between industry specialist duration and audit quality, as proxied by discretionary accruals. Our research hypothesis, stated in the null form, is as follows:

> *H1: The duration of an audit firm's industry specialist status is not associated with audit quality, as proxied by discretionary accruals.*

Chi et al. (2011) found evidence indicating that companies audited by higher quality auditors are associated with greater levels of real earnings management. The researchers conjecture that real earnings management surfaces as an unintended consequence of auditors' ability to better restrain the accrual-based earnings management activities of their clients. On a similar vein, we extend the reach of our tests by investigating whether auditor industry specialist tenure is associated with real earnings management. Consistent with H1, we do not offer a directional expectation regarding the association between industry specialist duration and our proxies for real earnings management. Our research hypothesis, stated in the null form, is as follows:

> *H2: The duration of an audit firm's industry specialist status is not associated with real earnings management.*

Methodology

Industry Specialist Duration

Prior studies generally state that dominant auditors distinguish themselves from their competitors by devoting additional resources to develop greater market shares, which is expected to enhance their industry-specific knowledge (Mayhew & Wilkins, 2003). Consistent with prior studies, we estimate an audit firm's market share by observing the audit fees it generates during a year from an industry, relative to total fees for that industry (e.g., Balsam et al., 2003; Cahan et al., 2008; Cahan, Jeter, & Naiker, 2011; Carcello & Nagy, 2004; Dunn & Mayhew, 2004; Francis, Reichelt, & Wang, 2005; Hay, Knechel, & Wong, 2006; Krishnan, 2003; Palmrose, 1986). Our measure of auditor industry specialization duration is based on a market share threshold of 30 percent or greater in a two-digit SIC group (Mayhew & Wilkins, 2003; Reichelt & Wang, 2010). Following the lead of Francis, Stokes, and Anderson (1999), we distinguish among audit firms that meet the established market share criteria at the city and national level. Hence, the variables of interest, *DUR_CITY* and *DUR_NATL*, measure the cumulative number of years an audit firm can be deemed an industry specialist at the city and national level, respectively, from $t-5$ through $t-1$. Industries are defined using the first two-digits of a company's primary SIC code, while cities are defined using the Metropolitan Statistical Area (MSA) codes of the U.S. Census Bureau. We use data from Audit Analytics to identify the location of the different auditor offices in the sample.

Accruals-based Earnings Management

In congruence with prior literature, we use discretionary accruals as a proxy for earnings management and concomitant audit quality. Our study uses the performance-adjusted discretionary accruals from the Jones model (Jones, 1991), modified to control for financial performance, as specified in Kothari, Leone, and Wasley (2005). Our analyses focus on absolute discretionary accruals for parsimony and due to the fact that auditors are expected to issue an opinion on whether financial statements are materially misstated, regardless of the direction of the misstatements (Cunningham, Li, & Stein, 2017). The discretionary accruals model is defined as follows:

$$TA_{i,t} = \beta_0 + \beta_1 \Delta REV_{i,t} + \beta_2 PPE_{i,t} + \beta_3 NI_{i,t} + \varepsilon_{i,t} \quad (1)$$

We use OLS to estimate Equation (1), where *TA* is total accruals, defined as the difference between income from operations before extraordinary items minus operating cash flows; ΔREV is change in revenues; *PPE* is gross property, plant and equipment; and *NI* is income before extraordinary items. All variables are scaled by lagged total assets. Cross-sections are formed using the first two-digits of the primary SIC code of a company. We require at least 20 observations in each cross-section to improve the validity of the discretionary accrual estimates. Similar to Reichelt and Wang (2010), we use the estimated betas from Equation (1) to estimate expected total accruals, and we adjust for accounts receivable, as follows:

$$ETA_{i,t} = \hat{\beta}_0 + \hat{\beta}_1(\Delta REV_{i,t} - \Delta AR_{i,t}) + \hat{\beta}_2 PPE_{i,t} + \hat{\beta}_3 NI_{i,t} + \varepsilon_{i,t} \qquad (2)$$

where $\hat{\beta}_0$ to $\hat{\beta}_3$ are estimated coefficients from Equation 1; *ETA* is expected total accruals; and ΔAR is change in accounts receivable. Other variables are as previously defined in Equation (1). We then estimate discretionary accruals, *DA*, by taking the difference between total accruals (*TA*) from Equation (1) and expected total accruals (*ETA*) estimated from Equation (2). That is,

$$DA_{i,t} = TA_{i,t} - ETA_{i,t} \qquad (3)$$

The main regression model evaluates the relationship between industry specialist duration and discretionary accruals, as follows:

$$\begin{aligned} DA\_ABS_{i,t} = {} & \beta_0 + \beta_1 DUR\_CITY_{i,t} + \beta_2 DUR\_NATL_{i,t} + \beta_3 CITY\_SPEC_{i,t} + \\ & \beta_4 NATL\_SPEC_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 MB_{i,t} + \beta_7 LOSS_{i,t} + \beta_8 CFO_{i,t} + \beta_9 LEV_{i,t} + \\ & \beta_{10} LIT_{i,t} + \beta_{11} SHRT\_TEN_{i,t} + \beta_{12} STD\_CFO_{i,t} + \beta_{13} ALTMAN_{i,t} + \\ & \beta_{14} BIG4_{i,t} + \beta_{15} \mathbf{YEAR}_t + \varepsilon_{i,t} \end{aligned} \qquad (4)$$

where *DA_ABS* is the absolute value of discretionary accruals (*DA*) from Equation (3) and *DUR_CITY* (+/−) and *DUR_NATL* (+/−) are as previously defined. *CITY_SPEC* (−) and *NATL_SPEC* (−) are indicators that control for the current specialist status of audit firms. Consistent with the industry specialist duration variables, *CITY_SPEC* and *NATL_SPEC* are based on a market share threshold of 30 percent or greater. Note that the specialist duration variables (i.e., *DUR_CITY* and *DUR_NATL*) are intended to capture the long term effects of an audit firm's experience as a major player in an industry, while the current specialist variables (i.e., *CITY_SPEC* and *NATL_SPEC*) are intended to capture the possible confounding effects of holding a significant market share in an industry during the current period.

The literature suggests that large companies are more financially stable and their growth opportunities influence the earnings management motivations of their managers (Dechow & Dichev, 2002; Dechow, Sloan, & Sweeney, 1995); hence the inclusion of *SIZE* (−) in the model. We also include the market-to-book ratio, *MB* (+), to control for other growth opportunities (Reichelt & Wang, 2010). Furthermore, the literature also suggests that profitability can affect the earnings management incentives of a company (Mosebach & Simko, 2010). Thus, we include *LOSS* (+/−) and *CFO* (+/−) to control for the potential impact of financial performance on earnings management. *LEV* (+) controls for companies that have high levels of financial leverage, because they face more pressure to meet their debt covenant agreements (Becker, DeFond, & Jiambalvo, 1998; DeFond & Jiambalvo, 1994). Litigation risk is also associated with abnormal accruals; hence the inclusion of *LIT* (+) in the regression model.

We include an indicator for companies with short auditor tenures, *SHRT_TEN* (+), because the length of the auditor-client relationship may have an impact on auditors' ability to detect accounting exceptions (Carcello & Nagy, 2004; Geiger & Raghunandan, 2002; Johnson et al., 2002). The regression model also includes a control for cash flow volatility, *STD_CFO* (+), given that companies with greater cash flows volatility have been shown to have greater incentives to manage earnings (Dechow & Dichev, 2002). Similarly, the model includes the Altman Z-score, *ALTMAN* (−), as a control for companies with high levels of financial performance risk (Altman 1968). We include *BIG4* (−) to control for audit quality differences related to the Big 4 firms and differences in their industry specialization opportunities. Lastly, we include a set of indicator variables for fiscal year (**YEAR**). Table 1 contains the operational definitions of the variables discussed in this section. All continuous variables are winsorized at the 1st and 99th percentiles to minimize the impact of potential outliers.

<Insert Table 1 here>

Real Earnings Management

We evaluate the association between real earnings management and industry specialist duration following an approach similar to that in Cohen, Dey, and Lys (2008), and Roychowdhury (2006). Their studies focus on examining whether different indicators of operating and financial performance are associated with upward earnings management. Our first real earnings management proxy is abnormal production, *Abn_Prod*. This measure hinges on managers' decisions to over-produce inventory as a means to spread fixed costs over a larger number of produced units, lowering costs of goods sold. Thus, greater values for this metric are suggestive of greater levels of real earnings management. Abnormal production is estimated as the error term from the following equation:

$$\frac{Prod_{it}}{Assets_{i,t-1}} = \beta_0\left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1\left(\frac{Sales_{i,t}}{Assets_{i,t-1}}\right) + \beta_2\left(\frac{\Delta Sales_{i,t}}{Assets_{i,t}}\right) + \beta_3\left(\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}}\right) + \epsilon_{i,t} \qquad (5)$$

where *Prod* is defined as the sum of cost of goods sold plus change in inventory.

Our next proxy for real earnings management is abnormal operating cash flows, *Abn_CFO*. Abnormally low operating cash flows can be attributed to managers' actions to artificially stimulate current sales but failing to produce a commensurate stream of cash flows. Thus, lower values for this metric are suggestive of greater levels of real earnings management. Abnormal cash flows from operations are estimated as the error term from the following equation:

$$\frac{CFO_{it}}{Assets_{i,t-1}} = \beta_0 \left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1 \left(\frac{Sales_{i,t}}{Assets_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t}}\right) + \beta_3 \left(\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}}\right) + \epsilon_{i,t} \quad (6)$$

Our third measure for real earnings management is abnormal discretionary expenses, *Abn_Discexp*. To manipulate earnings, managers may decide to reduce discretionary expenses such as advertising, leading to abnormally low expenses but improved margins. Thus, lower values for this metric are suggestive of greater levels of real earnings management. Abnormal discretionary expenses are estimated as the error term from the following equation:

$$\frac{Discexp_{it}}{Assets_{i,t-1}} = \beta_0 \left(\frac{1}{Assets_{i,t-1}}\right) + \beta_1 \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}}\right) + \epsilon_{i,t} \quad (7)$$

where *Discexp* is the sum of advertising, research and development, and selling, general and administrative expenses.

Lastly, we develop a real earnings management index (*REM_Index*) similar to Cohen et al. (2008). *REM_Index* is defined as the sum of the standardized values of *Abn_Prod*, *Abn_CFO*, and *Abn_Discexp*. That is, *REM_Index* = standardized *Abn_Prod* − (standardized *Abn_CFO* + standardized *Abn_Discexp*). By construction, observations with higher values for *REM_Index* are presumed to be associated with greater levels of real earnings management.

To test the association between auditor specialist duration and real earnings management, we run the following regression model:

$$\begin{aligned} REM_{i,t} = {} & \beta_0 + \beta_1 DUR\_CITY_{i,t} + \beta_2 DUR\_NATL_{i,t} + \beta_3 CITY\_SPEC_{i,t} + \\ & \beta_4 NATL\_SPEC_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 ROA_{i,t} + \beta_7 MB_{i,t} + \beta_8 SHRT\_TEN_{i,t} + \\ & \beta_9 BIG4_{i,t} + \beta_{10} \mathbf{YEAR}_t + \varepsilon_{i,t} \end{aligned} \quad (8)$$

where *REM* takes the form of one of the real earnings management proxies from equations (5), (6), and (7), or the real earnings management index (*REM_Index*). *ROA* (+/−) is return on assets. All other variables are as previously defined.

Sample

We use a sample of publicly-traded companies from Compustat and Audit Analytics for calendar years 2006 to 2014 (n = 54,485). We also collect data for five calendar years preceding the sample window (i.e., 2001 to 2005) to enable the estimation of *DUR_CITY* and *DUR_NATL*.[3] We eliminate companies with total assets of less than $1 million (n = 2,360) and missing data in Compustat or Audit Analytics to estimate the regression model (n = 13,833). We also omit financial, insurance, and utility companies due to significant differences in their operations and financial reporting methods (n = 11,628). Lastly, we remove observations from industries with less than two observations in any given city/year cross-section (n = 9,094). This latter step is performed to reduce the likelihood of bias in the operationalization of the specialist duration variables (Reichelt & Wang, 2010). The final research sample consists of 17,570 company-year observations.

<Insert Table 2 here>

Results

Descriptive Statistics

Table 3 presents the descriptive statistics. As shown on this table, the specialist duration variables, *DUR_CITY* and *DUR_NATL*, take raw values that range from zero to five. The mean values for these variables show that the audits in the sample are performed by audit firms with specialist durations of 0.892 and 1.212 years at the city and national level, respectively. *CITY_SPEC* and *NATL_SPEC* measure the current specialist status of auditors and show that 31.3

[3] Sample window cannot be expanded prior the passage of the Sarbanes-Oxley Act of 2002 (SOX) because audit fee data is not available.

percent and 20.2 percent of the audits were performed by city-level and f-level specialists, respectively. The mean value for *LOSS* shows that 39.6 percent of the observations in the sample are associated with a financial statement loss, while the mean value for *LIT* shows that 28.0 percent of the observations come from companies that operate in a litigious industry. In addition, 18.7 percent of the observations are associated with short auditor-client engagements, as evidenced by the mean value of *SHRT_TEN*. Lastly, Table 3 also shows that the greatest majority of the audits in the sample, 65.5 percent, are performed by Big 4 auditors (*BIG4*).

<Insert Table 3 here>

Table 4 presents the frequency distributions for the raw values of *DUR_CITY* and *DUR_NATL*. As shown in Panel A, 63.71 percent of the audits in the sample are performed by firms that do not meet the threshold for industry specialist at the local level in years $t-5$ through $t-1$. Thus, 36.29 percent of the audits are performed by firms having a history of being an industry specialist at the local city-level at least once in years $t-5$ through $t-1$. Correspondingly, Panel B shows that 73.06 percent of the audits are performed by firms that do not meet the threshold for industry specialist at the national level and, thus, 26.94 percent are performed by firms having a history of being a specialist. In comparison to Panel A, a lower proportion of auditors are able to meet the threshold for industry specialist at the national level. This provides some evidence of the greater competition for industry market shares at the national level.

Panel A and Panel B also depict the average value of discretionary accruals (*DA_ABS*) for each of the possible values of *DUR_CITY* and *DUR_NATL*, respectively. The pattern followed by discretionary accruals in relation to the duration variables could be interpreted as evidence of differences in reporting discretion. While not perfectly monotonic, both panels on this table show that the average values of discretionary accruals generally decrease as duration as industry specialist increases. This is preliminary indicator that industry specialist duration is negatively associated with financial reporting discretion. The last three columns of Panel A and Panel B depict a similar analysis for the real earnings management index (*REM_Index*), but there is no discernable pattern in the mean values for this variable.

<Insert Table 4 here>

Table 5 presents the correlation coefficients for the variables in the regression models. The largest correlation coefficient is between *REM_Index* and *Abn_Prod* at 91.9 percent. These two variables represent different operationalizations of the same construct and, as a result, they are not tested in conjunction. Similarly, *CFO* and *Abn_CFO* display a correlation coefficient of 71.6 percent and these two variables are only tested in conjunction in one of the alternative versions of the regression model. *ROA* and *CFO* display a correlation coefficient of 81.4 percent, indicating that better financial performance is strongly associated with greater cash flows from operations, which is an anticipated relationship. Table 5 also shows a durable parallel between *DUR_CITY* and *CITY_SPEC* (75.1 percent) and between *DUR_NATL* and *NATL_SPEC* (73.8 percent). Specialist duration surfaces as a result of auditors being able to consistently meet the threshold for an industry specialist designation, explaining the high correlations. To address the possibility of multicollinearity in the data, we estimate and examine the variance inflation factors (VIFs) for all regression models in the multivariate results subsection below. All other correlation coefficients are below or close 50.0 percent, alleviating further concerns about multicollinearity.

The correlation between *DA_ABS* and *DUR_CITY*, the variables of interest in the main regression model, is −10.6 percent. This indicates that discretionary accruals are negatively associated with auditor specialist duration at the city-specific level. Similarly, the correlation between *DA_ABS* and *DUR_NATL* is −11.2 percent, providing evidence that discretionary accruals are also negatively associated with auditor specialist duration at the national level. On the other hand, the correlation coefficients between the specialist duration variables and the real earnings management proxies range between −1.5 and 2.3 percent and do not appear to follow a discernible pattern.

<Insert Table 5 here>

Multivariate Results

The results in Table 6 evaluate the effects of audit firm industry specialist and industry specialist duration on audit quality, as proxied by discretionary accruals. All models in this table are statistically significant when taken as a whole (all p-values <= 0.01), and have adjusted r-squared values of approximately 32.8 percent. The VIF's for the models depicted on this table range from 1.10 to 2.10, with an average of 1.52. Model 1 and Model 2 present the baseline results after controlling for auditors' current specialist status at the city and national level, respectively. Model 3 presents the results when specialist duration is measured at the city level (*DUR_CITY*), while Model 4 presents the results when specialist duration is measured at the national level (*DUR_NATL*). Model 5 provides results for industry specialist duration measured at both, the city and national levels.

The results from Model 1 and Model 2 confirm the findings from prior studies that industry specialist auditors are associated with lower levels of discretionary accruals, as evidenced by the negative regression coefficients for *CITY_SPEC* (−0.0056; p-value <= 0.01) and *NATL_SPEC* (−0.0086; p-value <= 0.10), respectively. The results from Model 3 suggest that the duration of an audit firm as an industry specialist at the city level does not affect the absolute value of discretionary accruals, *DUR_CITY* (−0.0006; p-value = n.s.). However, *CITY_SPEC* continues to be negative and statistically significant in this model (−0.0039; p-value <= 0.10). The results from

Model 4 show that the estimated coefficient for *DUR_NATL* is statistically significant (−0.0009; p-value <= 0.05), suggesting that industry specialist duration at the national level plays an important role in decreasing accruals-based earnings management. Similar to Model 2, the estimated coefficient for *NATL_SPEC* is also statistically significant in Model 4 (−0.0052; p-value <= 0.01).

Model 5 considers the city and national level effects of industry specialist duration. The estimated regression coefficient for duration at the national level, *DUR_NATL* (−0.0008; p-value <= 0.01), provides confirmatory evidence that audit firms with longer specialist tenures perform better quality audits. This finding also lends support to Gaver and Utke (2017) by reinforcing the notion that it takes time before audit firms can perform as seasoned specialists. The estimated regression coefficient for *DUR_CITY* is negative but not significant. In addition, the estimated coefficients for the current industry specialist variables, *CITY_SPEC* (−0.0038; p-value <= 0.10) and *NATL_SPEC* (−0.0052; p-value <= 0.01), continue to be negative and significant. In sum, the results from Model 5 provide evidence that the duration of an audit firm as industry specialist at the national level plays a significant role in the curbing of the earnings management decisions of its clients. This finding is important because it underlines the need for a more inclusive set of variables in the study of auditor industry specialization.

With respect to the control variables on Table 6, most of the estimated regression coefficients are significant in the expected direction and their interpretation remains consistent across the different models on this table. We discuss the results for the control variables for all models on Table 6 in conjunction for brevity. The coefficient for *SIZE* is negative and significant, indicating that larger clients are associated with lower discretionary accruals (p-values <= 0.10). Similarly, clients with greater cash flows from operations (*CFO*) appear to be associated with lower discretionary accruals (p-values <= 0.01). Clients reporting a loss (*LOSS*) or operating in litigious industries *(LIT*) are instead associated with more discretionary accruals, as evidenced by the positive regression coefficients estimated for these variables (p-values <= 0.10 and p-values <= 0.01, respectively). Consistent with the findings of prior studies (*e.g.*, Francis & Yu, 2009), Table 6 shows that audits performed by the Big 4 firms (*BIG4*) are associated with lower discretionary accruals, and thus, better audit quality (p-values <= 0.01).

<Insert Table 6 here>

Tables 7, 8, 9, and 10 provide results when evaluating four different real earnings management proxies commonly found in the literature and their association with industry specialist duration. The first of these proxies is abnormal production, *Abn_Prod*, and the regression results for this variable are shown on Table 7. As discussed in the methodology section, a positive regression coefficient for *DUR_CITY* or *DUR_NATL* when regressed on *Abn_Prod* is indicative of greater levels of abnormal production and concomitant real earnings management. The estimated coefficients for *CITY_SPEC* and *NATL_SPEC* are positive and significant in models 1 through 5, indicating that audits performed by firms designated as industry specialists during the current period are associated with greater levels of abnormal production. This result, when taken in conjunction with the findings from Table 6, is consistent with the notion that managers resort to real earnings management when their accrual manipulation efforts are constrained by their industry specialist auditors.

With respect to the models of research interest, the estimated coefficients for *DUR_CITY* in Model 3 and Model 5 are positive and statistically significant (0.0037; p-value <= 0.05 and 0.0043; p-value <=0.01, respectively). This indicates that auditors with longer specialist durations at the city level are also associated with greater levels of real earnings management. The estimated coefficients for *DUR_NATL* in Model 4 and Model 5 are negative and statistically significant (−0.0028; p-value <= 0.05 and −0.0042; p-value <= 0.01, respectively), but net effect for *DUR_CITY* and *DUR_NATL* in Model 5 is positive (0.0043 + (0.0042)). Overall, the results depicted on Table 7 provide evidence that industry specialization (current or long term) fails to act as a deterrent to real earnings management. In accordance to prior studies, real earnings management surfaces as an unintended consequence of auditors' ability to curb the accruals-based earnings management activities of their clients (Chi et al., 2011). Table 7 findings highlight the fact that auditor specialization can affect the balance between accruals-based manipulations and real earnings management.

<Insert Table 7 here>

The second real earnings management proxy investigated is abnormal cash flows from operations, *Abn_CFO*, and the regression results for this variable are shown on Table 8. As discussed in the methodology section, a negative regression coefficient for *DUR_CITY* or *DUR_NATL* when regressed on *Abn_CFO* is indicative of abnormally low operating cash flows and, thus, greater levels of concomitant real earnings management. Consistent with the results reported on Table 7, the estimated coefficients for *CITY_SPEC* on Table 8 indicate that industry specialists are associated with lower levels of abnormal cash flows and, hence, greater levels of real earnings management. However, *NATL_SPEC* and the specialist duration variables, *DUR_CITY* and *DUR_NATL*, are not significant in any of the models depicted on this table.

<Insert Table 8 here>

Table 9 investigates the association between auditor industry specialist duration and abnormal expenses (*Abn_Discexp*). A negative regression coefficient for specialist duration on this table is indicative of lower discretionary expenses and, thus, greater levels of real earnings management. The estimated coefficients for *CITY_SPEC* and *NATL_SPEC* are negative and significant in models 1 through 5, indicating that audits performed by firms designated as industry specialists during the current period are associated with greater levels of real earnings management. The estimated coefficients for *DUR_CITY* in Model 3 and Model 5 are also negative and statistically significant (−0.0043; p-value <= 0.05 and −0.0035; p-value <= 0.10), indicating auditors with longer specialist durations at the city level are also associated with greater levels of real earnings management. The estimated regression coefficients for *DUR_NATL* in Model 4 and Model 5 are not statistically significant.

<Insert Table 9 here>

Table 10 investigates the association between auditor industry specialist duration and the real earnings management index, *REM_Index*. As discussed before, this index is generated by combining the standardized values of the three real earnings management indicators in this study (*i.e.*, *Abn_Prod*, *Abn_CFO*, and *Abn_Discexp*). As explained in the methodology section, a positive regression coefficient for duration on this table would be indicative of greater levels of real earnings management. All models on Table 7 are statistically significant when taken as a whole (all p-values <= 0.001), and have adjusted r-squared values of approximately 6.3 percent. The VIF's for the models on this table range from 1.03 to 2.71, with an average of 1.72.

Consistent with the results in prior tables, the estimated coefficients for *CITY_SPEC* and *NATL_SPEC* indicate that industry specialist auditors are associated with greater levels of real earnings management. More importantly, we find that the estimated regression coefficients for *DUR_CITY* in Model 3 and Model 5 are positive and significant (0.0312; p-value <= 0.01 and 0.0325; p-value <= 0.01, respectively). The estimated regression coefficient for *DUR_NATL* is not statistically significant in Model 4 and negative and significant in Model 5 (−0.0189; p-value <=

0.10); however, the net effect for *DUR_CITY* and *DUR_NATL* in Model 5 is positive (0.0325 + (0.0189)). In conjunction with the real earnings management results in prior tables, the results for *REM_Index* on Table 10 continue to provide evidence of real earnings management surfacing as an unintended consequence of better audit quality by auditors with longer industry specialist durations.

<Insert Table 10 here>

Sensitivity Analyses

This study finds evidence indicating that real earnings management surfaces as an unintended consequence of auditors with longer specialist durations being able to better constrain the accrual-management efforts of their clients. To establish a stronger link between our discretionary accrual tests and our real earnings management tests, we estimate the real earnings management models in Table 7 to Table 10 using a reduced sample of "accrual constrained" companies. That is, we identify a reduced sample of accrual constrained companies by eliminating observations in the lower and upper 25 percent tails of the raw discretionary accruals distribution. The statistical significance of the estimated regression coefficients from these tests is slightly weaker (untabulated); however, the results are consistent with those reported for our main real earnings management tests.

An additional concern is that the utilization of audit fees as a weight factor for the operationalization of the specialist duration variables (i.e., *DUR_CITY* and *DUR_NATL*) and the current specialist variables (i.e., *CITY_SPEC* and *NATL_SPEC*) could place too much emphasis on individual client size, ignoring that exposure to multiple clients helps build industry expertise. To address this concern, we estimate an alternative version of the market share-based measures in the regression model (i.e., *DUR_CITY*, *DUR_NATL*, *CITY_SPEC*, and *NATL_SPEC*) based on the number of clients in each cross-section. The results (untabulated) are consistent with those reported on Table 7 to Table 10. We also estimate the regression models using an alternative version of *DUR_CITY* and *DUR_NATL* based on the number of *consecutive* years an audit firm can be deemed an industry specialist and find consistent results (untabulated). Lastly, we investigate the association between auditor specialist duration and audit quality using subsamples based on the signed values of discretionary accruals (i.e., income-increasing vs. income-decreasing accruals). The results (untabulated) are consistent with those reported on Table 6 for the absolute value of discretionary accruals.

Conclusions and Limitations

This study provides empirical evidence that the length of an audit firm's duration as an industry specialist has a significant impact on the financial reporting quality of its clients. In particular, we find that firms with longer industry specialist durations provide better audit quality, as proxied by discretionary accruals. We further evaluate the association between industry specialist duration and audit quality by using four different proxies for real earnings management. While industry specialist auditors with longer durations effectively place constrains on discretionary accruals, we find that real earnings management appears to surface as an unintended consequence (Chi et al., 2011). Overall, the results from this study indicate that auditor specialist duration is a relevant earnings management deterrent.

The findings from this study have implications for current or future regulation that could limit audit firms' ability to increase their market share or freely manage their client portfolios. For instance, prior research has shown that audit firms consider their areas of industry specialization when managing their client portfolios (Cenker & Nagy, 2008). However, the mechanics of a system of mandatory rotations could make it harder for audit firms to develop and maintain a significant market share in some industries. While the PCAOB is no longer considering the implementation of mandatory auditor rotations in the United States (Chasan, 2014), other countries already request term limits for auditors or have implemented rotation-like policies (EPC, 2006; FRC, 2011; FRC, 2017). Thus, mandatory auditor rotations and its possible implications on auditor performance are topics of current interest for audit firms and business stakeholders worldwide.

This study is not without limitations. Similar to other studies in the extant industry specialization literature, our analyses are based on proxies for industry specialist experience, which is an unobservable. In addition, the specialist measures in this research stream assume that all audit firms are able to capture industry-specific knowledge at the same rate and speed. Our duration variables, by spreading over several periods, are less affected by this simplifying assumption; however, this is still a limitation. Lastly, we are not able to control for differences in the attrition rates of audit firms' staff, which is a particularly relevant issue when considering the high staff turnover rates experienced by the Big 4 firms and the loss of knowledge related to the process. Despite these limitations, we believe that our proxies for industry specialist duration make an incremental contribution the literature and provide interesting insights about the accumulation of knowledge among industry specialist auditors.

As for future research, the proxies for industry specialist duration developed in this study could be used to further explore the impact of other dimensions of industry specialization on earnings quality. For instance, the literature would benefit from studies evaluating the effects of specialist duration in the context of countries with differing lengths in their auditor term requirements, as such differences are likely to affect the accumulation of industry-specific knowledge. In addition, the duration measures developed in this study could be used to investigate duration issues within the context of audit partner tenures.

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TABLE 1
Variable List

Test Variables

DUR_CITY	=	cumulative number of years an audit firm can be deemed an industry specialist (i.e., market share within a two-digit SIC group > 30 percent) at the city-specific level from *t−5* through *t−1*
DUR_NATL	=	cumulative number of years an audit firm can be deemed an industry specialist (i.e., market share within a two-digit SIC group > 30 percent) at the national level from *t−5* through *t−1*
DA_ABS	=	absolute value of discretionary accruals; estimated using the modified Jones model adjusted for financial performance (Reichelt and Wang 2010)
Abn_Prod	=	abnormal production; estimated using the model from Roychowdhury (2006) and Cohen, Dey and Lys (2008); positive measure of real earnings management
Abn_CFO	=	abnormal cash flows; estimated using the model from Roychowdhury (2006) and Cohen, Dey and Lys (2008); negative measure of real earnings management
Abn_Discexp	=	abnormal discretionary expenses; estimated using the model from Roychowdhury (2006) and Cohen, Dey and Lys (2008); negative measure of real earnings management
REM_Index	=	standardized *Abn_Prod* − (standardized *Abn_CFO* + standardized *Abn_Discexp*); standardized value for each variable determined as follows: [variable – mean(variable)]/standard deviation(variable); see Cohen, Dey and Lys (2008) and Chi, Lisic and Pevzner (2011)

Control Variables

CITY_SPEC	=	1 if the auditor has a market share greater than 30 percent within a two-digit SIC at the city-specific level, 0 otherwise
NATL_SPEC	=	1 if the auditor has a market share greater than 30 percent within a two-digit SIC group at the national level, 0 otherwise
SIZE	=	natural log of the market value of common equity at the end of the fiscal year
MB	=	market value divided by book value
LOSS	=	1 if net income is negative, 0 otherwise
CFO	=	cash flow from operations scaled by total assets
LEV	=	total liabilities divided by average total assets
LIT	=	1 if the company operates in a litigious industry (i.e., SIC codes 2833−2836, 3570−3577, 3600−3674, 5200−5961, and 7370−7370), 0 otherwise
SHRT_TEN	=	1 if the company has been with the same auditor for less than 3 years, 0 otherwise
STD_CFO	=	standard deviation of cash flows from operations for years *t−4* though *t*
ALTMAN	=	Altman's z-score, as defined in Altman (1968)
BIG4	=	1 if the audit is performed by a Big 4 auditor, 0 otherwise
ROA	=	net income divided by average total assets
YEAR	=	set of indicator variables based on fiscal year

TABLE 2
Sample Selection

	Company-year observations
Observations from Audit Analytics and Compustat for fiscal years 2006−2014	54,485
Reporting less than $1 million in total assets	(2,360)
Missing data to estimate regression model variables	(13,833)
Financial, insurance and utility companies	(11,628)
From industries with less than two observations per cross-section	(9,094)
Final sample	17,570

TABLE 3
Descriptive Statistics
n = 17,570

	Mean	Std. Dev.	Min	25th PCT	Median	75th PCT	Max
Test Variables							
DUR_CITY	0.892	1.671	0.000	0.000	0.000	1.000	5.000
DUR_NATL	1.212	1.870	0.000	0.000	0.000	2.000	5.000
DA_ABS	0.093	0.105	0.001	0.029	0.062	0.114	0.616
Abn_Prod	0.010	0.257	−0.980	−0.083	0.031	0.143	0.730
Abn_CFO	−0.017	0.217	−1.110	−0.067	0.015	0.081	0.638
Abn_Disexp	0.089	0.352	−0.904	−0.067	0.033	0.201	1.615
REM_Index	−0.004	1.868	−9.696	−0.963	−0.066	0.790	10.561
Control Variables							
CITY_SPEC	0.313	0.464	0.000	0.000	0.000	1.000	1.000
NATL_SPEC	0.202	0.401	0.000	0.000	0.000	0.000	1.000
SIZE	5.822	2.245	−0.466	4.240	5.892	7.357	10.792
MB	2.960	5.919	−21.745	1.123	1.997	3.609	38.055
LOSS	0.396	0.489	0.000	0.000	0.000	1.000	1.000
CFO	0.006	0.340	−3.066	−0.007	0.080	0.145	0.557
LEV	0.529	0.400	0.030	0.282	0.473	0.664	3.412
ROA	−0.082	0.367	−2.843	−0.090	0.027	0.078	0.391
LIT	0.280	0.449	0.000	0.000	0.000	1.000	1.000
SHRT_TEN	0.187	0.390	0.000	0.000	0.000	0.000	1.000
STD_CFO	0.100	0.179	0.006	0.031	0.053	0.098	2.028
ALTMAN	3.047	9.994	−50.409	1.226	3.000	5.316	50.775
BIG4	0.655	0.475	0.000	0.000	1.000	1.000	1.000

Variables are as defined in Table 1.

TABLE 4
Frequency Distribution of Industry Specialist Duration
n = 17,570

Panel A: Specialist duration at the city level

				Discretionary Accruals (*DA_ABS*)			Real Earnings Management Index (*REM_Index*)		
DUR_CITY	**Frequency**	**Percent**	**Cumulative**	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
0	11,193	63.71	63.71	0.103	0.067	0.114	−0.039	−0.098	1.971
1	1,329	7.56	71.27	0.081	0.058	0.085	0.113	0.015	1.844
2	935	5.32	76.59	0.078	0.056	0.087	0.083	0.004	1.565
3	771	4.39	80.98	0.070	0.050	0.071	0.070	0.032	1.554
4	927	5.28	86.25	0.079	0.053	0.088	0.081	0.015	1.664
5	2,415	13.75	100.00	0.075	0.053	0.084	0.002	−0.058	1.645
	17,570	100.00							

Panel A: Specialist duration at the national level

				Discretionary Accruals (*DA_ABS*)			Real Earnings Management Index (*REM_Index*)		
DUR_NATL	**Frequency**	**Percent**	**Cumulative**	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
0	12,837	73.06	73.06	0.102	0.066	0.113	0.036	−0.051	1.980
1	827	4.71	77.77	0.069	0.050	0.069	−0.157	−0.116	1.451
2	857	4.88	82.65	0.072	0.055	0.069	−0.199	−0.143	1.452
3	793	4.51	87.16	0.065	0.049	0.062	−0.183	−0.109	1.429
4	532	3.03	90.19	0.066	0.048	0.067	−0.099	−0.037	1.474
5	1,724	9.81	100.00	0.074	0.052	0.084	−0.023	−0.069	1.630
	17,570	100.00							

Variables are as defined in Table 1.

TABLE 5
Pearson Correlations
n = 17,570

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	***DA_ABS***	1.000																			
2	***Abn_Prod***	-0.082	1.000																		
3	***Abn_CFO***	-0.269	0.432	1.000																	
4	***Abn_Disexp***	0.238	0.292	-0.463	1.000																
5	***REM_Index***	-0.054	0.921	0.502	0.442	1.000															
6	***CITY_SPEC***	-0.105	-0.035	0.009	-0.021	-0.027	1.000														
7	***NATL_SPEC***	-0.112	-0.004	0.019	-0.002	0.007	0.295	1.000													
8	***DUR_CITY***	-0.106	-0.030	0.009	-0.006	-0.016	0.751	0.330	1.000												
9	***DUR_NATL***	-0.112	0.012	0.028	0.003	0.023	0.272	0.739	0.392	1.000											
10	***SIZE***	-0.233	0.090	0.158	0.027	0.149	0.300	0.269	0.343	0.296	1.000										
11	***MB***	0.082	0.005	-0.018	0.116	0.055	0.011	0.022	0.015	0.016	0.134	1.000									
12	***LOSS***	0.253	-0.181	-0.403	0.238	-0.183	-0.113	-0.097	-0.115	-0.108	-0.432	0.003	1.000								
13	***CFO***	-0.488	0.287	0.716	-0.362	0.326	0.083	0.074	0.083	0.084	0.304	-0.013	-0.456	1.000							
14	***LEV***	0.184	-0.028	-0.104	0.034	-0.051	0.045	0.004	0.038	-0.005	-0.044	-0.099	0.115	-0.236	1.000						
15	***ROA***	-0.486	0.226	0.571	-0.363	0.221	0.108	0.097	0.108	0.106	0.352	-0.003	-0.559	0.814	-0.337	1.000					
16	***LIT***	0.206	-0.092	-0.169	0.182	-0.042	-0.070	-0.098	-0.056	-0.066	-0.071	0.056	0.194	-0.228	-0.066	-0.213	1.000				
17	***SHRT_TEN***	0.088	-0.017	-0.048	-0.016	-0.044	-0.077	-0.117	-0.241	-0.209	-0.247	-0.021	0.097	-0.103	0.053	-0.109	-0.028	1.000			
18	***STD_CFO***	0.507	-0.088	-0.275	0.236	-0.064	-0.102	-0.095	-0.101	-0.098	-0.282	0.028	0.254	-0.623	0.257	-0.534	0.184	0.112	1.000		
19	***ALTMAN***	-0.221	0.109	0.238	-0.062	0.146	0.017	0.049	0.023	0.053	0.268	0.162	-0.260	0.315	-0.506	0.457	-0.038	-0.048	-0.280	1.000	
20	***BIG4***	-0.187	0.026	0.035	0.066	0.069	0.351	0.362	0.408	0.386	0.606	0.030	-0.209	0.196	-0.011	0.222	-0.019	-0.328	-0.214	0.095	1.000

Variables are as defined in Table 1.

TABLE 6
Association between the Absolute Value of Discretionary Accruals and Auditor Specialist Duration

	Model 1	Model 2	Model 3	Model 4	Model 5
DUR_CITY			**−0.0006**		**−0.0002**
			(−1.21)		**(−0.38)**
DUR_NATL				**−0.0009****	**−0.0008***
				(−2.01)	**(−1.76)**
CITY_SPEC	−0.0056***		−0.0039*		−0.0038*
	(−4.07)		(−1.92)		(−1.86)
NATL_SPEC		−0.0086***		−0.0059***	−0.0052***
		(−6.04)		(−3.28)	(−2.87)
SIZE	−0.0014***	−0.0015***	−0.0014***	−0.0015***	−0.0013***
	(−3.21)	(−3.37)	(−3.13)	(−3.28)	(−2.96)
MB	0.0015***	0.0015***	0.0015***	0.0015***	0.0015***
	(7.98)	(8.01)	(7.98)	(8.00)	(7.99)
LOSS	0.0028	0.0029	0.0028	0.0029	0.0029
	(1.46)	(1.50)	(1.48)	(1.50)	(1.50)
CFO	−0.0726***	−0.0728***	−0.0726***	−0.0728***	−0.0729***
	(−11.56)	(−11.60)	(−11.56)	(−11.60)	(−11.61)
LEV	0.0123***	0.0120***	0.0123***	0.0120***	0.0122***
	(3.53)	(3.47)	(3.54)	(3.47)	(3.52)
LIT	0.0208***	0.0204***	0.0208***	0.0204***	0.0202***
	(11.63)	(11.34)	(11.61)	(11.35)	(11.25)
SHRT_TEN	0.0016	0.0013	0.0012	0.0010	0.0011
	(0.82)	(0.67)	(0.58)	(0.48)	(0.54)
STD_CFO	0.1741***	0.1742***	0.1741***	0.1743***	0.1740***
	(14.77)	(14.79)	(14.78)	(14.80)	(14.78)
ALTMAN	−0.0004**	−0.0004**	−0.0004**	−0.0004**	−0.0004**
	(−2.47)	(−2.41)	(−2.48)	(−2.42)	(−2.46)
BIG4	−0.0094***	−0.0086***	−0.0092***	−0.0084***	−0.0074***
	(−5.06)	(−4.55)	(−4.96)	(−4.40)	(−3.91)
Intercept	0.0788***	0.0788***	0.0787***	0.0788***	0.0786***
	(19.88)	(19.89)	(19.85)	(19.89)	(19.83)
Year dummies	yes	yes	yes	yes	yes
n	17,570	17,570	17,570	17,570	17,570
R2	0.328	0.328	0.328	0.328	0.328
F-Value	134.0799	135.7821	127.7123	129.4430	118.6672

Models estimated using OLS regression. *, **, *** denote significance at p-value < 0.10, 0.05, and 0.01, respectively. Two-tail tests with robust standard errors corrected for heteroskedasticity and time series following Rogers (1993). Variables are as defined in Table 1.

TABLE 7
Association between Abnormal Production and Auditor Specialist Duration

	Model 1	Model 2	Model 3	Model 4	Model 5
DUR_CITY			**0.0037****		**0.0043*****
			(2.57)		**(2.83)**
DUR_NATL				**−0.0028****	**−0.0042*****
				(−2.00)	**(−2.86)**
CITY_SPEC	0.0347***		0.0242***		0.0221***
	(8.67)		(4.22)		(3.79)
NATL_SPEC		0.0138***		0.0218***	0.0169***
		(3.25)		(4.12)	(3.17)
SIZE	−0.0061***	−0.0052***	−0.0062***	−0.0051***	−0.0061***
	(−4.95)	(−4.23)	(−5.00)	(−4.14)	(−4.95)
ROA	−0.1554***	−0.1557***	−0.1553***	−0.1558***	−0.1554***
	(−12.59)	(−12.60)	(−12.58)	(−12.61)	(−12.59)
MB	−0.0001	−0.0001	−0.0001	−0.0001	−0.0001
	(−0.18)	(−0.26)	(−0.16)	(−0.27)	(−0.18)
SHRT_TEN	−0.0024	−0.0019	−0.0012	−0.0029	−0.0024
	(−0.42)	(−0.34)	(−0.21)	(−0.53)	(−0.42)
BIG4	0.0154***	0.0227***	0.0156***	0.0235***	0.0154***
	(2.71)	(4.01)	(2.83)	(4.14)	(2.71)
Intercept	−0.0153*	−0.0162*	−0.0149*	−0.0162*	−0.0146*
	(−1.82)	(−1.94)	(−1.78)	(−1.93)	(−1.74)
Year dummies	yes	yes	yes	yes	yes
n	17,570	17,570	17,570	17,570	17,570
R2	0.056	0.053	0.056	0.053	0.057
F-Value	25.6109	21.2005	24.4367	20.4701	22.6348

Models estimated using OLS regression. *, **, *** denote significance at p-value < 0.10, 0.05, and 0.01, respectively. Two-tail tests with robust standard errors corrected for heteroskedasticity and time series following Rogers (1993). Variables are as defined in Table 1.

TABLE 8
Association between Abnormal Cash Flow and Auditor Specialist Duration

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
DUR_CITY			**−0.0009**		**−0.0012**
			(−1.01)		**(−1.20)**
DUR_NATL				**0.0007**	**0.0011**
				(0.82)	**(1.26)**
CITY_SPEC	−0.0122***		−0.0096**		−0.0091**
	(−4.77)		(−2.56)		(−2.41)
NATL_SPEC		−0.0026		−0.0047	−0.0028
		(−0.99)		(−1.40)	(−0.83)
SIZE	0.0022**	0.0019**	0.0023**	0.0019**	0.0022**
	(2.32)	(2.00)	(2.36)	(1.97)	(2.33)
ROA	0.3484***	0.3484***	0.3483***	0.3484***	0.3483***
	(31.33)	(31.32)	(31.31)	(31.32)	(31.31)
MB	−0.0005	−0.0005	−0.0005	−0.0005	−0.0005
	(−1.24)	(−1.20)	(−1.24)	(−1.20)	(−1.24)
SHRT_TEN	−0.0076*	−0.0083**	−0.0083*	−0.0081*	−0.0080*
	(−1.79)	(−1.96)	(−1.87)	(−1.87)	(−1.80)
BIG4	−0.0475***	−0.0502***	−0.0472***	−0.0504***	−0.0475***
	(−12.41)	(−12.85)	(−12.34)	(−12.88)	(−12.19)
Intercept	0.0385***	0.0390***	0.0384***	0.0389***	0.0384***
	(5.99)	(6.07)	(5.98)	(6.07)	(5.98)
Year dummies	yes	yes	yes	yes	yes
n	17,570	17,570	17,570	17,570	17,570
R2	0.336	0.336	0.336	0.336	0.336
F-Value	111.2535	109.6931	103.9230	102.6549	92.0646

Models estimated using OLS regression. *, **, *** denote significance at p-value < 0.10, 0.05, and 0.01, respectively. Two-tail tests with robust standard errors corrected for heteroskedasticity and time series following Rogers (1993). Variables are as defined in Table 1.

TABLE 9
Association between Abnormal Discretionary Expenses and Auditor Specialist Duration

	Model 1	Model 2	Model 3	Model 4	Model 5
DUR_CITY			**−0.0043****		**−0.0035***
			(−2.44)		**(−1.92)**
DUR_NATL				**−0.0023**	**−0.0012**
				(−1.38)	**(−0.67)**
CITY_SPEC	−0.0353***		−0.0232***		−0.0227***
	(−7.11)		(−3.29)		(−3.18)
NATL_SPEC		−0.0251***		−0.0184***	−0.0136**
		(−4.78)		(−2.75)	(−2.03)
SIZE	0.0182***	0.0175***	0.0184***	0.0176***	0.0186***
	(11.45)	(11.09)	(11.54)	(11.12)	(11.64)
ROA	−0.4053***	−0.4053***	−0.4058***	−0.4054***	−0.4057***
	(−24.84)	(−24.85)	(−24.85)	(−24.85)	(−24.85)
MB	0.0058***	0.0059***	0.0058***	0.0059***	0.0058***
	(8.22)	(8.27)	(8.21)	(8.27)	(8.22)
SHRT_TEN	−0.0016	−0.0036	−0.0047	−0.0045	−0.0046
	(−0.22)	(−0.50)	(−0.62)	(−0.61)	(−0.61)
BIG4	0.0751***	0.0722***	0.0765***	0.0728***	0.0804***
	(10.78)	(10.22)	(11.00)	(10.28)	(11.28)
Intercept	−0.0925***	−0.0921***	−0.0928***	−0.0920***	−0.0935***
	(−8.44)	(−8.40)	(−8.47)	(−8.40)	(−8.54)
Year dummies	yes	yes	yes	yes	yes
n	17,570	17,570	17,570	17,570	17,570
R2	0.175	0.174	0.175	0.174	0.176
F-Value	77.4719	75.9707	72.5101	70.9155	64.5337

Models estimated using OLS regression. *, **, *** denote significance at p-value < 0.10, 0.05, and 0.01, respectively. Two-tail tests with robust standard errors corrected for heteroskedasticity and time series following Rogers (1993). Variables are as defined in Table 1.

TABLE 10
Association between Real Earnings Management Index and Auditor Specialist Duration

	Model 1	Model 2	Model 3	Model 4	Model 5
DUR_CITY			**0.0312*****		**0.0325*****
			(3.09)		**(3.08)**
DUR_NATL				**−0.0082**	**−0.0189***
				(−0.81)	**(−1.81)**
CITY_SPEC	0.2883***		0.2007***		0.1885***
	(10.24)		(5.00)		(4.62)
NATL_SPEC		0.1353***		0.1588***	0.1184***
		(4.50)		(3.97)	(2.94)
SIZE	−0.0871***	−0.0803***	−0.0885***	−0.0800***	−0.0885***
	(−10.64)	(−9.88)	(−10.78)	(−9.83)	(−10.78)
ROA	−0.9408***	−0.9404***	−0.9373***	−0.9406***	−0.9376***
	(−13.16)	(−13.12)	(−13.11)	(−13.13)	(−13.11)
MB	−0.0136***	−0.0139***	−0.0135***	−0.0139***	−0.0136***
	(−4.15)	(−4.25)	(−4.13)	(−4.25)	(−4.15)
SHRT_TEN	0.0262	0.0429	0.0484	0.0397	0.0422
	(0.70)	(1.15)	(1.25)	(1.05)	(1.08)
BIG4	0.0674*	0.1098***	0.0567	0.1121***	0.0468
	(1.78)	(2.84)	(1.49)	(2.89)	(1.20)
Intercept	0.2591***	0.2519***	0.2617***	0.2519***	0.2648***
	(4.58)	(4.44)	(4.62)	(4.44)	(4.68)
Year dummies	yes	yes	yes	yes	yes
n	17,570	17,570	17,570	17,570	17,570
R2	0.063	0.059	0.063	0.059	0.063
F-Value	45.9118	39.6676	43.2293	37.3236	38.9431

Models estimated using OLS regression. *, **, *** denote significance at p-value < 0.10, 0.05, and 0.01, respectively. Two-tail tests with robust standard errors corrected for heteroskedasticity and time series following Rogers (1993). Variables are as defined in Table 1.