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# Collaborative Tenure, Audit Committee Chair Changes, and Earnings Management

Nelson Milan Carrasco Abarca  
ncarrasc@utk.edu

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To the Graduate Council:

I am submitting herewith a dissertation written by Nelson Milan Carrasco Abarca entitled "Collaborative Tenure, Audit Committee Chair Changes, and Earnings Management." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Bruce K. Behn, Major Professor

We have read this dissertation and recommend its acceptance:

Terry L. Neal, Russell Zaretsky, Robert M. Fuller

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Collaborative Tenure, Audit Committee Chair Changes, and  
Earnings Management

A Dissertation Presented for the  
Doctor of Philosophy  
Degree  
The University of Tennessee, Knoxville

Nelson Milan Carrasco Abarca  
August 2013

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## ABSTRACT

In a recent concept release the Public Company Accounting Oversight Board (PCAOB) highlighted concerns regarding auditor independence and auditor objectivity. They expressed concern that auditors may have a bias to accept management's views, particularly in long auditor tenure relations, and asked for public comments on the idea of mandatory auditor rotation. Prior research has focused primarily on the auditor side of the relation, however, my study considers the collaborative effect of the three parties involved in the financial reporting process (management (Chief Executive Officer (CEO), the auditor, and the audit committee). I find that longer collaborative tenure between the CEO and the auditor is associated with lower positive discretionary accruals (i.e., less earnings management). This finding is contrary to the PCAOB's concerns regarding long auditor tenure and lower financial reporting quality. I do not find that the joint tenure of the three parties (CEO, auditor and audit committee chair) is significantly associated with earnings management or accrual quality. I also find that the first year of an audit committee chair change is associated with an increase in positive discretionary accruals. This association does not differ based on different lengths of auditor tenure. However, longer collaborative tenure between the auditor and the CEO constrains earnings management and there is an even greater effect when there is an audit committee chair change (i.e., there are lower positive discretionary accruals). This study provides evidence that longer auditor tenure is not necessarily an undesirable situation, either by itself and particularly not if the long tenure is coupled with long tenure of the CEO.

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## I. Introduction

In an August 2011 concept release, the Public Company Accounting Oversight Board (PCAOB) highlighted concerns over a lack of objectivity and professional skepticism by the auditor, leading to deficiencies in the audit process and audit opinions that are not supported by sufficient evidence (PCAOB 2011). The release included observations from their inspections that “the audit partners and senior managers [of the inspected firm] may have a bias toward accepting management's perspective, rather than developing an independent view or challenging management's conclusions.” The PCAOB discussed the importance of auditor independence and sought public comments on the idea of mandatory audit firm rotation, particularly for firms with auditor tenure relationships greater than 10 years. Comments were accepted the next four months, with approximately 90 percent of the responders opposed to the idea (Johnson 2012). Furthermore, Congressman Mike Fitzpatrick (R-PA) introduced an amendment to the Sarbanes-Oxley Act of 2002 that would prohibit the PCAOB from requiring issuers to use specific auditors or for the rotation of auditors.<sup>1</sup> It remains to be seen what will come of these discussions regarding mandatory rotation as the PCAOB continues to gather more data and study the issue further.

Mandatory auditor rotation has been considered by Congress and regulators several times in the last 35 years as a potential solution over concerns of a lack of auditor independence, particularly when there is a lengthy relationship between the auditor and client (Metcalf Report 1977)<sup>2</sup>. Some of the frequently cited benefits of mandatory rotation are a “fresh viewpoint” or more incentive to resist pressure by management (PCAOB 2011). Ultimately the conclusion reached each time was that the costs of mandatory auditor rotation were believed to outweigh the benefits (AICPA 1978; SEC 1994). In addition, prior academic research with U.S. data has generally not supported the

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<sup>1</sup> Amendment available at: <http://financialservices.house.gov/UploadedFiles/BILLS-112hr-PIH-PCAOBdd.pdf>

<sup>2</sup> See also PCAOB (2011) for further details on various times mandatory audit firm rotation has been evaluated.

notion that long tenure is associated with negative financial reporting outcomes; in fact, results typically reveal that it is short tenure which is associated with these outcomes (see for example, Johnson et al. 2002; Myers et al. 2003; Carcello and Nagy 2004; Geiger and Raghunandan 2002; and Stanley and Dezoort 2007).

One issue frequently brought up in discussions of mandatory rotation is that there is a “level of 'coziness' the firm [has] with the management of the company being audited” (PCAOB 2011)<sup>3</sup>, particularly for companies with lengthy relationships with their audit firm.<sup>4</sup> This concern over “coziness” between the auditor and client is consistent with the attachment concept. Attachment is described as the “binding of one party to another” (Salancik 1977; Staw 1982 as described by Seabright et al. 1992) and “accrues through experience in the exchange relationship and as a result of investments the exchange partners make in the relationship over time” (Seabright et al. 1992). In examining questions regarding lengthy relationships between clients and auditors, groups such as regulators, accounting professionals, and researchers have focused primarily on the auditor side of the relation, by concentrating on the length of time that the auditor (i.e., audit firm) has been performing the audit. However, financial statements are a joint outcome from the efforts of management who prepare them, the auditor who expresses an opinion on them, and the audit committee who is charged with the financial reporting oversight of the company. Thus, in my study I consider the interrelationships of these groups and their association with earnings management and accrual quality. Therefore, I examine the issue of auditor tenure from a new perspective and use a different definition of tenure. I define tenure in my study based on the shared history between the people involved in the financial reporting process.

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<sup>3</sup> These views were expressed at a March 16, 2011 PCAOB Investor Advisory Group Meeting, where some members of this advisory group urged the PCAOB to consider mandatory rotation.

<sup>4</sup> The largest 100 companies (based on market capitalization) have an average auditor tenure of 28 years and the largest 500 companies have an average auditor tenure of 21 years (PCAOB 2011).

First, I examine how the collaborative tenure<sup>5</sup> between the auditor and the top managers (CEO) is associated with earnings management and accrual quality.<sup>6</sup> Second, I examine how the collaborative tenure among these three groups (auditor, manager, and audit committee) is associated with earnings management and accrual quality. I specifically focus on the collaborative tenure of the auditor, manager (CEO) and the audit committee chair. Third, I examine the association of the collaborative tenure of the auditor and managers with earnings management and accruals quality across different audit committee chair tenure lengths.

I focus on the tenure of the audit committee chair, rather than the entire audit committee following the reasoning of the Sarbanes-Oxley Act (SOX) which mandates the rotation of the person(s) in charge of the audit (i.e., the audit partner and concurring partner) as a way to provide a “fresh viewpoint” to the engagement, despite the fact that most of the audit team remains in place. The audit committee as a whole is charged with the financial reporting oversight of the company and the audit committee chair is the head of the audit committee, similar to the engagement partner being in charge of the individual audit.

The second part of my study examines the effect of an audit committee chair change and how this impacts earnings management and accrual quality. Prior research has not analyzed what occurs when the client-auditor relation is “broken or changed” because of changes in the individuals charged with the oversight of the financial reporting process. Audit committees are charged with this duty and in dealing with the auditor (hiring, firing, and reviewing the performance of the auditor). Thus, it would be important to know how changing a key audit committee person, such as the chair, is associated with earnings management and accrual quality. A new audit committee chair has the potential to change the dynamic of the auditing process by asking more questions or

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<sup>5</sup> The collaborative tenure is calculated as the shortest time that the auditor (i.e., audit firm) and the manager (CEO) have served together at the client in these roles.

<sup>6</sup> I also examine the collaborative tenure of the CFO and the joint tenure of the CEO and CFO in a sensitivity analysis.

focusing more attention on different issues than in the past. On the other hand, they could also be more reliant on the external auditor as they transition into their new role. Therefore, my fourth test examines the association of audit committee chair changes with earnings management and accrual quality. My fifth test expands on this concept by examining the association of audit committee chair changes with earnings management and accrual quality across different lengths of auditor tenure<sup>7</sup> (i.e., short, medium or long). My final test examines the association of audit committee chair changes and the collaborative tenure of the manager and auditor with earnings management and accrual quality. These two tests differ in that the first one considers the entire auditor tenure history, while the second one considers only the joint collaborative tenure of the auditor and manager.

I contribute to the literature as follows. First, I add a new dynamic in assessing the association of lengthy auditor-client relations and earnings management and accrual quality, by considering the audit committee chair tenure and audit committee chair changes.<sup>8</sup> This analysis is important because the audit committee is charged with financial reporting oversight and its significance has been a topic of comprehensive interest to both regulators and business professionals. Second, the PCAOB and others have expressed concern that auditors become “cozy” with their clients and perhaps more likely to accept management’s representations which could result in a negative impact on the financial statements. Therefore, I use a measure that allows me to identify and test the most likely scenario in which this situation could happen. Specifically, when the auditor and manager have served together for long periods, and when the auditor, manager and audit committee chair have served together for long periods. This new definition of tenure is relevant because these are the three primary groups responsible for the financial statements. My

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<sup>7</sup> Audit firm tenure is frequently referred to as “auditor tenure” in academic and regulatory studies and is used throughout the paper.

<sup>8</sup> Wang and Wang (2012) also utilize a collaborative tenure measure. With data from Taiwan, they examine the association of the collaborative tenure of the audit partner and managers of the company (CEO, CFO) with discretionary accruals.

study is not implying that audit committee members or auditors do not perform their jobs with due diligence; there are legal and reputational penalties to both groups for bad financial reporting outcomes (Srinivasan 2005; Johnstone 2011; Weber et al. 2008). I am simply examining how close relations in groups affect the financial reporting process, a topic of continuing interest among regulators and investors.

I find that longer collaborative tenure between the CEO and the auditor is associated with lower positive discretionary accruals (i.e., less earnings management). This is contrary to the PCAOB's concerns regarding long auditor tenure and lower financial reporting quality (PCAOB 2011). The PCAOB's August 2011 concept release called for further information regarding the idea of mandatory auditor rotation. This study provides evidence that longer auditor tenure is not necessarily an undesirable situation, if the long tenure is coupled with long tenure of the CEO. I do not find that the joint tenure of the three parties (CEO, auditor and audit committee chair) is significantly associated with earnings management or accrual quality.

In the second part of my study, I find that the first year of an audit committee chair change is associated with an increase in positive discretionary accruals. I do not find that this association differs based on different lengths of auditor tenure. I do find that longer collaborative tenure between the auditor and the CEO constrains earnings management and there is an even greater effect when there is an audit committee chair change (i.e., there are lower positive discretionary accruals). Thus, consistent with the first part of my study, I find that there is a benefit to longer time served between the CEO and the auditor.

## II. Background and Hypotheses Development

### *Debate on Mandatory Auditor Rotation*

Central to the mandatory audit firm rotation debate is whether the auditors' independence and objectivity is impaired as the tenure of the engagement with the client increases. The following concerns related to long auditor tenure were stated by the SEC Practice Section Executive Committee (AICPA 1992) [as summarized by Sinason et al. (2001)]

1. "Auditors may grow too close to the clients' management causing the auditor to identify with management's problems and lose professional skepticism.
2. Auditors may view the examination as a repeat of earlier engagements with the same clients. This may cause the auditor to anticipate results rather than evaluating important changes in client circumstances.
3. Auditors may be tempted to smooth over problem areas in order to retain the engagement. Pleasing the client's management may become the auditor's priority, rather than following the professional standards."

The first two concerns express the idea that the auditor becomes too familiar with either management or the audit engagement itself, potentially causing the auditor to question less and put more reliance on management explanations. The last point is the view that as the tenure relationship increases, the auditor could become more concerned with maintaining the audit engagement and therefore, perhaps less willing to challenge the client on accounting positions that are not in compliance with the applicable accounting standards. If in fact, any or all of these situations do occur in lengthy tenure relationships it has the potential to lead to negative financial reporting outcomes such as fraud, restatements, or aggressive earnings management to meet earnings benchmarks. However, one frequent counterargument to concerns regarding long tenure is that mandating a regular auditor rotation could actually lead to negative financial reporting outcomes

because the auditor does not have the deep institutional knowledge about the client in a short tenure timeframe, particularly if the client is a large, complex, or international organization (Johnson 2002; PricewaterhouseCoopers 2011).<sup>9</sup>

### ***Prior Research – Auditor Tenure***

Academic research has contributed to the debate on auditor tenure/auditor rotation by examining the association of audit firm tenure with audit quality and earnings management metrics; results on these relations have predominantly not supported the idea that long tenure relationships are negative. For example, Geiger and Raghunandan (2002) find a higher frequency of reporting failures in short tenure clients and Stanley and DeZoort (2007) find a negative relation between auditor tenure and the likelihood of a restatement, implying that short tenure is associated with lower audit quality. Myers et al. (2003) and Chen et al. (2008) find that discretionary accruals are lower in firms with long auditor tenure.<sup>10</sup> However, with Australian data, Carson et al. (2012) find that accruals are lower in short tenure clients. Using pre-and-post-SOX data, Davis et al. (2009) find that compared to medium auditor tenure firms (5 -14 years), both short and long auditor tenure are positively associated with using accruals to meet or beat earnings forecasts. However, these results only apply to the pre-SOX period; in the post-SOX period there is no difference among the three auditor tenure groups. In addition, Blouin et al. (2007) find that former Arthur Andersen clients with high levels of discretionary accruals that follow their audit team to the new audit firm have lower accruals in the year of the audit firm change, while those that did not follow their audit team

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<sup>9</sup> For example, in his testimony before the PCAOB, Theodore Bunting, chief accounting officer at Entergy, noted that “the utility industry is complex and requires expert auditors. ‘These complexities can require significant time to comprehend. Mandatory change in audit firms would result in disruption to our business and loss of auditor knowledge’” (Cohn 2012).

<sup>10</sup> Chen et al. (2008) uses data from Taiwan.

continued to report high accruals. These results do not support the idea that utilizing a new auditor improves financial reporting quality.

During prior discussions of mandatory auditor rotation, the rotation of the audit partner was also considered as an alternative way to give the “fresh viewpoint” without the anticipated high costs of audit firm rotation. The Sarbanes-Oxley Act (SOX) includes a provision requiring the lead audit partner and concurring partner to rotate off the engagement after five years. Prior academic research examining the association between audit partner tenure and audit quality or earnings management metrics has provided mixed results. For example, Manry et al. (2008) find that discretionary accruals are negatively associated with the lead audit partner’s tenure, implying that audit quality increases with partner tenure, however, the results hold only for small clients. They conclude that “partner tenure does not affect audit quality for large clients or for shorter-tenure smaller clients.” On the other hand, with Australian data, Carey and Simnett (2006) find that clients with long audit partner tenure are less likely to issue going-concern opinions and more likely to just beat earnings benchmarks, implying that audit quality diminishes with long audit partner tenure.

In general, the U.S. studies do not support the idea that lengthy auditor tenure relations are associated with low audit quality and/or low financial reporting quality. In addition, Ghosh and Moon (2005) find a positive association between earnings response coefficients and auditor tenure, providing evidence that investors view longer auditor tenure relationships as enhancing earnings quality. Furthermore, although the PCAOB observed that, in some cases, the auditor relies too heavily on management’s representations without seeking corroborating and objective evidence, “preliminary analysis [of the inspection] data appears to show no correlation between auditor tenure and the number of comments in PCAOB inspection reports” (PCAOB 2011). Despite a lack of evidence supporting concerns over lengthy auditor tenure and a GAO 2003 study concluding that



“mandatory audit firm rotation may not be the most efficient way to enhance auditor independence and audit quality”, the PCAOB has brought attention to mandatory auditor rotation once again.

Prior academic research has focused mainly on the auditor side of the relation in examining questions regarding auditor tenure. Although not stated explicitly, the studies which focus solely on the length of auditor tenure, are primarily examining the concern of the auditor getting too close to the engagement itself. The issue is that the auditor possibly views the engagement as a repeat of earlier engagements or becoming overly concerned with maintaining the client’s business (AICPA 1992). However, the financial statements are a joint outcome from the efforts of management who prepare them, the auditor who expresses an opinion on them, and the audit committee who is charged with the financial reporting oversight of the company. Therefore, it is important to understand how the collaborative tenure of these three groups is associated with earnings management and accrual quality. I investigate this question by introducing a new measure of tenure which allows for a more comprehensive analysis of situations where the auditor has a higher likelihood of growing too close to management because of their shared time together.

Wang and Wang (2012) also investigate collaborative tenure, specifically between the audit partner and managers (CEO and CFO). Consistent with the concerns previously mentioned by the SEC Practice Section (AICPA 1992), they argue that a long collaborative tenure between the audit partner and managers presents a “personal familiarity threat” where “auditors become familiar with the audit client’s management”. Wang and Wang (2012) find that discretionary accruals decrease with the collaborative tenure, implying that this familiarity is not associated with lower audit quality.

My study differs from Wang and Wang (2012) in several aspects. First, I perform my study with audit firm tenure (i.e., auditor tenure) rather than audit partner tenure; therefore, I am

examining a different but important aspect of the auditor-client relationship.<sup>11</sup> The PCAOB has expressed concerns regarding the bias of both audit partners and senior managers to accept management's representations despite the fact that mandatory partner rotation has been in place in the U.S. since 2002. As such, it is important to examine the collaborative tenure of the audit firm (i.e., auditor tenure) and the client and not just the collaborative tenure of the partner and the client. In addition, using Australian data, Carson et al. (2012) find that discretionary accruals are lower in clients with both short audit partner and audit firm tenure, with the audit firm tenure being the dominant effect.

Second, I further explore the idea of collaborative tenure with the addition of a new component: audit committee chair tenure. Third, I perform my analysis with data for companies traded on U.S. stock exchanges, while Wang and Wang (2012) use data from Taiwan. Finally, Wang and Wang (2012) use only one earnings management metric: discretionary accruals<sup>12</sup> while I examine my research questions with the use of discretionary accruals (modified Jones 1991 with performance adjustment [Kothari et al. 2005]), real earnings management (Roychowdhury 2006) and the Dechow and Dichev (2002) accrual quality model (as modified by McNichols 2002).<sup>13</sup> The addition of the real earnings management model is important to investigating these research questions in my post-SOX U.S. setting because Cohen et al. (2008) find that there is less use of discretionary accruals to manage earnings in the post-SOX environment, but more use of real earnings management techniques.

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<sup>11</sup> The collaborative tenure is calculated as the shortest time that the three groups, auditor (i.e., audit firm), manager, and audit committee chair have been together. Later, I perform tests taking into account the entire audit firm tenure history. See research design for further details. I do not include any analyses regarding the audit partner because the names of the audit partners are not publicly available in the United States.

<sup>12</sup> Wang and Wang (2012) also perform an auditor switch analysis given the collaborative tenure of the audit partner and managers. I do not perform this type of analysis in my study.

<sup>13</sup> I implement the accrual quality measure in a cross-section by year and Fama-French 48 industry classifications as implemented in Doyle et al. (2007).

### ***Social Exchange Theory and other prior research***

Social exchange theory (SET) provides a basis to further understand the notion of the auditor growing close to the audit engagement and to the people associated with the engagement. SET has been described as “the view that interaction between persons is an exchange of goods [both] material and non-material” (Homans 1958) and which “recognizes the existence of relational bonds, such as trust, commitment, ... and knowledge between [two parties]” (Vafeas 2010).

The auditor, managers, and audit committee chair all interact to produce the final version of a company’s audited financial statements. Throughout the course of the fiscal year and the audit engagement “exchange interactions” (Lambe et al. 2001) occur, resulting in an outcome (i.e., audited financial statements). SET posits that “these outcomes are compared over time to other exchange alternatives..., with positive outcomes increasing trust with the trading partner and their commitment to the exchange relationship.” As the length of time that these parties have served together increases, “the positive exchange interactions produce relational exchange norms that govern the exchange relationship.”<sup>14</sup> This idea is consistent with the view that greater trust between parties leads to more knowledge sharing (Tsai and Cheng 2011; Abrams et al. 2003) and that frequency of exchanges between parties “enhances the transfer of tacit knowledge among parties” (Jones et al. 1997).

Therefore, consistent with Wang and Wang (2012) it is possible that there will be a negative association between collaborative auditor and manager tenure and earnings management/accrual quality because the two groups have served together longer, built up more trust between each other and established norms that serve the relationship well, encourage more knowledge sharing and facilitate better outcomes (i.e., less earnings management).

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<sup>14</sup>These ideas are the premises of social exchange theory as discussed in Lambe et al. (2001).

However, it is also possible that the increased trust and established work patterns have the opposite effect on financial reporting quality. This idea of trust being created between parties is also consistent with prior accounting behavioral studies which offer important insights into auditor-client relations and the financial reporting process. For example, Rennie et al. (2010) find that the length of auditor tenure affects the extent to which auditors trust their clients, where longer tenure leads to greater trust. Additionally, Shaub (1996) discusses the concept that “an auditor’s level of subjective trust of the client is one factor in determining the nature, timing and extent of audit procedures”. Finally, Rose (2007) find that more trusting auditors pay less attention to evidence of aggressive financial reporting than less trusting auditors. Thus, taken together, these three studies imply that longer tenure leads to more trust with the client; a condition which can affect auditing procedures and may cause auditors to pay less attention to aggressive financial reporting (i.e., more earnings management).

However, Bamber and Iyer (2007) provide support for either the possibility of a positive association or no association between collaborative tenure and earnings management. They find that auditors identify with their clients more as auditor tenure increases and those auditors who identify more with their clients are more likely to give in to the client’s preferred accounting treatment. Although, they also find that auditor tenure is not associated with the auditor being more likely to give in to the client’s preferred accounting treatment.<sup>15</sup>

In terms of long working relationships, Katz (1982) find that engineering R&D project groups that have served together longer become more isolated from important sources of information outside their organization and had significantly less interaction among members of the group. Furthermore, “interparty attachment leads to maintaining an exchange relationship that

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<sup>15</sup> This study does not perform a test interacting auditor tenure and auditor identification with the client. Thus, it does not assess the interactive effect of these two conditions on the likelihood of accepting the client’s preferred accounting treatment.

[provides] fewer of the needed resources than it originally did, curtailing the exploration of available alternatives” (Seabright 1992 summarizing Blau 1964; Cook 1977; Cook and Emerson 1978 and Hirschman 1970). Therefore, it is also possible that as collaborative tenure increases, the auditor and manager have less interaction or the auditor becomes more trusting of management. Both of these situations could potentially lead to the auditor becoming more accepting of management’s assumptions. Thus, long collaborative tenure could lead to a positive association with earnings management.

Given the possible competing alternatives, I offer the hypothesis below (in null form).

**Hypothesis 1:** There is no association between the collaborative tenure of the auditor and manager with earnings management and accrual quality.

Similar reasoning can be used when bringing the audit committee chair into the analysis. A lengthy collaborative tenure between these three groups (auditor, manager, and audit committee chair) could be an aid in constraining earnings management because of the institutional knowledge that both the auditor and audit committee chair possess from their longer “exchange interactions”, increased trust, knowledge sharing and established norms of working together. However, this longer tenure also has the possibility of leading to an overreliance on management’s assumptions because of this increased trust or “attachment” (binding of one party to another) through these repeated interactions. Alternatively, an audit committee chair could rely more on the external auditor when they are new to their role and thus do not have any impact on “breaking” the close relationship between the auditor and client. Given the possible competing alternatives, I offer the hypotheses below (in null form).

**Hypothesis 2:** There is no association between the collaborative tenure of the auditor, manager, and audit committee chair with earnings management and accrual quality.

**Hypothesis 3:** The association of collaborative auditor and manager tenure with earnings management and accrual quality is constant among different lengths of audit committee chair tenure.

In the second part of my study, I examine the effect of an audit committee chair change and how this impacts earnings management. Audit committees are charged with financial reporting oversight and in dealing with the auditor (hiring, firing and reviewing the performance of the auditor). Thus, it would be important to know how changing a key audit committee person such as the audit committee chair is associated with earnings management. This change could be a potential solution to enhance audit quality without the expected increased costs of switching audit firms and remains an empirical question which I investigate further.

Prior team literature has noted that having a new member can stimulate change in the organization (Boeker 1997; Zellmer-Bruhn 2003), but it can also be a disruptive process because the team member that left may have taken important knowledge with him and it may take time to fully integrate the new member into the team functions (Chandler et al. 2005; Heinen and Jacobson 1976). Thus, a new audit committee chair may change the dynamic of the auditing process by asking more questions and focusing more attention on critical areas. This situation could potentially lead to constraining earnings management. Alternatively, a new audit committee chair may need time to adjust to fulfilling their duties and could rely heavily on the external auditor and thus perhaps have no effect on “breaking” the close relation between the auditor and client.

Given the possible competing alternatives, I offer the hypothesis below (in null form).

**Hypothesis 4:** There is no association between audit committee chair changes and earnings management and accrual quality.

The potential for a new audit committee member to bring change may be affected by the tenure of others involved in the financial reporting process. For example, Boeker (1997) noted that change within an organization was more likely after a new team member joined the group when the tenure of the other managers in the group was short. Consistent with this, firms with long auditor and manager tenure may be more resistant to change because “project members interacting over a long period will develop standard work patterns that are familiar and comfortable, patterns in which routine and precedent play a relatively large part” (Katz 1982). Thus, these long tenure firms may not exhibit a change in earnings management measures after an audit committee chair change because of these standard work patterns (Gersick and Hackman 1990). However, the new member, by providing different ways of looking at financial reporting issues, could potentially break up these patterns, perhaps resulting in a change in the earnings management measures. Thus, I offer the hypotheses below (in null form).

**Hypothesis 5:** The association of audit committee chair changes with earnings management and accrual quality is constant among different lengths of auditor tenure.

**Hypothesis 6:** Audit committee chair changes do not modify the association of the collaborative tenure of the auditor and managers with earnings management and accrual quality.

### III. Sample and research design

#### Sample

I include in my sample all companies traded on U.S. stock exchanges that have the required data in the Corporate Library, ExecuComp, and Compustat databases for fiscal years 2005 to 2009. I also use data from Audit Analytics for sensitivity tests. I obtain data regarding CFO and audit committee chair tenure, board size, and audit committee chair changes from the Corporate Library. CEO tenure and CEO duality are obtained from ExecuComp. Auditor tenure and all financial variables are retrieved from Compustat; data from CRSP is used to determine company age; and information on restatements and internal control weaknesses comes from Audit Analytics. I exclude regulated industries and financial companies (SIC codes 4400-4999 and 6000-6999) from the sample due to differences in the operating environment of these firms. Following prior research (eg. Johnson et al. 2002; Davis et al. 2009), I exclude firms with auditor tenure of one year because of differences in discretionary accruals in the initial engagement year (DeFond and Subramanyam 1998). I also require that firms have at least four years of data to be in the final sample.<sup>16</sup>

#### Dependent variables

I use three types of dependent variables: two earnings management measures (discretionary accruals and real earnings management) and one accrual quality measure which I describe in further detail below.

#### *Discretionary accruals*

Discretionary accruals are calculated using the Jones model (1991) as modified by Dechow et al. (1995) with the performance adjustment from Kothari et al. (2005). I estimate the model in a

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<sup>16</sup> This condition is relaxed later when I test only the subsample with positive discretionary accruals.



cross-section for each year and two-digit SIC code in order to allow the coefficients to vary across time and industry (eg. DeFond and Jiambalvo 1994; Cohen et al. 2008).

The estimated modified Jones model (Dechow et al. 1995) with the performance modification from Kothari et al. (2005) is:

$$\frac{TA_{it}}{Assets_{i,t-1}} = \gamma_1 \frac{1}{Assets_{i,t-1}} + \gamma_2 \frac{\Delta Rev_{it}}{Assets_{i,t-1}} + \gamma_3 \frac{PPE_{it}}{Assets_{i,t-1}} + \gamma_4 ROA_{it} + \varepsilon_{it} \quad (1)$$

Where, for fiscal year  $t$  and firm  $i$ :

$TA_{it}$  = earnings before extraordinary items and discontinued operations ( $EBXI_{it}$ , annual) minus operating cash flow from continuing operations (CFO, from the statement of cash flows,).

$Assets_{i,t-1}$  = total assets in the previous year (year  $t-1$ ),

$\Delta Rev_{it}$  = change in revenue from the preceding year (year  $t$  – year  $t-1$ ),

$PPE_{it}$  = gross value of property, plant, and equipment, and

$ROA_{it}$  = return on assets (net income/beginning assets).

Next, the coefficients estimated in equation (1) ( $\gamma_1$ ,  $\gamma_2$ ,  $\gamma_3$ , and  $\gamma_4$ ) are used to estimate the normal accruals ( $NA_{it}$ ) for each company in the sample as follows:

$$NA_{it} = \gamma_1 \frac{1}{Assets_{i,t-1}} + \gamma_2 \frac{(\Delta Rev_{it} - \Delta AR_{it})}{Assets_{i,t-1}} + \gamma_3 \frac{PPE_{it}}{Assets_{i,t-1}} + \gamma_4 ROA_{it} \quad (2)$$

$\Delta AR_{it}$  = change in accounts receivable from the preceding year, and all other variables are as previously defined.

Thus, discretionary accruals are defined as the difference between total accruals and the estimated normal accruals as:

$$DA_{it} = \frac{TA_{it}}{Assets_{i,t-1}} - NA_{it} \quad (3)$$

The discretionary accrual measure ( $DA_{it}$ ) is the measure that I use in the test model. I perform the following independent tests: 1) positive discretionary accruals only, 2) negative

discretionary accruals only, and 3) absolute value of discretionary accruals. The positive discretionary accruals are particularly important to examine because these could be used by management to increase income upwards in order to meet earnings targets. I also examine negative discretionary accruals because if a company is having either a particularly bad or good year then management may prefer to have “extra” expenses hit the income statement in the current year. In this way the company is either taking on “extra expenses” in a year when the company may not meet its earnings targets or in a year when the company has already easily met its earnings goals.

### ***Accrual quality***

I estimate the Dechow and Dichev (2002) model with the modifications introduced in McNichols (2002). The model is estimated in a cross-section by year and Fama-French 48 industry classifications (eg. Doyle et al. 2007). The accrual estimation errors are the residuals from:

$$\Delta WC_{it} = \delta_0 + \delta_1 CFO_{it-1} + \delta_2 CFO_{it} + \delta_3 CFO_{it+1} + \delta_4 \Delta REV_{it} + \delta_5 PPE_{it} + \varepsilon_{it} \quad (4)^{17}$$

Where, for fiscal year  $t$  and firm  $i$  (all variables deflated by beginning of the year total assets):

$\Delta WC$  = change in working capital from prior year,

$CFO_{it-1}$ ,  $CFO_{it}$ , and  $CFO_{it+1}$  = cash flows from operation in years  $t-1$ ,  $t$ , and  $t+1$ ,

$\Delta REV_{it}$  = change in revenue from the preceding year (year  $t$  – year  $t-1$ ), and

$PPE_{it}$  = gross value of property, plant, and equipment.

The measure of accrual quality is the standard deviation of five years of the accrual estimation errors noted above (year  $t$  to  $t-4$ ).

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<sup>17</sup> “The error term in equation (4) captures the extent to which accruals map into cash flow realizations, and can be used as a measure of accrual and earnings quality” (Dechow and Dichev 2002).

### ***Real earnings management measures***

Cohen et al. (2008) find an increase in the level of real earnings management after the passage of SOX and a decline in the use of accrual-based earnings management suggesting that “firms switched from accrual-based to real earnings management methods after the passage of SOX”. Therefore, I also use the measures of real earnings management developed by Roychowdhury (2006)<sup>18</sup> based on the work of Dechow et al. (1998). The three measures of real earnings management are: the abnormal level of cash flows from operation (CFO), abnormal level of production costs (Prod), and abnormal level of discretionary expenses (DiscExp). All models are estimated cross-sectionally by year and two-digit SIC code.

Abnormal levels of cash flow from operation are the residuals from:

$$\frac{\text{CFO}_{it}}{\text{Assets}_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \alpha_3 \frac{\Delta \text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \varepsilon_{it} \quad (5)$$

Abnormal levels of production cost are the residuals from:<sup>19</sup>

$$\frac{\text{Prod}_{it}}{\text{Assets}_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \alpha_3 \frac{\Delta \text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \alpha_4 \frac{\Delta \text{Sales}_{it-1}}{\text{Assets}_{i,t-1}} + \varepsilon_{it} \quad (6)$$

Abnormal levels of discretionary expenses are the residuals from:

$$\frac{\text{DisExp}_{it}}{\text{Assets}_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\text{Sales}_{it-1}}{\text{Assets}_{i,t-1}} + \varepsilon_{it} \quad (7)$$

<sup>18</sup> I use the models as developed by Roychowdhury (2006). Cohen et al. (2008) modify the model by omitting the regular intercept.

<sup>19</sup> Production cost (Prod) is defined as the sum of cost of goods sold (COGS) plus the change in inventories ( $\Delta \text{INV}$ ) where:

$$\frac{\text{COGS}_{it}}{\text{Assets}_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \varepsilon_{it} \quad (6.a) \text{ and}$$

$$\frac{\Delta \text{INV}_{it}}{\text{Assets}_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{\text{Assets}_{i,t-1}} + \alpha_2 \frac{\Delta \text{Sales}_{it}}{\text{Assets}_{i,t-1}} + \alpha_3 \frac{\Delta \text{Sales}_{it-1}}{\text{Assets}_{i,t-1}} + \varepsilon_{it} \quad (6.b)$$

Thus, equation (6) is the combination of (6.a) and (6.b).

Discretionary expenses are defined as the sum of research and development expenses, advertising expenses, and selling, general and administrative expenses.

*[Insert Table 1 here]*

## **Test models**

### ***Test 1 - Collaborative auditor and manager tenure***

I first assess the effect of the collaborative tenure of the auditor and managers on the dependent variables using the following model:

$$\text{Dependent}_i = \beta_0 + \beta_1\text{AUD\_TEN}_i + \beta_2\text{CEO\_TEN}_i + \beta_3\text{MIN\_CEO\_AUD}_i + \beta_x\text{CONTROL}_i + \varepsilon_i$$

(8)

Dependent = the three dependent variables (discretionary accruals, accrual quality, and real earnings management)

MIN\_CEO\_AUD = the minimum overlap in years between auditor and CEO tenure (where auditor tenure is calculated based on the audit firm's tenure with the client)<sup>20</sup>,

AUD\_TEN = auditor (audit firm) tenure in years

CEO\_TEN = CEO tenure in years and

Control = a set of control variables which are described at the end of this section.

In addition to test one, I perform four additional tests that have the following similarities across the models:

### ***Test 2 - Collaborative auditor, manager, and audit committee chair tenure***

I use the following model:

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<sup>20</sup> For example, a company with an auditor tenure of 15 years and a CEO tenure of 5 years has a collaborative tenure of 5 years. Later, I perform tests across different auditor tenure lengths.

$$\text{Dependent}_i = \beta_0 + \beta_1 \text{AUD\_TEN}_i + \beta_2 \text{CEO\_TEN}_i + \beta_3 \text{ACCH\_TEN}_i + \beta_4 \text{MIN\_CEO\_AUD}_i + \beta_5 \text{MIN\_CEO\_ACCH}_i + \beta_6 \text{MIN\_ACCH\_AUD}_i + \beta_7 \text{MIN\_CEO\_ACCH\_AUD}_i + \beta_x \text{CONTROL}_i + \varepsilon_i \quad (9)$$

The test variable (MIN\_CEO\_ACCH\_AUD) is the minimum overlap in years between auditor, CEO and audit committee chair tenure. Audit committee chair tenure is the time (measured in years) that the audit committee chair has served as a board member on that specific company.<sup>21</sup> Refer to Table 1 for the definitions of the other variables.

***Test 3 - Collaborative auditor and manager tenure across different audit committee chair tenure lengths***

Next, I perform an analysis using the collaborative auditor and CEO tenure interacted with audit committee chair tenure. I use the following model:

$$\text{Dependent}_i = \beta_0 + \beta_1 \text{LONG\_ACCH}_i + \beta_2 \text{CEO\_TEN}_i + \beta_3 \text{AUD\_TEN}_i + \beta_4 \text{MIN\_CEO\_AUD}_i + \beta_5 \text{LACCH}_i * \text{CEO\_TEN}_i + \beta_6 \text{LACCH}_i * \text{AUD\_TEN}_i + \beta_7 \text{LACCH}_i * \text{MIN\_CEO\_AUD}_i + \beta_x \text{CONTROL}_i + \varepsilon_i \quad (10)$$

The test variable is LACCH \* MIN\_CEO\_AUD. This is the interaction of 1) LONG\_ACCH, a categorical variable equal to one if the tenure of the audit committee chair is above the median, zero otherwise and 2) MIN\_CEO\_AUD, which measures the minimum overlap in years between auditor and CEO tenure. Refer to Table 1 for the definitions of the other variables.

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<sup>21</sup> The tenure as audit committee chair or audit committee member is not available in Corporate Library, only the time served as a board member. This duration (as a board member) better reflects potential relations that could have been built with managers and external auditors over time.

## **Test models for audit committee chair changes**

My last set of tests examine audit committee chair changes and the association with the dependent variables across three settings: Audit committee chair changes (Test 4), Audit committee chair changes and different auditor tenure lengths (Test 5), and Audit committee chair changes and the collaborative tenure of managers and the audit firm (Test 6).

### ***Test 4 - Audit committee chair changes***

I use the following model:

$$\text{Dependent}_i = \beta_0 + \beta_1 \text{ACCHD1}_i + \beta_2 \text{ACCHD2}_i + \beta_3 \text{ACCHD3}_i + \beta_x \text{CONTROL}_i + \varepsilon_i \quad (11)$$

ACCHD1 is a dichotomous variable that equals one if the audit committee chair changes from the prior year, zero otherwise. ACCHD2 is a dichotomous variable that equals one in the year after an audit committee chair change, zero otherwise. ACCHD3 is a dichotomous variable that equals one in the second year after an audit committee chair change, zero otherwise.

### ***Test 5 - Audit committee chair changes across different lengths of auditor tenure***

I use the following model:

$$\text{Dependent}_i = \beta_0 + \beta_1 \text{ACCHD1}_i + \beta_2 \text{SHORT\_D}_i + \beta_3 \text{LONG\_D}_i + \beta_4 \text{ACCD1} * \text{SHORT\_D}_i + \beta_5 \text{ACCD1} * \text{LONG\_D}_i + \beta_x \text{CONTROL}_i + \varepsilon_i \quad (12)$$

ACCHD1 is a dichotomous variable that equals one if the audit committee chair changes from the prior year, zero otherwise. I use three categories to classify auditor tenure as short, medium, and long, with medium being the base line (the omitted category).

Consistent with Davis et al. (2009), I divide auditor tenure as follows:

SHORT\_D = auditor tenure of 2 or 3 years

Medium = auditor tenure of 4-14 years (*omitted category*)

LONG\_D = auditor tenure greater than or equal to 15 years

I also perform sensitivity tests with the following alternative category:

SHORT\_P = auditor tenure of 1-10 years

LONG\_P = auditor tenure greater than 10 years (*omitted category*)

In the PCAOB concept release 2011-006, the PCAOB expressed particular interest in receiving comments on auditor tenure relations greater than 10 years.

Refer to Table 1 for definitions of the other variables.

### ***Test 6 - Audit committee chair changes and the collaborative tenure of managers and the auditor***

I use the following model:

$$\text{Dependent}_i = \beta_0 + \beta_1 \text{ACCHD1}_i + \beta_2 \text{AUD\_TEN}_i + \beta_3 \text{CEO\_TEN}_i + \beta_4 \text{MIN\_CEO\_AUD}_i + \beta_5 \text{ACCHD1} * \text{AUD\_TEN}_i + \beta_6 \text{ACCHD1} * \text{CEO\_TEN}_i + \beta_7 \text{ACCHD1} * \text{MIN\_CEO\_AUD}_i + \beta_x \text{CONTROL}_i + \varepsilon_i \quad (13)$$

ACCHD1 represents changes in the audit committee chair from the prior year as and the variable MIN\_CEO\_AUD measures the minimum overlap in years between auditor and CEO tenure.

### **Control variables**

I include controls for variables that are expected to be negatively associated with earnings management: SIZE (natural log of total assets), Cash flow from operations (CFO, operating cash flows divided by beginning total assets), Altman Z-score, AGE (number of years in CRSP), BIG\_N (dummy variable equal to 1 if the company is audited by a Big 4 auditor, 0 otherwise) and IMPORT (local client importance, calculated per auditor office as the individual client audit fees/total audit fees). I also control for LEVERAGE (total liabilities divided by total assets), SALE\_GROWTH, CEO DUALITY and Board Size which are expected to be positively associated with earnings management (Johnson et al. 2002; Myers et al. 2003; Manry et al. 2008; Gul et al. 2009; Wang and Wang 2012; Li et al. 2009; Vafeas 2005; Dechow et al. 1996; Dhaliwal et al. 2010; Carcello and

Nagy 2004). I also include a TREND variable to account for any changes in earnings management over time.



#### **IV. Results**

*[Insert Table 2 here]*

Table 2 reports the results of the descriptive statistics. Panel A contains the information for the full sample of companies used across all three models (discretionary accruals, real earnings management, and accrual quality) and Panel B reports information for the sample of companies with positive discretionary accruals. I present descriptive statistics for the positive discretionary accrual sample because this is the subsample for which I find results in the regression analyses and for which I focus most of my discussion on. The descriptive statistics are very similar between Panel A and Panel B. In terms of mean values, most firms have a Big N auditor which they have engaged for 15 years, the CEO has been in place for eight years, the audit committee chair has served on the board for seven years and 50% of the time the CEO is also the Chairman.

##### ***Test 1 Results - Collaborative auditor and manager tenure***

*[Insert Table 3 here]*

Table 3 reports results for the analysis of collaborative auditor and manager tenure using positive abnormal accruals as the dependent variable. The PCAOB has expressed concerns regarding the auditor growing too close to management and perhaps not exhibiting a high enough degree of professional skepticism. If this is the case, and the auditor relies too heavily on management's assumptions, it may allow management to engage in aggressive financial reporting practices, particularly those which may help the company to avoid missing earnings benchmarks. Thus, the concern with managing earnings is generally one of managing earnings up, which could be accomplished with the use of positive discretionary accruals.

I perform the analysis following two different procedures. First, because the dependent variable (positive discretionary accruals) takes on only positive values and it is highly skewed to the right, I perform my analysis with a generalized linear model specifying a gamma distribution. The use of a gamma distribution estimates parameters that ensure all fitted values will always be positive (which the OLS regression does not do), consistent with the original input values for the dependent variable. Thus, the estimated parameters will be better.<sup>22</sup> Second, I perform the same tests with the standard OLS regression commonly accepted in the accounting literature. The first two columns present results with the gamma regression and columns three and four are the results from OLS.<sup>23</sup>

The dependent variable is calculated using the modified Jones method (Dechow et al. 2005) with the performance adjustment recommended in Kothari et al. (2005) because the performance adjusted modification results in a better specified measure. Columns (1) and (3) use the minimum collaborative tenure approach described in Section III, where the variable MIN\_CEO\_AUD represents the minimum time the CEO and the auditor have served together. The coefficient on this variable is negative and significant at the 1% level indicating that longer collaborative tenure between the CEO and the auditor is associated with less positive discretionary accruals (i.e., less earnings management).<sup>24</sup> In addition, the coefficient on the auditor tenure variable is not significant,

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<sup>22</sup> The argument is the same when using a Binomial distribution when working with dichotomous dependent variables, or the use of a Poisson or Negative Binomial when working with count dependent variables.

<sup>23</sup> The Akaike Information Criterion (AIC) is a measure of the relative quality of statistical models. The lower the values for AIC the better the model. Usually, a model is said to be better when its AIC value is at least lower by two when compared to a competing model (for example when comparing gamma to OLS). When comparing AIC values for the models in columns (1) and (2) of table 3 (-4.336 and -3.384, respectively) the reported values should be multiplied by N (893 in this case) in order to get the actual AIC values (-3872.05 and -3021.91), this is due to the way STATA outputs AIC values for generalized linear models versus OLS. Therefore, according to AIC criterion, the Generalized Linear Model using a gamma distribution is superior to the competing model (OLS).

<sup>24</sup> Coefficients from the regression using a gamma distribution should be exponentiated, and their interpretation is a percentage change. Thus, the coefficient on MIN\_CEO\_TEN which is equal to -0.034231 suggests, keeping everything else constant, a 3.37% decrease in positive discretionary accruals for a one year increase in the joint CEO-auditor tenure

indicating no significant association between auditor tenure and earnings management. These results do not support the PCAOB's concern that longer auditor tenure and possible close relations with management may lead to adverse financial reporting outcomes. In fact, the results provide support against the idea of mandatory auditor rotation, because the longer joint tenure between CEO and auditor actually constrains earnings management.

The effect of MIN\_CEO\_AUD is consistent with Ali and Zhang (2012) who find that CEO's incentive to manage earnings changes with their tenure. Specifically, they find that CEO's manage earnings more in their early years with the company when they "have something to prove" and manage earnings less as tenure increases since the cost of having an earnings overstatement discovered would do greater harm to their established reputation. Thus, a longer tenured CEO has less incentive to manage earnings because he/she has already established a solid reputation and this condition coupled with a jointly longer serving auditor with significant institutional knowledge of the client is associated with less earnings management. However, the positive and significant coefficients of CEO\_TEN in columns (1) and (3) is not consistent with Ali and Zhang (2012)

Columns (2) and (4) present the analysis using the traditional interaction variable approach. The CEO\_AUD variable replaces the MIN\_CEO\_AUD variable and is equal to CEO tenure multiplied by auditor tenure. For example, if CEO tenure is six years and auditor tenure is ten years then the MIN\_CEO\_AUD variable would have a value of six; while the CEO\_AUD variable would have a value of sixty. The results for column (2) and (4) are consistent with that of columns (1) and (3); longer collaborative tenure between the CEO and auditor constrains earnings management.

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[ $\exp(-0.034231)=0.9663$ ;  $0.9663 - 1=-0.0337=3.37\%$ ]. Thus, for example, starting at the sample mean (0.0487), a year increase in the joint CEO-auditor tenure indicates a decrease of 0.001641 in discretionary accruals.

The coefficient on CEO\_TEN is positive and significant in all four specifications, indicating a positive association between CEO tenure and positive discretionary accruals (i.e., more earnings management). This result is also in columns (1) and (3) which use the minimum collaborative tenure variable. However, when interactions between continuous variables are used in a regression, as in columns (2) and (4), the coefficient on the base variable (i.e., CEO\_TEN) does not have a very meaningful interpretation. Specifically, this coefficient (CEO\_TEN) tells us the effect of CEO tenure when auditor tenure equals zero, which is not possible for this research setting.<sup>25</sup> For example, when I set AUD\_TEN at the sample median, the coefficient on ceo\_ten is 0.0005776 (0.0000319) for gamma (OLS) and is not significant. The use of regular interactions (rather than minimum joint tenure) allows for an additional analysis regarding the marginal effect of CEO tenure at different levels of auditor tenure. Using auditor tenure intervals of 2-30 years, I identify that CEO tenure is associated with an increase in positive discretionary accruals for auditor tenure of 2-9 years and a decrease in these accruals for auditor tenure over 20 years. There is, however, no association between positive accruals and CEO tenure at auditor tenure levels between 10-20 years. Thus, it is possible to conclude the following: a year increase in CEO tenure is associated with increases in earnings management when auditor tenure is less than 10 years, has no association when auditor tenure is between 10 and 20 years, and is associated with decreases in earnings management when auditor tenure is longer than 20 years. Again, results do not support the PCAOB's concern that longer auditor tenure and possible close relations with management may lead to adverse financial reporting outcomes. In fact, the results provide evidence against the idea of mandatory auditor rotation, because short auditor tenure is associated with more earnings management when CEO's are in their early years with the company.

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<sup>25</sup> The same explanation holds true for the ceo\_ten variable in the other tests; thus, I do not repeat the explanation in the other analyses.

The control variables that have a significant coefficient exhibit a sign in the expected direction as predicted by prior literature. Specifically, the SIZE, CFO, and IMPORT variables are negatively associated with positive discretionary accruals and the LEVERAGE and SALE\_GROWTH variables are positively associated with positive discretionary accruals.<sup>26</sup>

I also perform the same analyses using the following discretionary accrual dependent variables: (1) absolute value of discretionary accruals and (2) negative discretionary accruals. The test variable is not significant in any of these specifications. Therefore, the “benefit” that accrues from long collaborative tenure between the CEO and auditor is realized solely in positive discretionary accruals, a method used to increase earnings. This finding is important because executives usually have more incentive to manage earnings up to meet earnings targets in order to not miss analyst forecasts or thresholds for bonuses.

*[Insert Table 4 here]*

Table 4 presents the same analysis using the real earnings management measures of (1) abnormal cash flow from operation, (2) abnormal production costs, and (3) abnormal discretionary expenditures. If the auditor constrains the company’s use of accruals, then management may consider other alternatives to meet earnings benchmarks. One option is to affect the timing and amount of certain business decisions such as production costs or expenditures on discretionary items such as advertising or research and development. Cohen et al. (2008) find that in the post-SOX period companies are using more real earnings management techniques; thus, it is important to examine if these alternatives are used as a substitute for discretionary accruals. The table presents the results using OLS only. A gamma distribution is not needed because the real earnings

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<sup>26</sup> The same basic trends are in the remaining analyses, thus, I do not discuss the control variables for the remaining tests.

management measures are used with signed values (i.e., positive and negative), thus, not a one sided positive only measure for which a gamma distribution could be applied.<sup>27</sup> The test variable, (MIN\_CEO\_AUD) is not significant in any of the three specifications, thus, there is no association between long collaborative CEO and auditor tenure and the use of real earnings management measures.

*[Insert Table 5 here]*

Table 5 reports the results of the Dechow and Dichev (2002) model as modified by McNichols (2002). The variable of interest, MIN\_CEO\_AUD, is not significant, indicating no significant association between collaborative CEO and auditor tenure and the standard deviation of abnormal accruals.

***Test 2 Results - Collaborative auditor, manager, and audit committee chair tenure***

*[Insert Table 6 here]*

Table 6 reports results for the analysis of collaborative auditor, manager, and audit committee chair tenure using positive abnormal accruals as the dependent variable, with a gamma regression. The analysis includes the base variables for each tenure category (AUD\_TEN, CEO\_TEN, ACCH\_TEN), each two way tenure combination of these variables (MIN\_CEO\_AUD, MIN\_CEO\_ACCH, MIN\_ACCH\_AUD) and finally the three-way tenure combination for all three categories (MIN\_CEO\_AUD\_ACCH). Columns (1) and (2) use the minimum collaborative tenure, where the variable MIN\_CEO\_AUD\_ACCH represents the minimum time the CEO, auditor, and audit committee chair have served together. Columns (3) and (4) present the analysis using a more traditional interaction variable.

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<sup>27</sup> The same holds true for the other real earnings management analyses for tests 2-5; only OLS is used.

The coefficient on the three way collaborative tenure variable is not significant in any of the specifications (MIN\_CEO\_AUD\_ACCH or CEO\_AUD\_ACCH), indicating no association between it and positive abnormal accruals. The coefficient on the minimum collaborative tenure between CEO and auditor is negative and significant at the 1% level (MIN\_CEO\_AUD). This is consistent with the conclusion reached in test one; longer collaborative tenure between the CEO and the auditor is associated with less positive discretionary accruals (i.e., less earnings management).

I also perform the same analyses using the absolute value of discretionary accruals and negative discretionary accruals as the dependent variables. Untabulated results reveal that the coefficient on the three-way minimum variable is only significant in one instance (10% level): the minimum tenure (i.e., MIN\_CEO\_ACCH\_AUD) for absolute value of discretionary accruals using a gamma distribution. The minimum collaborative CEO and auditor tenure is not significant in any specification. Therefore, the benefits associated with long joint CEO and auditor tenure are found only in positive abnormal accruals; specifically, longer joint CEO and auditor tenure constrains earnings from being managed upward. Thus far it appears that the tenure of the audit committee chair has no significant association in relation to the company's use of discretionary accruals. However, I further examine this issue in test 3 by examining how results may differ in short versus long audit committee chair tenure.

*[Insert Table 7 here]*

Table 7 presents the results using the real earnings management measures described in Section III. Unlike the positive discretionary accruals analysis, the MIN\_CEO\_AUD variable is not significant; indicating no significant association between joint CEO and auditor tenure with real earnings management measures. In addition, the three-way minimum variable

(MIN\_CEO\_ACCH\_AUD) is also not significantly associated with the real earnings management measures.

*[Insert Table 8 here]*

Table 8 reports the results of the Dechow and Dichev (2002) model as modified by McNichols (2002). The variable of interest, MIN\_CEO\_ACCH\_AUD, is not significant, indicating no significant association between collaborative CEO, auditor, and audit committee chair tenure and the standard deviation of abnormal accruals.

***Test 3 Results - Collaborative auditor and manager across different audit committee chair lengths***

*[Insert Table 9 here]*

Table 9 reports results for the positive abnormal accrual analysis of collaborative auditor and manager tenure when splitting the sample between high and low audit committee chair tenure.<sup>28</sup> The analysis includes the MIN\_CEO\_AUD variable, the base variables AUD\_TEN and CEO\_TEN, a dummy variable to indicate long audit committee chair tenure (LONG\_ACCH), and all interactions between the LONG\_ACCH variable and the CEO\_TEN, AUD\_TEN, and MIN\_CEO\_AUD. Columns 1 (3) and 2 (4) present the results using minimum collaborative tenure and regular interactions for gamma (OLS).

For column 1, the coefficient on MIN\_CEO\_AUD is negative and significant at the 1% level indicating that longer collaborative tenure between the CEO and auditor decreases earnings management (i.e., positive discretionary accruals) for companies with short audit committee chair tenure. The coefficient on LACCH\*MIN\_CEO\_AUD is positive and significant at the 5% level, indicating a differential effect for companies with long audit committee chair tenure. The joint test

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<sup>28</sup> High audit committee chair tenure is greater than or equal to six years (the sample median) and low tenure is less than six years.



of  $LACCH * MIN\_CEO\_AUD + MIN\_CEO\_AUD$  is not significant, indicating that long collaborative tenure between the CEO and auditor does not decrease positive discretionary accruals for companies with long audit committee chair tenure. These results apply to the gamma distribution; however, there is no difference between short and long audit committee chair tenure when using OLS. In column 3, longer collaborative tenure between the CEO and auditor reduces positive discretionary accruals ( $MIN\_CEO\_AUD$ ), but the  $LACCH * MIN\_CEO\_AUD$  is not significant, indicating no differential effect for companies with long audit committee chair tenure. This is the same conclusion when using regular interaction variables (columns 2 and 4) for both gamma and OLS. For these tests, we look to the  $CEO\_AUD$  and  $LACCH * CEO\_AUD$  variables. Thus, three out of four tests provide no evidence of a differential effect for collaborative auditor and manager tenure across different audit committee chair tenure lengths. Therefore, results for test 3 predominantly provide the same conclusion as in test one. There is an effect for long collaborative tenure between the CEO and the auditor, but the effect does not differ based on audit committee chair tenure.

*[Insert Table 10 here]*

Table 10 presents the same analysis using real earnings management measures. For column 1, the coefficient on  $MIN\_CEO\_AUD$  is not significant indicating that longer collaborative tenure between the CEO and auditor is not associated with real earnings management techniques for the companies with short audit committee chair tenure. In addition, the coefficient on  $LACCH * MIN\_CEO\_AUD$  is also not significant, indicating no differential effect for companies with long audit committee chair tenure. Thus, there is no significant association between collaborative auditor and manager tenure and abnormal cash flow from operations for companies with either short or long audit committee chair tenure.

For columns 2 and 3, the coefficient on MIN\_CEO\_AUD is not significant indicating that longer collaborative tenure between the CEO and auditor is not associated with real earnings management techniques for the companies with short audit committee chair tenure. For column 2 (3), the coefficient on LACCH\*MIN\_CEO\_AUD is positive (negative) and significant at the 10% level, indicating a differential effect for companies with long audit committee chair tenure. The positive coefficient on LACCH\*MIN\_CEO\_AUD in column 2 indicates that companies with both long collaborative tenure between the CEO and auditor and a long audit committee chair tenure, are associated with higher abnormal production costs. Higher levels of production can lead to lower cost of goods sold, an alternative method for reporting higher earnings.<sup>29</sup> The negative coefficient on LACCH\*MIN\_CEO\_AUD in column 3 indicates that companies with both long collaborative tenure between the CEO and auditor and a long audit committee chair tenure, are associated with lower abnormal discretionary expenses, another alternative method for reporting higher earnings. Thus, in contrast to the results reported in Table 9, there is a differential effect based on audit committee chair tenure, with the result found in the subset of companies with long audit committee chair tenure.

*[Insert Table 11 here]*

Table 11 reports the results of the Dechow and Dichev (2002) model as modified by McNichols (2002). The variables of primary interest, MIN\_CEO\_AUD and LACCH\*MIN\_CEO\_AUD, are not significant, indicating no significant association between collaborative CEO and auditor tenure and the standard deviation of abnormal accruals for companies with either long or short audit committee chair tenure.

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<sup>29</sup> Refer to Cohen et al. (2008) p 765 for a discussion of how increases in production can affect reported earnings.

#### ***Test 4 Results – Audit committee chair changes***

*[Insert Tables 12 and 13 here]*

Tables 12 and 13 report the results of the analysis of audit committee chair changes. I use three separate variables representing the first, second, and third year of an audit committee chair change (ACCHD1; ACCHD2; ACCHD3). Columns 1 and 2 use positive discretionary accruals as the dependent variable. In these specifications the coefficient on ACCHD1 is positive and significant at the 5% level; this indicates a positive association between an audit committee chair change and earnings management (i.e. positive discretionary accruals) for the first year with the new audit committee chair. The coefficients on ACCHD2 and ACCHD3 are not significant, indicating no association between an audit committee chair change in the second or third year after the change and earnings management. Since I only find results in the first year of the audit committee chair change (ACCHD1), I perform tests 5 and 6 using only the ACCHD1 indicator variable for audit committee chair changes when using positive discretionary accruals as the dependent variable.

Columns 3-6 use the Dechow and Dichev (2002) model [with the McNichols (2002) modifications] as the dependent variable. Columns 3 and 4 present results for all companies for which data is available to calculate the Dechow and Dichev measure. In column 3 the ACCHD2 variable is significant. It is negative and significant at the 10% level, indicating a negative association between the year after an audit committee chair change and the standard deviation of abnormal accruals (i.e. the audit committee chair change is associated with higher accrual quality). Since I only find results for the ACCDH2 indicator variable, I perform tests 5 and 6 using only this one audit committee chair change indicator variable for the accrual quality (Dechow and Dichev 2002) analysis. The results in the accrual quality analysis differ from that found in the positive discretionary accrual analysis. The audit committee chair change is associated with higher positive

discretionary accruals (i.e. more earnings management) and the audit committee chair change is associated with higher accrual quality in the year after the audit committee chair change. Because of these seemingly conflicting results, I also perform two additional tests in columns 5 and 6. These columns display results only for companies that have positive discretionary accruals and have data necessary to calculate the Dechow and Dichev measure. In this set of tests neither the ACCHD1 nor the ACCHD2 variable is significant; indicating no association between an audit committee chair change and accrual quality for this smaller subset of companies.

Table 13 presents the same analysis using the three real earnings management measures as the dependent variables. None of the three audit committee chair change variables are significant; indicating no significant association between an audit committee chair change and the use of real earnings management techniques.

***Test 5 Results – Audit committee chair changes across different lengths of auditor tenure***

*[Insert Tables 14 and 15 here]*

Tables 14 and 15 report the results of the analysis of audit committee chair changes across different lengths of auditor tenure using positive discretionary accruals as the dependent variable. Table 14 reports results using the auditor tenure categories of short, medium and long following Davis et al. (2009) and Table 15 reports results using auditor tenure categories of short and long (PCAOB 2011). Columns one and three report results with the auditor tenure indicator variables. In Table 14 short and long auditor tenure indicator variables are used following Davis et al. 2009. With the gamma regression (column 1), I find that compared with medium auditor tenure (4-14 years), short auditor tenure (2-3 years) is positively associated with positive discretionary accruals. Neither the short tenure indicator variable (SHORT\_D) or the long tenure indicator (LONG\_D) are significant using OLS (column 3). The OLS results are consistent with the results in the post-SOX

period of the Davis et al. (2009) study. In Table 15, the PCAOB classification is used, splitting auditor tenure into two categories: short (10 years or less) and long (greater than 10 years). The SHORT\_P variable is positive and significant at the 5% level (columns 1 and 3), indicating that short auditor tenure is associated with higher positive discretionary accruals. This is opposite to the PCAOB's concerns of long auditor tenure being associated with negative financial reporting outcomes.

Next, I perform the main analysis using the ACCHD1 variable (audit committee chair change indicator variable), the short and long auditor tenure variables (SHORT\_D and LONG\_D) and the interaction of these variables (ACCHD1 interacted with both short and long auditor tenure variables). Since I only find results in the first year of the audit committee chair change (refer to Table 12), I focus the rest of my analysis using only the ACCHD1 indicator variable for audit committee chair changes (refer to columns 2 and 4). The SHORT\_D and the SHORT\_P variables are generally positive and significant. This indicates that short auditor tenure firms without an AC chair<sup>30</sup> change have higher positive discretionary accruals compared to medium (long) auditor tenure firms without an AC chair change for the Davis (PCAOB) classifications. This is consistent with the results reported in columns 1 and 3 which did not include any AC chair change variables. However, my research question is to assess whether the association of audit committee chair changes and earnings management differs across different lengths of auditor tenure. Table 14 (columns 2 and 4) report the results for the Davis et al. (2009) classifications and Table 15 (columns 2 and 4) report the results for the PCAOB (2011) classifications.

For the Davis et al. (2009) classifications, the combined coefficients of SHORT\_D + ACCHD1\_SHORT\_D are not significant (p-value = 0.649). This indicates that short auditor tenure

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<sup>30</sup> I use the abbreviation AC chair change to represent audit committee chair change.

firms with AC chair changes are not different from medium auditor tenure firms with AC chair changes in regards to their association to positive discretionary accruals. The combined coefficients of LONG\_D + ACCHD1\_LONG\_D are not significant (p-value = 0.614). This indicates that long auditor tenure firms with AC chair changes are not different from medium auditor tenure firms with AC chair changes in regards to their association to positive discretionary accruals. For the PCAOB 2011 classifications, the combined coefficients of SHORT\_P + ACCHD1\_SHORT\_P are not significant (p-value = 0.224). This indicates that short auditor tenure firms with AC chair changes are not different from long auditor tenure firms with AC chair changes in regards to their association to positive discretionary accruals. Thus, there is no difference in the association of audit committee chair changes with earnings management across different lengths of auditor tenure.

*[Insert Table 16 here]*

Table 16 reports the results of the same analyses as in column six of Tables 14 and 15 but with real earnings management measures as the dependent variable. I include the dummy variable ACCHD1 which represents a one for the first year of an audit committee chair change, auditor tenure indicator variables (Davis et al. 2009 or PCAOB 2011 classifications) and auditor tenure interacted with the audit committee chair change dummy variable. The first three columns use the Davis et al. (2009) auditor tenure categories and columns four through six use the PCAOB (2011) auditor tenure categories. The SHORT\_D and SHORT\_P variables are not significant in any of the six specifications. This indicates that short auditor tenure firms without an AC chair change are not different compared to medium (long) auditor tenure firms without an AC chair change for the Davis (PCAOB) classifications. However, I am interested in assessing whether the association of AC chair changes and earnings management differs across different lengths of auditor tenure.

For column 1, I find that  $SHORT\_D + ACCHD1*SHORT\_D$  is negative and significant at the 10% level (p-value of 0.057). This indicates that short auditor tenure firms with AC chair changes are associated with lower abnormal cash flow from operations compared to medium auditor tenure firms with AC chair changes. An alternative method for reporting higher earnings is to give customers more price discounts or offer more relaxed credit terms in order to increase sales; however, this in turn can lower the level of cash flow from operations. Thus, there is some evidence that short auditor tenure firms are associated with higher real earnings management, compared to the medium auditor tenure firms. The sum of  $LONG\_D + ACCHD1*LONG\_D$  is not significant (p-value of 0.875), which indicates that long auditor tenure firms with AC chair changes are not different from medium auditor tenure firms with AC chair changes in regards to their association with abnormal cash flow from operations. With untabulated joint tests for columns 2 and 3, I find that both short and long auditor tenure firms with an AC chair change are not different from medium auditor tenure firms with an AC chair change in their association with abnormal production costs or abnormal discretionary expenditures.

Using only two auditor tenure classifications (short and long) based on the PCAOB 2011 concept release, I find that the sum of  $SHORT\_P + ACCHD1*SHORT\_P$  is negative and significant at the 10% level (p-value of 0.086). This indicates that short auditor tenure firms with AC chair changes are associated with lower abnormal cash flow from operations compared to long auditor tenure firms with AC chair changes. Thus, contrary to the PCAOB's concerns regarding long auditor tenure, I find some evidence that short auditor tenure firms are engaging in more real earnings management. Similar to the results with the Davis et al. (2009) classifications, in untabulated results I find no difference between the short and long auditor tenure groups with AC

chair changes regarding their association with abnormal production costs or abnormal discretionary expenses.

*[Insert Tables 17 and 18 here]*

Table 17 reports the results of the Dechow and Dichev (2002) model as modified by McNichols (2002) using the Davis et al. (2009) auditor tenure classification. Untabulated results for SHORT\_D + ACCHD2\_SHORT\_D are consistent with those found with the positive discretionary accruals in Table 14; short auditor tenure firms with AC chair changes are not different from medium auditor tenure firms with AC chair changes in regards to their association with the standard deviation of abnormal accruals (p-value of 0.127). However when examining the long auditor tenure firms results differ from the positive discretionary accrual analysis. Untabulated results for LONG\_D + ACCHD2\_LONG\_D reveal that long auditor tenure firms with AC chair changes are different from medium auditor tenure firms with AC chair changes in regards to their association with the standard deviation of abnormal accruals. The long auditor tenure firms have a lower standard deviation of abnormal accruals compared to the medium auditor tenure firms (coefficient of -0.13348 and p-value of 0.047). Table 18 reports of same analysis using the PCAOB (2011) classifications for auditor tenure. Untabulated results for SHORT\_P + ACCHD2\*SHORT\_P indicate that there is no difference when comparing short auditor tenure firms with an AC chair change to long auditor tenure firms with an AC chair change (p-value of 0.475) Thus, I find limited evidence that there is a difference in the association of audit committee chair changes with accrual quality across different lengths of auditor tenure; it is found in the longer auditor tenure firms using the Davis et al. (2009) auditor tenure classifications. They have a lower standard deviation of abnormal accruals and therefore higher accrual quality. This makes sense because earlier in Table 12 I found a negative and significant coefficient on ACCHD2 (Table 12 – column 3).



***Test 6 Results – Audit committee chair changes and the collaborative tenure of the auditor and manager***

*[Insert Table 19 here]*

Table 19 analyzes whether the effect from the collaborative tenure of the CEO and auditor varies given an audit committee chair change. The dependent variable is positive discretionary accruals and the variables of primary interest are MIN\_CEO\_AUD and ACCHD1\*MIN\_CEO\_AUD and CEO\_AUD and ACCHD1\*CEO\_AUD for minimum collaborative tenure and regular interactions, respectively. In column 1 the coefficient on MIN\_CEO\_AUD is negative and significant at the 1% level, indicating that longer collaborative tenure between the CEO and the auditor decreases earnings management (i.e., positive discretionary accruals) for companies with no audit committee chair change. The coefficient on ACCHD1\*MIN\_CEO\_AUD is negative and significant at the 5% level, indicating a differential effect for companies with an audit committee chair change. The same conclusion is reached using the regular interaction variables with a gamma distribution (column 2). The differential effect for companies with an audit committee chair change is not present when using OLS, however, as previously mentioned, using a gamma distribution provides estimates that fit the data better. Thus, the conclusion is that longer collaborative tenure between the auditor and CEO constrains earnings management (as found in test 1) and there is an even greater effect when there is an audit committee chair change (i.e., there are fewer positive discretionary accruals).

*[Insert Table 20 here]*

Table 20 reports the same analysis using real earnings management measures. Neither of the variables of primary interest MIN\_CEO\_AUD and ACCHD1\*MIN\_CEO\_AUD are significant in any of the three specifications. This is consistent with the results found in Table 4 earlier; no

significant association between longer collaborative CEO and auditor tenure and the use of real earnings management measure. This test in Table 20 tells us that there is no effect for joint CEO and auditor tenure based on splitting the sample between a company having or not having an audit committee chair change.

*[Insert Table 21 here]*

Table 21 reports the results of the Dechow and Dichev (2002) model as modified by McNichols (2002). The variable of interest, MIN\_CEO\_AUD and ACCHD2\*MIN\_CEO\_AUD, are not significant, indicating no significant association between collaborative CEO and auditor tenure and the standard deviation of abnormal accruals for companies with or without audit committee chair changes.

## V. Sensitivity tests

I perform two additional versions for each analysis where manager tenure is based on: (1) the companies' CFO tenure, and (2) the combined CEO and CFO tenure. Untabulated results replacing CEO tenure with CFO tenure reveal that there is no significant association between collaborative CFO tenure and auditor tenure. Additionally, there is also no significant association when considering the collaborative tenure of all three parties (CEO, CFO and auditor). The CEO is the head of the company and is the one who would have the final responsibility for missing earnings benchmarks. If a little "extra" is needed to meet those benchmarks it would likely be the CEO instructing the CFO to do what is necessary in the accounting records to meet the desired goal. Thus, if there is a benefit to be had from a longer time served with the auditor it makes sense that it would be with the CEO who has the final authority to make the decision as to whether or not to employ some "extra" measures.

Prior research documents a positive association between audit committee turnover and accounting restatements (Srinivasan 2005; Arthaud-Day et al. 2005) and audit committee turnover and the disclosure of internal control material weaknesses (Johnstone et al. 2011). Restatement and/or disclosure of internal control material weaknesses could provide an incentive to improve the quality of the earnings reported by the company in future periods. Therefore, I conduct sensitivity tests to rule out the possibility that any difference in earnings management/accrual quality after an audit committee chair change is not due to these confounding events. I perform the following independent tests for the audit committee chair change analysis (tests 4-6) as follows: first, I control for accounting restatements in the three prior years (Srinivasan 2005); second, I control for internal control material weaknesses in the prior year (Johnstone et al. 2011); third, I drop firms with restatements involving fraud or SEC investigations because these types of events can produce

different outcomes (see for example Hennes et al. 2008). I perform these tests for the positive discretionary accrual sample, for which I previously found significant results. The results are predominantly the same with all three of the above additional specifications. In one instance (of the three modifications noted above) in Test 5 and one instance in Test 6 the significance drops one level, other than that all results are unchanged.

Results are also unchanged when including industry fixed effects for the positive discretionary accruals analyses.

## **VI. Conclusion**

The financial reporting process is an outcome from three major parties: management, the auditor and the audit committee. Prior research has focused primarily on the auditor for research questions involving financial reporting quality and earnings management; however, my study also considers the effect of the CEO and the audit committee chair. I examine how the collaborative tenure between the CEO and the auditor is associated with earnings management and accrual quality, as well as how the collaborative tenure among all three groups (CEO, auditor, and audit committee chair) is associated with earnings management and accrual quality. I find that longer collaborative tenure between the CEO and the auditor is associated with lower positive discretionary accruals (i.e., less earnings management). This finding is contrary to the PCAOB's concerns regarding long auditor tenure and lower financial reporting quality (PCAOB 2011). The PCAOB's August 2011 concept release called for further information regarding the idea of mandatory auditor rotation. This study provides evidence that longer auditor tenure is not necessarily an undesirable situation, either by itself and particularly not if the long tenure is coupled with long tenure of the CEO. I do not find that the joint tenure of the three parties (CEO, auditor and audit committee chair) is significantly associated with earnings management or accrual quality.

In the second part of my study, I examine how audit committee chair changes are associated with earnings management and accrual quality. I find that the first year of an audit committee chair change is associated with an increase in positive discretionary accruals. I do not find that this association differs based on different lengths of auditor tenure. I do find that longer collaborative tenure between the auditor and the CEO constrains earnings management and there is an even greater effect when there is an audit committee chair change (i.e., there are fewer positive discretionary accruals). Thus, consistent with the first part of my study, I find that there is a benefit

to longer time served between the CEO and the auditor contrary to the PCAOB 's concerns regarding lengthy auditor tenure relationships.

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## Appendix

### Table 1: Variable definitions

CEO_TEN	= CEO tenure in years;
AUD_TEN	= Auditor tenure in years;
ACCH_TEN	= Audit committee chair tenure as a board member;
MIN_CEO_AUD	= Minimum between the CEO tenure and the auditor tenure;
CEO*AUD	= Interaction between CEO tenure (CEO_TEN) and auditor tenure (AUD_TEN);
MIN_CEO_ACCH	= Minimum between CEO tenure (CEO_TEN) and audit committee chair tenure (ACCH_TEN);
MIN_ACCH_AUD	= Minimum between audit committee chair tenure (ACCH_TEN) and auditor tenure (AUD_TEN);
MIN_CEO_ACCH_AUD	= Minimum among CEO tenure (CEO_TEN), audit committee chair tenure (ACCH_TEN), and auditor tenure (AUD_TEN);
CEO*ACCH	= Interaction between CEO tenure (CEO_TEN) and audit committee chair tenure (ACCH_TEN);
ACCH*AUD	= Interaction between audit committee chair tenure (ACCH_TEN) and auditor tenure (AUD_TEN);
CEO*ACCH*AUD	= Interaction of the variables CEO tenure (CEO_TEN), audit committee chair tenure (ACCH_TEN), and auditor tenure (AUD_TEN).
LONG_ACCH	= Equal one if audit committee chair tenure is bigger than the sample median (ACCH_TEN>6);
LACCH*CEO_TEN	= Interaction between LONG_ACCH and CEO_TEN;
LACCH*AUD_TEN	= Interaction between LONG_ACCH and AUD_TEN;
LACCH*MIN_CEO_AUD	= Interaction between LONG_ACCH and MIN_CEO_AUD;
LACCH*CEO*AUD	= Interaction of LONG_ACCH and CEO*AUD;
ACCHD1	= Equals one in the year of an audit committee chair change, zero otherwise.
ACCHD2	= Equals one in the year after an audit committee chair change, zero otherwise.
ACCHD3	= Equals one in the second year after an audit committee chair change, zero otherwise.

**Table 1 (continued)**

SHORT_D	= Equals one if auditor tenure is two or three years, zero otherwise (Davis et al. 2009, classification);
LONG_D	= Equals one if auditor tenure is fifteen years or greater, zero otherwise (Davis et al. 2009, classification);
ACCHD1*SHORT_D	= Interaction of ACCHD1 and SHORT_D;
ACCHD1*LONG_D	= Interaction of ACCHD1 and LONG_D;
ACCHD1*AUD_TEN	= Interaction of ACCHD1 and AUD_TEN;
ACCHD1*CEO_TEN	= Interaction of ACCHD1 and CEO_TEN;
ACCHD1*MIN_CEO_AUD	= Interaction of ACCHD1 and MIN_CEO_AUD;
ACCHD1*CEO*AUD	= Interaction of ACCHD1, CEO_TEN, and AUD_TEN;
SHORT_P	= Equals one if auditor tenure is ten year or less, zero otherwise (PCAOB 2011);
ACCHD1*SHORT_P	= Interaction of ACCHD1 and SHORT_P;
SIZE	= Natural log of total assets;
CFO	= Operating cash flows divided by beginning total assets;
LEVERAGE	= Total liabilities divided by total assets;
BIG_N	= Equal to one if the auditor is one of the following: PWC, EY, KPMG, or Deloitte;
SALE_GROWTH	= (total sales – beginning total sales) / beginning total sales;
DUALITY	= equal to one if the CEO is also the Chairman of the Board;
ALTMAN	= Altman-z score, a measure of the probability of bankruptcy;
AGE	= Number of years on CRSP;
TREND	= The difference between the year and 2005;
BD_SIZE	= Number of board members;
IMPORT	= Local client importance, measured as individual client audit fees/total audit fees (calculated per auditor office).

## Table 2: Descriptive Statistics

### Panel A: Descriptive statistics for full sample

N=3,946

	25th Percentile	Mean	Median	75th Percentile	Std. Dev.
DA	-0.095	-0.054	-0.048	-0.005	0.089
Abnormal cash flow	-0.015	0.044	0.042	0.104	0.112
Abnormal production costs	-0.123	-0.025	-0.023	0.077	0.197
Abnormal Discretionary expenditures	-0.155	-0.031	-0.039	0.067	0.221
DD (*)	0.016	0.030	0.024	0.036	0.022
AUD_TEN	7.000	15.480	13.000	21.000	10.310
CEO_TEN	3.000	8.060	6.000	10.000	7.160
ACCH_TEN	3.000	7.330	6.000	10.000	5.840
MIN_CEO_AUD	3.000	6.180	5.000	8.000	4.680
MIN_CEO_ACCH_AUD	2.000	4.300	4.000	5.000	3.210
SIZE	6.440	7.430	7.320	8.350	1.450
CFO	0.073	0.123	0.116	0.172	0.103
LEVERAGE	0.347	0.502	0.496	0.623	0.240
BIG_N	1.000	0.953	1.000	1.000	0.212
DUALITY	0.000	0.467	0.000	1.000	0.499
ALTMAN	1.718	2.478	2.361	3.249	1.701
SALE_GROWTH	-0.230	0.071	0.667	0.164	0.278
AGE	12.000	25.907	18.000	37.000	19.490
BD_SIZE	8.000	10.034	9.000	11.000	3.281
IMPORT	0.019	0.107	0.044	0.111	0.168

(\*) Sample size for standard deviation of abnormal accruals N=3,673



**Table 2 (continued)****Panel B: Descriptive statistics for positive discretionary accruals**      **N=893**

	25th Percentile	Mean	Median	75th Percentile	Std. Dev.
DA	0.013	0.049	0.031	0.061	0.062
AUD_TEN	7.000	15.627	14.000	21.000	10.316
CEO_TEN	3.000	8.365	6.000	11.000	7.601
ACCH_TEN	3.000	7.251	6.000	9.000	5.780
MIN_CEO_AUD	3.000	6.342	5.000	8.000	5.019
MIN_CEO_ACCH_AUD	2.000	4.259	3.000	6.000	3.166
SIZE	6.175	7.180	6.990	8.024	1.453
CFO	0.016	0.047	0.060	0.104	0.111
LEVERAGE	0.368	0.534	0.522	0.669	0.244
BIG_N	1.000	0.934	1.000	1.000	0.248
DUALITY	0.000	0.424	0.000	1.000	0.494
ALTMAN	1.563	2.309	2.329	3.264	1.901
SALE_GROWTH	-0.039	0.075	0.057	0.192	0.369
AGE	12.000	25.931	19.000	36.000	19.314
BD_SIZE	8.000	10.068	9.000	11.000	3.409
IMPORT	0.016	0.107	0.043	0.114	0.168

**Table 3: Test 1 – Collaborative CEO-Auditor tenure and positive discretionary accruals analysis**

$$DA_{it} = \beta_0 + \beta_1 AUD\_TEN_{it} + \beta_2 CEO\_TEN_{it} + \beta_3 MIN\_CEO\_AUD_{it} (CEO*AUD_{it}) + \beta_4 SIZE_{it} + \beta_5 CFO_{it} + \beta_6 LEVERAGE_{it} + \beta_7 BIG\_N_{it} + \beta_8 DUALITY_{it} + \beta_9 ALTMAN_{it} + \beta_{10} SALE\_GROWTH_{it} + \beta_{11} AGE_{it} + \beta_{12} TREND_{it} + \beta_{13} BD\_SIZE_{it} + \beta_{14} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution Regular interactions	(3) OLS	(4) OLS Regular interactions
CONSTANT	-2.449802*** (0.000)	-2.558248*** (0.000)	0.058493*** (0.000)	0.052345*** (0.000)
AUD_TEN	0.001152 (0.775)	0.005579 (0.246)	-0.000036 (0.856)	0.000233 (0.311)
CEO_TEN	0.013200*** (0.009)	0.015442** (0.011)	0.000552** (0.041)	0.000827*** (0.007)
MIN_CEO_AUD	-0.034231*** (0.000)		-0.001285*** (0.003)	
CEO*AUD		-0.001143*** (0.001)		-0.000057*** (0.001)
SIZE	-0.127377*** (0.000)	-0.122498*** (0.001)	-0.003138* (0.080)	-0.003054* (0.084)
CFO	-3.273261*** (0.000)	-3.233607*** (0.000)	-0.386700*** (0.000)	-0.387550*** (0.000)
LEVERAGE	0.387315** (0.017)	0.368052** (0.027)	0.022766*** (0.010)	0.022566** (0.010)
BIG_N	0.003250 (0.981)	-0.024482 (0.855)	-0.005392 (0.503)	-0.006309 (0.438)
DUALITY	-0.000267 (0.997)	-0.037641 (0.623)	0.000299 (0.932)	-0.000797 (0.823)
ALTMAN	0.011750 (0.709)	0.006158 (0.852)	0.001741 (0.246)	0.001679 (0.263)
SALE_GROWTH	0.137439* (0.051)	0.145188** (0.041)	0.018383*** (0.005)	0.018236*** (0.005)
AGE	-0.000572 (0.782)	0.000209 (0.919)	0.000020 (0.852)	0.000053 (0.624)
TREND	0.040203* (0.073)	0.039392* (0.080)	0.003597*** (0.001)	0.003648*** (0.001)
BD_SIZE	0.013041 (0.509)	0.008916 (0.648)	0.001590 (0.113)	0.001470 (0.140)
IMPORT	-0.393119* (0.054)	-0.418530** (0.040)	-0.026093*** (0.004)	-0.027489*** (0.003)
Observations	893	893	893	893
AIC	-4.336	-4.334	-3.384	-3.385

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals. Columns (1) and (3) use the minimum between CEO tenure and auditor tenure (MIN\_CEO\_AUD) as the test variable. Columns (2) and (4) use regular interactions of CEO tenure and auditor (CEO\*AUD) as the test variable. All variables are as defined in Table 1.

**Table 4: Test 1 – Collaborative CEO-Auditor tenure and real earnings management analysis**

$$REM_{it} = \beta_0 + \beta_1 AUD\_TEN_{it} + \beta_2 CEO\_TEN_{it} + \beta_3 MIN\_CEO\_AUD_{it} + \beta_4 SIZE_{it} + \beta_5 CFO_{it} + \beta_6 LEVERAGE_{it} + \beta_7 BIG\_N_{it} + \beta_8 DUALITY_{it} + \beta_9 ALTMAN_{it} + \beta_{10} SALE\_GROWTH_{it} + \beta_{11} AGE_{it} + \beta_{12} TREND_{it} + \beta_{13} BD\_SIZE_{it} + \beta_{14} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
CONSTANT	0.0082 (0.714)	-0.1214*** (0.005)	0.1600*** (0.004)
AUD_TEN	0.0002 (0.381)	-0.0004 (0.578)	0.0003 (0.742)
CEO_TEN	0.0002 (0.595)	-0.0006 (0.579)	0.0006 (0.598)
MIN_CEO_AUD	-0.0005 (0.455)	0.0011 (0.481)	-0.0007 (0.687)
SIZE	0.0067*** (0.005)	0.0185*** (0.002)	-0.0339*** (0.000)
CFO	0.3880*** (0.000)	-0.7484*** (0.000)	0.3062*** (0.008)
LEVERAGE	-0.0770*** (0.000)	0.0463 (0.176)	0.0043 (0.900)
BIG_N	0.0053 (0.684)	0.0570** (0.024)	-0.0504 (0.112)
DUALITY	-0.0036 (0.423)	-0.0093 (0.400)	-0.0004 (0.972)
ALTMAN	-0.0084*** (0.006)	0.0125** (0.010)	-0.0123** (0.030)
SALE_GROWTH	-0.0196*** (0.009)	0.0495*** (0.002)	0.0168 (0.351)
AGE	-0.0002* (0.083)	0.0002 (0.514)	-0.0003 (0.499)
TREND	-0.0037*** (0.000)	0.0028 (0.101)	0.0081*** (0.000)
BD_SIZE	-0.0011 (0.405)	-0.0077** (0.034)	0.0091* (0.056)
IMPORT	-0.0359*** (0.008)	0.0384 (0.237)	0.0280 (0.482)
DA	-0.4561*** (0.000)	-0.0085 (0.918)	0.1415 (0.191)
OBSERVATIONS	3,946	3,946	3,946
AIC	-2.158	-0.556	-0.222

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

REM is one of three real earnings management measures as described in Section III. All variables are as defined in Table 1.

**Table 5: Test 1 – Collaborative CEO-Auditor tenure and accrual quality analysis**

$$\text{STD\_DA}_{it} = \beta_0 + \beta_1\text{AUD\_TEN}_{it} + \beta_2\text{CEO\_TEN}_{it} + \beta_3\text{MIN\_CEO\_AUD}_{it} + \beta_4\text{SIZE}_{it} + \beta_5\text{CFO}_{it} + \beta_6\text{LEVERAGE}_{it} + \beta_7\text{BIG\_N}_{it} + \beta_8\text{DUALITY}_{it} + \beta_9\text{ALTMAN}_{it} + \beta_{10}\text{SALE\_GROWTH}_{it} + \beta_{11}\text{AGE}_{it} + \beta_{12}\text{TREND}_{it} + \beta_{13}\text{BD\_SIZE}_{it} + \beta_{14}\text{IMPORT}_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) OLS
CONSTANT	-2.37648*** (0.000)	0.06902*** (0.000)
AUD_TEN	-0.00456* (0.075)	-0.00014* (0.052)
CEO_TEN	-0.00492 (0.232)	-0.00017 (0.184)
MIN_CEO_AUD	-0.00015 (0.980)	0.00002 (0.930)
SIZE	-0.14796*** (0.000)	-0.00448*** (0.000)
CFO	-0.20980 (0.261)	-0.01005 (0.239)
LEVERAGE	0.24710*** (0.004)	0.00699** (0.012)
BIG_N	-0.06378 (0.556)	-0.00516 (0.257)
DUALITY	0.02955 (0.423)	0.00053 (0.630)
ALTMAN	0.00523 (0.656)	0.00005 (0.899)
SALE_GROWTH	-0.03570 (0.403)	-0.00202 (0.369)
AGE	-0.00008 (0.950)	-0.00000 (0.992)
TREND	-0.00479 (0.550)	-0.00023 (0.352)
BD_SIZE	-0.00067 (0.953)	0.00005 (0.873)
IMPORT	0.07447 (0.504)	0.00125 (0.672)
OBSERVATIONS	3,673	3,673
AIC	-5.078	-4.861

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

STD\_DA is the standard deviation of the residuals from equation (4). The test variable is the collaborative CEO-Auditor tenure (MIN\_CEO\_TEN). Refer to Table 1 for variable definitions.

**Table 6: Test 2 – Collaborative CEO- Audit Committee Chair – Auditor tenure and positive discretionary accruals analysis**

$$DA_{it} = \beta_0 + \beta_1 AUD\_TEN_{it} + \beta_2 CEO\_TEN_{it} + \beta_3 ACCH\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} (CEO*AUD_{it}) + \beta_5 MIN\_CEO\_ACCH_{it} (CEO*ACCH_{it}) + \beta_6 MIN\_ACCH\_AUD_{it} (ACCH*AUD_{it}) + \beta_7 MIN\_CEO\_ACCH\_AUD_{it} (CEO*ACCH*AUD_{it}) + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \epsilon_{it}$$

VARIABLES	(1)	(2)	(3)	(4)
	Gamma distribution	OLS	Gamma distribution	OLS
CONSTANT	-2.4456*** (0.000)	0.0577*** (0.000)	-2.5500*** (0.000)	0.0523*** (0.001)
AUD_TEN	0.0030 (0.522)	0.0001 (0.476)	0.0068 (0.374)	0.0003 (0.389)
CEO_TEN	0.0154** (0.010)	0.0005 (0.104)	0.0191** (0.044)	0.0008 (0.102)
ACCH_TEN	0.0108 (0.480)	0.0010 (0.135)	-0.0047 (0.750)	-0.0001 (0.903)
MIN_CEO_AUD	-0.0379*** (0.001)	-0.0015*** (0.006)		
MIN_CEO_ACCH	-0.0236 (0.350)	-0.0010 (0.421)		
MIN_ACCH_AUD	-0.0211 (0.192)	-0.0018** (0.019)		
MIN_CEO_ACCH_AUD	0.0316 (0.300)	0.0019 (0.193)		
CEO*AUD			-0.0015*** (0.009)	-0.0001*** (0.009)
CEO*ACCH			-0.0003 (0.688)	-0.0000 (0.988)
ACCH*AUD			-0.0002 (0.822)	-0.0000 (0.817)
CEO*ACCH*AUD			0.0000 (0.520)	0.0000 (0.573)
SIZE	-0.1269*** (0.000)	-0.0030* (0.093)	-0.1255*** (0.000)	-0.0030* (0.089)
CFO	-3.2661*** (0.000)	-0.3877*** (0.000)	-3.2239*** (0.000)	-0.3877*** (0.000)
LEVERAGE	0.3887** (0.015)	0.0225*** (0.009)	0.3723** (0.021)	0.0227*** (0.010)
BIG_N	0.0006 (0.997)	-0.0053 (0.498)	-0.0180 (0.893)	-0.0058 (0.481)
DUALITY	-0.0052 (0.944)	0.0001 (0.977)	-0.0376 (0.623)	-0.0009 (0.811)
ALTMAN	0.0115 (0.715)	0.0017 (0.255)	0.0064 (0.843)	0.0017 (0.258)
SALE_GROWTH	0.1352* (0.057)	0.0181*** (0.006)	0.1472** (0.038)	0.0182*** (0.005)

**Table 6 (continued)**

VARIABLES	(1)	(2)	(3)	(4)
	Gamma distribution	OLS	Gamma distribution	OLS
AGE	-0.0010 (0.644)	-0.0000 (0.747)	0.0005 (0.800)	0.0001 (0.581)
TREND	0.0416* (0.065)	0.0037*** (0.001)	0.0399* (0.077)	0.0036*** (0.001)
BD_SIZE	0.0137 (0.482)	0.0016 (0.109)	0.0110 (0.564)	0.0015 (0.134)
IMPORT	-0.3758* (0.062)	-0.0243*** (0.006)	-0.4156** (0.040)	-0.0274*** (0.003)
Observations	893	893	893	893
AIC	-4.329	-3.380	-4.326	-3.377

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals. In columns (1) and (2) the test variable is the minimum among CEO tenure, audit committee chair tenure, and auditor tenure (MIN\_CEO\_ACCH\_AUD). In columns (3) and (4) the test variable is the regular interaction of CEO tenure, audit committee chair tenure, and auditor tenure (CEO\*ACCH\*AUD). All variables are as defined in Table 1.

**Table 7: Test 2 – Collaborative CEO- Audit Committee Chair – Auditor tenure and positive real earnings management analysis**

$$REM_{it} = \beta_0 + \beta_1 AUD\_TEN_{it} + \beta_2 CEO\_TEN_{it} + \beta_3 ACCH\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} + \beta_5 MIN\_CEO\_ACCH_{it} + \beta_6 MIN\_ACCH\_AUD_{it} + \beta_7 MIN\_CEO\_ACCH\_AUD_{it} + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
CONSTANT	0.0098 (0.665)	-0.1260*** (0.004)	0.1669*** (0.003)
AUD_TEN	0.0001 (0.597)	-0.0004 (0.631)	0.0003 (0.695)
CEO_TEN	0.0006 (0.178)	-0.0004 (0.767)	-0.0004 (0.775)
ACCH_TEN	-0.0003 (0.682)	0.0010 (0.447)	-0.0021 (0.162)
MIN_CEO_AUD	-0.0006 (0.471)	-0.0002 (0.900)	0.0011 (0.592)
MIN_CEO_ACCH	-0.0018 (0.190)	-0.0015 (0.611)	0.0060* (0.090)
MIN_ACCH_AUD	0.0004 (0.674)	-0.0008 (0.734)	0.0008 (0.767)
MIN_CEO_ACCH_AUD	0.0009 (0.608)	0.0040 (0.354)	-0.0069 (0.153)
SIZE	0.0068*** (0.004)	0.0185*** (0.002)	-0.0342*** (0.000)
CFO	0.3907*** (0.000)	-0.7515*** (0.000)	0.3084*** (0.007)
LEVERAGE	-0.0776*** (0.000)	0.0461 (0.178)	0.0049 (0.887)
BIG_N	0.0039 (0.771)	0.0600** (0.020)	-0.0538* (0.096)
DUALITY	-0.0037 (0.410)	-0.0099 (0.376)	0.0002 (0.990)
ALTMAN	-0.0084*** (0.006)	0.0124** (0.011)	-0.0122** (0.031)
SALE_GROWTH	-0.0200*** (0.009)	0.0494*** (0.003)	0.0177 (0.331)
AGE	-0.0002 (0.132)	0.0002 (0.537)	-0.0003 (0.509)
TREND	-0.0036*** (0.000)	0.0023 (0.174)	0.0087*** (0.000)
BD_SIZE	-0.0010 (0.448)	-0.0080** (0.027)	0.0095** (0.042)

**Table 7 (continued)**

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
IMPORT	-0.0350*** (0.009)	0.0366 (0.260)	0.0295 (0.457)
DA	-0.4545*** (0.000)	-0.0098 (0.904)	0.1424 (0.189)
OBSERVATIONS	3,946	3,946	3,946
AIC	-2.158	-0.555	-0.222

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

REM is one of three real earnings management measures as described in Section III. All variables are as defined in Table 1.



**Table 8: Test 2 – Collaborative CEO- Audit Committee Chair – Auditor tenure and accruals quality analysis**

$$STA\_DA_{it} = \beta_0 + \beta_1 AUD\_TEN_{it} + \beta_2 CEO\_TEN_{it} + \beta_3 ACCH\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} + \beta_5 MIN\_CEO\_ACCH_{it} + \beta_6 MIN\_ACCH\_AUD_{it} + \beta_7 MIN\_CEO\_ACCH\_AUD_{it} + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \epsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(4) OLS	(5) OLS
CONSTANT	-2.36316*** (0.000)	-2.36613*** (0.000)	0.07011*** (0.000)	0.07000*** (0.000)
AUD_TEN	-0.00626** (0.023)	-0.00609** (0.026)	-0.00019** (0.013)	-0.00018** (0.015)
CEO_TEN	-0.00374 (0.481)	-0.00291 (0.537)	-0.00014 (0.408)	-0.00011 (0.455)
ACCH_TEN	-0.01492** (0.028)	-0.01344** (0.025)	-0.00048*** (0.007)	-0.00043*** (0.008)
MIN_CEO_AUD	-0.00117 (0.880)	-0.00298 (0.628)	-0.00001 (0.962)	-0.00008 (0.670)
MIN_CEO_ACCH	0.00592 (0.632)	0.00092 (0.897)	0.00023 (0.521)	0.00005 (0.824)
MIN_ACCH_AUD	0.01574* (0.086)	0.01336* (0.067)	0.00049* (0.054)	0.00040* (0.053)
MIN_CEO_ACCH_AUD	-0.00736 (0.656)		-0.00027 (0.583)	
SIZE	-0.14767*** (0.000)	-0.14756*** (0.000)	-0.00449*** (0.000)	-0.00448*** (0.000)
CFO	-0.19988 (0.283)	-0.19966 (0.283)	-0.00937 (0.271)	-0.00939 (0.269)
LEVERAGE	0.23964*** (0.005)	0.23895*** (0.005)	0.00675** (0.015)	0.00672** (0.015)
BIG_N	-0.07183 (0.496)	-0.06941 (0.510)	-0.00585 (0.195)	-0.00577 (0.201)
DUALITY	0.02837 (0.444)	0.02707 (0.464)	0.00047 (0.671)	0.00043 (0.700)
ALTMAN	0.00599 (0.610)	0.00596 (0.611)	0.00005 (0.897)	0.00005 (0.900)
SALE_GROWTH	-0.03660 (0.393)	-0.03755 (0.382)	-0.00206 (0.360)	-0.00209 (0.354)
AGE	0.00044 (0.743)	0.00043 (0.751)	0.00002 (0.624)	0.00002 (0.635)
TREND	-0.00405 (0.615)	-0.00427 (0.594)	-0.00022 (0.381)	-0.00023 (0.358)
BD_SIZE	0.00095 (0.933)	0.00094 (0.934)	0.00010 (0.760)	0.00010 (0.757)
IMPORT	0.08344 (0.460)	0.08281 (0.463)	0.00137 (0.644)	0.00136 (0.647)
OBSERVATIONS	3,673	3,673	3,673	3,673
AIC	-5.078	-5.078	-4.863	-4.864

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 STD\_DA is the standard deviation of the residuals from equation (4).

**Table 9: Test 3 – Collaborative CEO – Auditor tenure across different audit committee chair tenure lengths – positive discretionary accruals analysis**

$$DA_{it} = \beta_0 + \beta_1 \text{LONG\_ACCH}_{it} + \beta_2 \text{AUD\_TEN}_{it} + \beta_3 \text{CEO\_TEN}_{it} + \beta_4 \text{MIN\_CEO\_AUD}_{it} (\text{CEO*AUD}_{it}) + \beta_5 \text{LACCH*CEO\_TEN}_{it} + \beta_6 \text{LACCH\_AUD\_TEN}_{it} + \beta_7 \text{LACCH*MIN\_CEO\_AUD}_{it} (\text{LACCH*CEO*AUD}_{it}) + \beta_8 \text{SIZE}_{it} + \beta_9 \text{CFO}_{it} + \beta_{10} \text{LEVERAGE}_{it} + \beta_{11} \text{BIG\_N}_{it} + \beta_{12} \text{DUALITY}_{it} + \beta_{13} \text{ALTMAN}_{it} + \beta_{14} \text{SALE\_GROWTH}_{it} + \beta_{15} \text{AGE}_{it} + \beta_{16} \text{TREND}_{it} + \beta_{17} \text{BD\_SIZE}_{it} + \beta_{18} \text{IMPORT}_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
CONSTANT	-2.373380*** (0.000)	-2.539185*** (0.000)	0.059902*** (0.000)	0.052436*** (0.000)
LONG_ACCH	-0.252868* (0.075)	-0.210921 (0.207)	-0.007533 (0.259)	-0.006435 (0.424)
CEO_TEN	0.019764*** (0.008)	0.016682* (0.070)	0.000579 (0.151)	0.000731 (0.112)
AUD_TEN	0.002244 (0.672)	0.006373 (0.327)	-0.000001 (0.997)	0.000266 (0.337)
MIN_CEO_AUD	-0.056454*** (0.000)		-0.001840*** (0.004)	
LACCH*CEO_TEN	-0.010754 (0.290)	0.002588 (0.823)	-0.000024 (0.966)	0.000306 (0.612)
LACCH*AUD_TEN	-0.001885 (0.771)	0.000567 (0.944)	-0.000097 (0.740)	-0.000035 (0.924)
LACCH*MIN_CEO_AUD	0.043519** (0.012)		0.001170 (0.174)	
CEO*AUD		-0.001530*** (0.003)		-0.000068*** (0.002)
LACCH*CEO*AUD		0.000560 (0.380)		0.000019 (0.508)
SIZE	-0.128644*** (0.000)	-0.127897*** (0.000)	-0.003041* (0.092)	-0.003008* (0.093)
CFO	-3.280458*** (0.000)	-3.246734*** (0.000)	-0.386697*** (0.000)	-0.387891*** (0.000)
LEVERAGE	0.414528*** (0.007)	0.405793** (0.011)	0.023025*** (0.008)	0.022961*** (0.009)
BIG_N	0.012837 (0.927)	-0.017530 (0.900)	-0.004564 (0.572)	-0.005584 (0.494)
DUALITY	-0.000672 (0.993)	-0.033496 (0.663)	0.000135 (0.970)	-0.000998 (0.783)
ALTMAN	0.018057 (0.538)	0.011175 (0.721)	0.001880 (0.205)	0.001811 (0.223)
SALE_GROWTH	0.140311** (0.038)	0.150546** (0.031)	0.018456*** (0.005)	0.018369*** (0.005)
AGE	-0.000133 (0.949)	0.000596 (0.772)	0.000026 (0.807)	0.000059 (0.566)
TREND	0.039227* (0.074)	0.039800* (0.071)	0.003573*** (0.001)	0.003669*** (0.001)
BD_SIZE	0.011281 (0.562)	0.012116 (0.527)	0.001580 (0.114)	0.001526 (0.122)
IMPORT	-0.375763* (0.066)	-0.400112** (0.049)	-0.025561*** (0.007)	-0.027047*** (0.004)
Observations	893	893	893	893
AIC	-4.336	-4.330	-3.379	-3.380

**Table 9 (continued)**

\*\* p<0.01, \* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals. LONG\_ACCH equals one if audit committee chair tenure bigger than sample median of six years, zero otherwise. In columns (1) and (3) the test variable is the interaction between LONG\_ACCH and MIN\_CEO\_AUD (LACCH\*MIN\_CEO\_AUD). In columns (2) and (4) the test variable is the interaction of LONG\_ACCH, CEO tenure, and auditor committee chair tenure (LACCH\*CEO\*AUD). All variables are as defined in Table 1.

**Table 10: Test 3 – Collaborative CEO – Auditor tenure across different audit committee chair tenure lengths – real earnings management analysis**

$$REM_{it} = \beta_0 + \beta_1 LONG\_ACCH_{it} + \beta_2 AUD\_TEN_{it} + \beta_3 CEO\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} + \beta_5 LACCH*CEO\_TEN_{it} + \beta_6 LACCH\_AUD\_TEN_{it} + \beta_7 LACCH*MIN\_CEO\_AUD_{it} + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
CONSTANT	0.0087 (0.700)	-0.1221*** (0.005)	0.1642*** (0.003)
LONG_ACCH	-0.0081 (0.345)	0.0085 (0.677)	-0.0145 (0.553)
CEO_TEN	0.0007 (0.243)	0.0003 (0.802)	-0.0011 (0.432)
AUD_TEN	0.0001 (0.848)	-0.0001 (0.949)	-0.0002 (0.785)
MIN_CEO_AUD	-0.0003 (0.745)	-0.0015 (0.453)	0.0023 (0.277)
LACCH*CEO_TEN	-0.0007 (0.280)	-0.0019 (0.292)	0.0035* (0.075)
LACCH*AUD_TEN	0.0004 (0.308)	-0.0008 (0.373)	0.0012 (0.272)
LACCH*MIN_CEO_AUD	-0.0004 (0.745)	0.0049* (0.069)	-0.0057* (0.056)
SIZE	0.0068*** (0.004)	0.0185*** (0.002)	-0.0341*** (0.000)
CFO	0.3893*** (0.000)	-0.7492*** (0.000)	0.3054*** (0.008)
LEVERAGE	-0.0770*** (0.000)	0.0454 (0.180)	0.0050 (0.885)
BIG_N	0.0041 (0.748)	0.0595** (0.019)	-0.0519 (0.102)
DUALITY	-0.0042 (0.349)	-0.0094 (0.395)	0.0002 (0.986)
ALTMAN	-0.0083*** (0.007)	0.0124** (0.010)	-0.0122** (0.030)
SALE_GROWTH	-0.0201*** (0.008)	0.0496*** (0.003)	0.0174 (0.336)
AGE	-0.0002 (0.111)	0.0002 (0.528)	-0.0003 (0.508)
TREND	-0.0036*** (0.000)	0.0025 (0.146)	0.0085*** (0.000)
BD_SIZE	-0.0010 (0.434)	-0.0078** (0.030)	0.0092* (0.054)

**Table 10 (continued)**

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
IMPORT	-0.0334** (0.011)	0.0358 (0.268)	0.0289 (0.463)
DA	-0.4549*** (0.000)	-0.0092 (0.911)	0.1408 (0.193)
Observations	3,946	3,946	3,946
AIC	-2.161	-0.556	-0.222

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

REM is one of three real earnings management measures as described in Section III. All variables are as defined in Table 1.

**Table 11: Test 3 – Collaborative CEO – Auditor tenure across different audit committee chair tenure lengths –accrual quality analysis**

$$\text{STD\_DA}_{it} = \beta_0 + \beta_1\text{LONG\_ACCH}_{it} + \beta_2\text{AUD\_TEN}_{it} + \beta_3\text{CEO\_TEN}_{it} + \beta_4\text{MIN\_CEO\_AUD}_{it} + \beta_5\text{LACCH*CEO\_TEN}_{it} + \beta_6\text{LACCH\_AUD\_TEN}_{it} + \beta_7\text{LACCH*MIN\_CEO\_AUD}_{it} + \beta_8\text{SIZE}_{it} + \beta_9\text{CFO}_{it} + \beta_{10}\text{LEVERAGE}_{it} + \beta_{11}\text{BIG\_N}_{it} + \beta_{12}\text{DUALITY}_{it} + \beta_{13}\text{ALTMAN}_{it} + \beta_{14}\text{SALE\_GROWTH}_{it} + \beta_{15}\text{AGE}_{it} + \beta_{16}\text{TREND}_{it} + \beta_{17}\text{BD\_SIZE}_{it} + \beta_{18}\text{IMPORT}_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(3) OLS
CONSTANT	-2.33821*** (0.000)	0.07077*** (0.000)
LONG_ACCH	-0.15476** (0.041)	-0.00600** (0.013)
CEO_TEN	-0.00428 (0.465)	-0.00021 (0.225)
AUD_TEN	-0.00752*** (0.010)	-0.00024*** (0.004)
MIN_CEO_AUD	-0.00225 (0.783)	-0.00002 (0.919)
LACCH*CEO_TEN	0.00063 (0.931)	0.00013 (0.563)
LACCH*AUD_TEN	0.00708** (0.041)	0.00024** (0.014)
LACCH*MIN_CEO_AUD	0.00287 (0.787)	0.00003 (0.922)
SIZE	-0.14708*** (0.000)	-0.00446*** (0.000)
CFO	-0.21161 (0.255)	-0.01013 (0.233)
LEVERAGE	0.24841*** (0.003)	0.00697** (0.011)
BIG_N	-0.05549 (0.607)	-0.00503 (0.265)
DUALITY	0.02566 (0.488)	0.00039 (0.723)
ALTMAN	0.00696 (0.548)	0.00011 (0.793)
SALE_GROWTH	-0.03601 (0.399)	-0.00198 (0.377)
AGE	0.00013 (0.922)	0.00001 (0.821)
TREND	-0.00345 (0.666)	-0.00018 (0.471)
BD_SIZE	-0.00143 (0.900)	0.00004 (0.894)
IMPORT	0.08420 (0.452)	0.00150 (0.609)

**Table 11 (continued)**

VARIABLES	(1) Gamma distribution	(3) OLS
Observations	3,673	3,673
AIC	-5.078	-4.863

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

STD\_DA is the standard deviation of the residuals from equation (4). LONG\_ACCH equals one if audit committee chair tenure bigger than sample median of six years, zero otherwise. In columns (1) and (3) the test variable is the interaction between LONG\_ACCH and MIN\_CEO\_AUD (LACCH\*MIN\_CEO\_AUD). In columns (2) and (4) the test variable is the interaction of LONG\_ACCH, CEO tenure, and auditor committee chair tenure (LACCH\*CEO\*AUD). All variables are as defined in Table 1.

**Table 12: Test 4 – Audit Committee Chair Changes**

VARIABLES	(1) DA Gamma distribution	(2) DA OLS	(3) STD_DA Gamma distribution	(4) STD_DA OLS	(5) STD_DA Gamma distribution	(6) STD_DA OLS
CONSTANT	-2.50776*** (0.000)	0.05650*** (0.000)	-2.44195*** (0.000)	0.06678*** (0.000)	-2.26782*** (0.000)	0.06955*** (0.000)
ACCHD1	0.23797** (0.011)	0.01105** (0.038)	0.00334 (0.938)	0.00011 (0.935)	-0.09842 (0.284)	-0.00223 (0.505)
ACCHD2	0.15245 (0.138)	0.00500 (0.296)	-0.06314* (0.086)	-0.00151 (0.179)	0.06068 (0.427)	0.00218 (0.413)
ACCHD3	0.10647 (0.352)	0.00610 (0.366)	-0.05203 (0.196)	-0.00125 (0.311)	-0.02251 (0.770)	-0.00049 (0.858)
SIZE	-0.11134*** (0.002)	-0.00266 (0.142)	-0.14772*** (0.000)	-0.00445*** (0.000)	-0.11049*** (0.000)	-0.00310*** (0.001)
CFO	-3.23652*** (0.000)	-0.38712*** (0.000)	-0.19436 (0.306)	-0.00970 (0.260)	-1.67859*** (0.000)	-0.07737*** (0.000)
LEVERAGE	0.35277** (0.031)	0.02164** (0.012)	0.27141*** (0.002)	0.00757*** (0.007)	-0.07604 (0.550)	-0.00228 (0.615)
BIG_N	-0.06716 (0.599)	-0.00814 (0.293)	-0.08190 (0.436)	-0.00571 (0.201)	-0.24527 (0.147)	-0.01328 (0.100)
DUALITY	-0.02385 (0.745)	-0.00073 (0.827)	0.01020 (0.774)	-0.00012 (0.906)	0.05454 (0.348)	0.00086 (0.631)
ALTMAN	0.00710 (0.831)	0.00163 (0.272)	0.00390 (0.744)	0.00000 (0.999)	0.00937 (0.595)	0.00080 (0.313)
SALE_GROWTH	0.14580** (0.042)	0.01814*** (0.005)	-0.03889 (0.359)	-0.00202 (0.366)	-0.01402 (0.807)	-0.00191 (0.587)
AGE	-0.00113 (0.553)	-0.00001 (0.918)	-0.00093 (0.405)	-0.00003 (0.388)	-0.00083 (0.631)	-0.00004 (0.460)
TREND	0.02976 (0.187)	0.00324*** (0.002)	-0.00586 (0.467)	-0.00026 (0.302)	0.01103 (0.527)	0.00055 (0.352)
BD_SIZE	0.00876 (0.651)	0.00139 (0.159)	-0.00012 (0.991)	0.00008 (0.797)	-0.00870 (0.633)	0.00009 (0.880)
IMPORT	-0.39956** (0.045)	-0.02561*** (0.005)	0.06656 (0.557)	0.00094 (0.751)	-0.34565** (0.024)	-0.00849** (0.035)
OBSERVATIONS	893	893	3,673	3,673	821	821
AIC	-4.329	-3.380	-5.076	-4.856	-4.911	-4.652

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals.

STD\_DA is the standard deviation of the residuals from equation (4).

Columns 1 and 2: Positive Discretionary Accruals (DA);

Columns 3 and 4: Accrual Quality (modified Dechow and Dichev)(STD\_DA)(all companies);

Columns 5 and 6: Accrual Quality (subsample of companies with positive DA).



**Table 13: Test 4 – Real earnings management measures – OLS only**

$$REM_{it} = \beta_0 + \beta_1 ACCHD1_{it} + \beta_2 ACCHD2_{it} + \beta_3 ACCHD3_{it} + \beta_4 SIZE_{it} + \beta_5 CFO_{it} + \beta_6 LEVERAGE_{it} + \beta_7 BIG\_N_{it} + \beta_8 DUALITY_{it} + \beta_9 ALTMAN_{it} + \beta_{10} SALE\_GROWTH_{it} + \beta_{11} AGE_{it} + \beta_{12} TREND_{it} + \beta_{13} BD\_SIZE_{it} + \beta_{14} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
CONSTANT	0.00733 (0.733)	-0.12077*** (0.004)	0.16407*** (0.003)
ACCHD1	0.00052 (0.920)	-0.00891 (0.369)	-0.00081 (0.947)
ACCHD2	-0.00220 (0.602)	-0.00336 (0.727)	0.00080 (0.944)
ACCHD3	-0.00578 (0.303)	0.00001 (1.000)	0.00020 (0.987)
SIZE	0.00664*** (0.005)	0.01842*** (0.002)	-0.03393*** (0.000)
CFO	0.38777*** (0.000)	-0.74982*** (0.000)	0.30677*** (0.008)
LEVERAGE	-0.07682*** (0.000)	0.04673 (0.171)	0.00382 (0.912)
BIG_N	0.00576 (0.654)	0.05703** (0.025)	-0.05094 (0.107)
DUALITY	-0.00391 (0.358)	-0.00899 (0.385)	0.00045 (0.969)
ALTMAN	-0.00837*** (0.006)	0.01236** (0.011)	-0.01218** (0.030)
SALE_GROWTH	-0.01994*** (0.008)	0.05023*** (0.002)	0.01653 (0.360)
AGE	-0.00018 (0.146)	0.00016 (0.622)	-0.00022 (0.556)
TREND	-0.00351*** (0.000)	0.00274 (0.106)	0.00809*** (0.000)
BD_SIZE	-0.00095 (0.466)	-0.00786** (0.030)	0.00906* (0.053)
IMPORT	-0.03578*** (0.008)	0.03751 (0.248)	0.02837 (0.478)
DA	-0.45565*** (0.000)	-0.01086 (0.894)	0.14330 (0.186)
OBSERVATIONS	3,946	3,946	3,946
AIC	-2.157	-0.556	-0.222

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The dependent variable is one of three real earnings management measures.

**Table 14: Test 5 – The association between audit committee chair changes and positive discretionary accruals across different length of auditor tenure, using auditor tenure categories as defined in Davis et al. (2009)**

$$DA_{it} = \beta_0 + \beta_1 ACCHD1_{it} + \beta_2 SHORT\_D_{it} + \beta_3 LONG\_D_{it} + \beta_4 ACCHD1 * SHORT\_D_{it} + \beta_5 ACCHD1 * LONG\_D_{it} + \beta_6 SIZE_{it} + \beta_7 CFO_{it} + \beta_8 LEVERAGE_{it} + \beta_9 BIG\_N_{it} + \beta_{10} DUALITY_{it} + \beta_{11} ALTMAN_{it} + \beta_{12} SALE\_GROWTH_{it} + \beta_{13} AGE_{it} + \beta_{14} TREND_{it} + \beta_{15} BD\_SIZE_{it} + \beta_{16} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(1) Gamma distribution	(3) OLS	(4) OLS
CONSTANT	-2.589442*** (0.000)	-2.623473*** (0.000)	0.054294*** (0.000)	0.053269*** (0.000)
ACCHD1		0.28607** (0.020)		0.01204 (0.119)
SHORT_D	0.307317** (0.014)	0.337964*** (0.010)	0.010001 (0.171)	0.010270 (0.178)
LONG_D	0.023596 (0.745)	0.041637 (0.578)	-0.000374 (0.917)	0.000140 (0.970)
ACCHD1*SHORT_D		-0.219231 (0.436)		-0.000831 (0.972)
ACCHD1*LONG_D		-0.135470 (0.481)		-0.004751 (0.646)
SIZE	-0.114377*** (0.002)	-0.115678*** (0.002)	-0.002762 (0.125)	-0.002872 (0.110)
CFO	-3.241196*** (0.000)	-3.246002*** (0.000)	-0.387120*** (0.000)	-0.387344*** (0.000)
LEVERAGE	0.402910** (0.018)	0.385142** (0.022)	0.023117*** (0.009)	0.022789*** (0.009)
BIG_N	0.003045 (0.983)	0.017505 (0.901)	-0.005835 (0.476)	-0.005362 (0.507)
DUALITY	-0.021737 (0.772)	-0.011002 (0.884)	-0.000590 (0.860)	-0.000419 (0.900)
ALTMAN	0.009719 (0.765)	0.009551 (0.769)	0.001720 (0.252)	0.001707 (0.256)
SALE_GROWTH	0.159175** (0.030)	0.156711** (0.033)	0.018546*** (0.005)	0.018239*** (0.005)
AGE	-0.000885 (0.657)	-0.000987 (0.617)	0.000006 (0.951)	0.000006 (0.951)
TREND	0.031073 (0.166)	0.029787 (0.185)	0.003395*** (0.001)	0.003373*** (0.001)
BD_SIZE	0.009819 (0.614)	0.010994 (0.568)	0.001443 (0.145)	0.001492 (0.126)
IMPORT	-0.389348* (0.055)	-0.385123* (0.053)	-0.026316*** (0.005)	-0.025775*** (0.005)
OBSERVATIONS	893	893	893	893
AIC	-4.330	-4.327	-3.378	-3.376

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is performance adjusted positive discretionary accruals. Refer to Table 1 for variable definitions.

**Table 15: Test 5 – The association between audit committee chair changes and positive discretionary accruals across different length of auditor tenure, using auditor tenure categories as defined in the August 2011 PCAOB concept release**

$$DA_{it} = \beta_0 + \beta_1 ACCHD1_{it} + \beta_2 SHORT\_P_{it} + \beta_3 ACCHD1 * SHORT\_P_{it} + \beta_4 SIZE_{it} + \beta_5 CFO_{it} + \beta_6 LEVERAGE_{it} + \beta_7 BIG\_N_{it} + \beta_8 DUALITY_{it} + \beta_9 ALTMAN_{it} + \beta_{10} SALE\_GROWTH_{it} + \beta_{11} AGE_{it} + \beta_{12} TREND_{it} + \beta_{13} BD\_SIZE_{it} + \beta_{14} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
CONSTANT	-2.656917*** (0.000)	-2.674737*** (0.000)	0.049202*** (0.001)	0.048686*** (0.001)
ACCHD1		0.247884* (0.052)		0.010056 (0.163)
SHORT_P	0.145290** (0.046)	0.153158** (0.047)	0.009312** (0.011)	0.009284** (0.013)
ACCHD1*SHORT_P		-0.093414 (0.620)		-0.000719 (0.946)
SIZE	-0.113900*** (0.002)	-0.115022*** (0.002)	-0.003002* (0.092)	-0.003098* (0.082)
CFO	-3.274999*** (0.000)	-3.280248*** (0.000)	-0.385691*** (0.000)	-0.385845*** (0.000)
LEVERAGE	0.386364** (0.016)	0.373642** (0.018)	0.022948*** (0.008)	0.022729*** (0.008)
BIG_N	-0.011907 (0.929)	0.001769 (0.989)	-0.004742 (0.552)	-0.004399 (0.574)
DUALITY	-0.049782 (0.506)	-0.043576 (0.564)	-0.001316 (0.693)	-0.001193 (0.719)
ALTMAN	0.011401 (0.709)	0.011870 (0.696)	0.001659 (0.262)	0.001643 (0.267)
SALE_GROWTH	0.159246** (0.033)	0.156038** (0.038)	0.018622*** (0.004)	0.018306*** (0.005)
AGE	0.000185 (0.927)	0.000206 (0.919)	0.000051 (0.599)	0.000052 (0.590)
TREND	0.035903 (0.112)	0.035009 (0.121)	0.003539*** (0.001)	0.003528*** (0.001)
BD_SIZE	0.012681 (0.517)	0.012166 (0.532)	0.001583 (0.109)	0.001598 (0.105)
IMPORT	-0.387891* (0.057)	-0.381942* (0.057)	-0.024478*** (0.008)	-0.023917*** (0.008)
OBSERVATIONS	893	893	893	893
AIC	-4.331	-4.331	-3.387	-3.387

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals. Refer to Table 1 for variable definitions.

**Table 16: Test 5 – The association between audit committee chair changes and real earnings management measures across different length of auditor tenure, using auditor tenure categories as defined in Davis et al. (2009) and PCAOB (2011)**

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures	(4) Abnormal cash flow from operation	(5) Abnormal production costs	(6) Abnormal discretionary expenditures
CONSTANT	0.0115 (0.569)	-0.1260*** (0.003)	0.1622*** (0.003)	0.0137 (0.528)	-0.1256*** (0.004)	0.1609*** (0.004)
ACCHD1	0.0051 (0.346)	-0.0077 (0.523)	-0.0102 (0.516)	0.0064 (0.321)	-0.0210* (0.078)	0.0031 (0.833)
SHORT_D	-0.0002 (0.977)	0.0128 (0.473)	-0.0098 (0.671)			
LONG_D	0.0011 (0.804)	0.0032 (0.779)	-0.0064 (0.608)			
ACCHD1_SHORT_D	-0.0858** (0.049)	0.0003 (0.997)	0.1281* (0.070)			
ACCHD1_LONG_D	0.0005 (0.955)	-0.0017 (0.924)	0.0067 (0.770)			
SHORT_P				-0.0051 (0.229)	0.0021 (0.847)	0.0039 (0.760)
ACCHD1_SHORT_P				-0.0132 (0.190)	0.0313* (0.085)	-0.0099 (0.670)
SIZE	0.0068*** (0.004)	0.0185*** (0.002)	-0.0341*** (0.000)	0.0067*** (0.004)	0.0184*** (0.002)	-0.0340*** (0.000)
CFO	0.3870*** (0.000)	-0.7490*** (0.000)	0.3084*** (0.007)	0.3901*** (0.000)	-0.7521*** (0.000)	0.3067*** (0.008)
LEVERAGE	-0.0769*** (0.000)	0.0470 (0.167)	0.0035 (0.919)	-0.0765*** (0.000)	0.0460 (0.178)	0.0038 (0.913)
BIG_N	0.0018 (0.869)	0.0602** (0.018)	-0.0473 (0.129)	0.0032 (0.798)	0.0590** (0.021)	-0.0499 (0.115)
DUALITY	-0.0040 (0.346)	-0.0089 (0.388)	0.0006 (0.962)	-0.0037 (0.384)	-0.0090 (0.386)	0.0003 (0.983)
ALTMAN	-0.0084*** (0.006)	0.0124** (0.010)	-0.0122** (0.030)	-0.0084*** (0.006)	0.0124** (0.010)	-0.0121** (0.031)
SALE_GROWTH	-0.0199*** (0.008)	0.0504*** (0.002)	0.0161 (0.371)	-0.0200*** (0.008)	0.0504*** (0.002)	0.0164 (0.363)
AGE	-0.0002 (0.111)	0.0001 (0.686)	-0.0002 (0.662)	-0.0002* (0.083)	0.0002 (0.588)	-0.0002 (0.581)
TREND	-0.0037*** (0.000)	0.0027 (0.105)	0.0081*** (0.000)	-0.0038*** (0.000)	0.0029* (0.088)	0.0082*** (0.000)
BD_SIZE	-0.0011 (0.392)	-0.0079** (0.029)	0.0093** (0.047)	-0.0011 (0.382)	-0.0077** (0.033)	0.0091* (0.052)
IMPORT	-0.0354*** (0.008)	0.0377 (0.246)	0.0281 (0.481)	-0.0361*** (0.008)	0.0383 (0.237)	0.0284 (0.476)
DA	-0.4571*** (0.000)	-0.0102 (0.900)	0.1460 (0.173)	-0.4549*** (0.000)	-0.0129 (0.874)	0.1443 (0.182)
OBSERVATIONS	3,946	3,946	3,946	3,946	3,946	3,946
AIC	-2.161	-0.555	-0.222	-2.159	-0.556	-0.222

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The dependent variable is one of three real earnings management measures as described in Section III. All variables are as defined in Table 1.

**Table 17: Test 5 – The association between audit committee chair changes and the standard deviation of abnormal accruals (accrual quality) across different length of auditor tenure, using auditor tenure categories as defined in Davis et al. (2009)**

$$STD\_DA_{it} = \beta_0 + \beta_1 ACCHD2_{it} + \beta_2 SHORT\_D_{it} + \beta_3 LONG\_D_{it} + \beta_4 ACCHD2*SHORT\_D_{it} + \beta_5 ACCHD2*LONG\_D_{it} + \beta_6 SIZE_{it} + \beta_7 CFO_{it} + \beta_8 LEVERAGE_{it} + \beta_9 BIG\_N_{it} + \beta_{10} DUALITY_{it} + \beta_{11} ALTMAN_{it} + \beta_{12} SALE\_GROWTH_{it} + \beta_{13} AGE_{it} + \beta_{14} TREND_{it} + \beta_{15} BD\_SIZE_{it} + \beta_{16} IMPORT_{it} + \epsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
CONSTANT	-2.50515*** (0.000)	-2.50816*** (0.000)	0.06487*** (0.000)	0.06480*** (0.000)
ACCHD2		-0.02085 (0.653)		-0.00030 (0.848)
SHORT_D	0.12443* (0.082)	0.10787 (0.129)	0.00364 (0.194)	0.00316 (0.261)
LONG_D	-0.04982 (0.258)	-0.04004 (0.377)	-0.00160 (0.231)	-0.00132 (0.340)
ACCHD2*SHORT_D		0.19668 (0.308)		0.00604 (0.434)
ACCHD2*LONG_D		-0.09344 (0.149)		-0.00255 (0.193)
SIZE	-0.14673*** (0.000)	-0.14630*** (0.000)	-0.00444*** (0.000)	-0.00443*** (0.000)
CFO	-0.19954 (0.292)	-0.20884 (0.266)	-0.00959 (0.264)	-0.00974 (0.255)
LEVERAGE	0.26142*** (0.002)	0.26292*** (0.002)	0.00745*** (0.008)	0.00751*** (0.007)
BIG_N	-0.03071 (0.782)	-0.03165 (0.775)	-0.00414 (0.376)	-0.00420 (0.369)
DUALITY	0.00811 (0.818)	0.00726 (0.835)	-0.00014 (0.892)	-0.00016 (0.881)
ALTMAN	0.00548 (0.648)	0.00619 (0.606)	0.00005 (0.908)	0.00007 (0.878)
SALE_GROWTH	-0.03884 (0.365)	-0.03595 (0.402)	-0.00211 (0.350)	-0.00202 (0.371)
AGE	-0.00064 (0.595)	-0.00062 (0.606)	-0.00002 (0.618)	-0.00002 (0.635)
TREND	-0.00541 (0.502)	-0.00470 (0.560)	-0.00024 (0.335)	-0.00023 (0.349)
BD_SIZE	0.00056 (0.960)	0.00045 (0.968)	0.00011 (0.734)	0.00011 (0.731)
IMPORT	0.07071 (0.530)	0.06964 (0.538)	0.00102 (0.730)	0.00098 (0.741)

**Table 17 (continued)**

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
Observations	3,673	3,673	3,673	3,673
AIC	-5.077	-5.076	-4.859	-4.858

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

STD\_DA is the standard deviation of the residuals from equation (4). Refer to Table 1 for variable definitions.

**Table 18: Test 5 – The association between audit committee chair changes and the standard deviation of discretionary accruals (accrual quality) across different length of auditor tenure, using auditor tenure categories as defined in the August 2011 PCAOB concept release**

$$STD\_DA_{it} = \beta_0 + \beta_1 ACCHD2_{it} + \beta_2 SHORT\_P_{it} + \beta_3 ACCHD2 * SHORT\_P_{it} + \beta_4 SIZE_{it} + \beta_5 CFO_{it} + \beta_6 LEVERAGE_{it} + \beta_7 BIG\_N_{it} + \beta_8 DUALITY_{it} + \beta_9 ALTMAN_{it} + \beta_{10} SALE\_GROWTH_{it} + \beta_{11} AGE_{it} + \beta_{12} TREND_{it} + \beta_{13} BD\_SIZE_{it} + \beta_{14} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
Constant	-2.52392*** (0.000)	-2.51745*** (0.000)	0.06411*** (0.000)	0.06435*** (0.000)
ACCHD2		-0.11645*** (0.003)		-0.00301*** (0.005)
SHORT_P	0.08090* (0.054)	0.06626 (0.127)	0.00260** (0.047)	0.00215 (0.114)
ACCHD2*SHORT_P		0.15499** (0.021)		0.00470** (0.033)
SIZE	-0.14690*** (0.000)	-0.14680*** (0.000)	-0.00445*** (0.000)	-0.00445*** (0.000)
CFO	-0.20705 (0.274)	-0.21114 (0.262)	-0.01020 (0.234)	-0.01025 (0.231)
LEVERAGE	0.25957*** (0.002)	0.26193*** (0.002)	0.00736*** (0.008)	0.00740*** (0.008)
BIG_N	-0.05386 (0.616)	-0.05240 (0.624)	-0.00479 (0.287)	-0.00479 (0.287)
DUALITY	0.00554 (0.874)	0.00599 (0.863)	-0.00023 (0.823)	-0.00022 (0.835)
ALTMAN	0.00455 (0.699)	0.00460 (0.696)	0.00004 (0.930)	0.00003 (0.938)
SALE_GROWTH	-0.03911 (0.369)	-0.03609 (0.403)	-0.00206 (0.359)	-0.00197 (0.381)
AGE	-0.00066 (0.558)	-0.00062 (0.583)	-0.00002 (0.538)	-0.00002 (0.564)
TREND	-0.00570 (0.473)	-0.00489 (0.537)	-0.00025 (0.320)	-0.00023 (0.351)
BD_SIZE	0.00054 (0.962)	0.00036 (0.974)	0.00012 (0.702)	0.00012 (0.702)
IMPORT	0.07327 (0.514)	0.07242 (0.521)	0.00115 (0.697)	0.00110 (0.711)
Observations	3,673	3,673	3,673	3,673
AIC	-5.078	-5.078	-4.860	-4.860

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

STD\_DA is the standard deviation of the residuals from equation (4).

**Table 19: TEST 6 – Audit committee chair changes and the collaborative tenure of CEO and the auditor – positive discretionary accruals analysis**

$$DA_{it} = \beta_0 + \beta_1 ACCHD1_{it} + \beta_2 AUD\_TEN_{it} + \beta_3 CEO\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} (CEO*AUD_{it}) + \beta_5 ACCHD1*CEO\_TEN_{it} + \beta_6 ACCHD1*AUD\_TEN_{it} + \beta_7 ACCHD1*MIN\_CEO\_AUD_{it} (ACCHD1*CEO*AUD_{it}) + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
CONSTANT	-2.4839*** (0.000)	-2.5860*** (0.000)	0.0573*** (0.000)	0.051454*** (0.000)
ACCHD1	0.3577* (0.051)	-0.0717 (0.762)	0.0163 (0.117)	0.002709 (0.836)
AUD_TEN	0.0006 (0.884)	0.0049 (0.319)	-0.0001 (0.763)	0.000200 (0.398)
CEO_TEN	0.0127** (0.017)	0.0150** (0.017)	0.0006** (0.044)	0.000830*** (0.007)
MIN_CEO_AUD	-0.0312*** (0.000)		-0.0011*** (0.009)	
ACCHD1*AUD_TEN	0.0037 (0.675)	0.0199 (0.140)	0.0003 (0.495)	0.000805 (0.219)
ACCHD1*CEO_TEN	0.0196 (0.203)	0.0502 (0.128)	0.0004 (0.596)	0.001321 (0.379)
ACCHD1*MIN_CEO_AUD	-0.0690** (0.033)		-0.0026 (0.103)	
CEO*AUD		-0.0011*** (0.002)		-0.000053*** (0.002)
ACCHD1*CEO*AUD		-0.0037* (0.075)		-0.000130 (0.134)
SIZE	-0.1302*** (0.000)	-0.1251*** (0.000)	-0.0033* (0.067)	-0.003219* (0.067)
CFO	-3.2778*** (0.000)	-3.2628*** (0.000)	-0.3867*** (0.000)	-0.388202*** (0.000)
LEVERAGE	0.3626** (0.025)	0.3475** (0.035)	0.0221** (0.011)	0.022149** (0.011)
BIG_N	0.0383 (0.770)	0.0013 (0.992)	-0.0045 (0.565)	-0.005540 (0.486)
DUALITY	0.0126 (0.870)	-0.0235 (0.760)	0.0005 (0.875)	-0.000471 (0.894)
ALTMAN	0.0109 (0.734)	0.0058 (0.863)	0.0017 (0.261)	0.001648 (0.274)
SALE_GROWTH	0.1382* (0.050)	0.1439** (0.044)	0.0180*** (0.006)	0.017792*** (0.006)
AGE	-0.0006 (0.782)	0.0000 (0.985)	0.0000 (0.825)	0.000053 (0.626)
TREND	0.0408* (0.070)	0.0402* (0.076)	0.0036*** (0.001)	0.003662*** (0.000)
BD_SIZE	0.0132 (0.498)	0.0105 (0.587)	0.0016 (0.107)	0.001531 (0.122)
IMPORT	-0.3669* (0.070)	-0.4073** (0.043)	-0.0249*** (0.006)	-0.026639*** (0.003)



**Table 19 (continued)**

VARIABLES	(1) Gamma distribution	(2) Gamma distribution	(3) OLS	(4) OLS
OBSERVATIONS	893	893	893	893
AIC	-4.329	-4.332	-4.331	-4.331

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

DA is the performance adjusted positive discretionary accruals. Refer to Table 1 for variable definitions.

**Table 20: TEST 6 – Audit committee chair changes and the collaborative tenure of CEO and the auditor – real earnings management analysis**

$$REM_{it} = \beta_0 + \beta_1 ACCHD1_{it} + \beta_2 AUD\_TEN_{it} + \beta_3 CEO\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} + \beta_5 ACCHD1*CEO\_TEN_{it} + \beta_6 ACCHD1*AUD\_TEN_{it} + \beta_7 ACCHD1*MIN\_CEO\_AUD_{it} + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Abnormal cash flow from operation	(2) Abnormal production costs	(3) Abnormal discretionary expenditures
CONSTANT	0.0086 (0.695)	-0.1210*** (0.004)	0.1594*** (0.004)
ACCHD1	-0.0040 (0.711)	-0.0010 (0.958)	0.0010 (0.968)
AUD_TEN	0.0002 (0.446)	-0.0003 (0.630)	0.0002 (0.782)
CEO_TEN	0.0003 (0.462)	-0.0008 (0.425)	0.0008 (0.456)
MIN_CEO_AUD	-0.0006 (0.379)	0.0013 (0.402)	-0.0008 (0.633)
ACCHD1*AUD_TEN	0.0003 (0.517)	-0.0005 (0.580)	0.0004 (0.687)
ACCHD1*CEO_TEN	-0.0014 (0.167)	0.0036 (0.121)	-0.0033 (0.218)
ACCHD1*MIN_CEO_AUD	0.0019 (0.249)	-0.0045 (0.235)	0.0027 (0.521)
SIZE	0.0066*** (0.005)	0.0185*** (0.002)	-0.0340*** (0.000)
CFO	0.3882*** (0.000)	-0.7493*** (0.000)	0.3062*** (0.008)
LEVERAGE	-0.0769*** (0.000)	0.0463 (0.175)	0.0047 (0.893)
BIG_N	0.0055 (0.668)	0.0562** (0.026)	-0.0493 (0.117)
DUALITY	-0.0036 (0.413)	-0.0090 (0.412)	-0.0006 (0.963)
ALTMAN	-0.0084*** (0.006)	0.0124** (0.010)	-0.0122** (0.030)
SALE_GROWTH	-0.0196*** (0.009)	0.0496*** (0.002)	0.0169 (0.349)
AGE	-0.0002* (0.082)	0.0002 (0.508)	-0.0003 (0.502)
TREND	-0.0036*** (0.000)	0.0027 (0.112)	0.0081*** (0.000)
BD_SIZE	-0.0011 (0.385)	-0.0076** (0.036)	0.0090* (0.058)
IMPORT	-0.0359*** (0.008)	0.0384 (0.236)	0.0278 (0.486)
DA	-0.4552*** (0.000)	-0.0110 (0.893)	0.1424 (0.189)
OBSERVATIONS	3,946	3,946	3,946
AIC	-2.156	-0.555	-0.220

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 The dependent variable is one of three real earnings management measures.

**Table 21: TEST 6 – Audit committee chair changes and the collaborative tenure of CEO and the auditor – accrual quality analysis**

$$STD\_DA_{it} = \beta_0 + \beta_1 ACCHD2_{it} + \beta_2 AUD\_TEN_{it} + \beta_3 CEO\_TEN_{it} + \beta_4 MIN\_CEO\_AUD_{it} + \beta_5 ACCHD2*CEO\_TEN_{it} + \beta_6 ACCHD2*AUD\_TEN_{it} + \beta_7 ACCHD2*MIN\_CEO\_AUD_{it} + \beta_8 SIZE_{it} + \beta_9 CFO_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} BIG\_N_{it} + \beta_{12} DUALITY_{it} + \beta_{13} ALTMAN_{it} + \beta_{14} SALE\_GROWTH_{it} + \beta_{15} AGE_{it} + \beta_{16} TREND_{it} + \beta_{17} BD\_SIZE_{it} + \beta_{18} IMPORT_{it} + \varepsilon_{it}$$

VARIABLES	(1) Gamma distribution	(2) OLS
CONSTANT	-2.3780*** (0.000)	0.0691*** (0.000)
ACCHD2	-0.0110 (0.858)	-0.0006 (0.763)
AUD_TEN	-0.0039 (0.141)	-0.0001* (0.098)
CEO_TEN	-0.0058 (0.157)	-0.0002 (0.103)
MIN_CEO_AUD	-0.0002 (0.972)	0.0000 (0.873)
ACCHD2_AUD_TEN	-0.0063** (0.028)	-0.0001* (0.099)
ACCHD2_CEO_TEN	0.0108 (0.209)	0.0004 (0.180)
ACCHD2_MIN_CEO_AUD	-0.0042 (0.757)	-0.0003 (0.505)
SIZE	-0.1474*** (0.000)	-0.0045*** (0.000)
CFO	-0.2172 (0.241)	-0.0102 (0.231)
LEVERAGE	0.2481*** (0.004)	0.0070** (0.012)
BIG_N	-0.0659 (0.542)	-0.0052 (0.248)
DUALITY	0.0307 (0.400)	0.0006 (0.603)
ALTMAN	0.0054 (0.645)	0.0001 (0.904)
SALE_GROWTH	-0.0331 (0.436)	-0.0020 (0.384)
AGE	-0.0001 (0.956)	-0.0000 (1.000)
TREND	-0.0041 (0.605)	-0.0002 (0.380)
BD_SIZE	-0.0008 (0.946)	0.0001 (0.863)
IMPORT	0.0746 (0.505)	0.0012 (0.680)
OBSERVATIONS	3,673	3,673
AIC	-5.077	-4.861

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

STD\_DA is the standard deviation of the residuals from equation (4). Refer to Table 1 for variable definitions.

## **VITA**

Nelson Milan Carrasco Abarca was born in Peumo, Chile. He graduated from Universidad de Santiago de Chile in June 1998 with a Bachelor in Accounting and Auditing. In 2000 he graduates from Pontificia Universidad Católica de Chile with a Diploma in Macroeconomics and Finance. Nelson graduated in August 2013 with a Doctor of Philosophy in Business Administration (Accounting concentration) and a Master of Science in Statistics from the University of Tennessee, Knoxville.