University of Alberta

Are Audit Programs Responsive to Audit Risk?

by

Le Luo

A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Accounting

School of Business

Spring 2011
Edmonton, Alberta

ABSTRACT

Professional standards require the auditor to change the nature, extent, and timing of testing and/or use more skilled labor as the risk of misstatements increases. This study investigates whether auditors adjust audit programs (detection) and/or the thresholds to record and require correction of detected misstatements in response to increases in audit risk and client size. Prior research from several countries indicates that audit programs are too static and are not risk adjusted (Mock and Wright 1993; Quadackers et al. 1996; Mock and Wright 1999). In addition, a key concern is that economic dependence on the client may cause the audit firm to refrain from recording and requiring correction of detected misstatements for larger clients.

Archival records from 10 Chinese audit firms are examined to assess audit procedures, audit labor and the audit posting thresholds used. Results of the study indicate that when audit risk or client size increases, the audit firm does not change its audit procedures or use more skilled labor, nor does it detect audit differences in different types of accounts. The audit firm detects a larger number of audit differences for larger clients. The audit firm also uses lower thresholds to record and require correction of detected misstatements in response to increases in audit risk and client size.

ACKNOWLEDGEMENT

I relish this opportunity to thank and acknowledge all those who have given me their generous assistance, guidance and support in the course of this dissertation and also the journey which has made me a stronger person. In particular I am indebted to Professor Karim Jamal, my Supervisor. He devoted a significant amount of time and efforts to my thesis and to my intellectual development. He encouraged me to pursue this topic, and was always ready to provide me with thought-provoking suggestions on this paper and other working projects. More importantly, I thank Professor Karim Jamal as a role model in terms of being highly motivated to explore fundamental questions in business practices and academic theories, and being open to different methods in conducting original and solid research. He is also a role model at successfully balancing the demands of his research, teaching, family, and professional community responsibilities. I am most grateful to him for supporting me in hard times and when looking back at my experiences in the PhD program, I feel so lucky to have him as my Supervisor.

Besides guiding me in my dissertation, the other members of my committee have directed and encouraged me in various ways. Professor David Deephouse encouraged me to think about the broader context and he furthered my interest in understanding behavior within professional organizations. Professor Yanmin Gao demonstrated a sincere interest in my development and was always willing to provide valuable comments. And I wish to recognize Professor Michael

Maier and Professor Peng Zhang for their time, insightful suggestions, and willingness to support me on this project.

I would like to thank my peers, Bradley Pomeroy, Kris Hoang, Krista Fiolleau, Erin Marshall, Yan Li, and Xiaosheng Zhuang, who challenged me and helped in my growth. They are a surrogate family.

I wish to thank my parents for instilling in me the joy of learning and the dedication to academic research. Without their guidance throughout my life, I would not have been able to achieve this.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

1.1 RESEARCH OBJECTIVES

DeAngelo (1981) defines audit quality as the joint probability that an auditor: (a) detects a misstatement in a client's accounting records; and (b) reports the detected misstatement. DeAngelo indicates that the probability of discovering a misstatement depends on the auditor's technological competence and the audit programs used and that the probability of reporting the detected misstatement is associated with the auditor's economic independence from the client.

Auditing standards (the Audit Risk Model or ARM) require that auditors assess their clients' risk levels and adjust their audit programs accordingly (ISA 200; SAS 107; CICA HB 5095; CAS 1211, 1231).[1] When audit risk increases, auditors should modify the nature, timing, and extent of audit procedures to collect evidence needed for expressing an audit opinion. Also, when audit risk increases, professional standards require materiality levels to be lowered (ISA 320; SAS 107; CICA HB 5142; CAS 1221).[2] Formulating an appropriate response to audit risk helps auditors perform a high quality audit. The purpose of this study is to examine how auditors comply with professional standards in practice when

[1] International Standards on Auditing (ISA) 200 "Overall Objective of the Independent Auditor and the Conduct of an Audit in accordance with International Standards on Auditing"; AICPA SAS 107 "Audit Risk and Materiality in Conducting an Audit"; the CICA handbook section 5095 "Reasonable Assurance and Audit Risk"; Chinese Auditing Standards (CAS) 1211 "Knowing the Client and Assessing the Risk of Material Misstatement" and 1231 "Auditing Procedures for Assessed Risk of Material Misstatement".

[2] International Standards on Auditing (ISA) 320 "Materiality in Planning and Performing an Audit"; AICPA SAS 107 "Audit Risk and Materiality in Conducting an Audit"; the CICA handbook section 5142 "Materiality"; Chinese Auditing Standards 1221 (CAS) "Materiality".

audit risk assessments increase. Specifically, the study investigates how auditors follow the audit risk model (ARM) in response to audit risk. Here in this study audit risk refers to the client's inherent risk.[3]

Prior literature focusing on auditors' searching for misstatements in clients' accounting records suggests that auditors do not make significant adjustments to their audit programs in response to increases in audit risk assessments. Archival studies using audit working papers find that there is little association between level of assessed audit risk and audit programs (Mock and Wright 1993; Quadackers et al. 1996; Mock and Wright 1999). Furthermore, in an experiment focusing on auditor response to increased fraud risk, Zimbelman (1997) finds that, rather than conducting different tests for high vs. low risk clients, audit programs are static and auditors simply exert more effort on the same audit procedures. Also, client size is associated with audit risk. Larger companies are more complex and have more subsidiaries than smaller companies and may require more audit efforts or more effective audit procedures (Bedard and Wright 1994; O'Keefe et al. 1994; Stein et al. 1994; Wright and Bedard 2000). However, there has been little research on how auditors adjust their audit programs to client size.

After discovering misstatements, auditors require clients to adjust these misstatements before issuance of audit opinions. They document these detected

[3] In my data, the client's inherent risk is not assessed at the financial statement item assertion level. It is rated at the overall financial statement level and the transaction cycle level (sales and accounts receivable cycle and inventory and warehousing cycle). This study examines how auditors comply with auditing standards in adjusting audit programs (nature, extent, and staffing) to audit risk. As an audit program is associated with an audit area or an entire audit, inherent risk ratings at the overall financial statement level or transaction cycle level are likely to be the proper level for the study.

misstatements in their audit working papers when the magnitudes of these misstatements exceed the audit difference posting threshold.[4] Prior literature indicates that auditors do not change the thresholds to record and require adjustments of detected misstatements in response to audit risk (Blokdijk et al. 2003). There is a concern that auditors may be less likely to record and require correction of detected audit differences for larger clients due to their greater economic dependence on these clients. Using data from audit working paper records, Gleason and Mills (2002) and Blokdijk et al. (2003) report that planning materiality increases with client size, but at a decreasing rate.

Two research questions are investigated. First, does the audit firm adjust its audit programs by changing the extent and/or type of testing[5] in response to audit risk assessments and client size? Second, does the audit firm change the thresholds to record and require correction of detected misstatements in response to audit risk and client size?

The first objective of this study is focused on how the audit firm adjusts audit programs in response to audit risk increases in the detection of misstatements. Detection of misstatements in financial reporting comprises both detection of errors and detection of fraud. With regard to error detection, the Audit Risk Model (ARM) suggests that as audit risk increases, the auditor should increase the extent of testing by increasing audit hours and/or assigning more

[4] Audit difference posting threshold is the threshold at which auditors will consider in the aggregation of audit differences and document in a summary of uncorrected misstatements. Materiality level is the threshold at which auditors will require adjustments. The audit difference posting threshold is normally lower than the materiality level.

[5] Ideally, this research would also examine the timing of audit procedures. However, timing is under less control of audit firms and it is more difficult for audit firms to track in their work. Thus, they were unwilling to provide the timing data.

experienced audit staff to the engagement (Bell et al. 2008; ISA 200; SAS 107; CICA HB 5095; CAS 1231). Shibano (1990) extends the ARM model and distinguishes between nonstrategic audit risk (audit risk for unintentional errors) and strategic audit risk (audit risk for deliberate irregularities or fraud). The key intuition of the Shibano (1990) model is that an optimal response to risk of fraud requires the auditor to change the type of procedures performed, and requires the auditor to be more variable and unpredictable in her audit approach. Although the above models indicate that the audit firm should adjust audit programs by changing the nature of audit procedures (mix of audit tests), extent of audit procedures (audit hours or sample size), staffing (audit labor use at each rank), and possibly timing (when audit tests are performed) in response to audit risk assessments, prior studies find little association between audit risk and audit programs (Mock and Wright 1993; Zimbelman 1997; Mock and Wright 1999). In addition, as client size increases, clients become more complex and have more subsidiaries, which is associated with higher audit risk. Thus, the audit firm may need to make more effort or adopt more effective audit procedures (Bedard and Wright 1994; O'Keefe et al. 1994; Stein et al. 1994; Wright and Bedard 2000). This study examines whether, in the detection of misstatements in clients' accounting records, the audit firm increases the proportion of higher-rank audit labor use, employs different audit procedures, and spends more audit hours in response to increases in audit risk assessments or in client size.

The second objective of the study is to examine how the audit firm changes the thresholds to record and require correction of detected misstatements

in response to audit risk or client size. As indicated by the audit risk model, when audit risk increases, the audit firm should lower the materiality level and/or report more detected misstatements (ISA 320; SAS 107; CICA HB 5142; CAS 1221). Furthermore, the audit firm is more economically dependent on larger clients and tends to document and suggest adjustments of less audit differences. By using private data from participating audit firms, this study tests whether the audit firm changes the thresholds to record and require correction of detected misstatements in response to audit risk and client size after these misstatements are found.

China provides an appropriate global setting to study how auditors follow standards (e.g. ISAs) and whether audit programs are adjusted to audit risk as required by the standards. In 2006, the Chinese Ministry of Finance approved revision of 26 existing Chinese Auditing Standards and issuance of 22 new Chinese Auditing Standards, which became effective on January 1, 2007.[6] A 2009 report issued by World Bank states that the 48 Chinese Auditing Standards "are largely comparable to IAASB-issued ISA".[7] On November 3, 2009, the International Federation of Accountants (IFAC) released an online chart, showing that International Standards on Auditing (ISAs) issued by the International Auditing and Assurance Standards Board (IAASB) have been adopted by 126 countries and jurisdictions around the world.[8] The IFAC classifies the ISA adoption approaches into four categories: (1) required by law or regulation; (2)

[6] The official announcement from the Chinese Ministry of Finance can be found in the following: http://www.cicpa.org.cn/Professional_standards/Professional_guidelines/200804/t20080428_4909.htm

[7] World Bank, "Report on the Observance of Standards and Codes (ROSC) - Accounting and Auditing: People's Republic of China", October 2009.

[8] Please refer to the following two links: http://press.ifac.org/news/2009/11/ifac-releases-new-tool-that-gauges-isa-adoption and http://web.ifac.org/isa-adoption/chart.

ISAs are adopted; (3) national standards are the ISAs; and (4) other. China is in the category of "national standards are the ISAs", which means that "While ISAs have generally been adopted as the local standards, there may be national modifications to them but changes, if any, are stated to be in line with the spirit of the IAASB Modifications Policy".[9] Thus, auditing practice in China reflects global application of ISAs.

Professional standards require compliance of all audit firms, regardless of size. Prior studies have focused on large accounting firms; whether their results apply to small accounting firms is open to empirical examination. Using archival data from non-Big 4 Chinese audit firms, this study provides an opportunity to investigate whether findings of compliance with auditing standards based on data from large firms still hold for smaller firms. Thus, this study affords a more comprehensive understanding of the audit profession when considering strategies in response to audit risk or client size.

Audit firms have widely adopted audit decision tools, such as automated planning approaches, which help auditors identify applicable audit procedures in response to risk assessments (Mock and Wright 1999; Winograd et al. 2000; Bierstaker et al. 2001; Rezaee et al. 2002; Alles et al. 2006; Chou et al. 2007; Dowling and Leech 2007). Thus, technology changes may also make audit programs more responsive to audit risk.

1.2 RESEARCH CONTRIBUTIONS

[9] Definitions of other categories with respect to ISAs adoption approaches can be found at: http://web.ifac.org/isa-adoption/chart.

This study extends prior literature in several ways. First, this study explicitly tests auditors' compliance with auditing standards. Auditors must follow the requirements in professional standards and adjust their audit programs to audit risk. In addition, professional standards require compliance of all audit firms, regardless of size. Prior studies indicate that audit programs are static to the changes in audit risk (Mock and Wright 1993; Quadackers et al. 1996; Zimbelman 1997; Mock and Wright 1999). By using proprietary data from non-Big 4 audit firms in a jurisdiction governed by ISAs to examine auditors' compliance with standards (especially the audit risk model), this study provides some insights on whether previous findings based on archival data from large (mainly U.S.) accounting firms still apply to small Chinese accounting firms.

Second, this study extends prior studies on the association between audit programs and audit risk by examining how auditors adjust audit labor usage (staff), audit procedures used (nature), and audit hours spent on related audit procedures (extent) to audit risk. The results add some new evidence on whether auditors increase the proportion of audit labor use at higher ranks and change audit procedures when audit risk increases. In addition, Johnstone and Bedard (2003) report that the use of specialist personnel can help moderate the negative association between client acceptance likelihood and audit risk (both error and fraud risk). This paper examines how such a risk-management strategy is carried out in allocation of audit labor after the client has been accepted for audit.

Finally, the study examines the effect of client size on an audit firm's decisions. Client size is an important factor as the audit firm may be less likely to

book and correct detected misstatements for larger clients. Using private archival data from participating audit firms, this paper examines how client size (and also audit risk) influences the audit firm's determination of the thresholds to record and require correction of detected misstatements.

1.3 OVERVIEW OF METHODOLOGY

This thesis collects archival data to investigate how audit risk assessment and client size affect the audit firm's detection and recording of misstatements in a client's financial statements. The study examines two factors: (1) audit risk assessment (high vs. low); and (2) client size (large vs. small). Ten Chinese public accounting firms from three provinces in China (Guangdong, Hebei, and Zhejiang) were willing to participate in the study. They provided engagement-level archival data for 113 clients, of which 104 clients were in the manufacturing industry.[10] Non-Big 4 Chinese accounting firms are economically significant—as measured by the number of clients, Chinese accounting firms dominate the emerging Chinese audit market.[11]

The collected data are related to the audits of participating clients' fiscal year 2007 financial reports. Participating audit firms are asked to provide risk assessments from original audit working papers and rate their evaluations of audit

[10] These three provinces ranked No.1, No.6, and No.4 respectively among all 31 provinces in Mainland China with respect to Gross Domestic Product (GDP) in 2007. The sum of these three provinces' GDP accounts for 25.5% of China's national GDP in 2007.

[11] For example, as measured by the number of listed clients, large international accounting firms account for 8.39%, 7.12%, 7.12%, 6.17%, and 6.94% of the audit market share from 2003 to 2007, respectively. Table 2 in Wang et al. (2008) also demonstrates the dominance of Chinese audit firms in the Chinese audit market as measured by the number of clients.

risk on a 9-point Likert scale (Lowest Risk = 1; Highest Risk = 9).[12] Also, auditors provide information about their clients' total assets.

Auditors follow the same standards, have common education background, and pass common examinations. Thus, they should be assessing risk similarly. Since the data in this study are private archival data from participating audit firms and the way in which audit firms evaluate audit risk for their clients cannot be controlled directly, the statistical analysis *ex post* compares risk ratings from participating audit firms by examining whether some audit firms are significantly harsher or more relaxed than other audit firms in the sample with respect to their audit risk assessments. For overall audit risk assessments, one audit firm (auditor X) tends to assess clients as more risky than other auditors. For audit risk assessments specific to sales and accounts receivable cycle, one other audit firm (auditor Y) tends to provide higher risk ratings than other auditors. With regard to audit risk assessments for inventory and warehousing cycle, the above two audit firms (auditors X and Y) generally give a higher risk assessment and a third audit firm (auditor Z) always yields a lower risk evaluation. Thus, for these three firms, the corresponding raw audit risk ratings (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) are adjusted by subtracting (or adding) the differences between their individual mean ratings and the mean ratings of the whole sample.

[12] Participating audit firms rate on a 9-point Likert scale (Lowest Risk = 1; Highest Risk = 9) for the client's overall audit risk assessment, audit risk assessment for the client's sales and accounts receivable cycle, and audit risk assessment for the client's inventory and warehousing cycle respectively.

After the above statistical adjustments are made to the raw audit risk ratings, clients in the sample are *ex post* classified into clients with higher and lower audit risk assessments (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) based on the adjusted audit risk ratings on the 9-point Likert scale. When the audit risk rating (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) is equal to or less than 3, the corresponding client is classified as a client with lower audit risk assessment (for overall/sales and accounts receivable cycle/inventory and warehousing cycle). And when the audit risk rating (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) is greater than 3, the corresponding client is classified as a client with higher audit risk assessment (for overall/sales and accounts receivable cycle/inventory and warehousing cycle).[13] The clients are also *ex post* divided into large and small clients based on the mean value of national industry assets size in year 2007, which was RMB 105,651,543.21.[14]

[13] Ideally, I would categorize the sample into 3 sub-samples (audit risk ratings beweetn 1 and 3 as low-risk group, audit risk ratings between 4 and 6 as moderate-risk group, and audit risk ratings between 7 and 9 as high-risk group). However, only few observations in my sample were deemed by their auditors to have audit risk assessments (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) higher than 7. By following prior literature (e.g. Bell et al. 2008; Felix et al. 2001), I made a dichotomous classification of my sample by combining clients with audit risk ratings between 4 and 6 and clients with audit risk ratings between 7 and 9. In addition, discussions with engagement partners from participating audit firms indicate that they do not accept clients for their audits if they evaluate these clients as having very high audit risk. This may help explain why few observations fall in the category of audit risk ratings between 7 and 9.

[14] In the analysis, clients are classified as large (small) when total assets are above (below) the mean value of national industry assets size in year 2007, which was 105,651,543.21 in RMBs, the Chinese currency (China Statistical Yearbook, 2008). This is 14,463,700.03 in US dollars or 14,196,850.70 in Canadian dollars. The exchange rates between US dollars and RMBs and between Canadian dollars and RMBs on December 31, 2007 are $1 USD = 7.3046 RMBs and $1 CAD = 7.4419 RMBs respectively.

Archival data are collected by asking participating audit firms to fill a structured data collection instrument, which includes three parts: (1) background information; (2) the five most important audit differences detected; and (3) key auditing procedures used in testing. The data collection instrument was developed based on a review of literature regarding the detection of misstatements and audit planning. For background information, the audit firm is asked to describe the following items: materiality for the engagement; overall client risk assessment; total actual audit hours used and the breakdown of audit hours at each staffing level (partners, managers, seniors, juniors, and other specialists); total assets and revenues of the client; the posting threshold to book an audit difference; the frequency and magnitude of accounting errors booked; and the total value of audit adjustments accepted by the client. With regard to the five most important audit differences detected, I collect data about: the nature of the audit differences dectected and the accounts involved in these differences; book value of unadjusted accounts; the value of these errors and their impacts on net income; and the value of adjustments made. Regarding key auditing procedures used, I concentrate on the sales and accounts receivable cycle and inventory and warehousing cycle, the two cycles which are critical to manufacturing firms. The data I gather are risk assessments for sales and accounts receivable (inventory and warehousing), reliance on internal control for sales and accounts receivable (inventory and warehousing), and both nature and audit hours of five auditing procedures with the most time allocation used in control and substantive tests for sales and accounts receivable (inventory and warehousing).

1.4 OVERVIEW OF RESULTS

The results suggest that, with respect to detection of misstatements, audit firms do not adjust audit programs to increases in audit risk or client size. Specifically, as audit risk assessment increases, audit firms increase the proportion of junior labor use relative to senior labor use. Audit firms do not adjust the nature or the extent of audit procedures used at the individual transaction cycle level for both sales and accounts receivable/inventory and warehousing. Audit firms detect similar numbers and magnitudes (as scaled by clients' total assets) of audit differences in similar types of accounts between higher-risk and lower-risk clients. Furthermore, when client size increases, audit firms do not increase the relative proportion of higher-rank labor use. Audit firms do not adjust the nature of audit procedures for transaction cycles of sales and accounts receivable/inventory and warehousing but reduce the extent of audit procedures in response to the increase in client size. Audit firms find more audit differences for large clients but detect audit differences in similar types of accounts between large and small clients. These results are not consistent with the framework described in professional standards, particularly the audit risk model (ARM) espoused in prevailing auditing standards.

For the thresholds to record and require correction of detected misstatements, audit firms tend to set a lower audit difference posting threshold and materiality level (as scaled by clients' total assets) in response to increases in audit risk. Also, audit firms set a lower audit difference posting threshold and

materiality level (as scaled by clients' total assets) for large clients than for small clients. These results imply that audit firms do respond to audit risk and client size in compliance with professional standards with respect to recording and requiring correction of detected misstatements.

1.5 THESIS ORGANIZATION

The remainder of this thesis is organized into six chapters. Chapter 2 provides a review of the relevant literature. This review includes studies on audit planning, with a focus on the association between audit risk assessments and auditors' adjustments in terms of auditing procedures, audit hours and audit personnel allocations. The literature on the nature and characteristics of booked misstatements in financial reporting is also discussed. Chapter 3 develops the hypotheses. Chapter 4 describes the methodology used in the study, and Chapters 5 and 6 present the descriptive and multivariate statistical analyses respectively. Chapter 7 provides a summary of the results and discusses the implications and the limitations of this study.

2 LITERATURE REVIEW

2.1 INTRODUCTION

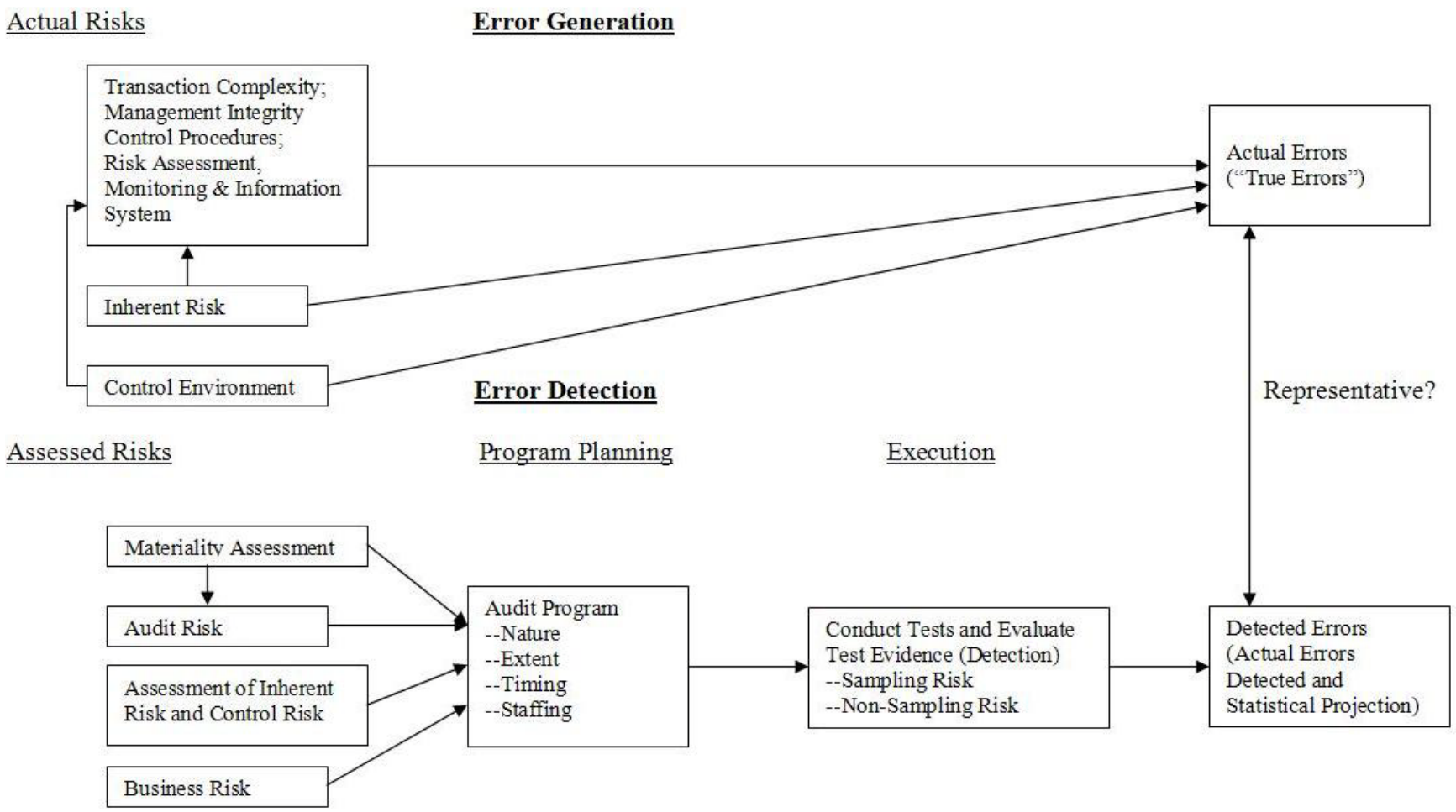
The primary objective of this study is to investigate how the audit firm complies with professional standards and adjusts audit programs in accordance with the Audit Risk Model (ARM). ARM indicates that the audit firm adjusts the nature of audit procedures (type of audit procedures), the extent of audit procedures (audit hours used), and the use of audit labor at different ranks in response to audit risk. ARM also requires the audit firm to lower the thresholds to record and require correction of detected misstatements. In addition, the audit firm may also adjust audit programs to client size as client size is associated with audit risk, and the audit firm is less likely to book and require correction of detected misstatements for larger clients due to the economic dependence on them. By examining how the audit firm adjusts audit programs and the thresholds to record and require correction of detected misstatements in response to audit risk, this paper extends prior literature on the association between audit programs and audit risk assessments (Mock and Wright 1993; Zimbelman 1997; Mock and Wright 1999). In a broader sense, the paper enhances the understanding of how auditing standards are followed in practice.

2.2 RELEVANT LITERATURE ON AUDITORS' DETECTION OF MISSTATEMENTS

Detection of misstatements in an audit client's financial reporting consists of both detection of errors and detection of fraud. Regarding error detection, professional guidance (ISA 200; SAS 107, 110; CICA HB 5095; CAS 1231) requires that auditors follow the Audit Risk Model (ARM) in their practice. ARM indicates that auditors should be responsive to perceived audit risk. Specifically, as risk assessments increase, auditors should increase the extent of audit tests (audit hours or audit sampling size) or assign more experienced/competent personnel or perform more audit procedures at the fiscal year end in order to lower planned detection risk and thus reduce achieved audit risk to an acceptable level (ISA 200; SAS 107, 110; CICA HB 5095; CAS 1231).

Also Caster et al. (2000) propose a process model for accounting error generation and error detection to represent the actual audit work and the model is presented in Figure 2.1, which demonstrates the processes of accounting error generation and detection. Auditors do their work to detect accounting errors in financial statements and try to persuade clients to correct these errors in order to assure that the financial statements are presented fairly in all material respects. Specifically, auditors assess risks for a particular client. Then auditors plan their procedures, which include: selection of tests (nature), decision of sample size (extent), performance of tests closer to fiscal year end (timing), and assignment of more experienced staff to the audit team (staffing). When auditors execute their audit tests, they may be subject to the influence of sampling risk or non-sampling risk. Finally, the product of the above processes is the detected errors, which need to be projected to determine an estimate of actual errors.

Figure 2.1 Model for Accounting Error Generation & Detection Processes



In terms of fraud detection, Shibano (1990) distinguishes between nonstrategic audit risk (audit risk for unintentional errors) and strategic audit risk (audit risk for deliberate irregularities or fraud). In his model, Shibano suggests that in response to fraud risk the auditor should rely on different types of audit procedures and use more variable audit approaches, which are difficult for the fraudulent client to predict.

Although the above models imply that the auditor should adjust audit programs by changing the nature of audit procedures (mix of audit tests), extent of audit procedures (audit hours or sample size), staffing (audit labor use at each rank), and possibly timing (when audit tests are performed) in response to increases in audit risk, prior studies find that audit programs are relatively static in response to audit risk. Archival studies using data from audit working papers have examined the associations between nature/extent of audit procedures and perceived audit risk. For example, Mock and Wright (1993) examine both the macro (engagement wide) risks and micro (account specific) risks and document no significant association between the risk levels and the nature of audit tests. They find that audit program planning is not responsive to changes in risk from year to year. They also report that audit extent is associated with the levels of certain risk factors (the number of prior years' errors in particular), but not responsive to changes in risk levels for the same client over different years. In their follow-up study, Mock and Wright (1999) document some evidence that the nature of audit tests is associated with changes in some of the client risks including risk changes at the assertion level. They again find that there is no

significant association between the client risk assessments and the extent of audit tests and that the audit extent tends to be related to the audit extent in the prior period rather than to the changes in client risk assessments. Similarly, Bedard (1989) reports that although "internal control quality" and "favorable past results" are the reasons most often listed for changes in audit tests, the inherent risk is not significantly associated with audit plan changes. Based on Dutch data, Quadackers et al. (1996) report similar static audit programs across time.

Some archival studies examine the adjustment of audit labor usage to client risk assessments and document some evidence that the audit firm responds to client risk in its allocation of audit personnel at each rank. For instance, O'Keefe et al. (1994) report that higher inherent risks are associated with higher staff and senior hours but not related with partner or manager hours. Stein et al. (1994) compare across financial services and industrial firms and indicate that greater use of upper-level audit personnel is made for financial services firms with higher risk while lower-level personnel is used more for industrial firms with lower risk. Hackenbrack and Knechel (1997) show that a higher proportion of labor hours at higher levels (partner and manager hours) are assigned to public clients. In addition, Johnstone and Bedard (2003) find that the assignment of specialist personnel moderates the negative association between client acceptance likelihood and audit risk (both error risk and fraud risk) while the charge of a higher billing rate mitigates the negative association between client acceptance likelihood and business risk (both client business risk and auditor business risk). Bell et al. (2008) examine audit labor use after business risk audit (BRA), using

proprietary data for 165 engagements performed in 2002. They report that BRA use a larger portion of higher-ranked labor than pre-BRA benchmarks and assign more labor and more higher-ranked labor to clients with high assessed business risk than pre-BRA benchmarks. In addition, labor uses at all ranks increase with assessed business risk.

Experimental studies using data from controlled settings also provide some evidence on the association between audit risk assessments and audit programs. For example, Zimbelman (1997) investigates the impact of requiring auditors to separately and explicitly assess fraud risk on auditors' program plannings. He finds that auditors do not modify the nature of their audit tests but significantly increase the extent of their audit tests in response to perceived fraud risk if they are required to separately and explicitly assess fraud risk. Similarly, Bedard and Wright (1994) document a weak association between assessed risks and audit tests. Wright and Bedard (2000) report that those auditors who make higher risk judgments and concentrate more on error hypotheses tend to plan for more effective audit procedures and provide more justification for their audit test decisions. Glover et al. (2000) examine whether auditors adjust their planned audit tests to significant, unexpected fluctuations detected by analytical procedures and document that a high proportion of auditors are reluctant to revise their audit plans in the presence of increased audit risk as suggested by the significant, unexpected fluctuations. Bierstaker and Wright (2004) also provide some experimental evidence on the joint effect of partner preferences and auditors' risk assessments on budgeted audit hours and tests, showing that

budgeted audit hours and tests increase with the assessed risk only when there is a partner preference for effectiveness, but not when there is a partner preference for efficiency. In the later experiments (Wright and Bedard 2000; Bierstaker and Wright 2004), auditors behave more in accordance with requirements of professional standards.

Furthermore, prior literature studies the relationship between audit risk assessments and audit differences detected in the audit. For example, Waller (1993) investigates the relationship between auditors' overall and assertion-level inherent risk assessments and audit differences and finds that the rate of audit differences varied over assertion and there was a low association between incidence of audit differences and auditors' assessments of inherent risk at assertion level. He also reports an insignificant association between the auditors' control risk assessments and the rate of audit differences at the assertion level. Willingham and Wright (1985) and Johnson (1987) document no association between the auditors' detailed controls assessments and the occurrence or magnitude of audit differences for accounts receivable, inventory, and accounts payable. Wright and Wright (1996) report no relationship between reliance on internal control and the magnitude of audit differences at the engagement level. In contrast, certain individual risk factors, such as external environment, client liquidity and profitability, and client management controls and environment, are found to be associated with types or sizes of detected audit differences (Kreutzfeldt and Wallace 1986; Johnson 1987; Kreutzfeldt and Wallace 1990; Wallace and Kreutzfeldt 1995).

There is little research on the association between client size and audit programs used in detection of misstatements in the audit client's financial reporting. Larger companies are more complex and have more subsidiaries than smaller companies and may require more audit efforts or more effective audit procedures (Bedard and Wright 1994; O'Keefe et al. 1994; Stein et al. 1994; Wright and Bedard 2000). Therefore, the understanding of how auditors adjust the nature and extent of audit procedures to increases in client size awaits more empirical evidence.

Regarding the effect of client size on audit labor use, prior literature documents that client size affects total audit hours and audit hours spent at different staffing levels. For example, O'Keefe et al. (1994) report that client size is associated with the total audit hours while it might have different influences on audit hours at different ranks. Also Stein et al. (1994) find that client size is a common determinant of audit hours for both industrial clients and financial services clients. Similarly, Hackenbrack and Knechel (1997) examine the relationship between auditors' labor usage and relevant engagement characteristics and suggest that client size is associated with changes in the allocation of labor usage for different audit activities and at different ranks.

In addition, client size is likely to be associated with the detected misstatements as smaller companies tend to have weaker internal controls than larger companies. Although earlier studies by Ramage et al. (1979) and Johnson et al. (1981) report that the relative magnitude of audit differences and the audit differences rates remain constant as audit value increased, later studies by Hylas

and Ashton (1982), Ham et al. (1985), Kreutzfeldt and Wallace (1986), Wright and Ashton (1989), Entwistle and Lindsay (1994), and Bell et al. (1998) find that larger firms tend to have a lower frequency and smaller relative size of mechanical accounting errors and more judgment errors.[15]

2.3 Relevant Literature on Auditors' Recording of Detected Misstatements

Professional guidance requires that materiality level be lowered as a response to increases in audit risk assessments (ISA 320; SAS 107; CICA HB 5142; CAS 1221). Empirically, Blokdijk et al. (2003) find that planning materiality increases with the assessment of control quality and decreases with the assessment of client complexity. But they do not find a significant association between client inherent risk and planning materiality.

Large clients are more complex and have operations in scattered locations. This may represent higher audit risk and ARM implies that the audit firm lowers the thresholds to record and require correction of detected misstatements. In contrast, the more economic dependence on large clients may motivate the audit firm to raise the thresholds to record and require correction of detected misstatements and suppress the recording and correction of detected misstatements. Using data from audit working paper records, Gleason and Mills (2002) and Blokdijk et al. (2003) report that planning materiality increases with

[15] Here mechanical accounting errors refer to procedural errors made by financial statements preparers, e.g. posting, coding, footing, and calculation. Judgment errors are items that have to be estimated because exact dollar amounts cannot be determined, such as estimates for contingencies or depreciation expenses (Hylas and Ashton 1982).

client size, but at a decreasing rate. More evidence is needed to understand the effect of client size on the audit firm's likelihood to record and adjust discovered misstatements.

In addition, with regard to the audit adjustments made to the detected misstatements, Icerman and Hillison (1991), Wright and Wright (1996), and Eilifsen et al. (2000) indicate that larger audit differences are more likely to be booked for adjustment. Gibbins et al. (2001) find that the adjustments of detected audit differences are affected by the relative size of the client to the individual auditor, not the size of the client relative to the audit firm's client base. Joe et al. (2008) document that audit adjustments are more likely to be waived for clients with stronger internal controls, particularly larger clients, and for clients which have longer relationship with incumbent auditors.

In brief, prior literature reports that when audit risk assessments increase, auditors increase audit labor use at lower ranks, do more of the same audit procedures, fail to use different audit procedures, and lower the thresholds to record and require correction of detected misstatements. In addition, as client size increases, audit labor hours spent at each staffing level may increase and auditors tend to raise the thresholds to record and require correction of detected misstatements.[16]

[16] Archival studies using publicly reported data (e.g. Reynolds and Francis 2001) find that Big 5 auditors report more conservatively for larger clients to protect their audit reputation. This implies that auditors may decrease the thresholds to record and require correction of detected misstatements for larger clients.

3 HYPOTHESES DEVELOPMENT

3.1 INTRODUCTION

The study of auditors' adjustments to changes in audit risk assessments and client size in detection and recording of misstatements is critical to the knowledge of how and whether audit work is organized and performed to comply with professional standards (especially ARM) in practice. Auditors' responses to audit risk and client size are also important to avoid audit failure and improve audit efficiency. Prior literature has documented little association between audit programs and audit risk or client size. By using more recent data from original audit working papers in a Chinese setting where ISAs are in effect, this research provides updated evidence on how auditors adjust audit programs to audit risk assessments and client size with respect to detecting misstatements in financial reporting. In addition, using proprietary data from internal records of participating audit firms, this study examines how auditors change the thresholds to record and require correction of detected misstatements in response to increases in audit risk assessments and client size.

In this study, the sample is *ex post* classified into different cells based on audit risk assessments (higher vs. lower)[17] and client size (large vs. small).[18] This

[17] If a client's audit risk assessment (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) is equal to or less than 3, it is classified as a client with lower risk (for overall /sales and accounts receivable cycle/inventory and warehousing cycle). If a client's audit risk assessment (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) is greater than 3, it is classified as a client with higher risk (for overall/sales and accounts receivable cycle/inventory and warehousing cycle).

study investigates how auditors adjust the nature and extent of audit procedures and the allocation of audit personnel to audit risk or client size. The study examines whether auditors record misstatements in different types of accounts when audit risk assessments or client size increases. Also, the study investigates how auditors change the planned materiality level (or the audit difference posting threshold) to record and require correction of detected misstatements in response to audit risk or client size. Thus, the hypotheses are developed as follows: (1) auditors' detection of misstatements in a client's accounting system; and (2) auditors' determination of the thresholds to record and require correction of detected misstatements.

3.2 HYPOTHESES ON AUDITORS' DETECTION OF MISSTATEMENTS

This paper investigates how auditors respond to increases in audit risk assessments and client size in their detection of misstatements in their clients' accounting systems. Specifically, the paper examines whether auditors adjust the audit labor use at each rank, nature of audit procedures (mix of audit tests), and the extent of audit procedures (audit hours spent on audit tests) between higher-risk and lower-risk clients and between large and small clients. In addition, the paper also studies whether auditors discover misstatements in different types of accounts across clients of different audit risks and sizes.

[18] If a client's total assets at the end of fiscal year 2007 are less than the national mean industry assets size in year 2007, which was RMB 105,651,543.21, it is classified as a small client. And if a client's total assets at the end of fiscal year 2007 are greater than the national mean industry assets size in year 2007, it is classified as a large client.

First, ARM suggests that auditors respond to increases in audit risk assessments by using more of higher-rank audit labor. Prior research documents that client inherent risk (or control risk) is positively associated with audit hours at senior or junior levels while higher client business risk results in more audit labor use at all ranks and a greater proportion of higher-rank labor (O'Keefe et al. 1994; Stein et al. 1994; Hackenbrack and Knechel 1997; Bell et al. 2008). Also when client size increases, large clients tend to have more complex business and more subsidiaries, which may require auditors to assign more experienced staff to their teams. Thus I have my first hypotheses:

H1a: Auditors increase the use of higher-rank audit labor (relative to lower-rank audit labor) when audit risk assessments increase.

H1b: Auditors increase the use of higher-rank audit labor (relative to lower-rank audit labor) when client size increases.

Second, professional standards require auditors to adjust their audit procedures as audit risk rises. However, prior studies indicate that there is little association between the nature of audit procedures and the audit risk assessments (Mock and Wright 1993; Zimbelman 1997; Mock and Wright 1999). This study examines whether the adoption of new Chinese Auditing Standards, which are essentially ISAs, may help practicing auditors better adjust their audit procedures to assessed audit risk. In addition, audit firms are aware of requirements from professional standards and regulators' concern that they should follow these standards. Therefore, they have an incentive to increase the link between risk assessments and actual audit procedures. Auditors may also adjust audit procedures for large clients as large clients tend to have more complex

transactions and operate in multiple locations. Therefore, I develop the second hypotheses in the following:

H2a: Auditors adjust the nature of their audit procedures when audit risk assessments increase.

H2b: Auditors adjust the nature of their audit procedures when client size increases.

Third, prior archival research has found the extent of audit procedures static when audit risk assessments change (Mock and Wright 1993; Mock and Wright 1999) while experimental studies report that auditors do respond to risk, though it is a mechanical response of doing more of the same audit procedures when audit risk rises (Zimbelman 1997). I posit that auditors increase the extent of their audit procedures (audit hours used) when audit risk assessments increase. Furthermore, larger clients may motivate auditors to extend their scope of audit and increase effort because larger clients are more complex and have more businesses scattered around in distant locations. Thus I put my third hypotheses as follows:

H3a: Auditors increase the extent[19] of their audit procedures when audit risk assessments increase.

H3b: Auditors increase the extent of their audit procedures when client size increases.

Finally, regarding the detected audit differences, prior literature indicates that there is little association between the audit risk and the occurrence or magnitude of detected audit differences (Johnson 1987; Waller 1993; Wright and Wright 1996). However, with the help of decision aids developed in recent years,

[19] Here the extent of audit procedures is defined as the corresponding hours for the audit procedures divided by the total audit hours for the engagement.

auditors may use different sets of audit procedures and/or do more of the audit procedures and thus focus on different audit areas and discover audit differences in different accounts when audit risk changes. In addition, prior studies suggest that larger clients are likely to have a lower frequency and smaller relative size of audit differences due to their stronger internal controls (Hylas and Ashton 1982; Ham et al. 1985; Kreutzfeldt and Wallace 1986; Wright and Ashton 1989; Bell et al. 1998). This implies that auditors may find different misstatements in different types of accounts between large and small clients. I summarize the relevant hypotheses in the below:

H4a: Auditors detect different numbers or magnitudes of audit differences or audit differences in different types of accounts when audit risk assessments increase.

H4b: Auditors detect different numbers or magnitudes of audit differences or audit differences in different types of accounts when client size increases.

3.3 HYPOTHESES ON AUDITORS' RECORDING OF DETECTED MISSTATEMENTS

This study examines how auditors respond to increases in audit risk assessments and client size in determining their thresholds to record and require correction of detected misstatements, as measured by the materiality level or audit difference posting threshold set by the auditors to book audit differences in their working papers. Professional standards (ISA 320; SAS 107; CICA HB 5142; CAS 1221) require the materiality level to be lowered in response to increases in audit risk assessments. Using Dutch data Blokdijk et al. (2003) document no significant association between client inherent risk and planning materiality. In addition, DeAngelo (1981) suggests that auditors are more economically dependent on

large clients and tend to cave in to pressures from large clients. They may document and propose adjustments of less detected misstatements. Archival studies using proprietary data from audit working papers report that planning materiality increases with client size, but at a decreasing rate (Gleason and Mills 2002; Blokdijk et al. 2003). However, auditors would like to protect their audit reputation and audit failures with large clients cause more severely negative impact on auditors. Thus, auditors tend to be more conservative and determine lower thresholds to record and require correction of detected misstatements. Archival studies using publicly reported data (e.g. Reynolds and Francis 2001) find that Big 5 auditors report more conservatively for larger clients in order to protect their audit reputation. For the hypotheses with respect to auditors' recording of detected misstatements for audit adjustments, I formulate them as that when audit risk assessments or client size rises the auditors would lower the thresholds to record and require correction of detected misstatements to perform effective audits or keep their reputation. Thus the hypotheses are as follows:

H5a: Auditors set lower thresholds to record and require correction of detected misstatements when audit risk assessments increase.

H5b: Auditors set lower thresholds to record and require correction of detected misstatements when client size increases.

4 RESEARCH DESIGN AND METHOD

4.1 METHODOLOGY

This study uses archival data from the audit working papers of accounting firms. The data collection is focused on the audit risk assessment and client size in order to investigate how auditors adjust audit programs in response to increases in audit risk level and client size.

Regarding audit risk, participating audit firms are asked to provide both the overall audit risk assessments and audit risk assessments on specific transaction cycles, which include sales and accounts receivable cycle and inventory and warehousing cycle. The participating audit firms evaluate their clients' overall audit risk and transaction-cycle level audit risk on a 9-point Likert scale (Lowest Risk = 1; Highest Risk = 9).[20] In the analysis of audit labor usage in detection of misstatements and determination of materiality (or audit difference posting threshold) in recording of detected misstatements for audit adjustments, clients in the sample are *ex post* classified into higher-risk clients and lower-risk clients based on the clients' overall audit risk assessments. Specifically, when the overall audit risk assessment is equal to or less than 3, the corresponding client is classified as a lower-risk client, and if the overall audit risk assessment is greater than 3, this client is classified as a higher-risk client. Ideally, the clients would be categorized into 3 sub-samples: overall audit risk assessment between 1 and 3 as

[20] The participating accounting firms fill in audit risk assessments based on their archives of internal records and audit working papers. As the audit firms usually review their working papers before these papers are put in archives, they provide the final audit risk assessments.

low-risk group; overall audit risk assessment between 4 and 6 as moderate-risk group; and overall audit risk assessment between 7 and 9 as high-risk group. However, only three of the clients in the sample of 104 manufacturing firms were deemed by their auditors to have audit risk assessments higher than 7. By following prior literature (e.g. Bell et al. 2008; Felix et al. 2001), a dichotomous classification of the sample was made by combining clients with overall audit risk assessments between 4 and 6 and clients with overall audit risk assessments between 7 and 9. In addition, discussions with engagement partners from participating audit firms indicate that they do not accept clients for their audits if they evaluate these clients as having very high audit risk. This may help explain why few observations fall in the category between 7 and 9.

In the analysis of audit procedures used for individual transaction cycles (sales and accounts receivable cycle or inventory and warehousing cycle), the same cut-off of risk assessments for individual transaction cycles is used to classify the sample into clients with higher and lower risk for sales and accounts receivable cycle (inventory and warehousing cycle). That is, when the risk assessment for sales and accounts receivable cycle (inventory and warehousing cycle) is equal to or less than 3, the client is determined as having lower risk for sales and accounts receivable cycle (inventory and warehousing cycle), and otherwise it is regarded as having higher risk for sales and accounts receivable cycle (inventory and warehousing cycle).

With respect to client size, participating audit firms fill in their clients' total assets at the end of fiscal year 2007. Clients in the sample are *ex post*

classified into large and small clients based on the national mean industry assets size in 2007, which was RMB (the Chinese currency) 105,651,543.21. Specifically, if a client's total assets are above (below) RMB 105,651,543.21, this client is classified as large (small).[21]

The structured data collection instrument includes three sections. In the first section, engagement-level background information is collected about the auditors' annual audits of financial reports for fiscal year 2007. In this section, participating audit firms need to retrieve from their audit working papers data on the following items: total assets and revenues of the client, the posting threshold to record an item on the audit difference schedule, total number of errors detected during the audit (excluding internal control deficiencies), total value of errors detected during the audit (balance sheet items, income statement items, and the aggregated value), total value of all audit adjustments accepted by the client (balance sheet items, income statement items, and the aggregated value), materiality level decided by the auditor, overall client risk assessment, total audit fees charged, the audit opinion issued, total actual audit hours used on the engagement, and the breakdown of audit hours at each rank (partners, managers, seniors, juniors, and other specialists). The second section collects data about five most important audit differences (in terms of quantitative or qualitative factors) detected in the fiscal year 2007 audit, including a detailed description of detected audit differences, the accounts involved in these audit differences, unadjusted

[21] I also try to classify clients into large (small) clients based on the provincial mean industry assets size in 2007 (RMB 94,166,260.73 for Guangdong Province, RMB 126,233, 486.66 for Hebei Province, and RMB 59,262,809.08 for Zhejiang Province). The results stay qualitatively the same as those where the classification of large and small clients is based on the national mean industry assets size in 2007.

book values of the accounts, values of these audit differences and their impacts on net income (income-increasing, income-decreasing, and no impact on income), values of adjustments made to these detected audit differences, whether the client consults the audit team for these audit differences before detection, and whether the audit team consults others for these audit differences. The last section is focused on audit procedures used in audits of sales and accounts receivable cycle and inventory and warehousing cycle. Participating audit firms provide data about risk assessments at the individual transaction cycle level (sales and accounts receivable cycle and inventory and warehousing cycle respectively), and whether internal controls at the individual transaction cycles are relied upon (yes or no). Participating audit firms also describe the five audit procedures with the most time allocation in control tests and substantive tests for sales and accounts receivable cycle and inventory and warehousing cycle respectively, and list actual audit hours spent on these audit procedures. A copy of the instrument used to collect data is shown in Appendix A.

4.2 VARIABLE MEASUREMENT

In the data collection, two factors—audit risk assessments and client size, attract particular attention. Data about assessments for overall audit risk, audit risk for sales and accounts receivable cycle, and audit risk for inventory and warehousing cycle are collected respectively. All these audit risk assessments are rated on 9-point Likert scale where 1 is for lowest risk and 9 represents for highest risk. An information sheet and consent form is provided to participating

audit firms, asking for archival data about actual audit procedures and misstatements detected during the audits of high-risk clients and low-risk clients.

Auditors follow the same standards, have common education background, and pass common examinations. Thus, they should be assessing risk similarly. Since the data in this study are private archival data from participating audit firms and the way in which audit firms evaluate audit risk for their clients cannot be controlled directly, the statistical analysis *ex post* compares risk ratings from participating audit firms by examining whether some audit firms are significantly harsher or more relaxed than other audit firms in the sample with respect to their audit risk assessments. For overall audit risk assessments, one audit firm (auditor X) tends to assess clients as more risky than other auditors. For audit risk assessments specific to sales and accounts receivable cycle, one other audit firm (auditor Y) tends to provide higher risk ratings than other auditors. With regard to audit risk assessments for inventory and warehousing cycle, the above two audit firms (auditors X and Y) generally give a higher risk assessment and a third audit firm (auditor Z) always yields a lower risk evaluation. Thus, for these three firms, the corresponding raw audit risk ratings (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) are adjusted by subtracting (or adding) the differences between their individual mean ratings and the mean ratings of the whole sample.

After this statistical adjustment, I conduct a Tukey test for multiple comparisons. The p-values for overall audit risk, audit risk for sales and accounts receivable cycle, and audit risk for inventory and warehousing cycle are 0.136,

0.217, and 0.150 respectively. This suggests that, after the adjustment, audit risk ratings are comparable across the audit firms.[22]

For client size, the mean value of national industry assets size in year 2007, which was RMB 105,651,543.21, is used as an *ex post* benchmark to classify clients as large and small. Specifically, a client is classified as large if its total assets exceed the mean value while a client is classified as small if its total assets are below the mean value.

This paper investigates how auditors adjust labor usage and nature and extent of audit procedures to audit risk assessments and client size in compliance with professional standards. The paper also examines whether auditors detect different misstatements across clients of different audit risks and sizes.

For the analysis of audit labor usage, the dependent variables include: (1) the natural logarithm value of audit hours at each rank (partners, managers, seniors, juniors, and other specialists); and (2) audit hours mix (percentage) at each staffing level, which is the audit hours used at each rank divided by total audit hours for the engagement (O'Keefe et al. 1994; Stein 1994; Bell et al. 2008). In terms of audit procedures used in the detection of misstatements, the dependent variables consist of: (1) nature of audit procedures, which is the number of key audit procedures used for the control or substantive tests of sales and accounts receivable cycle (or inventory and warehousing cycle); and (2) extent of audit procedures, which is measured as the audit hours for key audit procedures used in

[22] I also conduct the pairwise Kolmogorov-Smirnov test to examine the distributions of audit risks (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) between the audit firms. Most of the p-values are larger than 0.10, indicating that empirical distributions of audit risk assessments are similar across audit firms.

the control or substantive tests of sales and accounts receivable cycle (or inventory and warehousing cycle) divided by total audit hours for the engagement (Mock and Wright 1993; Mock and Wright 1999). For detected audit differences, the dependent variables include: (1) the number of detected audit differences; and (2) values of these detected audit differences (as scaled by the corresponding client's total assets at the end of fiscal year 2007).

Participating audit firms record in the data collection instruments the audit procedures they actually use and the audit differences they find. These audit procedures and audit differences are *ex post* classified into different categories to facilitate statistical analysis. With respect to the audit procedures, this study refers to auditing textbooks and Mock and Wright (1999) to identify audit procedures relating to four categories of control tests (make inquiries of appropriate client personnel, examine documents, records and reports, observe control-related activities, and reperform client procedures) and six categories of substantive tests (confirmations, documentation, recomputation, reprocessing/vouching, analytical procedures, and review of disclosures). For the detected audit differences, this study follows the categorizations suggested by Hylas and Ashton (1982) and Eilifsen and Messier (2000) and classify the detected audit differences into ten categories by audit area, which include: (1) revenue cycle and accounts receivable; (2) notes (other) receivable; (3) inventory and production costs; (4) prepaid expenses, deferred charges, and other assets; (5) property, plant and equipment; (6) purchasing cycle and accounts payable; (7) other liabilities and deferred credits;

(8) labor costs and employee benefits; (9) stockholders' equity; and (10) general and administrative expenses.

With regard to the auditors' recording of detected misstatements, this paper focuses on how audit risk assessments and client size affect the auditors' decisions of the thresholds to record and require correction of detected misstatements. Specifically, the paper examines how: (1) audit difference posting threshold (as scaled by the clients' total assets); and (2) materiality level (as scaled by the clients' total assets) differ between higher-risk and lower-risk clients and between large and small clients. The paper also studies whether the audit risk assessments and client size influence: (1) values of audit adjustments accepted by the client (as scaled by its total assets); and (2) ratios of accepted audit adjustments to total detected audit differences.

4.3 MODEL SPECIFICATION

To test auditors' compliance with ARM, this study first follows the regression analysis suggested by O'Keefe et al. (1994) and Bell et al. (2008) to investigate how auditors adjust their labor usage (at each rank) to audit risk assessments and client size.[23] The regression model for audit labor hours at each staffing level is as follows:

$$\ln(Phrs/Mhrs/Shrs/Jhrs/Ohrs/Thrs) = \beta_0 + \beta_1 \ln(assets) + \beta_2 Public * \ln(assets)$$
$$+ \beta_3 ROMM * \ln(assets) + \beta_4 Hrely * \ln(assets) + \beta_5 Mrely * \ln(assets)$$

[23] Prior studies assume that all other client characteristics tend to influence audit labor hours by "changing the curvature of the hours-size relationship". Thus the interactions between the log value of total assets and other client characteristics are included in the empirical models.

$$+ \sum_{i=6}^{14} \beta_i AuditFirmDummy + \varepsilon \quad (1)$$

where *Phrs*, *Mhrs*, *Shrs*, *Jhrs*, and *Ohrs* are actual labor hours at the audit partner, manager, senior, junior, and other supporting specialist (tax, IT, and others) levels respectively. *Thrs* is total audit hours at all levels (*Phrs+Mhrs+Shrs+Jhrs+Ohrs*). *ln(assets)* is the natural logarithm of the client's total assets at the end of fiscal year 2007. *Public* is a dummy variable which equals 1 if the client has issued any publicly traded securities, and 0 otherwise. *ROMM* is 1 if audit risk is assessed as higher, and 0 otherwise. *Hrely* is a dummy variable which equals 1 if the auditor placed high reliance on the client's internal control system, and 0 otherwise. *Mrely* is a dummy variable which equals 1 if the auditor placed moderate reliance on the client's internal control system, and 0 otherwise.

Then an ANOVA model is used to examine whether the relative use of audit labor at each staffing level (audit labor mix) varies across clients with higher and lower risk assessments or across large and small clients.

For the audit procedures, this study relies on ANOVA model to examine whether audit procedures (nature and extent) are adjusted to perceived audit risk or client size. In addition, the study focuses on the five key audit procedures with the most time allocation listed by auditors and uses the log-linear analysis to examine how the frequencies with which different types of audit procedures used for control tests or substantive tests of sales and accounts receivable cycle (inventory and warehousing cycle) appear are influenced by the transaction-cycle level audit risk assessment for sales and accounts receivable (inventory and warehousing) and client size.

For detected audit differences, an ANOVA model is used to study whether the overall audit risk assessment and client size affect the number of detected audit differences and the value of these audit differences. This paper also analyzes the five most important audit differences encountered by auditors in their audits and conducts the log-linear analysis to examine how the frequencies with which audit differences are detected in different types of accounts are affected by the audit risk assessments and client size.

Furthermore, this paper investigates auditors' determination of the thresholds to record and require correction of detected misstatements. An ANOVA model is used to examine how auditors change the audit difference posting thresholds and the materiality levels in response to audit risk assessments and client size. An ANOVA model is also used to study the influence of audit risk and client size on total values of audit adjustments accepted by the client and ratios of accepted audit adjustments to detected audit differences.

4.4 DATA

China provides a representative context to examine how auditors comply with standards (e.g. ISAs) and whether audit programs are responsive to audit risk as required by the standards (especially ARM). In 2006, the Chinese Ministry of Finance approved revision of 26 existing Chinese Auditing Standards and issuance of 22 new Chinese Auditing Standards, which became effective on

January 1, 2007.[24] A 2009 report by World Bank states that the 48 Chinese Auditing Standards "are largely comparable to IAASB-issued ISA".[25] On November 3, 2009, the International Federation of Accountants (IFAC) released an online chart, showing that International Standards on Auditing (ISAs) have been adopted by 126 countries and jurisdictions around the world.[26] The IFAC classifies the ISA adoption approaches into four categories: (1) required by law or regulation; (2) ISAs are adopted; (3) national standards are the ISAs; and (4) other. China is in the category of "national standards are the ISAs", which means that "While ISAs have generally been adopted as the local standards, there may be national modifications to them but changes, if any, are stated to be in line with the spirit of the IAASB Modifications Policy".[27] Thus, auditing practice in China reflects global application of and compliance with ISAs.

Audit firms from three provinces (Guangdong, Hebei, and Zhejiang) in China were willing to participate in the study and archival data with respect to 113 engagements were collected, of which detailed data on 104 engagements were usable to avoid the confounding effects of different accounting practices

[24] The official announcement from the Chinese Ministry of Finance can be found in the folloing: http://www.cicpa.org.cn/Professional_standards/Professional_guidelines/200804/t20080428_4909.htm

[25] World Bank, "Report on the Observance of Standards and Codes (ROSC) - Accounting and Auditing: People's Republic of China", October 2009.

[26] Please refer to the following two links: http://press.ifac.org/news/2009/11/ifac-releases-new-tool-that-gauges-isa-adoption, and http://web.ifac.org/isa-adoption/chart.

[27] Definitions of other categories with respect to ISAs adoption approaches can be found at: http://web.ifac.org/isa-adoption/chart.

across industries.[28] Clients from all the 104 engagements were in manufacturing industry.

The audit firms were approached through personal contacts. An information sheet and consent form was provided to participating audit firms for their agreement and collaboration with collecting archival data about their actual audit procedures and detected audit differences. It was made very clear in the information sheet and consent form (Appendix B) that the data collection is only for academic purpose and identities of the audit firms and the clients will not be revealed. The questionnaires were completed by the audit team head or engagement partners based on their audit plans and working papers for these clients.

Table 4.1 reports the background information of the audit clients in the sample. I present both descriptive statistics for the overall sample and descriptive statistics at the provincial and the audit firm level. With respect to the whole sample, the mean (median) value for total assets and total revenues are RMB 809,736,001 (103,079,334) and RMB 518,386,218 (61,504,554) respectively.[29] The average number of audit differences detected is 7.25 and the median value is 2. The mean (median) monetary value for total audit differences is RMB 23,522,399 (1,284,940). The average (median) overall risk assessment, risk assessment for sales and accounts receivable cycle, and risk assessment for

[28] 113 completed data collection instruments were received from participating audit firms. However, 9 were eliminated from the analysis because these audit clients were in other industries than manufacturing.

[29] All the monetary values are in RMBs (the Chinese currencies). The exchange rates between US dollars and RMBs and between Canadian dollars and RMBs on December 31, 2007 are $1 USD = 7.3046 RMBs and $1 CAD = 7.4419 RMBs respectively.

inventory and warehousing cycle, are 2.61 (2), 3.00 (3), and 3.16 (3) on a 9-point Likert scale respectively. In addition, the average total audit hours for the clients is 331 hours while the median audit hours used is 80 hours.

For the sub-samples in Guangdong, Hebei, and Zhejiang, the mean (median) total assets are RMB 1,739,459,650 (459,114,335), RMB 179,060,457 (31,410,895), and RMB 541,209,904 (152,310,000) respectively. The mean (median) total revenues for clients in these three provinces are RMB 1,070,933,953 (191,205,021), RMB 128,735,411 (35,000,000), and RMB 382,756,043 (57,081,000) respectively. The average (median) numbers of audit differences found are 13.34 (3), 4.38 (2), and 3.69 (2) respectively. The average (median) monetary values of audit differences are RMB 41,843,482 (2,280,000), RMB 15,037,558 (100,593), and RMB 11,586,661 (1,810,000). Clients in Guangdong, Hebei, and Zhejiang provinces have average (median) overall audit risk of 2.23 (2), 2.36 (1), and 3.46 (4) respectively. Mean (median) audit risk assessments for sales and accounts receivable cycle are 2.64 (2), 3.08 (4), and 3.48 (5) respectively. Mean (median) audit risk assessments for inventory and warehousing cycle are 2.69 (2), 3.38 (4), and 4.23 (4) respectively. The average (median) total audit hours used in each province are 707 (475), 178 (76), and 51 (40) respectively.

------Insert Table 4.1------

Table 4.1 suggests that the mean number of audit differences detected and the average total audit hours may be driven by some large values in the upper quartile. The distributions of these variables are consistent with prior studies (e.g.

Mock and Wright 1999; Bell et al. 2008), which also have large values in the upper quartile. Using scatter plots with total assets on the X-axis, I examine the relation between total assets and numbers of audit differences found and also the relation between total assets and total audit hours. The graphs indicate that an increase in total assets is associated with an increase in the number of detected audit differences and total audit hours. Furthermore, in order to reduce the effect of potential outliers on the statistical analysis, statistical methods which are less sensitive to potential outliers are adopted. For example, I perform regression analysis after taking log transformation of total assets and total audit hours. I find that total audit hours are positively associated with clients' total assets.

In addition, I compare audit risk assessments for overall/sales and accounts receivable cycle/inventory and warehousing cycle across the audit firms after making the adjustments discussed in the above. Tukey tests for multiple comparisons report p-values of 0.136, 0.217, and 0.150 respectively, which indicates that risk ratings are comparable across the audit firms and there is no clustering of risk ratings. In order to control unobservable audit firm specific effects, audit firm dummy variables are incorporated in the regression models.

5 DESCRIPTIVE STATISTICS

5.1 INTRODUCTION

This chapter examines whether there is significant difference with respect to audit risk assessments (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) and client size between the *ex post* classifications of the clients in the sample. The statistical test results (Section 5.2) indicate that higher-risk clients have higher levels of risk ratings than lower-risk clients. And as measured by total assets, large clients are significantly bigger than small clients (in the *ex post* classification). Also, the chapter presents the descriptive statistics of the sample as they relate to detection of misstatements in clients' accounting records (Section 5.3) and recording of those detected misstatements for audit adjustments (Section 5.4).

5.2 *EX POST* CLASSIFICATION OF CLIENTS BASED ON AUDIT RISK AND CLIENT SIZE

This section investigates whether there is significant difference in terms of audit risk assessments (for overall/sales and accounts receivable cycle/inventory and warehousing cycle) and client size between sub-groups of the sample clients that are classified *ex post.* All the risk assessments are rated on a 9-point bipolar Likert scale anchored at 1 with lowest risk and anchored at 9 with highest risk.

Table 5.1 presents the results of tests of significance comparing the groups of different audit risk levels (higher vs. lower) and different sizes (large vs.

small). Panel A shows comparisons of means. A Wilcoxon nonparametric test of significance is conducted to determine whether these differences are statistically significant. With respect to overall audit risk assessments, the mean rating of the higher-risk group (mean = 4.76) is higher than that of the lower-risk group (mean = 1.28) and the difference is significant (z-statistic = 8.778; p-value < 0.0001). This is also the case for the *ex post* classification based on risk assessments for individual transaction cycles. Specifically, for sales and accounts receivable cycle, the mean rating of the higher-risk group (mean = 4.91) is higher than that of the lower-risk group (mean = 1.71) and the difference is significant (z-statistic = 8.673; p-value < 0.0001). In terms of inventory and warehousing cycle, the mean rating of the higher-risk group (mean = 4.88) is higher than that of the lower-risk group (mean = 2.04) and the difference is also significant (z-statistic = 7.874; p-value < 0.0001). Furthermore, there is significant difference in total assets between large clients and small clients (z-statistic = 8.786; p-value < 0.0001). And the mean value of total assets for large clients is higher (mean = 1,590,000,000) than small clients (mean = 30,700,000).[30]

Panel B reports results for comparisons of medians. Similar to the results for comparisons of means, there is significant difference (z-statistic = 8.149; p-value < 0.0001) in median overall audit risk ratings between the higher-risk group (median = 5) and the lower-risk group (median = 1). Also, the higher-risk group has a significantly higher (z-statistic = 8.737; p-value < 0.0001) median value of audit risk ratings for sales and accounts receivable cycle (median = 5) than the lower-risk group (median = 1). The median audit risk rating for inventory and

[30] These mean (median) values are in RMBs (the Chinese currency).

warehousing cycle is significantly higher (z-statistic = 7.491; p-value < 0.0001) for the higher-risk group (median = 5) than for the lower-risk group (median = 2). In addition, the median value of total assets for large clients (median = 557,900,418) is significantly higher (z-statistic = 10.149; p-value < 0.0001) than that for small clients (median = 23,156,706).

------Insert Table 5.1------

A summary table shows the various sample sizes for the descriptive statistics in the rest of this chapter. Due to missing values, the sample sizes for the following analysis vary between 84 and 96.

------Insert Table 5.2------

5.3 Descriptive Statistics: Detection of Misstatements

Table 5.3 reports descriptive statistics of relative auditor labor use at each rank (partners, managers, seniors, juniors, and other specialists). With respect to total audit hours for the engagements, there are more total audit hours for large clients than for small clients (592.57 vs. 70.62, p-value < 0.0001). Specifically, when overall audit risk is higher, large clients attract more audit hours than small clients (602.04 vs. 73.43, p-value = 0.014). Also, when overall audit risk is lower, more audit hours are used for large clients than for small clients (583.86 vs. 69.50, p-value < 0.0001). Senior labor use accounts for a smaller portion of total audit hours for higher-risk clients than for lower-risk clients (23.04% vs. 36.32%, p-value = 0.0002). This holds for both large clients (21.72% vs. 36.48%, p-value = 0.008) and small clients (25.20% vs. 36.22%, p-value = 0.019). In contrast, audit

firms use relatively more of junior labor for higher-risk clients than for lower-risk clients (55.13% vs. 36.78%, p-value = 0.0002), both when clients are large (58.32% vs. 38.08%, p-value = 0.003) and when clients are small (49.90% vs. 35.89%, p-value = 0.063). The above descriptive statistical results indicate that auditors may increase the relative use of junior labor to senior labor in response to increases in audit risk assessments and they increase the total audit hours with increases in client size.

------Insert Table 5.3------

Table 5.4 shows the distribution of audit procedures for sales and accounts receivable cycle. For the control tests, a Tukey test for multiple comparisons indicates that examining documents, records, and reports accounts for a larger percentage of total audit hours than making inquiries of appropriate client personnel, and observing control-related activities (p-value = 0.0006). Audit firms in the sample are most likely to use the audit procedure of examining documents, records, and reports and they still perform the audit procedure of inquiring appropriate client personnel although they do not spend a lot of time on this procedure.[31]

Regarding the substantive tests for sales and accounts receivable cycle, a Tukey test for multiple comparisons suggests that the audit procedure of confirmations has a larger percentage in total audit hours than documentation, reprocessing/vouching, and analytical procedures (p-value = 0.009). Auditors in the sample are most likely to use confirmations and documentation for their substantive tests.

[31] In practice, auditors corroborate this procedure with other procedures.

In prior studies, there is no explicit benchmark that could be used to compare with the proportions in table 5.4. Mock and Wright (1999) report that the audit hours for accounts receivable, including both tests of controls and substantive tests, account for an average of 15% in total audit hours for a certain engagement. With respect to my sample, the average percent of audit hours for sales and accounts receivable cycle in total audit hours is about 39%, which is 2.6 times the average percentage reported in Mock and Wright (1999).

------Insert Table 5.4------

Table 5.5 reports the distribution of audit procedures for inventory and warehousing cycle.[32] Similar to control tests for sales and accounts receivable cycle, auditors are most likely to rely on examining documents, records, and reports.

Regarding the substantive tests for inventory and warehousing cycle,[33] a Tukey test for multiple comparisons indicates that the percentage of audit hours for confirmations in total audit hours is significantly higher than that of other types of substantive tests (p-value < 0.0001). Auditors use audit procedures of confirmations and recomputation more often than others.

Previous studies have not examined the allocation of audit hours into different categories of control tests or substantive tests for inventory and warehousing cycle. Thus, there is no prior benchmark that could be used to compare with the proportions in table 5.5.

[32] With respect to the tests of controls, a Tukey test for multiple comparisons shows that there is no significant difference across categories of audit tests (p-value = 0.150).
[33] In practice, auditors depend heavily on observing and testing the inventory count. By following Mock and Wright (1999) to facilitate my analysis, observing and testing the inventory count is categorized into “confirmations”.

------Insert Table 5.5------

Table 5.6 reports the distribution of audit differences by audit area. A Tukey test for multiple comparisons suggests that audit differences in purchasing cycle and accounts payable have the largest percentage of assets (p-value = 0.011). The average sizes measured as percentages of assets for the categories of audit differences in table 5.6 are comparable to previous studies (Hylas and Ashton 1982; Kreutzfeldt and Wallace 1986; Wright and Ashton 1989; Entwistle and Lindsay 1994) except that I document a higher magnitude of misstatements in purchasing cycle and accounts payable.

The three accounts most frequently involving audit differences are: (1) revenue cycle and accounts receivable; (2) prepaid expenses, deferred charges, and other assets; and (3) other liabilities and deferred credits. Prior studies on errors (Hylas and Ashton 1982; Kreutzfeldt and Wallace 1986; Wright and Ashton 1989; Entwistle and Lindsay 1994) also find revenue cycle and accounts receivable and prepaid expenses, deferred charges, and other assets as major areas of misstatements while errors in other liabilities and deferred credits do not occur as often as reported in table 5.6.

------Insert Table 5.6------

Table 5.7 presents effects of detected audit differences on income. About 39.25% of the detected audit differences overstate income, 24.21% of the detected audit differences understate income, and 36.54% of detected audit differences have no effects on income. The magnitude of overstatements is almost the same as the magnitude of understatements while the magnitude of audit differences

with no effects on income is about three times that of overstatements or understatements (as scaled by total assets). A Tukey test reports that the average size of audit differences which have no effects on income is the largest (p-value = 0.003).

Compared to prior studies (Hylas and Ashton 1982; Wright and Ashton 1989; Maletta and Wright 1996), table 5.7 reports a lower frequency of understatements and a higher frequency of misstatements that have no effects on income. The magnitudes of overstatements and understatements in table 5.7 (measured as percentage of assets) are similar to those in previous research, but the magnitudes of misstatements with no effects on income are higher.

------Insert Table 5.7------

Panel A of table 5.8 reports the number of detected audit differences and indicates that auditors find more audit differences for large clients than for small clients (11.45 vs. 2.49, p-value = 0.001), both when audit risk is higher (11.70 vs. 3.43, p-value = 0.042) and when audit risk is lower (11.21 vs. 2.11, p-value = 0.024). This may be due to the increased business complexity of large clients. Panel B presents the total values of detected audit differences (as scaled by the total assets) and auditors tend to detect a lower magnitude of audit differences (as scaled by the total assets) for large clients than for small clients (3.26% vs. 11.78%, p-value = 0.034).[34]

------Insert Table 5.8------

[34] For panel B, I use the Wilcoxon rank of sum tests to compare across different cells to remove the effect of potential outliers.

5.4 DESCRIPTIVE STATISTICS: RECORDING OF DETECTED MISSTATEMENTS

Table 5.9 reports descriptive statistics for auditors' recording of detected misstatements for audit adjustments. Panel A shows the materiality levels (as scaled by the clients' total assets) set by the auditors. Auditors have a lower materiality level for higher-risk clients than for lower-risk clients (0.27% vs. 0.45%, p-value = 0.023), particularly when client size is large (0.17% vs. 0.31, p-value = 0.053). Similarly, auditors set a lower materiality level for large clients than for small clients (0.24% vs. 0.54%, p-value = 0.0002), both when audit risk is higher (0.17% vs. 0.47%, p-value = 0.059) and when audit risk is lower (0.31% vs. 0.57%, p-value = 0.009). These results indicate that in accordance with ARM, auditors set a lower materiality level for detected audit differences to be booked and adjusted in response to increases in audit risk. Also, auditors set a lower materiality level for detected audit differences for large clients.

Panel B presents descriptive statistics for the audit difference posting thresholds (as scaled by the clients' total assets), above which auditors record an item on the audit difference schedule. Auditors set a lower audit difference posting threshold for clients with higher risk assessments than for clients with lower risk assessments (0.07% vs. 0.32%, p-value = 0.043), particularly when clients are small (0.14% vs. 0.52%, p-value = 0.082). Auditors determine a lower audit difference posting threshold for large clients than for small clients (0.04% vs. 0.41%, p-value = 0.014), particularly when audit risk assessments are lower (0.05% vs. 0.52%, p-value = 0.025). These results suggest that auditors respond to increases in audit risk and client size in accordance with ARM by determining a

lower audit difference posting threshold to book audit differences in their working papers for adjustments.

Panel C shows the audit adjustments accepted by the clients (as scaled by the clients' total assets). Large clients accept a lower value of audit adjustments than small clients (2.87% vs. 11.29%, p-value = 0.026).[35] These results imply that small clients accept a relatively higher magnitude of audit adjustments suggested by the auditors.

Panel D illustrates the ratio of accepted audit adjustments to total detected audit differences. Higher-risk clients are less likely to adjust detected audit differences than lower-risk clients (80.36% vs. 97.40%, p-value = 0.015). This finding justifies auditors' decisions of a lower threshold to record and adjust detected audit differences for clients with higher audit risk assessments as these clients tend to adjust less to the detected audit differences.

------Insert Table 5.9------

[35] For panel C, I use the Wilcoxon rank of sum tests to compare across different cells to remove the effect of potential outliers.

6 MULTIVARIATE ANALYSIS

6.1 MULTIVARIATE ANALYSIS: DETECTION OF MISSTATEMENTS

In this section, I examine how auditors adjust their labor usage and audit procedures to audit risk assessments and client size. First, regression analysis is used to investigate the determinants of both audit hours at each rank (partners, managers, seniors, juniors, and other specialists) and total audit hours. Table 6.1 reports my estimates. Panel A presents the estimates for partner hours and manager hours, panel B shows results for senior and junior hours, and panel C displays the estimates for other specialist (e.g. tax and IT)[36] hours and total audit hours spent on the engagement. After controlling for fixed effects of the individual audit firms, I find that when audit risk assessments increase, auditors only significantly increase their junior audit hours but not audit hours at other ranks or total audit hours for the engagements.[37] When client size increases, audit hours used for manager, senior, and junior levels and total audit hours also increase.[38] There is no significant audit firm specific effect on audit hours used at each staffing level and total audit hours.

------Insert Table 6.1------

[36] Other specialists in audit firms include specialists on tax, information technology, valuation, legal services, management consulting, and etc.
[37] I also use the continuous measure of audit risk instead of the dummy variable in the regressions and the results stay qualitatively the same.
[38] As suggested in O'Keefe et al. (1994) and Bell et al. (1998), the log values for audit labor hours at each rank or in total and the client's total assets are used in the regression.

Regarding the relative audit labor use at each rank, measured as the percentage of audit hours spent at each rank in total audit hours for the corresponding engagement, an ANOVA model is used to examine whether auditors increase the portion of higher-rank audit labor use in response to increases in audit risk assessments and client size. Table 6.2 reports results for the ANOVA analysis. Percentages of partner hours, manager hours, and other specialist hours in total audit hours are not associated with changes in audit risk assessments (F-value = 0.80, p-value = 0.372 for partner labor use; F-value = 2.33, p-value = 0.131 for manager labor use; F-value = 0.00, p-value = 0.954 for other specialist labor use). In contrast, percentages of senior hours and junior hours in total audit hours change significantly (F-value = 14.89, p-value = 0.0002 for senior labor use; F-value = 15.10, p-value = 0.0002 for junior labor use) in response to increases in audit risk assessments.

Further analysis indicates that the percentage of junior hours in total audit hours for the engagement is significantly higher (t-value = 3.90, p-value = 0.0002) when audit risk assessments are higher (mean = 55.13%) than when audit risk assessments are lower (mean = 36.78%). In contrast, the percentage of senior hours in total audit hours is significantly lower (t-value = -3.89, p-value = 0.0002) when audit risk assessments are higher (mean = 23.04%) than when audit risk assessments are lower (mean = 36.32%). The above results suggest that auditors tend to increase junior labor use relative to senior labor use when audit risk assessments increase. This may be due to auditors' tendency to increase the

relative magnitude of routine, repetitive audit work when audit risk assessments rise.

In addition, my results in table 6.2 demonstrate that client size does not affect the relative allocation of audit labor at each rank although audit labor use (the absolute amount of audit hours) at each staffing level may increase in similar proportions to increases in client size. Summarizing the results reported in table 6.1 and table 6.2, I find that when audit risk assessments increase, auditors do not increase their audit hours at each rank (in absolute amounts) except at the junior level and they are likely to increase the relative portion of junior labor use to that of senior labor use. When client size increases, auditors tend to increase their audit hours (the absolute amounts) at each staffing level with similar proportions. Therefore, hypotheses H1a and H1b are not supported by the empirical results.

------Insert Table 6.2------

Next, this study examines whether audit procedures are adjusted to audit risk assessments and client size. I focus on two transaction cycles—sales and accounts receivable cycle and inventory and warehousing cycle, as these two cycles are important for manufacturing firms. Table 6.3 presents the ANOVA results for the nature and extent of audit procedures (control tests and substantive tests) for sales and accounts receivable cycle. Panel A reports that neither risk assessments for sales and accounts receivable cycle (F-value = 0.45, p-value = 0.503) nor client size (F-value = 1.75, p-value = 0.189) tends to affect the nature of control tests for this cycle.

Panel B illustrates that risk assessments for sales and accounts receivable cycle impact the nature of substantive tests for this cycle (F-value = 3.89, p-value = 0.052) while client size does not (F-value = 0.00, p-value = 0.970). Further analysis shows that auditors are likely to concentrate on fewer substantive tests (t-value = -1.99, p-value = 0.049) when risk assessments for sales and accounts receivable cycle are higher (mean = 3.975) than when these risk assessments are lower (mean = 4.424).

Panel C finds that risk assessments for sales and accounts receivable cycle do not significantly affect the extent of control tests for this cycle (F-value = 0.39, p-value = 0.532) while client size may have a marginally significant effect on the extent of control tests for the cycle (F-value = 2.94, p-value = 0.090). There is also a significant interaction between risk assessments for sales and accounts receivable cycle and client size (F-value = 8.03, p-value = 0.006). Further analysis indicates that when these risk assessments are lower, the extent of control tests for sales and accounts receivable cycle is significantly lower (t-value = -3.13, p-value = 0.003) for large clients (mean = 0.073) than for small clients (mean = 0.167). When risk assessments for sales and accounts receivable cycle are higher, the extent of control tests for this cycle is similar (t-value = 1.11, p-value = 0.275) between large clients (mean = 0.125) and small clients (mean = 0.082).

Panel D reports significant effects of client size on the extent of substantive tests for sales and accounts receivable cycle (F-value = 14.80, p-value = 0.0002). The extent of substantive tests for this cycle is significantly higher (t-

value = 3.73, p-value = 0.0005) for small clients (mean = 0.446) than for large clients (mean = 0.102).

In aggregate, table 6.3 shows that auditors do not consistently and significantly adjust the nature and extent of audit procedures to risk assessments for sales and accounts receivable cycle. Auditors do not adjust the nature of audit procedures to client size while they tend to lower the extent of audit procedures for sales and accounts receivable cycle when client size increases. This may imply that smaller clients tend to have weaker internal control systems with respect to sales and accounts receivable cycle and thus auditors increase the extent of audit procedures used for the audit of this cycle (Kreutzfeldt and Wallace 1990; Bell and Knechel 1994; Wallace and Kreutzfeldt 1995; Wright and Wright 1996; Bell et al. 1998).

------Insert Table 6.3------

Log-linear models are used to analyze how risk assessments for sales and accounts receivable cycle and client size influence the frequencies of key audit procedures used in the audits. Table 6.4 reports the results about the frequencies with which different types of key audit procedures are used in the control tests of sales and accounts receivable cycle. I find that as risk assessments for sales and accounts receivable cycle increase, auditors are more likely to observe control-related activities in their control tests (Chi-square = 3.23, p-value = 0.073) and they are less likely to rely solely on making inquiries of appropriate client personnel in their control tests (Chi-square = 3.04, p-value = 0.081).

------Insert Table 6.4------

Table 6.5 presents the log-linear analysis results for the frequencies with which different types of key audit procedures are used in the substantive tests of sales and accounts receivable cycle. Auditors tend to depend more on reprocessing/vouching for clients with higher risk assessments of sales and accounts receivable cycle (Chi-square = 3.04, p-value = 0.081) and for smaller clients (Chi-square = 6.35, p-value = 0.012). In addition, auditors tend to perform analytical procedures for large clients with lower risk ratings of sales and accounts receivable cycle while auditors tend to perform analytical procedures for small clients with higher risk ratings of this cycle (Chi-square = 4.67, p-value = 0.031). In sum, the results in table 6.4 and table 6.5 imply that both control tests and substantive tests of sales and accounts receivable cycle are not adjusted to audit risk for this cycle and client size.

------Insert Table 6.5------

Table 6.6 illustrates ANOVA results for the analysis of the nature and extent of audit procedures (control tests and substantive tests) for inventory and warehousing cycle. Panel A reports that client size has a significant effect on the nature of control tests for this cycle (F-value = 3.77, p-value = 0.056). Further analysis shows that auditors tend to use more control tests (t-value = 1.96, p-value = 0.054) for large clients (mean = 4.244) than for small clients (mean = 3.674).

Panel B shows that neither risk assessments of inventory and warehousing cycle (F-value = 1.80, p-value = 0.183) nor client size (F-value = 1.31, p-value = 0.255) has a significant influence on the nature of substantive tests for the cycle.

Panel C presents that there is a significant main effect of client size on the extent of control tests for inventory and warehousing cycle (F-value = 8.13, p-value = 0.006). On average, the extent of control tests for this cycle is lower (t-value = -2.77, p-value = 0.007) for large clients (mean = 0.048) than for small clients (mean = 0.088). There is a significant interaction between risk assessments for this cycle and client size (F-value = 6.36, p-value = 0.014). Further analysis indicates that when risk assessments for inventory and warehousing cycle are higher, the extent of control tests for this cycle is similar (t-value = 0.19, p-value = 0.851) between large clients (mean = 0.064) and small clients (mean = 0.060). When risk assessments for inventory and warehousing cycle are lower, auditors have a higher extent of control tests for this cycle (t-value = 3.78, p-value = 0.0007) in their audits of small clients (mean = 0.106) than of large clients (mean = 0.038).

Panel D demonstrates significant effects of client size (F-value = 3.76, p-value = 0.056) and the interaction between risk assessments for inventory and warehousing cycle and client size (F-value = 14.47, p-value = 0.0003) on the extent of substantive tests for this cycle. On average, the extent of substantive tests for inventory and warehousing cycle is significantly lower (t-value = -1.80, p-value = 0.075) for large clients (mean = 0.121) than for small clients (mean = 0.160). When risk assessments for inventory and warehousing cycle are higher, there is no significant difference (t-value = 1.41, p-value = 0.170) with respect to the extent of substantive tests for this cycle between large clients (mean = 0.171) and small clients (mean = 0.115). In contrast, when risk assessments for inventory

and warehousing cycle are lower, the extent of substantive tests for this cycle in the audits of large clients (mean = 0.090) is significantly lower (t-value = -4.83, p-value < 0.0001) than that in the audits of small clients (mean = 0.189).

In aggregate, table 6.6 reports that auditors do not consistently and significantly adjust the nature and extent of audit procedures to risk assessments for inventory and warehousing cycle. Auditors tend to lower the extent of audit procedures (control tests and substantive tests) for inventory and warehousing cycle as client size increases, particularly when risk assessments for inventory and warehousing cycle are lower. This may imply that smaller clients tend to have weaker internal control systems for inventory and warehousing cycle and thus auditors increase the extent of audit procedures (Kreutzfeldt and Wallace 1990; Bell and Knechel 1994; Wallace and Kreutzfeldt 1995; Wright and Wright 1996; Bell et al. 1998).

------Insert Table 6.6------

Log-linear models are used to study how risk assessments for inventory and warehousing cycle and client size influence the frequencies of key audit procedures used in audits of this cycle. Table 6.7 displays the results about the frequencies with which different types of key audit procedures are used in the control tests of inventory and warehousing cycle. Auditors are more likely to reperform client procedures in their control tests for large clients (Chi-square = 4.86, p-value = 0.028), particularly when risk assessments for inventory and warehousing cycle are lower (Chi-square = 3.25, p-value = 0.072).

------Insert Table 6.7------

Table 6.8 presents the log-linear analysis results for the frequencies with which different types of key audit procedures are used in the substantive tests of inventory and warehousing cycle. Auditors tend to rely more on reprocessing/vouching (Chi-square = 7.64, p-value = 0.006) and review of disclosures (Chi-square = 3.62, p-value = 0.057) when auditing small clients. In addition, auditors use more of analytical procedures for large clients (Chi-square = 2.98, p-value = 0.084), particularly when risk assessments for inventory and warehousing cycle are lower (Chi-square = 2.92, p-value = 0.088). To sum up the results in table 6.7 and table 6.8, auditors do not significantly change the types of either control tests or substantive tests for inventory and warehousing cycle in response to risk assessments for this cycle and client size.

------Insert Table 6.8------

From the results above with respect to sales and accounts receivable cycle and inventory and warehousing cycle, there is only some evidence that auditors adjust the nature of audit procedures and types of key audit procedures to client size and risk assessments for individual transaction cycles. The empirical results do not provide substantial support for hypotheses H2a and H2b as the nature of audit procedures (or types of key audit procedures) stays static when audit risk assessments (with regard to sales and accounts receivable cycle or inventory and warehousing cycle) or client size increases. Similarly auditors do not adjust the extent of audit procedures to risk assessments for individual transaction cycles. In addition, auditors increase the extent of audit procedures for small clients rather

than large clients. Therefore, the empirical evidence does not support hypotheses H3a and H3b.

Furthermore, I investigate whether auditors detect different audit differences when audit risk or client size increases. Panel A of table 6.9 reports that auditors detect different numbers of audit differences between large clients and small clients (F-value = 10.76, p-value = 0.002) but not between higher-risk and lower-risk clients (F-value = 1.05, p-value = 0.308). Further analysis shows that auditors detect more audit differences (t-value = 3.39, p-value = 0.001) for large clients (mean = 11.45) than for small clients (mean = 2.49).

Panel B presents results for magnitudes of total audit differences detected by auditors (as scaled by total assets) and panel C and panel D report magnitudes of detected audit differences in balance sheet items and income statement items respectively. In order to remove the effect of potential outliers, I report ANOVA results for values of detected audit differences (as scaled by total assets) after the logit transformation. Panel B shows that client size influences the magnitudes of total audit differences (F-value = 6.89, p-value = 0.011). Further analysis indicates that auditors detect a lower magnitude of audit differences (t-value = -2.66, p-value = 0.009) for large clients (mean = 3.26%) than for small clients (mean = 11.78%). Panel C presents that the magnitudes of audit differences in balance sheet items (as scaled by total assets) are not affected by audit risk (F-value = 0.82, p-value = 0.369) or client size (F-value = 2.69, p-value = 0.106). Panel D reports that the magnitudes of audit differences in income statement items (as scaled by total assets) are influenced by audit risk (F-value = 5.98, p-

value = 0.017) and client size (F-value = 11.66, p-value = 0.001). Further analysis shows that auditors detect a lower magnitude of audit differences (t-value = -2.29, p-value = 0.025) in income statement items for higher-risk clients (mean = 0.56%) than for lower-risk clients (mean = 1.87%). Auditors detect a lower magnitude of audit differences (t-value = -3.97, p-value = 0.0002) in income statement items for large clients (mean = 0.51%) than for small clients (mean = 2.12%). In brief, I find that auditors detect more audit differences and lower magnitudes of audit differences (as scaled by total assets) when client size increases. When audit risk rises, auditors do not find more audit differences and they do not detect different magnitudes of audit differences (as scaled by total assets), except in income statement items.

------Insert Table 6.9------

Log-linear models are used to examine frequencies of data in table 6.10 with which auditors detect audit differences in different types of accounts. Auditors tend to detect more audit differences in prepaid expenses, deferred charges, and other assets (Chi-square = 4.01, p-value = 0.045) for higher-risk clients and more audit differences in stockholders' equity (Chi-square = 4.34, p-value = 0.037) and in general and administrative expenses (Chi-square = 5.99, p-value = 0.014) for lower-risk clients. Auditors are likely to detect more audit differences in property, plant and equipment (Chi-square = 4.32, p-value = 0.038) and in general and administrative expenses (Chi-square = 9.42, p-value = 0.002) for small clients. In brief, auditors do not detect audit differences in different

types of accounts between higher-risk and lower-risk clients and between large and small clients.

------Insert Table 6.10------

Summarizing the results in tables 6.9 and 6.10, I only find some evidence showing that when audit risk assessments or client size increases auditors detect different numbers or magnitudes of audit differences or detect audit differences in different types of accounts. Therefore, the hypothesis H4a is not supported while the hypothesis H4b is partly supported as auditors detect more audit differences and lower magnitudes of audit differences (as scaled by total assets) for large clients than for small clients.

6.2 MULTIVARIATE ANALYSIS: RECORDING OF DETECTED MISSTATEMENTS

In this section, I study whether auditors adjust the threshold to record and require correction of detected misstatements in response to audit risk assessments and client size. The materiality level and the audit difference posting threshold are used as measures for auditors' decisions of thresholds to record and require adjustments of detected misstatements. Panel A of table 6.11 presents that materiality is subject to the influences of both audit risk assessments (F-value = 6.13, p-value = 0.015) and client size (F-value = 13.47, p-value = 0.0004). Auditors set a lower materiality level (t-value = -2.32, p-value = 0.023) for higher-risk clients (mean = 0.27%) than for lower-risk clients (mean = 0.45%). Auditors also set a lower materiality level (t-value = -3.92, p-value = 0.0002) for large clients (mean = 0.24%) than for small clients (mean = 0.54%).

Panel B reports that auditors also adjust their audit difference posting thresholds in response to audit risk assessments (F-value = 3.06, p-value = 0.084) and client size (F-value = 5.57, p-value = 0.021). Further analysis indicates that auditors determine a lower audit difference posting threshold (t-value = -2.08, p-value = 0.043) for higher-risk clients (mean = 0.07%) than for lower-risk clients (mean = 0.32%). Auditors decide a lower audit difference posting threshold (t-value = -2.58, p-value = 0.014) for large clients (mean = 0.04%) than for small clients (mean = 0.41%). The above results imply that auditors tend to set lower thresholds to record and adjust detected misstatements for clients with higher risk assessments and for large clients. Therefore, the hypotheses H5a and H5b are supported and auditors do respond to audit risk assessments and client size in accordance with ARM.

------Insert Table 6.11------

Furthermore, in table 6.12 I find that client size affects the magnitudes of total audit adjustments accepted by clients (as scaled by total assets) and the magnitudes of audit adjustments accepted by clients in income statement items (F-value = 4.88, p-value = 0.030 for total audit adjustments accepted by clients; F-value = 10.39, p-value = 0.002 for audit adjustments accepted by clients in income statement items). Additional analysis shows that large clients accept a lower magnitude of audit adjustments (t-value = -2.45, p-value = 0.016) suggested by auditors than small clients (2.87% vs. 11.29%), particularly with respect to audit adjustments in income statement items (0.49% vs. 2.12%, t-value = -3.57, p-value = 0.0007). Higher-risk clients accept a lower magnitude (t-value = -1.70, p-

value = 0.094) of suggested audit adjustments in income statement items than lower-risk clients (0.53% vs. 1.87%).

Using the ratio of accepted adjustments to detected audit differences as a measure for clients' likelihood to accept audit adjustments and make corrections, I find that audit risk affects ratios of accepted adjustments to detected audit differences in total (F-value = 8.83, p-value = 0.004), in balance sheet items (F-value = 3.83, p-value = 0.054), and in income statement items (F-value = 11.07, p-value = 0.001). Further analysis shows that higher-risk clients are less likely to accept the audit adjustments than lower-risk clients in total (80.36% vs. 97.40%, t-value = -2.53, p-value = 0.015), in balance sheet items (80.35% vs. 94.32%, t-value = -1.81, p-value = 0.077), and in income statement items (82.60% vs. 99.94%, t-value = -2.52, p-value = 0.018). The above results imply that higher-risk clients are less willing to adjust the audit differences detected by auditors, which justifies the auditors' strategy to set a lower threshold to record and require correction of detected audit differences when audit risk increases.

------Insert Table 6.12------

6.3 Robustness Analysis

I conduct several robustness analyses regarding both detection and recording of misstatements. First, prior research suggests that the economic significance of audit fees may affect auditors' independence and audit fees can be used as a measure for the economic bond between auditors and their clients (DeAngelo 1981; Chung and Kallapur 2003; Hope and Langli 2009). Thus I use

audit fees rather than total assets as the measure for the auditor's economic dependence on clients. Due to missing data about the audit fee, this has reduced the sample to 98 observations from 104. I classify these 98 observations into two sub-groups (high-economic dependent vs. low-economic dependent) based on whether the audit fee from a particular client is higher (lower) than the median value of the sample audit fees received by the accounting firm which audits this client. I examine how auditors adjust their audit labor use and audit procedures, and the threshold to record and require correction of detected audit differences in response to audit risk assessments and their economic dependence on the clients. My results are qualitatively similar to the results that I get by using total assets (i.e. client size) as a proxy for economic dependence on clients.

Second, prior studies imply that the association between detection (recording) of misstatements and audit risk (client size) may be non-linear (Mock and Wright 1993; O'Keefe et al. 1994; Mock and Wright 1999; Gleason and Mills 2002; Blokdijk et al. 2003). I try to divide audit risk assessments and client size into three levels instead of two levels. I classify clients with risk assessments at top quartile as high-risk clients, clients with risk assessments at bottom quartile as low-risk clients, and clients in between as medium-risk clients.[39] I also perform the similar classification with regard to client size (as measured by total assets at the end of fiscal year 2007).[40] Then I investigate how auditors adjust their labor

[39] On the 9-point risk rating scale, clients with risk ratings higher than 4 are classified as high-risk clients, clients with risk ratings lower than 2 are classified as low-risk clients, and clients with risk ratings between 2 and 4 are classified as medium-risk clients.

[40] Clients with total assets at the end of fiscal year 2007 larger than RMB 557,900,418 are classified as large clients, clients with total assets smaller than 23,156,706 are classified as small clients, and clients with total assets in between are classified as medium clients. The exchange

use and audit procedures, and the threshold to record and require correction of detected audit differences to audit risk assessments and client size (3 × 3). The results are qualitatively the same as those based on two treatment levels for both factors (2 × 2).

Third, I perform more robustness checks for the regression model in table 6.1, which studies determinants of audit labor use at each rank. O'Keefe et al. (1994) indicate that the dummy variable (0, 1) which measures the audit risk assessment contains limited information and may be biased. Thus I incorporate the continuous variable of audit risk into the model instead of the dummy variable for higher risk (vs. lower risk) and the regression results stay qualitatively the same. I also try to control for the effect of the individual province instead of the individual audit firm in the model and the results indicate that there is no significant difference in terms of audit hours at each staffing level across these three provinces. Chung and Kallapur (2003) imply that the client's profitability may affect its abnormal accruals and in turn the audit efforts. Thus I add a proxy for that (measured as total revenues divided by total assets)[41] into the model and the results stay qualitatively the same. Next I rerun the regressions within sub-samples. I conduct regression analysis of audit labor hours for public clients and non-public clients respectively. The effects of client size on audit labor hours at each rank are more significant for non-public clients than for public clients. I also

---

rates between US dollars and RMBs and between Canadian dollars and RMBs on December 31, 2007 are $1 USD = 7.3046 RMBs and $1 CAD = 7.4419 RMBs respectively.

[41] I use this proxy for two reasons. First, participating audit firms provide data with respect to total assets and total revenues, but not the net income figures. Second, the sample audit clients are all in the manufacturing industry and it tends to be reasonable to assume that these audit clients have similar net profit margins. Thus, I divide total revenues by total assets to measure audit clients' pressure from profitability.

regress audit labor use at each staffing level on relevant independent variables for clients with high and low profitability respectively. For clients with high profitability, both client size and whether the client issues publicly traded securities are positively associated with audit labor use while only client size is positively associated with audit labor use for clients with low profitability.

Finally, with respect to the threshold to record and require correction of detected audit differences, as Becker et al. (1998) argue that auditors are never sued for income-decreasing accruals, auditors may be influenced by the direction of detected audit differences. I both try to include into the ANOVA model the direction of audit differences (income-increasing vs. income-decreasing) and perform the ANOVA analysis for income-increasing audit differences and income-decreasing audit differences in two sub-samples. The results indicate that the magnitudes of detected audit differences and audit adjustments accepted by clients (as scaled by total assets) do not vary between income-increasing and income-decreasing audit differences. In addition, following O'Keefe et al. (1994) and Bell et al. (2008), I try tentatively with the regression analysis for the threshold to record and require correction of detected audit differences. I use audit materiality level and audit difference posting threshold (both scaled by the corresponding client's total assets) as dependent variables. And I include as independent variables client size (as measured by total assets), number of detected audit differences, whether the client issues publicly traded securities, overall audit risk assessment (measured as a continuous variable), and high or moderate reliance on the client's internal control system (measured as two dummy

variables). The results show that audit risk assessments and client size are negatively associated with the level of materiality or audit difference posting threshold. This is consistent with the results from the ANOVA model in table 6.11.

7 CONCLUSION

7.1 SUMMARY OF RESULTS

Using archival data collected from the working papers of audit firms, this study investigates how auditors comply with professional standards and respond to audit risk assessments and client size in accordance with the audit risk model (ARM). The study examines: (1) how auditors adjust the allocation of audit labor use (staffing), nature of audit procedures (types of audit procedures), and extent of audit procedures (audit hours used) to audit risk assessments and client size; and (2) whether auditors respond to audit risk or client size in determining the thresholds to record and require correction of detected misstatements.

First, with respect to detection of misstatements in clients' financial reporting, I find that auditors in general do not adjust their audit programs to audit risk or client size. In particular, as audit risk assessments increase, auditors tend to increase more of junior labor use relative to senior labor use. Auditors do not adjust the nature or the extent of audit procedures used for sales and accounts receivable cycle and inventory and warehousing cycle. Auditors detect similar numbers and magnitudes of audit differences and detect audit differences in similar types of accounts. Furthermore, as client size increases, auditors do not increase the relative proportion of higher-rank labor use, though they do increase audit hours at each rank (partners, managers, seniors, juniors, and other specialists) proportionately. Auditors do not adjust the nature of audit procedures for sales

and accounts receivable cycle and inventory and warehousing cycle but they tend to lower the extent of these audit procedures when client size increases. Auditors detect more audit differences and lower magnitudes of audit differences for large clients but they find audit differences in similar types of accounts between large and small clients.

Second, with respect to the thresholds to record and require correction of detected misstatements, I find that when audit risk assessments rise, auditors tend to set a lower materiality level, and a lower audit difference posting threshold. As client size increases, auditors also set a lower materiality level and a lower audit difference posting threshold. Furthermore, I find that clients with higher risk assessments are less likely to accept the audit adjustments proposed by auditors.

7.2 IMPLICATIONS OF THE STUDY

This study has several implications. First, this study extends prior literature on the relation between audit programs and audit risk assessments. Based on the Audit Risk Model (ARM), I provide some new evidence on how auditors adjust their audit labor use (staffing), nature of audit procedures (types of audit procedures), and extent of audit procedures (hours spent on audit procedures) in response to increases in audit risk and client size during their detection of misstatements. The insensitivity of audit programs to changes in audit risk suggests difficulties in following professional standards in audit practices, which may be caused by turnover of professionals in audit firms or insufficiency of audit training programs.

Second, this study extends previous research by investigating how auditors adjust the thresholds to record and require correction of detected misstatements in response to changes in audit risk and client size. The results in the study indicate that auditors do respond to increases in audit risk and client size by setting lower thresholds to record and require correction of detected misstatements. This may compensate for their unresponsiveness to audit risk and client size in detecting misstatements in their clients' accounting records.

Finally, International Standards on Auditing (ISAs) have been adopted in various ways by 126 countries and jurisdictions. As China is in the category of "National Standards are the ISAs" and the highly ISAs-comparable Chinese Auditing Standards became effective on January 1, 2007, this provides an opportunity to examine the auditors' compliance with auditing standards in practice and my results may provide some evidence on how ISAs are applied in adopting countries. In addition, this study suggests that the stability of audit programs found in prior literature using archival data from large accounting firms may generalize to small audit firms.

7.3 LIMITATIONS OF THE STUDY

This study has several limitations. First, I rely on proprietary data from audit firms to investigate how auditors respond to increases in audit risk assessments and client size. Due to my research design, this study fails to capture the influences of external factors (outside the participating audit firms) on auditors' detection and recording of misstatements in their clients' accounting

records. Second, the data are collected from the audit firms that participated in the study, and the analysis is limited to the variables which the audit firms had in their working papers. Thus, the generalizability of the results needs more study using similar data from other audit firms. Third, as participating audit firms were unwilling to provide the timing data, this study fails to investigate how the timing of audit programs is affected by audit risk assessments and client size. Finally, I report that in response to increases in audit risk assessments auditors increase the portion of junior labor use relative to senior labor use in order to be economically efficient. Whether this strategy is effective in achieving acceptable audit risk is still an open question.

Table 4.1 Descriptive Statistics for Sample Client Firms

Panel A: Total assets

Variable	N	Mean	Median	Q1	Q3
Total assets	104	809,736,001	103,079,334	23,156,706	557,900,418
Guangdong	36	1,739,459,650	459,114,335	48,313,803	1,361,547,515
Firm1	16	3,496,614,445	1,361,547,515	580,041,458	4,539,577,206
Firm2	7	300,494,286	137,870,000	58,530,000	830,990,000
Firm3	13	351,635,099	29,803,257	18,235,679	125,000,980
Hebei	42	179,060,457	31,410,895	4,551,700	155,810,000
Firm4	12	24,522,297	6,385,850	5,114,750	8,528,150
Firm5	4	36,676,181	28,660,143	15,903,113	57,449,250
Firm6	9	317,675,173	100,000,000	50,000,000	400,000,000
Firm7	8	4,414,394	239,000	205,000	655,000
Firm8	9	465,019,464	387,970,000	155,810,000	780,990,000
Zhejiang	26	541,209,904	152,310,000	50,750,000	376,790,000
Firm9	12	198,787,350	183,600,000	48,200,000	332,000,000
Firm10	14	834,714,949	118,180,000	67,892,000	1,233,400,000

Panel B: Total revenues

Variable	N	Mean	Median	Q1	Q3
Total revenues	104	518,386,218	61,504,554	10,753,036	298,208,065
Guangdong	36	1,070,933,953	191,205,021	24,101,606	754,340,122
Firm1	16	2,256,765,946	922,356,871	403,492,540	1,960,130,851
Firm2	7	242,665,714	148,800,000	7,820,000	654,380,000
Firm3	13	57,439,012	21,343,212	12,351,621	67,630,410
Hebei	42	128,735,411	35,000,000	2,075,000	198,408,800
Firm4	12	31,513,793	3,685,500	1,838,550	11,286,500
Firm5	4	104,261,378	69,598,740	35,591,060	172,931,697
Firm6	9	162,128,272	60,000,000	30,000,000	200,000,000
Firm7	8	5,438,303	193,000	148,000	806,000
Firm8	9	345,446,152	293,600,000	168,000,000	503,100,000
Zhejiang	26	382,756,043	57,081,000	19,112,000	238,810,000
Firm9	12	91,055,448	51,080,000	22,920,000	111,100,000
Firm10	14	632,785,124	78,905,000	15,321,000	767,340,000

(Continued)

Panel C: Number of audit differences

Variable	N	Mean	Median	Q1	Q3
Number of audit differences	103	7.25	2	2	7
Guangdong	35	13.34	3	2	16
Firm1	15	28.87	16	13	48
Firm2	7	2.29	2	2	3
Firm3	13	1.38	1	1	2
Hebei	42	4.38	2	1	5
Firm4	12	1.83	2	2	2
Firm5	4	3.75	4	3	5
Firm6	9	6.89	5	4	10
Firm7	8	1.25	1	1	2
Firm8	9	8.33	4	0	10
Zhejiang	26	3.69	2	2	4
Firm9	12	3.50	4	2	5
Firm10	14	3.86	2	2	4

Panel D: Value of total audit differences

Variable	N	Mean	Median	Q1	Q3
Value of total audit differences	100	23,522,399	1,284,940	109,368	7,706,270
Guangdong	35	41,843,482	2,280,000	536,326	9,457,526
Firm1	15	95,639,233	11,684,858	5,000,000	198,912,323
Firm2	7	2,795,714	3,080,000	1,240,000	4,500,000
Firm3	13	797,184	364,124	241,587	560,433
Hebei	39	15,037,558	100,593	33,738	6,200,000
Firm4	12	738,912	23,909	13,950	71,812
Firm5	4	1,741,971	1,539,356	486,442	2,997,500
Firm6	9	48,193,294	6,200,000	2,250,000	15,100,000
Firm7	8	64,516	78,800	40,300	87,800
Firm8	6	22,729,030	9,631,800	5,438,300	44,559,000
Zhejiang	26	11,586,661	1,810,000	234,500	8,550,000
Firm9	12	5,186,048	721,000	114,000	6,740,000
Firm10	14	17,072,901	2,391,000	329,200	14,500,000

(Continued)

Panel E: Overall risk assessment

Variable	N	Mean	Median	Q1	Q3
Overall risk assessment	97	2.61	2	1	5
Guangdong	35	2.23	2	1	5
Firm1	15	2.60	2	1	5
Firm2	7	2.14	2	1	2
Firm3	13	1.85	1	1	3
Hebei	36	2.36	1	1	5
Firm4	12	2	1	1	5
Firm5	4	3.25	3	2	3
Firm6	4	4	5	3	5
Firm7	8	2	1	1	5
Firm8	8	2	1	1	5
Zhejiang	26	3.46	4	1	5
Firm9	12	3.25	3	2	4
Firm10	14	3.64	4	1	5

Panel F: Risk assessment for sales and accounts receivable cycle

Variable	N	Mean	Median	Q1	Q3
Risk assessment for sales and accounts receivable cycle	99	3.00	3	1	5
Guangdong	36	2.64	2	2	5
Firm1	16	2.69	2	2	5
Firm2	7	2.86	3	2	5
Firm3	13	2.46	2	1	3
Hebei	42	3.08	4	1	5
Firm4	12	4.17	5	3	5
Firm5	4	3	3	2	4
Firm6	9	3.36	3	3	5
Firm7	8	2	1	1	5
Firm8	9	2.33	1	1	5
Zhejiang	21	3.48	5	1	5
Firm9	12	3.33	3	1	5
Firm10	9	3.67	5	1	5

(Continued)

Panel G: Risk assessment for inventory and warehousing cycle

Variable	N	Mean	Median	Q1	Q3
Risk assessment for inventory and warehousing cycle	84	3.16	3	2	5
Guangdong	36	2.69	2	2	4
Firm1	16	2.81	2	2	4
Firm2	7	2.43	2	2	2
Firm3	13	2.69	2	2	3
Hebei	41	3.38	4	2	5
Firm4	12	4.08	5	3	5
Firm5	4	3.25	3	2	5
Firm6	8	3.38	4	4	4
Firm7	8	3.25	2	2	4
Firm8	9	2.67	2	1	5
Zhejiang	7	4.23	4	1	7
Firm9	4	5	2	5	6
Firm10	3	3.33	4	1	5

Panel H: Total audit hours

Variable	N	Mean	Median	Q1	Q3
Total audit hours	103	331	80	40	300
Guangdong	36	707	475	83	1,014
Firm1	16	1,352	1,224	839	1,696
Firm2	7	417	420	300	580
Firm3	13	69	60	46	100
Hebei	41	178	76	35	162
Firm4	12	76	69	55	78
Firm5	4	161	168	35	288
Firm6	9	189	100	80	240
Firm7	8	28	28	25	32
Firm8	8	477	180	110	780
Zhejiang	26	51	40	32	65
Firm9	12	33	34	28	40
Firm10	14	66	60	40	80

Note:
Total assets: the total assets of the client at the end of fiscal year 2007
Total revenues: the total revenues of the client in the period of fiscal year 2007
Number of audit differences: the total number of audit differences detected by the audit firm for the client
Value of total audit differences: the total monetary value of audit differences detected by the audit firm for the client
Overall risk assessment: the assessed audit risk level for the client as a whole (after adjustments to comparable ratings across all the audit firms in the sample)
Risk assessment for sales and accounts receivable cycle: the assessed audit risk level for the sales and accounts receivable cycle of the client (after adjustments to comparable ratings across all the audit firms in the sample)
Risk assessment for inventory and warehousing cycle: the assessed audit risk level for the inventory and warehousing cycle of the client (after adjustments to comparable ratings across all the audit firms in the sample)
Total audit hours: the total audit hours spent on the client by the audit firm
The above amounts for total assets, total revenues, and value of total audit differences are in RMBs (the Chinese currency). And the exchange rates between US dollars and RMBs and between Canadian dollars and RMBs on December 31, 2007 are $1 USD = 7.3046 RMBs and $1 CAD = 7.4419 RMBs respectively.

Table 5.1 Classification Checks of Audit Risk Assessments and Client Size

Panel A: Comparisons of means (Wilcoxon nonparametric test)

Classification	Treatment Levels	Mean	Z-statistic	p-value
Overall risk assessment	Higher	4.76	8.778	<0.0001***
	Lower	1.28		
Risk assessment for sales and accounts receivable cycle	Higher	4.91	8.673	<0.0001***
	Lower	1.71		
Risk assessment for inventory and warehousing cycle	Higher	4.88	7.874	<0.0001***
	Lower	2.04		
Client size (total assets)	Large	1,590,000,000	8.786	<0.0001***
	Small	30,700,000		

Panel B: Comparisons of medians (Wilcoxon rank test)

Classification	Treatment Levels	Median	Z-statistic	p-value
Overall risk assessment	Higher	5	8.149	<0.0001***
	Lower	1		
Risk assessment for sales and accounts receivable cycle	Higher	5	8.737	<0.0001***
	Lower	1		
Risk assessment for inventory and warehousing cycle	Higher	5	7.491	<0.0001***
	Lower	2		
Client size (total assets)	Large	557,900,418	10.149	<0.0001***
	Small	23,156,706		

Note:
*** $p < 0.01$
Overall risk assessment: the assessed audit risk level for the client as a whole (after adjustments to comparable ratings across all the audit firms in the sample)
Risk assessment for sales and accounts receivable cycle: the assessed audit risk level for the sales and accounts receivable cycle of the client (after adjustments to comparable ratings across all the audit firms in the sample)
Risk assessment for inventory and warehousing cycle: the assessed audit risk level for the inventory and warehousing cycle of the client (after adjustments to comparable ratings across all the audit firms in the sample)
Client size (total assets): the total assets of the client at the end of fiscal year 2007 (in RMBs)

Table 5.2 List of Sample Sizes for Descriptive Statistical Analysis

Dependent Variables in the Tables	N (number of observations)
Audit labor mix (Table 5.3)	96
Number of detected audit differences (Panel A of Table 5.8)	96
Value of detected audit differences (Panel B of Table 5.8)	93
Materiality (Panel A of Table 5.9)	88
Audit difference posting threshold (Panel B of Table 5.9)	84
Value of audit adjustments accepted by the client (Panel C of Table 5.9)	93
Ratio of accepted audit adjustments to detected audit differences (Panel D of Table 5.9)	90

Note:
For panel A of table 5.3, there are 97 observations. The breakdown information of audit labor use is missing in 1 observation. We have 96 observations for audit labor use at each rank.

Table 5.3 Descriptive Statistics for Audit Labor Mix at Different Ranks

Panel A: Total Hours

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	602.04 (n=23)	73.43 (n=14)	402.03 (n=37)	2.67	0.014**
Lower-risk clients	583.86 (n=25)	69.50 (n=35)	283.82 (n=60)	4.93	<0.0001***
Overall	592.57 (n=48)	70.62 (n=49)		4.83	<0.0001***
Test of differences (t-test: higher-lower)	0.08	0.16	0.84		
p-value (higher-lower)	0.935	0.872	0.403		

Panel B: Partner Hours Percentage

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	5.60% (n=23)	4.81% (n=14)	5.30% (n=37)	0.45	0.655
Lower-risk clients	6.04% (n=24)	6.54% (n=35)	6.34% (n=59)	-0.33	0.742
Overall	5.82% (n=47)	6.05% (n=49)		-0.20	0.841
Test of differences (t-test: higher-lower)	-0.28	-0.97	-0.90		
p-value (higher-lower)	0.779	0.339	0.368		

Panel C: Manager Hours Percentage

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	11.82% (n=23)	18.13% (n=14)	14.21% (n=37)	-1.44	0.158
Lower-risk clients	16.90% (n=24)	19.05% (n=35)	18.18% (n=59)	-0.73	0.469
Overall	14.42% (n=47)	18.79% (n=49)		-1.72	0.088*
Test of differences (t-test: higher-lower)	-1.55	-0.22	-1.52		
p-value (higher-lower)	0.129	0.830	0.132		

Panel D: Senior Hours Percentage

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	21.72% (n=23)	25.20% (n=14)	23.04% (n=37)	-0.63	0.530
Lower-risk clients	36.48% (n=24)	36.22% (n=35)	36.32% (n=59)	0.06	0.952
Overall	29.26% (n=47)	33.07% (n=49)		-1.06	0.290
Test of differences (t-test: higher-lower)	-2.76	-2.43	-3.89		
p-value (higher-lower)	0.008***	0.019**	0.0002***		

(Continued)

Panel E: Junior Hours Percentage

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	58.32% (n=23)	49.90% (n=14)	55.13% (n=37)	1.05	0.300
Lower-risk clients	38.08% (n=24)	35.89% (n=35)	36.78% (n=59)	0.38	0.707
Overall	47.98% (n=47)	39.90% (n=49)		1.66	0.099*
Test of differences (t-test: higher-lower)	3.19	1.90	3.90		
p-value (higher-lower)	0.003***	0.063*	0.0002***		

Panel F: Other Specialist Hours Percentage

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	2.54% (n=23)	1.96% (n=14)	2.32% (n=37)	0.47	0.644
Lower-risk clients	2.50% (n=24)	2.29% (n=35)	2.38% (n=59)	0.16	0.872
Overall	2.52% (n=47)	2.20% (n=49)		0.36	0.717
Test of differences (t-test: higher-lower)	0.04	-0.22	-0.06		
p-value (higher-lower)	0.968	0.827	0.954		

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Total hours: the sum of partner, manager, senior, junior, and other specialist (such as IT or tax specialists) hours
Partner hours percentage: partner hours used in the audit divided by the total audit hours
Manager hours percentage: manager hours used in the audit divided by the total audit hours
Senior hours percentage: senior hours used in the audit divided by the total audit hours
Junior hours percentage: junior hours used in the audit divided by the total audit hours
Other specialist hours percentage: other specialist (such as IT or tax specialists) hours used in the audit divided by the total audit hours

Table 5.4 Distribution of Audit Procedures – Sales and Accounts Receivable Cycle

	Audit Procedures Used		
		Average Effort	
	Number	Hours	Percentage of Total Hours
Audit Test Type – Tests of Controls			
Make inquiries of appropriate client personnel	29	3.48	1.75%
Examine documents, records, and reports	253	3.83	3.63%
Observe control-related activities	69	1.52	1.72%
Reperform client procedures	63	3.53	2.55%
Tukey test for multiple comparisons			
(Percentage of total hours)			
F-value: 5.94			
p-value: 0.0006***			
Audit Test Type – Substantive Tests			
Confirmations	145	8.04	12.49%
Documentation	168	4.21	4.03%
Recomputation	12	3.75	5.27%
Reprocessing/vouching	47	2.39	2.25%
Analytical procedures	49	8.20	2.22%
Review of disclosures	12	6.88	2.30%
Tukey test for multiple comparisons			
(Percentage of total hours)			
F-value: 3.12			
p-value: 0.009***			

Note:
*** $p < 0.01$
Percentage of total hours is the average percentage of hours spent on a certain audit procedure in the total hours spent on the corresponding engagement.

Table 5.5 Distribution of Audit Procedures – Inventory and Warehousing Cycle

	Audit Procedures Used		
		Average Effort	
	Number	Hours	Percentage of Total Hours
Audit Test Type – Tests of Controls			
Make inquiries of appropriate client personnel	31	2.23	2.41%
Examine documents, records, and reports	200	3.61	2.16%
Observe control-related activities	107	2.73	1.97%
Reperform client procedures	32	4.89	1.21%
Tukey test for multiple comparisons			
(Percentage of total hours)			
F-value: 1.78			
p-value: 0.150			
Audit Test Type – Substantive Tests			
Confirmations	157	11.57	5.65%
Documentation	49	5.13	2.95%
Recomputation	118	5.36	2.31%
Reprocessing/vouching	33	1.43	1.72%
Analytical procedures	16	12.18	1.58%
Review of disclosures	34	3.42	3.02%
Tukey test for multiple comparisons			
(Percentage of total hours)			
F-value: 9.54			
p-value: <0.0001***			

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Percentage of total hours is the average percentage of hours spent on a certain audit procedure in the total hours spent on the corresponding engagement.

Table 5.6 Distribution of Audit Differences by Audit Area

Audit Area	Detected Audit Differences		
		Average Size	
	Number	Amount	Percentage of Assets
Revenue cycle and accounts receivable	55	6,923,746.80	4.10%
Notes (other) receivable	14	4,293,914.26	1.58%
Inventory and production costs	32	3,915,819.73	1.27%
Prepaid expenses, deferred charges, and other assets	45	5,849,112.67	2.00%
Property, plant and equipment	34	4,616,414.32	1.30%
Purchasing cycle and accounts payable	11	5,794,531.40	6.92%
Other liabilities and deferred credits	40	3,676,751.38	0.98%
Labor costs and employee benefits	9	625,951.21	0.24%
Stockholders' equity	11	1,300,372.70	0.19%
General and administrative expenses	21	294,922.46	1.23%
Tukey test for multiple comparisons (Percentage of assets) F-value: 2.45 p-value: 0.011**			
Number of errors	272		
Number of companies reporting errors	97		
Number of companies reporting no error	6		

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Percentage of assets is the average percentage of audit difference amounts in the corresponding client's total assets at the end of fiscal year 2007.
The amount in the above table is in RMBs (the Chinese currency).

Table 5.7 Effects of Audit Differences on Income

Direction of Effect on Income	Detected Audit Differences		Average Size	
	Number	Percentage	Amount	Percentage of Assets
Overstatement	104	39.25%	4,114,132.03	1.20%
Understatement	66	24.21%	4,034,675.28	1.21%
No effect	95	36.54%	5,302,425.65	3.61%
Tukey test for multiple comparisons (Percentage of assets) F-value: 5.87 p-value: 0.003***				

Note:
*** p< 0.01
Percentage of assets is the average percentage of audit differences amounts in the corresponding client's total assets at the end of fiscal year 2007.
The amount in the above table is in RMBs (the Chinese currency).

Table 5.8 Descriptive Statistics for Detected Audit Differences

Panel A: Number of detected audit differences

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	11.70 (n=23)	3.43 (n=14)	8.57 (n=37)	2.14	0.042**
Lower-risk clients	11.21 (n=24)	2.11 (n=35)	5.81 (n=59)	2.42	0.024**
Overall	11.45 (n=47)	2.49 (n=49)		3.39	0.001***
Test of differences (t-test: higher-lower)	0.09	1.42	0.98		
p-value (higher-lower)	0.927	0.177	0.330		

Panel B: Value of detected audit differences (in percentage)

	Large clients	Small clients	Overall	Test of differences (Z-statistic: large-small)	p-value (large-small)
Higher-risk clients	2.39% (n=22)	25.86% (n=14)	11.52% (n=36)	1.87	0.062*
Lower-risk clients	4.12% (n=22)	6.15% (n=35)	5.36% (n=57)	-1.37	0.171
Overall	3.26% (n=44)	11.78% (n=49)		-2.12	0.034**
Test of differences (Z-statistic: higher-lower)	0.01	0.87	0.10		
p-value (higher-lower)	0.991	0.382	0.922		

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Number of detected audit differences: total number of audit differences detected during the audit, excluding internal control deficiencies
Value of detected audit differences: the monetary value of detected audit differences, which is scaled by the corresponding client's total assets at the end of fiscal year 2007
For panel B, I use the Wilcoxon rank of sum tests to compare across different cells to remove the effect of potential outliers.

Table 5.9 Descriptive Statistics for Materiality and Audit Difference Posting Threshold

Panel A: Materiality (in percentage)

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	0.17% (n=23)	0.47% (n=11)	0.27% (n=34)	-2.08	0.059*
Lower-risk clients	0.31% (n=25)	0.57% (n=29)	0.45% (n=54)	-2.72	0.009***
Overall	0.24% (n=48)	0.54% (n=40)		-3.92	0.0002***
Test of differences (t-test: higher-lower)	-1.98	-0.68	-2.32		
p-value (higher-lower)	0.053*	0.503	0.023**		

Panel B: Audit difference posting threshold (in percentage)

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	0.03% (n=21)	0.14% (n=12)	0.07% (n=33)	-1.45	0.174
Lower-risk clients	0.05% (n=22)	0.52% (n=29)	0.32% (n=51)	-2.38	0.025**
Overall	0.04% (n=43)	0.41% (n=41)		-2.58	0.014**
Test of differences (t-test: higher-lower)	-0.99	-1.79	-2.08		
p-value (higher-lower)	0.329	0.082*	0.043**		

Panel C: Value of audit adjustments accepted by the client (in percentage)

	Large clients	Small clients	Overall	Test of differences (Z-statistic: large-small)	p-value (large-small)
Higher-risk clients	1.61% (n=22)	24.48% (n=14)	10.51% (n=36)	1.36	0.173
Lower-risk clients	4.12% (n=22)	6.02% (n=35)	5.29% (n=57)	-1.37	0.171
Overall	2.87% (n=44)	11.29% (n=49)		-2.22	0.026**
Test of differences (Z-statistic: higher-lower)	-0.89	-0.12	-1.29		
p-value (higher-lower)	0.372	0.903	0.197		

(Continued)

Panel D: Ratio of accepted audit adjustments to detected audit differences (in percentage)

	Large clients	Small clients	Overall	Test of differences (t-test: large-small)	p-value (large-small)
Higher-risk clients	81.00% (n=21)	79.41% (n=14)	80.36% (n=35)	0.12	0.906
Lower-risk clients	95.45% (n=22)	98.69% (n=33)	97.40% (n=55)	-0.69	0.498
Overall	88.39% (n=43)	92.95% (n=47)		-0.79	0.434
Test of differences (t-test: higher-lower)	-1.56	-1.75	-2.53		
p-value (higher-lower)	0.129	0.103	0.015**		

Note:

*** p< 0.01 ** p< 0.05 * p< 0.10

Materiality: the materiality level of the audit scaled by the total assets of the client at the end of fiscal year 2007

Audit difference posting threshold: the amount of posting threshold to record an item on the audit difference schedule scaled by the total assets of the client at the end of fiscal year 2007

Value of audit adjustments accepted by the client: the monetary value of audit adjustments accepted by the client, which is scaled by the corresponding client's total assets at the end of fiscal year 2007

Ratio of accepted audit adjustments to detected audit differences: the total monetary value of all audit adjustments accepted by the client divided by the corresponding total value of audit differences detected during the audit

For panel C, I use the Wilcoxon rank of sum tests to compare across different cells to remove the effect of potential outliers.

Table 6.1 Regression for Labor Hours

This table reports results from the following regression (O'Keefe et al. 1994; Bell et al. 2008):

$$\ln(Phrs/Mhrs/Shrs/Jhrs/Ohrs/Thrs) = \beta_0 + \beta_1 \ln(assets) + \beta_2 Public * \ln(assets) + \beta_3 ROMM * \ln(assets) + \beta_4 Hrely * \ln(assets) + \beta_5 Mrely * \ln(assets) + \sum_{i=6}^{14} \beta_i AuditFirmDummy + \varepsilon$$

The regressions are estimated using 69 observations with available data for the above variables. *Phrs*, *Mhrs*, *Shrs*, *Jhrs*, and *Ohrs* are actual labor hours at the partner, manager, senior, junior, and other supporting specialist (tax, IT, and others) levels respectively. *Thrs* is total labor hours at all levels (*Phrs+Mhrs+Shrs+Jhrs+Ohrs*). *ln(assets)* is the natural log of the client's total assets at the end of fiscal year 2007. *Public* is a dummy variable which equals 1 if the client has issued any publicly traded securities, and 0 otherwise. *ROMM* is 1 if audit risk is assessed as higher, and 0 otherwise. *Hrely* is a dummy variable which equals 1 if the auditor placed high reliance on the client's internal control system, and 0 otherwise. *Mrely* is a dummy variable which equals 1 if the auditor placed moderate reliance on the client's internal control system, and 0 otherwise.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively (two-tailed).

Panel A: Partner and Manager Hours Regressions

	ln(Phrs)		ln(Mhrs)	
	Coefficient	p-value	Coefficient	p-value
Intercept	4.179	0.434	4.463	0.416
ln(assets)	0.111	0.169	0.320	0.0002***
Public* ln(assets)	-0.192	0.456	-0.318	0.231
ROMM* ln(assets)	-0.004	0.760	0.006	0.678
Hrely* ln(assets)	0.037	0.149	-0.005	0.853
Mrely* ln(assets)	-0.061	0.144	-0.054	0.207
Individual audit firm	Included		Included	
Observations	69		69	
Adjusted R^2	51.24%		62.86%	

Panel B: Senior and Junior Hours Regressions

	ln(Shrs)		ln(Jhrs)	
	Coefficient	p-value	Coefficient	p-value
Intercept	-3.528	0.475	6.563	0.186
ln(assets)	0.203	0.008***	0.252	0.001***
Public* ln(assets)	0.248	0.299	-0.227	0.340
ROMM* ln(assets)	0.001	0.920	0.032	0.016**
Hrely* ln(assets)	-0.006	0.788	-0.049	0.042**
Mrely* ln(assets)	-0.005	0.895	0.013	0.735
Individual audit firm	Included		Included	
Observations	69		69	
Adjusted R^2	71.69%		76.43%	

(Continued)

Panel C: Other Specialist and Total Hours Regressions				
	ln(Ohrs)		ln(Thrs)	
	Coefficient	p-value	Coefficient	p-value
Intercept	4.955	0.323	3.324	0.366
ln(assets)	-0.040	0.591	0.237	<0.0001***
Public* ln(assets)	-0.202	0.404	-0.051	0.772
ROMM* ln(assets)	-0.007	0.620	0.014	0.168
Hrely* ln(assets)	0.045	0.067*	-0.015	0.404
Mrely* ln(assets)	0.002	0.966	-0.015	0.607
Individual audit firm	Included		Included	
Observations	69		69	
Adjusted R^2	51.55%		82.27%	

Table 6.2 ANOVA Model for Audit Hours Percentages at Different Ranks

Panel A: Partner Hours Percentage

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.002443	1	0.002443	0.80	0.372
Size	0.000001	1	0.000001	0.00	0.990
Risk × Size	0.000896	1	0.000896	0.29	0.589

Panel B: Manager Hours Percentage

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.035842	1	0.035842	2.33	0.131
Size	0.031822	1	0.031822	2.07	0.154
Risk × Size	0.009324	1	0.009324	0.61	0.439

Panel C: Senior Hours Percentage

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.401546	1	0.401546	14.89	0.0002***
Size	0.003059	1	0.003059	0.11	0.737
Risk × Size	0.007553	1	0.007553	0.28	0.598

Panel D: Junior Hours Percentage

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.765497	1	0.765497	15.10	0.0002***
Size	0.047489	1	0.047489	0.94	0.336
Risk × Size	0.020966	1	0.020966	0.41	0.522

Panel E: Other Specialist Hours Percentage

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.000006	1	0.000006	0.00	0.954
Size	0.000272	1	0.000272	0.14	0.705
Risk × Size	0.000076	1	0.000076	0.04	0.841

Note:
*** $p < 0.01$
Partner hours percentage: partner hours in the audit divided by the total audit hours
Manager hours percentage: manager hours in the audit divided by the total audit hours
Senior hours percentage: senior hours in the audit divided by the total audit hours
Junior hours percentage: junior hours in the audit divided by the total audit hours
Other specialist hours percentage: other specialist (such as IT or tax specialists) hours in the audit divided by the total audit hours

Table 6.3
ANOVA Model for Nature and Extent of Audit Procedures for Sales and Accounts Receivable Cycle

Panel A: Nature of Control Tests for Sales and Accounts Receivable Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Sales/AR Risk	0.744260	1	0.744260	0.45	0.503
Size	2.884865	1	2.884865	1.75	0.189
Sales/AR Risk × Size	0.615023	1	0.615023	0.37	0.543

Panel B: Nature of Substantive Tests for Sales and Accounts Receivable Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Sales/AR Risk	4.800039	1	4.800039	3.89	0.052*
Size	0.001814	1	0.001814	0.00	0.970
Sales/AR Risk × Size	0.028816	1	0.028816	0.02	0.879

Panel C: Extent of Control Tests for Sales and Accounts Receivable Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Sales/AR Risk	0.005317	1	0.005317	0.39	0.532
Size	0.039703	1	0.039703	2.94	0.090*
Sales/AR Risk × Size	0.108514	1	0.108514	8.03	0.006***

Panel D: Extent of Substantive Tests for Sales and Accounts Receivable Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Sales/AR Risk	0.337204	1	0.337204	1.73	0.191
Size	2.882563	1	2.882563	14.80	0.0002***
Sales/AR Risk × Size	0.493954	1	0.493954	2.54	0.115

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Nature of audit procedures: the number of key audit procedures used for the control tests or substantive tests of sales and accounts receivable cycle
Extent of audit procedures: audit hours for key audit procedures used for the control tests or substantive tests of sales and accounts receivable cycle divided by total audit hours for the engagement
Sales/AR risk: risk assessment for sales and accounts receivable cycle, which has two treatment levels—higher and lower
Size: the size of the client, which has two treatment levels—large and small

Table 6.4
Five Audit Procedures for Control Tests of Sales and Accounts Receivable Cycle

Panel A: Make inquiries of appropriate client personnel by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	4	3	7
Low Sales/AR Risk	10	12	22
Total	14	15	29

Panel B: Make inquiries of appropriate client personnel: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	3.04	0.081*
Size	0.01	0.926
Sales/AR Risk × Size	0.44	0.505

Panel C: Examine documents, records, and reports by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	50	45	95
Low Sales/AR Risk	77	70	147
Total	127	115	242

Panel D: Examine documents, records, and reports: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	0.00	0.959
Size	0.00	0.959
Sales/AR Risk × Size	0.21	0.647

Panel E: Observe control-related activities by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	14	20	34
Low Sales/AR Risk	17	16	33
Total	31	36	67

Panel F: Observe control-related activities: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	3.23	0.073*
Size	0.97	0.326
Sales/AR Risk × Size	0.39	0.533

(Continued)

Panel G: Reperform client procedures by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	12	9	21
Low Sales/AR Risk	26	14	40
Total	38	23	61

Panel H: Reperform client procedures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	0.42	0.517
Size	1.73	0.188
Sales/AR Risk × Size	0.16	0.690

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
The log-linear analysis in the above examines how the frequencies with which different types of audit procedures used for control tests of sales and accounts receivable cycle appear in the cells above are influenced by the risk assessment for sales and accounts receivable cycle and the client size.
Sales/AR Risk =1 if the treatment level of risk assessment for sales and accounts receivable cycle is higher, and 0 if the treatment level of risk assessment for sales and accounts receivable cycle is lower.
Size =1 if the treatment level of client size is large, and 0 if the treatment level of client size is small.

Table 6.5
Five Audit Procedures for Substantive Tests of Sales and Accounts Receivable Cycle

Panel A: Confirmations by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	22	24	46
Low Sales/AR Risk	51	48	99
Total	73	72	145

Panel B: Confirmations: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	2.38	0.123
Size	0.02	0.884
Sales/AR Risk × Size	0.07	0.786

Panel C: Documentation by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	36	28	64
Low Sales/AR Risk	44	48	92
Total	80	76	156

Panel D: Documentation: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	0.58	0.445
Size	0.18	0.672
Sales/AR Risk × Size	1.42	0.233

Panel E: Recomputation by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	4	2	6
Low Sales/AR Risk	2	3	5
Total	6	5	11

Panel F: Recomputation: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	1.02	0.313
Size	0.04	0.835
Sales/AR Risk × Size	0.87	0.352

Panel G: Reprocessing/vouching by risk and size

	Large Client	Small Client	Total
High Sales/AR Risk	7	18	25
Low Sales/AR Risk	8	14	22
Total	15	32	47

(Continued)

Panel H: Reprocessing/vouching: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	3.04	0.081*
Size	6.35	0.012**
Sales/AR Risk × Size	0.28	0.595

Panel I: Analytical procedures by risk and size

	Large Client	**Small Client**	**Total**
High Sales/AR Risk	7	8	15
Low Sales/AR Risk	22	12	34
Total	29	20	49

Panel J: Analytical procedures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	0.81	0.367
Size	0.50	0.479
Sales/AR Risk × Size	1.20	0.272

Panel K: Review of disclosures by risk and size

	Large Client	**Small Client**	**Total**
High Sales/AR Risk	3	0	3
Low Sales/AR Risk	6	3	9
Total	9	3	12

Panel L: Review of disclosures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Sales/AR Risk	0.06	0.806
Size	0.91	0.341
Sales/AR Risk × Size	-	-

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
The log-linear analysis in the above examines how the frequencies with which different types of audit procedures used for substantive tests of sales and accounts receivable cycle appear in the cells above are influenced by the risk assessment for sales and accounts receivable cycle and the client size.
Sales/AR Risk =1 if the treatment level of risk assessment for sales and accounts receivable cycle is higher, and 0 if the treatment level of risk assessment for sales and accounts receivable cycle is lower.
Size =1 if the treatment level of client size is large, and 0 if the treatment level of client size is small.

Table 6.6
ANOVA Model for Nature and Extent of Audit Procedures for Inventory and Warehousing Cycle

Panel A: Nature of Control Tests for Inventory and Warehousing Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Inventory Risk	3.545709	1	3.545709	1.98	0.163
Size	6.755633	1	6.755633	3.77	0.056*
Inventory Risk × Size	0.136926	1	0.136926	0.08	0.783

Panel B: Nature of Substantive Tests for Inventory and Warehousing Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Inventory Risk	1.971989	1	1.971989	1.80	0.183
Size	1.436199	1	1.436199	1.31	0.255
Inventory Risk × Size	0.047870	1	0.047870	0.04	0.835

Panel C: Extent of Control Tests for Inventory and Warehousing Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Inventory Risk	0.002020	1	0.002020	0.51	0.476
Size	0.032007	1	0.032007	8.13	0.006***
Inventory Risk × Size	0.025051	1	0.025051	6.36	0.014**

Panel D: Extent of Substantive Tests for Inventory and Warehousing Cycle

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Inventory Risk	0.000269	1	0.000269	0.03	0.856
Size	0.030382	1	0.030382	3.76	0.056*
Inventory Risk × Size	0.116825	1	0.116825	14.47	0.0003***

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Nature of audit procedures: the number of key audit procedures used for the control tests or substantive tests of inventory and warehousing cycle
Extent of audit procedures: audit hours for key audit procedures used for the control tests or substantive tests of inventory and warehousing cycle divided by total audit hours for the engagement
Inventory risk: risk assessment for inventory and warehousing cycle, which has two treatment levels—higher and lower
Size: the size of the client, which has two treatment levels—large and small

Table 6.7
Five Audit Procedures for Control Tests of Inventory and Warehousing Cycle

Panel A: Make inquiries of appropriate client personnel by risk and size

	Large Client	Small Client	Total
High Inventory Risk	6	7	13
Low Inventory Risk	6	8	14
Total	12	15	27

Panel B: Make inquiries of appropriate client personnel: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	1.48	0.224
Size	0.65	0.421
Inventory Risk × Size	0.06	0.814

Panel C: Examine documents, records, and reports by risk and size

	Large Client	Small Client	Total
High Inventory Risk	36	25	61
Low Inventory Risk	59	59	118
Total	95	84	179

Panel D: Examine documents, records, and reports: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.72	0.396
Size	0.34	0.562
Inventory Risk × Size	1.70	0.193

Panel E: Observe control-related activities by risk and size

	Large Client	Small Client	Total
High Inventory Risk	16	23	39
Low Inventory Risk	26	29	55
Total	42	52	94

Panel F: Observe control-related activities: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.74	0.389
Size	2.40	0.121
Inventory Risk × Size	0.24	0.628

(Continued)

Panel G: Reperform client procedures by risk and size

	Large Client	Small Client	Total
High Inventory Risk	5	4	9
Low Inventory Risk	20	3	23
Total	25	7	32

Panel H: Reperform client procedures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.00	0.987
Size	4.86	0.028**
Inventory Risk × Size	3.25	0.072*

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
The log-linear analysis in the above examines how the frequencies with which different types of audit procedures used for control tests of inventory and warehousing cycle appear in the cells above are influenced by the risk assessment for inventory and warehousing cycle and the client size.
Inventory Risk =1 if the treatment level of risk assessment for inventory and warehousing cycle is higher, and 0 if the treatment level of risk assessment for inventory and warehousing cycle is lower.
Size =1 if the treatment level of client size is large, and 0 if the treatment level of client size is small.

Table 6.8
Five Audit Procedures for Substantive Tests of Inventory and Warehousing Cycle

Panel A: Confirmations by risk and size

	Large Client	Small Client	Total
High Inventory Risk	29	26	55
Low Inventory Risk	42	46	88
Total	71	72	143

Panel B: Confirmations: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.04	0.840
Size	0.00	0.984
Inventory Risk × Size	0.48	0.486

Panel C: Documentation by risk and size

	Large Client	Small Client	Total
High Inventory Risk	8	5	13
Low Inventory Risk	16	11	27
Total	24	16	40

Panel D: Documentation: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.48	0.490
Size	1.49	0.222
Inventory Risk × Size	0.04	0.845

Panel E: Recomputation by risk and size

	Large Client	Small Client	Total
High Inventory Risk	23	21	44
Low Inventory Risk	42	30	72
Total	65	51	116

Panel F: Recomputation: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.02	0.894
Size	1.17	0.279
Inventory Risk × Size	0.29	0.592

Panel G: Reprocessing/vouching by risk and size

	Large Client	Small Client	Total
High Inventory Risk	4	12	16
Low Inventory Risk	4	11	15
Total	8	23	31

(Continued)

Panel H: Reprocessing/vouching: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	1.75	0.186
Size	7.64	0.006***
Inventory Risk × Size	0.00	0.954

Panel I: Analytical procedures by risk and size

	Large Client	**Small Client**	**Total**
High Inventory Risk	2	2	4
Low Inventory Risk	11	1	12
Total	13	3	16

Panel J: Analytical procedures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.00	0.999
Size	2.98	0.084*
Inventory Risk × Size	2.92	0.088*

Panel K: Review of disclosures by risk and size

	Large Client	**Small Client**	**Total**
High Inventory Risk	5	6	11
Low Inventory Risk	5	18	23
Total	10	24	34

Panel L: Review of disclosures: log-linear analysis of the effects of risk and size

Source of variation	Chi-Square	Pr > ChisSq
Inventory Risk	0.01	0.911
Size	3.62	0.057*
Inventory Risk × Size	2.09	0.148

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
The log-linear analysis in the above examines how the frequencies with which different types of audit procedures used for substantive tests of inventory and warehousing cycle appear in the cells above are influenced by the risk assessment for inventory and warehousing cycle and the client size.
Inventory Risk =1 if the treatment level of risk assessment for inventory and warehousing cycle is higher, and 0 if the treatment level of risk assessment for inventory and warehousing cycle is lower.
Size =1 if the treatment level of client size is large, and 0 if the treatment level of client size is small.

Table 6.9
ANOVA Model for Number and Value of Detected Audit Differences

Panel A: Number of detected audit differences

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	172.469766	1	172.469766	1.05	0.308
Size	1,768.537183	1	1,768.537183	10.76	0.002***
Risk × Size	3.693724	1	3.693724	0.02	0.881

Panel B: Total value of audit differences detected during the audit

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.408956	1	0.408956	0.11	0.743
Size	25.955430	1	25.955430	6.89	0.011**
Risk × Size	0.028272	1	0.028272	0.01	0.931

Panel C: Total value of audit differences detected during the audit-B/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	3.300750	1	3.300750	0.82	0.369
Size	12.203238	1	12.203238	2.69	0.106
Risk × Size	0.433293	1	0.433293	0.11	0.744

Panel D: Total value of audit differences detected during the audit-I/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	28.555033	1	28.555033	5.98	0.017**
Size	55.701242	1	55.701242	11.66	0.001***
Risk × Size	0.587336	1	0.587336	0.12	0.727

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Number of detected audit differences: total number of audit differences detected during the audit, excluding internal control deficiencies
Values of audit differences detected during the audit are scaled by the corresponding client's total assets at the end of fiscal year 2007.
For panel B, panel C, and panel D, I report ANOVA results for scaled total values of audit differences after the logit transformation to remove the effect of potential outliers.

Table 6.10
Five Most Important Audit Differences in Different Areas

Panel A: Revenue Cycle and Accounts Receivable by Risk and Size

	Large Client	Small Client	Total
High Risk	11	6	17
Low Risk	19	11	30
Total	30	17	47

Panel B: Revenue Cycle and Accounts Receivable: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	0.20	0.654
Size	0.24	0.621
Risk × Size	1.09	0.297

Panel C: Notes (Other) Receivable by Risk and Size

	Large Client	Small Client	Total
High Risk	4	1	5
Low Risk	5	2	7
Total	9	3	12

Panel D: Notes (Other) Receivable: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	0.00	0.974
Size	1.24	0.265
Risk × Size	0.03	0.854

Panel E: Inventory and Production Costs by Risk and Size

	Large Client	Small Client	Total
High Risk	11	4	15
Low Risk	4	8	12
Total	15	12	27

Panel F: Inventory and Production Costs: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	1.94	0.163
Size	0.38	0.538
Risk × Size	1.41	0.236

(Continued)

Panel G: Prepaid Expenses, Deferred Charges, and Other Assets by Risk and Size

	Large Client	Small Client	Total
High Risk	18	6	24
Low Risk	8	8	16
Total	26	14	40

Panel H: Prepaid Expenses, and Other Assets: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	4.01	0.045**
Size	0.14	0.708
Risk × Size	0.29	0.589

Panel I: Property, Plant and Equipment by Risk and Size

	Large Client	Small Client	Total
High Risk	5	8	13
Low Risk	7	9	16
Total	12	17	29

Panel J: Property, Plant and Equipment: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	0.30	0.586
Size	4.32	0.038**
Risk × Size	1.56	0.212

Panel K: Purchasing Cycle and Accounts Payable by Risk and Size

	Large Client	Small Client	Total
High Risk	0	1	1
Low Risk	4	6	10
Total	4	7	11

Panel L: Purchasing Cycle and Accounts Payable: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	1.05	0.305
Size	0.52	0.469
Risk × Size	-	-

(Continued)

Panel M: Other Liabilities and Deferred Credits by Risk and Size

	Large Client	Small Client	Total
High Risk	14	4	18
Low Risk	11	9	20
Total	25	13	38

Panel N: Other Liabilities and Deferred Credits: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	0.17	0.680
Size	0.74	0.388
Risk × Size	0.20	0.652

Panel O: Labor Costs and Employee Benefits by Risk and Size

	Large Client	Small Client	Total
High Risk	3	0	3
Low Risk	3	1	4
Total	6	1	7

Panel P: Labor Costs and Employee Benefits: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	0.01	0.931
Size	0.94	0.333
Risk × Size	-	-

Panel Q: Stockholders' Equity by Risk and Size

	Large Client	Small Client	Total
High Risk	2	0	2
Low Risk	9	0	9
Total	11	0	11

Panel R: Stockholders' Equity: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	4.34	0.037**
Size	-	-
Risk × Size	-	-

(Continued)

Panel S: General and Administrative Expenses by Risk and Size

	Large Client	Small Client	Total
High Risk	0	1	1
Low Risk	3	15	18
Total	3	16	19

Panel T: General and Administrative Expenses: Log-linear Analysis of the Effects of Risk and Size

Source of variation	Chi-Square	Pr > ChisSq
Risk	5.99	0.014**
Size	9.42	0.002***
Risk × Size	-	-

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
The log-linear analysis in the above examines how the frequencies with which auditors detect audit differences in different types of accounts are influenced by the overall audit risk assessment and the client size.
Risk =1 if the treatment level of overall audit risk assessment is higher, and 0 if the treatment level of overall audit risk assessment is lower.
Size =1 if the treatment level of client size is large, and 0 if the treatment level of client size is small.

Table 6.11
ANOVA Model for Materiality and Audit Difference Posting Threshold

Panel A: Materiality

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.000072	1	0.000072	6.13	0.015**
Size	0.000157	1	0.000157	13.47	0.0004***
Risk × Size	0.000001	1	0.000001	0.07	0.797

Panel B: Audit difference posting threshold

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.000126	1	0.000126	3.06	0.084*
Size	0.000229	1	0.000229	5.57	0.021**
Risk × Size	0.000061	1	0.000061	1.48	0.228

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Materiality: the materiality level of the audit scaled by the client's total assets at the end of fiscal year 2007
Audit difference posting threshold: the amount of the posting threshold to record an item on the audit difference schedule scaled by the client's total assets at the end of fiscal year 2007

Table 6.12
ANOVA Model for Audit Adjustments Accepted and Ratio of Accepted Adjustments to Detected Audit Differences

Panel A: Total value of audit adjustments accepted by the client

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	5.750862	1	5.750862	1.58	0.212
Size	17.754730	1	17.754730	4.88	0.030**
Risk × Size	0.096431	1	0.096431	0.03	0.871

Panel B: Total value of audit adjustments accepted by the client-B/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.069182	1	0.069182	0.02	0.896
Size	7.570825	1	7.570825	1.88	0.175
Risk × Size	0.178917	1	0.178917	0.04	0.834

Panel C: Total value of audit adjustments accepted by the client-I/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	15.126609	1	15.126609	3.26	0.076*
Size	48.271422	1	48.271422	10.39	0.002***
Risk × Size	1.945105	1	1.945105	0.42	0.520

Panel D: Ratio of accepted adjustments to detected audit differences-total

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.620638	1	0.620638	8.83	0.004***
Size	0.004012	1	0.004012	0.06	0.812
Risk × Size	0.011946	1	0.011946	0.17	0.681

Panel E: Ratio of accepted adjustments to detected audit differences-B/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.355030	1	0.355030	3.83	0.054*
Size	0.015760	1	0.015760	0.17	0.681
Risk × Size	0.003655	1	0.003655	0.04	0.843

Panel F: Ratio of accepted adjustments to detected audit differences-I/S items

Source of variation	Sum of squares	df	Mean Squares	F-value	p-value
Risk	0.518726	1	0.518726	11.07	0.001***
Size	0.114121	1	0.114121	2.44	0.123
Risk × Size	0.224849	1	0.224849	4.80	0.032**

Note:
*** p< 0.01 ** p< 0.05 * p< 0.10
Values for audit adjustments accepted by the client are scaled by the client's total assets at the end of fiscal year 2007. I report ANOVA results for audit adjustments accepted by the client after the logit transformation to remove the effect of potential outliers.
The ratios are total monetary values of audit adjustments accepted by the client divided by the corresponding total monetary values of audit differences detected during the audit.

BIBLIOGRAPHY

Abdel-khalik, R. A., D. Snowball, and J. H. Wragge. The Effects of Certain Internal Audit Variables on the Planning of External Audit Programs. *The Accounting Review* 58 (2): 215-227.

Alles, M., G. Brenann, A. Kogan, and M.A. Vasarhelyi. 2006. Continuous Monitoring of Business Process Controls: A Pilot Implementation of a Continuous Auditing System at Siemens. *International Journal of Accounting Information Systems* 7 (2): 137-161.

Ameen, E. C., and J. R. Strawser. 1994. Investigating the Use of Analytical Procedures: An Update and Extension. *Auditing: A Journal of Practice & Theory* 13 (2): 69-76.

American Institute of Certified Public Accountants. *Statements on Auditing Standards*. http://www.aicpa.org/Research/Standards/AuditAttest/Pages/SAS.aspx.

Arnold, D. F., Sr., R. A. Bernardi, and P. E. Neidermeyer. 2001. The Association between European Materiality Estimates and Client Integrity, National Culture, and Litigation. *The International Journal of Accounting* 36 (4): 459-483.

Banker, R. D., H. Chang, and R. Cunningham. 2003. The Public Accounting Industry Production Function. *Journal of Accounting & Economics* 35 (2): 255–281.

Becker, C., M. DeFond, J. Jiambalvo, and K. R. Subramanyam. 1998. The Effect of Audit Quality on Earnings Management. *Contemporary Accounting Research* 15 (1): 1-24.

Bedard, J. C. 1989. An Archival Investigation of Audit Program Planning. *Auditing: A Journal of Practice & Theory* 9 (1): 57–71.

Bedard, J. C., S. Biggs, and J. DiPietro. 1998. The Effects of Hypothesis Quality, Client Management Explanations, and Industry Experience on Audit Planning Decisions. *Advances in Accounting* 16: 49-74.

Bedard, J. C., M. L. Ettredge, and K. M. Johnstone. 2008. Fee Pressure and the Longitudinal Dynamics of Audit Engagement Budgeting and Reporting. *Advances in Accounting* 24 (1): 32-40.

Bedard, J. C., and K. M. Johnstone. 2004. Earnings Manipulation Risk, Corporate Governance Risk and Auditors' Planning and Pricing Decisions. *The Accounting Review* 79 (2): 277–304.

Bedard, J. C., T. J. Mock, and A. M. Wright. 1999. Evidential Planning in Auditing: A Review of the Empirical Research. *Journal of Accounting Literature* 18: 96-142.

Bedard, J. C., and A. M. Wright. 1994. The Functionality of Decision Heuristics: Reliance on Prior Audit Adjustments in Evidential Planning. *Behavioral Research in Accounting* 6 (supplement): 62-89.

Bell, T. B., R. Doogar, and I. Solomon. 2008. Audit labor usage and fees under business risk auditing. *Journal of Accounting Research* 46 (4): 729-760.

Bell, T. B., and W. R. Knechel. 1994. Empirical Analyses of Errors Discovered in Audits of Property and Casualty Insurers. *Auditing: A Journal of Practice & Theory* 13 (1): 84-100.

Bell, T. B., W. R. Knechel, J.L. Payne, and J. J. Willingham. 1998. An Empirical Investigation of the Relationship between the Computerization of Accounting Systems and the Incidence and Size of Audit Differences. *Auditing: A Journal of Practice & Theory* 17 (1): 13-38.

Bell, T. B., W. R. Landsman, and D. A. Shackelford. 2001. Auditors' Perceived Business Risk and Audit Fees: Analysis and Evidence. *Journal of Accounting Research* 39 (1): 35–43.

Bierstaker, J., P. Burnaby, and J. Thibodeau. 2001. The Impact of Information Technology on the Audit Process: An Assessment of the State of the Art and Implications for the Future. *Managerial Auditing Journal* 16 (3): 159-164.

Bierstaker, J., R. Houston, and A. Wright. 2006. The Impact of Competition on Audit Planning, Review, and Performance. *Journal of Accounting Literature* 25, 1-58.

Bierstaker, J. L., and A. Wright. 2001. The Effects of Fee Pressure and Partner Pressure on Audit Planning Decisions. *Advances in Accounting* 18: 25-46.

Bierstaker, J. L., and A. Wright. 2005. The Effect of Partner Preferences on the Development of Risk-Adjusted Program Plans. *Advances in Accounting* 21: 1-23.

Blokdijk, H, F. Drieenhuizen, D. A. Simunic, and M. T. Stein. 2003. Factors Affecting Auditors' Assessments of Planning Materiality. *Auditing: A Journal of Practice & Theory* 22 (2): 297–307.

Blokdijk, H, F. Drieenhuizen, D. A. Simunic, and M. T. Stein. 2006. An Analysis of Cross-Sectional Differences in Big and Non-Big Public Accounting Firms' Audit Programs. *Auditing: A Journal of Practice & Theory* 25 (1): 27–48.

Braun, K. W. 2001. The Disposition of Audit-Detected Misstatements: An Examination of Risk and Reward Factors and Aggregation Effects. *Contemporary Accounting Research* 18 (1): 71-99.

Canadian Institute of Chartered Accountants. *Canadian Institute of Chartered Accountants Handbook – Assurance*. 2010.

Caramanis, C., and C. Lennox. 2008. Audit Effort and Earnings Management. *Journal of Accounting & Economics* 45 (1): 116-138.

Caster, P., D. W. Massey, and A. M. Wright. 2000. Research on the Nature, Characteristics, and Causes of Accounting Errors: The Need for a Multi-method Approach. *Journal of Accounting Literature* 19, 60-92.

Chan, K. H., K. Z. Lin, and P. L. Mo. 2003. An Empirical Study on the Impact of Culture on Audit-Detected Accounting Errors. *Auditing: A Journal of Practice & Theory* 22 (2): 281-295.

Chan, K. H., and P. L. Mo. 1998. Ownership Effects on Audit-Detected Error Characteristics: An Empirical Study in an Emerging Economy. *The International Journal of Accounting* 33 (2): 235-261.

Chaney, P. A., D. Jeter, and L. Shivakumar. 2004. Self Selection of Auditors and Audit Pricing in Private Firms. *The Accounting Review* 79 (1): 51–72.

Chou, C.L., T. Du, and V.S. Lai. 2007. Continuous Auditing with a Multi-agent System. *Decision Support Systems* 42 (4): 2274-2292.

Chung, H., and S. Kallapur. 2003. Client Importance, Nonaudit Services, and Abnormal Accruals. *The Accounting Review* 78 (4): 931-955.

Davidson, R., and W. Gist. 1996. Empirical Evidence on the Functional Relation between Audit Planning and Total Audit Effort. *Journal of Accounting Research* 34 (1): 111-124.

Davis, L. R., D. N. Ricchiute, and G. Trompeter. 1993. Audit Effort, Audit Fees, and the Provision of Nonaudit Services to Audit Clients. *The Accounting Review* 68 (1): 135-150.

DeAngelo, L. E. 1981. Auditor Size and Audit Quality. *Journal of Accounting & Economics* 3 (3): 183-199.

DeFond, M., and J.R. Francis. 2005. Audit Research after Sarbanes-Oxley. *Auditing: A Journal of Theory & Practice* 24 (supplement): 5–30.

DeFond, M. L., T. J. Wong, S. Li. 1999. The Impact of Improved Auditor Independence on Audit Market Concentration in China. *Journal of Accounting & Economics* 28 (3): 269-305.

Dikolli, S. S., S. A. McCracken, J. B. Walawski. 2004. Audit-Planning Judgments and Client-Employee Compensation Contracts. *Behavioral Research in Accounting* 16: 45-61.

Dopuch, N., M. Gupta, D. Simunic, and M. Stein. 2003. Production Efficiency and the Pricing of Audit Services. *Contemporary Accounting Research* 20 (1): 47–78.

Dowling, C., and S. Leech. 2007. Audit Support Systems and Decision Aids: Current Practice and Opportunities for Future Research. *International Journal of Accounting Information Systems* 8 (2): 92-116.

Eilifsen, A., W. R. Knechel, and P. Wallage. 2001. Application of the Business Risk Audit Model: A Field Study. *Accounting Horizons* 15 (3): 193–207.

Eilifsen, A., and W. F. Messier, Jr. 2000. The Incidence and Detection of Misstatements: A Review and Integration of Archival Research. *Journal of Accounting Literature* 19: 1-43.

Elder, R. J., and R. D. Allen. 2003. A Longitudinal Field Investigation of Auditor Risk Assessments and Sample Size Decisions. *The Accounting Review* 78 (4): 983–1002.

Emby, C. 1994. Framing and Presentation Mode Effects in Professional Judgment: Auditors' Internal Control Judgments and Substantive Test Decisions. *Auditing: A Journal of Theory & Practice* 13 (1): 102–115.

Emby, C., and D. Finley. 1997. Debiasing Framing Effects in Auditors' Internal Control Judgments and Testing Decisions. *Contemporary Accounting Research* 14 (2): 55-77.

Entwistle, G., and D. Lindsay. 1994. An Archival Study of the Existence, Cause, and Discovery of Income-Affecting Financial Statement Misstatement. *Contemporary Accounting Research* 11 (1): 271-296.

Fan, G., X. Wang, and H. Zhu. 2007. *The Report on the Relative Process of Marketization of Each Region in China*. The Economic Science Press (in Chinese).

Feldmann, D.A., and W.J. Read. 2010. Auditor Conservatism after Enron. *Auditing: A Journal of Theory & Practice* 29 (1): 267–278.

Felix, W. L., A. A. Gramling, and M. J. Maletta. 2001. The Contribution of Internal Audit as a Determinant of External Audit Fees and Factors Influencing This Contribution. *Journal of Accounting Research* 39 (3): 513–534.

Ferguson, A., J. R. Francis, and D. J. Stokes. 2003. The Effects of Firm-wide and Office-level Industry Expertise on Audit Pricing. *The Accounting Review* 78 (2): 429–448.

Ferguson, A., and D. J. Stokes. 2002. Brand Name Audit Pricing, Industry Specialization, and Leadership Premiums Post-Big 8 and Big 6 Mergers. *Contemporary Accounting Research* 19 (1): 77–110.

Ferris, K. R., and K. L. Tennant. 1984. An Investigation of the Impact of the Qualitative Nature of Compliance Errors on Internal Control Assessments. *Auditing: A Journal of Theory & Practice* 3 (2): 31–43.

Francis, J. R., K. Reichelt, and D. Wang. 2005. The Pricing of National and City-Specific Reputations for Industry Expertise in the U.S. Audit Market. *The Accounting Review* 80 (1): 113-136.

Gaumnitz, B. R., T. R. Nunamaker, J. J. Surdick, and M. F. Thomas. 1982. Auditor Consensus in Internal Control Evaluation and Audit Program Planning. *Journal of Accounting Research* 20 (2): 745-755.

Ghosh, A., and R. Pawlewicz. 2009. The Impact of Regulation on Auditor Fees: Evidence from the Sarbanes-Oxley Act. *Auditing: A Journal of Theory & Practice* 28 (2): 171–197.

Gibbins, M., S. Salterio, and A. Webb. 2001. Evidence about Auditor-Client Management Negotiation Concerning Client's Financial Reporting. *Journal of Accounting Research* 39 (3): 535-563.

Gleason, C. A., and L. F. Mills. 2002. Materiality and Contingent Tax Liability Reporting. *The Accounting Review* 77 (2): 317-342.

Glover, S. M., J. Jiambalvo, and J. Kennedy. 2000. Analytical Procedures and Audit-Planning Decisions. *Auditing: A Journal of Theory & Practice* 19 (2): 27–45.

Gul, F. A., and J. S. L. Tsui. 1997. A Test of the Free Cash Flow and Debt Monitoring Hypothesis: Evidence from Audit Pricing. *Journal of Accounting & Economics* 24 (2): 219–237.

Hackenbrack, K., and C. Hogan. 2005. Client Retention and Engagement Level Pricing. *Auditing: A Journal of Theory & Practice* 24 (1): 7–20.

Hackenbrack, K., and W. R. Knechel. 1997. Resource Allocation Decisions in Audit Engagements. *Contemporary Accounting Research* 14 (3): 481–500.

Ham, J., D. Losell, and W. Smiellauskas. 1985. An Empirical Study of Error Characteristics in Accounting Populations. *The Accounting Review* 60 (3): 387-407.

Hay, D. C., W. R. Knechel, and N. Wong. 2006. Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes. *Contemporary Accounting Research* 23 (1): 141–191.

Heintz, J. A., G. B. White, and J. C. Bedard. 1999. The Effect of Data Reliability on the Influence of Unaudited Values in Audit Analytical Procedures. *International Journal of Auditing* 3 (2): 135-146.

Hirst, E., and L. Koonce. 1996. Audit Analytical Procedures: A Field Investigation. *Contemporary Accounting Research* 13 (2): 457-486.

Hoitash, R. U. Hoitash, and J. C. Bedard. 2008. Internal Control Quality and Audit Pricing under the Sarbanes-Oxley Act. *Auditing: A Journal of Theory & Practice* 27 (1): 105–126.

Houghton, C. W., and J. A. Fogarty. 1991. Inherent Risk. *Auditing: A Journal of Practice & Theory* 10 (1): 1-21.

Houston, R. W. 1999. The Effects of Fee Pressure and Client Risk on Audit Seniors' Time Budget Decisions. *Auditing: A Journal of Practice & Theory* 18 (2): 70-86.

Houston, R., M. Peters, and J. Pratt. 1999. The Audit Risk Model, Business Risk and Audit-Planning Decisions. *The Accounting Review* 74 (3): 281–298.

Houston, R. W., M. F. Peters, and J. H. Pratt. 2005. Nonlitigation risk and pricing audit services. *Auditing: A Journal of Practice & Theory* 24 (1): 37-53.

Hylas, R. E., and R. H. Ashton. 1982. Audit Detection of Financial Statement Errors. *The Accounting Review* 67 (4): 751-765.

Icerman, R. C., and W. A. Hillison. 1990. Distribution of Audit-Detected Errors Partitioned by Internal Control. *Journal of Accounting, Auditing & Finance* 5 (4), 527-543.

International Federation of Accountants. 2009. *Handbook of International Standards on Auditing and Quality Control*. 2009 Edition.

Joe, J., A. Wright, and S. Wright. 2008. The Impact of Changes in the Reporting Environment on the Disposition of Proposed Audit Adjustments. *Working paper*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1322531.

Johnson, J. R., and R. A. Leitch, and J. Neter. 1981. Characteristics of Errors in Accounts Receivable and Inventory Audits. *The Accounting Review* 56 (2): 270-293.

Johnson, N. R. 1987. Auditor Detected Errors and Related Client Traits – A Survey of Inherent and Control Risks in a Sample of U.K. Audits. *Journal of Business Finance & Accounting* 14 (1): 39-64.

Johnstone, K. M. 2000. Client-Acceptance Decisions: Simultaneous Effects of Client Business Risk, Audit Risk, Auditor Business Risk, and Risk Adaptation. *Auditing: A Journal of Practice & Theory* 19 (1): 1-25.

Johnstone, K. M., and J. C. Bedard. 2001. Engagement Planning, Bid Pricing, and Client Response in the Market for Initial Attest Engagements. *The Accounting Review* 76 (2): 199–220.

Johnstone, K. M., and J. C. Bedard. 2003. Risk Management in Client Acceptance Decisions. *The Accounting Review* 78 (4): 1003-1025.

Joyce, E. J. 1976. Expert Judgment in Audit Program Planning. *Journal of Accounting Research* 14 (3): 29-60.

Kachelmeier, S. J., and Messier Jr., W. F. 1990. An Investigation of the Influence of a Nonstatistical Decision Aid on Auditor Sample Size Determinations. *The Accounting Review* 65 (1): 209-226.

Kaplan, S. E. 1985. The Effect of Combining Compliance and Substantive Tests on Auditor Consensus. *Journal of Accounting Research* 23 (2): 871-877.

Kinney Jr., W. R. 1979. The Predictive Power of Limited Information in Preliminary Analytical Review: An Empirical Study. *Journal of Accounting Research* 17 (supplement): 148-165.

Kinney Jr., W. R. 1981. Predicting Auditor-Initiated Adjustments Using Paired Balance Methods. *Journal of Accounting, Auditing & Finance* 5 (1): 5-17.

Kinney Jr., W. R., and R. D. Martin. 1994. Does Auditing Reduce Bias in Financial Reporting? A Review of Audit-Related Adjustment Studies. *Auditing: A Journal of Theory & Practice* 13 (1): 149–156.

Kinney Jr., W. R., and L. S. McDaniel. 1989. Characteristics of Firms Correcting Previously Reported Quarterly Earnings. *Journal of Accounting & Economics* 11 (1): 71-93.

Kizirian, T. G., B. M. Mayhew, and L. D. Sneathen, Jr. 2005. The Impact of Management Integrity on Audit Planning and Evidence. *Auditing: A Journal of Theory & Practice* 24 (2): 49–67.

Knechel, W. R., P. Rouse, and C. Schelleman. Forthcoming. A Modified Audit Production Framework: Evaluating the Relative Efficiency of Audit Engagements. *The Accounting Review*.

Kreutzfeldt, R. W., and W. A. Wallace. 1986. Error Characteristics in Audit Populations: Their Profile and Relationship to Environmental Factors. *Auditing: A Journal of Theory & Practice* 6 (1): 20–43.

Kreutzfeldt, R. W., and W. A. Wallace. 1990. Control Risk Assessments: Do They Relate to Errors? *Auditing: A Journal of Theory & Practice* 9 (supplement): 1–27.

Li, C. 2009. Does Client Importance Affect Auditor Independence at the Office Level? Empirical Evidence from Going-Concern Opinions. *Contemporary Accounting Research* 26 (1): 201-230.

Libby, R., J. T. Artman, and J. J. Willingham. 1985. Process Susceptibility, Control Risk, and Audit Planning. *The Accounting Review* 60 (2): 212-230.

Low, K. 2004. The Effects of Industry Specialization on Audit Risk Assessments and Audit-Planning Decisions. *The Accounting Review* 79 (1): 201-219.

Lyon, J. D., and M. W. Maher. 2005. The Importance of Business Risk in Setting Audit Fees: Evidence from Cases of Client Misconduct. *Journal of Accounting Research* 43 (1): 133–151.

Maletta, M. J. 1993. An Examination of Auditors' Decisions to Use Internal Auditors as Assistants: The Effect of Inherent Risk. *Contemporary Accounting Research* 9 (2): 508-525.

Maletta, M. J., and T. Kida. 1993. The Effect of Risk Factors on Auditors' Configural Information Processing. *The Accounting Review* 68 (3): 681-691.

Maletta, M. J., and A. Wright. 1996. Audit Evidence Planning: An Examination of Industry Error Characteristics. *Auditing: A Journal of Theory & Practice* 15 (1): 71–86.

Messier Jr., W. F., A. Eilifsen, and L.A. Austen. 2004. Auditor Detected Mistatements and the Effect of Information Technology. *International Journal of Auditing* 8 (3): 223-235.

Messier Jr., W. F., N. Martinov-Bennie, and A. Eilifsen. 2005. A Review and Integration of Empirical Research on Materiality: Two Decades Later. *Auditing: A Journal of Theory & Practice* 24 (2): 153–187.

Messier Jr., W. F., and D. R. Plumlee. 1987. The Effects of Anticipation and Frequency of Errors on Auditors' Selection of Substantive Procedures. *Accounting and Business Research* 17 (68): 349-357.

Mock, T., and J. Turner. 1981. *Auditing Research Monograph No. 3: Internal Accounting Control Evaluation and Auditor Judgment*. New York: AICPA.

Mock, T., and J. Turner. 1999. *Internal Accounting Control Evaluation and Auditor Judgment: An Anthology*. Garland Publishing Inc.

Mock, T., and A. Wright. 1993. An Exploratory Study of Auditors' Evidential Planning Judgments. *Auditing: A Journal of Theory & Practice* 12 (2): 39–61.

Mock, T., and A. Wright. 1999. Are Audit Programs Risk-Adjusted? *Auditing: A Journal of Theory & Practice* 18 (1): 55–74.

National Bureau of Statistics of China. 2008. *China Statistical Yearbook 2008*. China Statistics Press.

Nelson, M. W., J. A. Elliott, and R. L. Tarpley. 2002. Evidence from Auditors about Managers' and Auditors' Earnings Management Decisions. *The Accounting Review* 77 (supplement): 175-202.

Nelson, M. W., J. A. Elliott, and R. L. Tarpley. 2003. How Are Earnings Managed? Examples from Auditors. *Accounting Horizons* 17 (supplement): 17-35.

O'Keefe, T. B., D. A. Simunic, and M. T. Stein. 1994. The Production of Audit Services: Evidence from a Major Public Accounting Firm. *Journal of Accounting Research* 32 (2): 241–261.

Palmrose, Z.-V. 1986. The Effect of Non Audit Services on Pricing of Audit Services: Further Evidence. *Journal of Accounting Research* 24 (1): 405–411.

Palmrose, Z.-V. 1989. The Relation of Audit Contract Type to Audit Fees and Hours. *The Accounting Review* 64 (3): 488–499.

Pearson, T., and G. Trompeter. 1994. Competition in the Market for Audit Services: The Effect of Supplier Concentration on Audit Fees. *Contemporary Accounting Research* 11 (1): 115-135.

Pratt, J., and J. D. Stice. 1994. The Effects of Client Characteristics on Auditor Litigation Risk Judgments, Required Audit Evidence, and Recommended Audit Fees. *The Accounting Review* 69 (4): 639-656.

Prawitt, D. F. 1995. Staffing Assignments for Judgment-Oriented Audit Tasks: The Effects of Structured Audit Technology and Environment. *The Accounting Review* 70 (3): 443-465.

Puttick, G., S.D. van Esch, and S.P. Kana. 2008. *The Principles and Practice of Auditing*. 9th edition. Juta Academic.

Quadackers, L., T. J. Mock, and S. Maijoor. 1996. Audit Risk and Audit Programmes: Archival Evidence from Four Dutch Audit Firms. *The European Accounting Review* 5 (2): 217-237.

Ramage, J. G., A. M. Krieger, and L. L. Spero. 1979. An Empirical Study of Error Characteristics in Audit Populations. *Journal of Accounting Research* 17 (supplement): 72-102.

Rezaee, Z., A. Sharbatoghlie, R. Elam, and P. McMickle. 2002. Continuous Auditing: Building Automated Auditing Capability. *Auditing: A Journal of Practice & Theory* 21 (1): 147-163.

Seetharaman, A., F. A. Gul, and S. G. Lynn. 2002. Litigation Risk and Audit Fees: Evidence from UK Firms Cross-Listed on US Markets. *Journal of Accounting & Economics* 33 (1): 91–115.

Simunic, D. A. 1980. The Pricing of Audit Services: Theory and Evidence. *Journal of Accounting Research* 18 (1): 161–190.

Simunic, D. A. 1984. Auditing, Consulting and Auditor Independence. *Journal of Accounting Research* 22 (2): 119–148.

Srinidhi, B. N., and M. A. Vasarhelyi. 1986. Auditor Judgment Concerning Establishment of Substantive Tests Based on Internal Control Reliability. *Auditing: A Journal of Practice & Theory* 5 (2): 64–76.

Stein, M. T., D. A. Simunic, and T. B. O'Keefe. 1994. Industry Differences in the Production of Audit Services. *Auditing: A Journal of Practice & Theory* 13 (supplement): 128–142.

Tabor, R. H. 1983. Internal Control Evaluations and Audit Program Revisions: Some Additional Evidence. *Journal of Accounting Research* 21 (1): 348-354.

Trotman, K. T., and R. Wood. 1991. A Meta-Analysis of Studies on Internal Control Judgments. *Journal of Accounting Research* 29 (1): 180-192.

Turner, J. L. 1997. The Impact of Materiality Decisions on Financial Ratios: A Computer Simulation. *Journal of Accounting, Auditing & Finance* 12 (2): 125-147.

Wallace, W. A., and R. W. Kreutzfeldt. 1991. Distinctive Characteristics of Entities with an Internal Audit Department and the Association of the Quality of such Departments with Errors. *Contemporary Accounting Research* 7 (2): 485-512.

Wallace, W. A., and R. W. Kreutzfeldt. 1995. The Relation of Inherent and Control Risks to Audit Adjustments. *Journal of Accounting, Auditing & Finance* 10 (3): 459-483.

Waller, W. S. 1993. Auditors' Assessments of Inherent and Control Risk in Field Settings. *The Accounting Review* 68 (4): 783-803.

Walo, J. C. 1995. The Effect of Client Characteristics on Audit Scope. *Auditing: A Journal of Practice & Theory* 14 (1): 114–124.

Wang, Q., T. J. Wong, and L. Xia. 2008. State Ownership, the Institutional Environment, and Auditor Choice: Evidence from China. *Journal of Accounting & Economics* 46 (1): 112-134.

Willenborg, M. 1999. Empirical Analysis of the Economic Demand for Auditing in the Initial Public Offerings Market. *Journal of Accounting Research* 37 (1): 225–239.

Willingham, J. J., and W. F. Wright. 1985. Financial Statements Errors and Internal Control Judgments. *Auditing: A Journal of Practice & Theory* 5 (1): 57–70.

Winograd, B. N., J. S. Gerson, and B. L. Berlin. 2000. Audit Practices of PricewaterhouseCoopers. *Auditing: A Journal of Practice & Theory* 19 (2): 175–182.

Wright, A., and R. H. Ashton. 1989. Identifying Audit Adjustments with Attention-Directing Procedures. *The Accounting Review* 64 (4): 710-728.

Wright, A. M., and J. C. Bedard. 2000. Decision Processes in Audit Evidential Planning: A Multistage Investigation. *Auditing: A Journal of Practice & Theory* 19 (1): 123–143.

Wright, A., and S. Wright. 1996. The Relationship between Assessments of Internal Control Strength and Error Occurrence, Impact and Cause. *Accounting and Business Research* 27 (1): 58-71.

Wright, S., and A. M. Wright. 1997. The Effect of Industry Experience on Hypothesis Generation and Audit Planning Decisions. *Behavioral Research in Accounting* 9: 273-294.

Zimbelman, M. F. 1997. The Effects of SAS No.82 on Auditors' Attention to Fraud Risk Factors and Audit Planning Decisions. *Journal of Accounting Research* 35 (supplement): 75-97.

APPENDIX A: DATA COLLECTION INSTRUMENT

Data Collection Intrument: Audit Firm 1, Guangzhou Office

Client #1—Manufacturing Firm

Part I Fiscal Year 2007 Audit

Section 1 Background Information

	Year 2007
Total Assets	¥ _____
Total Revenues	¥ _____
What is the posting threshold (¥) to record an item on your audit difference schedule?	¥ _____
Total number (#) of Errors (audit differences) detected during the audit, excluding internal control deficiencies	_____ (# of errors)
Total value (¥) of Errors (audit differences) detected during the audit	¥ _____
--- B/S items	¥ _____
--- I/S items	¥ _____
Total value (¥) of all audit adjustments accepted by client	¥ _____
--- B/S items	¥ _____
--- I/S items	¥ _____
Materiality	¥ _____

Overall client risk assessment (Please circle a number on the scale)	|-----|-----|-----|-----|-----|-----|-----|-----|-----| 1 2 3 4 5 6 7 8 9 **Low Risk** **Medium Risk** **High Risk**
Final audit opinion for this client	
Audit fee charged to this client	¥ _____
Total actual audit hours on this engagement	_____ Hours
Breakdown of actual audit hours:	
-- Partner level (including concurring and/or second partner)	_____ Hours
-- Manager level	_____ Hours
-- Senior level	_____ Hours
-- Junior (<=2 years) level	_____ Hours
-- Tax specialist	_____ Hours
-- IT systems specialist	_____ Hours
-- Other specialist (e.g. valuation)	_____ Hours

Section 2 Five Most Important Audit Differences (in terms of quantitative or qualitative factors) Detected in Fiscal Year 2007 Audit

Please describe the error in more detail, e.g. obsolete inventory not written down to net realizable value (NRV)	List financial statement account involved (e.g. inventory)
Error 1:	
Error 2:	
Error 3:	
Error 4:	
Error 5:	

Book value (of each unadjusted account involved)	Amount of error (value in ¥) and impact on net income: circle (O) if error overstated net income or circle (U) if error understated net income	Value amount (in ¥) of adjustment made	Did the client consult (e.g. inform prior to detection) the audit team about this issue? Please circle one response:	Did the audit team seek consultation on this issue? Please circle one response:
Error 1: ¥ _____	¥ _____ O or U	¥ ____	Yes or No	Yes or No
Error 2: ¥ _____	¥ _____ O or U	¥ _____	Yes or No	Yes or No
Error 3: ¥ _____	¥ _____ O or U	¥ _____	Yes or No	Yes or No
Error 4: ¥ _____	¥ _____ O or U	¥ _____	Yes or No	Yes or No
Error 5: ¥ _____	¥ _____ O or U	¥ _____	Yes or No	Yes or No

Section 3 Auditing Procedures Used in Fiscal Year 2007 Audit

3.1 Auditing procedures for sales and accounts receivable

(1) Risk assessment for sales and accounts receivable (Please rate on the scale):

|----------|----------|----------|----------|----------|----------|----------|----------|
1 2 3 4 5 6 7 8 9

Low Risk **Medium Risk** **High Risk**

(2) Reliance on internal control for sales and accounts receivable (Please circle one):

Yes No

(3) Please provide more details for the five auditing procedures with the most time allocation regarding sales and accounts receivable (in order of amount of actual hours):

Control Tests – Sales and Accounts Receivable

Please describe the procedure in detail (e.g. examine customer purchase orders for credit approval).	Actual Audit Hours For This Procedure
Procedure 1:	____ Hours
Procedure 2 :	____ Hours
Procedure 3:	____ Hours
Procedure 4:	____ Hours

Procedure 5:	____ Hours

Substantive Tests – Sales and Accounts Receivable

Please describe the procedure in detail (e.g. confirm accounts receivable using positive confirmations).	Actual Audit Hours For This Procedure
Procedure 1:	____ Hours
Procedure 2 :	____ Hours
Procedure 3:	____ Hours
Procedure 4:	____ Hours
Procedure 5:	____ Hours

3.2 Auditing procedures for inventory and warehousing

(1) Risk assessment for inventory and warehousing (Please rate on the scale):

|----------|----------|----------|----------|----------|----------|----------|----------|

1 2 3 4 5 6 7 8 9

Low Risk **Medium Risk** **High Risk**

(2) Reliance on internal control for inventory and warehousing (Please circle one):

Yes No

(3) Please provide more details for the five auditing procedures with the most time allocation regarding inventory and warehousing (in order of amount of actual hours):

Control Tests – Inventory and Warehousing

Please describe the procedure in detail (e.g. examine the raw materials storage area to determine whether the inventory is protected from theft and misuse by the existence of a locked storeroom).	Actual Audit Hours For This Procedure
Procedure 1:	____ Hours
Procedure 2 :	____ Hours
Procedure 3:	____ Hours
Procedure 4:	____ Hours

Procedure 5:	____ Hours

Substantive Tests – Inventory and Warehousing

Please describe the procedure in detail (e.g. attending an inventory count).	Actual Audit Hours For This Procedure
Procedure 1:	____ Hours
Procedure 2 :	____ Hours
Procedure 3:	____ Hours
Procedure 4:	____ Hours
Procedure 5:	____ Hours

End. Thank you.

APPENDIX B: INFORMATION SHEET AND CONSENT FORM (FIRM CONTACT)

Error Detection and Resolution in Audit Firms

Information Sheet and Consent Form

Principal Investigator: Karim Jamal, Professor, AMIS, School of Business, University of Alberta, tel. (780) 492-5829

March 1, 2008

You are invited to participate in a study of error detection and resolution in audit firms. The study hopes to use the recent changes in audit regulation to understand how increased auditor effort affects the actual procedures conducted by audit firms, the number and nature of errors (audit differences) identified, and the resolution of those audit differences. We are interested in understanding how consistent audit firms are with each other, documenting the actual number and type of errors experienced by each audit firm, and understanding differences in audit approaches of various audit firms and their impact on identification and resolution of errors.

In this study, we would like you to provide archival data from your office of the firm about actual audit procedures and errors detected during the audit of 15-20 high-risk clients and 15-20 low-risk clients (listed firms or manufacturing firms are preferred). We would like the clients to be selected randomly. The archival data we need includes background information on the client (e.g., total revenues, total assets), errors detected and recorded on the summary of audit differences, adjustments made to financial statements during the audit, and the allocation of audit effort (hours). We do **not** need to know the identity of any of your clients. Please put a code for each client (e.g., Public Company 1) when you provide the data. The identity of your firm will be known only by Le Luo. Le Luo will put a code on all data as coming from Audit Firm 1 (or Audit Firm 2). All data provided by you will be maintained in a locked cabinet maintained by Le Luo. An electronic version of the data will be available only to Karim Jamal, Le

Luo and a small group of researchers working with them to understand auditor judgment and audit quality.

One distinctive feature of the study is that you will be able to get specific feedback about your firm, as well as generalized feedback about industry practices. Your firm will learn the number and types of audit differences identified, and the resolution of those audit differences. Each firm will also receive feedback on the aggregate amount, type, and distribution of errors experienced by the firm.

Aggregate results and excerpts from the study will be published in research paper(s) which will be presented at conferences and published in academic journals, but the name of your firm and your clients will not be associated with any of them. To ensure anonymity, the data from this study will be stored in a locked office, and will contain only an identifier indicating the auditing firm and the corresponding client (e.g., Client 1 of Audit Firm 1) and not any name or any other identifiable label. The measures taken to protect your anonymity, and the judgmental nature of the issues involved, minimize the potential for harm to you from any responses made while participating in this study. While we cannot offer an absolute guarantee of anonymity, we will follow all research safeguards and current best practices in handling research data.

We appreciate that you will take time from your busy schedule to assist us in this study. University of Alberta research ethics guidelines require that your participation be voluntary, and that you should be free to discontinue your participation at any time during the study, without any penalty**.** If you decide to withdraw from the study, you can request to have all your data deleted**.**

If you have any questions or concerns during your participation in this study or at any time subsequently, I would be pleased to answer them. If you have any ethical concerns with regard to this study, please contact the Research Ethics board at the School of Business. Contact information is as follows:

Dr. Karim Jamal
Department of Accounting and MIS
University of Alberta

Phone. (780) 492-5829
e-mail: karim.jamal@ualberta.ca

Mr. Le Luo
Department of Accounting and MIS
University of Alberta
Phone (780) 492-5829
e-mail: ll25@ualberta.ca

Chair, Faculty of Business Research Ethics Board
University of Alberta
Phone. (780) 492-8443
e-mail: researchethicsboard@bus.ualberta.ca

Your signature on this form indicates that you have read this Consent Form, understand the terms of your participation in this study and agree to those terms.

Please sign the form below and mail it to Le Luo, e-mail to ll25@ualberta.ca or fax to (780) 492-3325.

Please keep a copy of this consent form for your records.

Thank you for your participation.

---	---
Name of Participant (please print)	Date
---	---
Signature of Participant	Name of Your Firm