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ORIGINAL RESEARCH

Does office size matter in client acceptance decisions? Evidence from big 4 accounting firms

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Abstract
This study examines whether audit firm office size affects auditors' risk tolerance in making client acceptance decisions. Analyzing publicly traded client portfolios of the Big 4 audit firms from 2003 to 2012, we find that large Big 4 offices are less likely to accept clients with high audit risk. This is particularly true when auditors face temporary capacity constraints arising from the exogenous demand shock by SOX 404 during the post-SOX 404/pre-AS5 period (2003–2007). However, the negative association between office size and risk consideration in client acceptance decisions attenuates when AS5 coupled with the financial recession results in a temporary capacity surplus in the post-AS5/financial crisis period (2008–2012).

Keywords Client acceptance decisions · Office size · Big 4 auditors · Exogenous capacity shock

JEL Classification M42

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1 Introduction

There has been a transformation of the auditing profession since the failures of Enron and Arthur Andersen and the subsequent enactment of the Sarbanes–Oxley Act (SOX) in 2002. Auditors are under greater scrutiny by regulators, media, and investors. The cost of professional liability insurance has also increased because auditors face higher litigation risks.[1] In response to greater scrutiny and higher insurance costs, auditors take measures to mitigate litigation risk and maintain reputation. As such, auditors regularly reassess the risk of their client portfolio and pursue/retain clients with lower risks that provide profitable returns from limited resources (GAO 2006; Kaplan and Williams 2012; Rama and Read 2006). Auditors also require clients to adopt more conservative reporting strategies to reduce their firm's litigation risk (Cahan and Zhang 2006; Krishnan 2007). Additionally, the sudden availability of Arthur Andersen clients and the audit demands created by SOX resulted in a temporary capacity constraint, thereby increasing the cost of misalignment, and creating a unique opportunity for Big N auditors to rebalance their client portfolios (Landsman et al. 2009).

Prior studies indicate that auditors evaluate client risk characteristics when making client portfolio management decisions (Johnstone 2000; Johnstone and Bedard 2004) and change their portfolio management strategies in response to changes in litigation liability (Choi et al. 2004; Francis and Krishnan 2002). Shu (2000) finds that the propensity for dropped clients to be engaged with small audit firms is increasing in litigation risk. Hsieh and Lin (2016) document that partner-level industry specialists, as opposed to firm-level industry specialists, are less likely to accept risky clients, suggesting that individual partners are more conservative than the whole firm. From this perspective, practice offices within the same audit firm may have different risk attitude from individual partners or the whole firm. Considering offices may have variations in their practices and therefore have different risk attitude in accepting clients, we seek to add to the literature in this area by investigating if audit firm office size affects its client acceptance decision.

Recent studies highlight the impact of audit firm office size on audit quality and document that large Big 4 offices provide higher-quality audits because they have more experience, greater knowledge, and better local support networks (Choi et al. 2010; Francis and Yu 2009). Based on these studies, large Big 4 offices might be more likely to accept risky clients because they can mitigate the effect of those risks through high-quality audits. However, other studies argue that questionable audits impair the audit firm office reputation and adversely affect its ability to obtain and retain clients in the local market (Reynolds and Francis 2001). Therefore, whether audit firm office size affects its client acceptance decision is an empirical question.

We examine whether large offices and small offices have different risk preferences in accepting clients. Since various types of clients may be interested in choosing different auditors (Eshleman and Guo 2014; Ettredge et al. 2009), there may be systematic differences in client characteristics between large and small offices. To alleviate this concern, we first use a propensity-score matching approach to match clients in large Big 4 offices with clients in small Big 4 offices based on observable firm characteristics. Then, we model client acceptance decisions as a function of client-specific financial, audit, and litigation

[1] According to Bray (2002), premiums for professional liability insurance have soared in wake of the Enron-Andersen affairs and large firms may face rate increases of more than 100 percent.

risk factors, audit office size, and various controls. Using the matched sample from 2003 to 2012, we find that large Big 4 offices are more conservative in making client acceptance decisions than small offices. Specifically, large Big 4 offices are less likely to accept clients with a higher audit risk than small Big 4 offices. This is consistent with the notion that large auditors face greater losses from an audit failure than smaller auditors do in terms of reputation declines (Jones and Raghunandan 1998). We further consider the impact of exogenous capacity shock arising from changes in regulations or standards such as Sarbanes–Oxley Act Sect. 404 (SOX 404) and Auditing Standard No. 5 (AS5) and the financial recession on client acceptance decisions.[2] Specifically, the increasing audit demand by SOX 404 led to capacity constraints while AS5 together with the financial recession resulted in excess capacity. We find that large offices are less likely to accept risky clients when they face capacity constraints in the post-SOX 404/pre-AS5 period (2003–2007). However, the negative effect of audit firm office size on risk consideration in client acceptance decisions attenuates when auditors have surplus capacity to serve additional clients in the post-AS5/financial crisis period (2008–2012). It suggests that exogenous demand shocks such as SOX 404, AS5, and the financial crisis result in the temporary capacity constraints or surplus for auditors, which might affect auditor's tendency to accept or decline risky clients.

Our study contributes to the literature in the following ways. First, unlike existing studies of client portfolio management decisions that focus on firm-level or partner-level (Shu 2000; Johnstone and Bedard 2004; Hogan and Martin 2009; Hsieh and Lin 2016), this study considers the effect of audit firm office size on risk attitude in making client acceptance decisions. Second, we extend and complement previous studies that focus mostly on the association between office size and audit quality (Choi et al. 2010; Francis et al. 2013; Francis and Yu 2009; Asthana 2017) by examining whether large offices demonstrate different risk preferences in client acceptance decisions compared to small offices. Our findings suggest that office size is an important determinant of risk tolerance in client acceptance decisions, and offices have different risk preferences depending on their sizes even within the same audit firms. Finally, considering that exogenous capacity shocks might affect the relative power of supply and demand in the audit market, we investigate whether the association between client-related risks and client acceptance decisions changes in response to different capacity scenarios.

The remainder of this study proceeds as follows. Section 2 reviews the literature and develops our hypotheses. Section 3 describes our empirical estimation. Section 4 presents empirical results and sensitivity analyses. Section 5 provides conclusions and discusses limitations.

[2] SOX 404 requires management and the external auditor to report on the adequacy of the company's internal control over financial reporting, and thus caused an exogenous shock to the demand for Big 4 audit services. SOX 404 is effective for audits of all accelerated filer clients with fiscal years ending on or after November 15, 2004. The AS5, An Audit of Internal Control over Financial Reporting that is Integrated with an Audit of Financial Statements, was adopted by the PCAOB with the goal of improving the efficiency of integrated audits. The effective date for compliance with AS5 is for fiscal years ending on or after November 15, 2007. The financial recession began in December 2007 and ended June 2009 based on the National Bureau of Economic Research.

2 Literature review and hypothesis development

2.1 Auditor risk attitude toward client portfolio management decisions

Audit firms' client acceptance and continuance policies represent a key element in mitigating litigation and business risk. To ensure that the firm's clients will not present undue risks to the firm, including damage to the firm's reputation, audit firms may develop and maintain policies and procedures related to the acceptance of prospective clients and the continuance of existing clients. Specifically, auditors evaluate financial risk, audit risk, and litigation risk to determine acceptance or continuation of a client engagement, and then adopt risk adaptation strategies such as the use of specialist personnel, higher billing rates, and/or issuing modified opinions during the client risk management process (Asare et al. 2005; Elder et al. 2009; Johnstone 2000; Johnstone and Bedard 2003, 2004).

Moreover, exogenous shocks such as changes in litigation environment, changes in accounting or auditing standards, and the collapse of Arthur Andersen might influence audit firms' client portfolio management decisions. Big N audit firms highlighted the adverse impact of prevalent auditor liability rules on the potential supply of audits to small and risky clients (Arthur Andersen et al. 1992). Such concerns led to the enactment of the Private Securities Litigation Reform Act (PSLRA) of 1995. Relevant studies compare auditor's client portfolios before and after PSLRA 1995 and provide evidence of how Big N audit firms' clientele responded to changes in the U.S. litigation liability environment (Choi et al. 2004; Francis and Krishnan 2002; Jones and Raghunandan 1998). These studies support the idea that Big N auditors change their client management strategy in reaction to changes in potential litigation liability. When litigation liability increases, audit firms tend to be more conservative, and when litigation liability decreases, audit firms are more likely to accept/retain riskier clients.

After PSLRA 1995, the Enron scandal and the subsequent enactment of SOX caused dramatic changes in the audit market. Many Andersen clients were forced to switch to new auditors, sharply increasing demand and causing capacity stress for extant auditors. Auditors re-evaluated client portfolios as a risk management strategy to respond to high litigation risks and to restore reputation in the audit market (Hogan and Martin 2009; Rama and Read 2006; Read et al. 2004). As a result, risky clients are moving down from the Big 4 auditors to second-tier auditors. However, given that second-tier auditors are shedding clients that have increased audit and client business risk characteristics relative to their existing client base, the smallest audit firms likely accept the remining riskier clients (Hogan and Martin 2009). Landsman et al. (2009) suggest that Big N auditors are rebalancing their audit client portfolios in response to post-Enron capacity constraints arising from the sudden availability of Andersen clients and increased audit demands created by SOX. Hsieh and Lin (2016) find that partner-level industry specialists are less likely to accept riskier clients after SOX due to increased litigation risk.

In addition to different litigation environments, changes in standards may also affect an auditor's client portfolio management decisions. Schroeder and Hogan (2013) investigate how Auditing Standard No. 5 (AS5) impacts the market for public client audit services and find that the overall Big 4 public client portfolio has less exposure to audit and auditor business risk, but the percentage of misaligned clients in the portfolio increases during the post-AS5 period.

2.2 Effect of office size on client portfolio management decisions

Auditor practice offices have the responsibility to implement quality control procedures when making client acceptance and continuance decisions. There may be variations in these procedures among practice offices within the same audit firm. In normal circumstances, the engagement partner assesses the information obtained about the client and makes a recommendation about whether a client should be accepted or continued, and then submits the recommendation to the managing partner of the practice office for approval. Only client engagements with unusual conditions require approval by both the practice and national offices (AICPA 2015; Deloitte 2010).

Audit firms set firm-wide risk management policies related to the acceptance and continuance of client relationships and specific engagements to obtain reasonable assurance. Within the context of the firm's quality control policies, practice offices are the primary decision-making units in accounting firms (Francis et al. 1999; Francis and Yu 2009). Each office has its own characteristics (e.g., personnel, quality-control procedures, and industry expertise) and may have different client portfolio management decision-making processes. Hsieh and Lin (2016) indicate that partner-level industry specialists have incentives to protect their reputation, so they are less likely to accept risky clients than non-industry specialists, especially in the post-SOX period.

This study examines whether office size affects the association between risk consideration and client acceptance decisions. Larger offices have more collective experience in administering the audits of public companies and have acquired expertise in detecting material problems in the financial statements of SEC registrants. Auditors working in a large office have more peers to consult and thus have better local support networks (Francis and Yu 2009) whereas small offices are more concerned with the economic importance of a particular client and are more likely to compromise with a particular client (Choi et al. 2010). Recent studies investigate whether practice office size is a determinant of audit quality and provide evidence that Big 4 office size is positively associated with audit quality (Choi et al. 2010; Francis and Yu 2009; Francis et al. 2013). Specifically, large Big 4 offices are more likely to issue going-concern reports, and their clients are less likely to have aggressively managed earnings (Choi et al. 2010; Francis and Yu 2009). Small Big 4 offices result in more client restatements (Francis et al. 2013). Francis and Michas (2013) provide evidence that the contagion effect does not exist in the largest offices because larger offices perform higher-quality audits. From the above discussion, large offices of Big 4 auditors are more competent and therefore expected to mitigate the effect of risk on client portfolio management decisions by providing high audit quality.

In contrast, as described earlier, questionable audits impair a firm's office reputation and adversely affect the ability to obtain and retain clients in local markets (Reynolds and Francis 2001). Extending the argument of Jones and Raghunandan (1998) to the office level, large practice offices may be more risk averse because they have more to lose from an audit failure than smaller practice offices do regarding negative reputation consequences. Also, since larger offices are subject to lower economic dependence on any one client, they might not accept a risky client due to fee pressure, and therefore have better client portfolio management. Given these two opposing perspectives on the effect of audit firm office size on the relationship between risk and client portfolio management decisions, it is an empirical question whether and how the office size affects risk consideration and thus influences client acceptance decisions. Accordingly, we develop the following hypothesis:

H1 Office size affects the association between risk consideration and client acceptance decisions.

2.3 Effect of exogenous capacity shocks

The audit market has undergone dramatic changes in standards and regulations such as SOX 404, AS5 and the financial crisis. Specifically, SOX 404 requires management and the external auditor to report on the adequacy of the company's internal control over financial reporting, and thus have caused an exogenous shock to the demand for Big 4 audit services. Specifically, prior studies find that audit fees significantly increased after SOX 404 (Raghunandan and Rama 2006) and that Big 4 firms dropped clients that were not aligned with their shift in portfolio strategy towards larger clients subject to SOX 404 (Landsman et al. 2009). Since auditors face capacity constraints arising from the enactment of SOX 404, we expect that large audit offices might have more flexibility to choose clients and therefore are less likely to accept risky clients.

AS5, An Audit of Internal Control over Financial Reporting integrated with an Audit of Financial Statements, was adopted by the PCAOB with the goal of improving the efficiency of integrated audits. The increased efficiencies associated with AS5 reduce the total hours necessary to perform an integrated audit, resulting in a surplus capacity to serve additional clients as well as a reduction of current and future audit fee revenue (Krishnan et al. 2011; Schroeder and Hogan 2013). During a financial crisis, although business failure might increase engagement hours during the recession, audit firms might face excess capacity to the extent that existing clients went bankrupt or downsized. In addition, audit firms might face heightening fee pressure because their existing clients have tight profit margins. Further, many clients sought to reduce audit fees by engaging a non-Big 4 audit firm rather than paying higher fees to a Big 4 firm (Reason 2010; Schroeder and Hogan 2013). For example, Schroeder and Hogan (2013) demonstrate a continuing net loss of clients that switched from Big 4 auditors to non-Big 4 auditors in the recession period. Therefore, AS5 together with the recent economic recession resulted in fee pressure and capacity surplus for Big 4 firms. Thus, we predict the effect of office size on the association between risk consideration and client acceptance decisions will change after AS5.[3]

Different from recent studies on the capacity effects (Bills et al. 2016; Francis et al. 2017), we investigate whether these exogenous shocks stemming from SOX 404, AS5, and the financial crisis affect the relationship between audit firm office size and risk consideration in client acceptance decisions.[4] These exogenous shocks result in the temporary capacity constraints or surplus for audit firms, and therefore might change the relative power of supply and demand in the audit market. Specifically, we expect that large offices are less likely to accept risky clients when they face capacity constraints in the post-SOX 404/pre-AS5 period (2003–2007). However, the negative effect of audit firm office size on the association between risk consideration and client acceptance becomes weaker when they have

[3] As Schroeder and Hogan (2013) indicate, it is difficult to disentangle the impacts of AS5 from those of the economic recession, as both alter the auditor's relationships with existing clients and influence client acceptance and retention decisions.

[4] Audit offices that experience high levels of recent growth measured by increase in audit fees and offices that gain major industry clients will encounter temporary capacity constraint and thus impair office-level audit quality (Bills et al. 2016; Francis et al. 2017).

surplus capacity in the post-AS5/financial recession period (2008–2012). We, therefore, develop the following hypothesis:

H2 The effect of audit firm office size on the association between risk consideration and client acceptance decisions differs in response to changes in capacity stemming from the exogenous shocks.

3 Empirical estimation

Audit engagement is jointly determined by clients and auditors.[5] Our study focuses on how auditors manage their client acceptance decisions, but clients also select auditors. Large offices have their risk preferences in accepting clients while clients may make their own decisions in choosing auditors. Some clients voluntarily switch auditors to pursue better audit quality or alignment (Johnson and Lys 1990; Landsman et al. 2009; Mande and Son 2013; Shu 2000) while other clients change auditors for opportunistic reasons such as opinion shopping (Lennox 2000; Newton et al. 2016). To alleviate the concern that large offices and small offices might attract different types of clients, we first use a propensity-score matching approach to match clients in large Big 4 offices with clients in small Big 4 offices based on observable firm characteristics. This approach attempts to alleviate concerns that systematic differences in client characteristics explain the results. We, therefore, model the choice of auditors (large offices versus small offices) using the following logistic regression:

$$OFSIZE = \beta_0 + \beta_1 SIZE_t + \beta_2 CURR_t + \beta_3 LEV_t + \beta_4 ROA_t + \sum \text{CONTROLS} \quad (1)$$

where *OFSIZE*, refers to whether clients are audited by auditors in large or small offices and is coded one for Big 4 offices that are the largest quartile of Big 4 office sizes calculated as the total dollar amount of audit fees charged to all audit clients within an auditor office, and zero for the other 75 percent of Big 4 offices (Francis and Michas 2013). Since larger clients tend to select larger offices and larger offices tend to prefer larger clients, we include *SIZE* to proxy for the firm size. In addition, we follow Lawrence et al. (2011) to include the current ratio (*CURR*) and firm leverage (*LEV*) to control for the financial distress of the clients, and return on assets (*ROA*) to control for the client's return on assets. *SIZE* refers to natural logarithm of total assets. *CURR* is measured as current assets divided by current liabilities. *LEV* equals total debt divided by total assets. *ROA* refers to income before extraordinary items divided by total assets. Consistent with Lawrence et al. (2011), we include all control variables used in the main regression model below in Eq. (2). We match observations from large Big 4 offices to the observations of small Big 4 offices with the propensity score. The propensity score is matched without replacement and imposed

[5] Except for using private data as Johnstone and Bedard (2003, 2004), it is difficult to control for the demand side effect. Prior studies of client portfolio management using public data suffer from similar limitations (Hogan and Martin 2009; Hsieh and Lin 2016; Schroeder and Hogan 2013).

a caliper distance of 0.01.[6] We then test our hypotheses on the resulting matched-pairs sample.

3.1 Model of the client acceptance decision

We specify the logistic regression model below to examine the effect of audit firm office size on risk attitude when making client acceptance decisions. The interactions of these risks with office size form the basis for hypothesis testing.

$$\begin{aligned} NEW =& \beta_0 + \beta_1 FINR_t + \beta_2 AUDR_t + \beta_3 OFSIZE_t + \beta_4 OFSIZE_t \times FINR_t + \beta_5 OFSIZE_t \times AUDR_t \\ &+ \beta_6 BUSY_t + \beta_7 MAJORGAIN_t + \beta_8 OFSIZEGROWTH_t + \beta_9 LIT_t + \beta_{10} SIZE_t \\ &+ \beta_{11} ABFEE_t + \beta_{12} ABFEE_t \times OFSIZE_t + \beta_{13} SPEC_t + \beta_{14} SPEC_t \times FINR_t + \beta_{15} SPEC_t \times AUDR_t \\ &+ \beta_{16} LOCAL_t + \beta_{17} LOCAL_t \times FINR_t + \beta_{18} LOCAL_t \times AUDR_t \end{aligned} \tag{2}$$

where *NEW* equals one for clients who dismissed their prior auditors and became newly accepted by Big 4 audit firms in year t, and zero when clients are continuingly audited by the same Big 4 audit firms in year t.[7] While auditors consider accepting new clients from a pool of available prospective clients, auditors not only consider how the potential clients compare with each other, but also how potential clients compare with their existing client portfolio (Johnstone and Bedard 2004). Since it is difficult to obtain data on potential new clients screened out by Big 4 auditors in client acceptance decisions, we use continuing clients as a benchmark as do in Johnstone and Bedard (2004), Hogan and Martin (2009), and Hsieh and Lin (2016).

We measure client risk characteristics using *FINR* and *AUDR*. Financial risk (*FINR)* is the risk that the client economic conditions will deteriorate in either the short or long-term (Johnstone 2000). Specifically, we consider returns on assets (*ROA*), whether companies suffer loss (*LOSS*), ratio of debt (*LEV*), and cash (*CASH*) based on Landsman et al. (2009) as our financial risk measures. We then construct *FINR* as the first principal component from a factor analysis using these risk measures (Landsman et al. 2009).[8]

Audit risk (*AUDR*) is the risk that the auditor may unknowingly fail to appropriately modify her opinion on financial statements that are materially misstated (Johnstone 2000). Following prior studies (e.g., Hogan and Martin 2009; Landsman et al. 2009; Schroeder and Hogan 2013), we include sales growth (*GROWTH*), the ratio of account receivables and inventories to total assets (*INVREC*), absolute values of discretionary accruals (*ABS-DACC*) estimated using the performance-adjusted modified Jones model (Kothari et al.

[6] Shipman et al. (2017) suggest that imposing a caliper distance, which restricts the distance between propensity scores for a successful match, is a best way to decrease the likelihood of poor matches. We also re-perform the match using a caliper distance of 0.03 which is a commonly used caliper distance in accounting research, and the main results remain unchanged.

[7] We use the information on auditor changes (dismissal or resignation) provided by Audit Analytics database.

[8] The factor analysis indicates that there are two factors with an eigenvalue greater than 1. We use the factor with the greatest eigenvalue for each set of variables. The factor loadings of the risk measure *ROA*, *LOSS*, *LEV*, and *CASH* are − 0.0937, 0.7017, 0.0819, and 0.7015, respectively. As expected, *FINR* decreases with *ROA* and increases with *LOSS* and *LEV*. Despite an unexpected positive correlation between *CASH* and *FINR*, the findings for the other variables suggest that the increases in *FINR* are consistent with greater financial risk.

2005),[9] whether auditors issued modified opinions (*MODOP*), whether auditors issue going-concern opinions (*GC*), and the tenure of the auditor–client relationship (*TENURE*) based on Landsman et al. (2009) as our audit risk measures. We again construct *AUDR* as the first principal component from a factor analysis using these risk measures (Landsman et al. 2009).[10]

OFSIZE is coded one for large Big 4 offices, and zero for small Big 4 offices. We create interaction terms between risk factors and *OFSIZE* to evaluate H1. We include *BUSY*, *MAJORGAIN*, *OFSIZEGROWTH*, *LIT*, *SIZE*, *ABFEE*, *SPEC*, and *LOCAL* as control variables. The variables *BUSY*, *MAJORGAIN*, and *OFSIZEGROWTH* are included to capture auditor's capacity constraints. *BUSY* equals one if clients are calendar year companies and zero otherwise. Busy season clients have an impact on the resources of the firm, so we expect *BUSY* to be negatively related to client acceptance likelihood (López et al. 2008). *MAJORGAIN* equals one if the auditor gains a major industry client in the prior year, and zero otherwise. A major industry client is defined as a firm in the top 30 percent of each industry based on total assets for that year (Francis et al. 2017). Following a major client gain, an office may experience short-term capacity constraints that might negatively impact the likelihood of future client acceptance. However, Big 4 offices that gain a major industry client experience a positive reputation shock, leading to more same-industry client gains during the following years (Francis et al. 2017). Therefore, we do not have directional predictions for *MAJORGAIN*. *OFSIZEGROWTH* refers to the percentage change in audit fees for the prior year (Bills et al. 2016). Since the significant recent growth might temporarily stress office resources, we expect that office growth is negatively related to client acceptance likelihood. *LIT* equals one if clients are in one of these litigious industries, and zero otherwise.[11] *SIZE* refers to the natural logarithm of total assets. Client size is another measure of auditor business risk, so we expect that large clients decrease the client acceptance likelihood (Hogan and Martin 2009). Furthermore, auditors are reportedly responding to changes in the audit market by vigorously pursuing and retaining clients with low risks that provide profitable returns on the firm's limited resources (GAO 2006). As documented by Johnstone and Bedard (2003), auditors charge higher audit fees as a risk management strategy to moderate the effect of risk in client engagements. Therefore, we also include *ABFEE*, abnormal audit fees, in our regression models.[12] We predict that abnormal audit fees are positively correlated with the likelihood of client acceptance (Johnstone and Bedard 2003). Thus, we create an interaction term between abnormal audit fees and office size

[9] $\frac{TACC_t}{TA_t} = \beta_1 \frac{1}{TA_t} + \beta_2 \frac{\Delta REV_t - \Delta REC_t}{TA_t} + \beta_3 \frac{PPE_t}{TA_t} + \beta_4 ROA + \varepsilon_t$

[10] The factor analysis indicates that there are three factors with an eigenvalue greater than 1. We use the factor with the greatest eigenvalue for each set of variables. The factor loadings of the risk measure *GROWTH*, *ABSDACC*, *INVREC*, *GC*, *MODOP*, and *TENURE* are 0.3372, 0.6769, 0.0803, 0.4161, -0.1416, and -0.4779, respectively.

[11] Following Francis et al. (1994), we classify the following industries as litigious: bio-technology (SIC codes 2833–2836 and 8731–8734), computer hardware (SIC codes 3570–3577), electronics (SIC codes 3600–3674), retailing (SIC codes 5200–5961), and computer software (SIC codes 7370–7374).

[12] According to extant studies (Francis et al. 2005; Cassell, Giroux, Myers, and Omer 2012), we specify the following audit fee model for estimation by year: $FEE = \beta_0 + \beta_1 SIZE + \beta_2 INVREC + \beta_3 LEV + \beta_4 ROA + \beta_5 SEG + \beta_6 MAO + \beta_7 INDUSTRY + \varepsilon$ where *FEE* is the natural logarithm of total audit fees, *SIZE* is the natural logarithm of total assets, *INVREC* is inventory and receivables divided by total assets, *LEV* is total liabilities divided by total assets, *ROA* is return on assets, *SEG* is the natural logarithm of the number of business segments, *MAO* is one if auditor issue modified opinions for anything, and zero for unqualified opinions, and *INDUSTRY* is 2-digit SIC code industry dummy variables. Then, abnormal audit fees are estimated as the residual from this model.

to capture whether the sensitivity of audit fees and acceptance decision is different between large and small audit offices.[13] *SPEC* refers to whether the auditor is a city-level industry specialist. We use auditor market share as a proxy for industry specialization. Market share is calculated by audit fees earned by an auditor in an industry as a proportion of the total audit fees earned by all auditors serving in that specific industry (e.g., Cenker and Nagy 2008; Francis et al. 2005). Consistent with Francis et al. (2005), *SPEC* is measured based on the highest market share of audit fees within a city-industry combination. City is classified by the metropolitan statistical area (MSA) as defined by the U.S. Census Bureau Office of Management and Budget. Industry is defined by the two-digit SIC classification. Then, we create interaction terms between risk factors and *SPEC*. *LOCAL* refers to whether the auditor is a local auditor. *LOCAL* equals two if the client's headquarter and the auditor's practice office are located in the same city, one if the client's headquarters and the auditor's practice office are located in the same state but different cities, and zero if the client's headquarter and the auditor's practice office are located in different states. Then, we create interaction terms between risk factors and *LOCAL*. In addition, we include year, industry, and city fixed effects in the regression model. Fiscal year and industry fixed effects control for the idiosyncratic effects of time and a firm's industry characteristics. Moreover, client characteristics might be different among cities. For example, most large companies are likely to be headquartered in large cities and therefore select auditors nearby. Therefore, we try to control for systematic differences in clients' and auditors' characteristics across cities by including the city fixed effect.

3.2 Sample

Our sample is restricted to Big 4 clients. Since our focus of H2 is to examine the effect of capacity constraints/surplus arising from the exogenous shocks by SOX 404, AS5 and the financial recession, the sample period spanning from 2003 to 2012 enables us to have both five years before and after the AS5 adoption.[14] Our initial sample includes 29,899 non-financial domestic Big 4 clients for which the data on audit fees and MSAs are available from the Audit Analytics database.[15] We first delete 3635 observations that do not appear in Compustat. Next, we require a minimum of two observations per city-industry-year combination by deleting 4456 observations to avoid the determination of city-specific specialists with too few observations (Francis et al. 2005). Then we exclude 5275 observations with insufficient data to calculate the variables used in the regression. Conducting these selection procedures leaves us a primary sample of 16,533 firm-year observations. Then, we perform the propensity-score matching procedure and get a final matched sample of 9446 firm-year observations. Table 1 summarizes the sample selection process.

[13] We thank for the reviewer's suggestion.

[14] We extend our sample period to 2015 to reexamine H1 which is not restricted to the specific period. As we described in footnote 18, the main results remained qualitatively unchanged.

[15] According to U.S. Census Bureau, a MSA has one or more counties or county equivalents that have at least one urban core area of at least 50,000 populations which adjacent territory has a high degree of social and economic integration with the core as measured by commuting ties. We exclude observations without MSA codes because it is problematic to calculate city-level auditor industry expertise for those firms.

4 Empirical results

4.1 Descriptive statistics

Tables 2, 3 and 4 present the descriptive statistics.[16] Table 2 provides information regarding the dynamics of Big 4 clients. Panel A presents the client dynamics of Big 4 audit firms by showing clients in two sub-portfolios (new and continuing clients). Big 4 auditors, on average, have approximately two percent (=305/16,228) of new clients who dismissed their predecessor auditors and switched to successor Big 4 auditors during our sample period. The number of clients audited by Big 4 auditors dropped from 2299 in 2003 to 1310 in 2012. This reduction is consistent with the finding of Schroeder and Hogan (2013) that Big 4 auditors focused on reducing risk in their client portfolios which resulted in a low concentration of clients at the Big 4 firm level. Many clients of Big 4 audit firms switched downward to second-tier firms or small firms.[17] Panels B and C of Table 2 present the sources of new Big 4 clients. Panel B shows that among 305 new Big 4 clients in Panel A, there are 239 clients switching among Big 4 auditors and 66 new clients switching upwardly. Panel C indicates that among 239 new clients switching laterally, there are 141 clients switching from large offices and 164 switching from small offices.

Table 3 provides descriptive statistics of Big 4 audit firm office size measured by total audit fees. Office size varies enormously between large and small offices. Specifically, Big 4 offices that are the largest quartile of office sizes receives $21,200,000 to $45,500,000 in audit fees annually on average. However, small offices in the least quartile of size receives $2,647,180 to $6,195,648 in audit fees on average. Practice offices of various sizes have different experience, knowledge, local support networks, and economic dependencies on specific clients. Therefore, it is reasonable to examine client acceptance decisions in terms of Big 4 audit firm office size.

Panel A of Table 4 presents the descriptive statistics for matched sample. Using Eq. (1) to calculate the propensity scores, we obtain a propensity-score matched sample of 9446 firm-years, of which 4723 are clients audited by large Big 4 offices and 4723 are clients audited by small Big 4 offices. After the propensity matching procedure, there is no significant difference in risk attributes (*FINR* and *AUDR*) between clients in large offices and small offices.[18] Among all control variables, there are no significant differences in means between the two groups. Finally, none of the variance inflation factors on any of the variables exceeds five (untabulated), below the threshold value of 10 suggested by Kennedy (1992). Panel B of Table 4 presents statistics comparing differences in mean values for new

[16] To provide a full view of the audit market, Tables 2 and 3 include a sample of 16,533 firm-year observations before the propensity matching procedure.

[17] Another possible explanation for the largest reduction of Big 4 clients in 2005 is that many companies go private after the passage of SOX (Engel et al. 2007).

[18] Before the propensity matching procedure, clients audited by large Big 4 audit offices have significantly higher financial risk than clients audited by small Big 4 offices (mean value of *FINR* for large offices = − 0.1646, mean value of *FINR* for small office = − 0.2961, *p*-value from a test of difference in means across large offices and small offices = 0.000). Large Big 4 offices have clients with significantly lower audit risk compared to small offices (mean value of *AUDR* for large offices = − 0.1998, mean value of *AUDR* for small office = − 0.1630, *p*-value from a test of difference in means across large offices and small offices = 0.000). Therefore, the propensity score model seems effective in forming a matched sample, so there are no significant differences in risk attributes between clients in large offices and small offices after the matching procedure.

Table 1 Sample selection criteria

Domestic nonfinancial Big 4 clients from Audit Analytics with positive audit fees, with MSA codes, with SIC codes for the period 2003–2012	29,899
Delete: Number of observations not in Compustat	3635
Delete: City-industry-fiscal year combinations less than 2 observations	4456
Delete: observations with missing data	5275
Delete: observations lost due to the propensity matching procedure	7087
Final matched sample	9446

This table presents the sample selection process. The sample includes nonfinancial listed companies audited by Big 4 audit firms from 2003 to 2012. The full sample consists of 9446 observations

Table 2 Dynamics of Big 4 clients

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Panel A: Client dynamics of Big 4 audit firms											
New	42	32	32	43	23	30	32	29	18	24	305
Continuing	2257	2120	1854	1693	1560	1438	1393	1332	1295	1286	16,228
Panel B: Source of Big 4 new clients (Big 4 vs. non-Big 4)											
From Big 4	39	28	28	36	16	26	21	20	9	16	239
From non-Big 4	3	4	4	7	7	4	11	9	9	8	66
Panel C: Source of Big 4 new clients (large offices vs. small offices)											
From large offices	14	13	19	26	11	18	14	9	5	12	141
From small offices	28	19	13	17	12	12	18	20	13	12	164

This table provides information regarding the dynamics of the audit market from 2003 to 2012. Panel A shows the client dynamics of Big 4 audit firms, including total number of new clients and total number of continuing clients. Panels B and C presents the new clients that are switching from Big 4 auditors, non-Big 4 auditors, large offices, and small offices

Table 3 Descriptive statistics of Big 4 office size (in thousands)

	Total	Mean	SD	Q1	Median	Q3
EY	720	28,700	41,000	6196	13,600	32,100
DT	654	30,300	52,600	2937	14,100	39,000
KPMG	736	20,800	38,800	2647	6321	21,200
PWC	637	41,200	81,700	5619	13,900	45,500

This table provides the descriptive statistics of office size measured by total audit fees for each Big 4 audit firm separately from 2003 to 2012. Total refers to the total number of office-year observations of each Big 4 audit firm

Table 4 Descriptive statistics of regression variables

Variable	Large offices Means (n = 4723)	Small offices Means (n = 4723)	t-test Diff *p*-value
Panel A: Descriptive statistics for matched sample			
NEW	0.019	0.019	1.000
FINR	− 0.172	− 0.162	0.644
AUDR	− 0.183	− 0.176	0.594
BUSY	0.707	0.714	0.482
MAJORGAIN	0.016	0.016	0.935
OFSIZEGROWTH	0.369	0.367	0.953
LIT	0.371	0.377	0.538
SIZE	6.044	6.027	0.674
ABFEE	0.038	0.048	0.371
SPEC	0.539	0.540	0.951
LOCAL	1.232	1.228	0.723
Variable	New clients Means (n = 178)	Continuing clients Means (n = 9268)	t-test Diff *p*-value
Panel B: Mean comparison of new clients versus continuing clients			
FINR	0.079	− 0.172	0.002
AUDR	0.560	− 0.194	0.000
OFSIZE	0.500	0.500	1.000
BUSY	0.865	0.707	0.000
MAJORGAIN	0.034	0.016	0.057
OFSIZEGROWTH	0.516	0.365	0.179
LIT	0.410	0.374	0.318
SIZE	5.558	6.044	0.002
ABFEE	0.062	0.042	0.624
SPEC	0.388	0.542	0.000
LOCAL	1.146	1.232	0.090
Variable	Mean	SD	Median
Panel C: Descriptive statistics for financial risk factors			
ROA	− 0.022	0.243	0.031
LOSS	0.320	0.467	0.000
LEV	0.201	0.255	0.137
CASH	0.229	0.242	0.141
Panel D: Descriptive statistics for audit risk factors			
GROWTH	0.191	0.715	0.089
ABSDACC	− 0.028	0.158	− 0.026
INVREC	0.222	0.171	0.188
GC	0.001	0.037	0.000
MODOP	0.454	0.498	0.000
TENURE	5.770	2.993	5.000

This table reports descriptive statistics. Panel A represents the descriptive statistics of all variables used in our regressions. Panel B compares differences in mean values for new and continuing clients. Panels C and D show the descriptive statistics of financial risk factors and audit risk factors. The sample consists of 9446 observations. All variables are defined in "Appendix"

*,**,*** Indicate significance levels of 0.10, 0.05, and 0.01, respectively, using two-tailed tests

and continuing clients. There are 178 new clients and 9268 continuing clients in our sample period.[19] New clients have significantly higher financial and audit risk than continuing clients (*FINR*, $p=0.002$; *AUDR*, $p=0.000$). Panel C of Table 4 demonstrates the descriptive statistics of the financial risk factors. The average return on assets (*ROA*) is − 0.022. 32 percent of clients have poor performance (*LOSS*). The average debt ratio (*LEV*) is 0.201. The mean value of *CASH* is 0.229. Panel D presents the descriptive statistics of the audit risk factors. The average client growth rate (*GROWTH*) is 19.1 percent. The mean value of ratio of accounts receivable and inventory to total assets, *INVREC*, is 0.222. The mean value of absolute value of discretionary accruals, *ABSDACC*, is − 0.028. On average, 45.4 percent of clients receive modified opinions (*MODOP*) and 0.1 percent of clients receive going-concern opinions (*GC*). The averaged tenure (*TENURE*) is 5.770.

4.2 Logistic regression results

Table 5 shows the logistic regression results from analyzing the effect of audit firm office size on risk consideration in making client acceptance decisions. All reported t-statistics therein are corrected for heteroscedasticity and serial correlations by using the White standard errors and the firm-level clustering procedure, respectively. As indicated in column (1), the financial risk of new clients is similar to that of continuing clients. However, new clients have a higher audit risk than existing clients which is consistent with Schroeder and Hogan (2013). The coefficient on *OFSIZE* is negative but insignificant (coefficient = − 0.1347, $p=0.601$), suggesting that there is not difference in likelihood in accepting clients between large offices and small offices. The coefficient on *OFSIZE* × *FINR* is insignificantly positive (coefficient = 0.0926, $p=0.583$) while the coefficient on *OFSIZE* × *AUDR* is significantly negative (coefficient = − 0.8533, $p=0.001$). It is consistent with that audit risk might be more important than financial risk in client portfolio management (Johnstone and Bedard 2004). This result that large offices are less likely to accept clients with higher audit risk than small offices, supporting H1 and is consistent with the finding of Jones and Raghunandan (1998) that large auditors are risk averse because they have more to lose in terms of reputation.

To evaluate H2, we further divide our full sample into two periods: post-SOX 404/pre-AS5 period (2003–2007) and post-AS5/financial crisis period (2008–2012). The results in column (2) indicate the coefficient on *OFSIZE* × *FINR* is significantly positive (coefficient = 0.4072, $p=0.059$) and the coefficient on *OFSIZE* × *AUDR* is significantly negative (coefficient = − 1.3292, $p=0.000$) in the post-SOX404/pre AS5 period. The increasing audit demand by SOX 404 resulted in capacity constraints so that auditors might be more selective of their clients. Since SOX 404 focuses on the effectiveness of internal control over financial reporting, auditors might put more emphasis on internal control deficiencies which is an important factor of audit risk. Therefore, large offices are less likely to accept clients with a higher audit risk. On the other hand, in response to such increasing demand, audit firms may have to adjust their client portfolio management strategy by increasing more clients. To balance the client portfolio risk, large Big 4 offices may be more likely to take clients with higher financial risk in the post-SOX 404/pre-AS5 period. However, the effect of audit firm office size on risk consideration in client acceptance

[19] For new client observations, there are 140 observations switching between Big 4 audit firms and 38 observations switching from non-Big 4 audit firms to Big 4 audit firms.

Table 5 Logistic regression results of relating newly accepted clients to contextual variables for Big 4 audit firms

Variables	(1) Full Sample	(2) Post-SOX 404/Pre-AS5 Period	(3) Post-AS5/Financial Crisis Period
FINR	− 0.0895	− 0.5232*	0.3205
	[0.644]	[0.068]	[0.305]
AUDR	1.3740***	1.8912***	1.3594***
	[0.000]	[0.000]	[0.001]
OFSIZE	− 0.1347	0.1226	− 0.2364
	[0.601]	[0.741]	[0.609]
OFSIZE × FINR	0.0926	0.4072*	− 0.3991
	[0.583]	[0.059]	[0.223]
OFSIZE × AUDR	− 0.8533***	− 1.3292***	− 0.7630
	[0.001]	[0.000]	[0.188]
BUSY	0.9542***	0.7833***	1.2281**
	[0.000]	[0.010]	[0.016]
MAJORGAIN	0.4807	0.6014	− 0.6121
	[0.283]	[0.286]	[0.538]
OFSIZEGROWTH	0.0385	0.0300	− 0.1073
	[0.217]	[0.370]	[0.847]
LIT	0.0978	0.2695	− 0.1543
	[0.746]	[0.542]	[0.760]
SIZE	0.0356	0.1528**	− 0.1421
	[0.517]	[0.027]	[0.114]
ABFEE	− 0.1949	− 0.0248	− 0.7158
	[0.513]	[0.951]	[0.124]
ABFEE × OFSIZE	− 0.2289	0.0468	− 0.5346
	[0.537]	[0.923]	[0.429]
SPEC	− 0.4413**	− 0.5419**	− 0.2614
	[0.014]	[0.027]	[0.397]
SPEC × FINR	0.0660	0.2260	− 0.1919
	[0.686]	[0.271]	[0.567]
SPEC × AUDR	− 0.4419*	− 0.4781**	− 0.1890
	[0.098]	[0.034]	[0.807]
LOCAL	− 0.1441	− 0.1349	− 0.1333
	[0.249]	[0.479]	[0.510]
LOCAL × FINR	0.0538	0.2651	− 0.1877
	[0.680]	[0.133]	[0.440]
LOCAL × AUDR	0.4379***	0.3081*	1.1123***
	[0.006]	[0.071]	[0.000]
Constant	− 3.7023**	− 7.2328***	− 1.2152
	[0.031]	[0.000]	[0.385]
Observations	9446	5750	3696
Pseudo R-squared	0.1698	0.1608	0.3233

This table presents the estimates from the logistic regression of Big 4 audit firms' client acceptance decisions with Huber–White standard errors to correct for heteroskedasticity (*p*-values in parentheses). The models control for year, industry, and city fixed effects. The two-tailed *p*-values are calculated based on standard errors clustered by firm. All variables are defined in "Appendix". *·**·*** indicate significance at 10%, 5% and 1% levels, respectively, using two-tailed tests

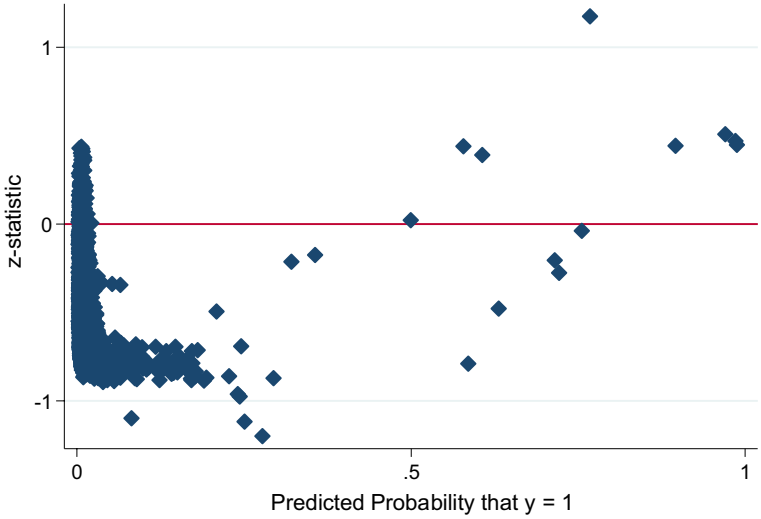

Fig. 1 z-statistics for *OFSIZE* × *AUDR* Interaction Effect Using the Full Sample Period (2003–2012). This Figure illustrates the interaction effect (*OFSIZE* × *AUDR*) z-statistics for each observation in the regression model by using the full sample period (2003–2012). We graphically examine the interaction effect of the individual sample observations according to Norton et al. (2004) and Keune and Johnstone (2012). The plots show that the mean interaction effect (*OFSIZE* × *AUDR*) is negative

decisions is weaker when auditors have excess capacity in the post-AS5/financial crisis period (*OFSIZE* × *AUDR*, coefficient = − 0.7630, $p = 0.188$). This suggests that the enactment of AS5 and the financial crisis caused excess capacity to serve additional clients and reduction of current and future audit fee revenue so that audit firms might be pressured to pursuit new clients. Collectively, our results suggest that exogenous capacity shocks such as SOX 404, AS5, and the financial recession are important factors affecting large offices' risk attitude in making client acceptance decisions.

Notably, Ai and Norton (2003) and Greene (2010) mention that the coefficient on an interaction term is the partial interaction, such that its significance should not be interpreted as necessarily indicative of the presence or absence of an interaction effect. To better understand interaction effects, we graphically examine the interaction effect of the individual sample observations according to Norton et al. (2004) and Keune and Johnstone (2012). Figure 1 illustrates the interaction effect (*OFSIZE* × *AUDR*) z-statistics for each observation in the regression model by using the full sample period (2003–2012). The plots show that the mean interaction effect (*OFSIZE* × *AUDR*) is negative. Similarly, Fig. 2 illustrates the interaction effect (*OFSIZE* × *AUDR*) z-statistics for each observation in the regression model by using the post-SOX 404/pre-AS5 (2003–2007). The plots also show that the mean interaction effect (*OFSIZE* × *AUDR*) is negative. Overall, for most observations, the interaction effect is negative while for some observations, the interaction effect is positive. It is also important to understand the economic significance of interactions (Greene 2010; Keune and Johnstone 2012). Therefore, we interpret an interaction effect as the change in the distance between the two sets of predicted probabilities as Greene (2010) suggested. Specifically, untabulated results demonstrate that the change increasing *OFSIZE*, a dummy variable, from zero to one will decrease 16 percent of averaged *NEW* values. This is also consistent with the presence of a negative *OFSIZE* × *AUDR* interaction.

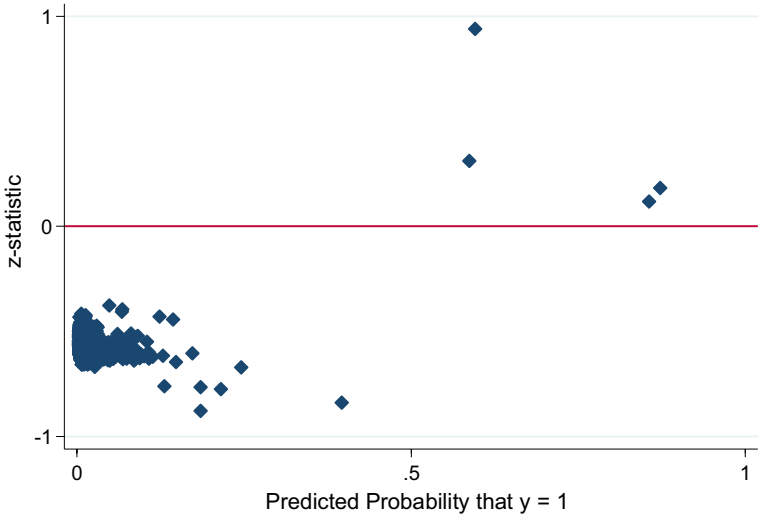

Fig. 2 z-statistics for *OFSIZE* × *AUDR* Interaction Effect Using the Subsample Period (2003–2007). This Figure illustrates the interaction effect (*OFSIZE* × *AUDR*) z-statistics for each observation in the regression model by using the post-SOX 404/pre-AS5 (2003–2007). We graphically examine the interaction effect of the individual sample observations according to Norton et al. (2004) and Keune and Johnstone (2012). The plots also show that the mean interaction effect (*OFSIZE* × *AUDR*) is negative

4.3 Additional tests

4.3.1 Continuing clients versus discontinued clients

Since audit firm's client portfolio management include client acceptance decisions and client retention decisions, it is important to investigate whether larger audit offices are more likely to shed riskier clients to protect their reputation. Therefore, we estimate the following logistic regression to compare continuing clients with discontinued clients.

$$\begin{aligned} CON =& \beta_0 + \beta_1 FINR_t + \beta_2 AUDR_t + \beta_3 OFSIZE_t + \beta_4 OFSIZE_t \times FINR_t + \beta_5 OFSIZE_t \times AUDR_t \\ &+ \beta_6 BUSY_t + \beta_7 MAJORGAIN_t + \beta_8 OFSIZEGROWTH_t + \beta_9 LIT_t + \beta_{10} SIZE_t \\ &+ \beta_{11} ABFEE_t + \beta_{12} ABFEE_t \times OFSIZE_t + \beta_{13} SPEC_t + \beta_{14} SPEC_t \times FINR_t + \beta_{15} SPEC_t \times AUDR_t \\ &+ \beta_{16} LOCAL_t + \beta_{17} LOCAL_t \times FINR_t + \beta_{18} LOCAL_t \times AUDR_t \end{aligned} \quad (3)$$

where *CON* equals one for clients that are continuingly audited by the same Big 4 audit firms in year t, and zero when clients are resigned by Big 4 audit firms in year t.[20] All other variables are as defined previously.

Table 6 provides the comparison between continuing clients and discontinued clients. As shown in Panel A, by the propensity matching procedure, we obtain a matched sample of 8624 firm-years, of which 4312 are clients audited by large Big 4 offices and

[20] Since some auditor resignations may have been misclassified as client dismissals by Audit Analytics, we re-run the regression by including both dismissals and resignation in year t as discontinued clients (*CON* = 0), and the result remains unchanged.

4312 are clients audited by small Big 4 offices. After the propensity matching procedure, there are no significant differences in risk attributes (*FINR* and *AUDR*) between clients in large offices and small offices. Panel B indicates that discontinued clients have significantly higher financial risk ($p=0.027$) and audit risk ($p=0.059$) than continuing clients. As shown in Panel C, the coefficient on *OFSIZE* is positive but not significant (coefficient = 0.0907, $p=0.879$), suggesting that there are no significant differences in the likelihood of shedding clients between large offices and small offices.[21] Moreover, the finding suggests that large offices are more likely to shed clients with a higher audit risk than small offices do (*OFSIZE* × *AUDR*, coefficient = − 1.3491, $p=0.000$). That is, large offices are more risk averse than small offices to protect their reputation when making client management portfolio decisions.

4.3.2 Alternative measure of office size

We use two alternative measures of office size to re-examine the effect of office size on risk consideration in client acceptance decisions. First, we use total fees (including both audit and non-audit fees) as an alternative measure of office size.[22] The untabulated results using this alternative measure of office size indicate that large offices are less likely to accept clients with higher audit risk (*OFSIZE* × *AUDR*, coefficient = − 0.8401, $p=0.001$). In addition, the effect of office size on risk consideration in client acceptance decisions is significantly negative (*OFSIZE* × *AUDR*, coefficient = − 1.2507, $p=0.001$) in the post-SOX 404/pre-AS5 period and becomes weaker in the post-AS5/financial crisis period (*OFSIZE* × *AUDR*, coefficient = − 0.891, $p=0.113$). This is consistent with our main results.

Second, we use a different cut-off point to define audit firm office size. For this purpose, *OFSIZE* is coded one for Big 4 offices that are the largest 10 percent of Big 4 office sizes calculated as the total dollar amount of audit fees charged to all audit clients within an auditor office, and zero for the other 90 percent of Big 4 offices. The untabulated results using this measure of office size are also consistent with our main results. Large offices are less likely to accept clients with a higher audit risk in the post-SOX 404/pre-AS5 period (*OFSIZE* × *AUDR*, coefficient = − 1.0155, $p=0.002$), but the association becomes weaker when auditors have excess capacity in the post-AS5/financial crisis period (*OFSIZE* × *AUDR*, coefficient = − 0.1537, $p=0.867$).

4.3.3 Alternative measure of financial risk

We use updated Z-score by Hillegeist et al. (2004) as an alternative measure of financial risk to re-examine the effect of office size on risk consideration in client acceptance decisions.[23]

[21] Since we use auditor resignations to proxy discontinued clients in client retention decisions, there are only 16 observations resigned by Big 4 auditors. Although we intend to examine the same scenarios regarding client retention decisions, we encounter some difficulties in analyzing subsamples. Specifically, our discontinued clients are much fewer in the subsample and can be perfectly predicted by several control variables.

[22] We thank for the reviewer's suggestion.

[23] We thank for the reviewer's suggestion.

Table 6 Comparison of continuing clients and discontinued clients

Variable	Large offices Means (n = 4312)	Small offices Means (n = 4312)	t-test Diff *p*-value
Panel A: Descriptive statistics for matched sample			
CON	0.998	0.998	1.000
FINR	− 0.189	− 0.167	0.351
AUDR	− 0.161	− 0.152	0.550
BUSY	0.699	0.708	0.346
MAJORGAIN	0.017	0.016	0.735
OFSIZEGROWTH	0.366	0.347	0.556
LIT	0.373	0.38	0.463
SIZE	6.082	6.087	0.911
ABFEE	0.036	0.047	0.348
SPEC	0.547	0.543	0.746
LOCAL	1.233	1.231	0.872
Variable	Discontinued clients Means (n = 16)	Continuing clients Means (n = 8608)	t-test Diff *p*-value
Panel B: Mean comparison of continuing clients versus discontinued clients			
FINR	0.421	− 0.179	0.027
AUDR	0.163	− 0.157	0.059
OFSIZE	0.500	0.500	1.000
BUSY	0.063	0.705	0.000
MAJORGAIN	0.063	0.016	0.148
OFSIZEGROWTH	0.457	0.356	0.790
LIT	0.688	0.376	0.010
SIZE	4.059	6.088	0.000
ABFEE	0.233	0.041	0.155
SPEC	0.250	0.546	0.018
LOCAL	1.188	1.232	0.790
Variables			Coeff
Panel C: Logistic regression results			
FINR			1.0775
			[0.140]
AUDR			0.7126
			[0.101]
OFSIZE			− 0.0601
			[0.930]
OFSIZE × FINR			0.0668
			[0.877]
OFSIZE × AUDR			− 1.3491***
			[0.000]
BUSY			4.1568***
			[0.008]
MAJORGAIN			− 0.3188

Table 6 (continued)

Variables	Coeff
	[0.725]
OFSIZEGROWTH	− 0.0756
	[0.122]
LIT	0.1063
	[0.910]
SIZE	0.7204***
	[0.001]
ABFEE	− 1.1089**
	[0.032]
ABFEE × OFSIZE	0.7812
	[0.389]
SPEC	1.5870*
	[0.067]
SPEC × FINR	− 0.9695
	[0.131]
SPEC × AUDR	1.0844*
	[0.051]
LOCAL	0.0346
	[0.954]
LOCAL × FINR	− 0.4746
	[0.218]
LOCAL × AUDR	0.0278
	[0.927]
Constant	0.9525
	[0.551]
Observations	8624
Pseudo R-squared	0.2898

This table reports the comparative analysis of continuing clients and discontinued clients. Panel A represents the descriptive statistics of all variables used in our regressions. Panel B compares differences in mean values and median values for new and continuing clients. Panel C presents the results of estimates from the logistic regression with Huber–White standard errors to correct for heteroskedasticity (*p*-values in parentheses). The two-tailed *p*-values are calculated based on standard errors clustered by firm

*,**,***Indicate significance at 10%, 5% and 1% levels, respectively, using two-tailed tests. CON equals 1 for clients that are continuingly audited by the same Big 4 audit firms and 0 when clients are resigned by Big 4 audit firms in year t. All other variables are defined in "Appendix"

$$ZSCORE = -0.08\left(\frac{WC}{TA}\right) + 0.04\left(\frac{RE}{TA}\right) - 0.10\left(\frac{EBIT}{TA}\right) - 0.22\left(\frac{V_E}{TL}\right) + 0.06\left(\frac{S}{TA}\right) - 4.34$$

where *WC* is working capital; *TA* is total assets; *RE* is retained earnings; *EBIT* is earnings before interest and tax divided by total assets; V_E is market value; *TL* is total liabilities; and *S* is total sales. The results using this alternative measure remain unchanged.

4.3.4 Effect of auditor locality on risk consideration in client acceptance decisions

Proximity to clients facilitates the acquisition of more idiosyncratic client information, such as client-specific incentives, means, and opportunities for substandard reporting. Since local auditors have more informational advantages than non-local auditors, local auditors provide higher-quality audit services than non-local auditors (Choi et al. 2012). Considering informational advantages associated with local audits, local auditors might tolerate relatively higher risk in accepting new clients than non-local auditors. We examine the effect of auditor locality on the association between risk consideration and client acceptance decisions, and the results are shown in Table 5. As indicated in column (1), local auditors are more likely to accept clients with high audit risk than non-local auditors do (*LOCAL* × *AUDR*, coefficient = 0.4379, $p = 0.006$).[24] That is, that local auditors with informational advantages have higher risk tolerance in client acceptance decisions since they can mitigate the effect of risk on client acceptance decisions by providing high quality audits. In addition, local auditors are more likely to accept clients with a higher audit risk when auditors have excess capacity in the post-AS5/financial crisis periods (*LOCAL* × *AUDR*, coefficient = 1.1123, $p = 0.000$). However, the effect of locality on risk consideration in client acceptance decisions becomes weaker when increasing audit demand by SOX 404 resulted in capacity constraints (*LOCAL* × *AUDR*, coefficient = 0.3081, $p = 0.071$). Therefore, the exogenous capacity shocks are important factors affecting client acceptance decisions.

4.3.5 Effect of industry specialization on risk consideration in client acceptance decisions

Industry specialization is another important attribute for individual offices. We examine the effect of city-level industry specialization on the association between risk consideration and client acceptance decisions by adding interaction terms between risk factors and *SPEC*. The coefficient on *SPEC* × *AUDR* shown in column (2) of Table 5 is significantly negative (coefficient = − 0.4781, $p = 0.034$) in the post-SOX 404/pre-AS5 period, suggesting that city-level industry specialists are less likely to accept clients with a higher audit risk compared to non-industry specialists when the litigation liability is relatively high such as right after SOX. This supports the viewpoint that industry specialists screen out risky clients to avoid litigation risk and protect their reputation for expertise in the audit market (Hertz 2006; Hsieh and Lin 2016; Lee et al. 2004).

5 Conclusions and limitations

This study examines whether large audit firm offices have different risk preferences in making client acceptance decisions. We further analyze whether the effect of office size on risk consideration in client acceptance decisions changes due to exogenous capacity shocks. We find that large Big 4 offices are less likely to accept clients with high audit risk. This is

[24] We use an alternative measure for LOCAL, where LOCAL is coded one if clients and auditors are located in the same MSA, and zero otherwise. The findings suggest that the coefficient on *LOCAL* × *AUDR* is significantly positive (coefficient = 0.5595, $p = 0.024$), which is robust.

consistent with the notion that large auditors face greater losses from an audit failure than smaller auditors do in terms of reputation declines (Jones and Raghunandan 1998). Moreover, the findings suggest that large offices are less likely to accept risky clients when auditors face capacity constraints arising from the exogenous demand shock by SOX 404 in the post-SOX 404/pre-AS5 period (2003–2007). However, the negative effect of office size on risk consideration in client acceptance decisions becomes weaker when AS5 together with the financial recession result in surplus capacity for auditors in the post-AS5/financial crisis period (2008–2012). This suggests that exogenous capacity shocks such as the adoption of SOX 404 and AS5 and the financial recession are important factors affecting auditor's capacity, and therefore influence audit firms' client acceptance decisions.

Our study is subject to the following limitations. First, the Big4 audit firms' client portfolios include both public and private clients but we only examine publicly traded clients. Second, the client acceptance decisions are jointly determined by clients and Big N auditors. However, due to the lack of data, we can't distinguish between clients that auditors may desire to acquire but the clients prefer a different auditor and clients who are not accepted by Big N auditors. Finally, measuring risk factors using public data may not fully capture auditors' overall perceptions of client risk characteristics.

Appendix

See Table 7.

Table 7 Variable definitions

Dependent variables
NEW = 1 for clients who dismissed their prior auditors and were newly accepted by Big 4 audit firms in year t, and 0 when clients are continuingly audited by the same Big 4 audit firms in year t
CON = 1 for clients that are continuingly audited by the same Big 4 audit firms in year t, and 0 when clients are resigned by Big 4 audit firms in year t
Testing variables
FINR = First principle component from a factor analysis of the financial risk variables *ROA*, *LOSS*, *LEV*, and *CASH*
AUDR = First principle component from a factor analysis of the audit risk variables *GROWTH*, *ABSDACC*, *INVREC*, *GC*, *MODOP*, and *TENURE*
OFSIZE = 1 if Big 4 offices are the largest quartile of Big 4 office sizes, and 0 otherwise
SPEC = 1 if auditor is a city level industry leader, and 0 otherwise. SPEC is measured based on the highest market share of audit fees within a city-industry combination. City is classified by MSA as defined by the U.S. Census Bureau Office of Management and Budget. Industry is defined by two-digit SIC classification
LOCAL = 2 if clients and auditors are located in the same city and same state, 1 if clients and auditors are located in the same state but different cities, and 0 if clients and auditors are located in different states
Control variables
BUSY = 1 if calendar year clients and 0 otherwise
SIZE = Natural logarithm of total assets
LIT = 1 if clients are in litigious industries (SIC 2833–2836, 3570–3577, 3600–3674, 5200–5961, 7370–7374, and 8731–8734) and 0 otherwise
ABFEE = Abnormal audit fees estimated as the residual from the following model $FEE = \beta_0 + \beta_1 ASSET + \beta_2 INVREC + \beta_3 LEV + \beta_4 ROA + \beta_5 SEG + \beta_6 MAO + \beta_7 INDUSTRY + \varepsilon$
MAJORGAIN = 1 if the auditor gains a major industry client in the prior year and 0 otherwise. A major industry client is defined as a firm in the top 30 percent of each industry based on total assets for that year
OFSIZEGROWTH = The percentage change in audit fees for the prior year
Variables used to measure financial risk (*FINR*)
ROA = Income before extraordinary items divided by total assets
LOSS = 1 if ROA < 0, and 0 otherwise
LEV = Total debt divided by total assets
CASH = Cash divided by total assets
Variables used to measure audit risk (*AUDR*)
GROWTH = Total assets less beginning total assets, divided by beginning total assets
INVREC = Inventory plus receivables divided by total assets
ABSDACC = Absolute value of discretionary accruals determined by Kothari et al. (2005) performance-adjusted modified Jones model
MODOP = 1 if the company receives a modified audit opinion and 0 otherwise
GC = 1 if the audit opinion is a going-concern and 0 otherwise
TENURE = Number of years audited by the incumbent auditor

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