Essays on corporate reporting and auditing

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Declaration

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Abstract

This thesis includes three essays in corporate reporting and auditing.

Chapter 1 studies how institutional blockholdings affect firm voluntary disclosure. We document that concentrated institutional ownership reduces firms' voluntary disclosure measured by the propensity to issue management forecasts, comprehensiveness of guidance, propensity to engage in conference calls, and the number of 8-K filings. We identify two channels through which blockholders affect firms' voluntary disclosure. First, blockholders have easier access to managers and substitute private for public information acquisition. Second, a higher proportion of non-monitoring blockholders with low demand for voluntary disclosure, such as passive blockholders, reduces the firm's incentive to provide voluntary disclosure. The results are robust to endogeneity and reverse causality concerns. Our study identifies an important effect that concentrated ownership has on firm corporate disclosure.

Chapter 2 examines how an increase in the audit market competition affects the incumbent accounting firms' audit quality. Our setting is a quasi-natural experiment related to the government-supported emergence of second-tier domestic accounting firms in China. We use this shock to perform a difference-in-differences test focused on the incumbent Big 4 firms' response to new competition, which we instrument by the industry-level variation in second-tier firms' market share change. We find that the audit fees and audit quality of Big 4 firms decreased in response to the increased competition from second-tier firms. The result of audit quality reduction is mainly driven by industries with lower initial Big 4 dominance. Our results highlight that increased competition, as captured by a larger number of audit firms, can reduce average audit quality, which contrasts the frequent regulatory opinion that more competition in the audit market will improve audit quality.

Chapter 3 identifies a new channel through which audit market competition affects audit quality of incumbent Big4 audit firms—auditor to client assignment. We use the same setting as in Chapter 2 which is the government-supported emergence of second-tier domestic accounting firms in China as a shock to the incumbent Big 4 firms' audit market competition. To identify how the Big 4 re-assign auditors to clients in response to changes in audit market competition, we make use of the signing-auditor level data and measure the auditor's experience and workload. We find that Big 4 firms assigned less experienced auditors to the industries with high competition and burdened them with more workload. These auditor re-assignments help to explain the negative effect of competition on Big 4 firms' audit quality.

1 Institutional Blockholders and Voluntary Disclosure

1.1. Introduction

Previous studies document a positive relation between institutional ownership and firm voluntary disclosure (e.g., Healy, Hutton, and Palepu 1999, Bushee and Noe 2000, Bushee, Matsumoto and Miller 2003 Ajinkya, Bhojraj and Sengupta 2005, Karamanou and Vafeas 2005, Boone and White 2015, Basu, Pierce and Stephan 2019, Abramova, Core and Sutherland 2017). This result is frequently attributed to the monitoring role of institutional investors—institutional investors demand more public disclosure to facilitate managerial monitoring as private information acquisition is costly. One would naturally assume a similar positive association for concentrated institutional holdings as (i) institutional blockholders face similar monitoring concerns and (ii) the benefits of monitoring increase with ownership concentration as idiosyncratic shocks have a larger effect on concentrated holdings (Almazan, Hartzell, and Starks 2005).[1] Contrary to this prediction, we propose that institutional blockholders reduce firm voluntary disclosure.

There are two reasons for a negative association between institutional blockholdings and voluntary disclosure. First, blockholders have more direct access to firms' management (Agrawal and Mandelker 1990, Porter 1992), which can provide them with more timely and tailored information that substitutes public information acquisition (the *private for public information substitution* hypothesis). This substitution lowers blockholder demand for public disclosure,

[1] In empirical tests, we define institutional blockholders as institutional investors who hold at least 5% of the firm's outstanding common shares. We also show our conclusions are robust to other definitions of blockholdings.

which in turn reduces managerial incentives to provide costly public disclosure.[2]

Second, previous studies document that not all institutional investors actively monitor firm management because of differences in monitoring costs. Almazan et al. (2005) argue that monitoring costs vary with the skills and resources an institution can devote to collect and analyse information. They find that, for these reasons, bank trusts and insurance companies face higher monitoring costs compared to investment advisers and investment companies. Thus, as the fraction of shares held by non-monitoring blockholding institutions increases, such as by passive index funds, managers face less pressure to engage in costly public disclosure (the *inactive monitoring* hypothesis). Non-monitoring blockholders may also encourage less public disclosure as they bear a disproportionally high cost of voluntary disclosure (Shleifer and Vishny 1986). Lower public disclosure can lower stock liquidity, however, lower marginal return due to higher trading cost is offset by blockholders' large volume of trades (Maug 1998, Edmans 2014). This effect contrasts with non-monitoring non-blockholders who prefer more transparency that promotes higher stock liquidity (Heflin and Shaw 2000, Boone and White 2015). This study empirically examines the effect institutional blockholdings have on voluntary disclosure and tests the two channels through which blockholdings can affect corporate communication.

To establish the importance of our research question, we first examine the prevalence of institutional blockholdings for a sample of Compustat firms over the period 2001–2015. We find that the average proportion of shares held by blockholders in a firm increases from around 12% in 2001 to 20% in 2015, a 67% increase. For comparison, He and Huang (2017) report average blockholdings of 10.2% over the period 1980-2010. Further, we find that the proportion of

[2] Public voluntary disclosure costs include the actual costs of making the disclosure e.g., costs of holding a conference call or distributing a press release, and also the consequential costs resulting from the proprietary nature of the information when disclosure reveals proprietary information e.g., to competitors in product markets, labour unions, or regulators (Beyer et al.2010).

Compustat firms with at least one blockholder increases from 60% in 2001 to 79% in 2015. Thus, in recent years, a substantial proportion of outstanding shares are held by blockholders.

Next, we examine the effect institutional blockholdings have on voluntary disclosure. Empirical tests show a negative association between blockholdings and the likelihood of quarterly management forecasts and the effect is economically significant. A one standard deviation increase in blockholdings leads to a 16.6% lower propensity to provide guidance. Consistent with previous studies (e.g., Ajinkya et al. 2005, Bushee and Noe 2000, Boone and White 2015), we find a positive effect of average institutional ownership on the likelihood of guidance. When we jointly include blockholdings and average institutional holdings, the latter captures the effect of non-blockholding institutional ownership, i.e., institutional ownership below 5% of outstanding common shares. We confirm that the positive effect average institutional ownership has on managerial guidance is driven by institutional non-blockholdings.

To address the concern our results may be driven by a specific measure of blockholding, we re-do the analysis using the Herfindahl measure of ownership concentration. We continue to find a negative effect of concentrated ownership on voluntary disclosure. We find similar results using the number of blockholders in a stock. Thus, our conclusions are not sensitive to the measure of blockholding.

To ensure our conclusions are not sensitive to the measure of voluntary disclosure, we perform three robustness tests. First, we measure the comprehensiveness of voluntary disclosure by the number of items included in the management forecast. This test helps us differentiate between firms that issue one compared to multiple forecasts. While a single forecast can reflect opportunistic guidance, e.g., to lower the stock price before option grant dates (Aboody and Kasznik 2000, Cheng and Lo 2006, Nagar, Nanda, and Wysocki 2003), comprehensive guidance is more likely to capture disclosure that is part of the firm's corporate communication (Ajinkya et

al. 2005). We find that on average managers disclose two income statement items, with the most common items including forecasts of earnings and revenue. Using Poisson regressions, we find a negative effect blockholdings have on the number of items disclosed, which supports our main results. Second, we examine the likelihood of conference calls hosted by management. Conference calls allow managers to build a narrative for firm performance and outlook complementing quantitative guidance. Qualitative information can provide incremental information to investors (Arslan-Ayaydin et al. 2016, Cho et al. 2010, 2012). We find that blockholdings reduce a firm's propensity to host conference calls. Third, we follow Guay et al. (2016), Segal and Segal (2016), Bourveau et al. (2018), Cadman et al. (2019), and Bao, Kim, Mian and Su (2019) and use the number of 8-K filings to measure voluntary disclosure. We confirm that higher blockholdings reduce the number of voluntary 8-K filings. Thus, our conclusions are not affected by the choice of voluntary disclosure measure.

We address the endogeneity concern in six ways. First, we control for time-invariant unobserved firm characteristics by controlling for firm-fixed effects. Second, we build on the psychology literature documenting that busyness harms performance (Lopez and Peters 2012, Tanyi and Smith 2015, Fich and Shivdasani 2006, Gunny and Hermis 2020). We exploit this feature and argue that managers are particularly busy close to the fiscal year-end as their attention is devoted to preparing and assessing the accuracy of the annual statements. 10-K filings and annual reports need to be audited and are more comprehensive in contrast to 10-Qs, which are unaudited and shorter. Limited managerial time and resources close to fiscal year-end means managers are less able to respond to blockholders pressure for private communication, thus the blockholder effect on voluntary disclosure should be weaker around fiscal year-end. We use this exogenous variation in *managerial ability* to respond to blockholders to contrast the disclosure effect of blockholders in the fourth compared to the other three fiscal quarters. Consistent with

our prediction, the blockholder effect is weaker in the fourth quarter.

Third, we use cross-sectional variation in *managerial incentives* to respond to blockholder pressure as identification. Specifically, we argue that analysts use public guidance to improve the quality and informativeness of their reports and are more likely to follow companies that provide guidance (Givoly and Lakonishok 1979, Lys and Sohn 1990, Stickel 1991, Feng and McVay 2010). Managers may be reluctant to cut guidance if this will negatively affect their relationship with analysts and risk losing coverage. Thus, the blockholder effect on voluntary disclosure should be weaker in the presence of analyst coverage, a result we confirm. Fourth, we expect blockholders' incentives to monitor and gain private information to reduce with portfolio diversification. This effect is driven by limited blockholder ability to monitor an increasing number of securities in a portfolio and a comparatively lower effect idiosyncratic shocks have on wealth (Faccio Marchica and Mura 2011). Consistently, we find a diminishing effect of blockholdings on voluntary disclosure as blockholders' portfolio diversification increases. Fifth, our results could capture the reverse association between voluntary disclosure where blockholders choose to invest in infrequent voluntary disclosure firms. To address this concern, we first run a Granger-type lead-lag approach test similar to Ajinkya et al. (2005) which rejects this prediction.

Finally, we use an instrumental variable approach to address the endogeneity concern. We make use of the Russell index assignments and use the inclusion into the Russell 3000 index as an instrument for blockholding.[3] A stock addition to the index generates an exogenous change to blockholdings through an increase in the number of institutional investors holding the stock and a decrease in institutional blockholding after conditioning on the total institutional ownership

[3] Our instrumental variable estimation is similar to Appel, Gormley, and Keim (2016). The main difference is that Appel et al. (2016) use the reconstitution of Russell indices as an exogenous variation to passive ownership, and our paper uses addition to Russell 3000 index to induce an exogenous variation in institutional blockholding. A discussion of different approaches using Russell index assignments for identification can be found in Appel et al. (2020).

(Appel et al. 2016, Boone and White 2015). Because index assignment is determined by an arbitrary rule on the market capitalization of the 3,000th largest firm, the variation in blockholder ownership prompted by the index inclusion is plausibly exogenous, after conditioning on the firms' market capitalization, which helps the identification. The instrumental variable estimation confirms our main result.

Our final tests examine the two channels through which institutional blockholding can affect voluntary disclosure. First, we argue that blockholders substitute private for public information acquisition. Obtaining private information is less costly if blockholders hold board seats (Cohen, Frazzini, and Malloy 2008). Consistently, we find that the effect we document is stronger when blockholders hold board seats. To sharpen this analysis, we also count the number of board seats by blockholders and find that a larger presence on the board has an incrementally stronger negative effect on the propensity to provide management forecasts. This result reflects that the likelihood of private information acquisition increases with the number of potential interactions with managers (Hermalin and Weisbach 1998, Raheja 2005, Song and Thakor 2006).

To test the prediction that an increasing proportion of non-monitoring blockholders reduces managerial incentives to provide voluntary disclosure, the *non-monitoring blockholder* hypothesis, we exploit heterogeneity in blockholder composition to examine the effect among blockholders with higher monitoring costs. Almazan et al. (2005) argue that passive institutional investors have higher monitoring costs as their low fee structure limits their ability to attract skilled managers and devote resources to active monitoring. Using mutual fund classification, we classify firms as either passive or active to identify funds with different monitoring costs and incentives.[4] Regression results confirm the negative effect of passive mutual funds on voluntary

[4] The alternative way to classify passive institutions would be Bushee's (1998) classification of quasi-indexers. We use mutual fund classification because Bushee's (1998) classification of quasi-indexers includes not only pure index-

disclosure is higher compared to active mutual funds. This result is consistent with the prediction that when block ownership by investors with low monitoring incentives increases, managers have less incentive to engage in costly voluntary public disclosure.

Our study offers an important contribution to the accounting literature. We document a significant negative effect blockholdings have on voluntary disclosure, which contrasts the positive association between average institutional ownership and the likelihood of managerial forecasts documented in earlier research (Healy et al. 1999, Bushee and Noe 2000, Bushee et al. 2003, Ajinkya et al. 2005, Karamanou and Vafeas 2005, Boone and White 2015, Basu et al. 2019 and Abramova et al. 2017). As the proportion of stocks with at least one blockholder reached 79% in 2015, our results identify an important institutional factor shaping today's corporate disclosure. Our results complement several literature streams. We expand the evidence on the association between family ownership and firm's disclosure (Ali, Chen, and Radhakrishnan 2007, Chen, Chen, and Cheng 2008) and firm's ownership structure and disclosures in annual reports (Garcia-Meca and Sanchez-Ballesta 2010). Further, our results complement research that shows that the likelihood of managerial forecasts increases with demand for information by other external parties, such as analysts and independent boards (Ajinkya et al., 2005, Karamanou and Vafeas 2005, Chapman and Green 2018). The study also adds to the growing literature on the effects blockholders have in capital markets (Brav, Jiang, Partnoy and Thomas 2008, Faccio et al. 2011, Bertrand and Mullainathan 2000, Fich, Harford and Tran 2015, Bhojraj and Sengupta 2003).

Importantly, we identify two channels through which blockholders affect voluntary disclosure—private for public substitution and inactive monitoring by passive blockholders. We

tracking passive institutions, but also actively managed institutions whose portfolio holdings mimic a passive institution. These institutions may be quite active in governance and demand information in different ways from index-tracking institutions.

find support for both channels affecting voluntary disclosure, which advances the knowledge of how a firm's information environment develops.[5] Our paper also complements Boone and White (2015), who find that passive institutional ownership promotes more voluntary disclosure. We show that when passive institutional ownership is concentrated, as captured by passive mutual funds holdings, the effect on voluntary disclosure is negative.

1.2. Previous Literature

The primary focus of our analysis is on institutional blockholders as previous studies suggest they can exert substantial pressure on managers. Brav et al. (2008) find that hedge fund blockholdings lead to higher returns and operating performance. Faccio et al. (2011) report that firms with diversified large shareholders undertake riskier investments. Bertrand and Mullainathan (2000) document that firms with more blockholders can better distinguish between a CEO's effort and luck. Fich et al. (2015) find that acquisitions where targets have significant blockholding have higher completion rates, higher premiums, and lower acquirer returns. Bhojraj and Sengupta (2003) report that bond ratings have a negative association with average institutional ownership, but a positive association with ownership concentration.

Blockholders can influence managerial behaviour through direct intervention within a firm, for example, they can submit a public shareholder proposal suggesting a desired course of action, and by privately pressuring managers (Admati et al. 1994, Grossman and Hart 1980, Kahn and Winton 1998, Shleifer and Vishny 1986, Gillan and Starks 1998, Karpoff 2001). They can also

[5] Our evidence on private communication between managers and large investors is consistent with anecdotal evidence. For example, Fortune (2016) article 'Why Big Investors Like to Meet Privately With CEOs' highlights that 'Tech billionaire Elon Musk's acknowledgement that, over the years, he had 'bandied about' with some of his biggest shareholders the idea of combining Tesla Motors (TSLA) and SolarCity (SCTY) is rare public recognition of the access and insights large investors get.' And that 'Big investors, through their private meetings with company bosses, get insights that can give them an advantage over smaller shareholders.'

vote against directors if the firm's actions do not align with blockholders expectations. Further, blockholders can trade in the company's shares and their trades can exert downward stock price pressure hurting managerial wealth and position. Consistently, Parrino et al. (2003), Gopalan (2008), Gallagher et al. (2013), Chen and Swan (2011) and Bharath et al. (2013) find that institutional stock sales significantly increase the probability of forced CEO turnover. Large institutional owners with common ownership in competing firms may also reduce product market competition (Azar et al. 2018). We expect that managers will adjust the firm's voluntary disclosure policy to conform to the informational needs of blockholders because blockholders can more directly affect managerial behaviour compared to non-blockholders.

Blockholders can also affect firm's voluntary disclosure because of their low demand for information. Bebchuk and Hirst (2019) argue that passive blockholders do not actively engage in monitoring behaviour, but instead are more deferential to management, thus associate with reduced managerial oversight. Heath et al. (2020) show that index funds are less-effective monitors than actively managed funds. Low monitoring incentives should associate with low information demand, which in turn can reduce managerial incentives to provide costly voluntary disclosure.

Our study builds on the literature that examines the association between the firm's ownership structure and annual report disclosures. A meta-analysis in Garcia-Meca and Sanchez-Ballesta (2010) highlights substantial variations in previous findings: 7 out of 18 studies they review find no significant association between ownership concentration and the annual report content and three studies report a positive correlation.[6] A potential reason for these mixed

[6] The studies reviewed in Garcia-Meca and Sanchez-Ballesta (2010) examine the association between firm ownership and (1) disclosure quality in annual reports (Adams and Hossain 1998, Adrem 1999, Chau and Gray 2002, Haniffa and Cooke 2002, Barako, Hancock and Izan 2006, Eng and Mak 2003, Hossain, Tan, and Adams 1994, Lakhal 2005, Lim, Matolcsy and Chow 2007, Mangena and Tauringana 2007, Patelli and Prencipe 2007, Raffournier 1995, Patelli

findings is that studies that look at firm choices within an annual report suffer from an identification problem as they cannot clearly delineate between the mandatory and voluntary components of an annual report as there is no template on what a standard report should include. Thus, differences in content and presentation do not necessarily capture differences in type and informativeness of reports but may reflect presentational choices (e.g., studies often score longer reports as of better quality) and corporate marketing preferences (e.g., some studies score higher annual reports that include the photo of the CEO). There is no such ambiguity in our setting that focuses on voluntary disclosure as the benchmark case is clear—no guidance, thus we can more confidently identify the impact ownership composition has on voluntary disclosure.

Further, we build on the literature that examines the association between family ownership and firm corporate communication. Ali, Chen, and Radhakrishnan (2007) examine 177 family firms that are S&P500 constituents between 1998–2002, defined as firms where members of the founding family hold positions in top management, are on the board, or are blockholders. They find that family firms have a similar unconditional propensity to issue management forecasts as non-family firms. Chen, Chen, and Cheng (2008) report that controlling for average institutional ownership, concentrated institutional ownership does not affect the likelihood of management forecasts in family firms that are part of S&P1500 between 1996-2000.[7]

In contrast to previous studies that centre on disclosures in annual reports, we focus on voluntary disclosure because it is an important component of the firm's corporate communication

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and Prencipe 2007, Raffournier 1995), (2) annual report environmental disclosure (Brammer and Pavelin 2006, Cormier, Magnan, and Van Velthoven 2005), (3) intellectual capital disclosures in the annual report (Cerbioni and Parbonetti 2007, Li, Pike, and Hannifa 2008), (4) oil and gas reserves disclosure in the annual report (Craswell and Taylor 1992), and (5) segment information disclosures in the annual report (McKinnon and Dalimunthe 1993, Mitchell, Chia, and Loh 1995). Thus, they focus on only one form of corporate communication, the annual report.

[7] Chen et al. (2008, 503) highlight that 'in our sample, family firms have lower institutional holdings, lower analyst coverage, and fewer issuances of public debt and equity than other firms'. Thus, at low levels of institutional holdings, institutional ownership concertation may not associate with voluntary disclosure. This result points to family firms being different from other firms with concentrated holdings, which further motivates our study.

(Healy and Palepu 2001), and it is a channel through which managers communicate their private information (Wang et al. 2013, Coller and Yohn 1997, Hirst, Koonce and Venkataraman 2008). Beyer et al. (2010) find that management forecasts account for most of the quarterly return variance compared to earnings announcements, earnings pre-announcements, analyst forecasts, and SEC filings. Studies document a significant association between voluntary communication and information asymmetry (Diamond and Verrecchia 1991, Coller and Yohn 1997, Williams 1996), share price performance (Graham et al. 2005, Haggard et al. 2008), litigation risk (Kasznik 1999, Soffer, Thiagarajan and Walther 2000), cost of capital (Botosan 1997), and analyst coverage (Healy, Hutton and Palepu 1999). We measure voluntary disclosure by the propensity to issue management forecasts and comprehensiveness of forecasts, which captures the number of forecasted items. In sensitivity tests, we also examine the firm's propensity to host conference calls and to file voluntary 8-K filings because guidance can reflect other considerations than disseminating private information, such as expectations management (Matsumoto 2002, Bartov, Givoly and Hayn 2002, Richardson, Teoh and Wysocki 2004).[8]

Our paper also relates to recent literature on the monitoring role of passive investors. Our evidence on passive blockholders' low demand for voluntary public disclosure is consistent with Schmidt and Fahlenbrach (2017), who question the monitoring role of passive investors documented in Appel et al. (2016). Specifically, Schmidt and Fahlenbrach (2017) report that exogenous increases in passive ownership reduce the quality of the firm's corporate governance and promote mergers and acquisitions with poorer outcomes. Schmidt and Fahlenbrach (2017, p. 301) argue that 'passive institutional investors may not have the capacity for high-cost governance activities that require continuous monitoring such as, for example, the M&A activity

[8] Managers have been called to stop providing guidance (CFA Institute 2006, U.S. Chamber of Commerce 2007) to avoid myopic behaviour related to meeting earnings benchmarks, such as boosting short-term profitability (Fuller and Jensen 2002, Jensen et al. 2004, Chen Matsumoto and Rajgopal 2011).

of corporations', though they can engage in 'low-cost governance activities such as consistently voting according to a pre-defined program at annual meetings or endorsing the removal of poison pills and staggered boards' as in Appel et al. (2016). Almazan et al. (2005) also highlight that passive institutional investors have higher monitoring costs as their low fee structure limits their ability to attract skilled managers and devote resources to active monitoring. Limited monitoring activity is consistent with low information demand.

Previous studies such as Ajinkya et al. (2005) and Bushee and Noe (2000) also examine the relation between institutional investors, ownership concentration and voluntary disclosures, but our paper differs from them in important ways. Ajinkya et al. (2005) study the association between properties of management forecasts and outside directors and average institutional ownership between 1997–2002. Thus, their focus is different from ours. As part of their sensitivity tests, they include an interaction between ownership concentration and Regulation Fair Disclosure (Reg FD) indicator to test the effect this regulation had on voluntary disclosure by various institutional investor groups. Because they do not report an average effect ownership concentration has on the propensity to issue management forecasts, it is impossible to make directional conclusions based on their analysis. Further, they do not include an interaction between average institutional ownership and reg FD indicator and the effect of ownership concentration in post-reg FD setting can be driven by an association between non-blockholders and guidance. Thus, their results do not answer if and, importantly, why ownership concentration associates on average with lower voluntary disclosure. This further motivates our focused analysis on the association between blockholdings and voluntary disclosure.

Bushee and Noe (2000) study how a firms' corporate disclosure, as captured by the Association for Investment Management and Research (AIMR) ratings, affects institutional holdings. They report that transient and quasi-indexers invest more in firms with higher

disclosure ratings, whereas dedicated investors show no sensitivity to disclosure rating levels or changes. Thus, their focus and findings are different from ours and their research design that relies on AIMR ranking does not speak to the extent voluntary disclosure affect institutional ownership as it combines scores of (1) annual report/10-K disclosures, (2) interim report/10-Q disclosures, and (3) investor relations activities. Also, in contrast to Bushee and Noe (2000) finding that quasi-indexers favour companies with higher disclosure, we show that quasi-indexer investors have a negative effect on voluntary disclosure when they become blockholders in a firm.

1.3. Data and Research Design

The starting point of our sample are institutional 13-F holdings reported between 2001 and 2015, which we merge with quarterly management forecast data from the I/B/E/S Guidance database. We use Compustat, CRSP and BoardEx to obtain accounting, market, and corporate governance data to create control variables. The resulting sample for our baseline analysis consists of 104,765 firm-year-quarters.

1.3.1. Research Methods

We estimate the effect of the cumulative institutional blockholder ownership on firm voluntary disclosure using the following logit model

$$P(MF\_occur_{it+1}) = \alpha_0 + \alpha_1 Block_{it} + \alpha_2 IO_{it} + B\text{Controls}_{it} + \omega_i + \tau_t + \varepsilon_{it} \quad (1)$$

where MF_occur_{it+1} is an indicator variable equal to 1 if firm i issued any management forecast during a calendar quarter t+1, and 0 otherwise. We follow Brickley, Lease and Smith (1988), Agrawal and Mandelker (1990), and Baysinger, Kosnik and Turk (1991) and define

blockholdings, $Block_{it}$, as the cumulative holdings by institutional blockholders. We define institutional blockholders as institutional investors who hold at least 5% of the firm's outstanding common shares.[9] IO_{it} is the percentage of institutional ownership, and captures the effect of non-blockholding institutional investors. Including a measure of institutional blockholdings together with a measure of total institutional holdings disaggregates total institutional ownership into blockholdings and non-blockholding (i.e., diversified ownership). Thus, the coefficient on blockholdings captures how a higher proportion of blockholdings in total ownership affects a firm's voluntary disclosure. $Controls_{it}$ is a vector of control variables. ω_i are industry dummies based on 2-digit SIC code classification, and τ_t are 56 quarter-year time dummies. ε_{it} represents the error term. Standard errors are clustered at the firm level.

MF_occur_{it+1} does not distinguish between firms that provide single vs. multiple forecasts. A single forecast may reflect managerial opportunism rather than a deliberate strategy to disclose private information (Ajinkya et al. 2005). We expect that blockholdings will affect both the propensity to report forecasts and the number of forecasted items. To capture the latter effect, we define comprehensiveness of guidance, MF_items_{it}, which measures the number of items disclosed in management forecasts during a calendar quarter. Although earnings per share (EPS) is the most common item provided in management forecasts, managers frequently disclosed other forecasts such as revenue and cash flows (Han and Wild 1991, Hirst et al. 2008, Chen et al. 2008,

[9] We follow previous literature in using 5% as the cut-off to identify blockholdings (Shleifer and Vishny 1986, Chen, Harford and Li 2007, Kang, Luo and Na 2018). The literature typically defines a blockholder as a 5% shareholder because this level triggers disclosure requirements in the United States (Edmans 2014). Our conclusions are robust to using other cut-offs. Our measure of blockholdings has important advantage over Bushee (1998) and Bushee and Noe (2000) classification of institutional investors into transient, quasi-indexers and dedicated. Specifically, we use a more granular measure of ownership concentration that is calculated at the firm level, which helps with a clear identification of the association between blockholdings in a firm and that firm's voluntary disclosure. Bushee (1998, p. 316) calculate percentage ownership by the three groups of institutions using 'factor analysis and cluster analysis to assign institutions into groups based on their past investment behavior'. Thus, a dedicated investor may not necessarily be considered a blockholder for a particular firm. Thus, conceptually, our approach is more sound than using Bushee's classification to address our research question.

Lansford et al. 2013). Since MF_items_{it} is a count variable, we use Poisson regression to estimate model (1) when MF_items_{it} is the dependent variable.

We follow prior literature on voluntary disclosure to include control variables that might influence firms' management forecast decisions (Ajinkya et al. 2005, Bushee and Noe 2000, Boone and White 2015, Karamanou and Vafeas 2005, Chapman and Green 2018). These include firms' market value of equity, leverage ratio, market to book ratio, return on assets, stock return during the quarter, stock return volatility, special items, changes in earnings per share, the number of analysts following a firm, board size, board independence, CEO turnover, and business complexity. We winsorize all continuous variables at 0.1% and 99.9% percentiles. The definitions of all variables can be found in Appendix A.

1.4. Institutional Blockholdings and Voluntary Disclosure: Empirical Analysis

1.4.1. Descriptive Evidence

Our first test looks at the prevalence of institutional block ownership to establish the importance of the effect we examine. If block ownership is sparse, it is hard to argue it will have an economically meaningful effect on voluntary disclosure. Figure 1.1 reports that the average proportion of shares held by institutional blockholders almost doubles over the sample period, increasing from 12% in 2001 to 20% in 2015. Thus, a considerable proportion of outstanding equity is held by institutional blockholders in recent years. For comparison, we present the percentage of institutional holdings, which increase from 32% in 2001 to 51% in 2015, a 59% increase. This evidence suggests a faster pace with which blockholders' ownership increases over our sample period compared to the growth in average institutional ownership.

[Figure 1.1]

To sharpen the analysis, Figure 1.2 presents the proportion of firms with at least one blockholder. We run this test because blockholdings may concentrate in a few stocks limiting the generalizability of the effect we study. The proportion of firms with at least one blockholder increases from 60% in 2001 to 79% in 2015. Thus, in recent years, most firms have institutional blockholder ownership. Jointly, Figures 1 and 2 suggest institutional blockholding is a staple element of the ownership structure, which justifies the need to examine its effects on corporate disclosure.

[Figure 1.2]

Table 1.1 Panel A presents descriptive statistics for variables from equation (1). On average 49.9% of firms provide quarterly forecasts with an average of 2.403 items disclosed by managers. Institutional investors hold on average 58.3% of shares in sample firms with 18.8% of shares held by blockholders. Our descriptive statistics are comparable with Boone and White (2015), who report an average institutional ownership of 43.5% for Russell 1000 stocks over the period 1996–2006 and that 40.4% of firms in their sample issued management guidance.

[Table 1.1]

Panel B of Table 1.1 reports the descriptive statistics by terciles of block ownership and the last column reports the difference in means between the high and low terciles. Firms with high block ownership have a higher level of institutional ownership, firm size, leverage, return on asset, analyst coverage, board size, board independence, and CEO turnover compared to firms with low block ownership. They also have a lower market to book ratio, special items, stock returns, volatility and segment income diversification. These results suggest that firms with higher blockholdings are unlikely to be distressed or of, broadly defined, ‘lower quality’, which could explain their lower propensity to issue management guidance.

Panel C reports Pearson correlations between *MF_occur* and average institutional holdings, *IO*, and average blockholdings, *Block*. Because *IO* and *Block* are highly correlated, we report the correlations for *IO* quartiles. For each quartile, we find a consistent positive correlation between *IO* and the indicator variable for management guidance. In contrast, blockholdings have a consistent negative association with the indicator for management guidance. These results provide preliminary support for our hypothesis. Panel D reports correlations between the control variables, which are consistent with earlier evidence (e.g., Bushee and Noe 2000, Boone and White 2015).

1.4.2. Institutional Blockholders and Management Forecasts

Panel A of Table 1.2 shows the regression results for equation (1). Model (1) reports logit regression results that exclude blockholdings to estimate the average effect institutional holdings have on the occurrence of management forecasts. We confirm earlier findings that higher institutional ownership is associated with a higher likelihood of management forecasts (Ajinkya et al. 2005, Bushee and Noe 2000, Boone and White 2015). The economic magnitude of the institutional ownership effect is comparable with earlier studies. Ajinkya et al. (2005) report that a one standard deviation increases in institutional ownership associates with a 22% increase in the likelihood of managerial guidance, which compares with our evidence of a 21% likelihood increase.

Model (2) reports the full specification of equation (1) and we find a negative and economically significant effect of blockholdings on the propensity to report management guidance: a one standard deviation increase in blockholdings reduces the likelihood of guidance by 17%. Including a measure of concentrated institutional ownership with average institutional holdings means the latter captures the effect of institutional non-blockholdings. Model (2)

confirms that the positive relation between average institutional holdings and the likelihood of guidance in Model (1) is driven by institutional non-blockholdings. The signs of the coefficients on the control variable are in line with earlier studies (Karamanou and Vafeas 2005, Boone and White 2015, Basu et al. 2019).[10]

[Table 1.2]

Our conclusions could be affected by infrequent opportunistic guidance where managers provide a single forecast that is easy to beat. To illustrate, Aboody and Kasznik (2000), Cheng and Lo (2006), and Nagar, Nanda, and Wysocki (2003) report increased pessimistic guidance before option grant dates. Matsumoto (2002) and Richardson et al. (2004) document that managers use guidance to beat analyst quarterly earnings targets. To address this concern, we examine whether blockholdings affect the comprehensiveness of guidance measured by the number of forecasted items, *MF_items*. Model (3) in Panel A reports Poisson regression results where *MF_items* is the dependent variable in equation (1) and we find a negative association between blockholdings and the comprehensives of guidance.

The level of blockholdings can correlate with unobserved firm characteristics, which in turn can correlate with the likelihood of managerial guidance. To address this concern, we perform two tests. First, we examine the sensitivity of managerial guidance to *changes* in the level of blockholdings. Skinner (1996, p. 397) argues that 'changes regressions are less susceptible to correlated omitted variables problems'. Model (1) in Panel B of Table 1.2 includes the first difference in blockholdings, $\Delta Block$, as an explanatory variable instead of *Block*. We find a negative association between the likelihood of guidance and changes in blockholdings, a result consistent with our main findings. Further, we repeat equation (1) after including firm-fixed

[10] Because some of the control variables could potentially be outcomes of blockholdings, in untabulated results, we repeated equation (1) with only *Block*, *IO* and fixed effects on the right-hand-side and find consistent evidence.

effects, which capture time-invariant unobserved firm characteristics. Because the Maximum Likelihood Estimation (MLE) used for the logit model may produce inconsistent estimates in the presence of fixed effects (Greene, 2004), we estimate equation (1) with firm-fixed effects using a linear regression. Model (2) in Panel B documents that controlling for firm-fixed effects leaves our conclusions unchanged.[11]

The 5% cut-off to define blockholdings is based on past literature, but is arbitrary, which is why we also measure concentrated holdings using the Herfindahl index of institutional ownership calculated as $HHI_{it} = \sum_{i=1}^{N} \left(\frac{shares\ held\ by\ institution\ i}{total\ shares\ outstanding}\right)^2 * 100$.[12] Model (1) in Panel C of Table 1.2 reports results for equation (1) where we use *HHI* instead of *Block*. We continue to find a negative association between ownership concentration and the likelihood of management forecasts: a one standard deviation increase in *HHI*∗100 lowers the likelihood of guidance by 1.9%.[13] Model (2) in Panel C repeats the regression with the Herfindahl index of institutional ownership after we control for firm-fixed effects and the conclusions are unchanged. Finally, we estimate equation (1) when we capture blockholdings by the number of blockholders in a firm, *#blockholders*. We find a negative association between the number of blockholders and the likelihood of managerial guidance. Jointly, Table 1.2 evidence suggests that when the institutional ownership shifts from dispersed to concentrated, firms decrease their propensity to communicate through management forecast.

In untabulated tests, we perform two additional tests. First, we use a dummy variable for whether there is at least one blockholder in a firm and find evidence similar to our main results. This further corroborates the conclusion that our results are not driven by a specific blockholder

[11] The results are similar if we use MLE to estimate the model with firm-fixed effects.
[12] Our conclusions remain robust to other cut-off points to define blockholdings such as 1% and 10%.
[13] Multiplying the Herfindahl index by 100 correspondingly reduces the magnitude of the coefficient on HHI. Unadjusted economic magnitude of HHI would be equivalent to 1.9%*100=190%.

measures. Second, to understand the extent our results can be captured by Bushee's (1998) classification of institutional investors into dedicated, transient and quasi-indexers, we calculated the proportion of blockholdings (as we classify blockholders) held by dedicated investors (using Bushee's classification) and find this proportion is only 14%. Excluding these dedicated blockholders from the analysis produces a highly significant negative association between blockholdings and voluntary disclosure. These results suggest our findings generalize beyond the dedicated investor group suggesting higher generalizability of our conclusions.

1.4.3. Alternative Measures of Voluntary Disclosure

Management forecast is just one type of firms' voluntary disclosure. To ensure our conclusion is not driven by this specific measure of corporate disclosure, Table 1.3 repeats the analysis where we predict the likelihood of management conference calls and 8K filings. Conference call data comes from Thomson Reuters Streetevents and starts in 2002. We code as 1 if a firm holds at least one conference call in quarter t+1, and 0 otherwise. The 8-K filing data comes from the SEC and starts in 2001. We count the number of voluntary 8-K filings for each firm-quarter. We follow prior literature and consider a filing to be voluntary if it is reported under the item labelled 'Other Events and Regulation FD' (He and Plumlee 2019).

Figure 3 reports that the proportion of firms with conference calls is 13% in 2002 and increases to 67% in 2015. For comparison, Frankel, Johnson and Skinner (1999) report that around 11% of firms held conference calls between February and November 1995, and Tasker (1998) finds that around 35% of firms hosted quarterly conference calls between March 1995 and February 1996. Chen et al. (2008) report that around 79% of S&P1500 firms had conference calls between 1996–2000. Figure 1.3 shows that the number of 8-K filings is 1.83 in 2001 and 2.29 in

2015. For comparison, He and Plummle (2019) report that the average number of voluntary filings is 2.78 for a sample of Compustat firms between 2005 and 2016.

[Figure 1.3]

Model (1) in Table 1.3 reports estimates for equation (1) where the dependent variable is an indicator whether a firm will host a conference call. Because we control for firm-fixed effects, we estimate the model using OLS, but the conclusions are the same when using MLE. Blockholdings reduce the probability of conference calls in contrast to the positive effect of non-blockholding institutional ownership. Thus, the results using conference calls confirm our main conclusions. Model (2) repeats the analysis for voluntary 8-K filings and our conclusions for blockholdings are similar to our main results. Overall, Table 1.3 results show our conclusions are not driven by a specific measure of voluntary disclosure.

[Table 1.3]

1.4.4. Additional Tests

This section first presents cross-sectional tests that provide further evidence for our arguments about the institutional blockholders' information needs and the managers' decision to respond to them. Then we use an instrumental variable approach to address the endogeneity concern.

First, we use cross-sectional variation in *managerial incentives* to respond to blockholder pressure in the presence of sell-side analysts. Specifically, we argue that analysts use public guidance to improve the quality and informativeness of their reports and are more likely to follow companies that provide forecasts (Givoly and Lakonishok 1979, Lys and Sohn 1990, Stickel 1991, Feng and McVay 2010). Managers may be reluctant to cut guidance, in response to blockholder pressure, if this will negatively affect their relationship with analysts and risk losing

coverage. Thus, the blockholder effect on voluntary disclosure should be weaker in the presence of analyst coverage. Model (1) in Table 1.4 confirms that higher analyst coverage moderates the negative effect blockholding has on the likelihood of issuing management forecasts.

[Table 1.4]

Second, we build on the psychology literature that documents a negative association between busyness and performance (Lopez and Peters 2012, Tanyi and Smith 2015, Fich and Shivdasani 2006, Gunny and Hermis 2020). We exploit this feature and argue that managers are particularly busy close to the fiscal year-end as their attention is devoted to preparing and assessing the accuracy of the annual statements. In contrast to 10-Qs, which are unaudited and shorter, 10-K filings and annual reports need to be audited and are more comprehensive. Limited managerial time and resources close to fiscal year-end means managers are less able to respond to blockholders pressure for private communication, thus the blockholder effect on voluntary disclosure should be weaker around fiscal year-end. We use this exogenous variation in *managerial ability* to respond to blockholders to contrast the disclosure effect of blockholders in the fourth compared to the other three fiscal quarters. Specifically, we define *Q4* as an indicator variable equal to 1 for the fourth fiscal quarter and 0 otherwise. We then interact *Q4* with the measure of institutional blockholdings, *Block*Q4*. This analysis is effectively a difference-in-differences regression where the treatment group is stocks with at least one blockholding and the control sample includes non-blockholding stocks. Model (2) in Table 1.4 reports the difference-in-differences regression results and we confirm the incrementally less negative effect of concentrated ownership on the propensity to issue guidance in the fourth quarter.

Third, we exploit heterogeneity within blockholders to identify instances where the blockholding effect on managers is likely to be stronger. Specifically, we argue that blockholders demand for private communication reduces with the level of blockholder portfolio diversification.

This effect is driven by limited blockholder ability to monitor an increasing number of securities in a portfolio and a comparatively lower effect of idiosyncratic shocks on wealth (Faccio et al. 2011). We use the number of firms held by each blockholder to measure their diversification and calculate the average institutional blockholders' portfolio diversification in each firm weighted by their percentage of ownership. Specifically, $Port\_Num$ is the average number of firms in each blockholders' portfolio scaled by 100. Consistently, Model (3) confirms a diminishing effect of blockholdings on voluntary disclosure as blockholders' portfolio diversification increases.

Fourth, our results could capture the reverse association where blockholders choose to invest in infrequent voluntary disclosure firms. To address this concern, we run a Granger-type lead-lag test similar to Ajinkya et al. (2005) where we include a lagged indicator for managerial guidance as an independent variable, MF_occur_t. Regression results in Model (4) show a positive coefficient on past guidance, consistent with persistence in firm's voluntary communication. Controlling for past guidance does not change our conclusion about the negative effect that blockholdings have on the likelihood of future guidance.

1.4.4.1 Instrumental Variable Analysis

The last test to address endogeneity is an instrumental variable approach. Following Appel et al. (2016), we make use of the Russell index assignments for identification. Specifically, we focus on the variation in institutional blockholdings that occurs around the cut-off point used to construct the Russell 3000 index, and use the inclusion into the Russell 3000 index as an instrument for blockholding. We focus on Russell 3000 where the exogenous effect on blockholdings is likely to be the highest. Specifically, to reduce institutional blockholding by 1%, an investor would require around $1.76million for the bottom Russell 3000 index stocks compared to £240million for Russell 1000 stocks. Thus, investors would need to spend

disproportionally more to reduce blockholdings in a much larger Russell 1000 index, which would question the validity of the instrument and reduce the power of our tests. Bottom stocks of Russell 3000 are effectively bottom stocks of Russell 2000 thus our choice is consistent with using Russell 2000 index.[14]

We use data from 2001 to 2006 because Russell 3000 changed their reconstitution policy after 2006. During 2001–2006, the Russell 3000 index included the 3000 largest US stocks in terms of market capitalization. The rankings which determine whether a stock is included in the Russell 3000 index are based on the end-of-May market capitalization. We use a similar method to rank stocks on end-of-May market capitalization and select firms that rank between 2500 to 3500. This method ensures that the firms in our sample are similar in terms of market capitalization. We then assess the effect of institutional blockholders on firms' voluntary disclosure exploiting the variation in blockholder ownership around the Russell 3000 cut-off in an instrumental variable setting. Specifically, we instrument institutional blockholders ownership with an indicator for being assigned to the Russell 3000 in a given year, *R3000*. The estimation relies on the assumption that, after conditioning on the stocks' market capitalization, inclusion in the Russell 3000 index does not affect firms' voluntary disclosure except through the impact on institutional blockholdings.

The inclusion into Russell index provides a source of exogenous variation in the ownership structure and affects institutional blockholding in the following ways. Russell index inclusion will

[14] Our focus on Russell 3000 is the main difference of our research design compared to previous papers using similar setting. Several papers use the Russell index assignment as a source of exogenous variation in firms' ownership structures. The specifications in the literature range from regression discontinuity to instrumental variable estimation. According to Appel et al. (2020), papers that use unbiased estimators find that Russell index assignments have little to no impact on total institutional ownership (e.g., Appel et al. 2016, Wei and Young 2019) and only increase ownership by index funds (e.g., Appel et al. 2016, 2019, Cao, Gustafson, and Velthuis 2019, Ben-David, Franzoni, and Moussawi 2019, Glossner 2019). Consistently, in untabulated results, using Russell 1000/2000 assignment shows no significant changes in institutional ownership and in blockholdings. Therefore, focusing on Russell 2000/1000 cut-off cannot generate variations in institutional blockholding that we need.

affect the number of institutional investors (Appel, et al. 2016, Crane, Michenaud and Weston 2016). This evidence reflects that (1) some non-index funds are benchmarked against the Russell index and fiduciary laws, e.g., the Employee Retirement Income Security Act, oblige funds to hold broad index portfolios, thus non-index investors have an incentive to hold index stocks, and (2) index funds that track the Russell index will mechanically buy stocks added to the index. The exogenous pressure to purchase stocks newly added to the index means an increase in their share price (Beneish and Whaley 1996, Lynch and Mendenhall 1997), which incentivizes some existing shareholders, including blockholders, to sell their stock. We do not expect all blockholders to sell, however, we expect that the price increase will reach the reservation price of at least some blockholders leading to a decrease in average blockholdings in the stocks added to the index. Importantly, we do not expect existing blockholders to increase their holdings in the newly added stock because their holdings already exceed the weights required for performance benchmarking. Further, we do not expect new blockholdings to form as a result of index additions as weights of stocks newly added to the Russell 3000 index are less than 0.1%, thus new institutional investors' holdings would typically be substantially below the 5% blockholding cut-off.

We merge stock-level ownership data and Russell 3000 equity index membership with firm disclosure data and control variables between 2001 and 2006. We select firms with institutional ownership higher than 50% (median) and restrict our sample to stocks in the 500 bandwidths around the 3000th market capitalization cut-off, i.e., 500 firms included in the Russell 3000 index and 500 firms that missed being included. Our ranking of market capitalization is based on the end-of-May CRSP market capitalization rankings.[15] This results in a sample of 2,376 observations in the baseline analysis.

[15] A detailed discussion of different ranking methods and their effects can be found in Appel et al. (2020).

We use 2SLS to estimate the instrumental variable regressions. Equation (2) shows the specification of the first-stage regression. Specifically, we regress blockholdings on the dummy variable *R3000*, and because Russell 3000 index assignment is determined by the stock's market capitalization, we control for the stocks' end-of-May log market capitalization, ln $(marketcap)_{it}$. To control for the potential effect of other institutional ownership, we control for total institutional ownership, IO_{it},

$$Block_{it} = \beta_0 + \beta_1 R3000_{it} + \beta_2 IO_{it} + \beta_3 \ln (marketcap)_{it} + \tau_t + u_{it}. \quad (2)$$

In the second stage regression, we predict the likelihood of management guidance using the instrumented block ownership controlling for the level of institutional ownership and market capitalization,

$$P\left(MF_{occur\,it+1}\right) = \alpha_0 + \alpha_1 \widehat{Block}_{it} + \alpha_2 IO_{it} + \alpha_3 \ln(marketcap)_{it} + \tau_t + \varepsilon_{it}. \quad (3)$$

Since institutional blockholding is correlated with total institutional ownership, we use two approaches to ensure that the blockholding effect does not affect voluntary disclosure through the change in total ownership. First, we select firms with a high level of institutional ownership, i.e., firms with institutional ownership higher than 50%, so that the inclusion in the index does not significantly change the total ownership of institutional investors. This step, jointly with the fact that we control for institutional ownership in the estimation, should significantly reduce the confounding effect of changes in total ownership. Second, to validate the proposition that Russell 3000 index additions induce exogenous variation in blockholdings, but do not change total institutional ownership in a stock, in untabulated results, we run a regression of total institutional ownership on the variable *R3000*. We observe that the inclusion in the index does not affect total institutional ownership. These results suggest a low likelihood of the potential confounding influence of total institutional ownership on our analysis.

Table 1.5 reports instrumental variables regression results. The first stage results document that being included in the Russell 3000 index decreases the ownership of institutional blockholders by 5.3%, which is around 28% of the average shares held by blockholders. In the second stage regression, we find a negative effect of instrumented block ownership on the probability of management forecast. Thus, 2SLS results support our main findings.

In untabulated results, we find that our conclusions remain unchanged when we forward the blockholding variable by one, two and three quarters in the first-stage model similar to Boone and White (2015). Further, we find that the reduction in blockholdings is driven by an increase in the number of institutions holding the firm's stock and a reduction in the number of blockholders, consistent with some blockholders selling their stock to new investors. Finally, our conclusions are the same when we use a narrower ±250 bandwidths around the index inclusion cut-off.

[Table 1.5]

There is a concern that Russell index inclusion could correlate with unobservables, such as higher analyst coverage or visibility of the stock to investors, which in turn could affect firm voluntary disclosure. We address this point in the two ways. First, in untabulated results, we checked for changes in analyst coverage and find no evidence of significant changes in analyst coverage for stocks added to the index. Second, in Model (2) of Table 1.5, we add analyst coverage to control variables and find that it does not change our conclusions that higher blockholdings reduce voluntary disclosure. Because we include institutional holdings in the regressions, we control for any effect higher visibility due to index inclusion would have on a firm's disclosure that would mediate through changes in institutional ownership. However, we acknowledge that we cannot fully preclude that other factors correlated with both index inclusion and with blockholdings could affect our conclusions.

We believe our analysis in Table 1.5 is not affected by the bias caused by the Russell float adjustment. Russell adjusts the index membership every year using a proprietary measure of market capitalization. After identifying the membership stocks, Russell uses a float-adjusted market capitalization to weigh the firm within each index. Studies that use the regression discontinuity method, such as Boone and White (2015), are subject to omitted variable bias related to market liquidity if they use a regression discontinuity design based on the observable float-adjusted ranking provided by Russell. We use an instrumental variable approach to identify firms included in the index, which eliminates the risk of estimation bias coming from Russell's float-adjusted reweighting of stocks.

Overall, tests that address endogeneity and reverse causality support our main conclusion. However, we cannot preclude the possibility that changes in blockholdings affect a firm's voluntary disclosure *indirectly* through their effect on non-blockholder information demand and the firm's fundamentals. It is possible that there may be indirect effects of blockholdings on voluntary disclosure mediated through channels such as blockholdings effect on firms' performance, risk-taking behaviour, or non-blockholders' information demand. We believe that our research design choices coupled with several robustness tests significantly reduces the likelihood that these indirect channels have first-order effects on voluntary disclosure. For example, a correlation between voluntary disclosure and firm performance suggests that controlling for the latter would significantly diminish the association between blockholdings and voluntary disclosure. We include several proxies for a firm's complexity, business risk, and operating and market performance, which should largely capture the effects mediated through these channels. Further, if firms engage in less voluntary disclosure in anticipation of changes in future performance and risk, then including measures of future performance and risk should eliminate the association between ownership concentration and voluntary disclosure. In

untabulated results we controlled for future risk and performance and find that our results remain unchanged. Further, our conclusions are robust when we include firm-fixed effects in the model, which should pick up unobservable time-invariant characteristics that could correlate with blockholdings. We believe the overall evidence suggests a direct effect of blockholdings on voluntary communication is of first-order magnitude.[16]

1.4.5. Channels through which Blockholding affect Voluntary Disclosure

This section explores two channels through which blockholdings affect voluntary disclosure: the private for public information substitution of active blockholders and low monitoring incentives of passive blockholders.

1.4.5.1 Active Blockholders

Blockholders have easier access to managers, which can facilitate private information acquisition. As blockholders substitute private for public information acquisition, managers have less incentive to provide costly public disclosure. Having a board seat creates opportunities for private communication between blockholders and managers and we examine if the effect we document is stronger in instances when blockholders hold board seats. We collect board director information from BoardEx and create an indicator variable *Board* if any of the blockholders hold board seats. We then interact this variable with blockholdings, *Block*Board*, to capture the joint effect of blockholdings and board seats. Model (1) in Table 1.6 reports regression results for equation (1) augmented with the board membership measure. We document that the blockholder

[16] In unablated results, we attempted to reconcile our evidence with Ali et al. (2007) and Chen et al. (2008), who find that family ownership and concentrated ownership in family firms have no effect on voluntary disclosure. Because institutional ownership in family firms tends to be low (Chen et al. 2008), their evidence likely captures that institutional holdings must reach a certain threshold before managers respond to institutional pressure. Consistently, we find that neither institutional blockholdings nor average institutional holdings associate with voluntary managerial guidance for stocks in the bottom total institutional ownership decile.

effect on voluntary disclosure becomes more negative when they have board representation. To sharpen this analysis, we also count the number of board seats held by blockholders, *#Board seats*.[17] A larger number of seats gives more opportunities for private information acquisition. Consistently, Model (2) documents a more negative effect when blockholders hold more board seats. Overall, Table 1.6 results support the private for public information substitution hypothesis.

[Table 1.6]

1.4.5.2 Passive Blockholders

The second channel through which blockholdings can affect voluntary disclosure is through blockholders' monitoring incentives. Building on Almazan et al. (2005) and Boone and White (2015), we argue that passive blockholders have low demand for public information because of their low monitoring need and a disproportionally high cost of public disclosure they bear compared to non-blockholders. Specifically, as the fraction of shares held by non-monitoring blockholding institutions increases, such as by passive index funds, managers face less pressure to engage in costly public disclosure. This reflects that monitoring costs vary with the skills and resources an institution can devote to collect and analyse information and such costs tend to be higher for non-monitoring passive investors (Almazan et al. 2005). Non-monitoring blockholders may also encourage less public disclosure as they bear a disproportionally high cost of voluntary disclosure (Shleifer and Vishny 1986). Passive blockholders have also limited demand for private information due to their limited ability to trade on private information (Parrino, Sias, and Starks, 2003). Further, their large holdings compensate for lower stock liquidity due to lower public disclosure. Consistently, Maug's (1998) blockholding formation model shows that blockholders build higher stakes to compensate for lower stock liquidity. Non-monitoring non-blockholders

[17] In unablated results, we find that the average number of board seats held by blockholders, conditional on blockholders having at least one board seat, is 1.063.

prefer higher disclosure to promote higher stock liquidity as transaction costs have a larger wealth impact on their trades (Heflin and Shaw 2000, Boone and White 2015).

Previous research uses Bushee's (1998) classification into transient, quasi-indexers, and dedicated investors to identify passive and active institutional investors (e.g., Boone and White 2015). A disadvantage of Bushee's (1998) classification is that institutions categorized as quasi-indexers include not only pure index-tracking passive institutions but also actively managed institutions whose portfolio holdings mimic a passive institution. These institutions may be quite active in governance and demand for private information compared to index-tracking institutions. To avoid this misclassification concern, we use a more precise mutual fund-level measure of passive ownership to test our prediction. Specifically, we obtain fund names by merging Thomson Reuters S12 mutual fund holdings data with the CRSP mutual fund data. We then categorize a fund as passively managed if the fund's name includes a string that identifies it as an index fund or if the CRSP Mutual Fund database classifies the fund as an index fund. Next, we compute the percentage of each stock's market capitalization that is owned by passive and other mutual funds at the end of each quarter. We then calculate the passive ownership concentration at the mutual fund level. Specifically, we define *Passive MFHHI* as the concentration of passive mutual fund holdings calculated using the Herfindahl index and multiplied by 100. We classify all other mutual funds as other mutual funds. Specifically, *Other MFHHI* is the concentration of other mutual fund holdings calculated using the Herfindahl index and multiplied by 100. We multiply the measures by 100 for ease of reporting as they tend to have relatively small magnitudes, which increases the magnitudes of coefficients. Similar to our main regressions that control for total institutional ownership, we include *Passive MF*, which is the percentage of shares held by passive mutual funds, and *Other MF*, which is the percentage of shares held by other types of mutual funds.

[Table 1.7]

Table 1.7 reports results using the mutual fund classification. We confirm that both passive and other categories of concentrated passive mutual funds holdings have a negative effect on voluntary disclosure, which mirrors are our main conclusions. In contrast, average (non-blockholding) mutual funds ownership has a positive effect on voluntary disclosure. To test if passive ownership has a more negative effect on voluntary disclosure, we compare magnitudes of coefficients on *Passive MFHHI* compared to *Other MFHHI*. We confirm that passive mutual fund ownership has an incrementally more negative effect on voluntary disclosure, a result consistent with managers reducing costly public disclosure when ownership by concentrated investors with low monitoring incentives is high.

1.5. Other Robustness Tests

There is a concern that our results are being driven by firms' pre-2001 ownership. That is, the results could be driven in part by the fact that some firms enter the sample with an already high blockholder ownership, whereas other firms enter the sample with low blockholder ownership. This leaves open the possibility that blockholders have already pre-selected into firms that meet their reporting preferences. To address this concern, we first re-do the analysis for a sample of firms from 2005 to 2015, which moves the sample start year by four years. Panel A of Table 1.8 presents the result. We find our conclusions are unchanged for this subsample. Second, we split the sample into firms that enter the sample with an already high block ownership (higher than sample median in the years that the firms enter the sample) and firms that enter with low block ownership. Panel B of Table 1.8 presents the result. We find that the results are similar in both subsamples. This evidence suggests our main results are unlikely to be driven by firms' pre-

2001 ownership structure.

[Table 1.8]

1.6. Conclusions

We study how institutional blockholders affect corporate voluntary disclosure. We document that blockholders reduce the likelihood of management forecasts and the comprehensives of guidance. We find similar results using conference calls and voluntary 8K filings. We identify two channels through which blockholders affect a firm's voluntary disclosure. First, blockholders have easier access to managers and substitute private for public information acquisition. Second, a higher proportion of non-monitoring blockholders with low demand for voluntary disclosure, such as passive blockholders, reduces a firm's incentive to provide voluntary disclosure. The study identifies an important consequence concentrated ownership has on firm corporate disclosure. While our findings are based on the US market, we expect the conclusions to generalize to other markets with institutional settings similar to the US. For example, countries like the UK and Japan have highly fragmented ownership structures similar to the US and our results should be replicable there. Conversely, our results might not be as applicable in markets where ownership is more concentrated, e.g., markets with high family ownership (Franks 2020). Further cross-country research will be helpful in validating our predictions.

Appendix A. Variable Definitions

This appendix provides definitions for variables used throughout the paper.

Variables	Description
Disclosure Variables	
MF_occur	An indicator variable that equals 1 if the firm issued at least one management forecasts during quarter t+1, and 0 otherwise. We consider as non-guidance firms absent from the I/B/E/S guidance database.
MF_items	The number of items disclosed in management forecasts in quarter t+1.
Institutional Blockholding and Concentration	
Block	Cumulative percentage holdings by blockholders in a firm. We define institutional blockholders as institutional investors who hold at least 5% of the firm's outstanding common shares.
HHI	The ownership concentration of institutional investors measured by the Herfindahl index times 100.
Control Variables	
IO	The total percentage of shares owned by institutional investors
Size	Natural logarithmic of the firm market value of equity at the end of quarter t.
MTB	A ratio of the market value of equity plus book value of long-term liabilities scaled by the book value of total assets.
Lev	Leverage is defined as the sum of long-term debt and short-term debt scaled by total assets.
ROA	Profitability is measured as income before extraordinary items scaled by total assets.
Ret	Stock return momentum is calculated as the buy-and-hold stock return during quarter t.
σRet	Standard deviation of stock return.
Special	A ratio of special items divided by total assets
Analyst	Natural logarithm of the number of analysts issuing earnings forecast for next year available at the end of quarter t.
ΔEPS	Change in earning per share in quarter t scaled by the stock price at the end of quarter t-1.
Boardsize	Natural logarithmic of the number of board directors at the end of quarter t.
Boardindep	The number of independent directors divided by the total number of directors.
CEOturnover	A dummy variable that equals 1 if there is CEO turnover in quarter t.
Complexity	The diversification of business segments by total revenue measured by Herfindahl index.
ω_i	Industry effect based on 2-digit SIC code classification.
τ_t	Year-quarter time effects.

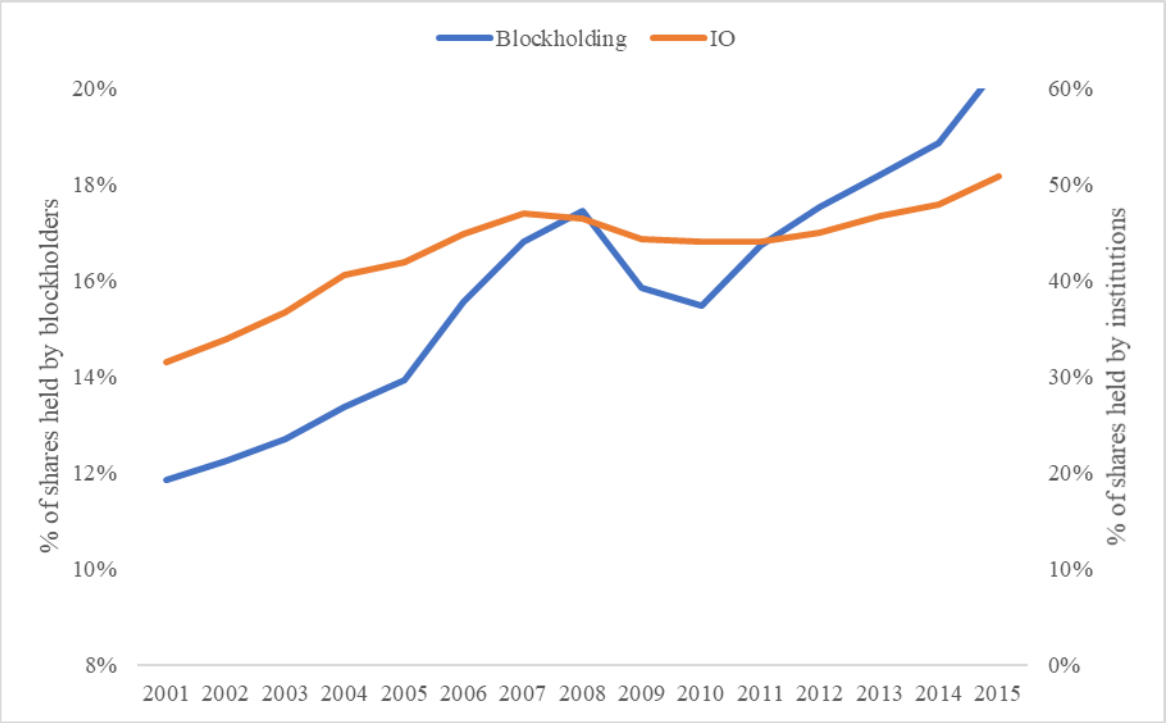


Figure 1.1 Average annual ownership by blockholders and institutional investors. Blockholders are defined as investors holding a minimum of 5% of the firm's stock.

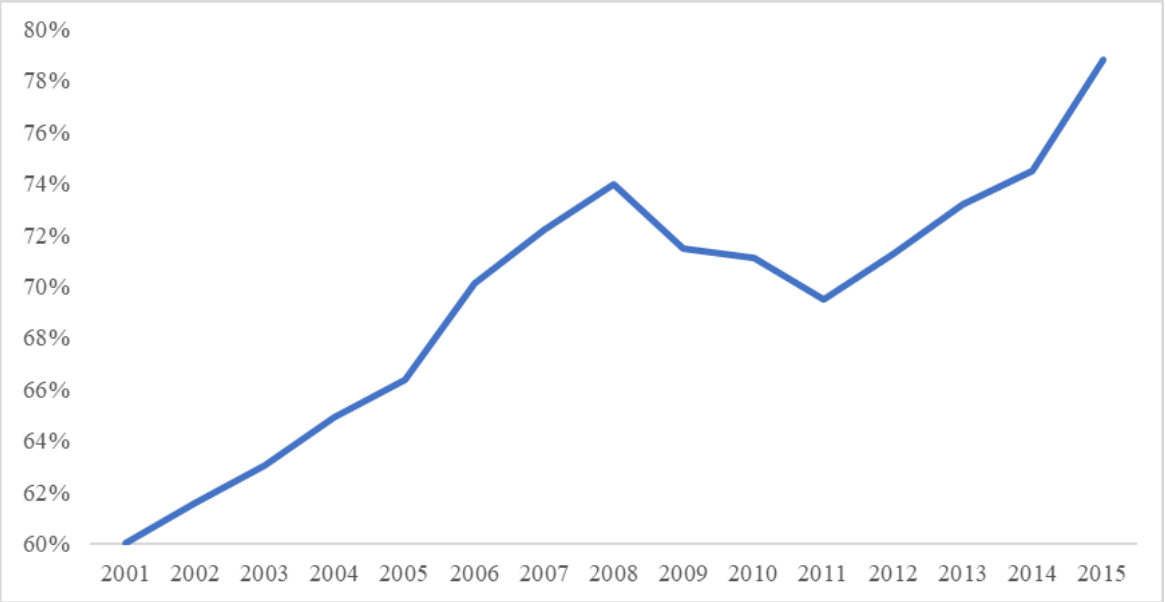


Figure 1.2 The annual proportion of firms with at least one blockholding over the period 2001-2015.

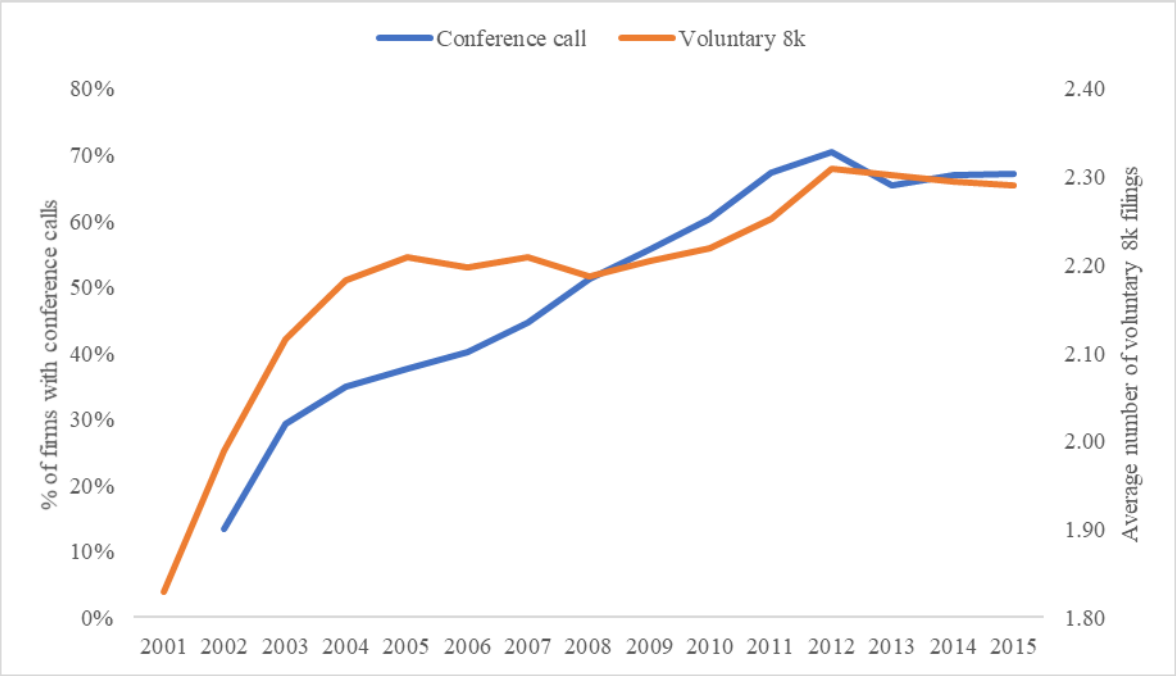


Figure 1.3 The annual proportion of firms hosting quarterly conference calls and providing voluntary 8K filings. Conference call data starts in 2002.

Table 1.1 Summary statistics

The table reports summary statistics for the variables used in our main tests. The sample consists of 104,765 firm-year-quarter observations from 2001–2015. Panel A presents the summary statistics for the full sample. Panel B presents the summary statistics by terciles of block ownership. Panel C reports Pearson correlation between the indicator for management guidance and average institutional ownership and average blockholdings for quartiles of institutional ownership. Panel D reports Pearson correlations between control variables.

Variable	Mean	Std. Dev.	Q1	Median	Q3
Panel A: Full sample results					
Dependent variables					
MF_occur	0.499	0.500	0.000	0.000	1.000
MF_items	2.403	1.708	1.000	2.000	3.000
Ownership variables					
IO	0.583	0.304	0.331	0.647	0.843
Block	0.188	0.148	0.065	0.175	0.286
HHI	2.515	1.814	1.127	2.303	3.606
Controls					
Size	6.271	2.016	4.852	6.252	7.618
MTB	1.967	1.657	1.106	1.469	2.199
Lev	0.203	0.219	0.010	0.157	0.315
ROA	-0.005	0.081	-0.004	0.009	0.020
Special	-0.004	0.035	-0.001	0.000	0.000
ΔEPS	0.003	0.153	-0.007	0.000	0.007
Ret	0.041	0.285	-0.103	0.020	0.146
σRet	0.110	0.102	0.049	0.084	0.140
Analyst	1.558	1.017	0.693	1.609	2.398
Boardsize	1.901	0.389	1.609	1.946	2.197
Boardindep	0.809	0.155	0.714	0.833	0.909
CEOturnover	0.036	0.186	0.000	0.000	0.000
Complexity	0.744	0.286	0.500	0.885	1.000

(Table 1 continued on next page)

Table 1.1, continued

	Blockholder groups			
	Low	Medium	High	Difference in means
	Mean	Mean	Mean	High vs. Low
Panel B: Summary statistics for terciles of blockholdings				
IO	0.317	0.572	0.799	0.482***
HHI	0.745	1.884	4.413	3.669***
Size	5.745	6.497	6.431	0.686***
MTB	2.153	1.953	1.814	-0.338***
Lev	0.199	0.198	0.212	0.013***
ROA	-0.018	0.000	0.000	0.018***
Special	-0.004	-0.003	-0.005	-0.001**
ΔEPS	0.004	0.002	0.003	-0.001
Ret	0.051	0.046	0.025	-0.026***
σRet	0.122	0.107	0.105	-0.017***
Analysts	1.227	1.639	1.718	0.491***
Boardsize	1.835	1.919	1.932	0.096***
Boardindep	0.799	0.809	0.815	0.016***
CEOturnover	0.033	0.036	0.037	0.004***
Complexity	0.758	0.726	0.748	-0.010***
N	34,922	34,922	34,921	

	Low IO		2		3		High IO	
	MF_occur	IO	MF_occur	IO	MF_occur	IO	MF_occur	IO
Panel C: Pearson correlation between MF_occur and IO and Block for quartiles of IO								
IO	0.054		0.179		0.071		0.021	
	(0.000)		(0.000)		(0.000)		(0.001)	
Block	-0.048	0.660	-0.172	0.172	-0.161	0.132	-0.092	0.301
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

(Table 1 continued on next page)

Table 1.1, continued

		MF_occur	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
Panel D: Pearson correlations between control variables														
I.	Size	0.407												
		(0.000)												
II.	MTB	-0.035	0.096											
		(0.000)	(0.000)											
III.	Lev	0.037	0.087	-0.074										
		(0.000)	(0.000)	(0.000)										
IV.	ROA	0.146	0.238	-0.263	-0.060									
		(0.000)	(0.000)	(0.000)	(0.000)									
V.	Special	-0.002	0.056	0.006	-0.028	0.515								
		(0.573)	(0.000)	(0.052)	(0.000)	(0.000)								
VI.	ΔEPS	-0.005	-0.023	-0.008	0.015	0.189	0.267							
		(0.116)	(0.000)	(0.008)	(0.000)	(0.000)	(0.000)							
VII.	Ret	-0.015	0.051	0.149	-0.004	0.067	0.074	0.032						
		(0.000)	(0.000)	(0.000)	(0.157)	(0.000)	(0.000)	(0.000)						
VIII.	σRet	-0.105	-0.277	0.091	0.025	-0.202	-0.080	0.033	0.278					
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
IX.	Analyst	0.474	0.816	0.046	0.075	0.164	0.016	-0.013	-0.030	-0.185				
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
X.	Boardsize	0.257	0.549	-0.123	0.156	0.100	0.010	-0.003	-0.016	-0.170	0.447			
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.380)	(0.000)	(0.000)	(0.000)			
XI.	Boardindep	0.049	0.007	0.038	-0.037	-0.001	0.007	-0.001	-0.012	-0.015	0.028	-0.219		
		(0.000)	(0.026)	(0.000)	(0.000)	(0.640)	(0.036)	(0.724)	(0.000)	(0.000)	(0.000)	(0.000)		
XII.	CEOturnover	0.020	0.026	-0.020	0.002	-0.019	-0.024	0.005	-0.020	0.008	0.029	0.057	0.000	
		(0.000)	(0.000)	(0.000)	(0.444)	(0.000)	(0.000)	(0.125)	(0.000)	(0.011)	(0.000)	(0.000)	(0.889)	
XIII.	Complexity	-0.096	-0.222	0.140	-0.054	-0.040	-0.003	0.001	0.005	0.091	-0.111	-0.238	0.005	-0.016
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.354)	(0.727)	(0.120)	(0.000)	(0.000)	(0.000)	(0.110)	(0.000)

Table 1.2 Institutional blockholders and management forecasts

The table presents regression results for the effect of institutional blockholding on management guidance. **Block** is the total ownership of institutional blockholders where blockholders are defined as holding at least 5% of ordinary shares outstanding. **HHI** is the ownership concentration of institutional investors measured by the Herfindahl index multiplied by 100. **#blockholders** is the number of blockholders. Panel A reports results for equation (1) where the dependent variable is either an indicator variable for whether a firm issued guidance in the next quarter or the number of forecasted items. Panel B reports results for regressions with changes in block ownership and with firm-fixed effects. Panel C reports results where we measure ownership concentration by the Herfindahl index and the number of blockholders. We use the logistic model to estimate models (1)-(2) in Panel A, model (1) in Panel B and models (1) and (2) in Panel C. We use Poisson regression to estimate model (3) in Panel A. We use OLS linear regressions to estimate model (2) in Panels B and C. Standard errors are clustered at the firm level. We report Pseudo R^2 for logit and Poisson regressions and R^2 for OLS.

	(1) Without controlling for blockholdings			(2) Full model			(3) #of forecasted items	
	Estimate	ME	p-value	Estimate	ME	p-value	Estimate	p-value
Panel A: Blockholdings and management guidance								
Block				-0.999	-16.6%	0.000	-0.278	0.000
IO	1.244	20.7%	0.000	1.722	28.5%	0.000	0.246	0.000
Size	0.080	1.3%	0.007	0.052	0.9%	0.078	0.023	0.022
MTB	-0.066	-1.1%	0.002	-0.068	-1.1%	0.002	0.000	0.978
Lev	0.392	6.5%	0.007	0.412	6.8%	0.004	0.094	0.023
ROA	3.766	62.6%	0.000	3.570	59.2%	0.000	0.812	0.000
Special	-4.152	-69.0%	0.000	-3.987	-66.1%	0.000	-0.843	0.000
ΔEPS	-0.065	-1.1%	0.231	-0.055	-0.9%	0.298	-0.051	0.051
Ret	0.142	2.4%	0.000	0.139	2.3%	0.000	0.030	0.060
σRet	0.152	2.5%	0.261	0.150	2.5%	0.264	-0.080	0.134
Analyst	0.780	13.2%	0.000	0.774	12.8%	0.000	0.103	0.000
Boardsize	0.411	6.8%	0.000	0.416	6.9%	0.000	-0.007	0.807
Boardindep	0.395	6.6%	0.018	0.378	6.3%	0.023	0.091	0.091
CEOturnover	-0.142	-2.4%	0.003	-0.141	-2.3%	0.003	0.008	0.635
Complexity	-0.120	-2.0%	0.240	-0.107	-1.8%	0.294	-0.078	0.015
*Year*quarter effects*	Yes			Yes			Yes	
Industry effect	Yes			Yes			Yes	
N	104,765			104,765			52,283	
Pseudo R^2	0.274			0.275			0.034	

(Table 2 continued on next page)

Table 1.2, continued

	(1) Regression in changes		(2) Fixed effects	
	Estimate	p-value	Estimate	p-value
Panel B: Regression with changes in block ownership and with firm-fixed effects				
ΔBlock	-0.235	0.052		
Block			-0.029	0.051
IO	1.238	0.000	0.028	0.017
Controls	Yes		Yes	
*Year*quarter effects*	Yes		Yes	
Industry effects	Yes		No	
Firm-fixed effects	No		Yes	
N	104,765		104,765	
Pseudo R^2/R^2	0.271		0.573	

	(1) Herfindahl index to capture blockholdings			(2)		(3) Number of blockholders	
	Estimate	ME	p-value	Estimate	p-value	Estimate	p-value
Panel C: The Herfindahl index of ownership concentration and the number of blockholders							
HHI	-0.112	-1.9%	0.000	-0.007	0.000		
#blockholders						-0.036	0.028
IO	1.903	31.5%	0.000	0.058	0.000	1.447	0.000
Controls	Yes			Yes		Yes	
*Year*quarter effects*	Yes			Yes		Yes	
Industry effects	Yes			No		Yes	
Firm-fixed effects	No			Yes		No	
N	104,765			104,765		104,765	
Pseudo R^2/R^2	0.276			0.573		0.274	

Table 1.3 Alternative measures of voluntary disclosure

The table presents regression results using two other measures of voluntary disclosure. Column **Conference calls** reports results from an OLS model predicting the likelihood of conference calls. Column **Voluntary 8-K filings** reports results of an OLS regression measuring voluntary disclosure by the natural logarithm of one plus the number of voluntary 8-K filings in a quarter.

	(1)		(2)	
	Conference calls		Voluntary 8-K filings	
	Estimate	p-value	Estimate	p-value
Block	-0.037	0.000	-0.061	0.005
IO	0.128	0.000	-0.023	0.181
Controls	Yes		Yes	
*Year*quarter effects*	Yes		Yes	
Firm-fixed effects	Yes		Yes	
N	103,206		104,765	
R^2	0.764		0.414	

Table 1.4 Endogeneity concern

The table presents regression results for the effect of institutional blockholding on management guidance. **Analyst** is the natural logarithm of 1 plus the number of analysts following a firm. **Q4** is an indicator variable for the fourth fiscal quarter. **Port_Num** is the average number of firms in blockholders' portfolios scaled by 100. **MF_occur$_t$** is past management guidance. Regressions are estimated using logistic regressions. Standard errors are clustered at the firm level.

	(1)		(2)		(3)		(4)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value	Estimate	p-value
Block	-2.579	0.000	-1.085	0.000	-0.967	0.000	-0.648	0.000
Block*Analyst	0.763	0.001						
Block*Q4			0.354	0.000				
Q4			0.100	0.000				
Port_Num*Block					0.004	0.015		
Port_Num					0.005	0.152		
MF_occur$_t$							3.122	0.000
IO*Analyst	-1.096	0.000						
IO	3.493	0.000	1.722	0.000	1.663	0.000	1.080	0.000
Controls	Yes		Yes		Yes		Yes	
Year*quarter effect	Yes		Yes		Yes		Yes	
Industry effect	Yes		Yes		Yes		Yes	
N	104,765		104,765		104,765		104,765	
Pseudo R2	0.280		0.276		0.276		0.489	

Table 1.5 Instrumental variable regressions

The table presents regression results using the 2SLS instrumental variable approach described in equations (2) and (3). **R3000** is an indicator variable for whether a firm is included in the Russell 3000 index. Standard errors are clustered at the firm level.

Second stage regression estimates	(1)		(2)	
	Estimate	p-value	Estimate	p-value
Block	-2.807	0.000	-2.722	0.000
IO	2.178	0.000	2.083	0.000
ln(mktcap)	-0.248	0.002	-0.261	0.001
Analyst			0.059	0.050
Year effect	Yes		Yes	
N	2,376		2,376	
First stage regression estimates	(1)		(2)	
	Estimate	p-value	Estimate	p-value
R3000	-0.053	0.000	-0.050	0.000
IO	0.541	0.000	0.572	0.000
ln(mktcap)	-0.109	0.000	-0.095	0.000
Analyst			-0.037	0.000
Year effect	Yes		Yes	
R^2	0.313		0.339	

Table 1.6 Institutional blockholders' board representation and management forecast

The table presents regression results for the effect of board representation on the propensity to issue management guidance. **Board** is an indicator variable for whether any of the blockholders holds a board seat. **#Board seats** is the number of board seats held by blockholders. Regressions are estimated using logistic regressions. Standard errors are clustered at the firm level.

	(1)		(2)	
	Estimate	p-value	Estimate	p-value
Block*Board	-0.866	0.013		
Block*#Board seats			-0.762	0.025
Block	-0.982	0.000	-0.982	0.000
Board	-0.123	0.470		
#Board seats			-0.016	0.630
IO	1.716	0.000	1.714	0.000
Controls	Yes		Yes	
*Year*quarter effect*	Yes		Yes	
Industry effect	Yes		Yes	
N	104,765		104,765	
Pseudo R^2	0.276		0.275	

Table 1.7 Passive institutional blockholders and voluntary disclosure

The table presents regression results for the effect of passive ownership concentration on the propensity to issue management guidance. **Passive MFHHI** is the concentration of passive mutual fund holdings calculated using the Herfindahl index and multiplied by 100. **Other MFHHI** is the concentration of other mutual fund holdings calculated using the Herfindahl index and multiplied by 100. **Passive MF** is the percentage of shares held by passive mutual funds. **Other MF** is the percentage of shares held by other types of mutual funds. Regressions are estimated using logistic regressions. Standard errors are clustered at the firm level.

	Estimate	p-value
Passive MFHHI	-2.291	0.004
Other MFHHI	-0.585	0.000
Passive MF	14.317	0.000
Other MF	3.466	0.000
Controls	Yes	
*Year*quarter effect*	Yes	
Industry effect	Yes	
N	101,629	
Pseudo R^2	0.270	
Test of coefficient equality: Passive MFHHI = Other MFHHI		
Chi2-test	4.420	
p-value	0.036	

Table 1.8 Other Robustness tests

Panel A presents regression results for the effect of institutional blockholding on management guidance for the sample of firms between 2005 and 2015. Panel B presents regression results for the effect of institutional blockholding on management guidance for firms that enter the sample with high and low block ownership. Regressions are estimated using logistic regressions. Standard errors are clustered at the firm level.

Panel A Management forecast and institutional blockholders for firms between 2005 and 2015

	Estimate	p-value
Block	-0.932	0.000
IO	1.736	0.000
Controls	Yes	
Year*quarter effect	Yes	
Industry effect	Yes	
Observations	82,703	
Pseudo R2	0.299	

Panel B Management forecasts and institutional blockholders for firms with high and low block ownership

	(1)		(2)	
	Low Block		High Block	
	Estimate	p-value	Estimate	p-value
Block	-0.963	0.006	-1.300	0.000
IO	1.480	0.000	2.008	0.000
Controls	Yes		Yes	
*Year*quarter effect*	Yes		Yes	
Industry effect	Yes		Yes	
Obs.	41,103		36,689	
Pseudo R2	0.254		0.244	

2 Does more competition improve the incumbent accounting firms' audit quality? Evidence from the emergence of second-tier accounting firms in China

2.1. Introduction

Audit regulators around the world have expressed concerns over the audit market dominance of Big 4 accounting firms and the potential adverse effect it may have on audit quality (GAO 2003, 2008, Oxera 2006). Their key concern is that Big 4 firms' dominance reduces clients' auditor choice, which in turn (i) encourages complacency among Big 4 auditors and lower audit quality, and (ii) leads to higher audit fees.[18] However, it is unclear whether one of the regulators' key advocated approaches—to increase the number of audit firms thus competition—will result in higher audit quality. Economic theory supports both positive and negative effects a higher number of competitors can have on product quality, particularly in cases when product quality, such as audit, is hard to observe (Kranton 2003, Horner 2002). Empirical audit research also provides conflicting evidence about the effect of competition among auditors on audit quality (Bonne et al. 2012, Dunn et al. 2013, Francis et al. 2013, Huang et al. 2016, Kallapur et al. 2010, Newton et al. 2013).[19]

One of the reasons for the mixed empirical evidence in the earlier literature on the association between auditors' competition and audit quality is that the association between market

[18] The financial press frequently highlights regulators' calls for increased audit market competition, e.g., "A shake-up of audit's oligopoly is long overdue To improve choice and quality, the Big Four's share must be capped" https://www.ft.com/content/9a68e2ee-ac53-11e8-89a1-e5de165fa619

[19] For positive effects higher audit competition has on audit quality, see Dunn et al. (2013), Kallapur et al. (2010), Newton et al. (2013). For negative effects, see Boone et al. (2012), Francis et al. (2013) and Huang et al. (2016).

concentration (usually measured using Herfindahl Index)—the most common measure of auditors' competition—and the actual level of market competition is unclear. For example, theoretically in a Bertrand competition model, just two firms can achieve a competitive equilibrium (Tirole, 1988), and empirically, Sullivan (2002) find that the merger wave in 1989 among the Big 8 accounting firms although significantly increased concentration, it increased the competitiveness of the merged firms and enabled them to better compete for large clients. Thus, high market concentration does not necessarily mean there is a lack of competition among auditors in the market (PwC 2006). Moreover, studies on the association between market concentration and audit quality suffer from an endogeneity problem that the high Big 4 market share may come from their superior auditing ability (DeFond and Zhang 2014).

In this paper, we use a setting of the government-supported emergence of second-tier domestic accounting firms ("Tier 2" firms hereafter) in China as an exogenous shock to the competitive environment of Big 4 firms, and examine how, in response to this competition increase, Big 4 firms change their audit fee and quality. There were a series of policies that aim at increasing the competence of Tier 2 firms during the period from 2007 to 2010. In 2007, the Chinese Institute of Certified Public Accountants (CICPA) put forth plans to develop ten large accounting firms capable of competing internationally. The State Council supported these plans in the No. 56 document *Ministry of Finance's Opinions on Accelerating Development of Chinese Accountancy Profession* (No.56[2009]) in 2009. In 2010 the Hong Kong audit market opened to some selected Chinese domestic firms which further increased their ability to compete with Big 4 firms. The motivation of these policies was to (1) promote more Chinese accounting firms to support listed Chinese companies and (2) to better protect state secrets, particularly in audits of

State-Owned Enterprises (SOEs).[20] After the introduction of the series of new policies, Tier 2 firms developed dramatically, through government supported mergers, overseas development and talent training programmes, etc. This led to the emergence of several large domestic audit firms with resources and expertise that enable them to compete for clients with the Big 4.[21] Further, we observe significant changes in the Big 4's market shares in China after the regulation, which suggests a material effect the policies had on the Big 4 firms' competitive environment. The setting has important advantages compared to the previous studies using measures based on market concentration which suffer from measurement errors and reverse causality problems. First, the emergence of Tier 2 firms provides a clear source of competition increase between Big 4 and Tier 2 firms. This credible competition threat from new entrants could potentially change the behavior of incumbent Big 4 firms, and allows us to link changes in this competitive pressure from Tier 2 firms to changes in Big 4 behavior. Second, the government promoted the emergence of Tier 2 firms not because of concerns about Big 4 audit quality but rather the concern about protecting state secret. The exogenous nature of the regulatory shock we focus on and the subsequent market share changes allow us to establish a causal relation between changes in competitive pressures and the Big 4 firms' audit fee and quality.

We first focus on Big 4 firms' audit fees to test whether the emergence of Tier 2 firms caused price competition between Tier 2 and Big 4 firms, which may drive down the audit fees that Big 4 firms' charge to their clients. Then to capture changes in audit quality, we focus on measures of earnings quality of Big 4 clients. More specifically, we use the absolute value of accruals scaled by client assets to measure earnings quality and assume that high-quality auditing constrains

[20] Big 4 firms in China are usually considered as international accounting firms that they have many connections with their international network, while Tier 2 firms are usually domestically developed.
[21] The largest Tier 2 firms in China include Lixin, Ruihua, Tianjian, Dahua, ShineWing, Zhitong, Daxin, Tianzhi, etc.

opportunistic earnings management. For robustness, we also use the likelihood of financial restatements and discretionary accruals to measure audit quality. We focus on competition from Tier 2 firms, which we define as the top ten domestic accounting firms based on A-share market-wide audit revenue. Top Tier 2 accounting firms' size and competence increased significantly after the series of regulation changes (Chan and Wu 2011) and are getting closer to that of Big 4 firms, thus some clients could plausibly choose between Big 4 and top Tier 2 firms.

To address endogeneity and allow for a causal interpretation of the relation between competition and audit quality, we use a difference-in-differences design to examine the effect of Tier 2 firms' emergence on Big 4 clients' audit fee and earnings quality. We consider the year 2007, when CICPA first proposed the plan to develop ten large domestic accounting firms as the event year and choose three years before the plan was proposed (2005-2007) as the pre-treatment period. The three years during which the series of policies actually took place (2008-2010) are during-treatment period. The three years after the policy changes (2011-2013) denote the post-treatment period.

We instrument the competitive pressure on Big 4 by the industry level variation in the competition between Big 4 and Tier 2 firms. As the audit capacity of Tier 2 firms increases, they should be able to increase their market share more quickly in industries with lower entry barriers (e.g., industries with lower audit complexity), which creates higher competitive pressure on Big 4 firms. We divide listed companies audited by Big 4 firms into treatment and control groups based on the level of competition increase from Tier 2 firms in an industry. Competition from Tier 2 firms in an industry is measured by changes in their annual industry market share of audit revenue between 2007-2013 (from the event year to the end of sample period). The higher the market share increase of Tier 2 firms, the more competition Big 4 faces in that industry. We

assign a Big 4 client company to the treatment group if it is in an industry where the market share change of Tier 2 firms is higher than the sample median. We assign a Big 4 client to the control group if it is in an industry with below-median Tier 2 market share change. We then compare Big 4 clients' audit fee and earnings quality in the high-competition group (treatment) with low-competition group (control) to determine the effects of competition increase from Tier 2 firms on Big 4.

We find that Big 4 firms' audit fee and audit quality reduced in the high-competition group compared to the low competition control group during and after the policy changes. Compared to the low-competition industries, the audit fee of Big4 clients in the high-competition industries decreased by 0.085‰[22] of their total asset value (38% of sample mean) in the transition period, and 0.149‰ (66% of sample mean) in the post-changes period. The absolute value of accruals also increased by 2.2% of their total assets (39% of sample mean) in the transition period and 1.8% (32% of sample mean) in the post-changes period.

We propose that the negative effects of competition on audit fee and earnings quality reflect that increased market competition from Tier 2 firms drives down the audit fee of Big 4 firms, which in turn reduces Big 4's audit quality. The reason is that reputation risk is the main motivation for auditors to provide high audit quality - auditors will lose all the future revenue if they fail to provide high quality. The key for this reputation mechanism to work is a certain level of price premium that serves as something to lose if high audit quality is not provided (Klein and Leffler 1981, Shapiro 1983). However, price competition drives this premium down so that the auditors may find it unprofitable to maintain high level of quality. Building on this prediction, the

[22] Big 4 clients are usually very large companies with an average of 278,473 million total assets in our sample, so the changes of audit fee in the percentage of total assets is small.

negative effect of competition on audit quality should be stronger if the Big 4 firms' audit profit margin is relatively low and increased competition reduces the audit profit below the level to support high-quality audits. To test this prediction, we split the sample into high Big 4 dominance and low Big 4 dominance groups according to the Big 4 firms' initial market share. We assume that Big 4 firms' profit margin is higher in the high-dominance markets and lower in the low-dominance market. We find that although audit fees decreased significantly in both subsamples, in the industries with below-median Big 4 dominance, the emergence of Tier 2 firms is followed by a large decrease in Big 4 audit quality. In industries with above-median Big 4 dominance, there is an increase in Big 4's audit quality after competition increase. This result suggests that the negative effect of competition on Big 4 audit quality is probably driven by low margin audits. For the audit markets with higher profit margin, competition is more likely to play a disciplining role to improve the audit quality.

Though our difference-in-differences design offers advantages in identification, there are still several concerns. First, the evidence that Big 4 firms' audit quality reduced can be driven by the changes in Big 4's client composition instead of changes in audit quality of existing clients. To address this, we track the same group of client firms throughout the sample period from 2005 to 2013 to explore the variation of audit fees and quality within existing clients. We confirm our main conclusions for this sample, particularly, a reduction in audit quality in industries with low Big 4 dominance.

The second concern is that changes in Big 4 firms' audit quality could reflect structural industry-level changes among Big 4 clients that result in lower-quality earnings. To mitigate this concern, we use companies audited by Tier 2 firms in the same industry as the control group. Industry-level changes in earnings quality would affect both Big 4 and Tier 2 clients. Our results

for this sample are consistent with our main conclusions. Thirdly, to mitigate the concern that non-audit services may affect our results, we exclude from the sample the clients of Deloitte who has the highest income from non-audit services among Big 4 firms. The negative effects on audit quality remain strong.

Finally, in the main analysis, we divide treatment and control groups based on the changes in Tier 2 auditors' market share of audit revenue from 2007 to 2013. There are two concerns with this measure of competition. First, this measure has an endogenous component that audit fee changes of Big 4 clients could also affect the calculation of the Tier 2 firms' market share based on audit fee.[23] This could lead to an upward-biased estimation of the magnitude of the effect on Big 4 audit fees in the main analysis. Second, the changes in Tier 2 firms' market share can be caused by industry-level demand shock from smaller firms which are unlikely to be the clients of the Big 4, and the competition that the Big 4 actually face among their existing and potential clients could remain unchanged. This measurement error can bias the estimation of the coefficients towards zero. To identify the supply-driven component of Tier 2 firms' share increase stemming from their competence increase and control for the endogenous component caused by the audit fee changes of Big4 clients, we use a two stage least square approach, and instrument for the high-competition treatment variable using a variable indicating whether the industry is emphasized in the *Document 56*. The government is likely to invest more resources in the specialized capacity of Tier 2 firms and provide more support in those industries, thus Big 4 in those industries face more competition from Tier 2 firms. This measure of competition is ex-ante determined and less affected by the audit fee and audit quality changes of Big 4, therefore has less

[23] The market share of Tier 2 firms is calculated as *total audit revenue of Tier 2 firms in year t/total audit revenue in the market in year t.* The revenue of Big 4 firms is included in the denominator, so the decrease in Big 4 firms' audit fee could mechanically lead to an increase in the market share of Tier 2 firms if the number of Big 4 clients is constant.

concern of endogeneity. It mainly affects the capacity of Tier 2 firms in supplying audit services and should have no influence on the demand-side in the audit market. We continue to find a negative effect of competition from Tier 2 firms on Big 4 audit fee and quality.

This study has several contributions to the literature. First, it adds to the literature on the links between audit market competition and audit quality. By using a quasi-natural experiment related to the government promoted emergence of Tier 2 audit firms in China, we provide evidence on a causal negative relation between an increased number of big audit firms and the incumbent Big 4 firms' audit quality. We also show that this effect is likely to depend on the Big 4 firms' profit margin in offering audit services: competition in low-margin industries has an incrementally negative effect on audit quality. Finally, our findings also shed light on potential competition effects in other certification markets such as the credit rating agency market.

2.2. Institutional Background

In this section, we first introduce how Big 4 firms became dominant in the China A-share audit market, and then discuss the policy changes to support the emergence of Tier 2 firms. We finally describe the changes in the audit market following the policy changes.

2.2.1. Big 4 Dominance in China A-share market

Before 2005, Big 4 firms accounted for around 30% of the total audit fee income in the A share annual audit market, which is comparable to the total Tier 2 firms' market share. The Big 4 firms' market share increased sharply in 2005-2007 to over 65%. The key contributor to Big 4's dominance in the A-share market was the listing of many large Chinese SOEs during this period such as Petro China, Bank of China and China Construction Bank. These companies hired Big 4

because the audit of very large companies required the capacity that only Big 4 possessed at that time (Gillis 2014). The required capacity included staff resources, technical expertise, and global reach to audit large multinational companies (GAO 2003, Oxera 2006). Thus, the capacity to audit large firms was the major barrier for non-Big4 firms to enter the market dominated by the Big 4 (GAO 2008). Further, the dual listing of large SOEs required them to hire Big 4 because of the auditors' international reputation and regulations of overseas stock exchanges that largely precluded domestic Chinese accounting firms.[24]

2.2.2. Challenges from Tier 2 accounting firms

A series of government policies related to audit market from 2007 to 2010 supported the development of Tier 2 accounting firms. These policies mainly include the *Document 56* and the opening of the H-share audit market in Hong Kong to domestic Chinese auditors. The Chinese Institute of Certified Public Accountants (CICPA) put forth plans in 2007 to develop ten large domestic accounting firms capable of competing internationally. In October 2009, the State Council supported these plans in the document *Ministry of Finance's Opinions on Accelerating Development of Chinese Accountancy Profession* ("*Document 56*" hereafter), which made the development of accounting firms a matter of national priority. This document called for China to develop ten large accounting firms capable of serving Chinese companies globally with a broad range of services, 200 middle-sized firms capable of serving large and medium-sized companies, and a large number of local firms to serve smaller organizations and rural areas.

Document 56 outlined the government's plan to (1) invest resources in more domestic accounting firms, (2) encourage mergers and acquisitions among these firms to increase their

[24] For example, Hong Kong required until 2010 that a Hong Kong CPA must audit accounts of companies listed on the HKSE, which largely precluded Chinese domestic firms.

audit capacity, and (3) provide support for more firms to expand internationally. In the document, the large state-owned enterprises, including those listed overseas and those in key industries like banking, energy, and telecommunications, were encouraged to give priority to domestic accounting firms to protect the safety of national economic information.

Another important policy was the opening of the H-share market to selected Tier 2 firms in 2010. One of the main obstacles for domestic accounting firms to overcome in order to serve large Chinese companies was to obtain the acceptance of their work overseas. Before 2010, Hong Kong Stock Exchange rules required that all Hong Kong listed companies should be audited by Hong Kong CPAs. Exceptions were possible but have only been granted to the Big 4. This has led to the audit market for Chinese companies listed in Hong Kong concentrated in the hands of the Big 4 firms. In 2010, the largest Chinese accounting firms were given the permission to audit H-share companies.[25] Additionally, several of the large domestic firms also acquired audit firms in Hong Kong or opened Hong Kong offices from then on to audit Hong Kong listed firms. This gave the Chinese companies dual-listed in Hong Kong more options in choosing their auditors, and increased the pressure for the Big 4 firms in competing for these companies with Tier 2 firms.

The government's regulatory and economic support to the Tier 2 firms helped them accumulate resources and overcome the entry barriers to audit even the largest clients who were typically the clients of Big 4.

2.2.3. Changes in the Chinese audit market

Following the regulatory changes, Tier 2 firms grew rapidly through mergers: from 2007 to 2013, the number of firms qualified for auditing listed securities decreased from nearly 70 to 40,

[25] The non-Big4 domestic firms allowed to audit H-share companies are Lixin (BDO), Tianjian (Pan-China), Dahua (Moore Stephens), ShineWing, Crowe Horwath, Zhitong (Grant Thornton), ZhongRuiYueHua (RSM), Daxin (PKF).

with most merger deals initiated with government support. After 2013, the number of qualified firms remained constant at 40. Several large accounting firms evolved from the wave of mergers between 2007 to 2013, e.g., Lixin, Ruihua, Tianjian, Dahua, Shinewing, Zhitong, Daxin and Tianzhi. These large Tier 2 firms also joined international accounting networks such as BDO and Grant Thornton, which helped them to develop reputation and obtain clients overseas. Chan and Wu (2011) report that the mergers and acquisitions of accounting firms in China resulted in larger firms with a more efficient audit practice. As the audit capacity and audit quality of Tier 2 firms increased, there are more choices for large listed companies that are traditionally Big 4 firms' clients, especially for those with relatively lower audit complexity. Since Tier 2 firms usually charge lower audit fees than Big 4 firms, switching to a Tier 2 firm can save audit fees which creates motivation for some companies to choose Tier 2 firms instead of Big 4 firms. The emergence of the large domestic accounting firms created a credible threat to the Big 4.[26] In the 2012 annual rankings of the top 100 CPA firms in China which based largely on audit revenue, Ruihua China ranked in the third place which pushed KPMG to the 5th place and E&Y to the 4th.

The competition between Big 4 and Tier 2 firms intensified among both existing listed companies and the new listings. In our sample, 39 companies switched away from Big 4 firms after 2007,[27] and the average size of the switched companies are 4 times larger in terms of total assets in the post-2007 period than in the pre-2007 period. This suggests that after the policy changes, more big companies switched from Big 4 firms to Tier 2 firms. For example, in 2010, two large companies in the Electric, Gas, and Sanitary Services industry (CSRC code: D) switched to Tier 2 firms—Datang International Power Generation Co., Ltd switched to Zhong Rui

[26] For example, the following article provides anecdotal evidence on how one of the biggest Tier 2 Chinese accounting firms grow to be a challenger to the Big 4 firms: "Accounting: Stalking the Big Four" https://www.ft.com/content/cd74664e-9797-11e2-97e0-00144feabdc0

[27] This is around 25% of the total number of Big 4 clients in 2013.

Yue Hua (RSM China), and Xingrong Environmental Co., Ltd to ShineWing. These switches caused a 29% reduction in PwC's audit fee income in that industry in 2010. The competition for audits is also present for newly listed companies. The total number of listed companies increased significantly during our sample period from 1375 in 2005 to 2536 in 2013. The share of Big 4 in the newly listed clients increased from 30% in 2015 to 83% in 2007, and then decreased to around 7% in 2013.

Figure 2.1a shows the changes in Big 4 and Tier 2 accounting firms' market share in the China A-share annual audit market between 2002 to 2017. The market share is measured by the fraction of audit fee income in the market. Tier 2 firms include the top 10 domestic firms, classified annually based on the audit fee income. The blue line in Figure 2.1a represents the change in the market share of Tier 2 firms. Their cumulative market shares have been increasing from 2007 and exceeded the Big 4 market share in 2014. The market share of Big 4 decreased from 66.47% in 2007 to 36.64% in 2017, while the Tier 2 firms' market share increased from only 10.63% in 2007 to 44.05% in 2017.

The change in the market share of Tier 2 firms has been significantly driven by a higher proportion of audits of large companies that are usually Big 4 firms' clients. Figure 2.1b shows that the fraction of firms audited by Tier 2 firms in the top 10% of companies ranked by total assets increased from close to zero in 2006 to nearly 30% in 2017. This evidence suggests that large companies could choose between Big 4 and Tier 2 firms after the regulatory changes when selecting an auditor. Jointly, the evidence in Figure 2.1 on the changes in audit market structure indicates that the competition between Big 4 and Tier 2 firms increased significantly after the policy changes.

[Figure 2.1]

2.3. Literature and Hypotheses

In this section, we first discuss the theories on how competition affects auditors' incentives to provide high audit quality and develop the hypotheses in our setting. Then we summarize previous empirical literature on competition and audit quality.

2.3.1. Theory and Hypotheses

In traditional competitive theory, economists assume that market participants can observe the quality of the product, and then greater competition enhances product quality (Watt and Zimmerman 1983, Tirole 1988). However, in the context of the audit market where quality is hard to observe, the prediction is less clear and depends on how competition interacts with auditors' incentives to provide audit quality.[28]

Because audit quality is unobservable, auditors have incentives to reduce quality by providing less input to the audit process and maximize short-term profits. Moreover, there is a conflict of interest in the supply of audit quality: client firm managers prefer unqualified opinions and can incentivize auditors to meet their expectations by increasing the audit firm's revenue through audit and non-audit services. Users of audited information, who prefer accurate reporting, do not generate revenue for audit firms. This can motivate auditors to conceal the problems they find in their clients' reporting and thereby decrease audit quality.

Despite auditors' motivations to decrease audit quality, they also have incentives to provide high audit quality. The two principal forces that motivate audit quality documented in previous

[28] We follow Watts and Zimmerman (1983, 1986) to define audit quality as: Audit quality= Probability (report the breach| breach exists) = Probability (discover the breach| breach exists) * Probability (report the breach | discover the breach) =Competence*Independence. Competence refers to the probability that the auditor discovers a given breach in the client's accounting system. Competence is reflected in factors such as inputs into the auditing process and expertise. Independence refers to the probability that the auditor reports the discovered breach.

literature are auditor's reputation risk and litigation risk (DeFond and Zhang 2014). We discuss the relevant literature on how competition affects audit quality through interactions with these incentives, and develop two contrasting hypotheses in our setting.

A rich theoretical literature in economics argues that the formation of reputation can help support quality provision in markets where information problems would otherwise preclude it (e.g., Klein and Leffler 1981, Shapiro 1983). In empirical auditing literature, several studies also find evidence that auditor reputation provides incentives for high-quality auditing (e.g.,Chaney and Philipich 2002; Cahan et al., 2011; Cahan et al., 2009; Krishnamurthy et al.,2006, Nelson et al., 2008; Skinner and Srinivasan, 2012). The effect of competition on equilibrium audit quality through reputation mechanism is ambiguous. One the one hand, competition may lead to audit quality decrease. Maintaining a good reputation requires a price premium (Klein and Leffler 1981, Shapiro 1983) that if auditors fail to provide high audit quality, they will lose the future premium. This reputation premium is even more important in audit market, because it not only motivates auditors to work hard but also to be independent (Strausz, 2005). However, price competition can drive the profits down which makes it less profitable for firms to sustain a reputation and induces them to focus on short-term incentives. This may place limits on the level of quality that can be supported (Kranton 2003). A lower level of audit quality from supply side can be caused by a lower level of resource input or less independence. When auditors are dominated by short-term incentives, it may choose to spend less effort or become less likely to resist a given manager's pressure to not report breaches, i.e., less likely to be independent (DeAngelo, 1981).

On the other hand, competition can also have a disciplining effect on audit quality. Horner (2002) shows that competition promotes quality when quality is noisily observed because it allows dissatisfied consumers to easily and credibly punish any firm by switching suppliers

whenever it fails to produce high quality. This mechanism is especially important in the audit market because the demand for audit services is mandated. This is consistent with regulators' concern that high audit market concentration could limit a company's choice of audit firms and thereby decreases the cost of reputation loss which leads to lower audit quality (e.g., GAO 2003; GAO 2008).

Litigation risk is another motivation for accounting firms to provide high audit quality. There is theoretical evidence that increased liability reduces audit failure (Deng et al., 2012) and reduces audit shirking (Zhang, 2007). For empirical literature, some previous studies examine shifts in litigation risk and find that lower litigation risk reduces audit quality (Firth et al., 2012; Geiger and Raghunandan, 2001; Lee and Mande, 2003; Lennox and Li, 2012; Venkataraman et al., 2008). The level of market competition can affect the regulator's ability to impose litigation costs on auditors. For example, the collapse of Arthur Anderson led to a permanent change in the industrial organization of the audit industry- from the "Big 5" to the "Big 4". This change further reduced the choices of auditors for many large multinational companies and caused concerns of many regulators on their ability to impose punishment in the future. Increasing competition in this market may increase the credibility of litigation threats and increase audit quality thereafter.

In this setting, Big 4 firms are concentrated in the current market, the emergence of Tier 2 firms introduces new competition. If the price competition with Tier 2 firms drives Big 4's premium down, this could cause a decrease to Big 4's audit quality, but it also provides clients with new choices which creates credible threat to punish Big 4 by choosing other auditors. For litigation concern, more competition from Tier 2 firms can increase the litigation risk of Big 4 because there is less concern for the market to become further concentrated. The audit quality may increase considering the increased litigation risk threat. In conclusion, the prediction of the

effect on Big 4's quality change is unclear and deserves further empirical tests. From the above arguments, we develop the following two contrasting hypotheses in our setting.

Price competition hypothesis: In this setting, because Tier 2 firms usually charge lower prices than Big 4 firms, it is very likely that the emergence of Tier 2 firms introduces price competition between Tier 2 and Big 4 firms, and drives the audit fee of Big 4 clients down. If the audit fee is driven down to a level that is not enough to support high audit quality, the Big 4 firms may decide to put less effort or become less independent to take higher short-run profits. This may lead to lower audit quality of Big 4 firms.

Disciplining hypothesis: The emergence of Tier 2 firms also provides more alternative choices for the companies which are traditionally Big 4 clients. This creates credible threat to the switching of auditors if the Big 4 firms fail to produce high quality. More capable auditors in the market also increase the credibility of litigation threats. These disciplining effects from the emergence of Tier 2 firms may lead to an increase in Big 4 firms' audit quality.

2.3.2. Empirical Evidence on the Association between Competition and Audit Quality

Prior empirical evidence on the relation between auditor competition and audit quality is mixed. The bulk of studies use market concentration as a measure of competition and study the association between market concentration and audit quality. The GAO (2003, 2008) find no evidence to support the argument that market concentration harms audit quality and suggests that more investigations are warranted. Kallapur et al. (2010) use a U.S. sample covering 2000 to 2006 and find that greater market concentration is associated with higher accruals quality indicating higher audit quality. Newton et al. (2013) use a U.S. sample for the period 2000 to 2009 and find that a higher auditor's market concentration is related to a lower likelihood of

financial restatements. Using Chinese data from 2001-2011, Huang et al. (2016) find a positive association between city-level market concentration and audit fee and earnings quality.

In contrast, Boone et al. (2012) use a sample of U. S. companies from 2003 to 2009 that would fail to meet the analysts' consensus earnings forecasts without using discretionary accruals, and find that higher auditor market concentration is associated with a higher likelihood of meeting analyst consensus earnings forecasts. With a sample covering 42 countries from 1999 to 2007, Francis et al. (2013) investigate the influence of the Big 4 dominance on audit quality, measured as accrual's quality, the likelihood of reporting a profit, and timely loss recognition. They provide cross-country evidence for a positive association between the Big 4 dominance and audit quality. Thus, what is the direction of the relation between audit market competition and audit quality remains an open question.

2.4. Research Design and Sample Description

2.4.1. Research Design and Measurement

In this paper, we use the government-supported emergence of the Tier 2 accounting firms as a shock to Big 4 firms' competitive pressure, and use a difference-in-differences style approach to examine its effect on Big 4 firms' audit fee and quality. We make use of the industry level variation in the competition between Big 4 and Tier 2 firms, and divide the client companies into treatment and control groups based on the level of competition in the industry.

Big 4 firms' competition pressure from Tier 2 firms in industry *m* is measured by Tier 2 firms' aggregate market share change between 2007-2013, which is the period between the event year and the end year in the sample:

$$Competition\ from\ Tier\ 2_m$$

$$= Market\ Share\ of\ Tier\ 2_{m,2013} - Market\ Share\ of\ Tier\ 2_{m,2007}$$

where *Market share of Tier* 2 is the sum of audit revenue earned by Tier 2 firms as a fraction of the total audit revenue earned in the market. We define Tier 2 firms as the top 10 domestic firms in the market in terms of total audit revenue ranked annually. The rationale behind this measure is the following: as the competence of Tier 2 firms increases, clients can more easily switch to Tier 2 auditors. In the market where Big4 used to dominate, clients can now choose to use Tier 2 firms. The higher the market share of Tier 2 firms, the more competition the Big4 face. We classify a Big 4 client company in the high-competition group (treatment group) if it is in an industry with above-median level of competition. The low-competition group (control group) contains the Big 4 clients in the industries with below-median level of the competition.

Our approach is motivated by the fact that audit complexity varies across industries: the auditing market in different industries have different levels of entry barriers, which makes Big 4 exposed to different levels of competition after the emergence of Tier 2 firms. For example, the financial industry requires higher skills and expertise because more estimation and professional judgement is involved in financial companies' annual reports compared to other industries. Big 4 may face less competitive pressure from Tier 2 firms in this industry due to their specialist knowledge. In the electric, gas, and sanitary services auditing market, audits tend to be simpler and Big 4 is likely to face more competitive pressure. Figure 2.2 shows the evolution in Big 4 market share for these two industries. We observe little variation in Big 4 market share for the finance industry, but a significant decline in the market share for the Electric, Gas, and Sanitary Services industry after the emergence of Tier 2 firms.

[Figure 2.2]

This research design relies on the variation in Tier 2 market share change promoted by the government regulation. Table 2.1 lists Tier 2 firms' market share by industry, comparing the average share of Tier 2 firms for the pre (2005-2007), during (2008-2010), and post- period (2010-2013) of the policy change. It also shows the pre-treatment market share of Big 4 firms in each industry. We exclude industries where Big 4 has no presence before 2007. In the year 2007, Big 4 firms were highly concentrated in the industries such as mining; metals and minerals; electric, gas, and sanitary services; construction; transportation and storage; financial industry. By the end of the sample, Tier 2 firms increased their market share in most of the industries.

[Table 2.1]

2.4.1.1 Measures and Model

We first focus on Big 4 firms' audit fees to test whether the emergence of Tier 2 firms caused price competition between Tier 2 and Big 4 firms. The dependent variable Fee_{it} is measured as the audit fee of Big 4's client *i* at year *t* divided by its total assets at year *t* times 1000. We next focus on the earnings quality of clients' annual reports as the main proxy for audit quality. More specifically, we use the variable $Absacc_{it}$, which is measured by the absolute value of total accruals of client *i* at year *t* divided by its total assets at year *t*. The assumption behind this measure is that high-quality auditing constrains opportunistic earnings management. An important advantage of audit quality measures based on earnings quality is that they are expected to detect "within GAAP" earnings manipulation even when it does not rise to the level of a material misstatement (DeFond et al. 2014).

We then use the following model to estimate the effect of competition shock from Tier 2 firms on Big 4's audit fee and audit quality:

(1) Fee_{it} ($Absacc_{it}$)

$$= \alpha_0 + \beta_1 High\_competition_i * During_t + \beta_2 High\_competition_i * Post_t$$
$$+ \beta_3 High\_competition_i + \beta_4 During_t + \beta_5 Post_t + X'_{it}\,\beta_6 + e_{it}.$$

where *High_competition* is the treatment variable with value 1 if client *i* is in the high-competition group, and 0 otherwise. *During* is an indicator variable for the transition period, and *Post* is an indicator variable for the post-treatment period. Because the effect on Big 4 audit quality from the increase in competition is unlikely to be instantaneous and the exact time for that effect is uncertain, we divide the time period in our sample into pre, during, and post-period to capture the potentially non-immediate effect. We choose three years before the plan was proposed (2005, 2006, 2007) as the pre-treatment period. The years during which the policy changes took place (2008, 2009, 2010) are the during-treatment transition period, and the three years after the series of policy changes (2011, 2012, 2013) are the post-treatment period.

The model compares Big 4 clients' audit fee and quality changes in the high-competition group to that of the Big 4 clients in the low-competition group. The coefficients we are interested in are β_1 and β_2, which are the interactions of the treatment variable with *During* and *Post*-treatment period dummy. Vector X_{it} contains a set of controls for client company characteristics and is based on previous research. The control variables include total assets, market to book ratio, leverage, return on assets, stock return, receivables and inventories, dual listings, and whether controlled by central government (Bonne et al. 2012, Dunn et al. 2013, Francis et al. 2013, Huang et al. 2016, Kallapur et al. 2010, Newton et al. 2013, etc.). Details of variable definitions are provided in Appendix A.

2.4.2. Data and Descriptive Statistics

The data for audit fee, company financial data, and stock market information comes from the Chinese Stock Market and Accounting Research (CSMAR) database. We classify industries using the China Securities Regulatory Commission (CSRC)'s industry classification. We begin with all Chinese A-share listed companies with auditor information from 2005 to 2013. Then we merge the data with financial and stock market information. The sample starts in 2005 which is three years before the proposal of *Document 56* and ends in 2013 which is three years after the opening of the H-share market. We keep only client firms audited by Big 4 auditors in our main analysis because our focus is on Big 4 firms' audit quality change. After excluding observations with missing information, the final sample consists of 927 firm-year observations.

Table 2.2 summarizes the main variables used in this study. The mean of Big 4 clients' audit fee is 5,470,649 RMB (around 781,521USD), and median is 2,790,000 RMB. On average, the audit fee accounts for only 0.23‰ of client companies' total assets. This is because the Big 4 clients are usually very large companies, and the audit fee is small compared to the huge assets. For the measure of audit quality, the absolute value of accruals counts for 5.6% of clients' total assets on average.

With respect to the control variables, total assets (*Assets*) is on average 278,473 million RMB, and the market to book ratio (*MTB*) is 0.001. The mean debt to asset ratio is around 0.54. The mean of return on assets (*ROA*) and yearly stock return (*Ret*) are 4.7% and 25.3% respectively. Receivables (*Recat*) and inventories (*Invat*) are on average 7.3% and 14.1% of total assets respectively. Around 21% of observations issue B share and 34.7% issue H share. Only 8% of the observations are also listed on New York Stock Exchanges. Around 37% of the

observations are controlled by the central government.

[Table 2.2]

2.5. Empirical Results

We first test the effect of Tier 2 firms' market share increase on Big 4 firms' audit fees. Because Tier 2 firms usually charge lower audit fee than Big 4, their competition with Big 4 for audit clients can potentially drive down Big 4 firms' audit fee. Columns (1) in Table 2.3 present the regression results for model (1) where the audit fee is the dependent variable. The coefficients for interactions *High_competition*During* and *High_competition*Post* are negative and significant, which suggests a reduction in audit fee of Big 4 clients in the high-competition industries compared to the control group of Big 4 clients in the low-competition industries. The audit fee of Big4 clients decreased by 0.083‰[29] of their total asset value (37% of sample mean) during the transition years of policy changes, and 0.157‰ (70% of sample mean) in the post-changes period in the high competition industry compared to industries with low competition. To increase the estimation efficiency, we also use an alternative specification that controls for the industry and year fixed effect. The result is reported in column (2) which is similar to the result in column (1). These results provide support for the price competition between Tier 2 and Big 4 firms that the Big 4 firms' audit fee has decreased significantly during and after the policy changes in the high-competition industries compared to the low-competition industries. The emergence of Tier 2 firms drove down the Big 4 firms' audit fee.

Because audit fees affect auditors' incentives to provide high audit quality, we next test the

[29] Big 4 clients are usually very large companies with an average of 278,473 million total assets, so the changes of audit fee in the percentage of total assets is small.

effect of Tier 2 firms' market share increases on Big 4 firms' audit quality as measured Big 4 clients' absolute value of accruals. Column (3) and (4) in Table 2.3 show that the competition has a negative effect on Big 4 clients' earnings quality. Specifically, in column (3) the absolute value of accruals increased by 2.1% of their total assets (37.5% of sample mean) in the high-competition industries during the transition years compared to low-competition industries. In column (4) the absolute value of accruals increased by 1.8% in the post-treatment period. These results support that competition increase from Tier 2 firms has a negative effect on Big 4's audit quality.

[Table 2.3]

2.5.1. Industries with High vs. Low Big 4 Dominance

The results so far are consistent with the *price competition hypothesis* that price competition pressure from Tier 2 firms drove down Big 4 firms' audit fee to a level that is not sufficient to support high audit quality. We next test whether the competition effect is more pronounced for industries with lower initial Big 4 dominance. The idea is that according to theoretical prediction (Klein and Leffler 1981, Shapiro 1983), the competition effect depends on whether the audit fee premium is sufficient to support high audit quality. The negative effect on audit quality should be more pronounced in industry markets with lower price premium, because in these industries Big 4 firms' audit fee premium is more likely to be driven to a level insufficient to support audit quality.

Since we cannot observe the costs of the audit projects, we assume that Big 4 can charge a higher price premium in industries where they have higher market shares[30], the negative effect we document in Table 2.3 should be less pronounced in industries with higher Big 4 dominance. This

[30] There is a possibility that higher market share can facilitate collusion between dominant firms and increase their profitability (Tirole 1988, pp. 557).

is because if the price premium is high, the market competition may drive down the price to a level that is still high enough to support high quality.

To examine this prediction, we divide the sample into two groups by Big 4 firms' industry dominance in the event year 2007: the high-dominance group with the Big 4' s total market shares higher than the median 36% in 2007, and low-dominance group with Big 4's market shares lower than 36% in 2007. We run regression (1) separately for each group, and the results are presented in Table 2.4.

[Table 2.4]

Table 2.4 Panel A shows that in the low-dominance group, competition from Tier 2 firms has a significantly negative effect on Big 4's audit fee in the during- and post-treatment period, and the earnings quality of Big 4 clients also decreased significantly in both periods. Further, the magnitude of the effect on earnings quality is larger than in the full sample, e.g., the coefficient on *High_competition*During* is 0.053 in column (4) of Table 2.4 and 0.022 in column (4) of Table 2.3. However, in the high-dominance group, although competition from Tier 2 firms has a significantly negative effect on Big 4 audit fees in both during- and post-treatment periods, the effect on Big 4 clients' earnings quality is positive in the post-treatment period.[31]

Jointly, the evidence suggests that although the price competition is pervasive in the audit market, the negative effect on Big 4 audit quality is driven by industries with lower Big 4 dominance, and there is evidence of a positive effect on audit quality in industries with higher Big 4 initial dominance. This is consistent with our prediction that in the lower Big 4 dominance markets, the price premium of Big 4 firms is more easily to be driven down by competition to the level which is not sufficient to support high quality, such that the auditors may need to cut costs

[31] The coefficient differences for the two subsamples are significant using Chi-squared test.

or become less independent from their clients. The *price competition hypothesis* is strongly supported in this subsample. In the higher Big 4 dominance markets, the price premium may still be high enough, and the threat to change auditors motivates Big 4 firms to improve their audit quality. The results in this subsample are consistent with the *disciplining hypothesis*.

2.6. Additional Tests

This section addresses the identification concerns for our main analysis.

2.6.1. Control for Changes in Client Composition

In the main analysis, we find a decrease in Big 4 clients' earnings quality measured by the absolute value of accruals scaled by total assets. However, since earnings quality is affected by both client characteristics and audit quality, this result could also be driven by the changes in Big 4 firms' client composition instead of changes in audit quality. For example, when facing increased competition, Big 4 may be less strict in selecting clients in order to serve more companies to increase their revenue. Some of the new clients may have poor accounting control systems which lead to lower earnings quality. Big 4 firms may also lose some clients with high earnings quality due to the competition from Tier 2 firms.

To address this concern, we use a subsample of the same group of Big 4 clients throughout the sample period 2005-2013 to explore the variations in their audit fee and earnings quality. Results for this sample are less likely to be driven by the changes in Big 4 firms' client composition.

[Table 2.5]

Table 2.5 documents a negative effect from Tier 2 competition on Big 4 clients' audit fees

and earnings quality. Further, when we divide the sample by Big 4 dominance, there is a significantly negative effect on earnings quality in the low-dominance, but not the high-dominance subsample which is consistent with previous findings.

2.6.2. Comparison with Tier 2 Firms

The second concern is that in the main analysis, we only focus on the fee and quality changes for Big 4 auditors. However, our results could also be affected by systematic changes in the earnings generating process in some industries. For example, a change in financial reporting requirements in certain industries may cause changes in earnings accruals and audit fee. To mitigate the concern that the changes in audit fee and quality may be caused by institutional changes in certain industries, we use companies audited by Tier 2 firms in the same industry as a control group, to see whether there are changes in the differences between Big 4 and Tier 2 firms' audit fee and quality after the policy changes. The industry-level changes in audit fee and earnings quality would affect both Big 4 and Tier 2 firms. We compare Big 4 and Tier 2 clients in high-competition industries and low-competition industries separately. The model has the following form:

(2) $$Fee_{it}\ (Absacc_{it}) = \alpha_0 + \beta_1 Big4_{it} * During_t + \beta_2 Big4_{it} * Post_t + \beta_3 Big4_{it} + \beta_4 During_t + \beta_5 Post_t + X'_{it}\,\beta_6 + e_{it}$$

where *Big4* is a dummy variable with value 1 if client *i* is audited by a Big 4 firm in year t, and 0 if audited by Tier 2 firms. The results are presented in Table 2.6. For audit fees, in the high-competition group β_1 and β_2 are significantly negative, and for the low-competition group β_2 is significantly positive. This shows that compared to Tier 2 firms, Big 4 firms' audit fee decreased

when they faced more competition. For audit quality, there is a significant positive effect on accruals in the high-competition group. This suggests that Big 4 decreased their audit quality compared to Tier 2 firms when facing more competition. The results suggest that there is a significant decrease in audit fees and audit quality of Big 4 firms compared to Tier 2 firms in the high-competition industries. Since the negative effects dominate in the high-competition group, the negative effects are likely to be caused by the competition increase from Tier 2 firms instead of industry-level institutional changes.

[Table 2.6]

2.6.3. Instrumental-variable Approach

In the main analysis, we divide treatment and control groups based on the realized changes in Tier 2 auditors' market share. There are two concerns with this measure of competition. First, this measure has an endogenous component that the changes in one of the dependent variables-Big 4 firms' audit fee-could also affect the calculation of the treatment variable *High-competition*, which is based on Tier 2 firms' market share of audit fee income.[32] This could upward bias the estimation magnitude of the effect on Big 4 firms' audit fee in the main analysis. Second, the changes in Tier 2 firms' market share may not only be caused by the supply side shock from Tier 2 firms' capacity increase, but also by industry-level demand shock from smaller firms, i.e., more newly listed smaller firms that would not have been audited by Big 4. In this case, the competition that the Big 4 actually face among their existing and potential clients could remain unchanged. This measurement error can bias the estimation of the coefficients towards zero. To

[32] The market share of Tier 2 firms is calculated as *total audit revenue of Tier 2 firms in year t/total audit revenue in the market in year t.* The revenue of Big 4 firms is included in the denominator, so the decrease in Big 4 firms' audit fee could mechanically lead to an increase in the market share of Tier 2 firms if the number of Big 4 clients is constant.

identify the supply-driven component of the Tier 2 auditors' share increase stemming from their capacity increase, and control for the endogenous component in the treatment variable caused by the audit fee changes of Big4 clients, we use a two stage least square approach. We instrument for the high-competition treatment variable using a pre-determined variable indicating whether the industry is emphasized in *Document 56*. *Document 56* says that overseas-listed companies, companies in the financial, energy and telecommunication sectors, and other large state-owned enterprises that are vital to the nation's economy and wellbeing should give priority to the large domestic accounting firms that can better protect national economic and information security as their service providers. For these industries, the government is likely to invest more resources in the specialized competence of Tier 2 firms and provide more support, and therefore, Big 4 firms may have more competition pressure. This measure of competition is ex-ante determined and less affected by the audit fee and audit quality changes of Big 4 firms, so it has less concern of endogeneity. It mainly affects the competence of Tier 2 firms in supplying audit services and should have no influence on the demand-side in the audit market.

We use the following model specification:

$$(3) \quad \Delta Fee_{it}\ (\Delta Absacc_{it}) = \alpha_0 + \beta_1 High\_compeition_i + X'_{i,t}\,\beta_2 + e_{it}$$

where ΔFee_{it} ($\Delta Absacc_{it}$) is the change in audit fee (earnings quality) for Big 4 client *i* from 2007 to year t.[33] We instrument the treatment variable *High-competition*$_i$ using the variable *Pressure*$_i$ indicating whether the client is in the industries mentioned above in *Document 56*. The vector X_{it}

[33] We estimate the model in this way because in the main analysis model, there are three potentially endogenous variables (the *High_competition* variable and the interaction terms), so we need at least three instrumental variables (IV) in that case. IV estimator is a consistent but biased estimator, and the finite sample bias is positively correlated with the number of IVs (Hahn and Hausman 2005). Transformation to this model specification leaves only one endogenous variable and the 2SLS estimation becomes more straightforward and less biased.

contains a set of control variables from model (1). The coefficient of interest is β_1. To allow for comparability, we first estimate model (3) using OLS regression, and then the 2SLS approach.

[Table 2.7]

The results are presented in Table 2.7. In column (1), the effect of competition on audit fee estimated by OLS regression is significant and the magnitude is comparable to the previous results. When using the instrumental variable approach, column (2) shows that the effect is also significant, and the magnitude becomes more than doubled. In column (3), the effect of competition on the absolute value of total accruals estimated by OLS regression is not significant. When using the IV approach, it becomes significant and much larger in magnitude. The results support the conclusions in our main analysis, and also indicate that the effects are likely to be underestimated in the main analysis.

2.6.4. Alternative Measures of Audit Quality

In this section, we use two alternative measures of audit quality to check the robustness of the main results. First, we use client firm's financial restatements as an alternative measure of audit quality. Accounting restatements correct misstatements in previously issued financial statements. This is a more direct measure of audit quality compared to accrual-based measures, because it indicates that the auditor erroneously issued an unqualified opinion on materially misstated financial statements (DeFond and Zhang 2014). The limitation of the measure is its low frequency-only 13% of the observations have restatements in our sample. We exclude restatements caused by accounting policy changes and mergers, and label 1 if there is at least one restatement in a firm year. We re-estimate the regressions in our main analysis. The results in table 2.8 column (1) and (2) show that our main conclusions are unchanged for the audit quality

measured by financial restatements.

[Table 2.8]

In our main analysis, we use absolute value of accruals as the measure of earnings quality of Big 4 clients. Discretionary accruals are also commonly used in the measure of earnings quality. We use total accruals instead of discretionary accruals because some recent research shows that using residuals (e.g., discretionary accrual) as dependent variable generates biased coefficients (Chen et al. 2018). In this section, we adopt a method suggested by Chen et al. (2018) to estimate the effect of competition on Big 4 clients' discretionary part of accruals. Specifically, we use the absolute value of accruals as dependent variable and add the variables in the modified Jones model (Dechow et al. 1995)-change in revenues (ΔRev_{it}) minus change in accounts receivables (ΔRec_{it}) and gross property, plant and equipment (PPE) in the model to control for the nondiscretionary part of accruals. These control variables are scaled by lagged total assets. The coefficients β_1 and β_2 effectively show the effect of competition on Big 4 clients' discretionary accruals. The results are presented in Table 2.8 column (3) and column (4) which further confirm our main results.

2.6.5. Parallel Trend Assumption

An important assumption for the difference-in-differences analysis is the parallel trend assumption. To address this concern, we estimate the dynamic treatment effects of the policy changes on Big4 firms' audit quality. Instead of using During and Post to denote the years during and after the policy changes, we construct 8 dummy variables indicating each of the years around those changes and use the year 2005 as the benchmark year: year2006, year2007, year2008, year2009, year2010, year2011, year2012, year2013. The policy changes took place after 2007 till

2010. We interact these year-dummies with the *High-competition* dummy in the following regression:

$$(4) \quad Fee_{it}\ (Absacc_{it}) = \alpha_0 + \sum_{t=2006}^{2013} \beta_{t-2005} High\_competition_i * year_t + X'_{it}\,\beta_9 + YearFE_t + IndustryFE_i + e_{it}.$$

If the parallel trend assumption is valid, we expect β_1 and β_2 to be insignificant.

[Table 2.9]

Table 2.9 shows that the effect of competition on audit fee is not significant before 2009, and the effect on the absolute value of accruals are not significant before 2008. This is consistent with a parallel trend between treated and control firms before treatment.

To further justify the validity of the difference-in-differences design, we show in Figure 2.3 the trend of the average value for the dependent variables, which are the scaled audit fee and the absolute value of accruals of Big 4 clients, in the high-competition treatment group net of the low-competition control group every year. Figure 2.3 shows that for audit fees, the difference between treatment and control groups are relatively constant before 2010, and mainly drop in the post treatment period. For audit quality, the difference in scaled absolute accruals is negative before 2007, and become constantly positive during and post the policy changes. The results are not likely to be driven by the pre-trends.

[Figure 2.3]

2.6.6. Non-audit Service

One concern for our main analysis is that the deterioration in audit quality can also be

affected by Big 4 firms' non-audit services. Generating more revenue from non-audit services can make auditors become less independent from their clients if they are also clients for non-audit services. To mitigate this concern, we collect non-audit revenue data for each Big 4 firm from the *Top 100 accounting firms in China* disclosed by CICPA. The non-audit revenue data are disclosed in year 2004, 2008, 2009 and 2016. On average, PWC has 7.5% of revenue from non-audit services, E&Y has 11.0%, KPMG has 26.1%, and Deloitte has 36.2%. We then address this concern by excluding the data from Deloitte who has the highest level of non-audit services, and run the same regressions using the rest of the data from only PWC, E&Y and KPMG. Table 2.10 presents the results for the Big 4 firms with low levels of non-audit services. The conclusions from our main analysis still hold. This suggests that non-audit services are not likely to drive our results.

[Table 2.10]

2.7. Conclusions

In this paper, we focus on the Big 4 accounting firms who dominate the most profitable audit market in China and show that introducing more competition to the Big 4 in the China A-share audit market decreased the Big 4's audit fee and audit quality. This effect is most pronounced in the industries where Big 4's initial dominance is lower. This result has important policy implications that introducing more competition can harm audit quality if there is already enough competition in the market.

The evidence of a negative effect on audit quality from higher audit market competition needs to be applied with caution to other economies. Though the Big 4 firms dominate the most profitable segments of audit market in China, their market dominance is still lower than in

countries such as the US and the UK. Since the effect of competition increase depends very much on the initial level of market competition and market structure, it is possible that audit quality can increase as market competition increases in other countries where Big 4 firms have more market power. Further, it is possible that the effect of competition on audit quality is a reverse U shape depending on the existing level of market competition, i.e., when the market is highly concentrated (e.g., monopoly), increasing competition can increase audit quality because the auditor wants to retain the high profit for a long time and the disciplining effect dominants in this case (fee is still high enough to maintain a significant level of profit margin, but this is lower than monopoly profit margin). As the level of competition increases, there is an optimal level of competition where the level of quality is the highest. If competition continues to increase, it would be more profitable for auditors to focus on short-term benefit, because the competition is too fierce that price competition drives price down to a level that maintaining a high level of quality would result in a big disadvantage in the short run, and that the auditors need to cut cost or compromise to their clients, the short-run motivation being dominant. In this setting, we find that for the high Big 4 dominance industries, competition has a positive effect on Big 4 audit quality, it could be the case that the competition level is not high enough in those markets, while in the low dominance industries, the competition is already fierce, so increasing competition decreases audit quality. In countries with higher Big 4 dominance such as the US, it could be the case that the current level of competition is not enough, so increasing competition could possibly be an effective way to increase audit quality. Therefore, it is very important to consider whether the level of competition is enough or too low in the current market situation when introducing a policy to regulate the audit market. We suggest that future research focus on this question.

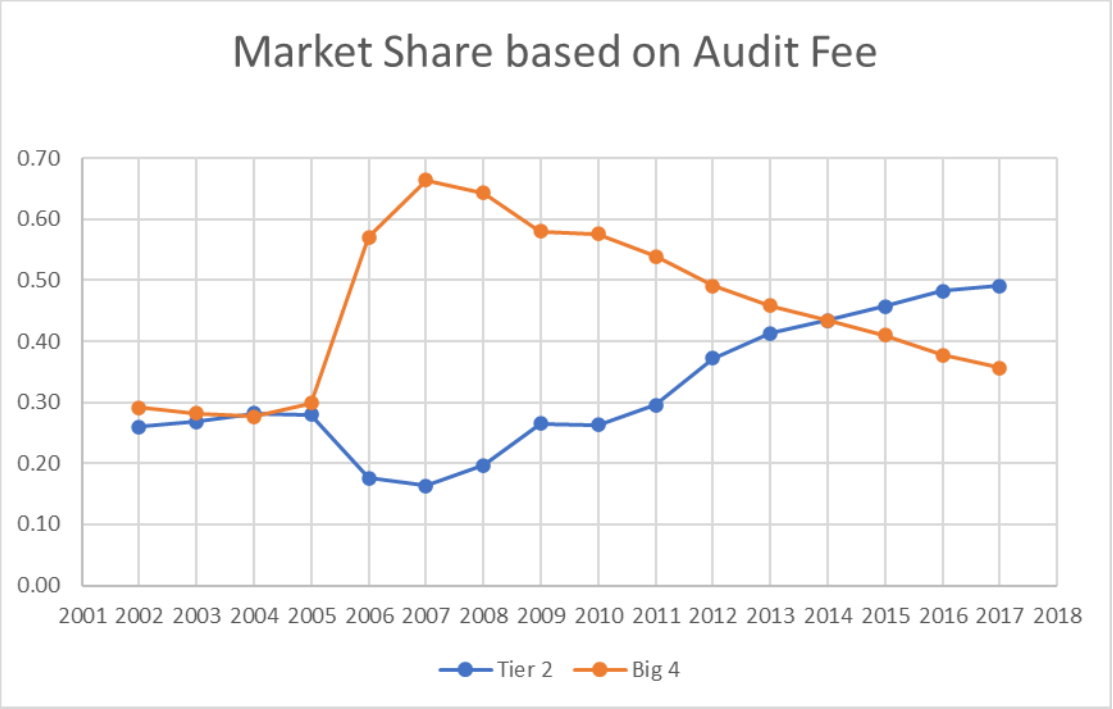
Appendix A Definition of variables

This appendix provides definitions for variables used throughout the paper.

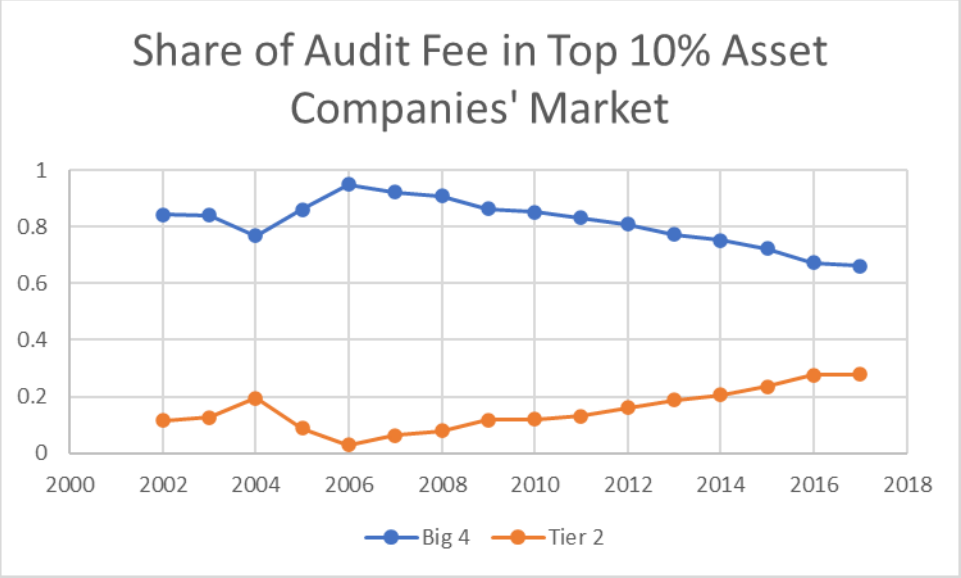
Variable	Definition
Dependent Variables	
AuditFee	The raw value of the total audit fee per client.
Fee	AuditFee divided by total assets times 1000. (AuditFee/Assets)*1000.
Absacc	The absolute value of accruals divided by total assets.
Client Characteristics	
Assets	The raw value of total assets.
LnAssets	The natural logarithm of total assets. Ln(Assets).
MTB	The market value of equity divided by total assets times 1000.
Recat	The percentage of receivables over total assets.
Invat	The percentage of inventories over total assets.
Lev	Leverage ratio. The percentage of total debts over total assets
ROA	Net income divided by total assets.
Ret	A client's annual stock return.
B-share	1 if a client issues B shares, and 0 otherwise.
H-share	1 if a client issues H shares, and 0 otherwise.
NYSE	1 if a client is also listed on New York stock exchanges, and 0 otherwise.
CentralGov	1 if a client is controlled by the central government.
Auditor Characteristics	
Big 4	1 if a client is audited by a Big 4 auditor.

*All currencies are in RMB

Figure 2.1 Market share changes of international “Big 4” and domestic “Tier 2” accounting firms in China A-share annual auditing market.

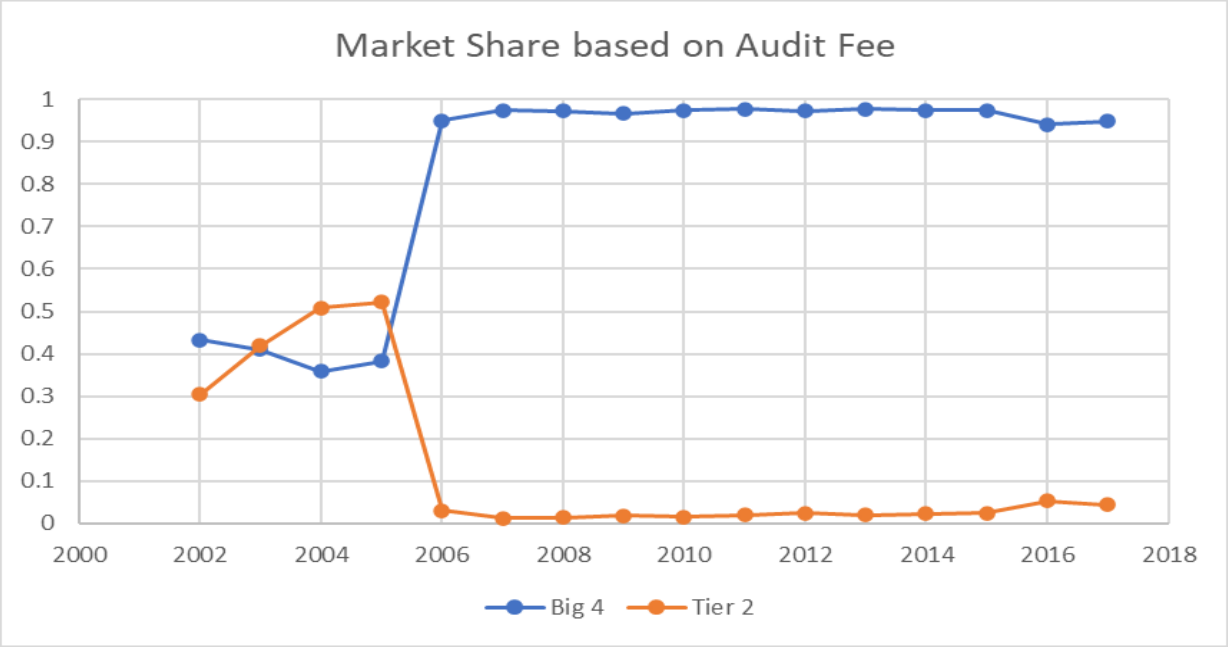


a. Changes in the whole China-A share annual audit market

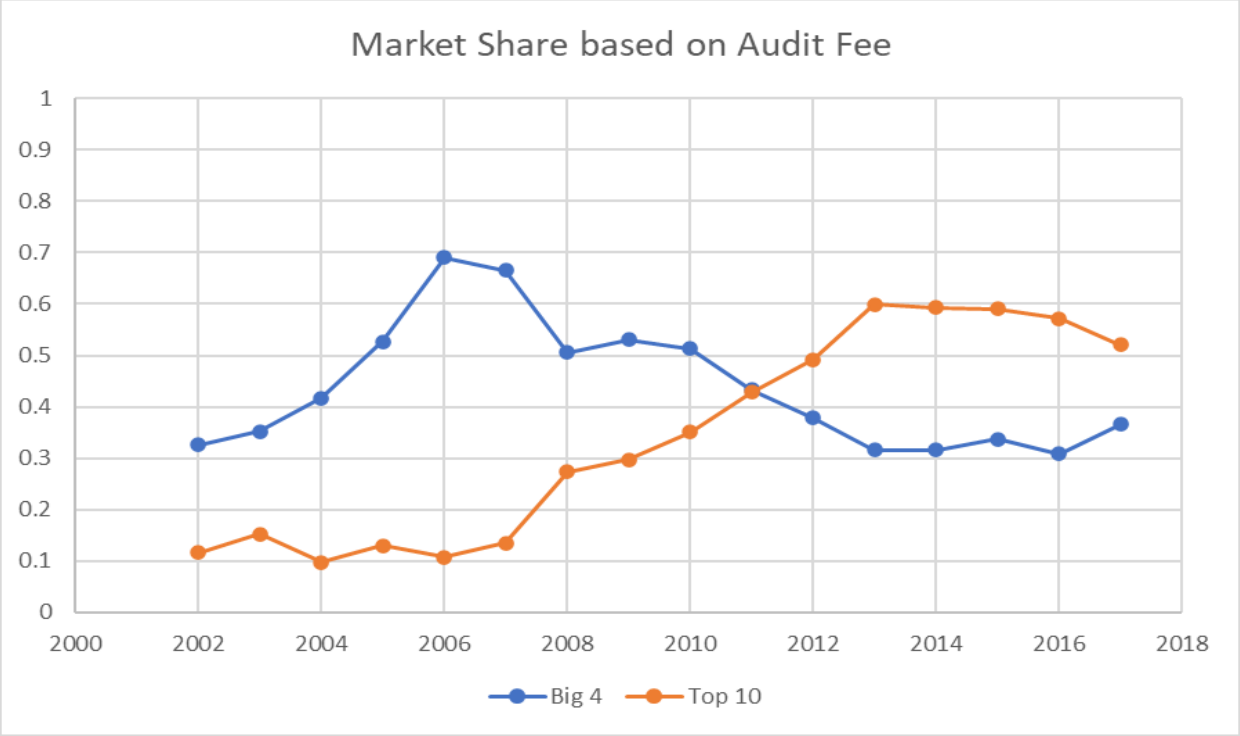


b. Market share changes in top 10% asset companies’ submarket on China A-share annual audit market.

Figure 2.2 Market share of Big 4 and Tier 2 firms in the Financial industry and Electric, Gas, and Sanitary Services industry by audit fee from 2002 to 2017

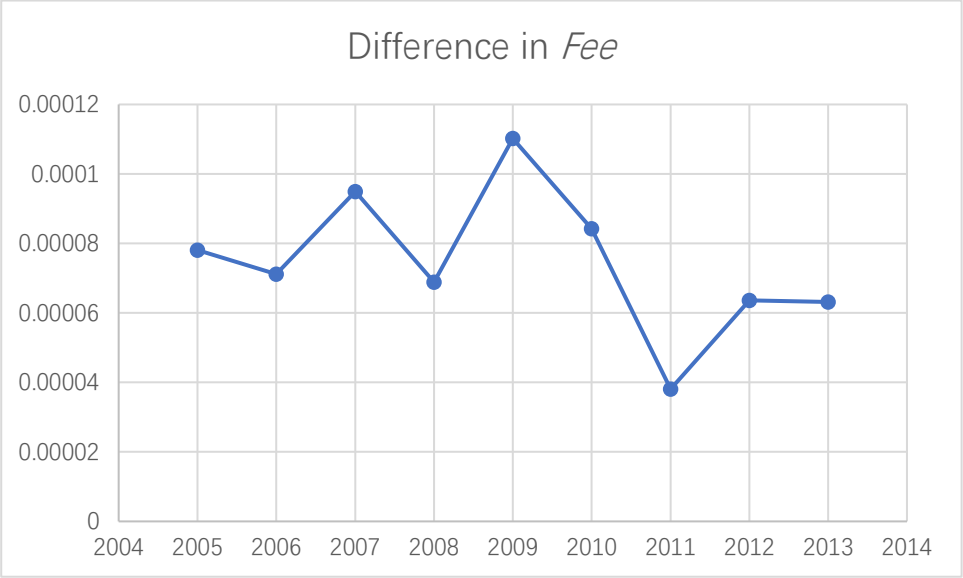


a. Financial Industry

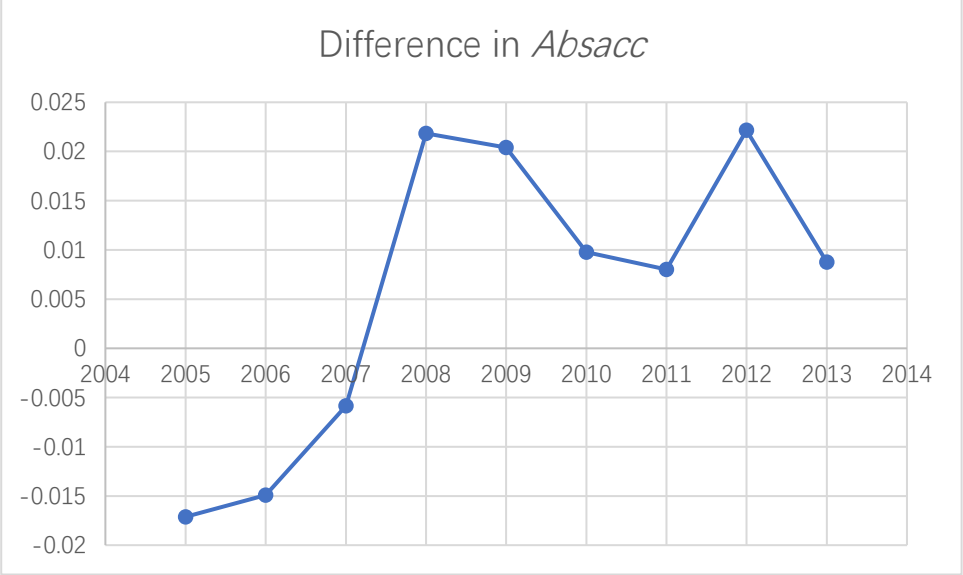


b. Industry of Electric, Gas, and Sanitary Services

Figure 2.3 Trend of Dependent Variables in the Treatment Sample (Net of Control)



a. Audit Fee



b. Absolute Value of Accruals

Table 2.1 Market shares of Tier 2 and Big 4 firms by industry

This table presents the market shares of Tier 2 and Big 4 firms. Column (1)-(3) shows the average annual market shares of Tier 2 firms for the periods 2005-2007, 2008-2010, and 2011-2013. Column (4) is the increase in market share from (1) to (3). Column (4) shows the share of the Big 4 in the year 2007. Market share is the fraction of audit fee income of all Tier 2 firms in an industry over the audit fee in the whole industry market.

		Share of Tier 2				Share of Big 4
CSRC Code	Industry	2005-2007	2008-2010	2011-2013	Change	2007
		(1)	(2)	(3)	(4)	(5)
B	Mining	5%	9%	16%	11%	94%
C0	Food and Beverage	30%	43%	55%	25%	28%
C1	Textiles and Clothing	31%	50%	66%	35%	11%
C3	Paper and Printing	19%	44%	71%	52%	43%
C4	Petroleum, Chemical, and Plastic	27%	38%	55%	28%	36%
C5	Electronic	35%	49%	63%	28%	23%
C6	Metals and Minerals	16%	31%	44%	27%	47%
C7	Machinery and Equipment	35%	43%	54%	18%	18%
C8	Pharmaceutical and Biological Products	38%	48%	62%	24%	14%
D	Electric, Gas, and Sanitary Services	12%	31%	51%	38%	67%
E	Construction	35%	19%	16%	-19%	75%
F	Transportation and Storage	29%	47%	49%	20%	49%
G	Information Technology	34%	56%	76%	42%	26%
H	Wholesale and Retail Trades	40%	47%	52%	13%	8%
I	Financial Industry	19%	2%	2%	-17%	97%
J	Real Estate	32%	40%	52%	20%	21%
K	Public Administration	39%	50%	69%	30%	7%

Table 2.2 Descriptive statistics

This table provides summary statistics for the variables used in the main tests. The sample consists of 927 client-year observations from 2005-2013. Variables are defined in Appendix A.

Variable	Mean	Std. Dev.	Q1	Median	Q3
Dependent Variables					
Fee	0.225	0.260	0.077	0.146	0.268
Absacc	0.056	0.056	0.019	0.041	0.073
AuditFee	5,470,649	7,164,834	1,310,000	2,790,000	5,680,000
Client Characteristics					
Assets (million)	278,473	1,494,692	6,000	18,000	67,000
LnAssets	23.837	1.875	22.515	23.614	24.928
ROA	0.047	0.063	0.019	0.041	0.077
Lev	0.539	0.205	0.400	0.531	0.667
Recat	0.073	0.083	0.014	0.041	0.108
Invat	0.141	0.154	0.020	0.104	0.190
Ret	0.253	0.797	-0.248	0.002	0.516
MTB	1.055	1.105	0.383	0.727	1.290
B-share	0.214	0.410	0.000	0.000	0.000
H-share	0.347	0.476	0.000	0.000	1.000
NYSE	0.080	0.271	0.000	0.000	0.000
Cengov	0.370	0.483	0.000	0.000	1.000

Table 2.3 The effect of competition on audit fee and earnings quality

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality measured by absolute value of accruals. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Fee* in column (1) and (2) is the audit fee paid by the client scaled by its assets; Absacc in column (3) and (4) is the absolute value of total accruals scaled by client assets. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 2.3, continued

	Fee	Fee	Absacc	Absacc
	(1)	(2)	(3)	(4)
High_competition*During	-0.083**	-0.085***	0.021**	0.022**
	(0.038)	(0.032)	(0.010)	(0.010)
High_competition*Post	-0.157***	-0.149***	0.016	0.019*
	(0.035)	(0.033)	(0.010)	(0.010)
High_competition	0.114***		-0.006	
	(0.036)		(0.007)	
During	-0.010		-0.008	
	(0.029)		(0.008)	
Post	0.019		-0.013	
	(0.027)		(0.008)	
LnAssets	-0.088***	-0.099***	-0.002	-0.003
	(0.011)	(0.011)	(0.001)	(0.002)
ROA	-0.751***	-0.641**	-0.232**	-0.215*
	(0.258)	(0.297)	(0.099)	(0.109)
Lev	0.091	0.082	0.024	0.024
	(0.067)	(0.074)	(0.016)	(0.018)
Recat	0.261**	0.212*	-0.036	-0.043
	(0.100)	(0.125)	(0.025)	(0.033)
Invat	-0.094***	0.017	0.060***	0.067**
	(0.036)	(0.069)	(0.021)	(0.029)
Ret	-0.019	-0.019	-0.001	0.001
	(0.018)	(0.024)	(0.002)	(0.004)
MTB	0.050***	0.039*	0.004	0.003
	(0.015)	(0.021)	(0.003)	(0.004)
B-share	0.002	0.022	0.008	0.009*
	(0.019)	(0.018)	(0.005)	(0.005)
H-share	0.128***	0.136***	-0.010***	-0.009**
	(0.021)	(0.021)	(0.003)	(0.003)
NYSE	0.040	0.053**	0.036***	0.033***
	(0.025)	(0.026)	(0.005)	(0.005)
Cengov	-0.020	-0.028	-0.011***	-0.008**
	(0.012)	(0.018)	(0.004)	(0.004)
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	927	927	927	927
R-squared	0.460	0.484	0.180	0.207

Table 2.4 The effect of competition by different Big 4 dominance

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality for subsamples divided by Big 4's initial dominance in the industry market. *Big 4 dominance* is defined as high if it is above the median of Big 4's market share across industries in 2007. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals to 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Fee* in column (1) and (2) is audit fee paid by the client scaled by its assets; Absacc in column (3) and (4) is the absolute value of total accruals scaled by client assets. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Fee	Fee	Absacc	Absacc
Panel A Low Big 4 Dominance				
High_competition*During	-0.089*	-0.073*	0.051***	0.053**
	(0.048)	(0.042)	(0.015)	(0.017)
High_competition*Post	-0.153***	-0.136***	0.047***	0.051***
	(0.048)	(0.042)	(0.014)	(0.015)
High_competition	0.139***		-0.021**	
	(0.052)		(0.009)	
During	-0.016		-0.016	
	(0.033)		(0.012)	
Post	-0.008		-0.026**	
	(0.032)		(0.012)	
Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	396	396	396	396
R-squared	0.575	0.602	0.260	0.275

Table 2.4 (continued)

	(1) Fee	(2) Fee	(3) Absacc	(4) Absacc
Panel B High Big 4 Dominance				
High_competition*During	-0.115**	-0.119***	-0.007	-0.010
	(0.044)	(0.039)	(0.011)	(0.009)
High_competition*Post	-0.196***	-0.206***	-0.021*	-0.021*
	(0.045)	(0.042)	(0.012)	(0.011)
High_competition	0.147***		0.018**	
	(0.042)		(0.008)	
During	0.064*		0.014*	
	(0.032)		(0.007)	
Post	0.102***		0.018**	
	(0.032)		(0.008)	
Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	531	531	531	531
R-squared	0.421	0.445	0.189	0.223

Table 2.5 Results for the same group of Big 4 clients

This table presents regression results for the same group of client firms throughout time from 2005-2013. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals to 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Fee* in column (1), (3) and (5) is the audit fee paid by the client scaled by its assets; The dependent variable *Absacc* in column (2), (4) and (6) is the absolute value of total accruals scaled by client assets. Column (1) and (2) use the full sample for estimation. Column (3) and (4) use the Low Big 4 dominance subsample and columns (5) and (6) use the High Big 4 dominance subsample for estimation. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2) High Dom	(3) Low Dom	(4)	(5) High Dom	(6) Low Dom
	Fee	Fee	Fee	Absacc	Absacc	Absacc
High_competition*During	-0.038***	-0.029**	-0.006	0.021	0.004	0.028
	(0.012)	(0.011)	(0.022)	(0.016)	(0.011)	(0.025)
High_competition*Post	-0.080***	-0.001	-0.119***	0.024*	-0.006	0.042**
	(0.014)	(0.012)	(0.024)	(0.013)	(0.008)	(0.020)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	360	198	162	360	198	162
R-squared	0.704	0.754	0.873	0.276	0.325	0.340

Table 2.6 Tier 2 clients as control groups

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality using Tier 2 clients as control groups. *Big 4* is a dummy variable equal to 1 if the client is audited by a Big 4 firm, and 0 if audited by a Tier 2 firm. *During* and *Post* equals to 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Fee* in Model (1) and (2) is audit fee paid by the client scaled by its assets; Absacc in column (3) and (4) is the absolute value of total accruals scaled by client assets. Column (1) and (3) use the High-competition subsample, and column (2) and (4) use the Low-competition subsample for estimation. The sample contains both observations audited by Big 4 firms and Tier 2 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) High-competition Fee	(2) Low-competition Fee	(3) High-competition Absacc	(4) Low-competition Absacc
Big4*During	-0.062*	0.045	0.017**	-0.003
	(0.035)	(0.033)	(0.006)	(0.007)
Big4*Post	-0.114***	0.082***	0.006	-0.011
	(0.033)	(0.031)	(0.006)	(0.007)
Big4	0.230***	0.056**	0.004	0.008
	(0.039)	(0.024)	(0.004)	(0.007)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3,608	4,104	3,608	4,104
R-squared	0.648	0.692	0.248	0.218

Table 2.7 Results for instrumental-variable approach

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality using OLS regressions (column (1) and (3)) and the 2SLS instrument variable approach (column (2) and (4)). *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. In columns (2) and (3), this is instrumented by the dummy variable *Pressure* which equals 1 if the observation is in the industry emphasized in *Document 56*. The dependent variable *ΔFee* in column (1) and (2) is the change from 2007 to 2013 of audit fees paid by client i scaled by its assets; *ΔAbsacc* in column (3) and (4) is the change from 2007 to 2013 of the absolute value of total accruals of client i scaled by its assets. The sample contains only observations audited by Big 4 firms. Robust standard errors are clustered at the client year level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	OLS	2SLS	OLS	2SLS
	ΔFee	ΔFee	ΔAbsacc	ΔAbsacc
High_competition	-0.126***	-0.265***	0.003	0.033**
	(0.027)	(0.102)	(0.007)	(0.129)
Controls	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes
Observations	365	365	365	365
R-squared	0.245	0.110	0.213	0.186
		First Stage		
Pressure		0.531***		
		(0.089)		
Controls		Yes		
Year effects		Yes		
Industry effects		Yes		
Observations		365		
R-squared		0.311		

Table 2.8 The effect on audit quality using alternative measures

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit quality using alternative measures. Column (1) and (2) shows the results for audit quality measured by financial restatements. Column (3) and (4) shows the effect on absolute value of accruals controlling for non-discretionary accrual, so the coefficient estimations for β_1 and β_2 are effectively the effect on discretionary accrual. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Restate* equals 1 if there are restatements for the financial report in year t, and 0 otherwise. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) Restate	(2) Restate	(3) Absacc	(4) Absacc
High_competition*During	0.061	0.048	0.041***	0.042***
	(0.058)	(0.052)	(0.015)	(0.015)
High_competition*Post	0.108*	0.122***	0.031**	0.035**
	(0.055)	(0.046)	(0.014)	(0.014)
High_competition	-0.059		-0.019	
	(0.045)		(0.012)	
During	-0.112**		-0.019	
	(0.047)		(0.013)	
Post	-0.105***		-0.023*	
	(0.038)		(0.013)	
ΔRev - ΔRec			0.021*	0.032**
			(0.013)	(0.014)
PPE			0.004	0.026*
			(0.013)	(0.014)
Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	927	927	899	889
R-squared	0.042	0.091	0.184	0.225

Table 2.9 Test for parallel trend

This table presents dynamic DiD regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *Year* dummies equal 1 if the observation is in that year. The dependent variable *Fee* in column (1), (2) and (3) is audit fee paid by the client scaled by its assets; Absacc in column (4), (5) and (6) is the absolute value of total accruals scaled by client assets. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
		High-Dom	Low-Dom		High-Dom	Low-Dom
	Fee	Fee	Fee	Absacc	Absacc	Absacc
High_competition*year2006	0.004	-0.037	0.030	0.003	0.006	0.002
	(0.069)	(0.096)	(0.063)	(0.013)	(0.021)	(0.019)
High_competition*year2007	-0.010	-0.029	-0.091	0.003	0.005	-0.015
	(0.082)	(0.085)	(0.110)	(0.020)	(0.010)	(0.031)
High_competition*year2008	-0.073	-0.110	-0.081	0.030***	0.005	0.033**
	(0.061)	(0.066)	(0.078)	(0.011)	(0.011)	(0.016)
High_competition*year2009	-0.066	-0.116*	-0.081	0.028**	0.001	0.058**
	(0.060)	(0.067)	(0.068)	(0.013)	(0.014)	(0.028)
High_competition*year2010	-0.120*	-0.192***	-0.111*	0.014	-0.025***	0.056**
	(0.062)	(0.068)	(0.066)	(0.013)	(0.009)	(0.025)
High_competition*year2011	-0.141**	-0.211***	-0.155**	0.014	-0.027**	0.040**
	(0.060)	(0.065)	(0.064)	(0.014)	(0.012)	(0.016)
High_competition*year2012	-0.166***	-0.245***	-0.173**	0.030**	-0.011	0.064**
	(0.060)	(0.071)	(0.074)	(0.013)	(0.012)	(0.027)
High_competition*year2013	-0.148**	-0.231***	-0.133**	0.018	-0.017*	0.037**
	(0.059)	(0.071)	(0.064)	(0.012)	(0.010)	(0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	927	531	396	927	531	396
R-squared	0.484	0.448	0.605	0.210	0.230	0.280

Table 2.10 Results for the subsample without high non-audit services

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit fees and audit quality using a sample without audit firms with high non-audit services. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Fee* in column (1) and (2) is audit fee paid by the client scaled by its assets; Absacc in column (3) and (4) is the absolute value of total accruals scaled by client assets. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	(1) Fee	(2) Fee	(3) Absacc	(4) Absacc
High_competition*During	-0.130***	-0.128***	0.019**	0.023**
	(0.049)	(0.043)	(0.009)	(0.009)
High_competition*Post	-0.205***	-0.197***	0.016*	0.022**
	(0.047)	(0.046)	(0.009)	(0.009)
High_competition	0.166***		-0.005	
	(0.047)		(0.006)	
During	0.009		-0.004	
	(0.028)		(0.007)	
Post	0.053**		-0.012	
	(0.026)		(0.007)	
Controls	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	729	729	729	729
R-squared	0.447	0.478	0.171	0.204

3 Does audit market competition affect auditors' assignments to clients within incumbent Big 4 accounting firms?

3.1. Introduction

In chapter 2, we studied how audit market competition affect audit quality using a setting in China where there is a government-supported emergence of Tier 2 firms. This creates competition pressure to the incumbent Big 4 firms and we examined how Big 4 firms react to this competition increase. The measures of audit quality we used in chapter 2 are mainly based on the earning quality of client companies. These output-based measures of audit quality leave an important part of the question still much unexplored: what happened within the Big 4 accounting firms that caused the audit quality change in response to the competition? Moreover, previous literature provides little evidence from inside the accounting firms on the channels through which audit competition would affect audit quality.

In this chapter, we use a novel test to shed light on this question. Specifically, we propose that incumbent accounting firms respond to changes in audit market competition by altering the assignment of auditors to clients. As firms providing professional services, human resources are crucial to their service quality. When competition from new entrants reduces the profit margin (Ge et al. 2021, Kranton 2003, Tirole 1988), the incumbent audit firm can attempt to lower audit costs by (i) allocating less costly resources to audits subject to more competition, which we capture by auditor experience, and by (ii) increasing the resource utilization, which we capture by the auditor's workload. Moreover, audit partners also have their own incentives in choosing clients. For example, when the competition increases in the audit market of their existing clients, they may want to switch to the client markets with less competition, and their experience affect their motivation and ability to change their client portfolio and workload. Auditors' experience is a key indicator of their competence and has a direct bearing on firm-level audit quality (PCAOB 2015). Audit workload affects individual

auditors' ability to put effort into the auditing process thus directly contributing to the quality of their work. Varying the assignment of experienced auditors to clients and their workload should therefore have a direct bearing on clients' audit quality (Chi et al. 2017, Lee et al. 2019, Gul et al. 2013, Lennox et al. 2013). Tracking changes in auditor-client assignments and auditors' workload, in response to an exogenous audit market competition shock, and matching them to audit outcomes allows us to causally link the effect of market competition on audit quality mediated through audit assignments. Since audits are administered by partners, auditors' ability and incentive to provide high audit quality are more salient at the partner levels than at the firm level (Reynolds and Francis 2000; Francis 2004, 2011; DeFond and Francis 2005). This helps us to identify an important direct channel through which audit market competition should affect audit quality.

To investigate the research question and establish a causal relation between auditor assignments and audit market competition, we use the similar design as in chapter 2 which is a quasi-natural shock related to the government-supported emergence of second-tier domestic accounting firms in China ("Tier 2" firms hereafter). The main advantage in addition to what explained in chapter 2 is that audit reports in China disclose the names of signing-auditors. This enables us to track and identify the characteristics of the signing-auditors and study the effect of competition on the allocation of signing-auditors within an incumbent firm.

To capture the variation in auditors' ability to provide quality audits, we use the signing auditors' experience. Auditor experience is measured twofold. The first measure is the number of years since an auditor first audited a China A-share listed client. The second measure is the relative audit experience measured relative to other signing-auditors in the same Big4 audit firm. To capture the intensity of audit resource utilization by audit firms, we measure the signing's auditor workload using the number of clients signed by the same auditor in a year.

Similar to the design in chapter 2, we use a difference-in-differences approach and instrument changes in audit market competition faced by the Big4 by the industry level variation in competition between Big 4 and Tier 2 firms. Competition from Tier 2 firms is measured by changes in their annual market share between 2007-2013 where market share is the sum of industry-audit revenue earned by Tier 2 firms as a fraction of all industry audit

revenue. The higher the market share of Tier 2 firms, the more competition the Big4 firms face. We divide Big4 audited listed firms into treatment and control groups based on the level of Tier 2 audit firms' competition in the industry markets: the treatment group is Big4 clients in industries where the market share change of Tier 2 firms is higher than the median in the sample. The control group includes Big 4 audited firms in the industries with below-median change in Tier 2 market share, i.e., firms in markets where Big4 experience small changes in competition. We then track Big 4 assigned auditor experience and workload changes in the high vs. the low competition group to determine the effect of competition increase from Tier 2 firms.

We find that after the emergence of Tier 2 firms, Big4 firms assign less experienced auditors to industries with higher competition compared to industries with lower competition. Further, these auditors have relatively more workload after the competition increases compared to low-competition industries. This result is consistent with the prediction that when the Big4 face downward pressure to the audit fee, they have the incentive to allocate less costly resources to such audits. These re-assignments likely contribute to the decrease in Big4 audit quality in firms that experience an increase in competition from Tier 2 firms documented in chapter 2.

Changes in Big4 auditor assignments could be caused by systematic changes in high-competition industries. To mitigate this concern, robustness tests use auditors from Tier 2 firms in high competition industries as a control group. Industry-level changes would affect both Big4 and Tier 2 clients, thus this analysis keeps industry effects the same between both groups. We then compare the difference in auditor experience and workload changes for high- and low-competition groups separately. The conclusions from this test support the main results.

This study contributes to several literature streams. First, it adds to the literature on the relation between audit market competition and audit quality. Previous literature studying this question focus on the audit firm level measures of audit quality such as clients' accruals and financial restatements (Boone et al. 2012, Francis et al. 2013, Ge et al. 2021, Huang et al. 2016, Kallapur et al. 2010, Newton et al. 2013, etc.). Our study provides evidence on a causal

negative relation between an increased number of audit firms and incumbent Big4 auditor assignments. This finding sheds light on the potential channel, auditor-client assignment, through which competition affects audit quality.

Second, the study contributes to the emerging audit partner literature by providing evidence on the factors that affect the matching process of individual auditors and clients. Previous studies in this area focus on the associations between audit quality measures and partners' economic incentives, partners' innate characteristics, and partners' governance arrangements (e.g., Lennox and Wu 2018). However, the matching of partners to clients is unlikely to be random. Our study provides evidence on how competition from new entrants, an important market-level factor, affects the assignment of audit partners to clients within incumbent Big4 audit firms.

The rest of the paper proceeds as follows. Section 3.2 reviews prior literature and generates hypotheses for empirical tests. Section 3.3 describes the research design and Section 3.4 introduces the data collection process and describes the sample. Section 3.5 presents the main results of the paper. Section 3.6 reports robustness tests. Section 3.7 concludes the paper.

3.2. Literature Review and Empirical Predictions

We first review literature on how auditor experience and workload at individual level affect audit quality, and how auditor and clients are matched within accounting firms in this section. Then we generate predictions on how audit market competition increase form Tier 2 firms affect the auditor allocation in the Big 4 firms.

Research on the association between audit quality and auditor experience

Audits are performed by individual auditors, thus their incentives and ability should have a direct effect on audit quality (Watts and Zimmerman 1983). Previous literature generally finds a positive association between auditor experience and audit quality. For example, Chi et al. (2017) use partner level data from Taiwan, and find that after controlling for the partner's client-specific experience, a partner's generic (pre-client) experience is associated with smaller absolute and negative values of discretionary accruals. Lee et al. (2019) investigates

whether engagement audit quality varies with audit partner experience in the United States. They measure partner experience by the number of years since the audit partner's bachelor's degree and find a significant positive association between audit partner experience and audit fee.

Research on the association between audit quality and audit partner workload

A heavy workload could distract a partner from giving adequate attention to an audit and could motivate the partner to make a superficial appraisal instead of gathering all the required evidence (PCAOB 2015). Therefore, a heavy workload could result in low-quality audits. Sundgren and Svanstrom (2014) use the number of engagements as a proxy for the partner's workload. Using soon-to-be-bankrupt private companies from Sweden, they find a negative association between the partner's workload and the partner's decision to issue a going concern opinion. They conclude that a heavy workload impairs audit quality. Lai et al. (2017) use data from Malaysia and find that partners with more listed clients are associated with larger absolute discretionary accruals which indicates a lower audit quality.

However, the workload may not be exogenous to the audit quality. To the extent that a partner's workload is efficiently managed by the audit firm's quality control system, the amount of work could reflect an optimal choice for the partner. Goodwin and Wu (2016) use data from Australia and find that a partner's workload is not reliably linked to a number of audit quality proxies (discretionary accruals, meeting or just beating the zero-profit threshold, or the partner's propensity to issue going concern opinions). In addition, a partner with a larger client base has more reputation capital at stake in the event of audit failure, thus an incentive to supply high-quality audits (DeAngelo 1981).

Client-partner assignment within audit firms

While the matching process of clients and partners within audit firms is an important research topic, we find little empirical research related directly to it. Theoretically, given the audit firms' objective, when assigning partners to clients, audit firms should consider the appropriateness of the match between the client and partner and the cost of the assignment compared to the audit fee. For example, audit firms consider the client's needs and

circumstances, the partner's skills and availability, and the audit firm's resources of available partners (Cardinaels et al. 2021). Audit partners can also play an important role in the matching process because partners have their own incentives and preferences in choosing audit clients. They can actively solicit new clients and negotiate with clients regarding audit fee and financial reporting choices (Gibbins et al. 2001). As clients are endogenously assigned to partners based on both client characteristics, audit characteristics and partner characteristics, it is challenging to draw causal inferences from studies investigating the effect of audit partners that simply look at the association between auditor characteristics and audit quality (Lennox and Wu 2018).

We develop our predictions regarding the competition effect on the experience and workload of Big 4 auditors assigned to their clients by discussing the audit firms' decision making and audit partners' incentives in the process of client-partner matching when there is increased competition from Tier 2 firms.

Empirical predictions

From our results in chapter 2, when facing more competition from Tier 2 firms, the Big 4 firms' audit fee decreased significantly due to price competition. If the decreased audit fee is not enough to support high audit quality, Big 4 firms may assign less experienced partner to these low profit audit projects in the industries that face more competition, as longer-serving auditors typically achieve more senior positions with higher compensation levels. Moreover, partners have their own preferences in choosing clients. Their motivation and bargaining power can also affect the auditor-client allocation. More experienced partners usually have more advantages in intervening the allocation process and choose clients they prefer. Since competition may drive price down, more experienced auditors may choose to audit the clients in industries with lower price competition, and less experienced auditors are more likely to be assigned to audit clients in high-competition industries.

On the other hand, in the high competition industries, it is also possible that more experienced auditors are more likely to keep their clients from switching to their competitors and are more competitive in obtaining new clients. For less experienced partners, their clients

may easily switch to Tier 2 firms and they may be less able to compete for new clients in the high-competition markets. Therefore, it is also likely to observe that after the competition increase from Tier 2 firms, audit partners are more experienced for clients in high competition industries than in low competition industries.

Further, we expect that to increase the resource utilization when the profit margin is subject to downward pressure due to increased audit market competition, Big 4 firms may increase the workload of auditors in the high-competition industries. However, it is also possible that in the low competition industries, it is more easily to obtain new clients, so the increase in workload may be larger than that in the high-competition industries.

In summary, the predictions of the competition effect on the Big 4 clients' signing-partners experience and workload is not clear and need to be tested empirically.

3.3. Research Design

The research design is similar to the design in Chapter 2. We use a difference-in-differences approach to examine the effect of the emergence of Tier 2 firms on Big4 auditor assignment to clients. The measure of competition, the classification of treatment and control groups and the definition of treatment periods are the same as in chapter 2. In this section, we mainly explain the signing-auditor information and how we measure their experience and workload. We present the model specification at the end of this section.

Signing-auditor information

To capture changes in Big 4 auditor assignment to clients, we track the name of the signing auditor. China's auditing standards require auditors to sign the audit reports. There are usually two signing auditors for each audit report, the more senior signing auditor mainly performing the review work and the relatively junior signing auditor mainly administering the fieldwork. Signing auditors can be partners or senior managers. I refer to the more senior auditor as *auditor1* and the junior auditor as *auditor2*, and calculate the experience and workload for each auditor. Typically, the two auditors share the same legal liability and are subject to the same rules on mandatory rotation (Lennox et al. 2014). Under Articles 3 and 5

issued by the CSRC and the Ministry of Finance (October 8, 2003), the two signing auditors have to be rotated every five years or, in the case of newly listed companies, at the end of the second year following the initial public offering (IPO). In addition, the name of the review auditor is usually disclosed in the audit report above the name of the engagement auditor. This enables us to identify rotation events affecting each signing auditor. We focus on signing auditors' experience and workload, because these two variables are an important individual level input to audit quality (Chi et al. 2017, Gul et al. 2013, Lee et al. 2019, Lennox et al. 2013). We then compare the auditor experience and workload before and after competition increase in high-competition industries with low-competition industries. In the main analysis, we focus on the senior auditors (*auditor1*), because they are usually much more experienced and are more costly resources to the accounting firm.[34] We provide analysis for *auditor2* in additional tests.

Measure of auditor experience and workload

We use two measures for the signing-auditor's experience. The first measure, *Exp*, is the number of years since the auditor first signed an audit report of an A-share listed company:

$$Exp_{it} = t - year1_i + 1$$

where $year1_i$ is the first year that the auditor of client *i* signed on an audit report.

The second measure is the relative experience measured as the auditor of client *i*'s experience relative to other signing-auditors in the same audit firm. Following Ke et al.(2015), we construct a relative experience measure as follows:

$$Relative\_Exp_{ijt} = 100 - \frac{\left(-1 + Rank\_Years_{ijt}\right)}{\left(-1 + N_{jt}\right)} * 100$$

where $Rank\_Years_{ijt}$ is a ranked measure of client *i*'s auditor experience in audit firm *j* in year *t*, and N_{jt} is the total number of auditors in audit firm *j* with public clients in year *t*. The $Relative\_Exp_{ijt}$ variable ranges from 0 to 100, with higher values indicating that auditor of

[34] In our sample, the mean of Big 4 auditor1's experience is nearly 6 years, and auditor2's experience is 2.7 years. The average number of client reports signed by auditor 1 is 2.3 and 1.2 by auditor2. This shows that auditor1 is usually more experienced than auditor2 and signs more audit reports.

client *i* has relatively more experience. We calculate the variables for the signing and reviewing auditors.

The measure for auditors' workload WL_{it} is the number of clients signed by the auditor of client *i* in a year:

$$WL_{it} = N_{it}$$

where N_{it} is the number of clients signed to the auditor of client *i* in year *t*.

Model specification

We use the following difference-in-differences regression model to examine how Big4 change the assignment of auditors to clients in response to changes in market competition:

$$\begin{aligned} Big\ 4\ auditor\ Experience\ (Workload)_{it} \\ = \alpha_0 + \beta_1 High\_competition_i \times During_t \\ + \beta_2 High\_competition_i \times Post_t + \beta_3 High\_competition_i \\ + \beta_4 During_t + \beta_5 Post_t + X'_{it}\,\beta_6 + e_{it}. \end{aligned} \quad (1)$$

The model compares Big4 auditors' experience and workload changes in the high-competition group to changes in the low-competition group to determine the effect of competition increase from Tier 2 firms on Big4 firms' auditor-client assignment. The coefficient β1 captures the effect of increased competition on Big4 auditors' choice of auditor assignment during the transition period and β2 measures the incremental effect in the post-treatment period. The vector X_{it} contains a set of controls for client company characteristics. Following prior literature (Lee et al. 2019, Ke et al. 2015) we control for total assets, market to book ratio, receivables, inventories, leverage ratio, return on assets, annual stock return, dual listed shares on B share, Hong Kong and New York stock exchanges, and whether a firm is controlled by the central government. For auditors' workload, it is also affected by auditors' ability (Goodwin et al. 2016) and the total number of clients in the audit firm, so we add auditor experience as a proxy for auditor ability and the number of audit firm clients to the control variables when using workload as the dependent variable. Details of variable definitions are in Appendix A.

3.4. Data and Descriptive Statistics

The accounting firm and auditor information, company financial data, and stock market information come from the Chinese Stock Market and Accounting Research (CSMAR) database. We begin with all Chinese A-share listed companies with auditor information from 2005 to 2013 and merge this data with financial and stock market information. The sample starts in 2005 which is three years before the proposal of Document 56 and ends in 2013 which is three years after the series of policy changes. We keep only client firms audited by Big4 auditors in the main analysis to focus on Big4 auditor allocation changes. After excluding observations with missing information, the final sample consists of 927 firm-year observations.

Table 3.1 summarizes the main variables used in this study. The mean of *auditor1* experience (the review auditor) is nearly 6 years, and *auditor2* experience (the engagement auditor) is 2.7 years. The average number of client reports signed by *auditor1* is 2.3 and 1.2 by *auditor2*. This shows that review auditors are usually more experienced than engagement auditors and sign more audit reports. With respect to the control variables, total assets (*Assets*) is on average 279,060 million RMB, and the market to book ratio (*MTB*) is 0.001. The mean debt to asset ratio (*Lev*) is around 0.543. The mean of return on assets (*ROA*) and yearly stock return (*Ret*) are 4.6% and 25.3% respectively. Receivables (*Recat*) and inventory (*Invat*) are on average 7.3% and 13.8% of total assets respectively. Around 21.5% of observations issue B share and 34% issue H share. Only 8% of the firm-years include firms also listed on the New York Stock Exchange. Around 37% of firm-year observations are by companies controlled by the central government. The average number of clients for a Big 4 firm per year is 35. The values of controls are comparable with those in chapter 2.

[Table 3.1]

Table 3.2 shows the sample distribution by industries and market share changes of Tier 2 firms in each industry. We classify industries using the China Securities Regulatory Commission (CSRC)'s industry classification. Around 16 percent of the observations come

from the Machinery and Equipment industry (CSRC code: C7) and 13.5 percent operate in the Metals and Minerals industry (CSRC code: C6), whereas only 9 (0.97 percent) observations are from the Paper and Printing industry (CSRC code: C3) and 18 (1,94 percent) observations operate in the Public Administration industry (CSRC code: K). Tier 2 firms' growth between 2007 and 2013 varies considerably across industries. By the end of the sample, Tier 2 firms increased their market share in most of the industries, except for the Construction, Transportation and Storage and the Financial Industries.

[Table 3.2]

3.5. The Effect of Competition on the Allocation of Auditor Experience and Workload

We first study the effect of Tier 2 firms' market share increase on the changes in Big4 firms' auditor experience with a focus on *auditor1*. Table 3.3 shows the regression results for model 1 for auditor experience. Columns (1) and (2) show that Big4 firms assign less experienced review auditors in the high-competition group compared to the low-competition group during the policy changes that increased the competition from Tier 2 firms. The effect of competition on auditor assignment is economically significant: on average, the Big 4 assigned 23% (-1.375/5.928) less experienced auditors to clients in the high-competition industries during the transition years compared to the low-competition industries. Using the relative experience measure, average experience reduced by 17.6% (-8.861/50.26). Table 3.3 results are consistent with the prediction that Big4 assigned less experienced auditors to industries with higher competition from Tier 2 firms.

[Table 3.3]

Tier 2 firms may hire more experienced auditors away from Big4 in competitive industries instead of auditor changes within Big4 firms. In untabulated results, we find no evidence of signing-auditor changes from Big4 firms to Tier 2 firms in the sample period, which suggests this channel is unlikely to explain the results.

Next, we examine the impact competition from Tier 2 firms has on Big4 firms' auditor

workload. Table 3.4 presents regression results for the effect of competition on workload. The coefficient on the interaction term *High_competition*×*Post* in Column (1) is significantly positive, which suggests that competition from second-tier firms has a positive effect on the auditor's workload in the high-competition group. On average, Big 4 assigned 23% (0.541/2.331) more clients to the signing-auditor in the high-competition industries in the post-treatment period compared to low-competition industries.

[Table 3.4]

Overall, the results in Tables 3.3 and 3.4 suggest that Big4 firms allocate less experienced auditors to high-competition industries, and assign more workload to these auditors compared to low-competition industries. Previous studies suggest that lower auditor experience is associated with lower audit quality in China (Gul, Wu, and Yang 2013; Lennox, Wu, and Zhang 2013). In chapter 2 we document that higher competition from Tier 2 accounting firms reduces Big4 audit quality. The results in this section identify the channel through which this effect happens—assigning less experienced auditors with higher workloads to audits in high competition industries.

One observation from the results is that the timing of the effects on auditor experience and workload are different. The effect on experience is most significant in the during-treatment period, while the effect on workload is most significant in the post-treatment period. We interpret the results as that in the transition period, Big 4 firms assign less experienced auditors to high-competition industries compared to low-competition industries. The workload is similar in the two groups. This reassignment can decrease the costs of the audit projects. However, in the post-treatment period, as the competition increase, less experienced auditors have disadvantages in keeping the clients, so the clients left in the high-competition industries are those with experienced auditors. This can potentially explain why we observe weaker evidence of the effect for auditor experience in the post-treatment period. For auditors' workload, the number of clients increased more in during-treatment period in the low-competition group, so we do not observe significant differences in the treatment and control groups in this period. In the post-treatment period, as the competition continue to increase in the high-competition industries, more auditors entered the low-competition industries and

decreased the average workload there. So the difference in workload between the two groups becomes significant in the post-treatment period.

3.6. Additional Tests

3.6.1. Tier 2 Firms as Controls

Our results could reflect systematic changes in operations in high-competition industries that affect audit difficulty. To mitigate this concern, we use auditors from Tier 2 firms as a control group in Eq. (1) and compare the differences in Big4 and Tier 2 auditor experience and workload changes separately for High-competition and Low-competition industries. The regression model is:

$$\begin{aligned} &Auditor\ Experience(Workload)_{it} \\ &\quad = \alpha_0 + \beta_1 Big4_{it} * During_t + \beta_2 Big4_{it} * Post_t + \beta_3 Big4_{it} \\ &\quad + \beta_4 During_t + \beta_5 Post_t + X'_{it}\,\beta_6 + e_{it} \end{aligned} \tag{2}$$

where *Big* 4 is a dummy variable equals to 1 if the client *i* is audited by Big 4 in year *t*, and 0 if audited by Tier 2 firms.

Table 3.5 presents the results for *auditor1* experience. In the high competition subsample (columns (1) and (3)), β1 are significantly negative during the period of policy changes. This shows that competition has a negative effect on the Big4 auditor experience allocated to high competition industries compared to Tier 2 firms.

In the low-competition subsample (columns (2) and (4) in Table 3.5), the coefficients for most of the interaction terms are positive but not significant except for column (2) where β1 is significantly positive. This result is consistent with the prediction that Big 4 firms assign more experienced auditors to low competition industries when facing more competition increase. The tests for the coefficient equality show that the coefficients of β1 for the high-competition subsample are significantly lower than for the low competition subsample. The results support the argument that compared to Tier 2 firms, Big4 firms assign less experienced auditors to high-competition industries and more experienced auditors to low-competition industries.

[Table 3.5]

Table 3.6 presents the results for the auditor's workload. In the high-competition subsample (column (1)), there are no significant differences between changes in Big 4 and Tier 2 firms' auditor workload. However, in the low-competition subsample (column (2)), the coefficients for the interaction terms are significantly negative. This shows that Big 4's auditor workload decreased more compared to Tier 2 firms in low competition industries. This may be caused by that as the competition increased, more auditors from the Big 4 firms entered the low-competition markets for clients.

[Table 3.6]

3.6.2. Analysis for Engagement Partners

Table 3.7 reports results for the effect of Tier 2 firms' market share increase on the change of Big4 firms' auditor experience and workload for *auditor2*. The effect is only significant for auditor workload. This result is consistent with that the workload of *auditor2* in the high-competition industries increased compared to low-competition industries when the competition from Tier 2 firms increased. The weak results for *auditor2* could be that the variation of their experience and workload are relatively low compared to *auditor1*.

[Table 3.7]

3.7. Conclusion

Auditors' experience and workload are two important factors that affect audit quality (Chi et al. 2017, Lee et al. 2019, Gul et al. 2013, Lennox et al. 2013). In this paper, we study the effect of competition on audit quality from the perspective that competition affects how incumbent audit firms assign auditors to their clients with a focus on auditors' experience and workload. We use the government-supported emergence of the second-tier firms in China as a setting to capture competition increase. We find that the Big 4 firms assign less experienced auditors to industries with higher competition and these auditors have more workload after the competition increase. This is consistent with the theoretical prediction that when the price

premium is low, there is less motivation for audit firms to exert high effort, which contributes to the decrease in audit quality in Big 4 firms when the competition increased.

Appendix A Definition of variables

This appendix provides definitions for variables used throughout the paper.

Variable	Definition
Dependent Variables	
Exp1	The number of years from first signing an audit report for auditor1 (review auditor).
Exp2	The number of years from first signing an audit report for auditor2 (engagement auditor).
Relative_Exp1	The experience of signing-auditor1 relative to other auditor 1 in the year.
Relative_Exp2	The experience of signing-auditor2 relative to other auditor 2 in the year.
WL1	The number of client reports signed by auditor1.
WL2	The number of client reports signed by auditor2.
Independent Variables	
High_competition	1 if a client is in high-competition industries, and 0 otherwise. High-competition industries are defined as the industries with above-median Tier 2 market share increase.
During	1 if the observation is between 2008-2010, and 0 otherwise.
Post	1 if the observation is between 2011-2013, and 0 otherwise.
Assets	The raw value of total assets.
LnAssets	The natural logarithm of total assets. Ln(Assets).
MTB	The market value of equity divided by total assets times1000.
Recat	The percentage of receivables over total assets.
Invat	The percentage of inventories over total assets.
Lev	Leverage ratio. The percentage of total debts over total assets
ROA	Net income divided by total assets.
Ret	A client's annual stock return.
B-share	1 if a client issues B shares, and 0 otherwise.
H-share	1 if a client issues H shares, and 0 otherwise.
NYSE	1 if a client is also listed on New York stock exchanges, and 0 otherwise.
Cengov	1 if a client is controlled by the central government.
Ln(N_CL)	The natural logarithm of the number of audit firm clients
Big 4	1 if a client is audited by a Big 4 auditor.

*All currencies are in RMB

Table 3.1 Variable summary

This table provides summary statistics for the variables used in the main tests. The sample consists of 927 client-year observations from 2005-2013. Variables are defined in Appendix A.

Variable	Mean	Std. Dev.	Q1	Median	Q3
Exp1	5.928	3.682	3	5	8
Exp2	2.714	2.077	1	2	4
Relative_Exp1	50.260	28.120	25.676	51.250	72.727
Relative_Exp2	51.597	28.063	23.077	53.000	74.359
WL1	2.331	1.466	1	2	3
WL2	1.225	0.496	1	1	1
Assets (million)	279,060	1,494,630	6,100	18,000	68,000
LnAssets	23.849	1.874	22.532	23.614	24.943
MTB	1.054	1.107	0.373	0.719	1.310
Recat	0.074	0.083	0.015	0.042	0.110
Invat	0.138	0.147	0.021	0.103	0.188
Lev	0.543	0.206	0.405	0.533	0.671
ROA	0.046	0.061	0.018	0.040	0.076
Ret	0.253	0.806	-0.250	0.000	0.522
B-share	0.215	0.411	0	0	0
H-share	0.340	0.474	0	0	1
NYSE	0.081	0.273	0	0	0
Cengov	0.372	0.484	0	0	1
N_CL	34.989	13.883	20	38	44
Ln(N_CL)	3.456	0.475	2.996	3.638	3.784

Table 3.2 Industry distribution

This table shows the sample distribution by industries and market share changes of Tier 2 firms in each industry.

Industry	Obs.	%	Tier2 firm market share change
Mining	55	5.93	0.17
Food and Beverage	27	2.91	0.28
Textiles and Clothing	14	1.51	0.30
Paper and Printing	9	0.97	0.67
Petroleum, Chemical, and Plastic	69	7.44	0.38
Electronic	45	4.85	0.24
Metals and Minerals	125	13.48	0.28
Machinery and Equipment	146	15.75	0.18
Pharmaceutical and Biological Products	20	2.16	0.34
Electric, Gas, and Sanitary Services	59	6.36	0.47
Construction	36	3.88	0.07
Transportation and Storage	122	13.16	0.08
Information Technology	23	2.48	0.47
Wholesale and Retail Trades	25	2.7	0.11
Financial Industry	53	5.72	0.01
Real Estate	81	8.74	0.25
Public Administration	18	1.94	0.46
	927	100	

Table 3.3 Regression results for auditor experience

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' auditor-client assignment related to auditor experience. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Exp1* in column (1) and (2) is the experience for *auditor1* (review auditor). *Relative_Exp1* in column (3) and (4) is the relative experience in an audit firm for *auditor1* in the year. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. Standard errors are shown in the brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 3.3, continued

	Exp1	Exp1	Relative_Exp1	Relative_Exp1
	(1)	(2)	(3)	(4)
High_competition*During	-1.375***	-1.625***	-11.69**	-13.66***
	(0.485)	(0.426)	(4.577)	(4.063)
High_competition*Post	-0.750	-1.185***	-3.470	-6.970*
	(0.487)	(0.431)	(4.267)	(3.837)
High_competition	0.395		1.333	
	(0.379)		(3.517)	
During	1.656***		4.684*	
	(0.321)		(2.791)	
Post	2.810***		1.077	
	(0.365)		(3.077)	
LnAsset	0.180*	0.395***	0.400	2.033**
	(0.101)	(0.134)	(0.787)	(1.026)
ROA	0.784	-0.433	9.246	-2.835
	(1.826)	(1.960)	(16.94)	(17.68)
Lev	-1.129	-0.604	-4.904	-0.481
	(0.796)	(0.835)	(6.619)	(6.869)
Recat	2.045	3.420**	24.40**	43.49***
	(1.413)	(1.574)	(11.32)	(14.11)
Invat	0.364	-0.100	9.081	1.855
	(0.852)	(1.131)	(6.609)	(10.43)
Ret	0.163	0.219	-0.442	0.228
	(0.153)	(0.239)	(1.395)	(2.060)
MTB	-0.001	0.072	1.771**	2.143*
	(0.094)	(0.123)	(0.801)	(1.120)
B-share	-0.654**	-0.658**	-4.081	-3.367
	(0.305)	(0.326)	(2.540)	(2.733)
H-share	-0.819**	-0.868**	-2.295	-2.536
	(0.371)	(0.394)	(3.001)	(3.207)
NYSE	1.347***	1.098**	14.58***	12.31***
	(0.372)	(0.447)	(3.361)	(3.931)
Cengov	0.263	0.0731	-1.618	-3.666
	(0.303)	(0.338)	(2.237)	(2.625)
Industry FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Observations	927	927	927	927
R-squared	0.114	0.155	0.038	0.077

Table 3.4 Regression results for auditor workload

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' auditor-client assignment related to auditor workload. *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *WL1 is* the workload for the review auditor (auditor1). The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. Standard errors are shown in the brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 3.4, continued

	WL1	WL1
	(1)	(2)
High_competition*During	0.266	0.214
	(0.299)	(0.275)
High_competition*Post	0.564**	0.548**
	(0.231)	(0.234)
High_competition	-0.532**	
	(0.213)	
During	-0.973***	
	(0.246)	
Post	-1.815***	
	(0.222)	
Exp1	0.074***	0.072***
	(0.017)	(0.018)
N_Clients	0.018***	0.019***
	(0.003)	(0.004)
LnAsset	-0.213***	-0.182***
	(0.043)	(0.050)
ROA	0.044	-0.238
	(1.052)	(1.101)
Lev	0.537	0.368
	(0.344)	(0.348)
Recat	0.519	1.207*
	(0.585)	(0.645)
Invat	-0.763***	-0.667
	(0.291)	(0.438)
Ret	-0.008	0.095
	(0.071)	(0.091)
MTB	-0.110*	-0.066
	(0.063)	(0.072)
B-share	0.229*	0.271**
	(0.127)	(0.136)
H-share	0.048	0.082
	(0.113)	(0.122)
NYSE	-0.161	-0.135
	(0.203)	(0.212)
Cengov	0.154	0.128
Industry FE	No	Yes
Year FE	No	Yes
Observations	927	927
R-squared	0.247	0.275

Table 3.5 Compare to Tier 2 firms' auditor experience

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' auditor experience using Tier 2 clients as control groups. *Big 4* is a dummy variable equal to 1 if the client is audited by a Big 4 firm, and 0 if audited by a Tier 2 firm. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Exp1* in column (1) and (2) is the experience for review auditor (auditor1). *Relative_Exp1* in column (3) and (4) is the relative experience in an audit firm for auditor1 in the year. Column (1) and (3) use the High-competition subsample, and column (2) and (4) use the Low-competition subsample for estimation. The sample contains both observations audited by Big 4 firms and Tier 2 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. Standard errors are shown in the brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	High_competition Exp1	Low_competition Exp1	High_competition Relative_Exp1	Low_competition Relative_Exp1
	(1)	(2)	(3)	(4)
Big4*During	-0.987*	0.886**	-8.315*	2.563
	(0.570)	(0.340)	(4.180)	(2.732)
Big4*Post	-0.161	0.538	-2.176	-0.662
	(0.545)	(0.411)	(3.769)	(3.317)
Big4	-3.528***	-4.203***	-0.585	-1.717
	(0.460)	(0.298)	(3.352)	(2.539)
During	1.043***	0.655**	2.155	-0.891
	(0.240)	(0.264)	(1.307)	(1.290)
Post	1.951***	2.071***	-0.185	-1.246
	(0.244)	(0.273)	(1.213)	(1.041)
Observations	3,748	4,255	3,748	4,255
R-squared	0.125	0.114	0.012	0.012
Test of coefficient equality	**Big4*During (1) = (2)**		**Big4*During (3) = (4)**	
Chi2-test	8.06		4.80	
p-value	0.0045		0.0285	

Table 3.6 Compare to Tier 2 firms' workload

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' audit workload using Tier 2 clients as control groups. *Big 4* is a dummy variable equal to 1 if the client is audited by a Big 4 firm, and 0 if audited by a Tier 2 firm. *During* and *Post* equal 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *WL1 is* the workload for auditor1. Column (1) uses the High-competition subsample, and column (2) uses the Low-competition subsample for estimation. The sample contains both observations audited by Big 4 firms and Tier 2 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. Standard errors are shown in the brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	High_competition	Low_competition
	WL1	WL1
	(1)	(2)
Big4*During	0.250	-0.274
	(0.284)	(0.275)
Big4*Post	-0.164	-0.904***
	(0.249)	(0.218)
Big4	-0.715***	0.0162
	(0.244)	(0.216)
During	-0.885***	-0.836***
	(0.191)	(0.139)
Post	-1.135***	-1.121***
	(0.215)	(0.196)
Observations	3,748	4,255
R-squared	0.184	0.164
Test of coefficient equality	**Big4*Post (1) = (2)**	
Chi2-test	5.04	
p-value	0.0248	

Table 3.7 Regression results for engagement auditor (*auditor2*)

This table presents regression results for the effect of competition from Tier 2 firms on Big 4 firms' auditor-client assignment related to auditor experience and workload for the engagement auditor (*auditor2*). *High_competition* is the treatment variable equal to 1 if the client is in the industry auditing market with high competition, and 0 otherwise. *During* and *Post* equals 1 if the observation is in the year between 2008-2010 and 2011-2013 respectively. The dependent variable *Exp2, Relative_Exp2* in column (1) and (2) are experience and relative experience for *auditor2*. *WL2* in column (3) *is* the workload for auditor2. The sample contains only observations audited by Big 4 firms. All regressions include a constant. Robust standard errors are clustered at the client year level. Standard errors are shown in the brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Exp2	Relative_Exp2	WL2
	(1)	(2)	(3)
High_competition*During	-0.008	-4.188	0.161*
	(0.350)	(4.899)	-0.092
High_competition*Post	0.01	-2.715	0.055
	(0.362)	(4.802)	-0.088
High_competition	0.077	3.309	-0.044
	(0.228)	(3.289)	-0.074
During	0.525**	2.766	-0.248***
	(0.229)	(2.614)	-0.07
Post	0.566**	1.349	-0.191**
	(0.229)	(2.874)	-0.079
Controls	Yes	Yes	Yes
Observations	921	921	921
R-squared	0.029	0.010	0.103

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