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Local competition and auditors' provision of non-audit services☆

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ABSTRACT

Non-audit services (NAS) provide auditors a platform to market their unique expertise and provide services surpassing the necessities of a financial statement audit. In this paper I study the effect of local competition on auditors' use of NAS within their product mix. My findings show that auditors respond to intensifying competition by increasing their selling of NAS. This response is especially strong in local markets where there are smaller differences in the average audit quality gap between the highest versus lowest quality auditors or when audit fees are depressed. The results suggest that NAS function as both a differentiation tool for higher quality auditors as well as a supplementary revenue stream when audit fees are reduced. I also find that the provision of NAS reduces audit quality in highly competitive environments, suggesting that the nature of NAS sold in competitive markets is more detrimental to audit quality than NAS sold elsewhere.

1. Introduction

The role and value of the non-audit services (NAS) offered by public accounting firms to their clients has long been questioned by academics and regulators (Antle, Gordon, Narayanamoorthy, & Zhou, 2006; Gigler & Penno, 1995; Tysiac, 2013; Whisenant, Sankaraguruswamy, & Raghunandan, 2003). Typically, NAS consist of advisory and other compliance-related services performed by a company's external auditor, which are designed to help the client operate more effectively (Ernst & Young, 2013). These services can include, but are not limited to, enterprise strategy, marketing, corporate finance, mergers and acquisitions, government consulting, legal services, and risk management services (Harris, 2014). This arrangement, where the same firm is contracted to conduct both an independent audit of the company's financials as well as provide guidance on business matters, has led many to raise concerns about auditor independence (Ashbaugh, LaFond, & Mayhew, 2003; DeFond, Raghunandan, & Subramanyam, 2002; Kinney, Palmrose, & Scholz, 2004). Some studies have found evidence that audit quality falls when a company increases its use of their auditor's NAS (Frankel, Johnson, & Nelson, 2002; Srinidhi & Gul, 2007), although there is yet to be a consensus on the exact conditions under which NAS becomes harmful to audit quality (Antle et al., 2006; Ashbaugh et al., 2003; Knechel, Sharma, & Sharma, 2012; Lim & Tan, 2008). By definition, these services are non-essential to the audit process. Nevertheless, clients spend millions of dollars annually on NAS in addition to the standard audit fees (Harris, 2014). An important question that remains difficult to answer is how auditors approach negotiations over the quantity of NAS to be provided. Are NAS value-added services offered by the auditor that stand independent of the audit fee negotiations? Or do NAS feature prominently in an auditor's ability to court clients and differentiate itself in the competitive landscape?

This paper aims to address two central questions. The first is whether the intensity of local competition affects the quantity of NAS sold. And if so, through what channels does competition make itself apparent? The second question is whether the NAS sold in competitive markets have a different impact on audit quality relative to those sold in less competitive markets. By exploring these questions, we can better understand auditor-client fee negotiations, as well as the dynamics within audit firms as they seek to maximize the combined profits from their two chief revenue streams. Tackling these questions also enables us to gain insight on how bargaining power between auditors and their clients shifts based on the strength of the alternate suppliers of accounting services and what effect the shifting bargaining power can have on the resulting audit quality.

To answer the above questions, I examine the relationships between non-audit service fees, audit quality, and two different measures of local

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market competition, each of which captures a different aspect of the competitive landscape. The first measure of local competition is the inverse of a Herfindahl-Hirschman Index[1] (HHI) calculated using audit fees paid by client companies to determine market share. This allows me to measure competition as a function of the audit fees that clients generate, going beyond a client company's size and giving insight into how valuable clients are in terms of revenue generation. The second measure of local competition is a count of the number of auditors actively engaged with at least one client within the area.[2] This measure captures the number of competitors while simultaneously accounting for new entrants and departures as competing audit firms acquire at least one client or lose their remaining clients within the area. This allows me to test the sensitivity of firms to even a relatively small addition or subtraction to the local supply of active audit firms.

My first set of analyses addresses competition's impact on the provision of NAS while my second set of analyses investigates the interaction between competition, NAS, and audit quality. Results from the initial analyses suggest that, on average, the quantity of NAS provided to each client increases when local markets become more competitive.[3] When the market share among audit firms becomes less concentrated or additional firms enter the market, auditors respond by selling and providing NAS. The results suggest that a one standard deviation increase in the HHI-based measure of competition (number of competing audit firms) corresponds with an estimated 4.4% (5%) increase in the amount of NAS sold. The results provide evidence that the quantity of an auditor's resources devoted to NAS is tied to the competition that audit firms face in the audit market, suggesting that NAS and their role within the audit firm cannot be considered independently of the firm's audit-related offerings.

My second set of analyses find results consistent with an increase in the negative effect of NAS on audit quality as competition rises. These findings suggest that as competition rises, the types of NAS being provided become increasingly detrimental to audit quality.

To help establish causality in my main results, I study the dissolution of Arthur Andersen in 2002 as a historical unexpected shock to local competition. Using a difference-in-differences approach, I find that engagements in areas where Arthur Andersen was operating in 2001 and then exited in 2002 saw larger decreases in NAS use than areas in which Arthur Andersen had never operated. The results suggest that areas that saw a negative shock to competition significantly reduced their use of NAS, even after controlling for the broader effects of SOX and auditor changes. I also find consistent results when using pre-collapse market shares to predict post-collapse HHIs in a two-stage least squares (2SLS) framework.

To flesh out these results and determine the nature of the relationship between competition and NAS, I perform several additional tests to determine the channels through which competition sparks increases in NAS. I find that firm-years in which there are smaller differences in the average audit quality gap between the highest versus lowest quality auditors show heightened sensitivity to competition.[4] Further, these effects appear to be driven by the higher quality firms, suggesting that higher audit quality firms capitalize on the superior quality of their audit services in order to promote their NAS. I also find that higher quality auditors are on average more sensitive to market share-based measures of competition while lower quality auditors show a stronger sensitivity to changes in the number of competitors than higher quality auditors.

I also find evidence consistent with increased sales of NAS in competitive areas, regardless of fee pressure. However, I do find that the strength of the association between NAS and competition is greater when fee pressure is present. This suggests that, in conjunction with competition, audit firms place increased emphasis on non-audit fee revenue when audit fees are depressed. This reaffirms the findings of Beardsley, Lassila, and Omer (2019) and highlights that both competition and fee pressure play a role in the motivation of NAS sales.

This study contributes to the literature in several ways. First, it demonstrates a clear relationship between local competition and the sale of NAS. Building on the Beardsley et al. (2019) study that associated increased NAS with fee pressure, I find evidence linking competition directly to NAS sales and the allocation of local resources needed to provide them, regardless of fee pressure. This raises an important issue in our understanding of the relationship between NAS and audit quality. If local competition is driving auditors to focus their efforts more on NAS, any observed reductions in audit quality coinciding with increases in NAS may be purely, or at least partially, a result of resource allocation rather than violations of independence. This would be consistent with the distraction effects documented in Beardsley, Imdieke, and Omer (2021). It is important that future work distinguish between the compromising of auditors' ethical standards and reductions in the resources spent on assurance that are the result of increased emphasis on NAS.

A second contribution is the documentation of auditors using NAS as a differentiation tool. In addition to showing that auditors use NAS to differentiate themselves in areas where the average quality gap between high- and low-quality auditors is small, I document different responses to competition with respect to NAS based on the quality of the firms' assurance outputs. This furthers the literature on the joint determination of audit and non-audit fees, showing that higher quality auditors bargain for more non-audit service fees when compared to lower quality auditors.

Third, this study provides insight on the relationship between competition, NAS, and audit quality. In addition to finding evidence consistent with prior studies that suggest competition is correlated with reduced audit quality (Newton, Wang, & Wilkins, 2013) and that fee pressure from reduced audit fees pushes auditors to increase their non-audit service fees (Beardsley et al., 2019), I find that the NAS contracted in highly competitive markets are more harmful to audit quality than those sold elsewhere. This suggests that not all NAS have identical properties and the types of NAS provided in competitive markets may be altered in ways that are undesirable. These findings can help to reconcile the previous literature and provide a mechanism that links competition to fee pressure, NAS, and reduced audit quality.

Finally, the results of this study can also be useful to regulators and practitioners. In recent years, Europe has begun to cap the value of NAS that an auditor can provide relative to the value of the assurance fees paid (Ritter, 2015). My findings suggest that such a cap may be effective in the U.S. as well. It would limit the potential profitability of diverting additional resources to NAS. By limiting firms in this way, regulators can

[1] Following Beardsley et al. (2019) and Beardsley et al. (2021), I use the inverse of the Herfindahl-Hirschman Index to formulate a measure that increases with competition.

[2] From a practical standpoint, I only capture companies that appear in both Audit Analytics and Compustat. I acknowledge that these firms are large firms relative to other companies that are not included in both databases.

[3] My primary tests use the log of non-audit service fees as the dependent variable, which serves as a proxy for the quantity of NAS provided. The major assumption needed in interpreting results using this measure is that the pricing of NAS either does not vary across observations or that any systematic variation can be sufficiently controlled for. In order to guard my results against bias stemming from variations across time, industry, auditor, or area, I include year fixed effects, industry fixed effects, auditor fixed effects, and Metropolitan Statistical Area fixed effects.

[4] Absolute performance-matched discretionary accruals (full variable definition available in Appendix A) is used as the proxy for audit quality in these calculations. Averages are determined based on all clients audited by the corresponding auditor within the MSA-year.

incentivize firms to prioritize audit services as their primary source of income and ensure sufficient resources are allocated to assurance.[5]

The remainder of this paper is structured as follows. Section 2 provides background information and summarizes relevant literature. Section 3 develops hypotheses for testing. Section 4 outlines the data and the methodology used. Section 5 discusses results and their implications. Section 6 concludes.

2. Background and literature review

The study of the multiproduct firm is rooted in the theory of the firm in economics. Early work on multiproduct firms focused on barriers to entry such as economies of scale, scope, or the contestability of markets that would determine feasible sustainable market structures (Bailey & Friedlaender, 1982; Baumol, Panzar, & Willig, 1982; Willig, 1979) or varying quality within a single firm's product line (Champsaur & Rochet, 1989; Katz, 1984). While economies of scale, scope, and the contestability of markets are all relevant factors in determining competition in audit markets, in this paper I step back from factors that determine competition to focus on the changes observed after market entry/exit decisions have already been made.

One strain of economic research on multiproduct firms that is directly applicable to the case of audit and NAS comes from Johnson and Myatt (2003). Their paper models the response of multiproduct firms to new entrants in the market. Their model predicts that after new competitors enter, incumbents will expand their production of products/services for which marginal revenues are the least sensitive to outside competition. This provides a theoretical foundation for why auditors may opt to focus more heavily on NAS, a differentiated product that is less likely to be negatively affected by competition, when competition intensifies.

Recently, despite the restricts imposed by SOX that outlaw a company's auditor from providing certain consulting services, new trends have emerged with data showing the growth of non-audit service fees outpacing the growth of audit fees within the Big 4 (Harris, 2014), but not at non-Big 4 audit firms (Hannen, 2015). These opposing trends suggest that the competitive landscape in which audit firms operate and sell their NAS may be a key driver in their use. Aobdia, Enache, and Srivastava (2016) provide evidence that the stranglehold the Big 4 possess on the large public-company audit market may be loosening, although the Big 4 still control an overwhelming majority of that market. While there has been past evidence that audit fees are sensitive to competition (Bandyopadhyay & Kao, 2001; Maher, Tiessen, Colson, & Broman, 1992; Sanders, Allen, & Korte, 1995), post-SOX data indicates that the Big 4 continue to operate in a fee space that is very different from smaller accounting firms (Carson, Simnett, Soo, & Wright, 2012). Companies that opt for a Big 4 vs non-Big 4 audit still appear to have fundamental differences (Guedhami, Pittman, & Saffar, 2014; Hay & Davis, 2004; Hope, Kang, Thomas, & Yoo, 2008), suggesting competition may be felt within groups rather than from the whole market.

There is also a growing literature on clients pressuring auditors to lower audit fees. Ettredge, Fuerherm, and Li (2014) and Christensen, Omer, Sharp, and Shelley (2014) both document reductions in audit fees in the U.S. following the recession of the late 2000s. Beardsley et al. (2019) demonstrates this fee pressure's role in pushing audit offices to increase their focus on NAS and finds that this effect is greater at small and mid-size auditors. Given that this office-level finding contradicts the overall trend that NAS growth has not been widely observed at non-Big 4 firms (Harris, 2014), it may be the case that the behavior is a response to stickiness in the availability of local resources. This especially may be the case given that Numan and Willekens (2012) finds evidence consistent with local differentiation being important to an auditor's success and Nagy, Sherwood, and Zimmerman (2020) finds that audit office quality is associated with the quantity of local resources. There is also evidence from Keune, Mayhew, and Schmidt (2016) that suggests that local competition and local audit fee pricing can be affected if there is non-Big 4 leadership in the region.

NAS have been studied extensively in relation to audit quality with mixed results. Some studies warn of the negative impacts of NAS on audit quality (Frankel et al., 2002; Srinidhi & Gul, 2007) while others find reduced or no association between NAS and audit quality after specific controls are accounted for (Ashbaugh et al., 2003; Knechel et al., 2012; Lim & Tan, 2008). Antle et al. (2006) even documents positive effects of NAS on audit quality, citing knowledge spillovers that could aid in conducting the audit. Other studies such as Causholli, Chambers, and Payne (2014) find specific conditions, in their case high fee-growth-opportunity clients, which trigger an especially negative relationship between earnings management and NAS. Paterson and Valencia (2011) find that certain recurring services, such as tax services, could aid in reducing the likelihood of related restatements while audit-related NAS were positively associated with restatements.

There is also a literature studying the relationship between competition and audit quality, also with mixed results. Starting with studies that uncovered a negative correlation between competition and audit quality, Kallapur, Sankaraguruswamy, and Zang (2010), Ding and Jia (2012), and Newton et al. (2013) are just a few examples of studies that document decreases in audit quality as audit competition increases. Conversely, there are studies with opposing conclusions. Boone, Khurana, and Raman (2012), Dunn, Kohlbeck, and Mayhew (2011), as well as Gong, Li, Lin, and Wu (2016) find positive associations between audit competition and audit quality and instead warned of the dangers of too much audit market concentration. Recently, Ho (2022) has proposed and documented evidence consistent with a non-monotonic relationship between audit market competition and audit quality. That study finds that audit quality is higher in markets without extreme competition, which incentivizes myopic behavior and price competition, or a single monopolist, which has no incentive to compete based on quality.

Throughout these mixed results, there has yet to be significant consideration of the three-way interactions between competition, audit quality, and NAS. Beardsley et al. (2019) documents a positive association between competition and NAS and a positive association between fee pressure and NAS. Beardsley et al. (2021) documents distraction effects by which audit quality suffers when auditors place greater emphasis on providing NAS. However, one question that is yet to be addressed is whether the NAS provided in competitive versus non-competitive markets vary in their effect on audit quality and if the effects of competition on NAS can be sufficiently distinguished from those felt from fee pressure. This study aims to help fill that gap. This is a critical point of tension because if auditors sell materially different NAS in competitive markets than they do elsewhere, the nature of the services provided and the way that they need to be considered may be very different. It may be the case that not all NAS should be considered equal. If NAS sold in competitive markets are more harmful to audit quality than those sold elsewhere irrespective of fee pressure, researchers and regulators could then seek to better understand which types of NAS are particularly troublesome and try to distinguish between reductions in audit quality that stem from the provision of NAS versus those that are the results of distractions from the audit function.

3. Hypothesis development

Contemporary NAS provided to U.S. public companies can include any service to an audit client, outside of the formal audit procedures,

[5] Alternatively, audit firms, most notably Ernst and Young, have recently proposed splitting their accounting and consulting functions into two distinct organizations (Ernst & Young, 2022). This may also be effective for reducing internal struggles between prioritizing audit and non-audit services. However, this may have limited effectiveness given that the split of Andersen Consulting (later renamed to Accenture) from Arthur Andersen in 1989 did not prevent the fall of Arthur Andersen in 2001.

which is not specifically cited in Section 201 of the Sarbanes Oxley Act of 2002 as one of the nine non-permissible classes of NAS. These services must also be approved by the client's audit committee and should not impair an auditor's independence during the auditing process. Even with these strict guidelines in place, NAS can still take many forms and vary across different firms (Ernst & Young, 2013), though for the most part they manifest themselves in the form of advisory services. These advisory services can include guidance on how to conform to laws and regulations, handle mergers and acquisitions, or general business advice. These services add value by providing clients with insightful guidance on operational decisions (Ciconte III, Knechel, & Mayberry, 2014) while simultaneously providing auditors with a deeper understanding of their clients' business activities (Antle et al., 2006; Knechel et al., 2012; Wu, 2006) and an additional revenue stream.

If auditors have the capacity to provide additional NAS, and these services earn positive profits, we should expect auditors to attempt to maximize the quantity of NAS sold. However, given that NAS come at a monetary cost to clients and a resource cost to the auditor (Beardsley et al., 2019), audit firms may wish to be selective about when and how much they try to sell NAS to their clients. If local audit offices have limited short run resources, auditors will face a trade-off between allocating marginal resources to NAS or the audit function. Further, increases in the use of NAS may overwhelm the natural capacity of an auditor's NAS staff, leading to reductions in service quality (Khanna, Noe, & Sonti, 2008).

An important situation in which auditors may have incentive to alter their behavior with respect to NAS is in the presence of heightened levels of competition in the audit market. There are several reasons why auditors may decide to do this. I begin by discussing some of the reasons for increased use of NAS in highly competitive markets, followed by reasons against.

The first reason why auditors may decide to raise their emphasis on NAS in areas where there exists intense competition is that NAS may act as a tool for differentiating their offerings from those of competing firms. The type and quality of the advisory services that any individual firm can offer will vary depending on their personnel, experiences, and personal/professional networks (Ernst & Young, 2013). In this way, each audit firm can position its NAS as a unique offering that cannot be identically replicated by competitors. Given this, it would be natural for auditors, as multiproduct firms, to shift their efforts towards NAS, a more differentiated product, that should be less negatively impacted by competition in the audit market (Johnson & Myatt, 2003).

A second reason why auditors may be inclined to push for the increased use of NAS in competitive markets comes from their inability to extract sufficient rents from assurance services alone. In markets where audit competition is high, auditors have been observed to compete based on price (Maher et al., 1992). This price competition can drastically reduce the profitability of assurance services. If this is the case, then it would be natural for audit firms to look for alternate revenue sources from which to derive profits. One of these sources is NAS (Beardsley et al., 2019).

A third reason why auditors may seek to increase their production of NAS in competitive markets is that NAS may provide knowledge spillovers that increase the quality of their audits (Antle et al., 2006). If the in-depth knowledge of clients gained from providing NAS is beneficial to the audit, then auditors may wish to provide additional NAS in competitive markets in order to improve their audits.

There are also many reasons why we might expect the opposite result, with audit firms reducing their use of NAS in more competitive markets. For one, this could occur if clients do not see the value in NAS. While past literature has documented evidence of a positive association between NAS and firm value (Lai & Krishnan, 2009), if clients view these services to be more of a superfluous tool to appease the auditor rather than to actually add value, then we would expect client companies to use a competitive supply market to minimize the amount of NAS they purchase. In this case, the observed usage of NAS would be driven by the relative bargaining power of auditors and their potential clients. We would expect to see relatively little usage of NAS in highly competitive markets.

Similarly, even if NAS are deemed valuable by client companies, we may see the fees that they generate reduced in highly competitive markets due to price competition. The literature has already established that auditors have been observed to reduce their audit fees in competitive markets in order to court clients (Maher et al., 1992). If markets are sufficiently competitive, they may choose to do the same with NAS and reduce the fees they charge for advisory work in order to gain favor with potential clients.

Lastly, auditors may be reluctant to increase their use of NAS due to fears of reduced audit quality or breaches to independence (in practice or perception). If local audit offices are limited in their resources, allocating additional resources to NAS will detract from the attention that will be paid to the audit function (Beardsley et al., 2021). Auditors may have quality and reputational concerns with respect to their assurance services that prevent them from increasing NAS production in competitive markets.

Taking all of these arguments into consideration, it is unclear how we should expect the use of NAS to respond to competitive markets, thus creating the need for empirical investigation. I state my first hypothesis without an expected sign as follows:

H1. The competitiveness of the audit services market will affect auditors' provision of non-audit services.

Following previously discussed arguments from above, one of the potential costs to audit firms of allocating additional resources to NAS is a reduction in audit quality. It is therefore critical to investigate if responses to competition by using NAS affects audit quality. My second hypothesis examines whether the relationship between NAS and audit quality changes when markets become more competitive. It is expressed as follows:

H2. The effect of non-audit services on audit quality will be affected by the competitiveness of the audit market.

All variables and testing procedures will be discussed and defined in Section 4.

4. Data and methodology

4.1. Data overview and sample construction

For my analyses, local markets are measured at the U.S. Metropolitan Statistical Area (MSA) level. My sample spans the period of 2000–2018 and contains 121,891 firm-year observations across 5023 MSA-years. The data on audit and non-audit service fees, as well as auditor-client matchings, is gathered from Audit Analytics, with the remaining variables either sourced directly from, or calculated using, Compustat data.

I use all firm-years that can be matched across both the Compustat and Audit Analytics databases. This provides 138,454 potential firm-years for the study. Removing 16,563 observations with missing data leaves a total of 121,891 firm-years to be used in the NAS analysis. Missing data needed to calculate measures of audit quality and appropriate controls further limits the sample to 105,309 firm-years. After eliminating firm-years with two-digit SIC codes between 44 and 49 and 60–64,[6] there are 86,924 firm-years for the audit quality analysis. A breakdown of sample construction can be found in Table 1.

[6] SIC codes 44–49 and 60–64 correspond with utilities and financial institutions which are incompatible with abnormal accruals models of audit quality (Dechow et al., 1995; Kothari et al., 2005; Menon & Williams, 2004).

Table 1
Sample construction.

Sample construction	NAS analysis	Audit quality analysis
Firm-years available in Compustat from 2000 to 2018	226,912	226,912
Firm-years available in Audit Analytics from 2000 to 2018	232,328	232,328
Overlapping firm-years within both databases	138,454	138,454
Firm-years with missing values	16,563	33,145
Firm-years with two-digit SIC between 44 and 49 or 60–64	N/A	18,385
Firm-years used in analysis	121,891	86,924
Observations by year:		
2000	3378	2675
2001	4663	3852
2002	6690	5226
2003	7654	5902
2004	7544	5787
2005	8051	5824
2006	7393	5245
2007	7114	4854
2008	6867	4692
2009	6630	4467
2010	6444	4441
2011	6545	4442
2012	6568	4360
2013	6668	4575
2014	6509	4625
2015	6448	4512
2016	6035	4137
2017	5555	3835
2018	5135	3473
Firm-years used in analysis	121,891	86,924

This table details the construction of the sample and the distribution of firm-years.

4.2. Main variables

My study uses non-audit service fees in order to measure a firm's usage of NAS. By using the log of a firm's non-audit service fees paid (*NAS*) as the central dependent variable, I am able to proxy for the quantity of NAS used by the firm. Formulating *NAS* as a quantity rather than a proportion of total fees avoids mechanical issues stemming from audit fees reductions as competition rises. Nevertheless, there are potential issues with this measure if there are differences in pricing across geographic areas, industries, time, and auditors. To help mitigate any issues stemming from auditor specific, industry dependent, time trends, or area-specific pricing, I include auditor, industry, year, and MSA fixed effects. After implementing these controls that target pricing variation, what remains should be a good approximation for changes in quantity.

To proxy for audit quality, I utilize restatements (*RESTATE)* and performance-matched absolute abnormal accruals (*ACCRUALS*) calculated using the Modified Jones model with performance-matching (Dechow, Sloan, & Sweeney, 1995; Jones, 1991; Kothari, Leone, & Wasley, 2005). Restatements capture egregious reporting errors and fraud while accruals estimate the level of within-GAAP manipulation. Each measure captures a different aspect of audit quality that could potentially be affected by the use of NAS.

As previously alluded to, this study calculates local competition at the MSA level. In order to provide more comprehensive results, two measures of competition are used. The first measure of competition is the inverse of a Herfindahl-Hirschman Index (*HHI*). The Herfindahl-Hirschman Index is designed to capture the degree of concentration among client firms within the market. Taking on values between zero and one, a lower score on the index indicates that an MSA is more competitive, with public company market share being distributed more widely across several auditors. On the opposite end, a higher score closer to one indicates that an MSA is less competitive and is heavily dominated by a single auditor who has managed to court a large share of the public company market. Following Beardsley et al. (2019) and Beardsley et al. (2021), I take the inverse of the index to formulate a measure that increases with audit competition. The measure uses audit fees earned for calculating market share which provides a measure of competition weighted by the revenues earned by auditors.

My second measure of local competition is a count of the number of auditors with at least one client within the MSA (*AU_COUNT*).[7] Measuring competition in this way allows me to test the sensitivity of auditors to new entrants/departures. Using both the HHI-based measure and a count-based measure of competition helps distinguish between auditors changing their behavior immediately upon the entry of new competitors, or if they respond more sensitively to the capturing of market share after new entrants are established.[8]

4.3. Controls

The primary NAS specification with controls is as follows[9]:

$$\begin{aligned} NAS = {} & \beta_0 + \beta_1 Competition + \beta_2 MSA\_AUDIT\_FEES \\ & + \beta_3 OFFICE\_AUDIT\_FEES + \beta_4 AUDIT\_FEES \\ & + \beta_5 TOTAL\_ASSETS + \beta_6 SEGNUM \\ & + \beta_7 DEBTASSETS + \beta_8 LITIGATION + \beta_9 TENURE \\ & + \beta_{10} BIG4 + \beta_{11} SPECIALIST\_MSA + \beta_{12} SPECIALIST\_NAT \\ & + \text{Industry Fixed Effects} + \text{Auditor Fixed Effects} + \text{Year Fixed Effects} \\ & + \text{MSA Fixed Effects} + \varepsilon \end{aligned} \quad (1)$$

$$Competition : HHI, AU\_COUNT$$

MSA_AUDIT_FEES is the log of total audit fees paid by all public company clients within the MSA-year. This proxies for the total capacity/population of clients within the MSA. *OFFICE_AUDIT_FEES* is the log of the total audit fees paid to the audit office associated with the engagement within the MSA-year, proxying for the size of the auditor's local resources.[10] *AUDIT_FEES* is the log of the firm's fee paid for audit services. Prior literature (Firth, 1997; Palmrose, 1986b; Whisenant

[7] Client-auditor matches are taken from Audit Analytics; thus, I only consider firms within the MSA that also appear in Audit Analytics.

[8] Auditors excluded from the count are auditors with only clients that are privately held, or auditors that are too small to appear in Audit Analytics (measures of competition are calculated based on the whole sample of Audit Analytics). Auditors who hold these client portfolios are unlikely to be direct competition for accounting firms that audit clients within the sample. On average, I observe 36.6 auditors per MSA which should be a fairly representative number of the active auditors in the area capable of competing for publicly-held corporations.

[9] Two notable controls that cannot be included due to public data unavailability are whether office managing partners are specialized in advisory services, and non-Big 4 leadership. The first has been linked to increased NAS fees and reduced quality as demonstrated in Mowchan (2016), while the latter has been linked to increased competition in Keune et al. (2016). While I do not believe that the omission of these controls invalidates my findings, it is important to acknowledge that they likely play a role in auditors' determination of their product mix and could affect my ability to generate accurate point estimates.

[10] A limitation of the data is its inability to identify the exact number of offices that each auditor has in each MSA. It is possible for particularly congested MSAs, such as those associated with major cities, to contain multiple offices within a single MSA. Due to data limitations, I assume that each MSA is serviced either by a single office or set of offices per auditor that I treat as a single office, as it is common for multiple offices of the same audit firm within a concentrated area to work cooperatively and share resources in order to serve local clients.

et al., 2003) has shown positive associations between the audit and non-audit service fees paid as they both proxy for the level (both quality and quantity) of services provided and there should be some knowledge spillover between these services (Simunic, 1984; Wu, 2006) or increased effort (Davis, Ricchiute, & Trompeter, 1993).

TOTAL_ASSETS and *SEGNUM* are the log of total assets and the number of geographic segments of the client company (Antle et al., 2006; DeFond et al., 2002; Firth, 1997).

The next two controls proxy for the relative riskiness of the client for the audit firm. *DEBTASSETS* is the client's debt-to-assets ratio while the *LITIGATION* variable indicates whether the client company is in a high litigation industry (Antle et al., 2006; DeFond et al., 2002; Hay, Knechel, & Wong, 2006). Industries with high litigation risk are identified following Kim and Skinner (2012).[11]

The *TENURE* control, calculated as the number of years of tenure the auditor has with the specific client company, proxies for how established the relationship is between the audit firm and its client.

BIG4 indicates whether a company's auditor is one of the Big 4 auditors. Including this variable controls for any non-audit service fee premium associated with choosing a Big 4 firm as the external auditor (Antle et al., 2006; DeFond et al., 2002).

The last pair of controls, *SPECIALIST_MSA* and *SPECIALIST_NAT*, indicate whether a client's auditor is the MSA or national market share leader within their industry. Auditors are defined as specialists if they have more clients in the specified region than any other firm. The literature linking specialists to audit fee premiums is mixed (Craswell, Francis, & Taylor, 1995; Francis, Reichelt, & Wang, 2005; Palmrose, 1986a) with no clear guidance for the relationship between the use of specialists and NAS.

Finally, as noted above, I include year fixed effects, auditor fixed effects, industry fixed effects, as well as MSA-fixed effects throughout in order to control for variations across time, auditor, industry, or area.

In addition to this main NAS specification, an alternate specification is tested with additional controls for auditor alignment (*ALIGNMENT*) and distance to the closest competitor (*DISTANCE*). Following Numan and Willekens (2012), these added variables control for the presence of spatial competition within MSAs.

The audit quality specification with controls is as follows:

$$\begin{aligned} AQ = {} & \beta_0 + \beta_1 NAS + \beta_2 Competition + \beta_3 NAS{*}Competition \\ & + \beta_4 MSA\_AUDIT\_FEES + \beta_5 OFFICE\_AUDIT\_FEES \\ & + \beta_6 AUDIT\_FEES + \beta_7 TOTAL\_ASSETS \\ & + \beta_8 SEGNUM + \beta_9 ROA + \beta_{10} DEBTASSETS \\ & + \beta_{11} CURRENT\_RATIO + \beta_{12} LITIGATION + \beta_{13} TENURE + \beta_{14} BIG4 \\ & + \beta_{15} SPECIALIST\_MSA + \beta_{16} SPECIALIST\_MSA{*}NAS \\ & + \beta_{17} SPECIALIST\_MSA{*}AUDIT\_FEES + \beta_{18} SPECIALIST\_NAT \\ & + \beta_{19} SPECIALIST\_NAT{*}NAS + \beta_{20} SPECIALIST\_NAT{*}AUDIT\_FEES \\ & + \text{Industry Fixed Effects} + \text{Auditor Fixed Effects} + \text{Year Fixed Effects} \\ & + \text{MSA Fixed Effects} + \varepsilon \end{aligned} \tag{2}$$

$$AQ : RESTATE, ACCRUALS$$

$$Competition : HHI, AU\_COUNT$$

[11] Companies with a 4-digit SIC code between 2833 and 2836, 8731 and 8734, 3570 and 3577, 7370 and 7374, 3600 and 3674, or 5200 and 5961 are identified as having high litigation risk.

In order to test if the combination of NAS paired with competitive audit markets drives changes in audit quality, I introduce an interaction term between the measures of competition and NAS. Supplementary controls that have been shown to affect audit quality, return on assets and the current ratio (Becker, Defond, Jiambalvo, & Subramanyam, 1998; Menon & Williams, 2004; Zmijewski, 1984), are added for this analysis along with specialist interactions for both audit and non-audit fees (Lim & Tan, 2008).

4.4. Describing the data

Formal definitions of each variable used are listed in Appendix A. Descriptive statistics are provided in Table 2A with an accompanying correlation table in Table 2B. Overall, the descriptive statistics and correlations are consistent with prior studies (Beardsley et al., 2021).[12] The average *NAS* within the sample is 11.548 with a median of 11.608. This is on average 54% of audit fees paid. The inverse HHI index averages 3.603 (median of 3.815). The average number of active local auditors is 36.491, with a median of 34. Other than two correlation pairs, all correlation pairs have an acceptably low correlation such that there is minimal concern about multicollinearity. The two exceptions are *AU_COUNT* and *MSA_AUDIT_FEES* which has a correlation of 0.707 and *ALIGNMENT* and *OFFICE_AUDIT_FEES* which has a correlation of −0.738.[13] This is unsurprising as both measures in the first pair are likely correlated with MSA population while the two measures in the second pair are tied to measuring client/industry importance. To mitigate concerns from these relatively high correlations, all *AU_COUNT* analyses have been run with and without *MSA_AUDIT_FEES*. Results are qualitatively and statistically similar and therefore only results with *MSA_AUDIT_FEES* are tabulated for presentational consistency with the *HHI*-based analyses. Similarly, the regression involving *ALIGNMENT* was tested with and without *OFFICE_AUDIT_FEES* (untabulated) with quantitatively and qualitatively similar results.

5. Results

5.1. Main results

The results of the primary specification from Hypothesis 1 (model (1)) are presented in Table 3. The variables of interest for columns (1) and (2) are the inverse Herfindahl-Hirschman Index (*HHI*) calculated using audit fees and a count of the number of active auditors within the MSA (*AU_COUNT*), respectively.

Both variables of interest produce consistent results. Using *HHI* to measure competition produces a positive and statistically significant result at the 1% level (two-tailed p-value = 0.000). For *AU_COUNT* I also observe a positive and statistically significant coefficient at the 1% level

[12] It is important to note that Beardsley et al. (2021) and my study differ in the definition of many controls. For example, they count the number of business segments for firms while I capture the number of geographic segments. Another key difference is how expertise/specialists are designated. Beardsley et al. (2021) define expertise as any audit office with >30% market share while I only denote the local/national market share leader as a specialist. It is also important to note that the Beardsley et el. (2019, 2021) studies incorporate manually collected location data to conduct their studies at the office level while this study uses engagement level data from public sources and aggregates to the MSA-level to estimate office level variables. While this likely does generate some inconsistencies between the two data sets, I do not expect them to be materially systematically different when averaged over the large sample size and period.

[13] Another potentially notable correlation pair is *AUDIT_FEES* and *TOTAL_ASSETS* which have a correlation of 0.840. This is not a concern as these controls are both proxies for client size that are well established in the literature and often included simultaneously without issue (e.g., Lisic, Myers, Pawlewicz, & Seidel, 2019).

Table 2A
Descriptive statistics.

Variable	N	Mean	Std. Dev.	25th	50th	75th
NAS	121,891	11.548	1.940	10.250	11.608	12.880
HHI	121,891	3.603	0.861	3.047	3.815	4.232
AU_COUNT	121,891	36.491	25.148	20.000	34.000	45.000
ALIGNMENT	121,891	0.330	0.369	0.039	0.148	0.549
DISTANCE	121,891	0.209	0.332	0.000	0.028	0.250
RESTATE	86,924	0.093	0.290	0.000	0.000	0.000
ACCRUALS	86,924	0.304	0.908	0.148	0.204	0.255
MSA_AUDIT_FEES	121,891	18.658	1.575	18.270	18.893	19.490
OFFICE_AUDIT_FEES	121,891	15.978	2.541	14.066	16.878	17.880
AUDIT_FEES	121,891	13.257	1.590	12.155	13.290	14.283
TOTAL_ASSETS	121,891	6.224	2.812	4.406	6.378	8.169
SEGNUM	121,891	0.653	0.743	0.000	0.000	1.386
ROA	86,924	−0.191	0.763	−0.099	0.022	0.067
DEBTASSETS	121,891	0.778	2.358	0.338	0.534	0.761
CURRENT_RATIO	86,924	3.075	4.225	1.243	1.936	3.220
LITIGATION	121,891	0.278	0.448	0.000	0.000	1.000
TENURE	121,891	5.523	5.679	1.000	4.000	8.000
BIG4	121,891	0.694	0.461	0.000	1.000	1.000
SPECIALIST_MSA	121,891	0.091	0.287	0.000	0.000	0.000
SPECIALIST_NAT	121,891	0.328	0.469	0.000	0.000	1.000

This table presents descriptive statistics on the sample used. All variables are as defined in Appendix A. The continuous variables are winsorized at the 1st and 99th percentile.

Table 2B
Pearson correlation table.

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
(1) NAS	1.000									
(2) HHI	−0.003	1.000								
(3) AU_COUNT	−0.022	0.454	1.000							
(4) ALIGNMENT	−0.208	−0.237	−0.184	1.000						
(5) DISTANCE	−0.168	−0.297	−0.225	0.653	1.000					
(6) RESTATE	0.003	−0.028	−0.003	0.029	0.016	1.000				
(7) ACCRUALS	−0.131	0.011	0.036	0.121	0.069	0.005	1.000			
(8) MSA_AUDIT_FEES	0.045	0.547	0.707	−0.347	−0.417	−0.024	0.008	1.000		
(9) OFFICE_AUDIT_FEES	0.480	0.210	0.225	−0.738	−0.571	−0.030	−0.183	0.428	1.000	
(10) AUDIT_FEES	0.678	0.035	0.040	−0.202	−0.184	−0.030	−0.177	0.173	0.624	1.000
(11) TOTAL_ASSETS	0.676	−0.035	−0.027	−0.250	−0.185	−0.054	−0.268	0.075	0.577	0.840
(12) SEGNUM	0.191	−0.004	0.002	−0.135	−0.085	−0.024	−0.061	0.094	0.216	0.272
(13) ROA	0.269	−0.041	−0.047	−0.184	−0.089	−0.011	−0.597	−0.010	0.292	0.332
(14) DEBTASSETS	−0.130	0.004	0.033	0.118	0.074	0.016	0.544	0.011	−0.176	−0.152
(15) CURRENT_RATIO	−0.146	0.030	0.007	0.004	0.003	0.008	−0.038	0.007	−0.069	−0.188
(16) LITIGATION	−0.107	0.062	−0.010	−0.011	−0.126	0.003	0.049	0.045	0.001	−0.127
(17) TENURE	0.216	−0.001	0.004	−0.011	−0.007	−0.009	−0.028	0.070	0.196	0.347
(18) BIG4	0.445	−0.049	−0.094	−0.516	−0.352	−0.010	−0.162	−0.002	0.719	0.525
(19) SPECIALIST_MSA	0.091	−0.031	−0.047	−0.071	−0.100	−0.001	−0.032	−0.032	0.114	0.107
(20) SPECIALIST_NAT	−0.115	−0.073	−0.010	0.191	0.131	−0.019	0.085	−0.039	−0.226	−0.149

	(11)	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*	*(20)*
(11) TOTAL_ASSETS	1.000									
(12) SEGNUM	0.199	1.000								
(13) ROA	0.498	0.135	1.000							
(14) DEBTASSETS	−0.265	−0.085	−0.538	1.000						
(15) CURRENT_RATIO	−0.138	−0.077	0.072	−0.107	1.000					
(16) LITIGATION	−0.238	0.054	−0.145	0.003	0.080	1.000				
(17) TENURE	0.244	0.080	0.064	−0.002	−0.034	−0.040	1.000			
(18) BIG4	0.542	0.167	0.263	−0.139	−0.071	−0.034	0.206	1.000		
(19) SPECIALIST_MSA	0.127	0.021	0.050	−0.023	−0.042	−0.060	0.066	0.144	1.000	
(20) SPECIALIST_NAT	−0.101	−0.044	−0.113	0.074	−0.017	−0.088	−0.049	−0.197	0.056	1.000

(two-tailed p-value = 0.000). These results suggest that the provision of NAS increases in more competitive markets. Whether it be more competitive in terms of a more widely distributed market share, or more competitive with regards to the number of suppliers of audit services in the market, when local competition increases so does the average engagement's provision of NAS.

The results suggest that a one standard deviation increase in the HHI-based measure of competition corresponds with an estimated 4.4% increase in the amount of NAS sold. A one standard deviation increases in the number of auditors competing in the market increases NAS by an estimated 5%. This is economically significant given that the average non-audit service fees for the sample is approximately $874,000 per engagement.

Columns (3) and (4) provide the alternate specification with the measures of spatial competition from Numan and Willekens (2012) included. After including these additional measures, results remain

Table 3
Main results.

	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*NAS*	*NAS*	*NAS*	*NAS*
HHI	?	0.051***		0.051***	
		(6.404)		(6.497)	
AU_COUNT	?		0.002***		0.002***
			(3.877)		(3.875)
ALIGNMENT	?			0.025	0.025
				(1.108)	(1.122)
DISTANCE	?			0.123***	0.118***
				(4.251)	(4.092)
*ALIGNMENT*DISTANCE*	?			−0.046	−0.042
				(−1.347)	(−1.223)
MSA_AUDIT_FEES	?	−0.037**	−0.032*	−0.037**	−0.031*
		(−2.232)	(−1.918)	(−2.187)	(−1.868)
OFFICE_AUDIT_FEES	+	0.018***	0.019***	0.026***	0.027***
		(5.315)	(5.530)	(6.037)	(6.213)
AUDIT_FEES	+	0.486***	0.486***	0.479***	0.479***
		(90.647)	(90.600)	(83.927)	(83.879)
TOTAL_ASSETS	+	0.255***	0.255***	0.256***	0.257***
		(88.293)	(88.314)	(88.435)	(88.452)
SEGNUM	+	0.047***	0.046***	0.046***	0.046***
		(7.531)	(7.494)	(7.410)	(7.378)
DEBTASSETS	+	0.030***	0.030***	0.030***	0.030***
		(21.147)	(21.052)	(21.367)	(21.271)
LITIGATION	?	−0.071***	−0.070***	−0.069***	−0.068***
		(−5.454)	(−5.403)	(−5.253)	(−5.209)
TENURE	+	0.012***	0.011***	0.011***	0.011***
		(15.485)	(15.435)	(15.215)	(15.161)
BIG4	+	0.065	0.066	0.060	0.061
		(0.809)	(0.819)	(0.740)	(0.752)
SPECIALIST_MSA	?	0.045***	0.046***	0.052***	0.053***
		(3.440)	(3.501)	(3.931)	(3.978)
SPECIALIST_NAT	?	0.047***	0.046***	0.048***	0.047***
		(5.215)	(5.111)	(5.263)	(5.152)
Industry, Auditor, Year, and MSA Fixed Effects			Included		
Constant		4.979***	5.007***	4.884***	4.911***
		(17.360)	(17.349)	(17.012)	(17.001)
Observations		121,891	121,891	121,891	121,891
R-squared		0.564	0.564	0.564	0.564

This table presents the results of ordinary least squares regressions of model (1) using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions. The dependent variable for all columns is the log of non-audit service fees. All other variables are as defined in Appendix A. Industry, auditor, year, and MSA fixed effects are included. Industry fixed effects are determined using the Fama-French 12 standard industry classifications.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

consistent and statistically significant at the same levels.[14] While *ALIGNMENT* and the interaction term fail to generate significant results, *DISTANCE* generates a positive and significant coefficient at the 1% level (two-tailed *p*-value = 0.000 for both columns). This suggests that greater differences in the alignment between auditors and their closest competitors increases *NAS*. Auditors may capitalize on their differences in alignment in order to differentiate themselves and sell NAS. This is investigated further in Section 5.3.1.

Turning attention to the controls, I observe consistent results across all specifications. Total MSA audit fees are negatively associated with NAS while total office audit fees are positively associated with NAS. As expected, firms that pay larger audit fees, have more total assets, consist of more geographic segments, are more highly levered, have longer relationships with their current auditor, and employ local or national specialists purchase more NAS. Higher litigation risk engagements contract less NAS, which suggests that, on average, auditors prefer to distance themselves from litigation risk and reduce ties to high-risk clients rather than approach high risk clients as candidates for increased advisory services.[15]

5.1.1. Non-audit services, competition, and audit quality

My initial results suggest that local competition can drive audit firms to increase their selling of NAS. Given the limitations of local resources, this shift may consequently correspond with a reduction in an audit firm's ability to maintain high levels of audit quality. As competition rises, if more resources are allocated to NAS, fewer resources remain to satisfy the audit function. Next, I investigate Hypothesis 2 to test the relationship between competition and audit quality.

[14] Running the analyses with the spatial competition measures included, but with the main measures of competition (*HHI* and *AU_COUNT)* excluded, yields negative and significant results for *ALIGNMMENT* but with the results on *DISTANCE* and the interaction term unchanged. This suggests that there may be either multicollinearity issues between *ALIGNMENT* and the other measures of competition or that *ALIGNMENT* is a less pervasive measure of competition. With only a mild negative correlation (0.208–0.237) between *ALIGNMENT* and the central measures of competition, it is likely to be the latter. Given that *ALIGNMENT* and the interaction term between *ALIGNMENT* and *DISTANCE* are statistically insignificant, they are excluded from the additional analyses to reduce the likelihood that they introduce noise to the analyses.

[15] One potentially surprising result is the lack of significance in all models for *BIG4*. This is due to the inclusion of individual auditor fixed effects. Excluding individual auditor fixed effects from testing yields the expected result consistent with the literature wherein *BIG4* is positive and statistically significant (two-tailed *p*-value = 0.000 in all models). While Big 4 engagements collectively do, on average, include more NAS than non-Big 4 engagements, the difference is not equal across all Big 4 firms. Therefore, I choose to include individual auditor fixed effects which capture the differences between Big 4 firms.

Results for model (2) are presented in Table 4. Columns (1) and (3) display results using restatements as a proxy for audit quality using logit regressions while results in columns (2) and (4) use absolute abnormal accruals as the proxy for audit quality and ordinary least squares regressions. The interaction term, as constructed, increases both with increases in competition and increases in NAS.

Reviewing the results, there is a positive and statistically significant coefficient on *NAS* in the accruals models (two-tailed *p*-value = 0.000 for both accruals models) but no significant results in the restatement models. These mixed results echo the lack of consensus in the literature where studies continue to uncover conflicting and confounding evidence on the relationship between NAS and audit quality.[16] The coefficients on the measures of competition are negative and statistically significant in the restatement models (two-tailed *p*-value = 0.000 for both restatement models) but fail to yield significant results in the accruals models. Together, the coefficients on NAS and individual measures of competition provide no consistent trend for the response of audit quality to changes in competition or NAS. On the other hand, when examining the interaction between competition and NAS, I observe positive and statistically significant coefficients in three of the four models (two-tailed *p*-values = 0.000 for all three statistically significant results). The lone exception is the restatement model using auditor count. These results suggest that the additional NAS sold in competitive markets are more detrimental to audit quality than the NAS sold in less competitive markets. As an additional test, I rerun these tests after partitioning the sample based on the intensity of fee pressure. In untabulated results, I find no significant difference or consistency between results derived from firm-years with more fee pressure versus those with less fee pressure. This contrasts with the findings of Beardsley et al. (2019)[17] and suggests that competition, rather than fee pressure, may be the driving force that, when combined with NAS, leads to reductions in audit quality.[18]

5.2. The exit of Arthur Andersen

An extremely important historical event that occurred during my sample period was the demise of Arthur Andersen in 2002 following the Enron scandal (Bondarenko, 2021). Not only was this significant due to the large number of clients that required new auditors, but also because of the nature of Arthur Andersen's dissolution. Arthur Andersen provided consulting services associated with NAS that led to allegations of violations of independence. As a result, the role of NAS was heavily scrutinized, and legislation directly addressed which NAS would no longer be permitted in the Sarbanes-Oxley Act of 2002 (SOX). Strict guidelines were also put in place that mandate that a client's audit committee must approve NAS before those services can be provided.

With this spotlight on the potential negative consequences of NAS, it is important to investigate if the relationship between local competition and NAS changed after the fall of Arthur Andersen and how the exit of Arthur Andersen affected the local markets in which the firm was operating. Following the dissolution of Arthur Andersen, the markets in which they were operating should have become less competitive and, because Arthur Andersen did not operate in all local markets, the shock to competition affects the sample of MSAs unequally, creating variation. If my hypothesis is correct, we should see a disproportionate reduction in the use of NAS in these markets relative to other unaffected areas where Arthur Andersen did not operate.[19]

To test this, I employ a differences-in-differences approach, using observations from fiscal years 2001 and 2002 as a source of time and treatment variation pre- and post-exit of Arthur Andersen.

$$\begin{aligned} NAS = {} & \beta_0 + \beta_1 Competition + \beta_2 AA\_EXIT + \beta_3 FYEAR \\ & = 2002 + \beta_4 AA\_EXIT * FYEAR = 2002 \\ & + \beta_5 Controls + \text{Industry Fixed Effects} + \text{Auditor Fixed Effects} \\ & + \text{Year Fixed Effects} + \varepsilon \end{aligned} \tag{3}$$

I identify MSAs in which Arthur Andersen served clients in 2001 but not in 2002 to use as the treatment group. MSAs in which Arthur Andersen had no presence in either year act as the control group. The treatment group consists of 150 MSAs while the control group is comprised of 97 MSAs. I find no statistical difference, pre-treatment, between Arthur Andersen's clients and clients of the other Big 4 audit firms in terms of audit fees, non-audit fees, or audit quality to suggest that Arthur Andersen was a non-generic large auditor.

Results are presented in Table 5. The *AA_EXIT* term identifies observations from areas where Arthur Andersen was present in 2001 and exited in 2002. The interaction identifies observations in post-treatment areas where Arthur Andersen used to be present but no longer operated in as of 2002. It is also worthwhile to note that year fixed effects are included to help control for the general impact of SOX and the broad reduction we would expect in NAS for reputational concerns that would likely be felt by all auditors. Auditor and industry fixed effects are also included. These year, auditor, and industry fixed effects should also mitigate concerns that particular subgroups respond to SOX differently, driven either by unobserved heterogeneity or fear of any stigma associated with NAS due to SOX. Examining first the *AA_EXIT* coefficients, I observe no statistically significant difference between the treatment and control groups. The treatment group appears comparable to the control

[16] Previous studies have found mixed evidence when examining the association between NAS and audit quality (e.g., Ashbaugh et al., 2003; Frankel et al., 2002; Kinney et al., 2004; Lim & Tan, 2008; Paterson & Valencia, 2011; Srinidhi & Gul, 2007). Nonetheless, recent works have documented a positive relationship between fee pressure and reductions in audit quality (Ettredge et al., 2014), especially when fee pressure is accompanied by increases in NAS (Beardsley et al., 2019). Pushing further down to the root cause of this fee pressure, the observed effects could be derived from the NAS sold in highly competitive markets, regardless of fee pressure.

[17] While the Beardsley et al. (2019, 2021) studies are the most closely related to my study, a major difference is that their studies are conducted at the office level while this study conducts analyses at the engagement level. We may expect that testing conducted at the engagement level is less likely to produce significant results due to the ability to control for more client specific and engagement specific characteristics that may be obscured when aggregating to the office level. Another potential difference in expected results could be attributable to the heightened influence of high market share auditors in analyses performed at the engagement level. Because high market share auditors comprise a higher percentage of the observations for engagement level testing, they may exert greater influence than in office level testing. However, it is unclear how this would affect the comparability of results given that the Beardsley et al. (2019, 2021) studies drop all audit offices that audit fewer than 5 publicly listed clients. This would effectively eliminate the majority of non-Big 4 audit offices from the sample which are included in this study. The extent to which these cases would affect the results is unclear. Therefore, I am unable to precisely predict how this would affect the comparability of results. Future work would benefit from reconciling these studies for comparison aggregated to the office level and disaggregated to the engagement level.

[18] The analyses for Table 4 were also rerun including the fee-growth opportunity variable defined in Causholli et al. (2014) as a control with quantitively and qualitatively similar results (untabulated). My results also remain consistent after rerunning the analyses after including tax service fees as a control (untabulated) following Paterson and Valencia (2011). This suggests that the reductions in audit quality observed in the analyses due to increases in competition and NAS are not a byproduct of the effects discovered in Causholli et al. (2014) or Paterson and Valencia (2011).

[19] Although Arthur Andersen was one of the five largest auditors, examining the pre-treatment period there is no statistical difference between areas where Arthur Andersen operated and areas where it did not. Further, Arthur Andersen is not statistically different from the other members of the Big 4 with respect to audit fees, non-audit fees, or audit quality before its collapse. The only statistical difference between Arthur Andersen and a generic auditor is the number of clients they served, which aids in increasing the size of the shock to competition.

Table 4
The effects of non-audit services on audit quality when combined with competition.

	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*RESTATE*	*ACCRUALS*	*RESTATE*	*ACCRUALS*
NAS	+	0.017	0.026***	0.020	0.026***
		(1.336)	(13.153)	(1.610)	(13.152)
HHI	?	−0.133***	0.004		
		(−4.396)	(0.673)		
*HHI*NAS*	+	0.001***	0.001***		
		(3.761)	(8.392)		
AU_COUNT	?			−0.008***	0.001***
				(−4.573)	(4.843)
*AU_COUNT*NAS*	+			0.000	0.001***
				(0.521)	(6.611)
MSA_AUDIT_FEES	−	−0.063	−0.003	−0.030	0.277
		(−0.870)	(−0.310)	(−0.405)	(−0.910)
OFFICE_AUDIT_FEES	−	−0.062***	−0.011**	−0.064***	−0.011**
		(−5.898)	(−2.134)	(−6.126)	(−2.089)
AUDIT_FEES	−	0.236***	0.014***	0.242***	0.014***
		(11.143)	(3.342)	(11.413)	(3.554)
TOTAL_ASSETS	+	−0.141***	−0.051***	−0.143***	−0.051***
		(−14.070)	(−14.504)	(−14.191)	(−14.581)
SEGNUM	+	0.009	0.021***	0.009	0.020***
		(0.470)	(6.328)	(0.441)	(6.239)
ROA	−	−0.000	−0.000**	−0.000	−0.000**
		(−1.245)	(−2.425)	(−1.244)	(−2.433)
DEBTASSETS	+	0.004	0.187***	0.004	0.187***
		(0.717)	(22.796)	(0.813)	(22.800)
CURRENT_RATIO	−	0.009***	−0.002***	0.009***	−0.002***
		(2.942)	(−2.761)	(3.113)	(−2.817)
LITIGATION	?	−0.013***	0.055***	−0.013***	0.054***
		(−4.046)	(6.989)	(−4.102)	(6.917)
TENURE	?	−0.003	−0.003***	−0.001	−0.003***
		(−1.049)	(−8.017)	(−0.421)	(−7.624)
BIG4	−	0.256	−0.132	0.252	−0.129
		(0.390)	(−0.999)	(0.379)	(−0.975)
SPECIALIST_MSA	?	0.113	−0.641***	−0.046	−0.640***
		(0.293)	(−9.659)	(−0.119)	(−9.597)
*SPECIALIST_MSA*NAS*	?	−0.001	−0.015***	0.002	−0.015***
		(−0.026)	(−5.746)	(0.073)	(−5.594)
*SPECIALIST_MSA*AUDIT_FEES*	?	0.002	0.060***	0.011	0.059***
		(0.038)	(12.130)	(0.262)	(12.127)
SPECIALIST_NAT	?	0.135	0.505***	0.059	0.497***
		(0.605)	(5.489)	(0.266)	(5.527)
*SPECIALIST_NAT*NAS*	?	0.184***	0.021***	0.187***	0.022***
		(8.149)	(4.300)	(8.268)	(4.521)
*SPECIALIST_NAT*AUDIT_FEES*	?	−0.160***	−0.054***	−0.156***	−0.054***
		(−5.797)	(−6.759)	(−5.704)	(−6.862)
Industry, Auditor, Year, and MSA Fixed Effects				Included	
Constant		−3.432**	0.157	−4.298***	0.277
		(−2.355)	(0.812)	(−2.877)	(1.434)
Observations		83,848	86,924	83,848	86,924
R-squared			0.366		0.366

This table presents the results of logit regressions for columns (1) and (3) and ordinary least squares regressions for columns (2) and (4) of model (2) using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions. The dependent variable for columns (1) and (3) is equal to 1 if a restatement was issued for the firm-year, and 0 otherwise. The dependent variable for columns (2) and (4) is performance-matched absolute abnormal accruals measured using the Modified Jones model (Dechow et al., 1995; Jones, 1991; Kothari et al., 2005). Firm-years with two-digit SIC codes between 44 and 49 and 60–64 have been excluded. The logit regressions of columns (1) and (3) include 3076 fewer observations due to their industries/MSAs perfectly predicting success/failure.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5
The exit of Arthur Andersen (difference-in-differences).

	Expected	(1)	(2)
VARIABLES	Sign	*NAS*	*NAS*
HHI	+	0.103***	
		(4.544)	
AU_COUNT	+		0.003**
			(2.374)
AA_EXIT	null	−0.082	0.061
		(−0.687)	(0.574)
*AA_EXIT*FYEAR = 2002*	−	−0.179**	−0.258***
		(−2.045)	(−3.073)
AU_CHANGE	−	−0.213***	−0.227***
		(−6.494)	(−7.131)
Controls		Included	
Observations		11,353	11,353
R-squared		0.656	0.655

This table presents the results of estimating model (3):
$NAS = \beta_0 + \beta_1 Competition + \beta_2 AA\_EXIT + \beta_3 FYEAR = 2002 + \beta_4 AA\_EXIT * FYEAR = 2002 + \beta_5 Controls$
+ Industry Fixed Effects + Auditor Fixed Effects + Year Fixed Effects + ε
Using clustered standard errors by MSA, *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions. The dependent variable for both columns is the log of non-audit service fees. The sample for this analysis is restricted to observations from 2001 and 2002. The *AA_EXIT* is the treatment variable that is equal to 1 for all observations for MSAs where Arthur Andersen held at least one client in 2001 and zero otherwise. The mean of *AA_EXIT* for this sample is 0.555. The *AA_EXIT*FYEAR = 2002* interaction is equal to 1 for all observations from the year 2002 in MSAs where Arthur Andersen no longer operated but had in the previous year, and zero otherwise. The controls include all controls from the main results in Table 3. All control variables are as defined in Appendix A. Industry, auditor, and year fixed effects are included as well. β_3 is not explicitly reported as it is included within the year fixed effects. Industry fixed effects are determined using the Fama-French 12 standard industry classifications.
*** p < 0.01, ** p < 0.05, * p < 0.1.

group. Turning next to the interaction term, I find statistically significant and negative coefficients in both models (two-tailed *p*-value = 0.041 and 0.002). These results provide evidence that areas where Arthur Andersen exited saw a significant reduction in NAS, in excess of the reductions caused by SOX and auditor changes, following the fall in competition. This provides further evidence for my main findings that NAS play a more prominent role when local competition is high.[20]

As an additional examination of the collapse of Arthur Andersen, I also perform a two-stage least squares analysis based on predicted changes in competition levels solely driven by the exit of Arthur Andersen. To do this, I recalculate the HHI for each MSA in 2001 excluding all Arthur Andersen clients. These recalculated HHIs excluding Arthur Andersen (*HHI_NOAA*) are then used as an instrument in the first stage to predict the 2002 HHIs for each MSA.

$$HHI_{2002} = \alpha_0 + \alpha_1 HHI\_NOAA_{2001} + \alpha_2 Controls + \varepsilon \quad (4)$$

In the second stage, NAS are regressed on the predicted HHIs ($\widehat{HHI}$) in order to derive a coefficient that reflects the effects on NAS attributable to changes in competition derived from the exit of Arthur Andersen.

$$NAS_{2002} = \beta_0 + \beta_1 \widehat{HHI}_{2002} + \beta_2 Controls + \varepsilon \quad (5)$$

Results are displayed in Table 6A. The first stage shows a strong positive relationship between *HHI_NOAA* and *HHI*. The *t*-stat is >10, suggesting that *HHI_NOAA* is a suitable instrument. A coefficient less than one suggests that Arthur Andersen's clients were not perfectly distributed proportionally based on pre-exit market shares. The variation that is captured by the coefficient is the portion of the change in *HHI* that is directly attributable to the exit of Arthur Andersen.

Results for the second stage (see Table 6B) are consistent with the main findings and previous tests. I find a positive and statistically significant (1% level, two-tailed tests) relationship between the predicted *HHIs* and NAS. This is evidence that firms in MSAs where competition was predicted to decrease following the exit of Arthur Andersen saw decreases in the use of NAS, while MSAs where competition was predicted to increase following the exit of Arthur Andersen saw increases in the use of NAS. To complement the two-staged tests, I also run change analyses for the year 2002 and find consistent results (untabulated).

Table 6A
The exit of Arthur Andersen (2SLS: First Stage).

	Expected	(1)
VARIABLES	Sign	*HHI*
HHI_NOAA	+	0.550***
		(16.550)
Controls		Included
Observations		6409
R-squared		0.763

This table presents the results of the first stage of a two-stage least squares regression model (4) as follows:
$HHI_{2002} = \alpha_0 + \alpha_1 HHI\_NOAA_{2001} + \alpha_2 Controls + \varepsilon$
The dependent variable is the Herfindahl-Hirschman Index. The sample for this analysis is restricted to observations from 2002. The *HHI_NOAA* variable is the Herfindahl-Hirschman Index calculated for year 2001 MSAs after excluding Arthur Andersen clients. The controls include all controls for the main results in Table 3. All control variables are as defined in Appendix A. Industry and auditor fixed effects are included as well. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Standard errors are clustered by MSA. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

5.2.1. Local competition and NAS in the Post-SOX Era

Given the significant focus on NAS during Arthur Andersen's exit and the passing of SOX, a natural question to ask is whether the above results hold if I limit the sample to only post-SOX firm-years. This period has a different regulatory environment with respect to NAS than the pre-SOX era. Table 7 reruns the main specification of model (1) restricting the sample to the decade following SOX. Specifically, I examine firm-years from 2004 to 2013.[21] My results remain qualitatively unchanged, consistent with a positive relationship between competition and NAS.

[20] One possible alternative explanation for these findings is that the lower NAS fees observed in the post period are driven by capacity constraints within the surviving audit firms. If surviving firms became engaged with former Arthur Andersen clients, without additional staff to support the new clients, the audit firms would likely become capacity constrained and forced to sell fewer NAS per engagement due to their physical inability to provide them. However, due to the pre-collapse statistics and the findings of Kohlbeck, Mayhew, Murphy, and Wilkins (2008), I do not believe this is the case. Kohlbeck et al. (2008) finds that 60% (39 out of 65) of Arthur Andersen offices were purchased whole by either Deloitte, KPMG, or Ernst and Young. Those offices appear to have been purchased with the intentions of expanding the purchasers' market share and they retained 70% of the Arthur Andersen clients belonging to those offices at the time of purchase. This accounts for 42% of former Arthur Andersen clients that were able to remain with their original audit team and did not strain the capacity of their new auditor. Given Arthur Andersen's pre-collapse market share of 19%, if capacity constraints drove post-collapse reductions in NAS, we should expect the effect to be in the neighborhood of 10% (58% of their initial market share). Results show that NAS fell on average between 19 and 26% due to the shock to local competition. Thus, the data suggests that the fall in NAS cannot be solely due to capacity constraints.

[21] This is consistent with the post-SOX period covered in Beardsley et al. (2019).

Table 6B
The exit of Arthur Andersen (2SLS: Second Stage).

VARIABLES	Expected Sign	(1) *NAS*
$\widehat{HHI}$	+	0.394***
		(7.267)
Controls		Included
Observations		6409
R-squared		0.611

This table presents the results of the second stage of a two-stage least squares regression model (5) as follows:

$NAS_{2002} = \beta_0 + \beta_1 \widehat{HHI}_{2002} + \beta_2 Controls + \varepsilon$

The dependent variable is the log of non-audit service fees. The sample for this analysis is restricted to observations from 2002. The $\widehat{HHI}$ variable is the 2002 Herfindahl-Hirschman Index as predicted from the first stage outlined in Table 6A. The controls include all controls for the main results in Table 3. All control variables are as defined in Appendix A. Industry and auditor fixed effects are included as well. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Standard errors are clustered by MSA. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

5.3. Competition channels

Given the observed relationship between changes in local market competition and the provision of NAS, it is critical to identify the channels through which these changes are derived. In order to isolate and distinguish among the possible competitive channels through which auditors are being incentivized to alter their behavior, I have developed several tests based on potential reasons for the change in the provision of NAS.

5.3.1. Using non-audit services as a tool for differentiation

Increases in the provision of NAS could be driven by either an extreme similarity, or an extreme dissimilarity, in the audit quality among competing firms. If an increase in the provision of NAS is caused by auditors' fear that they cannot sufficiently distinguish themselves from their competition based on audit quality alone, then we should observe an especially prevalent increase in the provision of NAS in areas where competing firms are very similar in audit quality. If increases are instead spurred by easily distinguishable outputs when comparing competing firms, then we should find the effect to be more stark in areas where audit quality is more varied.

To test this, I divide observations into two partitions, those that operate in MSAs where auditors are more similar in audit quality and those that operate in MSAs where audit quality is more dissimilar. I define dissimilarity in audit quality as the difference in average audit quality between the highest quality and lowest quality auditors within the MSA. The calculation of average audit quality only factors in local clients belonging to that MSA-year, which would have been handled by the local audit office. Audit quality is measured using performance matched absolute abnormal accruals calculated under the Modified Jones model (Dechow et al., 1995; Jones, 1991; Kothari et al., 2005). Observations taken from areas in which this difference is low are labeled as having similar quality among local auditors and those taken from areas where the difference is high are labeled as dissimilar in quality. All classifications are made relative to the median.

Results are shown in Table 8A. Columns (1) and (2) include firm-years from MSAs with similar audit quality while columns (3) and (4) display results for firm-years from MSAs with dissimilar audit quality. Examining first the results in columns (1) and (2), the coefficients on the variables of interest maintain the same directionality as the main results, but they are larger in magnitude with statistical significance on both variables of interest (two-tailed *p*-value = 0.000 for both models). In contrast, for columns (3) and (4) we see much smaller magnitudes and statistical significance is not achieved for the HHI-based measure. The *AU_COUNT* coefficient only generates marginally statistical significance in the opposite direction. This suggests that the results are primarily driven by firms in MSAs where the dispersion in audit quality among local auditors is small. Increases in the provision of NAS in competitive markets might therefore stem from auditors' inability to differentiate themselves based on audit quality.

To find out if these results were primarily driven by either high- or low-quality auditors, I further partition the firm-years within similar quality MSAs based on the median average audit quality of the auditor. Results (shown in Table 8B) suggest that the observed effects come primarily from high-quality auditors. While both high- and low-quality auditors produce coefficients of the same direction, the coefficients generated for high-quality auditors are much larger and statistically significant (two-tailed *p*-value = 0.000 for both models). This suggests

Table 7
Main results post-SOX.

VARIABLES	Expected Sign	(1) *NAS*	(2) *NAS*	(3) *NAS*	(4) *NAS*
HHI	?	0.058***		0.058***	
		(5.421)		(5.448)	
AU_COUNT	?		0.003***		0.003***
			(3.974)		(3.953)
ALIGNMENT				0.025	0.024
				(0.885)	(0.845)
DISTANCE				0.094***	0.092***
				(2.793)	(2.725)
*ALIGNMENT*DISTANCE*				−0.060	−0.058
				(−1.448)	(−1.401)
Controls			Included		
Industry, Auditor, Year, and MSA Fixed Effects			Included		
Constant		2.841***	3.252***	2.790***	3.202***
		(5.432)	(6.218)	(5.328)	(6.116)
Observations		69,824	69,824	69,824	69,824
R-squared		0.567	0.567	0.567	0.567

This table presents the results of ordinary least squares regressions of model (1) using robust standard errors for the period of 2004–2013. The controls include all controls for the main results in Table 3. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions. The dependent variable for all columns is the log of non-audit service fees. All other variables are as defined in Appendix A. Industry, auditor, year, and MSA fixed effects are included. Industry fixed effects are determined using the Fama-French 12 standard industry classifications.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 8A
Non-audit services as differentiation.

		SIMILAR QUALITY		*DISSIMILAR QUALITY*	
	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*NAS*	*NAS*	*NAS*	*NAS*
HHI	+	0.059***		0.020	
		(5.224)		(1.336)	
AU_COUNT	+		0.007***		−0.001*
			(6.766)		(−1.809)
Controls			Included		
Observations		56,843	56,843	57,758	57,758
R-squared		0.567	0.567	0.568	0.568

This table presents the results of ordinary least squares regressions of model (1) using the full sample.
The dependent variables for all columns are the log of non-audit service fees. The sample is partitioned by differences in the average audit quality of the highest audit quality and lowest audit quality active auditor within each MSA. MSAs in which this difference is below the median are identified as similar quality MSAs while those at or above the median are identified as dissimilar quality MSAs. Audit quality is determined using performance-matched absolute abnormal accruals and only observations for which audit quality can be calculated are included. The controls include all controls for the main results in Table 3. All control variables are as defined in Appendix A. Industry, auditor, and year fixed effects are included as well. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Analyses conducted using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 8B
Non-audit services as differentiation, lower vs higher quality auditors in similar quality MSAs.

		LOWER QUALITY AUDITOR		*HIGHER QUALITY AUDITOR*	
	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*NAS*	*NAS*	*NAS*	*NAS*
HHI	+	0.004		0.090***	
		(0.280)		(5.604)	
AU_COUNT	+		0.001		0.011***
			(0.550)		(7.211)
Controls			Included		
Observations		28,007	28,007	28,836	28,836
R-squared		0.636	0.636	0.508	0.509

This table presents the results of ordinary least squares regressions of model (1) using the full sample.
The dependent variables for all columns are the log of non-audit service fees. The included sample consists of only firm-years labeled as having similar quality from Table 8A. In this table, that sample is further partitioned based on the average audit quality of the auditor for each firm-year. Firm-years with an auditor whose average audit quality for the MSA is below the median are labeled as lower quality auditors with the remaining auditors labeled as higher quality auditors. Audit quality is determined using performance-matched absolute abnormal accruals and only observations for which audit quality can be calculated are included. The controls include all controls for the main results in Table 3. All control variables are as defined in Appendix A. Industry, auditor, and year fixed effects are included as well. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Analyses conducted using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

that higher quality auditors take advantage of their position as market leaders in audit quality and capitalize by promoting their expertise in the form of NAS.

Given these results, a natural next question to ask is if this response is generalizable to all MSAs and not limited to areas with similar quality among competing auditors. Table 8C presents results of model (1) after

Table 8C
Non-audit services as differentiation, lower vs higher quality auditors.

		LOWER QUALITY AUDITOR		*HIGHER QUALITY AUDITOR*	
	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*NAS*	*NAS*	*NAS*	*NAS*
HHI	+	0.028**		0.050***	
		(2.414)		(4.360)	
AU_COUNT	+		0.002***		0.001
			(3.291)		(1.550)
Controls			Included		
Observations		57,058	57,058	57,543	57,543
R-squared		0.622	0.622	0.506	0.506

This table presents the results of ordinary least squares regressions of model (1) using the full sample.
The dependent variables for all columns are the log of non-audit service fees. In this table, that sample is partitioned based on the average audit quality of the auditor for each firm-year. Firm-years with an auditor whose average audit quality for the MSA is below the median are labeled as lower quality auditors with the remaining auditors labeled as higher quality auditors. Audit quality is determined using performance-matched absolute abnormal accruals and only observations for which audit quality can be calculated are included. The controls include all controls for the main results in Table 3. All control variables are as defined in Appendix A. Industry, auditor, and year fixed effects are included as well. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Analyses conducted using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

partitioning the full sample based on whether observations are audited by a lower or higher quality auditor.

Interestingly, when using the full sample, I observe statistically significant results for both high- and low-quality auditors. However, while both higher and lower quality auditors sell additional NAS in competitive markets, they respond differently to different measures of competition. Comparing columns (1) and (3), we observe a much larger coefficient for high-quality auditors, suggesting that high-quality auditors are more sensitive to changes in market share than lower quality auditors. Conversely, columns (2) and (4) produce evidence that suggests that lower quality auditors are sensitive to changes in the number of local competitors while high-quality auditors produce no statistically significant response to the number of local competitors. Together, these results are intuitive given that high-quality auditors are more likely to be larger auditors who compete for market leadership/share while lower quality auditors are likely to be associated with smaller offices which are more sensitive to displacement from other small offices. This is consistent with the data as 76.1% of observations labeled as high-quality are associated with a Big 4 auditor while only 63.3% of observations labeled as lower audit quality are audited by a member of the Big 4. Larger, high-quality auditors are, on average, more sensitive to shifts in market share while smaller, lower-quality auditors are still sensitive to shifts in market share, but to a smaller degree, and are more responsive to the entrance of additional competitors.

5.3.2. *Using non-audit services to compensate for lower audit fees*

An alternative explanation for the main findings could be that the changes observed in the provision of NAS is the result of auditors seeking a compensating revenue stream due to depressed audit fees in competitive markets (Beardsley et al., 2019). It may be the case that the increases observed in NAS are primarily a response to depressed audit fees and unaffected by competition. If this is the case, then we should be able to isolate the results to areas in which audit fees are depressed. I test this hypothesis in two ways. The first method partitions firm-years based on actual audit fees paid relative to predicted audit fees for each engagement. Predicted audit fees are estimated by regressing characteristics

Table 8D
Non-audit services as an alternate revenue stream.

		MOST UNDERPRICED		*LEAST UNDERPRICED*	
	Expected	(1)	(2)	(3)	(4)
VARIABLES	Sign	*NAS*	*NAS*	*NAS*	*NAS*
		Partitioned using Method 1			
HHI	+	0.052***		0.038***	
		(4.706)		(3.390)	
AU_COUNT	+		0.000		0.002***
			(0.448)		(3.692)
Controls			Included		
Observations		59,859	59,859	62,032	62,032
R-squared		0.520	0.519	0.522	0.522
		Partitioned using Method 2			
HHI	+	0.062***		0.008	
		(5.988)		(0.652)	
AU_COUNT	+		0.003***		−0.001**
			(4.324)		(−2.020)
Controls			Included		
Observations		59,540	59,540	62,351	62,351
R-squared		0.529	0.529	0.597	0.597

This table presents the results of ordinary least squares regressions of model (1) using the full sample.
The dependent variables for all columns are the log of non-audit service fees. Firm-years are partitioned based on audit fees paid relative to the benchmarks outlined below.
Method 1: Firm-years with audit fees below the median relative to predicted audit fees are marked as the most underpriced while firm-years equal to or above the median are labeled as least underpriced.
Predicted audit fees determined using the following OLS regression:
$AUDIT\_FEES = \beta_0 + \beta_1 TOTAL\_ASSETS + \beta_2 CLIENTS + \beta_3 SEGNUM + \beta_4 DEBT\text{-}ASSETS + \beta_5 LITIGATION + \beta_6 TENURE + \beta_7 BIG4 + \beta_8 SPECIALIST\_MSA + \beta_9 SPECIALIST\_NAT + \varepsilon$
CLIENTS is defined as the number of clients audited by the auditor in the MSA.
Method 2: Firm-years with audit fees below the median relative to total assets are marked as the most underpriced while firm-years equal to or above the median are labeled as least underpriced.
Audit fees relative to total assets benchmark = $AUDIT\_FEES / (TOTAL\_ASSETS^{1/2})$
The controls include all controls for the main results in Table 3. All control variables are defined in Appendix A. Industry, auditor, and year fixed effects are included. Industry fixed effects are determined using the Fama-French 12 standard industry classifications. Analyses conducted using robust standard errors. *t*-statistics are reported in parentheses below the coefficient estimates. All *p*-values are calculated using two-tailed distributions.
*** p < 0.01, ** p < 0.05, * p < 0.1.

shown to affect fees on audit fees paid.[22] The coefficients from this regression are then used to generate predicted fitted terms. Firm-years that fall below the median ratio of actual fees to predicted fees are marked as the most underpriced while firm-years equal to or above the median are marked as the least underpriced. The exact regression used is outlined in the description to Table 8D. The second method uses the square root of a company's total assets as a benchmark on which to base audit fees (Aobdia et al., 2016). I then divide actual audit fees by that value in order to form a measure that compares the audit fees paid to the benchmark. The smaller the result, the more underpriced the audit engagement is, and vice versa.

Results are shown in Table 8D. Columns (1) and (2) display results for firm-years that are considered to be the most underpriced while columns (3) and (4) represent results for firm-years that are the least underpriced. Broadly, I observe similar results to my main findings in both partitions. In column (1) the HHI-based variable of interest takes on a positive coefficient that is statistically significant at the 1% level for both methods (two-tailed *p*-value = 0.000 for both). The count variable in column (2) generates a positive coefficient that is also statistically significant at the 1% level for the second method of calculating fee pressure but not the first (two-tailed *p*-value = 0.000). These results suggest that engagements that are underpriced in terms of audit fees, on average, include larger amounts of NAS. On the other side of the partition, we also observe positive and statistically significant coefficients for *HHI* and *AU_COUNT* using the first method (two-tailed *p*-value = 0.000 for both) but not for the second method.

Putting these findings together, we generally observe a positive relationship between NAS and local competition, with or without fee pressure.[23] It is important to note however that the coefficients generated by the most underpriced partition are significantly larger than those produced by the least underpriced partition for the HHI-based models. This could provide some evidence that the positive relationship between NAS and competition is stronger when fee pressure is present. One difficulty in interpreting these results is the correlation between fee pressure and competition. As we would expect, the underpriced engagements tend to be in more competitive MSAs. While we can logically posit that competition leads to fee pressure, I cannot fully disentangle the two. While these results do suggest that fee pressure can be a catalyst alongside competition in motivating the selling of NAS, they do not explain away the findings from the main analyses and difference-in-difference testing.

5.4. Limitations and robustness

A major limitation of my data is that I only observe the fees paid and cannot observe the true demand and supply functions. One possible alternative story that could explain my results is that more competitive MSAs may have higher competition among auditors, due to their higher demand for audit and NAS. In order to address this hypothesis, I compare more versus less competitive MSAs along dimensions that are associated with audit complexity, such as the number of operating segments that a client has and the value of receivables and inventory. Partitioning at the sample median *HHI*, I find no statistically significant difference between the two groups with respect to clients' average number of operating segments. Further, I find that the below median group (less competitive) on average actually carry higher values of receivables and inventory, which would suggest that they should require additional audit and NAS. These results suggest that my main findings are not demand driven and support the conclusion that the increased NAS use in competitive markets is supply driven.

A related limitation to my data is that I cannot observe NAS purchased from firms that are not also serving as the external auditor. This would only be an issue if we believe that auditors are more/less likely to allow other competitors to perform NAS for their clients as competition rises/falls.[24] Given that a company's auditor is already engaged with the firm, the auditor should have a cost advantage in providing NAS relative to competitors. Thus, the auditor should always be willing to provide NAS at a lower price so long as it is an allowable service under SOX and is in the auditor's capability. Therefore, unobserved allowable NAS is

[22] While the predicted audit fee model is rooted in the models developed by studies such as Beardsley et al. (2019), not all variables can be replicated due to data availability and the incompatibility of study-specific controls (e.g., differences in how studies define expertise/specialists).

[23] The exception is the second method of estimating fee pressure that produces a null result for *HHI* and negative result for *AU_COUNT*. While the negative result is statistically significant, it is inconsistent with the results of the other method and inconclusive when considered alongside the other proxy for local competition.

[24] While auditors cannot prevent their clients from purchasing NAS from other firms, it is possible that clients may shy away from purchasing NAS elsewhere if they believe that it could harm their working relationship with their auditor. Nevertheless, this incentive should not vary with competition, so it is unlikely to affect my findings.

unlikely to be widespread and therefore is unlikely to affect my results.

As a final set of robustness checks, all main results are re-run after controlling for the ratio of auditors to clients in the MSA and whether the audits are conducted during busy season. With these additions, results remain consistent and statistically significant, providing more evidence consistent with the main results.

6. Conclusion

This study examines auditors' provision of NAS as a response to local competition. Measuring competition at the MSA level and using non-audit service fees as a proxy for the quantity of NAS provided, I find that auditors increase their provision of NAS for engagements in geographic areas where local competition is higher. This is especially pronounced in areas where the range in the quality of local auditors is small, or audit fees are depressed. The results are consistent with higher quality auditors capitalizing on their expertise in the audit space in order to increase their sales of NAS, as well as auditors selling additional NAS in markets where audit fees are depressed.

I conduct difference-in-differences analyses using the exit of Arthur Andersen to test the impact of a negative shock to local competition. I find evidence consistent with my main findings, with results showing that areas affected by the exit of Arthur Andersen having greater reductions in NAS than unaffected areas, regardless of whether auditor switches took place, and after controlling for the broader effect of SOX.

Additionally, I find that NAS are associated with greater reductions in audit quality when competition is high. This suggests that the added emphasis placed on NAS in competitive markets may be especially costly to audit quality.

Declaration of Competing Interest

None.

Data availability

All data used is available from public sources identified in the text.

Appendix A. Variable descriptions and computations

Variables are marked in upper case and italics. Compustat item codes are shown in lower case and italics. Data source: CS = Compustat; AA = Audit Analytics.

Dependent Variables:

Abbreviation	Compustat/Audit Analytics Data Item Code (blank if variable is not constructed using database items)	Data Source (CS/AA)	Description
NAS	*log*(*non_audit_fees*)	AA	Log of non-audit service fees
RESTATE	1 if a restatement was issued pertaining to that year, 0 otherwise	AA	Indicator for whether a restatement was issued pertaining to that fiscal year
ACCRUALS		CS	Performance-matched absolute abnormal accruals under the Modified Jones model.

Variables of Interest:

Abbreviation	Calculation	Data Source	Description
HHI	$\left(\sum_{i=1}^{N} x_i^2\right)^{-1}$	CS	The inverse of the Herfindahl-Hirschman Index for the MSA in which the company is located, calculated based on audit fees. x is the market share of auditor i based on audit fees N is the number of auditors in the MSA
AU_COUNT	$\sum_{i=1}^{N} 1_i$	AA	Count of the number of auditors in the MSA with at least one public company client N is the number of auditors in the MSA
AA_EXIT	1 if fiscal year is 2001 and Arthur Andersen holds at least one client in the MSA or fiscal year is 2002 and Arthur Andersen held at least one client in the MSA in the previous year and none now, 0 otherwise	AA	Indicates firm-years in MSAs where Arthur Andersen was present in 2001 and then left in 2002.
AU_CHANGE	1 if an auditor change took place before the current year's audit, 0 otherwise	AA	Indicates firm-years in which an auditor change took place.
HHI_NOAA		AA	*HHI* calculated using only firms not audited by Arthur Andersen in 2001.
FYEAR = 2002	1 if the corresponding fiscal year for the financial statements being audited is 2002, 0 otherwise	AA	Indicator for if the corresponding fiscal year for the financial statements being audited is 2002.

Controls:

Abbreviation	Compustat/Audit Analytics Data Item Code (blank if variable is not constructed using database items)	Data Source (CS/AA)	Description
ALIGNMENT	$\frac{\sum_{i=1}^{N} audit\_fees_i}{\sum_{j=1}^{M} audit\_fees_j}$	AA	Percentage of the auditor's local audit fees that are generated by clients in the client's two-digit SIC. N is the number of clients served by the auditor in the MSA and industry. M is the number of clients served by the auditor in the MSA.

(*continued on next page*)

(*continued*)

Abbreviation	Compustat/Audit Analytics Data Item Code (blank if variable is not constructed using database items)	Data Source (CS/AA)	Description
DISTANCE	$min\left(\begin{array}{c}\lvert ALIGNMENT_i \\ -ALIGNMENT_{-i}\rvert\end{array}\right)$		Distance between auditor's alignment and the alignment of the closest competing auditor for the industry and MSA.
MSA_AUDIT_FEES	$log\left(\sum_{i=1}^{N} audit\_fees_i\right)$	AA	Log of the sum of all audit fees paid in the MSA. *N* is the number of firm-year observations in the MSA-year.
OFFICE_AUDIT_FEES	$log\left(\sum_{i=1}^{N} audit\_fees_{i,j}\right)$	AA	Log of the sum of all audit fees paid in the MSA-year to the auditor associated with the engagement. *N* is the number of firm-year observations in the MSA-year audited by auditor *j*.
AUDIT_FEES	$log(audit\_fees)$	AA	Log of audit service fees
TOTAL_ASSETS	$log(at)$	CS	Log of total assets
SEGNUM		CS	Log of the number of geographic segments that the firm is comprised of
ROA	ib/at	CS	Return on assets
DEBTASSETS	lt/at	CS	Debt to assets ratio
CURRENT_RATIO	lct/act If current assets is missing in Compustat then Cash + Short-term investments + Receivables + Other Current Assets + Inventory is used, Compustat codes:$che + rect + aco + invt$. If current liabilities is missing in Compustat then Accounts Payable + Other Current Liabilities + Debt in Current Liabilities + Income Taxes Payable is used, Compustat codes: $ap + lco + dlc + txp$	CS	Current ratio.
LITIGATION	Companies with a 4-digit SIC code between 2833 and 2836, 8731–8734, 3570–3577, 7370–7374, 3600–3674, or 5200–5961 receive a value of 1, 0 otherwise	CS	Indicator for whether the company is in a high litigation industry
TENURE	Count variable, +1 if $auditor\_fkey_t = auditor\_fkey_{t-1}$, reset to 0 if $auditor\_fkey_t \neq auditor\_fkey_{t-1}$	AA	Number of consecutive years that the current auditor has audited the firm
BIG4	1 if $auditor\_fkey = \{1, 2, 3, 4\}$, 0 otherwise	AA	Indicator for whether the company's external auditor is one of the Big 4 auditors
SPECIALIST_MSA	1 if the auditor is the MSA's market share leader in terms of the number of public company audits done for that industry, 0 otherwise		Indicator for whether the company's external auditor is a local specialist
SPECIALIST_NAT	1 if the auditor is the national market share leader in terms of the number of public company audits done for that industry, 0 otherwise		Indicator for whether the company's external auditor is a national specialist

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