Does Working from Home Impact Audit Quality? Evidence from Non-Pharmaceutical Interventions during COVID-19

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Abstract

Catalyzed by the COVID-19 pandemic, many audit firms have announced large-scale plans to adopt working from home (WFH) policies. It is unclear whether and how this emerging work arrangement would affect audit quality. Exploiting county-level non-pharmaceutical interventions (e.g., shelter-in-place orders and lockdowns) that exogenously increased local auditors' WFH practices, this paper documents that WFH is associated with higher audit quality. Specifically, using a generalized difference-in-differences research design, we show that auditors' adoption of WFH policies resulted in a lower likelihood of non-reliance restatements, lower discretionary accruals, and a higher likelihood of going-concern opinions. We also find some evidence that these results are stronger for clients of Big 4 auditors and clients with less tangible assets. Further, audit fees are higher among auditors impacted by WFH policies. Overall, the findings advance our understanding of the implications of WFH policies for audit quality during COVID-19 and are informative to audit firms, audit committees, and regulators.

Keywords: Working from Home, Remote Audits, Audit Quality, COVID-19, Non-Pharmaceutical Interventions

Data Availability: Data are available from the public sources cited in the text.

I. INTRODUCTION

Recently, large audit firms have announced plans that allow for more flexible work arrangements including giving employees the option to work from home (WFH). For example, PwC will allow all of its 40,000 U.S. client services employees to work remotely in perpetuity (DiNapoli 2021). Deloitte, EY, and KPMG are also giving their employees the choice to work remotely (Bennett 2021; DiNapoli 2021; Lander 2021). In response, the PCAOB and the business press have raised concerns over the effectiveness of audit firms' WFH policies and their influence on audit engagements (PCAOB 2020a; Maurer 2020).[1,2] Motivated by both the emerging practice of remote work in the auditing profession during the COVID-19 pandemic, and concerns over its consequences, we investigate the effect of working from home on audit quality. This inquiry is ultimately an empirical matter because theory offers competing predictions.

Gajendran and Harrison's (2007) meta-analysis suggests a theoretically ambiguous relationship between remote work and job outcomes and proposes three mechanisms that can impact this association: employees' perception of job autonomy as a result of remote work, work-family conflicts, and social relations in the workplace. Specificlly, by increasing work convenience, flexibility, and positive perceptions of job autonomy, WFH can lead to higher employee satisfaction, employee performance, and firm profits (Bloom, Liang, Roberts, and Ying 2015; Mas and Pallais 2017). On the other hand, remote work is also associated with deteriorating workplace relations, thereby lowering job satisfaction (Sousa-Poza and Sousa-Poza 2000). Mixed empirical findings from the audit setting during the pandemic mirror these

[1] Throughout this paper, we refer to audit offices as "auditors" or "audit offices"; we refer to client firms as "clients", "firms", or "client firms"; we refer to employees of audit firms as "individual auditors" or "auditors".
[2] PCAOB's concerns include limited access to client firms' personnel, delays by management in responding to auditors' inquiries, and challenges in communicating with other auditors (PCAOB 2020a)

theoretical ambiguities. Luo and Malsch (2020) and PCAOB (2020b) suggest that auditors increased training, engaged in more frequent and structured communication, and involved more senior personnel potentially counteracting any challenges arising from remote auditing. Further, prior research indicates that reliance on electronic communication, presumably occurring more frequently during the pandemic, may have led to an increased amount of evidence collected (Bennett and Hatfield 2013). Altogether, this evidence seems to indicate that WFH during COVID-19, at minimum, was not associated with a deterioration and could have even led to an increase in audit quality. However, it is also possible that audit quality declined to the extent that clients and auditors were unprepared for the sudden shift to remote work. Prior studies suggest that auditors find it challenging to modify audit plans to address unexpected risks (e.g., Hammersley, Johnstone, and Kadous 2011). Moreover, increased stressors such as the need to work in a place where one usually rests, family demands arising from school closures, and social isolation may result in decreased psychological well-being for auditors, and thereby, lower performance outcomes (Hernandez 2020; Wang, Liu, Qian, and Parker 2021). Finally, many audit tasks rely on face-to-face communication with the client or involve direct inspection or observation of client assets both of which can be negatively impacted by remote work (PCAOB 2020a).

We exploit the adoption of non-pharmaceutical interventions (NPIs) in different municipalities across the U.S. during the period March 2020 to May 2020 as a setting to examine the effect of WFH on audit quality.[3] Since the NPIs adopted by the local governments were not predictable by individual audit offices, they represent an exogenous increase in local auditors' WFH practices (Hernandez 2020). Using a generalized difference-in-differences (DiD) research

[3] Examples of NPIs include shelter-in-place orders, lockdowns, closures of non-essential services, and school closures.

design and controlling for firm and year fixed effects, we compare the change in audit quality of audit engagements affected by county-level NPIs (i.e., treatment group) with that of unaffected audit engagements (i.e., control group). Specifically, client firm-year observations in the treatment group meet two conditions: (i) the auditor is located in a county that adopted an NPI, and (ii) the NPI began during the period between the client's fiscal-year end and the audit opinion date. We specifically focus on the period between the fiscal-year end and the audit opinion date because auditors usually conduct major audit work (e.g., fieldwork) during this period (Chen, Huang, Li, and Pittman 2021; Glover, Hansen, and Seidel 2022). By default, our control group consists of client firm-year observations meeting any of the following three conditions: (i) NPIs began before the fiscal-year end, (ii) NPIs began after the audit opinion date, or (iii) NPIs were not adopted in the auditor's county. We measure audit quality using three proxies: non-reliance restatements, performance-adjusted discretionary accruals, and the likelihood of the auditor issuing a going concern opinion (including Type-1 and Type-2 errors) (DeFond and Zhang 2014).

We find that WFH is positively related to audit quality. On average, WFH results in a 1.3 percentage point decrease in the probability of non-reliance restatements, a 12 percent decrease in discretionary accruals, and an 8.1 percentage point increase in the probability of issuing going concern opinions. We also find that WFH is associated with a 5.2 percentage points decrease in the incidence of Type-2 errors related to going concern opinions, which suggests auditors become less aggressive in their reporting (Knechel, Vanstraelen, and Zerni 2015).

In additional tests, we find that WFH policies are positively related to audit fees. The increase in audit fees in our setting has at least three implications: (i) to the extent that audit fees are a proxy for audit quality (DeFond and Zhang 2014; Hribar, Kravet, and Wilson 2014), the

increased audit fees after auditors' adoption of WFH policies corroborates our main findings; (ii) auditors can pass the cost of disruptions from WFH on to their clients (Luo and Malsch 2020; Maurer 2020; PCAOB 2020a); (iii) to the extent that audit fees are a proxy for audit effort (Aobdia 2019; Lobo and Zhao 2013), the increase in audit fees indicates that WFH policies do not result in shirking among auditors (Goudreau 2013; Bloom et al. 2015).

To assess the robustness of our results under alternative research designs, we utilize the county-level COVID-19 outbreaks as an alternative proxy for increased WFH.[4] We also conduct analyses to isolate the the potential influence of the NPI treatment on clients vs. auditors. In both cases, our inferences remain unchanged. Finally, we conduct a series of additional analyses to corroborate our inferences. First, we find that the positive effect of WFH on audit quality is stronger for Big 4 auditors when audit quality is proxied by going concern opinions. This is consistent with Raphael (2021) who indicates that Big 4 auditors are likely to have resource advantages to implement more effective WFH policies. Second, we find that the positive effect of WFH on audit quality measured by discretionary accruals is attenuated for firms with high levels of tangible assets (i.e., inventories and fixed assets). This is consistent with the PCAOB's (2020b) concerns over the remote audit of tangible assets, which require physical inspection. Third, we find evidence that the decreased rate of non-reliance restatements after auditors' adoption of WFH policies is concentrated in restatements related to accounting rule application failure, which corroborates the role of auditors in decreasing the probability of non-reliance restatements.

[4] Similar to natural disasters, local COVID-19 outbreaks are unlikely to be correlated with omitted variables affecting audit quality, which would strengthen our inferences (Gow, Larcker, and Reiss 2016).

Our paper contributes to multiple strands of literature. First, we contribute to the emerging literature on the impact of COVID-19 on various social and economic outcomes including labor markets and unemployment (Kong and Prinz 2020), increased productivity (Aksoy et al. 2022),, compliance with social distancing rules (Barrios et al. 2021), mental health (Brodeur et al. 2021), economic slowdown (Goolsbee and Syverson 2021, and crime (Abrams 2021). Our results indicate that despite the absence of a learning curve to adjust to remote work, auditors, especially those with significant technological resources, were able to successfully adapt to the new work arrangements.

Second, our results have practical implications for audit firms, audit committees, and regulators. Prior studies mainly rely on interviews and surveys from other settings to assess the effectiveness and consequences of WFH in the accounting profession (e.g., Luo and Malsch 2020; Maurer 2020). Our paper provides large sample archival evidence from the U.S. on the effect of WFH policies on audit quality. Further, our results do not appear to support the concerns of the PCAOB regarding the negative implications of remote work (PCAOB 2020a).

Third, we add to the literature that examines the effect of WFH on employee productivity and performance. Prior studies primarily focus on relatively simple job functions that can be easily done from home, such as answering customer service calls (Bloom et al. 2015; Mas and Pallais 2017).[5] Our study documents the benefits of WFH arrangements in the audit setting where the job functions are relatively complex and interdependent and where communication among auditors is key. In addition, even though prior research provides evidence that WFH increases employee productivity, it is unclear whether this work arrangement would reduce

[5] Bloom et al. (2015, 171) acknowledge their field experiment involved a particular group of employees (i.e., those working in call centers). As such, "the direct implications for performance are limited to these types of jobs."

mistakes. Our results show that WFH would help auditors mitigate the risk of misstatements in financial reports, which suggests WFH may also function in other professions that involve compliance and error prevention procedures. Overall, our findings advance our understanding of the potential benefits of the increasingly popular work arrangement of WFH in the audit setting (Dingel and Neiman 2020). However, we alo caution readers that our results pertain to WFH during a period of health crisis and therefore our results are limited to the this period and may not be generalizable. We leave this to future research.

The remainder of this paper is structured as follows. Section II provides a background of the WFH policies implemented in the US, related literature, and the research question. Section III discusses the research design and data, and Section IV presents the main empirical tests. Section V reports robustness tests and additional analyses, and Section VI concludes the study.

II. BACKGROUND, RELATED LITERATURE, AND HYPOTHESIS DEVELOPMENT

NPIs and WFH Policies

The COVID-19 pandemic triggered a sudden shift toward WFH (Teodorovicz, Sadun, Kun, and Shaer 2021). Before the pandemic, only about 5 to 15 percent of Americans reported working from home relative to 50 percent as of April 2020 (Brynjolfsson et al. 2020). Moreover, recent survey evidence suggests that WFH is here to stay even after the pandemic ends (Barrero, Bloom, and Davis 2021) and many organizations have started to consider extending WFH beyond the pandemic (Teodorovicz et al. 2021). Audit firms are no exception. For example, the Big 4 audit firms have announced plans to give employees more choices to work remotely (Bennett 2021; DiNapoli 2021; Lander 2021).

One major reason for the sudden spread in the adoption of WFH policies among employers was the NPIs issued by governments across the globe as the best defense against the spread of

the COVID-19 pandemic (Perra 2021). According to the Centers for Disease Control and Prevention (CDC) (2022), "community NPIs are policies and strategies, apart from pharmaceutical interventions such as vaccination and medical treatment delivery methods, that organizations and communities put into place to help slow the spread of illness during an infectious disease outbreak, such as pandemic flu." In the U.S. the authority to issue NPIs rests with state and local officials, such as state governors, mayors, and county public health department officials (Dave, Friedson, Matsuzawa, and Sabia 2021).

The NPIs issued by different municipalities in the U.S. in response to COVID-19 included social distancing, shelter in place, limited gathering size, the closing of public venues, school closures, non-essential service closures, religious gathering cancellations, and lockdowns. Numerous reports from national, state, and local media sources suggest a substantial reduction in public gatherings following NPIs (Fry 2020), as well as business closings (U.S. Department of Labor 2020).

Prior Research and Hypothesis Development

In their meta-analytic review of the literature on remote work, Gajendran and Harrison (2007) propose a theoretical framework identifying three intervening mechanisms that can impact productivity and performance: perceived autonomy, work-family conflict, and workplace relations. First, an increase in perceived job autonomy, which is the result of having discretion over the location and timing to complete tasks, increases intrinsic motivation and leads to greater job satisfaction, less turnover intent, and improved performance (Spector 1986). Second, by allowing employees more flexibility, WFH can reduce conflict at home because it allows for better coordination of family responsibilities potentially leading to greater job satisfaction and performance. However, WFH can also accentuate work-family conflict if work encroaches on

the family boundaries making it harder to disengage from work (Ashforth, Kreiner, and Fugate 2000). Finally, WFH can be detrimental to performance to the extent that it leads to social isolation which impairs the psychological need for belonging, damaging the quality of relationships in the workplace especially the relationship with supervisors (Cooper and Kurland 2002).[6] In addition to the three intervening mechanisms, the framework proposes direct effects of WFH on job outcomes, such as the increase in actual work hours and increased productivity due to less time spent on commuting and fewer disruptions. However, these theoretical arguments do not suggest a clear prediction for whether WFH positively or negatively impacts performance. Mixed empirical findings mirror these theoretical ambiguities (e.g., see Bailey and Kurland 2002; Gajendran and Harrison 2007).

Further, this line of literature is subject to several criticisms (Gajendran and Harrison 2007). First, the decision to WFH is endogenous in that certain employees are usually the ones that seek WFH jobs. Second, prior research has not examined how working from home full time impacts job outcomes because prior to COVID-19 most employees worked remotely only part of the time. Third, the majority of these studies rely on surveys and interviews with self-reported responses. For example, Bloom et al. (2015) is one of the widely cited experimental studies in which employees from a call center are randomly assigned to either remote or office working conditions. Bloom et al. (2015) document that WFH is associated with a 13 percent increase in worker productivity and performance and lower levels of attrition.[7] Based on follow-up interviews, workers attributed their improved performance to the increased convenience of remote work, and higher levels of job satisfaction. In a recent study surveying engineering,

[6] Managers tend to perceive they have less control over remote employees and may change how they monitor them, while remote workers perceive they are being punished (Cooper and Kurland 2002).
[7] Worker performance is measured as the number of working days, the number of calls answered, and the number of minutes per each call.

finance, and marketing employees of a large technology firm, Bloom et al. (2022) find that hybrid WFH, whereby employees work a mix of days at home and at work each week, led to a reduction in attrition rates among employees, and an 8 percent increase in employee productivity. This suggests that WFH can also benefit complex jobs that require higher level skills.[8]

The COVID-19 setting provides an opportunity to further understand the consequences of WFH because of the sudden and exogenous shift to a mandatory remote working environment where employees were required to work from home full-time. Galanti, Mazzei, Zappalà, and Toscano (2021) find that WFH during the pandemic deteriorated work-life conflict and social isolation leading to negative perceptions of productivity, while Wang et al. (2021) report that job autonomy and increased social support due to the extensive use of online social platforms positively impacted performance. Similarly, Barrero et al. (2021) find a positive association between WFH and self-reported measures of efficiency relative to pre-pandemic levels.

In the context of our study, auditors faced two major challenges during COVID-19: first, a sudden shift to remote auditing accompanied by a disruption to the planned audit procedures, and the adoption of new workflow patterns (Luo and Malsch 2020), and second, uncertainty in the business conditions of their clients which could make it more challenging for the auditor to evaluate going concern in the new remote work environment (Maurer 2020). Relative to other settings examined in prior research, such as call centers, audit tasks are considered to be complex and are largely interdependent where much of auditing work requires communication and interaction between team members as well as interactions with client personnel (Vera-Muñoz, Ho, and Chow 2006).

[8] This is a based on lines of codes written by employees which is an activity best performed in a quiet space at home (Bloom et al 2022).

Based on findings from prior research, it is unclear how WFH will impact the audit process and audit quality. On the one hand, the shock from COVID-19 and the sudden shift to WFH policies may lead to productivity losses due to at least four reasons. First, auditors needed to adapt to a work mindset in a place where they usually rest and manage health risks and childcare responsibilities (Hernandez 2020). Second, echoing the concerns of the PCAOB, it may be challenging for auditors to complete audit tasks due to unavailable or limited access to client personnel, or managers delaying responses to auditor inquiries (PCAOB 2020a). This in turn may lead to auditors accepting alternative evidence that may not be of the same quality (Luo and Malsch 2020; PCAOB 2020a; Maurer 2020). Relatedly, prior evidence suggests that auditors find it challenging to modify audit plans to address unexpected risks (Hammersley et al. 2011). Luo and Malsch (2020) find that coaching and monitoring young staff, and coordination were some of the challenges auditors faced during COVID-19 lockdowns in China, where using technology and alternative procedures was not sufficient to overcome the face-to-face disruptions.

Third, it is important to understand the implications of the shift to electronic means of communication such as email and video-conferencing in the context of audit work. For example, while using email may cause the auditor to miss important non-verbal clues that could be informative to the auditor, auditors tend to over-rely on their interactions with clients through video-conferencing as a surrogate for gathering evidence (Bennett and Hatfield 2018). Hence, the net benefits of shifting to electronic communications remain unclear (Bennett and Hatfield 2018). In addition, the shift to remote work also created challenges around monitoring or reviewing the work of staff auditors (Becker, Belkin, Tuskey, and Conroy 2022). Fourth, stress and social isolation, multitasking, decreased work motivation, distractions, and limited

communication with colleagues could impede employee productivity (Hernandez 2020; Mustajab et al. 2020). Further, despite the claims of the Big 4 firms regarding flexible arrangements, Buchheit, Dalton, Harp, and Hollingsworth (2016) argue that some Big 4 firms have questioned flexible arrangements in the past and that the Big 4 do not provide sufficient organizational support for such arrangements (Johnson, Lowe, and Reckers 2008).

There are at least three arguments for why the shift to remote work may not be detrimental and could even benefit audit quality. First, based on the argument that remote work increases flexibility and positive perceptions of work-life balance, Mustajab et al. (2020) find that remote work during COVID-19 led to greater satisfaction due to increased time with family, increased flexibility in terms of choosing the time and place to work, less time commuting, and the psychological comfort of not having physical supervision, all of which can enhance auditor well-being, job satisfaction, and, in turn, increase auditor performance (Hernandez 2020). Second, recent evidence indicates that audit firms quickly adapted to the new environment by changing their procedures to address the challenges of remote work (PCAOB 2020; Jin et al. 2022). Some examples include auditors asking the client to perform livestream walkthroughs, using video conference calls to review client confidential documents, engaging in more frequent and structured communication both within the team and with client personnel, involving more senior personnel, and less travel time which meant more time spent collecting evidence, all of which can potentially improve audit quality.

Third, clients appeared to be more responsive and cooperative during the crisis which could benefit timely collection of evidence (Luo and Malsch 2020). Consistent with these findings, PCAOB inspection reports of audit engagements during COVID-19 show that audit firms had been proactive in addressing the challenges in the new environment by emphasizing

audit quality, professional skepticism, and consultations (PCAOB 2020b). In addition, audit firms increased their training and guidance related to remote audits.[9] Finally, auditors may have had to rely more on email to request evidence and communicate with client personnel during COVID-19. Prior research has shown that staff auditors are more likely to request evidence over email relative to face-to-face communication potentially generating benefits for audit quality (Bennett and Hatfield 2018).[10]

Findings from the emerging research on COVID-19, WFH and audit quality are mixed. Using semi-structured interviews from China, Luo and Malsch (2020) find evidence consistent with auditors adapting and modifying their audit procedures to maintain a high quality audit. Bhattacharjee et al. (2020) find that remote audit work can trigger higher level thinking skills and more creative hypothesis generation by auditors, under the condition of less frequent monitoring by managers. This suggests that remote work can enhance audit quality. It is also possible that we do not observe any change in audit quality as a result of WFH policies during COVID-19. For example, deHaan et al. (2022) use the COVID-19 pandemic as a stress test case to examine whether reporting systems are resilient to systemic increases in complex economic events and coordination challenges. They find that the disruptions caused by the COVID-19 pandemic had almost no effect on the timeliness and quality of financial reports, and attribute this to firms' and auditors' investments in digital technologies. Finally, it is also plausible that we observe lower audit quality as a result of WFH policies during the COVID-19 pandemic. Consistent with this

[9] For example, "an engagement team performed a real-time virtual inventory observation, using known landmarks to verify the location" of the inventory (PCAOB 2020b). In another instance, "an engagement team conducted a "dry run" virtual inventory observation with the public company's management in advance of the year-end physical inventory observation to test the technology they intended to use."

[10] Consistent with these arguments, anecdotal evidence suggests that audit quality either did not change or improved during COVID-19. For example, in a survey by the Center for Audit Quality, 32 percent of audit committee members agreed that audit quality improved, while 66 percent stated that audit quality did not change (Tysiac 2022).

view, Jin et al. (2022) use survey and archival data from China to examine the impact of remote auditing on audit quality. While the results from the survey are somewhat ambiguous, they find that audit quality proxied by discretionary accruals and the issuance of modified opinions declined with remote work. Gong et al. (2022) use a DiD framework using stay-at-home orders at the state-level and find that audit quality proxied by restatements and abnormal accruals declined when auditors switched to remote auditing. Given the counteracting arguments about how working from home may impact audit quality and prior mixed evidence we state the following research question:

***RQ*:** Does auditors' working from home affect audit quality?

III. RESEARCH DESIGN AND DATA

Test Variable: NPI Treatment

The main variable of interest, NPI_TREAT_{it}, is calculated based on the adoption of NPIs by local governments in the U.S. during the COVID-19 pandemic. This data is collected by Keystone Strategy from government health websites and local news media reports.[11] The NPIs include lockdowns, closures of non-essential services, school closures, the closing of public venues, social distancing, shelter-in-place mandates, and gathering size limitations.[12] As the local governments' adoption of NPIs is arguably outside auditors' control and selection, these NPIs plausibly represent an exogenous increase in local auditors' WFH practices.[13]

[11] https://www.keystonestrategy.com/coronavirus-covid19-intervention-dataset-model/

[12] Prior studies have used this dataset to examine determinants and consequences of NPIs (e.g., Horvath, Kay, and Wix 2021; Kim, Parker, and Shroaer 2020).

[13] We follow the suggestion in Goolsbee and Syverson (2021) to examine NPIs at the county rather than state level because many counties that were hardest hit by COVID-19 initiated their NPIs at an earlier stage than their respective states. We also use state-level NPIs and the corresponding NPI start dates to define an alternative treatment on audit engagements. The disagreement between state-level and county-level NPI treatments comprises around 1.03% of the observations. Our empirical results are qualitatively similar to the main analysis when excluding observations where there is a disagreement between the state-level and county-level NPI treatments (untabulated).

The NPI data identifies the date on which a specific NPI began at the county level. We match this data with the county where each office is located from the data obtained from Audit Analytics.[14] Thereafter, we use the fiscal year-end of the financial statements and audit opinion date to determine whether any NPIs affected the audit engagement. Specifically, the treatment variable, NPI_TREAT_{it} is an indicator variable that is equal to one if any local NPIs were issued in the county of the audit office between the fiscal-year end and the audit opinion date of client firm *i* in fiscal year *t*, and zero otherwise. We focus on the period between the fiscal-year end and the audit opinion date as auditors usually conduct major audit work (e.g., fieldwork) during this period (Chen et al. 2021; Glover et al. 2022). Figure 1 illustrates the case of KPMG, Rochester (Monroe County, NY) which audited Constellation Brands' 2019 financial statements. The fiscal year-end for the financial statement is 02/29/2020. NPIs in Monroe County began on 03/12/2020. The signature date of the opinion is 04/21/2020. Because the NPIs began at a time between the fiscal-year end and the opinion date, this firm-year observation is classified in the treatment group.

[Insert Figure 1 around here]

To further validate that the NPI treatment captures an increase in the local WFH practice (Hernandez 2020; Dave et al. 2021; Perra 2021), we examine the change in the weekly local Google Trends popularity scores for the term "working from home" during 1/5/2020 to 6/28/2020. Specifically, for each affected metropolitan area, we define five indicator variables indicating the week of the NPI adoption (*WEEK[0]*) and two leads and lags (*WEEK[-1], WEEK[-2], WEEK[1], WEEK[2]*), respectively. For metropolitan areas unaffected by NPIs, all

[14] We use the data on Simplemaps website (https://simplemaps.com/data/us-cities) to match audit office cities with their counties. The Simplemaps dataset is based on the U.S Geological Survey and U.S. Census Bureau. We first use the audit office exact city and state abbreviations to find their counties in this dataset and if we are unable to find a match we use fuzzy matching and manually check the results to ensure matching accuracy.

the five-week indicators are set to zero. We then regress the Google Trends popularity scores on these five indicator variables including metropolitan area fixed effects and cluster standard errors by metropolitan area. Figure 2 plots the coefficient estimates using OLS. In economic terms, the popularity score for the "working from home" search term significantly increases by 7.1 and 17.1 points in the week after and two weeks after the local NPI adoption, respectively. These results support our main assumption in this study that NPI treatments capture a substantial increase in the local adoption of WFH policies.

[Insert Figure 2 around here]

Dependent Variable: Audit Quality Proxies

We use three proxies to capture audit quality: (i) non-reliance restatements (*NONRELI_REST*), (ii) unsigned performance-adjusted discretionary accruals (*DISC_ACCRUALS*), and (iii) auditors' issuance of going-concern opinions (*GC*) together with their Type I and Type II errors (Aobdia 2019; Kothari, Leone, and Wasley 2005).[15] We use these three proxies for audit quality because they have complementary strengths (DeFond and Zhang 2014). *NONRELI_REST* is an indicator variable equal to one if there is a non-reliance restatement of the financial statements per Audit Analytics, and zero otherwise. Non-reliance restatements directly capture more egregious misstatements and provide strong evidence of poor audit quality (DeFond and Zhang 2014). In addition, restatements have relatively less measurement error.[16] *DISC_ACCRUALS* represents unsigned performance-adjusted discretionary

[15] We use the unsigned discretionary accruals because some firms during the COVID-19 pandemic may have stronger incentives to engage in income-decreasing earnings management (i.e., taking a "big bath"). According to Kirschenheiter and Melumad (2002), facing market-wide bad news, some firms may under-report earnings in the current period in order to report higher earnings in the future when accruals reverse. As such, in our setting, unsigned discretionary accrual provides a better proxy for audit quality than the signed discretionary accruals.

[16] According to Czerney, Schmidt, and Thompson (2014), 97 percent of restatements in Audit Analytics are disclosed within two years following the end of the last misstated period. Files, Sharp, and Thompson (2014) also use a two-year cut-off period to identify future restatements. The NPI treatment in our sample is concentrated in the

accruals calculated using the Jones model (Aobdia 2019; Kothari et al. 2005). Discretionary accruals are more likely than the other measures to detect client firms' less egregious earnings manipulation. Finally, *GC* opinion, which is under the auditor's influence and control, represents auditors' direct communication with financial statement users (DeFond and Zhang 2014). *GC* is an indicator variable equal to one, if the auditor issues a going concern opinion, and zero otherwise.

While COVID-19 may have created liquidity problems for client firms, and thereby, increased the likelihood of auditors issuing going concern opinions, we also measure auditors' Type-1 error (*GC_TYPE1_ERR*) and Type-2 error (*GC_TYPE2_ERR*) in issuing GC opinions. Similar to Cunningham, Li, Stein, and Wright (2019) we define *GC_TYPE1_ERR* and *GC_TYPE2_ERR* based on the Altman Z-score (Altman 1968) for the client firm, which predicts whether a firm has a high probability of going bankrupt.[17] We identify financially safe firms using the year-specific top decile of Z-score in our sample. We also identify financially distressed firms using the year-specific bottom decile of Z-score in our sample. We define *GC_TYPE1_ERR* as an indicator variable equal to one if auditors issue a going-concern opinion for financially safe firms, and zero otherwise. We define *GC_TYPE2_ERR* as an indicator variable equal to one if auditors *do not* issue a going-concern opinion for financially distressed

fiscal year of 2019. We collected the restatement data from Audit Analytics in January 2022. Therefore, we believe sufficient time is provided to determine whether the financial statements in our sample were materially misstated. It is noteworthy that our DiD research design would also alleviate the concern that some restatements have not been disclosed. Specifically, we expect there is no systematic difference in the time it takes to disclose restatements between the treatment group and control group. Accordingly, the DiD estimate would not be biased even if there are some restatements that have not yet been disclosed.

[17] Adopting a DiD research design, Cunningham et al. (2019) define auditors' incorrect opinions on material weaknesses of internal controls if a client's propensity to have a material weakness is in the top decile of predicted values of material weaknesses of firms by year but the auditor does not report an opinion disclosing material weaknesses on internal controls. In a Norwegian setting, Che, Hope, and Langli (2020) use clients' defaults on debt payments to define auditors' GC Type-1 and Type-2 errors, but such data is unavailable in our setting.

firms, and zero otherwise. Type-1 errors suggest auditors' conservative reporting, and Type-2 errors suggest auditors' aggressive reporting (Knechel et al. 2015).

Empirical Model

To test the association between working from home and audit quality, we estimate a generalized DiD model using ordinary least-squares (OLS):[18,19]

$$AUDIT\_QUALITY_{it} = \beta_0 + \beta_1 NPI\_TREAT_{it} + \boldsymbol{\gamma}'\boldsymbol{X}_{it} + \delta FIRM_i + \theta YEAR_t + \varepsilon_{it} \quad (1)$$

where *i* and *t* index client firm and fiscal year, respectively. *AUDIT_QUALITY* is one of the three audit quality measures: [*NONRELI_REST*, *DISC_ACCRUALS*, *GC*]. In addition, we consider Type-1 errors (*GC_TYPE1_ERR*) and Type-2 errors (*GC_TYPE2_ERR*) as dependent variables. *X* is a vector of control variables selected following DeFond and Zhang (2014, Table 3). Specifically, when *AUDIT_QUALITY* is proxied with *NONRELI_REST* or *DISC_ACCRUALS*, control variables include firm size (*SIZE*), leverage (*LEVERAGE*), loss indicator (*LOSS*), sales growth (*SALES_GROWTH*), operating cash flows divided by the beginning assets (*CFO*), Big 4 indicator (*BIG_FOUR*), market-to-book ratio (*MTB*), total accruals deflated by the beginning total assets (*TOTAL_ACCRUALS*), an indicator variable of equity or long-term debt issuance (*ISSUANCE*). When *AUDIT_QUALITY* is proxied with *GC*, *GC_TYPE1_ERR*, or

[18] For the indicator dependent variables *NONRELI_REST*, *GC*, *GC_TYPE1_ERR*, and *GC_TYPE2_ERR*, we use a linear probability estimator instead of non-linear estimators, such as logit or probit. The reason is that for dichotomous dependent variables, OLS coefficient estimates remain unbiased, especially in large samples (Wooldridge 2010). In a similar vein, Angrist and Pischke (2008) argue that the asymptotic properties and flexibility of linear models often produce more robust results than nonlinear models. In addition, Greene (2004) suggests that linear models can accommodate a large number of firm and year fixed effects with fewer estimation biases than nonlinear models.

[19] Please note that eventhough there is variation in *NPI_TREAT* across clients of a specific audit office in fiscal year of 2019, while our level of analyses is firm-year and all NPIs occur in 2019 fiscal year, this is not a staggered DiD model. There fore, concerns about bisas in staggered DiD estimations rising from heterogeneous treatment effects (e.g., issues discussed in Barrios (2021) and Baker et al. (2022)) do not apply to our setting.

GC_TYPE2_ERR, control variables include: firm size (*SIZE*), lagged *GC* (*LAG_GC*), leverage (*LEVERAGE*), loss indicator (*LOSS*), return on assets (*ROA*), Altman (1968) Z-scores (*ZSCORE*), the change in leverage (*D_LEVERAGE*), an indicator variable of future equity issuance (*F_ ISSUANCE_EQUITY*), report lag (*REPORT_LAG*), operating cash flows divided by the beginning assets (*CFO*), capital investment divided by the beginning assets (*INVESTMENT*), and firm age (*AGE*). All continuous variables are winsorized at the 1% and 99% levels to reduce the influence of extreme values. Appendix A provides definitions of all the variables. *FIRM* and *YEAR* are firm and year fixed effects.[20] We cluster standard errors by firm.

Following prior literature, when *AUDIT_QUALITY* is proxied with *GC, GC_TYPE1_ERR,* or *GC_TYPE2_ERR*, we restrict our sample to firms with negative earnings or negative operating cash flows (Aobdia 2019).[21] In all specifications, the control group consists of client firm-year observations meeting any of the following three conditions: (i) NPIs began before the fiscal-year end, (ii) NPIs began after the audit opinion date, or (iii) NPIs were not adopted in the auditor's county.

The coefficient on *NPI_TREAT*, β_1 in Eq. (1) estimates the average treatment effect of WFH policies on audit quality. For dependent variables *NONRELI_REST*, *DISC_ACCRUALS, GC_TYPE1_ERR*, and GC_*TYPE2_ERR,* a negative (positive) β_1 represents an increase (decrease) in audit quality; for dependent variable *GC*, a positive (negative) β_1 represents an increase (decrease) in audit quality (DeFond and Zhang 2014).

Data and Sample Selection

[20] *FIRM* and *YEAR* absorb the treatment and post variable in a difference-in-difference model. Therefore, *NPI_TREAT* represents the interaction term between the treatment and post variables. Our main results are qualitatively similar when adding state fixed effects to Eq. (1).
[21] Our main results for *GC* are qualitatively similar using the full sample (untabulated).

Our sample is constructed from the intersection of non-financial firms in Compustat and Audit Analytics from 2015 to 2021.[22,23] After excluding observations with missing variables, our sample constitutes 19,056 firm-year observations when audit quality is proxied by non-reliance restatements (*NONRELI_REST*). Table 1 details the sample construction.

[Insert Table 1 around here]

Descriptive Statistics

Table 2 presents summary statistics of NPI treatments in the sample. Panel A shows the annual distribution of our sample. Out of 3,243 observations in 2019, 857 observations (26 percent) are in the treatment group. Panel B presents the distribution of our treatment sample across the states in the U.S. California, New York, and Texas have the most treatment observations. Panel C presents the distribution of different types of NPIs in our sample. It is noteworthy that local governments usually adopted multiple types of NPIs at the same time. The most common NPIs in our sample include the closing of public venues, gathering size limitation, closure of non-essential services, school closures, shelter in place mandates, and social distancing. Figure 3 shows the location of audit offices affected and unaffected by NPIs in the fiscal year 2019. Overall, the distribution of our sample presented in Table 2 and Figure 3 alleviates concerns that our results are driven by observations in a specific state or NPI type.

[Insert Table 2 and Figure 3 around here]

[22] The NPIs in our sample were concentrated in the fiscal year 2019. We use a 4-year pre-period for our DiD research design. The main empirical results are qualitatively similar if the sample period begins in 2016 or 2017. The results are also robust to the sample period ending in 2019. See Section V for a discussion of alternative sample periods.

[23] For our main analyses, we only identify client firms affected by an NPI treatment in the 2019 fiscal year, and treatment observations corresponding to the same client firm in 2020 are excluded from the sample. We delete these observations because it is unclear whether auditors switched back to working in person after the NPIs end.

Panel A of Table 3 presents the summary statistics of the variables in this study. The average probability of restatements (*RESTATEMENT*) is 5.5 percent; the average probability of non-reliance restatements (*NONRELI_REST*) is 1.4 percent.[24] The average probability of going concern opinions is 10.2 percent.[25] The mean (median) of the unsigned discretionary accruals (*DISC_ACCRUALS*) is 0.255 (0.096).[26] Four and a half percent of our sample has been subject to an NPI treatment (*NPI_TREAT)*. Summary statistics of other variables are generally consistent with those in prior studies. Panel B of Table 3 presents summary statistics of our main audit quality proxies for the treatment and control groups before and after fiscal year 2019, respectively. Both treatment and control group have lower non-reliance misstatements and discretionary accruals in the post period. The treatment group has a higher rate of going concern opinions in the post period while the control group has a lower rate of going concern opinions in the post period. We test the difference in differences of audit quality proxies in the pre and post period among the trearment and control groups. We find that the average rate of non-reliance misstatements and discretionary accruals has decreased more significantly among the treatment group compared to control group and the average rate of going concern opinions has increased more significantly among the treatment group compared to the control group. This analysis provides preliminary univariate evidence that audit quality of the treatment group significantly increases relative to the control group.

[Insert Table 3 around here]

IV. EMPIRICAL RESULTS

[24] These statistics are slightly lower than those in prior studies (e.g., Lennox and Li 2014) possibly because some restatements for the fiscal year 2020 have not yet been disclosed.
[25] This statistic is slightly higher than prior studies (e.g., Mayew, Sethuraman, and Venkatachalam 2015) possibly because of the pandemic effects on the operations of client firms.
[26] This statistic is consistent with prior studies (e.g., Francis and Yu 2009).

Main Results: WFH and Audit Quality

We estimate Eq. (1) to test the association between WFH and audit quality. Table 4 presents the estimation results using the ordinary least square estimator (OLS). Panel A shows the results using non-reliance restatements (*NONRELI_REST*) and discretionary accruals (*DISC_ACCRUALS*) as the dependent variables. Column (1) includes firm size (*SIZE*), firm fixed effects, and year fixed effects as control variables. The coefficient on the NPI treatment (*NPI_TREAT*) is negative and significant ($p < 0.10$). Column (2) includes the full vector of control variables, firm fixed effects, and year fixed effects. The coefficient on *NPI_TREAT* is negative and significant ($p < 0.05$). In economic terms, WFH decreases the probability of non-reliance restatements by 1.31 percentage points. Using unsigned discretionary accruals (*DISC_ACCRUALS*) as the dependent variable, column (3) includes only firm size (*SIZE*), firm fixed effects, and year fixed effects as control variables. The coefficient of the NPI treatment (*NPI_TREAT*) is negative and significant ($p < 0.01$). Column (4) includes the full vector of control variables, firm fixed effects, and year fixed effects. The coefficient on *NPI_TREAT* is negative and significant ($p < 0.01$). In economic terms, WFH decreases the level of unsigned discretionary accruals by 12.08 percent (0.0722/0.598) of the standard deviation of *DISC_ACCRUALS* in our sample.

Panel B of Table 4 presents the results using the issuance of going concern opinions (*GC*), Type-1 errors (*GC_TYPE1_ERR*), and Type-2 errors (*GC_TYPE2_ERR*) as the dependent variables. In columns (1) and (2) *GC* is used as a proxy for audit quality. Column (1) includes only firm size (*SIZE*), lagged GC opinion (*LAG_GC*), firm fixed effects, and year fixed effects as control variables. The coefficient on the NPI treatment (*NPI_TREAT*) is positive and significant ($p < 0.01$). Column (2) includes the full vector of control variables, firm fixed effects, and year

fixed effects. The coefficient on *NPI_TREAT* is positive and significant ($p < 0.01$). In economic terms, WFH increases the probability of going concern opinions by 8.14 percentage points. In column (3) *GC_TYPE1_ERR* is used as a proxy for audit quality and Eq. (1) is estimated using the full vector of control variables as well as firm and year fixed effects. The coefficient on *NPI_TREAT* is negative but not significant ($p > 0.25$). In column (4) *GC_TYPE2_ERR* is used as a proxy for audit quality and Eq. (1) is estimated using the full vector of control variables as well as firm and year fixed effects. The coefficient on *NPI_TREAT* is negative and significant ($p < 0.10$). In economic terms, WFH decreases the probability of Type-2 errors of going concern opinions by 5.21 percentage points, which suggests that auditors' reporting decision becomes less aggressive (Knechel et al. 2015). Taken together, these results using various audit quality proxies show a consistent, positive association between WFH and audit quality.

[Insert Table 4 around here]

Identification Assessment

In this section, we discuss three identifying assumptions of our DiD research design (Glaeser and Guay 2017; Blundell and Costa Dias 2009): (i) the parallel trends assumption, (ii) stable unit treatment value assumption (SUTVA), and (iii) perfect compliance assumption. We also consider the possible influences of the violation of these assumptions on our estimation and inferences.

Parallel Trends Assumption

The key identifying assumption behind the DiD method is that in the absence of the NPI treatment, the observed DiD estimate is zero (parallel trends assumption) (Bertrand, Duflo, and Mullainathan 2004). While this assumption is not directly testable, following prior studies (e.g., Kausar et al. 2016; Lamoreaux 2016) we estimate a dynamic model and regress the three audit

quality proxies on *NPI_TREAT [0]*, *NPI_TREAT [-1]*, *NPI_TREAT[-2]*, respective control variables, firm fixed effects, and year fixed effects. *NPI_TREAT [-1]* is an indicator variable that is equal to one in the year prior to the treatment, and zero otherwise; *NPI_TREAT [-2]* is an indicator variable equal to one in the two years prior to the treatment, and zero otherwise. All control variables and the sample selection method are the same as in Eq. (1). Panel A of Table 5 presents the estimation results using OLS. The results show that the coefficients on *NPI_TREAT [-1]* and *NPI_TREAT [-2]* are insignificant at the conventional levels in all specifications, suggesting the parallel trends assumption does not appear to be violated in our DiD research design. In addition, we continue to find the significant effects of *NPI_TREAT [0]* on all three audit quality proxies, which supports our main results presented earlier in Table 4.

[Insert Table 5 around here]

Stable Unit Treatment Value Assumption

In our setting the SUTVA requires that the NPI treatment status of the treated audit engagement does not affect the audit quality of the control audit engagement, and vice versa (Glaeser and Guay 2017; Blundell and Costa Dias 2009). This assumption is unlikely to be violated because audit offices of a specific audit firm are geographically scattered and operate in a decentralized manner.[27]

Perfect Compliance Assumption

To examine the perfect compliance assumption in our setting, following the econometrics literature (e.g. Angrist and Pischke 2008), we classify auditors into three groups: (i) "never adopters" refers to auditors that would never adopt WFH policies with or without the NPI

[27] For example, according to the analysis of Beck, Gunn, and Hallman (2019), the mean distance between an audit office and the closest large office of the same audit firm is 633 kilometers (393 miles).

treatment; (ii) "always adopters" refers to auditors that would always adopt WFH policies with or without the NPI treatment; (iii) "marginal adopters" (or "compliers") refer to auditors that would adopt WFH policies if and only if they receive the NPI treatment.[28] The presence of either "always adopters" or "never adopters" is a sufficient condition for imperfect compliance (Glaeser and Guay 2017).

Given the mandatory nature of the NPI treatments, it is unlikely that there are any "never adopters" in our sample of audit offices. We are unable to estimate the prevalence of "always adopters", which includes auditors that have voluntarily adopted WFH policies prior to the NPI treatment. Hence, our DiD estimate represents a weighted average of the treatment effect for "marginal adopters" and "always adopters" (Angrist, Imbens, and Rubin 1996; Blundell and Costa Dias 2009) and the potential presence of "always adopters" in our sample would work against finding significant results.

V. ADDITIONAL ANALYSES

Alternative Event Dates using County-Level COVID-19 Case Numbers

To alleviate the concern that the NPI data collected by Keystone Strategy might not represent the timing of extensive WFH policies accurately among audit offices, we define alternative event dates for auditors' adoption of WFH policies using the daily county-level number of COVID-19 cases. Specifically, we first obtain the 7-day rolling average of county-level new COVID-19 cases (hereafter, "case number") from The New York Times (2021). We then calculate the weekly rate of change in the case numbers for each county.[29] The average

[28] We assume that there are no "defier" auditors that would adopt WFH policies without the NPI treatment but would not adopt WFH policies with the NPI treatment.

[29] To illustrate the calculation of the weekly rate of change in the case number, $CASE_{c,d}$ represents the 7-day rolling average of the new case number per 100,000 residents for county c on day d. The weekly rate of change in the case number is defined as $R\_CASE_{c,d} = (CASE_{c,d} - CASE_{c,d-7})/CASE_{c,d-7}$. We consider all available $R\_CASE_{c,d}$ on Sundays in 2020.

weekly change rate is 0.338 and the standard deviation is 1.624. Next, we identify an event date for each audit office county as the first time when the weekly change rate exceeds the sample's standard deviation (1.624). Finally, consistent with the definition of *NPI_TREAT*, we define *COVID_TREAT* as an indicator equal to one if the event date of the auditor's county falls between the client's fiscal year-end and the audit opinion date, and zero otherwise. For the fiscal year 2019, 22.48% of firm-year observations are in the treatment group.

For each of our three audit quality proxies (*NONRELI_REST*, *DISC_ACCRUALS*, and *GC*), we use the same DiD design specified in Eq. (1) using *COVID_TREAT* as the test variable. Panel B of Table 5 presents the estimation results using OLS. In columns (1) and (2), where *NONRELI_REST* and *DISC_ACCRUALS* are used as proxies for audit quality, respectively the coefficients on *COVID_TREAT* are negative and significant ($p < 0.05$ and $p < 0.05$, respectively). In column (3) where GC is used as a proxy for audit quality, the coefficient on *COVID_TREAT* is positive and significant ($p < 0.05$).

Overall, using alternative event dates based on the county-level COVID-19 case numbers, we continue to find a consistent, positive effect of WFH on audit quality. In addition, for each of our three main audit quality proxies, the effect size estimate is arguably close to the estimate in Table 4 using the main test variable *NPI_TREAT*.

Consideration of NPI Treatments on Clients

In this section, we conduct several tests to distinguish the effect of NPI treatments on audit offices from the effect on client firm headquarters. Specifically, we classify our sample observations into four groups: (i) both the audit office and client are located in counties that have implemented NPIs; (ii) only the audit office is located in counties that have implemented NPIs, (iii) only the client is located in counties that have implemented NPIs, and (iv) neither the audit

office nor the client is located in counties that have implemented NPIs. Figure 4 illustrates our main design and four alternative specifications using these four groups as treatment and control. First, we define an alternative treatment variable, *NPI_TREAT_A_ C*, and set it equal to one if any NPIs affect either the auditor or the client during the period between the fiscal-year end and the audit opinion date, and zero otherwise (Alternative Specification 1 in Figure 4). Using the same DiD design, we re-estimate Eq. (1) by replacing *NPI_TREAT* with *NPI_TREAT_A _C*. Panel A of Table 6 presents the estimation results. We continue to find a positive and significant association between WFH and audit quality across all models.

Second, we re-estimate Eq. (1) by including only untreated observations (i.e., neither the auditor nor the client are located in a county with NPIs) in the control group (Alternative Specification 2 in Figure 4). Panel B of Table 6 presents the estimation results. We continue to find a positive and significant association between WFH and audit quality across all models.

Third, we re-estimate Eq. (1) using a treatment group comprised of observations where only the auditor but not the client county adopted an NPI and a control group comprised of observations with neither the auditors nor the clients receiving treatment (Alternative Specification 3 in Figure 4). Panel C of Table 6 presents the estimation results. We continue to find a positive and significant association between WFH and audit quality when using *DISC_ACCRUALS* and *GC* as the audit quality proxies. The coefficient on *NPI_TREAT* is not significant when *NONRELI_REST* is the dependent variable at the conventional levels ($p > 0.10$). We caution that the insignificant coefficient may be due to the low power of the test for non-reliance restatements.

Finally, we re-estimate Eq. (1) using a treatment group comprised of observations where only the client but not the auditor county adopted an NPI and a control group comprised of

observations with neither the auditors nor the clients receiving treatment (Alternative Specification 4 in Figure 4). Panel D of Table 6 presents the estimation results. The coefficient on *NPI_TREAT_C* is not significant at the conventional levels using each audit quality proxy. This falsification test suggests that the documented positive association between NPI and audit quality is likely attributable to the auditors rather than the clients. Overall, these results confirm our main inferences.

[Insert Figure 4 and Table 6 around here]

Alternative Sample Periods

In this section, we consider alternative time periods for our sample construction. Untabulated results show that inferences are qualitatively similar when using the sample period from 2016 to 2020 (3-year pre-period and 2-year post-period). Second, we find consistent results for *DISC_ACCRUALS* and *GC* when using the sample period from 2017 to 2020 (2-year pre-period and 2-year post-period), while the result for *NONRELI_REST* is not significant ($p > 0.10$). We caution that the insignificant coefficient may be due to the low power of the test for non-reliance restatements and shorter sample periods. Finally, since auditors in the control group may voluntarily adopt WFH in the fiscal year of 2020, we exclude the observations in 2020. We continue to find a consistent, positive effect of WFH on the three main audit quality proxies using either the sample period from 2015 to 2019 (4-year pre-period and 1-year post-period) or from 2016 to 2019 (3-year pre-period and 1-year post-period). Overall, our main results are robust to alternative sample periods.

Consideration of NPI Treatments Shortly before the Fiscal-Year End

In our main research design as explained earlier in Section III, observations for which an NPI began before a client's 2019 fiscal-year end are classified in the control group. We

acknowledge that the NPIs may still affect such audit engagements. To alleviate the concern that these observations may bias our estimates and inferences, we exclude them(323 firm-years) from our sample and re-estimate Eq. (1). Untabulated results show that our main inferences remain unchanged.

Working from Home and Audit Fees

In this section, we examine the relationship between WFH policies and audit fees, which has three implications for our study: (i) Under a neoclassical view of audit markets, audit fees represent audit quality (Hribar et al. 2014; DeFond and Zhang 2014). Therefore, a positive association with audit fees would corroborate our main results; (ii) given the concerns over disruptions caused by WFH in audit engagements (PCAOB 2020a; Luo and Malsch 2020; Maurer 2020), a positive association would suggest auditors can pass the cost of these disruptions to their clients; (iii) Given concerns that WFH may increase shirking among auditors (Goudreau 2013; Bloom et al. 2015), a positive association would suggest that WFH can spur increased effort among auditors (e.g., Lobo and Zhao 2013; Aobdia 2019).

To examine how WFH impacts audit fees, we use the same DiD research design and estimate Eq. (1) with the logarithm of audit fees as the dependent variable (*LN_FEES*). The control variables are selected according to DeFond and Zhang (2014, Table 3). Table 7 presents the estimation results using OLS. Column (1) presents the results controlling for industry fixed effects. The coefficient on *NPI_TREAT* is positive and significant ($p < 0.01$). Column (2) presents the results controlling for firm fixed effects. The coefficient on *NPI_TREAT* is positive and significant ($p < 0.10$). In economic terms, WFH increases audit fees by 3.4 percent. Together, our DiD estimates show that WFH is associated with higher audit fees, corroborating our main results in Table 4. In addition, these results suggest that auditors can pass the costs of

WFH disruptions to their clients. Further, these results alleviate concerns that WFH policies might increase employee shirking in the audit setting (Goudreau 2013; Bloom et al. 2015).

[Insert Table 7 around here]

Big 4 Auditors

We test whether the positive effect of WFH on audit quality varies with auditors' resources to implement WFH policies. Raphael (2021) argues that better project management, processes, and technology capabilities of firms would improve the effectiveness of WFH. Although we cannot directly observe these resources, we expect Big-Four auditors to have better project management, processes, and technology capabilities (e.g., cloud-based platform to store, share, and review work papers) than their non-Big4 counterparts. Therefore, we predict the positive effect of WFH on audit quality would be more pronounced for Big 4 auditors. To test this prediction, we add an indicator variable (*BIG_FOUR*) and its interaction with *NPI_TREAT* to Eq. (1). Consistent with our prediction, untabulated results show that the coefficient on the interaction term between *BIG_FOUR* and *NPI_TREAT* is positive and significant using *GC* as the dependent variable ($p < 0.10$).[30]

Tangible Assets

Tangible assets, including inventory and fixed assets, may be more difficult for auditors to audit remotely as these accounts usually require substantive in-person audit procedures (e.g., physical observation of inventory counts and inspection of fixed assets per AS No. 15) (PCAOB 2020a; Maurer 2020). Therefore, we expect the positive effect of WFH on audit quality would be attenuated for firms with high levels of tangible assets. To test this prediction, we define

[30] We do not find significant interactions between *BIG_FOUR* and *NPI_TREAT* using the other two audit quality proxies.

TANGIBLE as the sum of inventory and net property, plant, and equipment scaled by the beginning total assets. We add *TANGIBLE* and its interaction with *NPI_TREAT* to Eq. (1). Consistent with our prediction, untabulated results show that the interaction term between *TANGIBLE* and *NPI_TREAT* is positive and significant using *DISC_ACCRUALS* as the dependent variable ($p < 0.010$).[31] These results indicate that the overall positive effect of WFH on audit quality may vary with the characteristics of auditors and clients' accounts and financial statements.

Types of Non-reliance Restatements

To further examine the effect of WFH on different types of non-reliance restatements, we re-estimate Eq. (1) using the following two types of non-reliance restatements respectively: (i) non-reliance restatements — accounting rule (GAAP/FASB) application failure, (ii) non-reliance restatements — frauds.[32] Using the same DiD design, untabulated results show that the negative effect of auditors' WFH on the probability of non-reliance restatements is concentrated among those that are due to accounting rule application failure ($p < 0.05$). These results support auditors' role in decreasing the probability of accounting-related non-reliance restatements.

VI. CONCLUSION

Exploiting county-level NPIs that exogenously increased auditors' WFH practices, we document that WFH is positively associated with audit quality. Given that many audit firms have large-scale plans to adopt WFH policies, we provide timely empirical evidence and practical implications for audit firms planning to adopt WFH policies. This paper also responds to the

[31] We do not find significant interactions between *TANGIBLE* and *NPI_TREAT* using the other two audit quality proxies.

[32] Audit Analytics notes that restatements classified as "accounting rule (GAAP/FASB) application failure" or "financial fraud, irregularities and misrepresentations" are not mutually exclusive.

concerns raised by the PCAOB (PCAOB 2020a), the Center for Audit Quality (Tysiac 2022), and the business press (Maurer 2020) over the consequences of the emerging work arrangement in the public accounting profession. We caution that our empirical results are subject to a few limitations. We infer the adoption of WFH policies using NPI treatments during the COVID-19 pandemic. Therefore our results may not generalize to a hybrid remote working setting, whereby employees work a mix of days at home and at work each week. Further, the improvement in audit quality could be due to enhanced scrutiny surrounding audits during this time. Nevertheless we believe it is important to understand how WFH during the COVID-19 pandemic impacted the audit. Future research can examine remote work under different circumstances. Second, while our study exploites mandatory WFH policies during the COVID-19 pandemic, we believe that with voluntary adoption of WFH policies auditors would likely consider their client, firm, office, and employee characteristics to weigh the costs and benefits of WFH, and therefore we expect that the positive effect of WFH on audit quality would likely be greater than our estimated average treatment effect. Finally, while we do not evaluate the long-term influence of WFH on audit quality in our study, survey evidence shows employees adapt to WFH and further improve their work performance (PwC 2021). Despite these caveats, we believe our empirical results provide new insights into the relationship between WFH and audit quality for auditors, audit committees, regulators, and academic researchers. *Ex ante*, we expect the overall effect of WFH during auditors' fieldwork on audit engagements to be more pronounced than in other periods of audit work. The reason is that auditors usually perform inquiries of management, substantive testing, and communication with clients during their fieldwork. These audit procedures are arguably more difficult for auditors to perform remotely. Therefore, if audit firms strategically adopt WFH at other stages of audit engagements (e.g., planning and risk assessment) other than

the fieldwork, our research design provides a lower bound for the effect of WFH policies on audit quality.

Appendix A: Variable Description

Variable	Description (Compustat mnemonics are in parentheses)	Source
Dependent Variables		
NONRELI_REST	Equal to 1 if the fiscal year-end financial statements are restated and the restatement is disclosed in Form 8-K item 4.02 indicating non-reliance on the financial statements and zero otherwise.	Audit Analytics
GC	Equal to 1 if the auditor issues a going-concern opinion, and zero otherwise.	Audit Analytics
GC_TYPE1_ERR	Equal to 1 if the firm's Z-score is in the top decile of all firms by year but the auditor issues a GC opinion (i.e., conservative reporting), and zero otherwise.	Compustat, Audit Analytics
GC_TYPE2_ERR	Equal to 1 if the firm's Z-score is in the bottom decile of all firms by year but the auditor does not issue a GC opinion (i.e., aggressive reporting), and zero otherwise.	Compustat, Audit Analytics
DISC_ACCRUALS	The absolute value of the residual from the cross-sectional regressions each year using all firm-year observations in the same industry (2-digit SIC) and the OLS: $$\frac{TA_{it}}{ASSETS_{it-1}} = \delta_1\left(\frac{1}{ASSETS_{it-1}}\right) + \delta_2\frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \delta_3\frac{PPE_{it}}{ASSETS_{it-1}} + \delta_3 ROA_{it} + e_{it}$$ where *TA* is total accruals measured as earnings before extraordinary items (*IB*) minus net cash flow from operations excluding extraordinary items and discontinued operations (*OANCF-XIDOC*), Δ*SALES* is the change in sales, *PPE* is gross property, plant, and equipment, and *ROA* is the return on assets measured as *IB* scaled by lagged total assets $ASSETS_{it-1}$. To reduce measurement errors, we only consider industry-year groups with at least 10 observations to estimate the cross-sectional regressions.	Compustat
LN_FEES	The logarithm of audit fees	Audit Analytics
Test Variables		
NPI_TREAT	Equal to 1 if any NPIs affect the county of the firm's auditor (audit office) between the fiscal-year end and the audit opinion date, and zero otherwise.	Keystone Strategy, Audit Analytics
COVID_TREAT	We define alternative event dates based on the COVID-19 case number data collected by the New York Times (2021). We use the weekly rate of change in the county-level new COVID-19 case numbers (seven-day rolling average of new case numbers per 100,000 residents). We define the event date of the treatment for each county (i.e., county-level COVID-19 outbreaks) as the first time when the weekly rate of change in the case number exceeds the sample standard deviation (1.624). *COVID_TREAT* is an indicator equal to 1 if the event date of the auditor's county falls between the client's fiscal year-end and the audit opinion date, and zero otherwise.	The New York Times, Audit Analytics
NPI_TREAT_A_C	Equal to 1 if any NPIs affect the county of the firm's headquarters or the firm's auditor (audit office) between the fiscal-year end and the audit opinion date, and zero otherwise.	Keystone Strategy, Audit Analytics, Compustat
Control Variables		
ACC_RECEIVABLE	Accounts (trades) receivables (RECTR) divided by the beginning total assets (AT)	Compustat
AGE	The logarithm of the number of years that the firm has been listed in Compustat	Compustat
ANNOUNCE_LAG	The logarithm of the number of days between the fiscal-year end and the earnings announcement date (RDQ).	Compustat

BIG_FOUR	Equal to 1 if the audit firm is a Big 4, and zero otherwise.	Audit Analytics
CFO	Cash flow from operations (OANCF) divided by the beginning total assets (AT)	Compustat
CURRENT	Total current assets (ACT) divided by the beginning total assets (AT)	Compustat
D_LEVERAGE	Change in the leverage	Compustat
DECEMBER	Equal to 1 if the company's fiscal year-end is in December, and zero otherwise.	Compustat
FOREIGN	Equal to 1 if the firm has non-zero foreign pre-tax income or loss (PIFO), and zero otherwise.	Compustat
ICMW	Equal to 1 if the auditor reports material weakness in internal controls, and zero otherwise. Missing values are set to zero.	Audit Analytics
INVENTORY	Inventory (INVT) divided by the beginning total assets (AT)	Compustat
INVESTMENT	Capital expenditure (CAPX) is divided by the beginning total assets (AT). Missing values are set to zero.	Compustat
ISSUANCE	Equal to 1 if the cash flow from the sale of common and preferred stock (SCSTKC) or long-term debt issuance (DLTIS) is greater than 0, and zero otherwise.	Compustat
ISSUE_EQUITY	Equal 1 if the cash flow from the sale of common and preferred stock (SCSTKC) is greater than 0, and zero otherwise.	Compustat
F_ISSUE_EQUITY	The future value of *ISSUE_EQUITY*. Missing values are set to zero.	Compustat
LAG_GC	The lagged value of *GC*	Audit Analytics
LEVERAGE	Total liability (LT) divided by the total assets (AT)	Compustat
LN_NONAUDIT	The logarithm of the total non-audit fees	Audit Analytics
LN_SEGMENT	The logarithm of 1 plus the number of geographical and business segments	Compustat
LOSS	Equal to 1 if the income before extraordinary items (IB) is negative, and zero otherwise.	Compustat
MERGER	Equal to 1 if the firm has a merger or an acquisition (ACQMETH), and zero otherwise.	Compustat
MTB	Market-to-book value = the market value of equity (PRCC_F * CSHO) at the fiscal year-end divided by the total stockholders' equity (SEQ)	Compustat
QUICK_RATIO	Current assets (ACT) minus the sum of inventories (INVT) and other current assets (ACO) divided by current liability (LCT)	Compustat
REPORT_LAG	The logarithm of the number of days between the opinion date and the fiscal year-end.	Audit Analytics
RESTATEMENT	Equal to 1 if the firm restates previously issued financial statements, and zero otherwise.	Audit Analytics
RETURNS	12-month cumulative returns of the fiscal year after adjusting for stock splits and stock dividends.	Compustat
ROA	Income before extraordinary items (IB) divided by the beginning total assets (AT)	Compustat
SALES_GROWTH	Year-on-year sales growth	Compustat
SIZE	The logarithm of total assets (AT)	Compustat
TANGIBLE	The sum of the total inventory (INVT) and the net value of property, plant, and equipment (PPENT) divided by the beginning total assets (AT)	Compustat
TOTAL_ACCRUALS	Total accruals = earnings before extraordinary items (IB) minus net cash flow from operations excluding extraordinary items and discontinued operations (OANCF-XIDOC) divided by the beginning total assets (AT)	Compustat
ZSCORE	Altman Z-score calculated following Altman (1968)	Compustat

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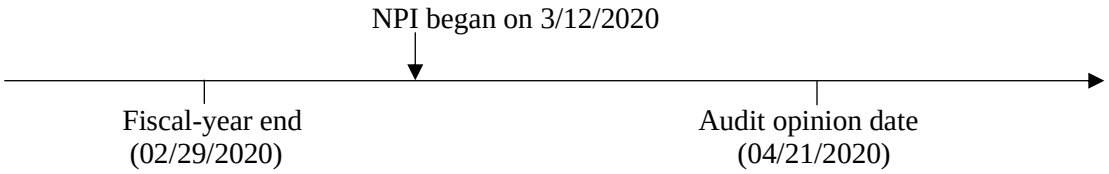
Figure 1 Illustration of NPI Treatment

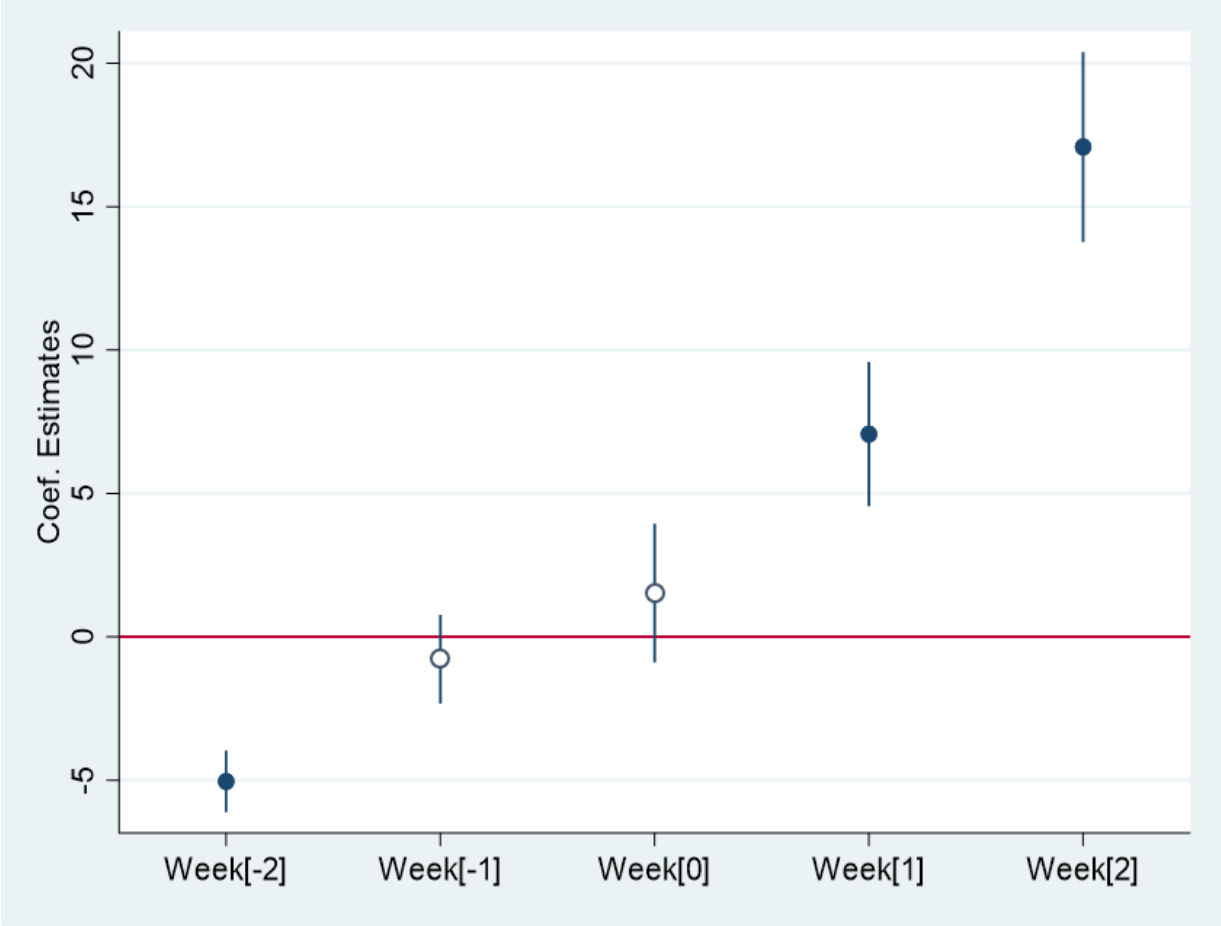
Audit Office: KPMG LLP (Rochester, NY)
City: Rochester
County: Monroe County
State: NY

Client Firm: Constellation Brands
Fiscal Year: 2019
Fiscal-year end: 02/29/2020
NPI Starting Date: 03/12/20
Signature Date of Opinion: 04/21/2020



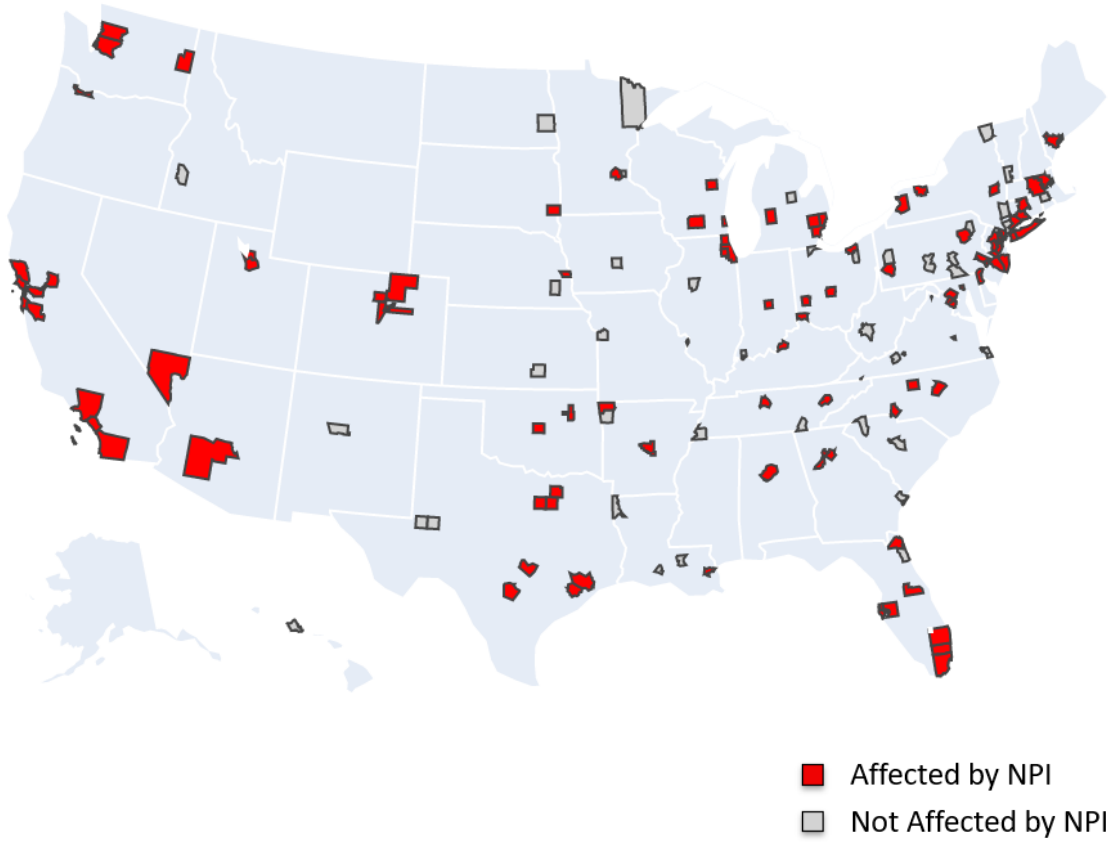
Note: The treatment variable, NPI_TREAT_{it}, is an indicator variable equal to 1 if an NPI occurs in the county of the audit office between the fiscal-year end and the audit opinion date, and zero otherwise.

Figure 2: Google Trends Popularity Score for "working from home" around the Local NPI Adoption



Note: To validate that NPI treatments capture an increase in the local WFH practices, we estimate a model regressing the weekly metropolitan-level Google Trends popularity scores for the term "working from home" on five dummy variables indicating five weeks around the local adoption of NPIs. This figure plots the coefficient estimates and confidence intervals from the OLS regression. The dependent variable is the weekly Google Trends popularity score for the term "working from home" in each metropolitan area (on a scale from 0 to 100), where higher values indicate higher popularity. Using the data from Keystone Strategy, we define five dummy variables indicating the five weeks around the NPI adoption in each affected metropolitan area. For metropolitan areas unaffected by any NPIs, all indicators are set to zero. The sample period is from the week of 1/5/2020 to the week of 6/28/2020. The 26-week panel consists of 5,460 metropolitan area per week observations and 210 unique metropolitan areas. The regression model includes five-week indicators and metro fixed effects. Robust standard errors are clustered by metropolitan area. The adjusted R-squared is 0.092. For more details on the Google Trends popularity score, see https://trends.google.com/trends/?geo=US.

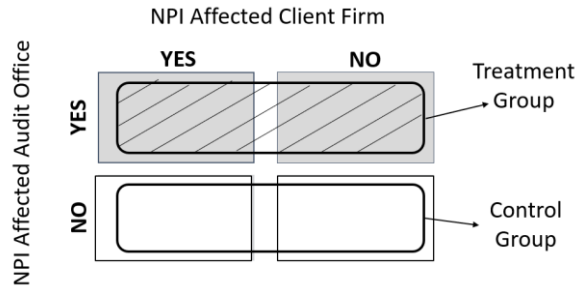
Figure 3: Audit Offices Affected by NPIs in the Fiscal Year of 2019



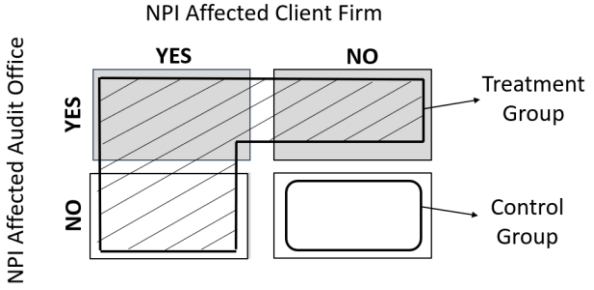
Note: This figure presents the location of audit offices affected and unaffected by NPIs in the fiscal year of 2019.

Figure 4: Illustration of Treatment and Control Groups – Consideration of NPI Treatments on Auditors and Clients

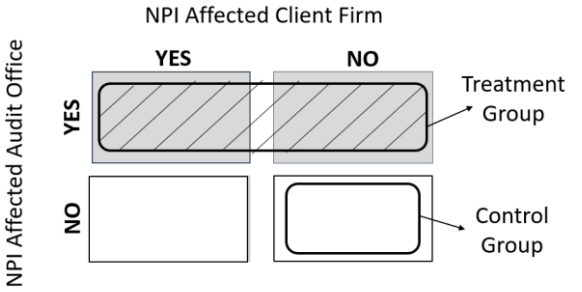
Main Specification (Table 4):



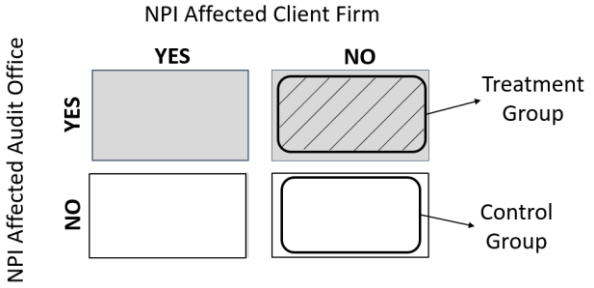
Alternative Specification 1 (Panel A of Table 6):



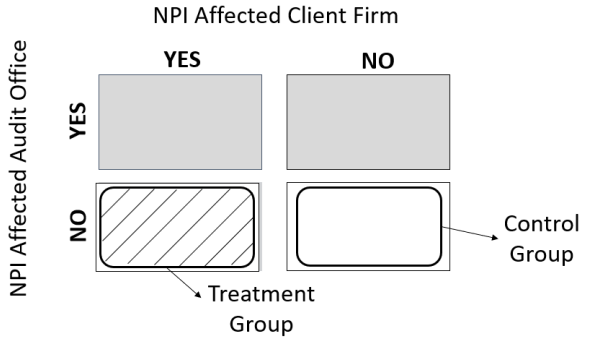
Alternative Specification 2 (Panel B of Table 6):



Alternative Specification 3 (Panel C of Table 6):



Alternative Specification 4 (Panel D of Table 6):



Note: This figure illustrates the treatment and control groups for the main specification and four alternative specifications of the robustness tests in Section V.

Table 1: Sample Selection

Procedure	Number of Obs.
Sample for non-reliance restatements and discretionary accruals:	
Non-financial firm-year obs. in Compustat Fundamentals Annual and Audit Analytics (2015-2020)	29,570
Less: Missing control variables	(10,514)
Sample for *NONRELI_REST*	**19,056**
Less: Obs. in the industry-year group < 10	(240)
Sample for *DISC_ACCRUALS*	**18,816**
Sample for going-concern opinions:	
Non-financial firm-year obs. in Compustat Fundamentals Annual and Audit Analytics (2015-2020)	29,570
Less: Missing control variables	(12,744)
	16,826
Less: Obs. not under financial distress	(9,267)
Sample for *GC*	**7,559**

This table presents the sample selection process.

Table 2: Descriptive Statistics of NPI Treatments

Panel A: NPI Treatment by Year

Fiscal Year	Number of NPI Obs.	Number of Obs.	Percentage
2015	0	3,499	0%
2016	0	3,380	0%
2017	0	3,311	0%
2018	0	3,285	0%
2019	857	3,243	26%
2020	0	2,341	0%

Panel B: NPI Treatment by State (Top 20)

State of Audit Office	Number of NPI Obs.
CA	178
NY	130
TX	115
NJ	44
FL	40
PA	33
UT	33
CO	31
MA	31
IL	28
WA	21
GA	20
VA	18
CT	17
MI	15
OH	14
MN	12
NC	12
NV	9
TN	9
Other states	47

Panel C: NPI by Type

NPI Type	Number of Instances
Closing of public venues	655
Gathering size limitation: <10 people	585
Gathering size limitation: 11 - 25 people	38
Gathering size limitation: 26 - 100 people	429
Gathering size limitation: 101 - 500 people	518
Lockdown	13
Non-essential services closure	558
Religious gatherings banned	487
School closure	731
Shelter in place mandate	549
Social distancing	657

This table presents descriptive statistics of NPIs. Panel A presents the number of observations with NPI treatments per year. Panel B presents the number of observations with NPI treatments by states of audit offices (the top 20 states). Panel C presents the number of NPIs by type. Different types of NPIs are often adopted simultaneously.

Table 3: Summary Statistics and Difference in Differences Analysis

Panel A: Summary Statistics

Variable	N	Mean	SD	p25	Median	p75
NONRELI_REST	19056	0.014	0.119	0	0	0
DISC_ACCRUALS	19035	0.255	0.598	0.038	0.096	0.232
GC	19056	0.102	0.303	0	0	0
GC_TYPE1_ERR	19056	0.003	0.058	0	0	0
GC_TYPE2_ERR	19056	0.06	0.238	0	0	0
REPORT_LAG	19044	4.164	0.302	3.989	4.094	4.317
LN_FEES	18774	13.814	1.494	12.872	14.006	14.837
NPI_TREAT	19056	0.045	0.207	0	0	0
COVID_TREAT	19056	0.038	0.192	0	0	0
NPI_TREAT_A_C	19056	0.048	0.213	0	0	0
ACC_RECEIVABLE	19056	0.128	0.144	0.028	0.09	0.173
AGE	19056	2.762	0.903	1.946	2.944	3.434
ANNOUNCE_LAG	19052	4.015	0.415	3.761	4.025	4.277
BIG_FOUR	19056	0.639	0.48	0	1	1
CFO	19056	-0.052	0.506	-0.018	0.066	0.118
CURRENT	19056	0.436	0.287	0.195	0.419	0.663
D_LEVERAGE	15092	0.041	1.293	-0.033	0.005	0.059
DECEMBER	19056	0.735	0.442	0	1	1
FOREIGN	19056	0.487	0.5	0	0	1
ICMW	19056	0.044	0.204	0	0	0
INVENTORY	19056	0.099	0.143	0	0.033	0.145
INVESTMENT	19056	0.044	0.06	0.009	0.025	0.054
ISSUANCE	19056	0.872	0.334	1	1	1
ISSUE_EQUITY	19056	0.677	0.468	0	1	1
F_ISSUE_EQUITY	17288	0.661	0.473	0	1	1
LAG_GC	18714	0.09	0.287	0	0	0
LEVERAGE	19056	0.914	2.428	0.374	0.568	0.759
LN_NONAUDIT	19056	9.312	5.18	8.134	11.225	12.899
LN_SEGMENT	18889	1.038	0.722	0.693	1.099	1.609
LOSS	19056	0.439	0.496	0	0	1
MERGER	19056	0.168	0.374	0	0	0
MTB	19056	3.334	14.013	0.993	2.091	4.269
QUICK_RATIO	17794	2.138	3.202	0.678	1.21	2.211
REPORT_LAG	19044	4.164	0.302	3.989	4.094	4.317
RESTATEMENT	19056	0.055	0.227	0	0	0
RETURNS	18169	0.074	0.652	-0.281	-0.007	0.276
ROA	19056	-0.32	1.814	-0.12	0.014	0.065
SALES_GROWTH	19056	0.203	0.99	-0.063	0.043	0.178
SIZE	19056	6.265	2.663	4.65	6.588	8.093
TANGIBLE	19056	0.365	0.315	0.099	0.293	0.569
TOTAL_ACCRUALS	19056	-0.26	1.445	-0.132	-0.065	-0.026
ZSCORE	16922	3.802	10.007	1.027	2.515	4.61

Table 3: (Continued)

Panel B: Difference in Differences Analysis

	Treatment Group before 2019				Treatment Group after 2019								
Variable	**N**	**Mean**	**SD**	**Median**	**N**	**Mean**	**SD**	**Median**	**A=**	**ΔMean**	**Std. Err.**	**t-statistic**	**p-value**
NONRELI_REST	2,766	0.0282	0.1656	0	857	0.0105	0.1020	0		-0.0177***	0.005	-3.26	<0.01
DISC_ACCRUALS	2,744	0.4073	0.8959	0.1222	851	0.3312	0.6974	0.1277		-0.0761***	0.025	-3.05	<0.01
GC	1,804	0.3326	0.4713	0	629	0.4022	0.4907	0		0.070***	0.019	3.73	<0.01

	Control Group before 2019				Control Group after 2019								
Variable	**N**	**Mean**	**SD**	**Median**	**N**	**Mean**	**SD**	**Median**	**B=**	**ΔMean**	**Std. Err.**	**t-statistic**	**p-value**
NONRELI_REST	10,706	0.0135	0.1156	0	4,727	0.0085	0.0916	0		-0.0051**	0.002	-2.56	0.011
DISC_ACCRUALS	10,557	0.2314	0.5371	0.0954	4,656	0.2168	0.4738	0.0920		-0.0146*	0.009	-1.67	0.095
GC	4,461	0.1881	0.3908	0	2,097	0.0982	0.2977	0		-0.090***	0.009	-10.32	<0.01

Variable	**(A-B)=**	**Diff. (ΔMean)**	**Std. Err.**	**t-statistic**	**p-value**
NONRELI_REST		**-0.0126****	**0.006**	**-2.18**	0.029
DISC_ACCRUALS		**-0.0615****	**0.026**	**-2.32**	0.02
GC		**0.1595*****	**0.021**	**7.74**	<0.01

Panel A of this table presents summary statistics of all the variables in this paper. Panel B of this table presents summary statistics of the main audit quality proxies for the treatment and control groups. We report the summary statistics before and after 2019, respectively. The sample for *GC* is restricted to firm-years under financial distress (i.e., negative earnings or negative operating cash flows). t-statistics are based on robust standard errors clustered by firm. ***, **, * represents significance at the 0.01, 0.05, and 0.10 levels, respectively, based on two-tailed tests. All continuous variables are winsorized at the 1% and 99% levels. Appendix A provides the variable definitions.

Table 4: Main Results - WFH and Audit Quality

Panel A: WFH, Non-reliance Restatements, and Discretionary Accruals

	(1)	(2)	(3)	(4)
Dependent Variable =	***NONRELI_REST***	***NONRELI_REST***	***DISC_ACCRUALS***	***DISC_ACCRUALS***
NPI_TREAT	**-0.0102***	**-0.0131****	**-0.112*****	**-0.0722*****
	(0.005)	**(0.006)**	**(0.034)**	**(0.0271)**
SIZE	0.0055*	0.0079**	-0.0747***	0.0273
	(0.003)	(0.004)	(0.026)	(0.0230)
LEVERAGE		0.0000		-0.0089
		(0.001)		(0.016)
LOSS		-0.0057*		-0.0561***
		(0.003)		(0.015)
SALES_GROWTH		0.0000		0.0184*
		(0.001)		(0.0095)
CFO		0.0003		-0.450***
		(0.006)		(0.074)
BIG_FOUR		-0.0142		-0.0283
		(0.016)		(0.022)
MTB		-0.0000		0.0012
		(0.000)		(0.0007)
TOTAL_ACCRUALS		-0.0011		
		(0.002)		
ISSUANCE		0.0005		0.0199
		(0.003)		(0.020)
Constant	-0.0113	-0.0169	0.813***	0.0978
	(0.019)	(0.026)	(0.153)	(0.146)
Number of Observations	22,710	19,056	22,299	18,816
Number of Clusters	5,459	4,475	5,368	4429
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.390	0.375	0.511	0.452

Table 4 (Continued)

Panel B: The Association between WFH and Going Concern Opinions

Dependent Variable =	(1) *GC*	(2) *GC*	(3) *GC_TYPE1_ERR*	(4) *GC_TYPE2_ERR*
NPI_TREAT	**0.0971*** **	**0.0814*** **	**-0.0105**	**-0.0521***
	(0.021)	**(0.027)**	**(0.009)**	**(0.027)**
SIZE	-0.0962***	-0.0794***	-0.0153**	-0.0676***
	(0.010)	(0.015)	(0.007)	(0.017)
LAG_GC	0.0521**	0.0239	-0.0005	-0.0177
	(0.023)	(0.033)	(0.012)	(0.032)
LEVERAGE		0.298***	0.0307*	0.184***
		(0.054)	(0.017)	(0.057)
LOSS		0.0135	0.0049	-0.0021
		(0.0176)	(0.009)	(0.022)
ROA		0.0045	-0.0058	-0.0029
		(0.008)	(0.005)	(0.007)
ZSCORE		-0.0003	0.0029***	-0.0030***
		(0.001)	(0.0007)	(0.0007)
D_LEVERAGE		-0.0000	0.0000	0.0000
		(0.000)	(0.000)	(0.000)
RETURNS		-0.0182**	0.00255	-0.0245***
		(0.007)	(0.003)	(0.008)
F_ISSUANCE_EQUITY		-0.0031	0.0016	0.0079
		(0.013)	(0.005)	(0.015)
REPORT_LAG		0.193***	-0.0148	-0.0696*
		(0.041)	(0.0141)	(0.0361)
CFO		-0.0512	-0.0230	0.0202
		(0.045)	(0.026)	(0.038)
INVESTMENT		-0.0169	0.0101	-0.234*
		(0.146)	(0.054)	(0.137)
AGE		0.0056	-0.0112	0.103*
		(0.050)	(0.019)	(0.058)
Constant	0.657***	-0.444*	0.144*	0.485**
	(0.0451)	(0.227)	(0.083)	(0.218)
Number of Observations	10,831	7,559	7,559	7,559
Number of Clusters	3,744	2,820	2,820	2,820
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.681	0.602	0.451	0.434

Panel A of this table presents the results testing how WFH impacts the probability of non-reliance restatements and discretionary accruals. *NONRELI_REST* is an indicator variable equal to one if the fiscal year-end financial statements are restated and the restatement is disclosed in Form 8-K item 4.02, and zero otherwise. *DISC_ACCRUALS* are calculated using the performance-adjusted Jones model (Aobdia 2019; Kothari et al. 2005). Panel B presents the results testing how WFH impacts the probability of issuing going concern opinions (*GC*). Following Aobdia (2019), the sample is restricted to firm years with negative earnings or negative operating cash flows. *GC_TYPE1_ERR* is equal to one if the firm's Z-score is in the top decile of all firms by year but the auditor issues a GC opinion (i.e., conservative reporting), and zero otherwise; *GC_TYPE2_ERR* is equal to one if the firm's Z-score is in the bottom decile of all firms by year but the auditor does not issue a GC opinion (i.e., aggressive reporting), and zero otherwise. Standard errors clustered by firm are included in parentheses. ***, **, * represents significance at the 0.01, 0.05, and 0.10 levels, respectively, based on two-tailed tests. Appendix A provides the variable definitions

Table 5: Parallel Trends Assumption and Alternative Event Dates

Panel A: Parallel Trends Assumption

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
NPI_TREAT [0]	**-0.0152***	**-0.0617****	**0.0709****
	(0.008)	**(0.0306)**	**(0.033)**
NPI_TREAT [-1]	-0.0053	0.0712	-0.0087
	(0.0086)	(0.0469)	(0.033)
NPI_TREAT [-2]	-0.0020	-0.0460	-0.0293
	(0.0091)	(0.0308)	(0.027)
Number of Observations	19,056	18,816	7,559
Number of Clusters	4,475	4,429	2,820
Controls	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.375	0.453	0.602

Panel B: Robustness Test - Alternative Event Dates Based on County-Level COVID-19 Case Numbers

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
COVID_TREAT	**-0.0156****	**-0.0777****	**0.0683****
	(0.007)	**(0.032)**	**(0.030)**
Number of Observations	19,056	18,816	7,559
Number of Clusters	4,475	4,429	2,820
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.375	0.452	0.601

Panel A of This table presents results examining the parallel trends assumption following prior studies (e.g., Kausar et al. 2016; Lamoreaux 2016). We regress the three audit quality proxies on *NPI_TREAT [0], NPI_TREAT [-1], NPI_TREAT[-2],* control variables, firm fixed effects, and year fixed effects. *NPI_TREAT [-1]* is an indicator variable equal to one in the one year prior to the treatment, and zero otherwise; *NPI_TREAT [-2]* is an indicator variable equal to one in the two years prior to the treatment, and zero otherwise. In column (1) the dependent variable is non-reliance restatements (*NONRELI_REST*). In column (2) the dependent variable is unsigned discretionary accruals (*DISC_ACCRUALS*). In column (3) the dependent variable is the probability of going concern opinion (*GC*). In column (3) the sample is restricted to firm years with negative earnings or negative operating cash flows. Control variables are included in all models. Standard errors clustered by firm are included in parentheses. Panel B of this table presents the results of testing how WFH impacts audit quality

using alternative event dates. We define the alternative event dates for auditors' adoption of WFH policies using the COVID-19 case number data collected by the New York Times (2021). We focus on the weekly rate of change in the county-level new COVID-19 case numbers (seven-day rolling average of new case numbers per 100,000 residents). We define the event date for each county as the first time when the weekly rate of change in the case numbers exceeds the sample standard deviation (1.624). We define *COVID_TREAT* as an indicator equal to one if the event date of the auditor's county falls between the client's fiscal year-end and the audit opinion date. In column (1) the dependent variable is non-reliance restatements (*NONRELI_REST*). In column (2) the dependent variable is unsigned discretionary accruals (*DISC_ACCRUALS*). In column (3) the dependent variable is the probability of going concern opinion (*GC*). In column (3) the sample is restricted to firm years with negative earnings or negative operating cash flows. Standard errors clustered by firm are included in parentheses. ***, **, * represents significance at the 0.01, 0.05, and 0.10 levels, respectively, based on two-tailed tests. Appendix A provides the variable definitions.

Table 6: Robustness Test - Consideration of NPI Treatments on Clients

Panel A: NPI Treatment on Auditors or Clients

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
NPI_TREAT_A _C	**-0.0139****	**-0.0799*****	**0.0761*****
	(0.006)	**(0.028)**	**(0.026)**
Number of Observations	19,056	18,816	7,559
Number of Clusters	4475	4429	2820
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.375	0.452	0.601

Panel B: Alternative Control Group

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
NPI_TREAT	**-0.0135****	**-0.0780*****	**0.0802*****
	(0.006)	**(0.027)**	**(0.027)**
Number of Observations	19,006	18,768	7,542
Number of Clusters	4473	4427	2818
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.376	0.452	0.601

Table 6: (Continued)

Panel C: Alternative Treatment and Control Group

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
NPI_TREAT	**0.00057**	**-0.120****	**0.0968***
	(0.006)	**(0.058)**	**(0.055)**
Number of Observations	17,691	17,460	6,891
Number of Clusters	4219	4175	2638
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.418	0.462	0.605

Panel D: NPI Treatment on Clients

	(1)	(2)	(3)
Dependent Variable =	***NONRELI_REST***	***DISC_ACCRUALS***	***GC***
NPI_TREAT_C	**-0.0192**	**-0.166**	**-0.0318**
	(0.0311)	**(0.177)**	**(0.115)**
Number of Observations	17,616	17,383	6,830
Number of Clusters	4214	4170	2622
Constant	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Adjusted R-squared	0.415	0.466	0.608

Panel A of this table presents the results testing how WFH impacts audit quality using an alternative definition of the NPI treatment. In column (1) the dependent variable is non-reliance restatements (*NONRELI_REST*). In column (2) the dependent variable is unsigned discretionary accruals (*DISC_ACCRUALS*). In column (3) the dependent variable is the probability of going concern opinion (*GC*). *NPI_TREAT_A_C* is an indicator equal to one if any NPIs affect either the auditor or the client during the period between the fiscal-year end and the audit opinion date. We use the clients' headquarters locations. Panel B of this table presents the results testing how WFH impacts audit quality using an alternative control group. The alternative control group is comprised of observations that NPIs affect neither the auditors nor the clients. Panel C of this table presents the results testing how WFH impacts audit quality using an alternative treatment group and an alternative control group. The alternative treatment group is comprised of observations that NPIs affect the auditors but not the clients; the alternative control group is comprised of observations that NPIs affect neither the auditors nor the clients. Panel D of this table presents the results testing the association between WFH and audit quality using an alternative treatment group and an alternative control group. *NPI_TREAT_C* is an indicator equal to one if any NPIs affect the client but not the auditor during the period between the fiscal-year end and the audit opinion date. The alternative control group is comprised of observations that NPIs affect neither the auditors nor the clients. In column (3) the sample is restricted to firm years with negative earnings or negative operating cash flows. Standard errors clustered by firm are included in parentheses. ***, **, * represents significance at the 0.01, 0.05, and 0.10 levels, respectively, based on two-tailed tests. Appendix A provides the variable definitions.

Table 7: WFH and Audit Fees

	(1)	(2)
Dependent Variable =	***LN_FEES***	***LN_FEES***
NPI_TREAT	**0.0709*** **	**0.0340***
	(0.021)	**(0.020)**
BIG_FOUR	0.580***	0.517***
	(0.021)	(0.063)
SIZE	0.454***	0.260***
	(0.005)	(0.015)
LEVERAGE	0.0365***	0.0191***
	(0.002)	(0.003)
LOSS	0.145***	0.0483***
	(0.014)	(0.011)
ROA	0.0022	0.0090***
	(0.003)	(0.003)
CURRENT	0.440***	0.0653
	(0.037)	(0.048)
QUICK_RATIO	-0.0303***	-0.0136***
	(0.0019)	(0.003)
FOREIGN	0.225***	0.0758**
	(0.019)	(0.033)
LN_SEGMENTS	0.127***	0.0683***
	(0.013)	(0.022)
DECEMBER	0.0511***	-0.0066
	(0.017)	(0.043)
GC	0.115***	0.0382
	(0.025)	(0.026)
Constant	10.01***	11.56***
	(0.173)	(0.107)
Number of Observations	21,002	20,072
Number of Clusters	4,759	4,715
Industry FE	Yes	No
Firm FE	No	Yes
Year FE	Yes	Yes
Adjusted R-squared	0.872	0.951

This table presents the results testing how WFH impacts audit fees. Column (1) presents the results controlling for industry fixed effects based on the 2-digit SIC code; Column (2) presents the results controlling for firm fixed effects. Standard errors clustered by firm are included in parentheses. ***, **, * represents significance at the 0.01, 0.05, and 0.10 levels, respectively, based on two-tailed tests. Appendix A provides the variable definitions.