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Does headquarters location matter in corporate tax avoidance?☆

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ABSTRACT

This study examines whether corporate headquarters (CHQ) location influences firms' tax avoidance practice. Our two-stage OLS regression analysis demonstrates that firms engage in less (more) tax avoidance when their CHQ are located near (farther away from) urban areas. Using recursive path analysis, we further examine the channels through which CHQ location impacts tax avoidance practice and find that the overall negative effect comprises a larger direct negative effect of CHQ location and a smaller indirect negative effect of CHQ location through financial reporting opacity and number of analysts following on firms' tax avoidance. Furthermore, our nonrecursive path analysis shows that while CHQ location affects tax avoidance through direct and indirect channels, tax avoidance does not affect the choice of CHQ location. Finally, we find that when firms switch their CHQ from urban areas to rural areas (vice versa), their tax avoidance increases (decreases) accordingly. Our study thus provides a useful extension of tax avoidance studies and the literature on CHQ location's effect on firms' strategic decisions and performance.

1. Introduction

In this study, we investigate whether location of corporate headquarters near to or farther away from metropolitan areas affects firms' tax avoidance strategies. Prior studies investigate the relationship between the location of corporate headquarters (CHQ) and firms' financial and dividend policies and find that CHQ location helps explain the cross-sectional variation of corporate policies in the United States (e.g., Gao et al., 2011; John et al., 2011). Corporate headquarters (CHQ) play a central role in exchanging information between various outside stakeholders and management of a company and is ultimately in control of firms' differential product units and governance system (Collis and Montgomery, 1998; Davis and Henderson, 2008).[1] Because of its strategic importance, CHQ are central to many firm theories (Kleinbaum and Stuart, 2014), and a relatively recent stream of finance literature examines whether CHQ location systematically influences various corporate outcomes.[2]

John et al. (2011) argue that CHQ location affects shareholders' ability to monitor management; the cost of providing effective oversight increases with the distance of CHQ from metropolitan areas. They suggest that in spite of technological advances, distance is likely to affect information costs of analysts and investors. John et al. (2011) find evidence that firms with remotely located CHQ pay higher dividends to mitigate manager-shareholder agency conflicts, especially when they have large free cash flows and limited growth opportunities. Several studies document the effect of CHQ location on important corporate

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[1] CHQ performs four key roles: (1) formulate and communicate a firm's strategies; (2) allocate valuable resources; (3) fulfill general overhead functions; and (4) set administrative context by choosing structures, systems, and control processes and by achieving coherence (Collis and Montgomery, 1998). Corporate headquarters locations have a significant impact on corporate financial policies. Firms exhibit conformity in their financial policies to those of other local firms, and corporate headquarters location helps explain the cross-sectional variations of corporate policies in the United States. Corporations located in the same metropolitan areas exhibit similar leverage ratios and have similar policies of cash holdings. These firms also tend to follow similar patterns of issuing equity and debt (e.g., Gao et al., 2011).

[2] While value-relevant information can be gathered from different sites relating to geographically diverse firms, most strategic decisions are expected to be made at firms' CHQ. Hence, distance from CHQ is likely to affect the cost of obtaining most value-relevant soft information. This is the primary reason why capital market research selects CHQ locations as the source of information, even for multidivisional firms (John et al., 2011).

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policies. For example, in a recent study, Chow et al. (2022) examine how state corporate tax system affects relocation of company headquarters. Their results suggest that state corporate income tax policy is an effective policy tool in attracting and retaining business more broadly. Furthermore, El Ghoul et al. (2013) observe that CHQ location impacts cost of equity; greater information asymmetry associated with CHQ's distance from a financial center increases cost of equity capital. Kedia and Rajgopal (2009) find that CHQ location can explain differences in broad-based option grants, whereas Pirinsky and Wang (2006) find a strong co-movement of stock returns of firms located in the same geographic area. In a similar vein, Gao et al. (2011) show that CHQ location can explain cross-sectional variation of capital structures of US companies. While these studies help us understand the role of CHQ location on corporate outcomes, in a recent article, Menz et al. (2015) argue, "*We still lack studies that provide direct evidence of whether and how the CHQ affects various performance and strategic outcomes*" (p. 38). We respond to this research call and investigate whether CHQ location plays an incremental role in explaining the difference in corporate tax avoidance practice among business enterprises.[3] We suggest that as CHQ location makes a difference in various key corporate decisions, it is worthy to investigate as a part of distance-based studies whether the location of CHQ in urban areas (i.e., CHQ located closer to metropolitan areas) or remote areas (i.e., farther away from metropolitan areas) has any differential effect on corporate tax avoidance.

Our motivation to examine the effect of CHQ location on tax avoidance stems from the fact that CHQ is the place where most strategic decisions are made and corporate tax avoidance practice has major firm-specific and societal implications. If managers perceive corporate tax payment merely as a business transaction and one of many operating costs, they will aim to minimize tax payment in order to maximize profits (Avi-Yonah, 2008). However, not paying a "fair share" of tax is often regarded as "unethical," "irresponsible," or even "unpatriotic" (Weisbach, 2002),[4] because this type of action might suggest that business enterprises are exploiting their implicit contract with society at the expense of the latter (Freedman, 2003; Slemrod, 2004; Landolf, 2006; Williams, 2007; Erle, 2008; Friese et al., 2008). While it is commonly viewed that corporate tax avoidance serves shareholders' interest, aggressive tax behavior can also harm these stakeholders because such behavior frequently generates adverse media coverage and reputational damage and could result in penalties and even cessation of operations (Williams, 2007; Erle, 2008).

Managerial actions exclusively dedicated to lowering corporate taxes are becoming an increasingly common feature of the corporate landscape all over the world. Firms are understandably eager to invest in tax planning to lower their taxes because this action benefits shareholders as the residual claimants (e.g., Mills, 1998; Mills et al., 1998). However, firms also consider the cost of pursuing aggressive tax avoidance strategies including economically material fines, interest, and penalties that IRS might impose for underreporting (Wilson, 2009). Acknowledging the ever-increasing role and relevance of corporate tax avoidance, we argue that it is important to explore whether CHQ location of business enterprises affect firms' aggressive tax avoidance practice. Specifically, we examine whether firms' tax avoidance is affected by the distance of their headquarters from urban (metropolitan) areas, where a greater number of sophisticated investors, money managers, and financial analysts are able to provide higher oversight on firms' actions including their tax avoidance practice. Remotely located CHQ increases the cost of stakeholder oversight of managerial decisions, resulting in higher information asymmetry between managers and shareholders. Scholars document that firms with CHQ located in relatively remote and rural locations are followed by fewer adjacent investors, investment bankers, analysts, or brokers and characterized by greater information asymmetry not only between managers and distant investors but also between local and nonlocal investors (Loughran and Schultz, 2005; Malloy, 2005; Loughran, 2008). We conjecture that CHQ location closer to urban or metropolitan areas is likely to mitigate a firm's tax avoidance, as greater observability of managerial actions and lower information asymmetry facilitate higher monitoring of corporate decisions.

Following Loughran and Schultz (2005), we classify firms as centrally located or located in urban areas if they are headquartered within a 100-mile radius of one of the ten largest metropolitan statistical areas based on population size as reported in the 2010 US census. Due to possible endogeneity issues,[5] we employ a two-stage least square analysis and use the predicted value of urban location of CHQ as our proxy for urban CHQ location in our analysis.[6] Using a sample of 54,826 observations for 7407 firms for the period from 1990 to 2019, our two-stage regression analyses show that firms with headquarters located in urban (metropolitan) areas are engaged in less tax avoidance compared with remotely located firms. Our result is consistent with the notion that higher stakeholder and regulatory oversight mitigates urban firms' aggressive tax avoidance practice. The result complements Desai and Dharmapala (2006) that aggressive tax planning stems from agency conflict between managers and shareholders where managers file complex and obscure financial reports to hide their opportunistic tax savings. Our results suggest that corporate transparency is likely to improve through higher stakeholder monitoring in urban firms that reduces information asymmetry and mitigates aggressive tax avoidance practice.

In the next stage, we determine both the direct and indirect channels through which CHQ location impacts tax avoidance practice. We rely on recursive path analysis to decompose the association between CHQ location and tax avoidance into two indirect or mediated channels: financial reporting opacity measured by absolute discretionary accruals and analyst coverage measured by number of analysts following used as a proxy for monitoring by sophisticated information intermediaries. The recursive or unidirectional path analysis shows that CHQ location affects tax avoidance through both the direct and indirect channels. The significant indirect channels capture how the mitigating effect of CHQ location on tax avoidance is mediated through reduced financial reporting opacity and higher number of analysts following. The overall negative effect is composed of a larger direct negative effect of CHQ location in metropolitan areas on tax avoidance (82.9% of the total effect)[7] and smaller indirect negative effect of CHQ location on tax avoidance through reporting opacity (6.8% of the total effect) and analyst coverage (10.3% of the total effect). Finally, the relative magnitude of the mediated path through analyst coverage is 1.5 times that through financial reporting opacity. Monitoring by financial analysts thus seems

[3] There is a renewed interest in the academic community to identify factors that induce managers to engage in tax avoidance practice (Wilde and Wilson, 2018; Hanlon and Heitzman, 2010).

[4] Recent initiatives undertaken by various domestic and international bodies (e.g., the European Commission's corporate social responsibility [CSR] policy, the Tax Justice Network [TJN], Global Reporting Initiative [GRI], and the United Nations [UN] Global Compact) underline the importance of corporate tax payments to run properly various government welfare payments (Lanis and Richardson, 2018).

[5] For example, there could be reverse causality, as firms sometimes prefer to choose a CHQ location that helps them avoid taxes. The motivation to avoid taxes might induce firms to choose a CHQ location in a tax-friendly environment. Furthermore, there could be other omitted variables that might simultaneously affect the choice of CHQ location and firms' tax avoidance.

[6] In our two-stage least-squares approach in the first stage, we use all our control variables and instrumental variables such as diversity of population, strictness of labor laws, number of airports, and business enterprises located in the urban setting to estimate the predicted value of urban location. This predicted value is used in the second stage of our analysis.

[7] The negative path coefficient of − 0.0241 from CHQ location to tax avoidance (as evident from recursive path analysis) implies that a one standard deviation increase of CHQ location in metropolitan areas results in a 2.41% decrease in tax avoidance.

to play a relatively larger role in mitigating tax avoidance. Our results suggest that the mitigating effect of urban CHQ location on tax avoidance is attributed to the aggregate impact of higher observability of managerial tax decisions and lower costs of monitoring by individual and institutional shareholders, investment community, media, and regulators. The relative ease with which these stakeholders have access to firm-specific information enables them to closely monitor urban firms' various strategic decisions, including tax avoidance.

It is also likely that the negative association between urban (or metropolitan) CHQ location and tax avoidance arises from reverse causality. While the use of predicted value of urban location in our two-stage regression analyses deals with this issue, we further investigate this possibility by conducting a nonrecursive path analysis that allows for a bidirectional relationship that exists between the dependent and test variables. In our setting, it allows for the likely effect of CHQ locations on tax avoidance and vice versa. Our nonrecursive path analysis shows that CHQ location continues to affect tax avoidance through both the direct and indirect channels; however, in an opposite direction, tax avoidance does not affect the choice of CHQ location. As a robustness check, we also conduct a change analysis where we examine whether CHQ relocation from rural to urban areas or from urban to rural areas systematically influences tax avoidance practices. We observe that a firm's tax avoidance increases (decreases) when it relocates its CHQ from an urban to a rural (from a rural to an urban) area.[8]

Our study extends the existing literature on the role of CHQ location in firms' strategic decisions and performance by demonstrating that CHQ location closer to urban areas mitigates tax avoidance. Bauer et al. (2020) show that tax aggressiveness facilitates diversion of corporate resources and exacerbates managerial self-dealing. Our results indicate that when there is a greater corporate transparency, as in the case of urban-located firms, firms' actions are observable and closely monitored by various stakeholder groups. Because their interactions with outside parties are frequent and more transparent, managers are constrained from engaging in higher tax avoidance. Furthermore, our path analyses allow us to demonstrate the larger direct effect of CHQ location and a smaller indirect effect mediated through reduced financial reporting opacity and increased analyst coverage on tax avoidance. The results also indicate that in spite of a larger aggregate effect of CHQ location, reduced financial reporting opacity and higher analyst coverage stand out in their role in mitigating tax avoidance.

Our study provides specific insights into tax avoidance literature by including CHQ location as an important determinant of corporate tax avoidance. Prior studies demonstrate that when firms are subject to close IRS monitoring, they undertake less aggressive tax positions (e.g., Hoopes et al., 2012); however, Kubick et al. (2017) find that firms located closer to the IRS office are more likely to have higher tax avoidance, as they are believed to have an informational advantage over the IRS. Prior research further implies that self-dealing managers can exploit complex tax planning to lower taxes and hide their diversionary activities by suppressing information essential for monitoring (e.g., Desai and Dharmapala, 2006; Graham and Tucker, 2006; Desai et al., 2007). However, CHQ location closer to urban or metropolitan areas is deemed to have closer proximity to an IRS office and thus, may constrain such managerial diversion. IRS monitoring and necessary enforcement are likely to be more frequent for these firms compared with remotely located firms. Our results indicate that firms with urban CHQ location (deemed to have proximity to IRS office) undertake less tax avoidance, thereby vindicating the results of Hoopes et al. (2012).

The remainder of the paper proceeds as follows. Section 2 includes background discussion and hypotheses, followed by research design in Section 3. Section 4 discusses sample and descriptive statistics. Section 5 includes discussion of primary results, and additional test and sensitivity test results. Section 6 concludes the paper.

2. Background discussion and hypothesis

Corporate headquarters (CHQ) of most business enterprises are responsible for important tasks such as communication with external and internal stakeholders, strategic planning, finance, taxes, human resources, accounting, marketing, and information technology (Wanner, 2006). Prior studies document that CHQ location is important from an agency standpoint (John et al., 2011; Chen et al., 2020). In an agency setting, proximity of CHQ to various stock market participants impacts the flow of information and observability of managerial action. Finance literature establishes that investors exhibit local bias in constructing stock portfolios, as local investors have a relatively greater informational advantage over distant investors due to their greater familiarity with the local corporate culture and observability of the nearby CHQ (Coval and Moskowitz, 1999, 2001; Ivkovic and Weisbenner, 2005).

Interestingly, despite advances in information technology, CHQ location still influences the corporate decision-making process. Individual and institutional investors and other market participants are more likely to favor nearby firms because it is easier for them to monitor those firms' activities and thus have higher informational advantage and monitoring power over nonlocal investors. Prior finance studies contend that CHQ location away from urban (metropolitan) areas decreases the observability of managerial actions, making it harder for various stakeholders to monitor corporate decisions relating to long-term investments, tax avoidance, use of free cash flows, corporate cash holdings, and so forth (John et al., 2011; Boubaker et al., 2015; Kubick et al., 2017). Boubaker et al. (2015) find a positive relationship between the distance of CHQ from metropolitan areas and corporate cash holdings, indicating that remotely located firms (i.e., with CHQ located away from metropolitan areas) are more likely to accumulate cash rather than distributing it to shareholders. The authors argue that those firms are subject to less shareholder scrutiny and have a higher incidence of agency problems, as the distance from metropolitan areas facilitates management's extraction of private benefits. However, John et al. (2011) show that remotely located firms are more inclined to distribute excess cash in the form of dividends in an effort to reduce manager-shareholder agency problems, especially when firms have limited growth opportunity and large free cash flows. Furthermore, Malloy (2005) finds that financial analysts are more accurate in their earnings forecasts of local firms, while Kedia et al. (2004) show that geographic proximity is an informational advantage in acquisitions. These findings suggest that CHQ location in urban (metropolitan) areas allows sophisticated shareholders, financial intermediaries like analysts, fund managers, and other market participants and government agencies relatively easier access to firm-specific information that reduces the cost of monitoring key corporate decisions. With reduction of information asymmetry and lower monitoring costs, higher corporate oversight considerably mitigates management's self-dealing behavior and manager-shareholder agency problems.

Prior research on corporate tax avoidance shows that U.S. public firms undertake less aggressive tax positions when tax enforcement is stricter (Hoopes et al., 2012). Irrespective of the severity of IRS enforcement, firms may also refrain from drastically lowering their taxes in order to avoid being labeled as tax aggressive (Hanlon and Slemrod, 2009; Mills et al., 2010). Hoopes et al. (2012) further contend that if managers benchmark firms' tax position this year with that of last year, managers may presume that deviating from tax avoidance strategies implemented previously may attract more intense IRS scrutiny in the

[8] Although it is possible that there is a reverse causality between location and tax avoidance when firms relocate from urban to rural areas (due to potentially less observability and higher monitoring cost in rural areas), this potential reverse causality does not exist when firms relocate from a rural area to an urban area, as moving to an urban area is likely to result in paying higher tax. Firms are subject to higher oversight from sophisticated investors, information intermediaries, and regulators when their CHQs are located closer to urban or metropolitan areas.

current year. In a related study, however, Kubick et al. (2017), using geographic distance to represent information asymmetry, find evidence that corporations avoid more taxes when located closer to the IRS. The finding is consistent with taxpayers' believing that proximity provides them with an informational advantage over the IRS. While tax avoidance could be viewed as a legitimate corporate action to maximize after-tax income, such behavior is deemed as unethical and irresponsible from a societal perspective (e.g., Freedman, 2003; Landolf, 2006; Williams, 2007) because money "lost" from tax avoidance is a direct financial transfer from the society to the company (Dowling, 2014). It is also unclear whether corporate tax avoidance is beneficial for shareholders. For instance, aggressive tax avoidance may result in negative media coverage, reputational damage, and in the extreme, cessation of operations (Williams, 2007; Erle, 2008). Recently, Bauer et al. (2020) find evidence that aggressive tax planning facilitates diversion of corporate resources by insiders. The authors show that the path from tax aggressiveness to other receivables (used as a proxy for managerial diversion) is mediated by both greater cash flows from tax savings and increased financial opacity from tax planning, and that additional cash flows play a more important role than financial opacity in helping controlling shareholders to divert corporate resources through tax aggressiveness.

In a more recent study, Chow et al. (2022) focus on the relation between U.S. states' corporate income tax rates and companies' decision to move their HQ. Their investigation is important because a common strategy in many jurisdictions is to use various tax policies, including tax rates, to retain and/or attract firms.[9] They argue that managers strive to maximize after-tax value and governments attempt to encourage economic development while simultaneously raising tax revenues. As part of this process, firms often organize their operations to reduce their exposure to higher-tax jurisdictions. Anticipating this response, governments either lower tax rates or implement measures to curb income shifting. Using changes in state corporate income tax rates across time and states as the setting, Chow et al. (2022) find that a one-percentage-point increase in the HQ state corporate income tax rate increases the likelihood of firms relocating their HQ out of the state by 16.8%, and an equivalent decrease in the HQ state rate decreases the likelihood of HQ relocations by 9.1%.

Many states with the lowest total tax costs for mature corporate headquarters operate without one or more of the major taxes, such as a corporate income or sales tax. Wyoming and South Dakota, both of which forego corporate income taxes, offer the lowest effective tax rates for mature corporate headquarters at 6.9% and 8.2% respectively, whereas Montana and Alaska, which operate without state sales taxes, are also very competitive at 9.0% and 11.2%. A highly competitive business tax structure and favorable legal and regulatory environment combine to make Wyoming one of the most popular states for firms' incorporation. Conversely, high statutory corporate tax rates are responsible for the preponderance of the tax burdens experienced by firms; six of the 10 highest tax cost states for mature corporate headquarters have statutory tax rates above 8.5%, led by Iowa's 12% top marginal rate (Tax Foundation, August 31, 2015).

Given the potential effect of corporate tax avoidance on stakeholders and the role of CHQ location in various corporate decisions (including reduction of corporate tax liabilities), we investigate whether firms with CHQ located in urban or metropolitan areas engage in higher or lower tax avoidance compared with firms with remotely located CHQ. Prior studies provide some interesting but conflicting results on tax avoidance. On one hand, Kubick et al. (2017) document that proximity of CHQ to an IRS office enables firms to avoid more taxes probably because firms have an informational advantage over the IRS. On the other hand, though firms are more willing to engage in tax avoidance as this action benefits shareholders as the residual claimants (Mills, 1998; Mills et al., 1998), firms also consider the costs associated with aggressive tax avoidance strategies, including economically material fines, interest, and penalties that the IRS can impose for underreporting (Wilson, 2009). Hanlon and Slemrod (2009) explain that firms may deliberately reduce their tax avoidance in order to avoid being labeled as tax aggressive and thus, suffer political costs. Consistent with this view, Hoopes et al. (2012) show that closer IRS monitoring reduces corporate tax avoidance. Their findings are contrary to Slemrod et al. (2001), who argue that firms may increase their tax avoidance when IRS monitoring is stricter to ensure that their tax liability after an IRS audit remains stable. In other words, companies may undertake more aggressive tax positions to create some negotiating room when they perceive that an IRS audit is more likely. Finally, Hanlon et al. (2007) document that the largest firms in their sample with total assets exceeding $5 billion have the highest tax deficiency rate at 74% indicating that the large firms subject to closer IRS monitoring exhibit more tax noncompliance, implying that IRS scrutiny may be less important.

From these research observations, it is unclear about the directional impact of CHQ location on firms' tax avoidance practice. Therefore, we express our prediction in the following alternative hypothesis.

Hypothesis. : Location of corporate headquarters has an effect on firms' tax avoidance practice.

3. Research design

3.1. Measures of tax avoidance

Following prior studies, we employ four measures of corporate tax avoidance. Our first two measures are *TA_GAAP* and *TA_CASH* (e.g., Balakrishnan et al., 2019; Kim and Zhang, 2016). *TA_GAAP* is the firm's mean industry and size-matched *GAAP_ETR* minus the firm's *GAAP_ETR*, where *GAAP_ETR* is the sum of current income tax expense over the three-year period *t*-2 to *t*, divided by the sum of pretax financial income over the same period. *TA_CASH* is the firm's mean industry and size-matched *CASH_ETR* minus the firm's *CASH_ETR*, where *CASH_ETR* is the sum of cash paid for income taxes over the three-year period *t*-2 to *t*, divided by the sum of pretax financial income over the same period. The higher the value of *TA_GAAP* and *TA_CASH*, the higher is the firm's tax avoidance,[10,11]

Our third measure of corporate tax avoidance is discretionary permanent book-tax differences (*DTAX*) (e.g., Frank et al., 2009; Armstrong

[9] Anecdotal evidence shows that managing corporate tax liabilities is one of the drivers of corporate headquarters (HQ) relocation. For example, the factors cited for General Electric (GE) relocating its HQ from Fairfield, Connecticut, to Boston, Massachusetts, in 2016 included a change from a 9% state tax rate to a lower rate and a negotiated $145 million incentive, in addition to benefits such as being in a vibrant new area in a major city that offered better access to high-tech workers relevant to the firm's new strategic theme (Lohr 2016, Marks 2016).When the Connecticut legislature passed a budget increasing the burden of the state's already high corporate taxes in 2015, major employers like General Electric initiated a very public search for a new home. Taxes are but one of many factors companies weigh while making location decisions—a state like New York, for instance, can be a popular place to locate corporate headquarters despite high tax burdens—but in many cases, they can be a very important one (Walczak, 2015).In many cases, CHQ location or relocation decision was based on factors other than tax considerations. Recently, GM decided to stay in Detroit after deliberating on whether their new hybrid work model calls for a change in their HQ location. They are now committed to develop downtown Detroit even more in the foreseeable future (https://www.gm.com/stories/detroit-nonprofit-community-investment).

[10] We sort size and industry independently. Industry is based on the two-digit SIC industry classification. We censor *GAAP_ETR* and *CASH_ETR* to be between 0 and 1.

[11] Balakrishnan et al. (2019) suggest that both *TA_GAAP* and *TA_CASH* are superior measures of a firm's aggressive tax avoidance practice, as *TA_GAAP* and *TA_CASH* use the benchmarks that allow us to measure a firm's tax avoidance relative to other similar firms operating in the same industry.

et al., 2012; Rego and Wilson, 2012). *DTAX* is the discretionary permanent book–tax difference, measured as the residual from the following model, estimated by year and two-digit SIC industry portfolio (Frank et al., 2009). The higher the value of *DTAX*, the higher is the firm's tax avoidance.[12]

$$PERMDIFF_{i,t} = \beta_0 + \beta_1 INTAN_{i,t} + \beta_2 UNCON_{i,t} + \beta_3 MI_{i,t} + \beta_3 CSTE_{i,t} + \beta_4 NOL_{i,t} + \beta_6 LAGPERM_{i,t} + e_{i,t} \quad (1)$$

where *PERMDIFF* = total book-tax difference – temporary book-tax difference = *[{PI – [(TXFED +TXFO) / STR]} – (TXDI / STR)]*, divided by lagged assets (*AT*); *INTAN* = goodwill and other intangible assets divided by lagged assets; *UNCON* = income (loss) reported under the equity method (*ESUB*), divided by lagged assets; *MI* = income (loss) attributable to minority interest (MII), divided by lagged assets; *CSTE* = current state tax expense (*TXS*), divided by lagged assets; *NOL* = change in net operating loss carryforwards (*TLCF*), divided by lagged assets; *LAGPERM* = *PERMDIFF* in year *t*-1; and *STR* is the statutory tax rate.

Because the above three tax avoidance proxies may have some measurement errors, we develop a composite measure of tax avoidance (*TAX_FACTOR*) as the first principal component factor of these three measures as our fourth measure (e.g., Chen et al., 2010; Kim and Zhang, 2016). We observe only one component with eigen value of greater than one (2.169) and use this component as the firm's composite tax avoidance measure. Again, the higher the value of *TAX_FACTOR*, the higher is the firm's tax avoidance.

3.2. Firms' decision to select corporate headquarters (CHQ) location

We predict that a firm's CHQ location has an effect on corporate tax avoidance strategies. We acknowledge that the relationship between CHQ location and tax avoidance is likely to have an endogeneity bias. For instance, firms could select CHQ location to avoid taxes. Furthermore, some omitted variables could potentially influence both CHQ location and tax avoidance. To address such an endogeneity issue, we determine the likelihood that firms select their headquarters in the proximity to major urban (metropolitan) cities. We employ a two-stage least-squares (2SLS) approach, where in the first stage, we use a Probit model to determine a firm's propensity to select its CHQ location closer to a major urban (metropolitan) city. Taking a cue from prior studies (e.g., Loughran and Schultz, 2005), we categorize a company as urban (*URBAN*) if its headquarters is located within 100 miles from any of the 10 largest metropolitan cities and their suburbs, according to a 2010 US census.[13] In addition to the control variables used in our primary analyses, we include a few instrumental variables that could potentially affect the choice of CHQ location, but do not affect corporate tax avoidance practice.

Stuart and Sorenson (2003) observe that due to the possibility of more social ties, business clustered in a particular geographic location motivates companies to choose that location for their CHQ.[14] In light of that, we assert that a greater number of firms in urban areas (*Ln (NEARFIRMS)*) would lead firms to favor urban CHQ locations. Several studies observe that diverse places attract talented and innovative people from different backgrounds to come together and establish more businesses; therefore, the greater diversity is likely to influence the selection of CHQ location (Lucas, 1988; Lee et al., 2004; Lee, 2001). Likewise, the availability of more college graduates in the locality makes it easier for business enterprises to recruit educated workforce. As such, we contend that the availability of more college graduates in the urban area (*Ln(GRADS)*) would motivate firms to establish their headquarter in that area. Following this logic, we use percentage of minority population in an urban area, a proxy for diversity (*DIVERSITY*) as another determinant of CHQ selection. We further maintain that stricter regional labor laws and regulation would deter companies from establishing their CHQ in specific locations. We consider statewide labor freedom representing ease in hiring and firing workers, measured by statewide labor freedom score (*LABOR_FREEDOM*), as another determinant of CHQ selection, expecting that greater labor freedom score would be positively associated with *CHQ* location in urban (metropolitan) areas.[15] Finally, considering that nearness to airports facilitates transportation of raw materials and finished products to and from companies, we assume that a higher number of airports (*Ln(AIRPORTS)*) in the urban area would attract more companies to set up their CHQs.

Our first-stage logistic regression model to estimate the likelihood of choosing a CHQ location in urban areas is the following:

$$URBAN = \beta_0 + \beta_1 CONTROL_{TAX-AVOID} + \beta_2 Z_{i,t} + Industry + Year + \varepsilon_{i,t} \quad (2)$$

The dependent variable, *URBAN* is 1 if the CHQ of the firm is located within a 100-mile radius of one of the 10 largest metropolitan cities, 0 otherwise. The vector *Z* represents the five instrumental variables (discussed above) that are likely to influence the choice of CHQ location but apparently not corporate tax avoidance practice. In addition, we include several control variables that are likely to influence corporate tax avoidance ($CONTROL_{TAX-AVOID}$) in case any of them has an effect on firms' choice of CHQ location. The variable definitions are included in Appendix A.

3.3. Headquarter location and tax avoidance

3.3.1. Baseline analysis

We use the predicted value of CHQ location (*Pred_URBAN*) estimated using model (2), in the second stage regression where we use the following baseline OLS model to examine our hypothesis:

$$TAX\_AVOID_{i,t} = \delta_0 + \delta_1 Pred\_URBAN_{i,t} + \delta_4 CONTROL_{TAX\_AVOID} + Industry + Year + \varepsilon_{i,t} \quad (3)$$

We expect the coefficient of *Pred_URBAN* to be significantly different from zero, indicating that CHQ location closer to or farther away from urban (metropolitan) areas has an influence on firms' tax avoidance practice.

In model (3), we include a comprehensive set of control variables ($CONTROL_{TAX\_AVOID}$) that are expected to influence corporate tax avoidance (e.g., Dyreng et al., 2010; Rego and Wilson, 2012; Chen et al., 2010; Hoi et al., 2013; Armstrong et al., 2012). We include return on assets (*ROA*), a net operating loss carryforward indicator (*NOL*), and change in net operating loss carryforward (Δ*NOL*), because the level of operating performance impacts corporate tax planning. We include variation in profitability (*SD(ROA)*) as it may influence tax-planning strategies (e.g., Armstrong et al., 2012; Rego and Wilson, 2012); foreign income (*FOR_INCOME*) to control for differences in tax-planning

[12] Conceptually, *DTAX* captures tax avoidance activities that are in the more aggressive end of the tax avoidance continuum and directly affect net income through a reduction of total tax expense (McGuire et al., 2012).

[13] We use the following ten largest metropolitan cities per the 2010 census as central location or major metropolitan area: New York City, Los Angeles, Chicago, Dallas, Houston, Washington-Baltimore, Miami, Philadelphia, Atlanta, Phoenix, and their suburbs.As a robustness check, we also consider a firm as the urban firm if it is located within a 100-mile radius from the center of one of the 49 metropolitan areas of one million or more people per the 2010 US census. The results obtained are qualitatively similar to our main results.

[14] Stuart and Sorenson (2003) argue that social relationship is crucial in using business resources as they state, "because entrepreneurs find it difficult to leverage the social ties necessary to mobilize essential resources when they reside far from these resources" (p. 29).

[15] We use the statewide labor freedom score, available in Frasier Institute's website: https://www.fraserinstitute.org/studies/economic-freedom.

opportunities (Rego, 2003), and change in goodwill (Δ*GOODWILL)* to control for the possible impact of mergers and acquisitions on tax planning. Considering the possibility that investment can lead to book-tax difference because of the difference in financial accounting rules and tax codes, we control for new investment (*NEWINVST*) and property, plant, and equipment (*PPE*). We further include intangible assets (*INTAN*) and equity income (*EQINC*) (Chen et al., 2010) to control for the effect of differential book and tax treatments for intangibles and the equity method of investment accounting income; and firm's cash holdings (*CASH*) that are likely to influence managers' tax deferral strategies (McGuire et al., 2012). We control for firm size (*SIZE*), leverage (*LEV*), and growth opportunities (*MTB*) because these firm attributes are likely to affect tax avoidance strategies in varying degrees; and for the complexity of firm operations by including the number of business segments (*BUSSEG*) and geographic segments (*GEOSEG*) in the model.

In a recent study, Kubick et al. (2017) find that two distance-based measures can systematically influence tax avoidance: proximity of CHQ with IRS regional offices (*Ln(DIST_IRSTM)*) and IRS industry specialist (*INDSPEC*). We include these two variables in our model as we recognize that the distance-based measures are relevant to our research setting.

4. Sample and descriptive statistics

4.1. Sample

Panel A, Table 1 summarizes the sample selection process. In our initial sample selection, we exclude utilities and financial companies because of their unique industry characteristics and institutional factors that differentiate the firms operating in those industries from the nonutility and nonfinancial firms. Furthermore, similar to prior tax avoidance studies, we also ensure that our initial sample does not have firms with negative pretax book income, negative income tax expense, and negative cash tax payments to ensure proper interpretation of our results. After applying these filters, we have 135,612 observations for 15,896 unique firms for fiscal years 1990–2019 available from the Compustat annual database. From these observations, we exclude another 21,555 observations (6288 firms) due to non-availability of data in IBES. Finally, we eliminate another 59,232 observations for 6288 firms due to lack of adequate data to calculate some variables for our analysis. Thus, our final sample comprises 54,826 observations for 7407 unique firms.

Panel B, Table 1 reports the sample distribution by industry based on the Fama-French 48-industry classification process. We observe that Business Services has the highest representation in our sample (13.84%), followed by Pharmaceutical Products (10.15%) and Petroleum and Natural Gas (7.57%). Defense, and the Shipping and Railroad Equipment industries have smallest representations, with 0.15% and 0.19% of the total sample firms, respectively. No single industry is overrepresented in our sample. As such, our empirical findings are not biased by observations from any overrepresented industry. The year-wise distribution of our sample observations, as presented in Panel C, Table 1, also indicates that the sample firms do not cluster in any single year; rather, they are uniformly distributed across the years.

4.2. Descriptive statistics

We present descriptive statistics of the key variables in Table 2. The means (medians) of our four tax avoidance measures are 0.006 (0.000) for *TA_GAAP*, 0.025 (0.057) for *TA_CASH*, − 0.006 (0.001) for *DTAX*, and 0.009 (−0.003) for *TAX_FACTOR*. These statistics are consistent with prior tax avoidance studies that use these measures. (e.g., Balakrishnan et al., 2019). On average, 50.09% (*URBAN* = 0.509) of our sample firms are located within a 100-mile radius of one of the ten largest metropolitan cities. Consistent with this, the average predicted value of urban CHQ location of our sample observations is 0.502. The mean (median) absolute value of performance-adjusted discretionary accruals (*ABDACC*) is 0.045 (0.031). The mean and median of *Ln(ANALYSTS*) are 2.803 and 3.219, respectively. The mean logarithmic value of equity, a measure of average firm size (*SIZE*), is 6.421 (median 6.897), indicating that the sample comprises relatively large firms. Further, on an average, the sample firms are profitable, as indicated by the mean (median) *ROA* of 0.028 (0.071). The mean (median) leverage and market-to-book ratio are 0.211 (0.179) and 4.241 (3.000), respectively, indicating that the sample firms have low leverage and high growth opportunities.

5. Results

5.1. CHQ location and tax avoidance

Panel A, Table 3 presents the result of the first-stage regression from estimating model (2). This table reports the unstandardized coefficients of regression estimates. This analysis helps us estimate the probability of a firm's selection of an urban CHQ location (*Pred_URBAN*). We use five instrumental variables that are likely to influence business enterprises to choose an urban location as corporate headquarters: *Ln(NEARFIRMS), Ln(GRADS), DIVERSITY, Ln(AIRPORTS),* and *LABOR_FREEDOM*.[16] As expected, all these variables are significantly, positively associated with the selection of urban areas as CHQ, thus providing justification for using these variables as instruments for urban CHQ selection. The results relating to the control variables indicate that urban firms are characterized by more volatile return on assets (*SD(ROA)*); they have higher foreign income (*FOR_INCOME*) and are more capital intensive as proxied by positive coefficient of *PPE*. Further, urban firms have higher intangible assets (*INTAN*) and more business segments (*BUSSEG*). Interestingly, urban firms are, in general, larger in size (*SIZE*), hold less cash (*CASH*), and experience more net operating loss (*NOL)*.

In Panel B, Table 3, we present our empirical findings by estimating model (3) to examine whether the predicted value of urban location is associated with tax avoidance.[17] The variable of interest, *Pred_URBAN*, regresses significantly, negatively on all four tax avoidance measures, as demonstrated by significantly negative coefficients of *Pred_URBAN* for *TA_GAAP* (−0.0034), *TA_CASH* (−0.0136), *DTAX* (−0.0007), and *TAX_FACTOR* (−0.0108). The results indicate that firms with CHQ located closer to urban (metropolitan) areas are more likely to engage in significantly less tax avoidance practice, which supports our hypothesis that corporate headquarters location influences firms' tax avoidance practice. The significantly positive coefficients *ABDACC* for *TA_CASH* (0.3083), *DTAX* (0.1118), and *TAX_FACTOR* (0.1098) (i.e., for three out of four tax avoidance variables) suggest that ceteris paribus, tax avoidance firms are more likely to report opaque financial information measured by absolute discretionary accruals probably to obscure their opportunistic tax avoidance practice (e.g., Desai and Dharmapala, 2006; Balakrishnan et al., 2019; Kerr, 2019). The coefficients of *Ln (ANALYSTS)* for *TA_GAAP*, *TA_CASH*, *DTAX*, and *TAX_FACTOR* are − 0.0118, − 0.0015, − 0.0211, and − 0.0114, respectively, and are statistically significant. The results indicate that in the presence of greater coverage and monitoring by sophisticated information intermediaries such as financial analysts, firm managers are likely to engage in less tax avoidance practice (e.g., Allen et al., 2016).

The coefficients of the control variables are mostly consistent with

[16] As mentioned earlier, these variables are not likely to influence firms' tax avoidance strategies.

[17] As we mentioned earlier, Stata SEM modeling automatically standardizes each coefficient, for convenience of interpretation. In case of such standardization, it is not possible to use any fixed effects. However, Table 3 simply presents the unstandardized results of OLS estimation, and as such in Table 3 we can control for industry and year fixed effects.

Table 1
Sample Selection and Distribution.

Panel A: Sample Selection

	Firms	Observations
Firms (except financial and utility) for the years 1990–2019	15,896	135,612
Firms with no analyst forecast data in IBES	(2201)	(21,555)
Firm without necessary data to calculate the variables	(6288)	(59,232)
Final Observations	**7407**	**54,826**

Panel B: Industry-wise Sample Distribution

Industry	Firms	Percentage
Agriculture	208	0.38%
Food Products	877	1.60%
Candy & Soda	181	0.33%
Beer & Liquor	236	0.43%
Tobacco Products	55	0.10%
Recreation	351	0.64%
Entertainment	888	1.62%
Printing and Publishing	345	0.63%
Consumer Goods	658	1.20%
Apparel	543	0.99%
Healthcare	894	1.63%
Medical Equipment	1908	3.48%
Pharmaceutical Products	5565	10.15%
Chemicals	1118	2.04%
Rubber and Plastic Products	384	0.70%
Textiles	115	0.21%
Construction Materials	976	1.78%
Construction	559	1.02%
Steel Works etc.	658	1.20%
Fabricated Products	126	0.23%
Machinery	1546	2.82%
Electrical Equipment	800	1.46%
Automobiles and Trucks	839	1.53%
Aircraft	280	0.51%
Shipbuilding, Railroad Equipment	104	0.19%
Defense	82	0.15%
Precious Metals	2110	3.84%
Non-Metallic and Industrial Metal Mining	2802	5.11%
Coal	203	0.37%
Petroleum and Natural Gas	4150	7.57%
Communication	2056	3.75%
Personal Services	598	1.09%
Business Services	7590	13.84%
Computers	1650	3.01%
Electronic Equipment	3076	5.61%
Measuring and Control Equipment	899	1.64%
Business Supplies	515	0.94%
Shipping Containers	126	0.23%
Transportation	1765	3.22%
Wholesale	1743	3.18%
Retail	2330	4.25%
Restaurants, Hotels, Motels	943	1.72%
Almost Nothing	1974	3.60%
Total	**54,826**	**100.00%**

Panel C: Year-wise Sample Distribution

Year	Firms	Percentage
1990	1515	2.76%
1991	1581	2.88%
1992	1698	3.10%
1993	1801	3.28%
1994	1887	3.44%
1995	2001	3.65%
1996	2032	3.71%
1997	2015	3.68%
1998	2029	3.70%
1999	2014	3.67%
2000	1940	3.54%
2001	1850	3.37%
2002	1795	3.27%
2003	1762	3.21%
2004	1740	3.17%
2005	1735	3.16%
2006	1744	3.18%
2007	1749	3.19%
2008	1722	3.14%
2009	1716	3.13%
2010	1759	3.21%

(*continued on next page*)

Table 1 (*continued*)

2011	1892	3.45%
2012	1929	3.52%
2013	1933	3.53%
2014	1902	3.47%
2015	1876	3.42%
2016	1855	3.38%
2017	1846	3.37%
2018	1852	3.38%
2019	1656	3.02%
Total	**54,826**	**100.00%**

Panel A of this table shows the sample selection process. This table also depicts how our sample is distributed industry-wise (Panel B) and year-wise (Panel C). Industry-wise classification is based on Fama-French industry definition. We do not include companies belonging to the finance and utility sectors.

Table 2
Descriptive Statistics.

Variables	(1) N	(2) Mean	(3) Median	(4) S.D.	(5) Q1	(6) Q3
TA_GAAP	54,826	0.006	0.000	7.858	-0.051	0.043
TA_CASH	54,826	0.027	0.057	0.604	-0.077	0.191
DTAX	54,826	-0.006	0.001	0.097	-0.018	0.014
TAX_FACTOR	54,826	0.009	-0.003	0.129	-0.019	0.022
URBAN	54,826	0.509	1.000	0.499	0.000	1.000
PRED(URBAN)	54,826	0.502	0.439	0.264	0.291	0.761
ABDACC	54,826	0.045	0.031	0.053	0.021	0.093
Ln(ANALYSTS)	54,826	2.803	3.219	0.442	1.565	4.009
ROA	54,826	0.028	0.071	0.130	0.027	0.140
SD(ROA)	54,826	0.068	0.042	0.085	0.021	0.080
NOL	54,826	0.587	1.000	0.393	0.000	1.000
ΔNOL	54,826	0.029	0.000	0.295	0.000	0.005
FOR_INCOME	54,826	0.025	0.000	0.075	0.000	0.020
ΔGOODWILL	54,826	0.033	0.000	0.095	0.000	0.006
NEWINVST	54,826	0.059	0.000	0.184	0.000	0.051
PPE	54,826	0.264	0.182	0.268	0.104	0.374
INTAN	54,826	0.297	0.119	0.432	0.014	0.305
EQINC	54,826	0.002	0.000	0.015	0.000	0.000
CASH	54,826	0.210	0.111	0.498	0.041	0.293
SIZE	54,826	6.421	6.897	2.024	5.011	8.893
LEV	54,826	0.211	0.179	0.203	0.021	0.322
MTB	54,826	4.241	3.000	4.353	1.000	6.000
BUSSEG	54,826	1.323	1.217	0.731	0.973	2.021
GEOSEG	54,826	1.665	1.609	0.882	1.000	2.303
Ln(NEARFIRMS)	54,826	13.371	13.407	0.617	13.221	13.707
Ln(GRADS)	54,826	14.367	14.324	0.596	13.913	14.856
Ln(AIRPORTS)	54,826	3.218	3.045	0.556	2.773	3.367
LABOR_FREEDOM	54,826	5.976	5.932	0.991	5.225	6.729
DIVERSITY	54,826	0.492	0.476	0.112	0.440	0.604
M&A	54,826	0.206	0.000	0.291	0.000	0.000
BIG4	54,826	0.320	0.000	0.466	0.000	1.000
SD(REV)	54,826	0.196	0.126	0.273	0.067	0.234
Ln(DIST_IRSTM)	54,826	3.026	2.893	1.418	2.053	4.563
INDSPEC	54,826	0.402	0.000	0.503	0.000	1.000

This table presents the descriptive statistics of all our empirical variables. All variables except the dummy variables are winsorized at 1% and 99%. Please refer to Appendix A for a complete list of variable definitions.

similar prior studies. For instance, tax avoidance increases with net operating loss carryforward (*NOL*), but not with change in *NOL* (*ΔNOL*) (e.g., Kim and Zhang, 2016). However, the signs of the coefficients of some control variables are not consistent across tax avoidance measures. *SIZE* is significantly, positively associated with *TA_GAAP* and *TAX_FACTOR* but negatively associated with *DTAX*. *CASH* is significantly, positively associated with *TA_GAAP* and *DTAX* but is insignificant for the other two tax avoidance measures. *LEV* is significantly negative for *TA_CASH* and *TAX_FACTOR* but is positive for *DTAX*. *MTB* is significantly, positively associated with *TA_GAAP*, *TA_CASH*, and *TAX_FACTOR*. *BUSSEG* and *GEOSEG*, proxies for operating complexity, are significantly, positively associated with *TA_GAAP*, *DTAX*, and *TAX_FACTOR*. However, proximity to an IRS regional office *Ln*(*DIST_IRSTM*) or an industry-specialist tax office (*INDSPEC*) does not have any significant effect on corporate tax avoidance practice as evident from the insignificant coefficients of these variables.

5.2. Mediating paths of influence of CHQ location on tax avoidance

As a continuation of our baseline analysis of the relationship between CHQ location and corporate tax avoidance, we identify two possible mediating paths of CHQ location influence that along with CHQ's direct influence creates the overall effect of CHQ location on firms' tax avoidance. We argue that our source variable, i.e., CHQ location, may not only have a direct effect on the outcome variable, i.e., tax avoidance, but also have an indirect effect through some mediating variables. Path analysis requires researchers to postulate source or causal variables, mediating variables (that are influenced by source variable and are influencing outcome variable), and outcome or consequent variables (Bhattacharya et al., 2012). While regression analysis provides information about the direct effect of source variables, path analysis provides information on the relative strength and influence of alternative paths that taken together, creates overall effect on outcome variables. Following prior research, we consider two alternative or mediating factors, namely, financial reporting opacity and analyst coverage.

Kerr (2019) demonstrates that countries and firms with greater levels of transparency exhibit lower levels of tax avoidance. Frank et al. (2009) find that the nonconformity between financial accounting standards and tax laws allows firms to manage book income upward and taxable income downward in the same reporting period whereas Balakrishnan et al. (2019) document that tax-aggressive firms have lower corporate transparency. They report that tax-aggressive firms have larger analysts' forecast errors, greater forecast dispersion, lower accrual quality, and a higher level of information asymmetry. A large body of literature examines the effect of financial reporting transparency on the capital market and on disciplining corporate management (e.g., Leuz and Verrecchia, 2000; Lang et al., 2012). These studies, in general, indicate that reporting transparency is likely to mitigate information asymmetry and firms' tax avoidance practice. Firms with CHQ located in urban areas are subject to higher shareholder oversight and report less opaque financial information. Depending on the degree of their reporting opacity, firms may engage in higher or lower tax avoidance. We therefore contend that one mediating path through which CHQ location influences corporate tax avoidance is financial reporting opacity. Following Bauer et al. (2020), we use the absolute value of performance-adjusted discretionary accruals (*ABDACC*) as the measure of financial reporting opacity, our first mediating variable.

Allen et al. (2016) document that higher analyst coverage constrains corporate tax aggressiveness and improves firms' information environment. Allen et al. (2016) suggest that higher analyst coverage increases visibility of firms' aggressiveness tax-planning behavior and analysts' demand for more transparent information. Firms with CHQ location in urban areas are likely subject to higher number of analysts' following, as it is more convenient for analysts to follow and monitor management action in those firms due to lower information asymmetry compared with remotely located firms. The higher analyst coverage reduces information asymmetry with better flow of information between managers

Table 3
Corporate Headquarters Location and Tax Avoidance.

Panel A: First-stage Regression	
Variables	
Ln(NEARFIRMS)	2.8150 * **
	(5.98)
Ln(GRADS)	2.7372 * **
	(66.27)
Ln (AIRPORTS)	0.0228 * **
	(5.92)
LABOR_FREEDOM	0.7757 * **
	(17.36)
DIVERSITY	0.0106 * **
	(6.92)
ROA	-0.1130
	(−1.43)
SD(ROA)	0.1776 * *
	(2.24)
NOL	0.1408 * **
	(5.65)
ΔNOL	0.0025
	(0.04)
FOR_INCOME	0.5415 * **
	(2.95)
ΔGOODWILL	0.1019
	(0.82)
NEWINVST	-0.3559 * **
	(−5.14)
PPE	0.0351 * *
	(2.18)
INTAN	0.1508 * **
	(7.97)
EQINC	2.6122
	(1.17)
CASH	-0.0260 * *
	(−2.05)
SIZE	0.0688 * **
	(3.43)
LEV	0.0502
	(0.84)
MTB	0.0040 *
	(1.91)
BUSSEG	0.0178 * *
	(2.02)
GEOSEG	-0.0944 * **
	(−5.19)
Ln(DIST_IRSTM)	-0.0241
	(−1.09)
INDSPEC	0.183
	(1.19)
Observations	54,826
Industry FE	Yes
Year FE	Yes
Adj. R-squared	0.2406

Panel B: Second-stage Regression				
Variables	***TA_GAAP***	***TA_CASH***	***DTAX***	***TAX_FACTOR***
Pred_URBAN	-0.0034 *	-0.0136 * **	-0.0007 * *	-0.0108 * **
	(−1.86)	(−10.49)	(−2.44)	(−6.19)
ABDACC	-0.0015	0.3083 * **	0.1118 * **	0.1098 * *
	(−0.41)	(3.24)	(20.72)	(2.49)
Ln(ANALYSTS)	-0.0118 * *	-0.0015 *	-0.0211 * *	-0.0114 * **
	(−2.11)	(−1.76)	(−2.04)	(−3.02)
ROA	-0.5993 * **	0.0013	0.3288 * **	0.4511 * **
	(−12.01)	(0.04)	(35.25)	(8.59)
SD(ROA)	0.5176 * **	0.1180 * **	-0.0545	0.3934 * **
	(10.20)	(3.27)	(−1.43)	(3.30)
NOL	0.0778 * **	0.0338 * **	0.0338 * **	0.0469 * **
	(5.09)	(3.12)	(11.86)	(6.43)
ΔNOL	-0.0575	-0.0282	0.0477	0.0431
	(−1.23)	(−1.01)	(1.51)	(1.27)
FOR_INCOME	0.2842 * *	0.1876 * *	0.0371 *	0.0812 * **
	(2.57)	(2.39)	(1.84)	(3.01)
ΔGOODWILL	0.6141 * **	-0.0590	-0.2949 * **	-0.3559 * *
	(7.80)	(−1.06)	(−4.81)	(−2.46)
NEWINVST	-0.0659 *	-0.1398 * **	-0.0148 *	-0.3398 * **
	(−1.69)	(−4.63)	(−1.93)	(−7.85)
PPE	0.0080	-0.0061	0.0217 * *	0.0323
	(1.07)	(−1.36)	(2.12)	(1.08)
INTAN	-0.0411 * **	-0.0372	0.0749 * **	0.0641 * *
	(−3.60)	(−0.89)	(6.69)	(2.38)
EQINC	1.7891	-6.8212	-1.8240 * **	-1.3785 * **
	(1.40)	(−1.00)	(−7.12)	(−3.28)
CASH	0.0402 * **	0.0049	0.0386 * **	-0.0068
	(2.68)	(0.46)	(4.01)	(−0.44)
SIZE	0.0492 * **	0.0041	-0.0029 * **	0.0301 * **
	(11.27)	(1.34)	(−3.62)	(3.60)
LEV	-0.0577	-0.1543 * **	0.0505 * **	-0.3319 * **
	(−1.10)	(−6.13)	(7.69)	(−3.99)
MTB	0.0072 * **	0.0031 * **	0.0006	0.0023 * *
	(5.39)	(3.28)	(1.36)	(2.38)
BUSSEG	0.0678 * **	-0.0592	0.0159 * **	0.1181 * **
	(5.80)	(−1.23)	(7.28)	(4.58)
GEOSEG	0.0425 * **	0.0242	0.0108 * **	0.0231 * *
	(4.11)	(1.30)	(5.63)	(2.13)
Ln(DIST_IRSTM)	-0.0008	-0.0041 *	-0.0086 * *	-0.0081 *
	(−0.89)	(−1.87)	(−2.01)	(−1.76)
INDSPEC	0.0081 * *	0.0003	0.0071 *	0.0090 * *
	(2.07)	(1.23)	(1.80)	(2.15)
Observations	54,826	54,826	49,624	49,624
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.118	0.091	0.353	0.269

This table shows how urban location is associated with tax avoidance measures. Here we use a 2-stage least-squares (2SLS) approach. Panel A shows the result of the first-stage logistic regression estimate, where we show how instruments of CHQ location (nearby firms, number of graduates, labor law and regulation, and diversity) load on a firm's probability to choose an urban CHQ location. Panel B presents the result of second-stage estimation showing how the predicted value of urban CHQ location selection (estimated using the first-stage regression) is related to tax avoidance. All variables except the dummy variables are winsorized at 1% and 99%. Z-statistics in Panel A and t-statistics in Panel B are based on standard errors corrected for firm clustering. * , * *, and * ** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Please refer to Appendix A for a complete list of variable definitions.

and outside stakeholders that might influence firms' tax planning process. We, therefore, contend that the other mediating path through which CHQ location influences corporate tax avoidance is analyst coverage. Consistent with Allen et al. (2016), we use the number of analysts following as the measure of analyst coverage, our second mediating variable.

5.3. Direct and indirect paths

We suggest that financial reporting opacity and analyst coverage are the mediating (indirect) paths through which CHQ location affects corporate tax avoidance. For this, we perform path analysis using a structural equation model (SEM) to test how a source variable (i.e., urban location) impacts an outcome variable (i.e., tax avoidance) by decomposing the association between the source and outcome variable into their direct and indirect paths (e.g., Baron and Kenny, 1986; DeFond et al., 2016). A direct path has only one path coefficient; however, an indirect path includes (1) a path coefficient between the source variable and the mediating variable, and (2) path coefficient(s) between the mediating and the outcome variables. The total magnitude of indirect path is the product of these two path coefficients.

As depicted in Fig. 1, the direct path is the path between urban location and tax avoidance. We then decompose the potential association between urban location and tax avoidance into two mediated or indirect channels: financial reporting opacity measured by performance-matched discretionary accruals (*ABDACC*) (e.g., Kothari et al., 2005) and analyst coverage (measured by logarithmic value of number of analysts following *Ln(ANALYST)*) (e.g., Allen et al., 2016). We predict that less opaque financial reporting quality and greater analyst coverage of urban firms would lead to less aggressive tax avoidance. Following prior studies (e.g., Lu et al., 2011; Pevzner et al., 2015; DeFond et al.,

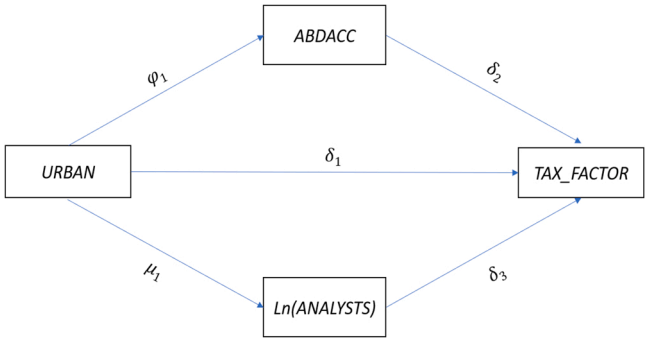

Fig. 1. Direct and Indirect Paths and Hypotheses.

2016; Bauer et al., 2020), we apply a series of equations using recursive or unidirectional path analysis; this analysis decomposes the link between CHQ location and tax avoidance into a direct and two indirect paths. We use the following models to test both direct and indirect path coefficients.[18].

$$TAX\_AVOID_{i,t} = \delta_0 + \delta_1 Pred\_URBAN_{i,t} + \delta_2 ABDACC_{i,t} + \delta_3 Ln(ANALYSTS)_{i,t} + \delta_4 CONTROL_{TAX\_AVOID} + \varepsilon_{i,t} \quad (4)$$

$$ABDACC_{i,t} = \varphi_0 + \varphi_1 Pred\_URBAN_{i,t} + \varphi_2 CONTROL_{ABDACC} + \varepsilon_{i,t} \quad (5)$$

$$Ln(ANALYSTS)_{i,t} = \mu_0 + \mu_1 Pred\_URBAN_{i,t} + \mu_2 CONTROL_{Ln(ANALYSTS)} + \varepsilon_{i,t} \quad (6)$$

We add two potential mediating variables (*ABDACC* and *Ln*(*ANALYSTS*)) along with *Pred_URBAN* and other control variables in model (4). We anticipate that financial reporting opacity and analyst coverage, respectively, would positively and negatively impact tax avoidance, i.e., a positive coefficient of *ABDACC* ($\delta_2 > 0$)and a negative coefficient of *Ln*(*ANALYSTS*)($\delta_3 < 0$).

We employ models (5) and (6) to examine the indirect paths. In the models, we control for established determinants of each path variable. As depicted in Fig. 1, the value of $\delta_1$is the direct path between the source variable (*URBAN*) and the outcome variable (Tax Avoidance).[19] The models (5) and (6) and Fig. 1 show that the values of $\varphi_1$and μ_1 represent path between urban location of a firm and financial reporting opacity and the number of analysts following, respectively. The values of $\delta_2$and $\delta_3$represent the paths from financial reporting opacity and analysts following, respectively, to tax avoidance. The products of the path coefficients $\varphi_1 \times \delta_2$ and $\mu_1 \times \delta_3$measure the magnitude of the indirect path from CHQ location to tax avoidance.

Control variables in model (5) ($CONTROL_{ABDACC}$) include all the control variables used in model (4) plus two additional dummy variables, *M&A* and *BIG4*, that could be instrumental in discretionary accrual estimation. *M&A* is equal to 1 if the firms engage in merger and acquisition activities in the year, 0 otherwise; *BIG4* is equal to 1 if the company is audited by any of the Big Four auditors, 0 otherwise. Control variables in model (6) ($CONTROL_{Ln(ANALYSTS)}$) include all control variables in model (4) plus volatility of revenue proxied by *SD(REV)*, as prior literature shows that volatility of revenue can also impact analysts following (Tucker and Zarowin, 2006; Rountree et al., 2008).

We conduct recursive path analyses using the models (4), (5), and (6) to examine the direct path (effect) from CHQ location to tax avoidance, and indirect or mediating path (effect) from financial reporting opacity and analyst coverage to tax avoidance. We present the summary of our results of recursive path analysis in Fig. 2 and Table 4. The direct path from *URBAN* to *TAX_FACTOR* is − 0.0241, which is significant at the 1% level, supporting our primary results that firms with urban CHQ are likely to engage in less tax avoidance. Next, we conduct analyses of indirect or mediating paths. Both *ABDACC* and *Ln(ANALYSTS)* qualify as significant mediators between urban location and tax avoidance, as we observe statistically significant coefficients of φ_1, μ_1, δ_2, and δ_3. In path analysis, it is important to test the model's goodness of fit (GIF). We present the GIFs in our path analysis model at the bottom of Table 4. We observe a comparative fit index (CFI) of 0.963. To the extent that a CFI score approaching 1 (with any score above 0.90 indicating a moderately good fit), we maintain that our model exhibits good fit. RMSEA score is 0.045; a score below 0.06 with an insignificant chi-square value represents an acceptable fit. However, a moderately large sample size mostly generates a significant chi-square value (Chau, 1997). Hence, we can conclude that an RMSEA value of 0.045 along with a chi square value of 232.27 is indicative of a good fit (e.g., Lu et al., 2011; Bauer et al., 2020).

We observe a statistically significant negative value of φ_1 (−0.0423) and a significantly positive value of δ_2 (0.0451). This shows the mediating role of financial reporting opacity in the link between urban location and corporate tax avoidance. We maintain that firms located in urban areas are less likely to disseminate opaque financial reports, probably due to greater monitoring by sophisticated shareholders and other market participants; as such, relatively more reliable financial reporting by firms with urban CHQ are likely to reduce information asymmetry between managers and shareholders and constrain firms' aggressive tax avoidance practice. Combining these two path coefficients, we have a net negative effect of − 0.002 [(−0.0423) × (−0.0451)] on tax avoidance.

For the second mediating path, there is a positive link between urban location and number of analysts following, as exhibited by the significant positive coefficient of μ_1 (0.0652). However, a statistically significant negative value of δ_3 (−0.0391) indicates a negative association between number of analysts following and corporate tax avoidance; this finding is consistent with Allen et al. (2016). More importantly, our second mediated path analysis shows that greater analysts following (i.e., greater analyst coverage) in firms with urban CHQ location results in less tax avoidance by these firms. Combining these two path coefficients, we have a net negative effect of − 0.003 [(0.0652) × (−0.0391)] on tax avoidance.

Next, we compare the magnitude of effects of direct and indirect paths. The direct path from *URBAN* to *TAX_FACTOR* has the strongest impact, as this path captures the total percentage effect of 82.76% [(−0.0241)/{(−0.0241 + (−0.002) + (−0.003)}]. *ABDACC* and *Ln*

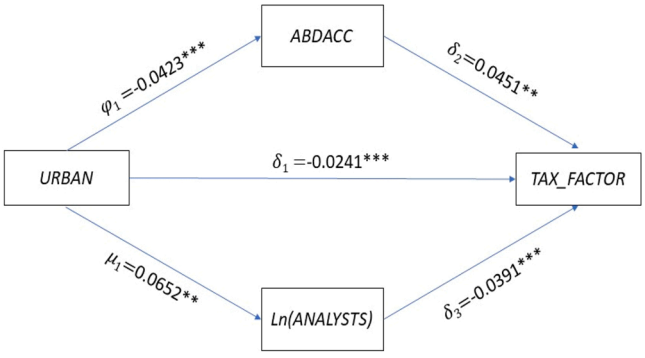

Fig. 2. Path Analysis Results.

[18] In SEM for path analysis process, Stata automatically standardizes all the variables to mean zero and standard deviation of 1, for the sake of convenience of interpretation. Because Stata does not allow a fixed effect in this path analysis, we demean all our variables at the industry and year level as alternative of firm and year fixed effects. Our results do not considerably change when we demean by the firm and year level (e.g., Ni et al., 2020).

[19] For better interpreting our findings, we standardize all path coefficients. Further, acknowledging that *ABDACC* and *Ln(ANALYSTS)* are likely to be correlated, we allow for covariance between the error terms in models (4) and (5).

Table 4
Recursive Path Analysis.

	Coefficient	z-statistic
Direct path		
p(*URBAN, PC_TAXAVOID*)=δ_1	-0.024 * **	-6.19
Percentage	82.76%	
Mediated path for abnormal discretionary accruals		
p(*URBAN, ABDACC*)=φ_1	-0.042 * **	-2.99
p(*ABDACC, PC_TAXAVOID*)=δ_2	0.045 * *	2.49
Total mediated path for abnormal discretionary accruals =$\varphi_1 \times \delta_2$	-0.002	
Percentage	6.90%	
Mediated path for analyst following		
p(*URBAN, Ln(ANALYSTS)*)=μ_1	0.065 * *	2.36
p(*Ln(ANALYSTS), PC_TAXAVOID*)=δ_3	-0.039 * **	-3.02
Total mediated path for analyst following =$\mu_1 \times \delta_3$	-0.003	
Percentage	10.34%	
Number of observations	49,624	
Goodness-of-Fit Criteria		
CFI	0.963	
RMSEA	0.045	
Chi Square	232.27	

This table presents the main results of recursive (unidirectional) path analysis. More specifically, we test how CHQ location influences corporate tax avoidance using a direct path and two mediated or indirect paths. The two mediated paths are via financial reporting opacity (ABDACC) and number of analysts following (Ln(ANALYSTS)). We apply models (4), (5), and (6) for this purpose. All variables are standardized to mean zero and standard deviation of 1, for ease of interpretation. Please refer to Appendix A for a complete list of variable definitions.

Table 5
Nonrecursive Path Analysis.

	Coefficient	z-statistic
Direct path		
p(*URBAN, PC_TAXAVOID*)=δ_1	-0.0551 * *	-2.04
Percentage	80.91%	
Mediated path for abnormal discretionary accruals		
p(*URBAN, ABDACC*)=φ_1	-0.0491 *	-1.71
p(*ABDACC, PC_TAXAVOID*)=δ_2	0.2193 * *	2.24
Total mediated path for abnormal discretionary accruals =$\varphi_1 \times \delta_2$	-0.011	
Percentage	16.15%	
Mediated path for analyst following		
p(*URBAN, Ln(ANALYSTS)*)=μ_1	0.0220 *	1.89
p(*Ln(ANALYSTS), PC_TAXAVOID*)=δ_3	-0.0950 * *	-2.01
Total mediated path for analyst following =$\mu_1 \times \delta_3$	-0.002	
Percentage	2.94%	
Direct path		
p(*PC_TAXAVOID, URBAN,*)=Ω_1	0.0104	0.33
Observations	49,624	
Goodness-of-Fit Criteria		
CFI	0.721	
RMSEA	0.071	
Chi Square	127.27	

This table presents the results of nonrecursive (bi-directional) path analysis. For this analysis in Structural Equation Modelling (SEM), we augment models (4), (5), and (6) with another regression model similar to model (6), with the exception that the dependent variable is predicted value of urban location and tax factor is the dependent variable. Please refer to Appendix A for a complete list of variable definitions.

(ANALYSTS) account for 6.9% and 10.34% of the total effect, respectively. Finally, the relative magnitude of the mediated path through analyst coverage is 1.5 times higher (−0.003/−0.002) than that through financial reporting opacity. The details of our calculations are presented in Table 4.

5.4. Additional tests

We acknowledge that the negative association between urban CHQ location and tax avoidance might be characterized by endogeneity-related bias. For instance, there is a possibility that a firm may select its CHQ location far from big metropolitan cities to avoid taxes. Furthermore, there could be some possible omitted variables that might be correlated with both CHQ location and tax avoidance. In our original analyses, we use predicted score of urban location that is calculated using several instrumental variables that are likely to affect the selection of CHQ location but not tax avoidance (Angrist and Imbens, 1995; Angrist et al., 1996). We believe that the analysis addresses the reverse causality and omitted variable issues. However, we conduct a few more analyses such as nonrecursive path analysis and change in CHQ location from rural to urban areas and vice versa to further address the potential endogeneity issues.

5.4.1. Nonrecursive path analysis

We use the nonrecursive path analysis method to address possible reverse causality or simultaneity (e.g., Bauer et al., 2020; Lu et al., 2011). Nonrecursive analysis allows for a bi-directional link between the source variable and the outcome variable. Hence, in our setting, we allow urban location to affect tax avoidance and vice versa to deploy the nonrecursive approach in SEM. More specifically, we augment models (1) to (3) with the model (4), that is, a modified version of model (1), where *PRED_URBAN* is the dependent variable and *TAX_AVOID* is the independent variable (e.g., Bauer et al., 2020). We present the summary of main results of the nonrecursive path analysis in Table 5. We continue to observe a significant association between urban CHQ location and tax avoidance via both the direct path and mediated paths. However, we do not observe any significant direct link between tax avoidance and urban location (coefficient 0.0104; z-statistics 0.33), indicating that firms' decision to locate CHQ closer to urban areas are not affected by their tax avoidance strategy. We infer from this finding that while there remains the possibility that firms could select a location that helps them maximize tax savings, our large sample empirical analysis does not support this possibility. Additionally, to examine whether the relationship between these two variables goes in a single direction versus a bi-direction in nonrecursive analysis, researchers compare the fit statistics of the recursive versus the nonrecursive estimations (e.g., Bhattacharya et al., 2012; Lu et al., 2011; Bauer et al., 2020). As presented at the bottom of Table 5, the fit statistics for nonrecursive analysis are inferior to those for the recursive model. Especially, the chi-square value for the nonrecursive model (127.27) is substantially lower than that for the recursive model (232.27).

5.4.2. CHQ relocation and change in tax avoidance

Our previous analyses show that firms with CHQ located in close proximity to urban (metropolitan) areas are likely to engage in less tax avoidance practice. Our nonrecursive path analysis renders credence to this finding by showing that the link between urban location and less tax avoidance is not bi-directional. In this section, we examine whether CHQ relocation systematically influences the link between CHQ location and tax avoidance. If greater monitoring and observability of urban firms reduce their tax avoidance practice, we should expect that relocating from urban to rural (UTR) (from rural to urban (RTU)) would increase (decrease) tax avoidance. For CHQ relocation tests, we rely on firms' business addresses available on 10 K filings. We use the relocation data from Professor Bill McDonald's website,[20] which provides corporate relocation data for the years 1994–2012. We do not use CHQ location data from Compustat, as Compustat reports the current CHQ location of a firm and backfills the CHQ location for the prior years (e.g., Chow et al., 2022). Moreover, because the SEC did not require online filings until May 1996, the relocation for the years 1994 and 1995 are limited. Hence, based on available data, we conduct the relocation tests

[20] https://sraf.nd.edu/data/augmented-10-x-header-data/

for the years 1996–2012. For our analyses, we need to have three years of data for the relocation firms that include the years before and after the relocation. This filter and other data requirements allow us to retain 486 relocations. To avoid confounding time windows, we eliminate 164 observations with multiple relocations, leaving us with a final sample of 322 unique firms that relocated for the period 1996–2012. Of these firms, 164 (158) firms relocate from urban to rural (rural to urban) locations.

To test how corporate relocation influences tax avoidance practice, we examine a modified version of model (3) separately for UTR and RTU firms. We modify model (3) in two ways. First, instead of *Pred_URBAN*, we use a categorical variable *URBAN*, which equals 1 if a company is located within a 100-mile radius of any of the large 10 metropolitan cities, 0 otherwise. Second, we introduce another categorical variable, *POSTRELOC*, which takes the value of 1 in the post-relocation period, 0 otherwise. Our variable of interest is *URBAN×POSTRELOC;* a positive or negative coefficient of *URBAN×POSTRELOC* would indicate whether tax avoidance of the relocated firms increases or decreases after relocation. Third, for possible collinearity, we drop year fixed effect from model (3).

We present the results of this analysis in Table 6. Panels A and B of Table 6 depict the results for the impact of relocation on change in tax avoidance for both UTR and RTU firms. For brevity, we present only the coefficients of interest. As reported in Panel A, the significant positive values of *POSTRELOC* for *TA_GAAP*, *TA_CASH* and *TAX_FACTOR*, indicate that tax avoidance, on average, increases in the year after relocation. Crucially, we observe significantly positive coefficients for the interaction term *URBAN×POSTRELOC* for *TA_CASH* (0.0311; *t*-statistic: 3.17), *DTAX* (0.0056; *t*-statistic: 2.00), and *TAX_FACTOR* (0.0096; *t*-statistic: 2.31). These findings suggest that when the firms' CHQ are relocated from urban to rural areas, their propensity to engage in aggressive tax avoidance practice is likely to exacerbate in the year after relocation. Furthermore, as depicted in Panel B of Table 6 for the RTU firms, the interaction variable, *URBAN×POSTRELOC*, has significantly negative coefficients for *TA_GAAP* (−0.0200; *t*-statistic: −2.29), *DTAX* (−0.0143; *t*-statistic: −2.69), and *TAX_FACTOR* (−0.0233; *t*-statistic: −4.47). The results indicate that the firms relocating their CHQ from rural to urban areas are likely to engage in less tax avoidance practice in the year after relocation.

While it remains a possibility that firms have incentives to relocate CHQ to relatively remote rural location to avoid taxes (due to less observability and monitoring), it is reasonable to argue that a firm's CHQ relocation from a rural to an urban area is not motivated by corporate incentives to pay more taxes. As such, even though there is likely to be reverse causality between higher tax avoidance and CHQ relocation from urban to rural areas, the potential link between less tax avoidance and CHQ relocation from rural to urban areas is not likely to be influenced by reverse causality. Hence, our finding that firms' relocation of CHQ from rural to urban areas is associated with less tax avoidance renders further support to the possibility that proximity to large urban (metropolitan) areas affects firms' tax avoidance decision.

6. Conclusion

Our study provides a useful extension of both tax avoidance and distance-based literatures by investigating the effect of firms' corporate headquarters (CHQ) location on tax avoidance practice. Extant literature suggests that CHQ location has a significant impact on firms' financial policies. Most corporate strategic decisions are made at CHQ, and hence, CHQ location may explain cross-sectional variation of many corporate policies in the United States. In spite of technological advances, distance to CHQ location still impacts the information processing costs and the ability of financial intermediaries, regulators, and sophisticated stakeholders to obtain value-relevant information to monitor management actions. CHQs located closer to metropolitan or urban areas are associated with higher observability of managerial actions and lower monitoring costs for firms' stakeholders. Loughran and Schultz (2005) show that trading costs are higher for rural firms than for urban firms; rural firms are followed by fewer analysts and owned by fewer institutions; their shares are more illiquid compared with urban firms. John et al. (2011) find that rural firms pay more dividends to resolve manager-shareholder conflicts relating to free cash flow, especially when they have fewer investment opportunities. Pirinsky and Wang (2006) document a strong co-movement of stock returns of firms

Table 6
Relocation Test.

Panel A: Relocation from Urban to Rural Area				
	(1)	(2)	(3)	(4)
Variables	***TA_GAAP***	***TA_CASH***	***DTAX***	***TAX_FACTOR***
URBAN	-0.0115 * *	-0.0118 * **	-0.0019 *	-0.0315 * *
	(−2.29)	(−5.69)	(−1.71)	(−2.45)
POSTRELOC	0.0177 *	0.0185 * *	-0.0124	0.0108 * *
	(1.86)	(2.47)	(0.66)	(1.98)
URBAN×POSTRELOC	-0.0042	0.0311 * **	0.0056 * *	0.0096 * *
	(−0.33)	(3.17)	(2.00)	(2.31)
Control Variables	Yes	Yes	Yes	Yes
Observations	1611	1611	1325	1325
Industry FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.127	0.085	0.339	0.198
Panel B: Relocation from Rural to Urban Area				
	(1)	(2)	(3)	(4)
Variables	**TA_GAAP**	**TA_CASH**	**DTAX**	**TAX_FACTOR**
URBAN	-0.0127	0.0307 * **	0.0047	0.0295 * **
	(−1.01)	(3.43)	(0.81)	(4.57)
POSTRELOC	0.0032	0.0038	-0.0148 *	-0.0652
	(0.18)	(0.26)	(−1.87)	(−1.48)
URBAN×POSTRELOC	-0.0200 * *	-0.0070	-0.0143 * **	-0.0233 * **
	(−2.29)	(−0.83)	(−2.69)	(−4.77)
Control Variables	Yes	Yes	Yes	Yes
Observations	1495	1495	1234	1234
Industry FE	Yes	Yes	Yes	Yes
Adj. R-squared	0.104	0.038	0.158	0.102

This table shows how relocation of firms affect tax avoidance practices. Panel A (Panel B) shows the results for firms that relocated from urban to rural (rural to urban) area. All variables except the dummy variables are winsorized at 1% and 99%. The number in parentheses are *t*-statistics. *t*-statistics are based on standard errors corrected for firm clustering. * , * *, and * ** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Please refer to Appendix A for a complete list of variable definitions.

located in the same geographic areas, while Kubick et al. (2017) find that geographic proximity to an IRS office gives firms an informational advantage; as a result, they engage in more tax avoidance.

Using two-stage ordinary least squares regressions, our study documents a negative relationship between CHQ location closer to urban (metropolitan) areas and firms' tax avoidance measures. The recursive path analysis further shows that financial reporting opacity and analyst coverage are the two mediating paths in the empirical link between CHQ location and tax avoidance. The results on the two mediating paths indicate that CHQ located near urban areas are less likely to produce opaque financial information, resulting in more transparent financial reporting that has a mitigating effect on tax avoidance, and are more likely to have greater analyst coverage, resulting in higher monitoring by sophisticated information intermediaries and lower tax avoidance. The absence of full mediation in our model implies that residual factors in aggregate are also responsible for CHQ's direct locational effect on firms' tax avoidance. Our nonrecursive path analysis shows that on average, firms' decision to locate their CHQs closer to or more distant from urban (metropolitan) areas is not influenced by their tax avoidance strategy, thereby addressing the possibility of reverse causality in the relationship between CHQ location and tax avoidance.

Finally, our change analyses demonstrate that firms relocating from rural to urban areas are likely to engage in less tax avoidance, while firms relocating from urban to rural areas increase their tax avoidance, further validating our baseline results that proximity to urban (metropolitan) areas has a significant mitigating effect on firms' tax avoidance practice.

Prior to the COVID-19 crisis, majority companies wanted their employees to work on-site. CODIV-19 induced pandemic forced companies to allow workers to operate on-line from remote locations. As the pandemic eases, companies are expecting to keep a hybrid model of work where employees work both remotely and on-site. This phenomenon has become more common in present days. As a result of this change of work mode in the post COVID-19 world, factors influencing corporate decision on CHQ location are likely to change. *"Organizations with the biggest productivity increases during the pandemic have supported and encouraged "small moments of engagement" among their employees, moments in which coaching, mentorship, idea sharing, and coworking take place. These organizations are preparing for hybrid working by training managers for remote leadership, by reimagining processes, and by rethinking how to help employees thrive in their roles."*[21] This changing landscape of corporate America and across the world in the post pandemic period provides an interesting avenue for future research on key factors that might influence corporations' decision to choose and/or relocate their headquarters, and the implication of such decision for corporate tax avoidance.

Author agreement

We certify that all authors have seen and approved the final version of the manuscript being submitted. We warrant that the article is the authors' original work, hasn't received prior publication and isn't under consideration for publication elsewhere.

Declaration of Interest

We do not have any financial and personal relationships with other people or organizations that could inappropriately influence (bias) our work.

Data availability

Data for the study are obtained from public sources as identified in the text.

Appendix A. Variable definitions

Variable	Definition[1]	Data Source
Pred_URBAN	Predicted score of a firm's probability to select an urban CHQ location using the regression model: $URBAN = \beta_0 + \beta_1 CONTROL_{TAX-AVOID} + \beta_2 Z_{i,t} + Industry + Year + \varepsilon_{i,t.}$ The vector *Z* represents the instrumental variables that are likely to impact CHQ location, but not corporate tax avoidance practices. *Z* vector variables include (*Ln(NEARFIRMS)*, *(Ln(GRADS)*, *Ln (AIRPORTS)*, *LABOR-FREEDOM* and *DIVERSITY* all located within the 100-mile radius of large metropolitan cities. We define these variables later in this Appendix.	Authors' calculation based on Compustat
TA_GAAP	The firm's mean industry-size GAAP ETR minus the firm's GAAP ETR, where GAAP ETR is the sum of current income tax expense over the years *t*, *t*-1, and *t*-2, divided by the sum of pretax financial income over the years *t*, *t*-1, and *t*-2. Higher value indicates greater tax avoidance.	Authors' calculation
TA_CASH	The firm's mean industry-size CASH ETR minus the firm's CASH ETR, where CASH ETR is the sum of cash paid for income taxes over the years *t*, *t*-1, and *t*-2, divided by the sum of pretax financial income over the years *t*, *t*-1, and *t*-2. Higher value indicates greater tax avoidance.	Authors' calculation
DTAX	The discretionary permanent book–tax difference of Frank et al. (2009), which is the residual from the following regression, estimated by year and two-digit SIC code: $PERMDIFF_{it} = \beta_0 + \beta_1 INTAN_{it} + \beta_2 UNCON_{it} + \beta_3 MI_{it} + \beta_4 CSTE_{it} + \beta_5 NOL_{it} + \beta_6 LAGPERM_{it} + e$ where *PERMDIFF* = total book–tax difference – temporary book–tax difference =[{*PI* – [(*TXFED* +*TXFO*) / *STR*]} – (*TXDI* / *STR*)], scaled by lagged assets (*AT*); *INTAN* = goodwill and other intangible assets (*INTAN*), scaled by lagged assets; *UNCON* = income (loss) reported under the equity method (*ESUB*), scaled by lagged assets; *MI* = income (loss) attributable to minority interest (*MII*), scaled by lagged assets; *CSTE* = current state tax expense (*TXS*), scaled by lagged assets; *NOL* = change in net operating loss carryforwards (*TLCF*), scaled by lagged assets; *LAGPERM* = *PERMDIFF* in year *t*-1; and *STR* is the statutory tax rate.	Authors' calculation
TAX_FACTOR	The principal component score of the above three tax avoidance variables.	Authors' calculation
ABDACC	Absolute value of performance-adjusted discretionary accruals calculated using Kothari et al. (2005).	Authors' calculation
Ln(ANALYSTS)	Log normal value of 1 + number of analysts following each firm.	IBES.
ROA	Return on assets, calculated as pretax income (PI) divided by lagged total assets (AT).	Compustat
SD(ROA)	Standard deviation of *ROA* over the past five years.	Compustat
NOL	An indicator variable that equals one for net operating loss carryforwards (*TLCF*), 0 otherwise.	Compustat
ΔNOL	Change in net operating loss carryforwards (*TLCF*) scaled by lagged total assets (*AT*).	Compustat
FOR_INCOME	Foreign income (PIFO), scaled by lagged total assets (*AT*).	Compustat
ΔGOODWILL	Change in goodwill (*GDWL*) scaled by lagged total assets (*AT*). If the value is negative, then it is set to zero.	Compustat

(*continued on next page*)

[21] "What executives are saying about the future of hybrid work" (McKinsey and Company's report dated May 17, 2021)

(*continued*)

NEWINVST	New investment, calculated as (*XRD* + *CAPX* + *AQC* - *SPPE* - *DPC*), scaled by lagged total assets (*AT*).	Compustat
PPE	Net property, plant, and equipment at the end of the year, calculated as *PPENT* scaled by lagged total assets (*AT*).	Compustat
INTAN	Intangible assets at the end of the year, calculated as *INTAN* scaled by lagged total assets (*AT*). If *INTAN* is missing, then *INTAN* = *GDWL*.	Compustat
EQINC	Equity income in earnings, calculated as *ESUB* scaled by lagged total assets (*AT*).	Compustat
CASH	Cash holdings at the end of the year, calculated as *CHE* scaled by lagged total assets (*AT*).	Compustat
SIZE	Log of market value of equity at the end of the year, calculated as *PRCC_F* ×*CSHO*.	Compustat
LEV	Financial leverage at the end of the year, calculated as long-term debt (*DLTT*) scaled by total assets (*AT*).	Compustat
MTB	Market-to-book ratio at the end of the year, calculated as the market value of equity (*PRCC_F* ×*CSHO*) divided by the book value of equity (*CEQ*).	Compustat
BUSSEG	Log normal value of the 1 +number of business segments.	Compustat
GEOSEG	Log normal value of the 1 +number of geographic segments.	Compustat
Ln(NEARFIRMS)	Log normal value of 1 + the number of COMPUSTAT firms located within a 100-mile radius of any one of the 10 metropolitan cities.	Compustat
Ln(GRADS)	Log normal value of 1 + the number of college graduates located within a 100-mile radius of any one of the 10 metropolitan cities.	
Ln(AIRPORTS)	Log normal value of 1 + the number of airports located within a 100-mile radius of any one of the 10 metropolitan cities.	
DIVERSITY	Percentage of minority population within a 100-mile radius of any one of the 10 metropolitan cities.	
LABOR_FREEDOM	Statewide labor freedom score	
M&A	A categorical variable with a value of 1 if the firm engaged in mergers and acquisitions in the current year, 0 otherwise.	Compustat
BIG4	A categorical variable with a value of 1 if the firm was audited by any of the Big Four auditors in the current year, 0 otherwise.	Audit Analytics
Ln(DIST_IRSTM)	Log normal value of the distance from the nearest IRS territory manager.	
INDSPEC	An indicator variable that equals one if the nearest industry specialist is within 150 miles of the territory manager and 0 otherwise.	

[1]The bold letter items in parentheses mostly represent Compustat item.

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