Common Equity Blockholders and Diffusion of Tax Avoidance

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Abstract

We study the role of common institutional blockholders (CIBs) in facilitating diffusion of tax avoidance knowledge across firms. We find that firms follow other firms held by the same CIBs in making tax avoidance decisions. We establish causality of the peer effect with analyses using exogenous events, i.e. state-level tax rate increases. Increases in tax avoidance of local firms, induced by the state-level tax rate increases, will lead other non-local firms which share CIBs with local firms to increase their tax avoidance. Moreover, we uncover two mechanisms through which common institutional blockholders facilitate the diffusion of tax avoidance, namely tax lobbying activities and setting up subsidiaries in tax havens. In addition, we find that peer effect is stronger for firms that have maintained peer relations for a longer period and for firms that share common institutional blockholders with a longer investment horizon. Finally, diffusion of tax avoidance through common institutional blockholders is distinct from other previously identified diffusion channels of tax avoidance based on common industry, common location, or board interlocks. Our results are robust to a battery of alternative specifications. Overall, our study documents a novel channel of tax avoidance diffusion through CIBs.

Keywords: Tax Avoidance; Peer Effect; Common Institutional Blockholder; Corporate Governance

JEL classification: H25, H26, G23

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1. Introduction

Tax avoidance is the practice of reducing tax expenses (Dyreng, Hanlon, and Maydew, 2008). Prior studies have provided several explanations for corporate tax avoidance, such as firm-level characteristics and agency concerns (Hanlon and Heitzman, 2010). Among these possible determinants, ownership structure is an important element for corporate tax avoidance (Desai and Dharmapala, 2009). Although prior studies have explored the impact of ownership structure on cross-sectional variation in tax avoidance (Chen, Chen, Cheng, and Shevlin, 2010; Cheng, Huang, Li, and Stanfield, 2012; Khurana and Moser, 2013), this area remains under-studied and needs further examination (Hanlon and Heitzman, 2010). In this paper, we study the role of common ownership, i.e., ownership by investors common to multiple firms, in facilitating diffusion of tax avoidance knowledge across firms. In other words, we study peer effect of tax avoidance among firms sharing a common investor base.

It is widely documented that peer effect is an important driver of corporate policies, and prior literature has identified a few channels that are related to connections in executive social networks or product market connections.[4] For instance, Brown and Drake (2014) document peer effect of tax avoidance through social network ties. Kubick, Lynch, Mayberry, and Omer (2015) analyze mimicking of tax avoidance for firms operating in the same industry. Unlike prior studies that identify peer firms based on personal or economic linkage, the focus of our paper is diffusion of corporate tax avoidance among economically unrelated peer firms.

We identify a novel channel of tax avoidance diffusion through connections between firms sharing common institutional blockholders (CIBs). We identify two firms as peer firms to each other if there is at least one institutional investor holding a block of shares (i.e., 5% of shares outstanding) of both firms. Peers identified in this way, namely common institutional blockholder peers (CIB peers), have two unique features: first, the majority of a focal firm's CIB peers operate in industries different from the one where the focal firm operates; therefore, peer effects on these peers are unlikely to be driven by similarity in industry characteristics. For instance, only 2.7% (5.4%) of a firm's CIB

[4] See, for example, Beatty, Liao, and Yu (2013), Chiu, Teoh, and Tian (2013), Kaustia and Rantala (2015), Brown and Drake (2014), Cen, Maydew, Zhang, and Zuo (2017), Kubick, Lynch, Mayberry; Omer (2015).

peers operate in the same industry, defined with three-digit (two-digit) SIC industry code, as the focal firm. Second, common institutional blockholders may facilitate transmission of tax avoidance-related knowledge from CIB peers to the focal firm and hence create common pressure on both CIB peers and the focal firm in their tax avoidance decisions.

We posit that tax avoidance policies of a focal firm follow tax avoidance policies of its common blockholer peers. For one thing, institutional blockholders have a significant impact on corporate behaviour (Cronqvist and Fahlenbrach, 2009). By participating in corporate decision-making processes, institutional investors convey their preferences to managers and serve as a bridge to facilitate the diffusion of information between firms they hold. For another, institutional blockholders' preferences for tax avoidance may differ (Khurana and Moser, 2013; Cheng, Huang, Li, and Stanfield, 2012), and firms' tax avoidance decisions should partially depend on the preference of a particular investor who holds a significant stake in the firm. Since institutional blockholders can express their opinions through either "vote with their feet" or "vote with their voice", firms have incentives to cater to their institutional blockholders' preference and learn from their peers about tax avoidance experience.

Although actual actions of institutional investors to influence firms' tax policy are often private and difficult to observe, anecdotal evidence suggests that institutional investors holding large stakes generate pressure on firms in regard to their choices of tax avoidance policies. The effects of institutional investors in this context are twofold. On one hand, some institutional investors actively promote certain tax avoidance strategies to firms they hold. For example, Goldman Sachs Investment Partners and three hedge funds, including JANA Partners LLC, Corvex Management LP and Och-Ziff Capital Management Group LLC, urged executives of Walgreen Co. to consider moving the company's incorporation outside the United States so as to reduce income tax burden.[5] On the other hand, some institutional investors have concerns about the negative consequence of tax avoidance on brand value and recommend a modest tax arrangement.[6] Although institutional investors may differ in

[5] See, e.g., the news article, "Tax-exempt but tax conscious," *Pensions & Investments*, April 28, 2014.

[6] For example, as reported in the article "UK fund houses question Alphabet tax" by *Financial Times* on September 24, 2016, four UK fund houses representing almost £1tn of assets wrote to the board of Alphabet, Google's parent company, to raise concerns about its tax arrangement. These investors commented that "Our

their attitudes toward tax avoidance, firms in an institutional investor's portfolio have access to common tax-related information and are exposed to common tax-related pressure from this institutional investor, leading these firms to achieve similar levels of tax avoidance.

To test our main hypothesis, we first examine the association between tax avoidance of a focal firm and the lagged tax avoidance of its CIB peers. We provide evidence that tax avoidance of a focal firm is positively associated with lagged tax avoidance of its CIB peers using three book-tax difference measures of tax avoidance. Furthermore, we adopt a lead-lag change analysis and find that a focal firm's tax avoidance changes in the same direction as the lagged changes in tax avoidance of its CIB peers. We are mindful of the possibility that this positive relation is not induced by the presence of CIB, but instead is due to the fact that the CIB simply chooses to hold firms with similar tax avoidance. We call this possibility that investors select similar firms for investment the self-selection hypothesis.

We address the concern that our empirical results are explained by this self-selection hypothesis by showing that, firms' tax avoidance is significantly correlated with exogenous variations in tax avoidance of their CIB peers. We analyze a subsample of firms that have CIB peers which experience exogenous variations in tax avoidance. The source of exogenous variations in tax avoidance is increases in state-level corporate income tax rates (Heider and Ljungqvist, 2015). We first confirm that firms located in states with increases in corporate income tax rates (i.e. event states) avoid more taxes after these state-level tax rate rises. Then, we focus on firms whose CIB peers are affected by these events and hence experience exogenous variations in tax avoidance. We compare the change in tax avoidance for focal firms that have such affected CIB peers with other focal firms that do not have such affected CIB peers. We restrict this analysis to focal firms that located outside the event states and therefore they are not directly affected by these state level shocks. Our difference-in-differences analysis suggests that, among all firms located outside event states, firms with CIB peers located in event states increase tax avoidance more than firms without CIB peers located in event states around the event year. These results argue against the self-selection hypothesis.

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point about tax was not just the obvious 'are you avoiding it', but also 'have you really properly considered the implication for brand value and your license to operate in society."

To shed further insights on the efficacy of CIB on propagations of tax avoidance across firms, we present a placebo test by analyzing the effects of past peers on the tax avoidance of focal firm. Past peers refer to firms that shared a common CIB with the focal firm only in the past (before year *t*-3). Our expectation is that the tax avoidance of these past peers should have much weaker, if not none, effect on the tax avoidance of focal firm because the peer effect should disappear after peer relation is broken (i.e., there is no CIB between the focal firm and the past peers in the current year). We find that average tax avoidance of past peers in year *t*-1 only has very limited and almost insignificant effects on the focal firm's tax avoidance in year *t*, suggesting that the peer effect exists only because of the presence of CIBs.

We then examine how CIBs induce peer effect of tax avoidance and uncover two tax avoidance strategies used by firms to follow peer firms' tax avoidance, i.e. tax lobbying and establishment of tax haven subsidiaries. We find that a firm's engagement in tax lobbying activities is positively associated with its CIB peers' engagement in tax lobbying in the prior year, and a firm's decision to establish tax haven subsidiaries is also positively related to its peers' lagged establishment of tax haven subsidiaries. These results provide fresh evidence about the mechanisms of peer effect induced by CIBs.

In our complementary analyses, we examine cross-sectional variations in peer effect on corporate tax avoidance on the basis of differences in peer relations. First, we posit and find that the peer effect should be stronger for peers that have maintained the peer relation for a longer period (i.e., long-term peers) because longer duration of peer relation better facilitates transmission of tax avoidance knowledge. Second, we find that peer effect is stronger when peer firms are linked through common dedicated institutional blockholders, rather than common transient institutional blockholders (we classify CIBs according to their investment horizons into dedicated versus transient investors following Bushee, 1998; Bushee, 2001). This result suggests that dedicated institutional investors have a stronger impact on the diffusion of tax avoidance because these long-horizon investors are more likely to exert their influences on corporate tax arrangements compared to transient investors who care about short-term profits. This result is consistent with anecdotal evidence that investors with

a long-term horizon tend to have a preferred tax planning and publicly promote it to firms.[7] In addition, we find that the CIB peer effect has a significant contribution to the focal firm's tax avoidance after controlling for other types of peer effects stemming from commonality in industry affiliation, headquarters state, or board interlocks.

We conduct several sets of robustness tests for our main results that a firm follows other firms held by CIBs to make tax avoidance decision. Our results are robust to value-weighted version of peer averages using levels of common ownership between peers as weight, are robust to using peer average of residual tax avoidance as the regressor by orthogonalizing tax avoidance of each peer against its fundamentals before we calculate the peer average, are robust to controlling for firm fixed effects which absorb time-invariant omitted variables, and are robust to alternative tax avoidance measures, i.e. current effective tax rate and cash effective tax rate. Our results are also robust to restricting the analysis to CIB peers that are held by the largest CIB of the focal firm.

Our paper makes contributions in the following ways. First, our paper contributes to literature on tax avoidance. Hanlon and Heitzman (2010) suggest that studies on the determinants of corporate tax avoidance are incomplete, and the impact of ownership structure on corporate tax avoidance decisions remains under-studied. We respond to Hanlon and Heitzman's (2010) call to explore further the impact of ownership structure on corporate tax avoidance. We show that ownership structure can affect corporate tax avoidance behaviour in an indirect way through the influences of peer firms with common institutional blockholders. Our exploration of peer effect across economically unrelated firms uncovers a new mechanism of diffusion of tax avoidance knowledge and may explain the prevalence of tax avoidance scandals recently.

Second, we contribute to the literature on institutional blockholders' influence on corporate behaviour. Blockholders can influence corporate policies in many aspects, such as investment, financing, and executive compensation (Cronqvist and Fahlenbrach, 2009). Bird and Karolyi (2017) show that aggregated institutional ownership can positively affect corporate tax avoidance. Cheng,

[7] Sasja Beslik, head of responsible investments at Nordea Asset Management which invests in Alphabet and Apple, said it is becoming "quite clear" to companies and investors "that aggressive tax planning belongs to the past. It will damage them in the long run much more than they think", as reported in the article "UK fund houses question Alphabet tax" by *Financial Times* on September 24, 2016.

Huang, Li, and Stanfield (2012) find that hedge funds actively increase firms' tax avoidance after seizing a large block of shares. We extend this line of research by showing that institutional blockholders facilitate the spillover of tax avoidance information across firms they hold.

Third, to the best of our knowledge, our paper is the first in literature to identify peer firms on the basis of common institutional blockholders, and it contributes to the emerging literature about peer effect on corporate behaviour. Unlike prior studies that focus on peers based on economic linkage (e.g., industry, customer-supplier relationships), peer firms identified based on common institutional blockholders capture unique underlying relatedness between firms beyond conventional economic relations.

The rest of the paper is organized as follows. Section 2 summarizes the related literature and develops our hypotheses. Section 3 describes our sample and research design. Section 4 presents the main empirical results. Sections 5 presents our analyses of two mechanisms of peer effects on tax avoidance. Section 6 presents the supplementary analyses about the cross-section difference in peer effects induced by CIBs and comparison with other types of peer effects. Section 7 presents a battery of robustness tests, and Section 8 concludes.

2. Literature review and hypothesis development

2.1 Determinants and consequences of tax avoidance

As tax expense is material on a firm's financial statements, tax avoidance is the practice of reducing explicit taxes (Dyreng, Hanlon, and Maydew, 2008). Prior research has provided several possible explanations for variation in tax avoidance other than firm characteristics, such as manager effects and ownership structure (Hanlon and Heitzman, 2010; Armstrong, Blouin, Jagolinzer, and Larcker, 2015; Badertscher, Katz, and Rego, 2010; 2013).

One stream of literature examines the role of management incentives in tax avoidance, and argues that firms engage in more tax avoidance to create value if managers' and shareholders' interests are aligned. Using private survey data, Phillips (2003) finds that business unit managers with after-tax-income-based compensation are more likely to report a lower effective tax rate. Armstrong, Blouin, and Larcker (2012) document that tax directors have incentives to reduce tax expense, by

providing evidence of a negative correlation between the compensation of tax director and the effective tax rate. Dyreng, Hanlon, and Maydew (2010) provide evidence that executives have a significant impact on firms' tax avoidance behaviour. Campbell, Guan, Li, and Zheng (2016) show that corporate tax avoidance increases when managers' downside risk is protected contractually.

Prior studies suggest that ownership structure is another important determinant of tax avoidance (Hanlon and Heitzman, 2010). It is documented that the level of tax avoidance is affected by concentrated ownership, level of institutional ownership, and institutional investor type. Chen, Chen, Cheng, and Shevlin (2010) document that family firms have a lower level of tax avoidance than non-family firms do. They explain that family firms forgo tax benefits to avoid cost from negative reputation effects and suspicions of diversion from minority shareholders. Khurana and Moser (2013) find that the level of tax avoidance is negatively associated with institutional ownership by institutional investors with long-term investment horizons. As tax avoidance increases firm value and improves accounting earnings and cash flows (Hanlon and Heitzman, 2010), hedge fund activists with strong compensation incentives are positively associated with corporate tax avoidance (Cheng, Huang, Li, and Stanfield, 2012).

As for the consequences of tax avoidance, prior studies suggest that tax avoidance not only has direct consequences for cash flow and firm value, but also has potential consequences for shareholders and creditors (Hanlon and Heitzman, 2010). For example, by generating tax savings, tax avoidance has an impact on capital structure, such as reducing leverage (Graham and Tucker, 2006). Desai and Dharmapala (2009) find that the association between tax avoidance and firm value depends on the level of institutional ownership. Their finding suggests that shareholders' ability to control the manager explains cross-sectional variation in the consequences of tax avoidance for firm value. Hasan, Hoi, Qiang, and Zhang (2014) investigate the impact of tax avoidance from a creditor perspective. They find that firms with greater tax avoidance have higher bank loan spreads and higher at-issue bond spreads. The above evidence suggests that different types of investors may hold different views on corporate tax avoidance engagement.

Although prior studies provide several explanations together with empirical evidence for the cross-sectional variations in tax avoidance, this field remains under-studied (Hanlon and Heitzman,

2010). As Hanlon and Heitzman (2010) suggest that the effect of ownership structure on tax avoidance is worth a more serious examination, our study is aimed at exploring another possible explanation for variations in corporate tax avoidance from an institutional ownership perspective.

2.2 Peer effect on tax avoidance

In prior research, peer firms are often identified as firms sharing the same product market, supply chain, managerial talent, or analyst (Kubick, Lynch, Mayberry, and Omer, 2015; Cen, Maydew, Zhang, and Zuo, 2017; Brown and Drake, 2014; Bizjak, Lemmon, and Whitby, 2009; Kaustia and Rantala, 2015). Using different types of peer firms, this stream of literature studies the peer effect on corporate tax policy and provides empirical evidence consistent with the diffusion theory that corporate tax avoidance knowledge diffuses across peer firms.

Kubick, Lynch, Mayberry, and Omer (2015) study the tax avoidance behaviour of competitors in the product market and find that firms are likely to mimic their product market leaders. Similarly, using exogenous tax rate shocks associated with executive turnover in Dyreng, Hanlon, and Maydew (2010), Bird, Edwards, and Ruchti (2018) examine the reaction of industry peers with similar firm size and find that peer firms respond by changing their effective tax rates in the same direction. As for peer firms identified based on supply chains, it is documented that a close customer-supplier relationship promotes the diffusion of tax avoidance knowledge from customers to suppliers (Cen, Maydew, Zhang, and Zuo, 2017). Another type of peer firms is identified on the basis of network ties, for example, board interlocks. Network ties influence corporate behaviour because of the promotion of new ideas (Bizjak, Lemmon, and Whitby, 2009). Consistent with this argument, Brown and Drake (2014) examine the impact of network ties on corporate tax avoidance. Using board interlocks as a proxy for network ties, they document that corporate tax avoidance strategies are shared among firms through their network connections.

In relation to the above-mentioned stream of research on peer effect, our study identifies peer firms as firms with common institutional blockholders. We argue that this new peer identification method is distinguished from the conventional methods in the following ways. First, unlike peer firms in the same product market or the same supply chain, peer firms identified in our study are tied via a

third party, i.e. common institutional blockholders. In other words, common institutional blockholder peers do not necessarily interact with each other as directly as product market competitors or customers and suppliers do. For example, over 80% of the peer groups identified in our sample are not industry competitors to each other, and over 99% of peer groups in our sample do not have customer-supplier relationships. Second, because institutional investors are sophisticated, their choices of holding firms reflect their informed views on firm relatedness and their influences on corporate behaviour capture the actual link between firms in the equity market.

2.3 Hypothesis development

2.3.1 Tax avoidance and common blockholder peer

We argue that firms with common institutional blockholders can have similar tax avoidance behaviour for the following reasons. First, institutional investors have a significant influence on corporate behaviour because of their monitoring incentives (Chen, Harford, and Li, 2007; Harford, Jenter, and Li, 2011). For example, they can influence corporate behaviour either directly through board elections, management proposal voting, and shareholder proposal submissions (Admati, Pfleiderer, and Zechner, 1994), or indirectly through informal discussions and negotiations with managers (Edmans, 2009). As institutional investors have their own preferences for tax avoidance, they may convey their ideas and knowledge to managers and influence the tax avoidance policy setting process. Therefore, institutional blockholders can serve as a bridge to facilitate diffusion of tax avoidance information across firms they hold.

Second, as institutional investors have different preferences for tax avoidance, under the pressure that blockholders can "vote with their feet", managers have incentives to adjust their tax avoidance behaviour to cater to their institutional blockholders' demand. They may imitate the tax avoidance behaviour of their peer firms who share common institutional blockholders, because learning from peer firms' experiences can protect themselves from deviating too much from their blockholders' tax avoidance preferences. Therefore, we predict that firms are likely to adopt tax avoidance policy similar to that of their CIB peers. Our main hypothesis is stated as follows:

H1*: The level of (change in) tax avoidance of a focal firm is positively associated with the level of (change in) tax avoidance of its common institutional blockholder peer firms.*

2.3.2 The impact of length of connection period

As our main hypothesis emphasizes the role of common institutional blockholders in influencing corporate tax avoidance policies, the length of period that two peer firms are connected by a common blockholder may also matter. If the influence from institutional blockholders is continuous, the longer the period a firm is held by a certain institutional blockholder, the greater the influence of the blockholder on the firm's corporate policies is. Thus, for peer firms that are commonly held by a certain institutional blockholder for a longer period, their tax avoidance behaviour may have greater similarity because of the stronger influence they get from their common institutional blockholder. However, if the similarity in tax avoidance policy for common institutional blockholder peers is due to blockholders' investment preferences beforehand, there should be no difference in the length of period for which two firms are connected by a common blockholder. Thus, our second hypothesis is stated as follows:

H2*: The peer effect of tax avoidance is stronger for peer firms that are connected by a common institutional blockholder for a longer period.*

2.3.3 The impact of institutional investor type

Prior studies classify institutional investors into three types—dedicated investors, quasi-indexers, and transient investors—according to their investment horizons (Bushee, 1998, 2001; Bushee and Noe, 2000). Dedicated institutions are investors with long-term horizons, as characterized by their low turnover rate. Dedicated institutions have a "relationship investing" role and focus on providing long-term patient capital, while quasi-indexers often have diversified holdings and adopt a passive, buy-and-hold portfolio investment strategy (Bushee, 2001). Transient institutions, characterized by their high turnover rate and highly diversified portfolio holdings, focus on short-term trading profits (Bushee, 2001).

Institutional investors with different investment horizons may influence firms to different degrees. Because of their long-term horizons, dedicated institutions have a stable influence on corporate behaviour. Thus, compared with transient institutions that have high turn-over rate,

dedicated institutional investors are more likely to get involved and influence corporate behaviour. We predict that the peer effect on corporate tax avoidance behaviour is stronger for peer firms connected via dedicated institutional blockholders. Our third hypothesis is stated as follows:

> ***H3****: The peer effect of tax avoidance is stronger for peers that are connected by a dedicated common institutional blockholder than for peers connected by a transient common institutional blockholder.*

3. Methodology

3.1 Sample and data

The initial sample includes all firm-year observations with non-missing financial information for tax avoidance measures and control variables in merged CRSP-Compustat database from 1980 to 2014. We select this sample period because of the availability of our data on institutional blockholders. We extract stock price and return information from CRSP and institutional blockholder information from Thomson Reuters. We exclude foreign corporations as these firms are subject to resident country tax laws that are different from US tax laws. We exclude firms that do not have institutional blockholder peers in the prior year because we put our focus on how a firm follows its peers in respect of tax avoidance (we will introduce the definition of peers in the next section). Following prior research (e.g., Frank, Lynch, and Rego, 2009; Ljungqvist, Zhang, and Zuo, 2017), we exclude firms in the financial industry (SIC: 6000-6999) and those in the utility industry (SIC: 4900-4999). Our final sample contains 58,982 firm-year observations.[8]

3.2 Peers identified by common institutional blockholders

We extract institutional holding information from the Thomson Financial Spectrum database (13-F filings). Since the institutional holding information is available at quarterly level, we identify an institution as a firm's blockholder in year *t* if this institution holds at least 5% of the firm's shares outstanding in at least one quarter in that year. If two firms share the same institutional blockholder in any of the four quarters ending at firm *i*'s fiscal year *t*, we identify these two firms as common institutional blockholder peers (CIB peers) to each other in fiscal year *t*. For example, consider a firm

[8] Please refer to our sample selection procedure in Table A1, Appendix B.

i with fiscal year end in 2005Dec, a firm *j* is regarded as the focal firm *i*'s CIB peer if firm *j* shares a CIB with *i* in any quarter over 2005Q1~2005Q4.

3.3 Tax avoidance measures

Following prior research (Chen, Chen, Cheng, and Shevlin, 2010; Lennox, Lisowsky, and Pittman, 2013; Chyz, Leung, Li, and Rui, 2013), we use multiple measures of tax avoidance for our analyses. Specifically, we adopt three measures of book-tax difference to capture a firm's tax avoidance behaviour. Book-tax difference measures are aimed at capturing the difference between book income and taxable income. A high book-tax difference indicates a high level of tax avoidance.

Our first book-tax difference measure, *BTD_F1,* is defined as the difference between total pretax financial income and taxable income (Frank, Lynch, and Rego, 2009). *BTD_F1* is calculated as follows:

BTD_F1 = (Pretax income – ((Current federal tax expense + Foreign tax expense)/ Statutory tax rate))/Lagged total assets.

Our second book-tax difference measure, *BTD_F2,* captures the permanent portion of book-tax difference that is not influenced by accruals manipulation (Lennox, Lisowsky, and Pittman, 2013; Khurna and Moser, 2013). Following Frank, Lynch, and Rego (2009), *BTD_F2* is calculated as follows:

BTD_F2 = (Pretax income – ((Current federal tax expense + Foreign tax expense)/ Statutory tax rate) – (Total deferred tax expense/Statutory tax rate))/Lagged total assets.

The third measure of book-tax difference is from Manzon and Plesko (2002). The Manzon and Plesko (2002) measure of book-tax difference (*BTD_MP*) is defined as follows:

BTD_MP = (Domestic income – (Current federal tax expense/statutory tax rate) – state income taxes – other income taxes – equity income)/Lagged total assets.

4. Main Empirical Results

4.1 Summary statistics

Table 1 presents summary statistics for our sample. Panel A reports descriptive statistics for key variables used in our empirical analyses. The sample consists of 58,970 firm-year observations from 1980 to 2014. Our dependent variable is one of the three tax avoidance measures. For tax avoidance

measures in our sample, *BTD_F1* has a mean value of -0.037 and a standard deviation of 0.174; *BTD_F2* has a mean value of -0.038 and a standard deviation of 0.169; and the mean value of *BTD_MP* is -0.039, with a standard deviation of 0.169. The summary statistics of book-tax difference measures in our sample are similar to those in prior literature (e.g. Frank, Lynch, and Rego, 2009; Chyz, Leung, Li, and Rui, 2013). Our independent variable is the equally-weighted average of one of the three tax avoidance measures for a firm's peer firms (*PBTD_F1*, *PBTD_F2*, and *PBTD_MP*). The descriptive statistics show that *PBTD_F1* has a mean value of -0.025 and a standard deviation of 0.065; the mean value of *PBTD_F2* is -0.026 and the standard deviation is 0.062; and *PBTD_MP* has a mean value of -0.028 and the standard deviation is 0.063. For control variables, firm-year observations in our sample have average institutional ownership of 32.5% and average market capitalization of 1,373.20 dollars in millions. The mean value of market-to-book ratio in our sample is 2.628 and sample firms on average have a leverage ratio of 0.213. The mean value of profitability (*ROA*), calculated as income before extraordinary items scaled by total assets, is -0.014, and the percentage of firms with positive loss carryforward is 34.1%. On average, our sample firms have a foreign income scaled by lagged total assets (*FI*) of 0.009 and an equity income in earnings scaled by lagged total assets (*EQINC*) of 0.001. As for non-current assets, sample firms have an average of 0.138 intangible assets relative to total assets, and an average of 0.566 *PPE* relative to lagged total assets.

Panel B describes basic statistics of peers for our sample firms. On average, a firm has 659 CIB peers in a year. For each focal firm, we then identify the number of its CIB peers that are also industry peers with the focal firm, that have customer-supplier relationships with the focal firm, and that share the same director on board with the focal firm. The proportions of CIB peers that are also connected with the focal firm via any of these three channels are reported. Panel B shows that on average, among all CIB peers of a firm, the fraction of CIB peers that also operate in the same industry (i.e., one-digit SIC industry code) as the focal firm is 18%. When we measure the commonality of industry affiliations with the two (three)-digit SIC industry code, the fraction of CIB peers that also share industry affiliation with the focal firm decreases to 5.4% (2.7%). This suggests that our sample of peer firms has pretty limited overlaps with the conventional industry peers. The fraction of CIB peers that

are customers (suppliers) of the focal firms is as low as 0.005% (0.004%). Although we may underestimate actual product-market relations because it is optional for a firm to report identities of customers that contribute to less than 10% of its sales, the ratios we report here highlight that the peer firms identified by common blockholders have very limited customer-supplier relationships. The fraction of peer firms that are connected via common board of directors is 0.047%, suggesting that the common blockholder peer firms identified in our sample are also quite different from peer firms with board interlocks.

4.2 Peer effect on tax avoidance – baseline result

We estimate the following regression model to examine the CIB peer effect on corporate tax avoidance.

$$\begin{aligned} TaxAvoid_{i,t} = {} & a_0 + b_1 PTaxAvoid_{i,t-1} + b_2 INST_{i,t-1} + b_3 MB_{i,t-1} + b_4 LEV_{i,t-1} + b_5 ROA_{i,t-1} \\ & + b_6 LOGMCAP_{i,t-1} + b_7 NOL_{i,t-1} + b_8 \Delta NOL_{i,t-1} + b_9 INTANG_{i,t-1} \\ & + b_{10} PPE_{i,t-1} + b_{11} FI_{i,t-1} + b_{12} EQINC_{i,t-1} + e_{i,t-1} \end{aligned} \quad (1)$$

The dependent variable, $TaxAvoid_{i,t}$, is one of the three tax avoidance measures defined above (*BTD_F1*, *BTD_F2*, and *BTD_MP*) for firm *i* in year *t*. The independent variable, $PTaxAvoid_{i,t-1}$, is defined as the equally-weighted average of one of the three tax avoidance measures of firm *i*'s CIB peers in year *t*-1 (*PBTD_F1*, *PBTD_F2*, and *PBTD_MP*). A lead-lag technique is used to mitigate the concern of contemporaneous common factors that influence both the focal firm and its peer firms (i.e., the dependent variable is in year *t*, while the independent variable is in year *t*-1. In other words, we identify CIB peers using CIBs' holding information in year *t*-1 and then calculate the average of tax avoidance of these peers in year *t*-1). We expect a positive association between tax avoidance of a focal firm and that of its CIB peers ($b_1 > 0$).

The control variables include a set of variables that are likely to influence a firm's tax avoidance behaviour as documented prior literature (Manzon and Plesko, 2002; Rego, 2003; Dyreng, Hanlon, and Maydew, 2008; Frank, Lynch, and Rego, 2009; Chen, Chen, Cheng, and Shevlin, 2010; Cheng, Huang, Li, and Stanfield, 2012; Chyz, Leung, Li, and Rui, 2013). *INST* is the percentage of institutional ownership; *MB* is the market-to-book ratio; *LEV* is a firm's leverage ratio; *ROA* is the proxy for a firm's profitability; *LOGMCAP* is the natural log of a firm's market capitalization, which

is a proxy for firm size; *NOL* is an indicator variable that equals one if a firm's loss carryforward at the beginning of the year is positive and zero otherwise; Δ*NOL* measures the change in loss carryforward; *INTANG* is a firm's intangible assets; *PPE* is property, plant, and equipment, which is a proxy for a firm's asset structure; *FI* measures a firm's foreign income; *EQINC* measures a firm's equity income in earnings. Detailed variable definitions are provided in Appendix A. We winsorize all continuous variables at the 1st and the 99th percentile. We control for year and industry fixed effects, with industries identified using two-digit SIC codes. Standard errors are clustered at the firm level.

Our pooled sample results of peer effect on tax avoidance are reported in Table 2. The results suggest a positive association between tax avoidance behaviour of a focal firm and lagged tax avoidance of its CIB peers. Specifically, the coefficient of *PBTD_F1* is 0.181 with a *t*-value of 12.05; similarly, *PBTD_F2* has a coefficient of 0.170 (*t*-value=10.71); and *PBTD_MP* has a coefficient of 0.188 with a *t*-value of 12.24. With regard to coefficients of control variables, we find firms with higher institutional ownership exhibit greater tax avoidance. We also find a positive coefficients of *ROA* and change in tax loss carryforward (Δ*NOL*), similar to findings in Chen, Chen, Cheng, and Shevlin (2010) and Manzon and Plesko (2002). In addition, larger firms and firms with higher PPE have a higher level of book-tax difference, which is consistent with findings in Cheng, Huang, Li, and Stanfield (2012) and Chyz, Leung, Li, and Rui (2013). Taken together, the pooled sample results in Table 2 support our prediction of the peer effect on a firm's tax avoidance behaviour.[9]

Our empirical test in Table 2 uses a lead-lag technique so that identities of CIB peers are based on CIBs' holding information in the year (*t*-1) prior to the year of focal firm's tax avoidance (year *t*). This technique helps to reach our claim that a firm follows its CIB peers' tax avoidance. In unreported analysis, we also try an alternative way to identify CIB peers on the basis of CIBs' holdings information in the concurrent year (*t*), and the results are quite similar.

4.3. Endogeneity issues

[9] We implement a battery of robustness tests in Section 7 and find similar results.

We are mindful of the possibility that this positive relation is not induced by the CIB, but instead is due to the fact that the CIB simply chooses to hold firms with similar tax avoidance. We call this possibility that investors select similar firms for investment the self-selection hypothesis.

We address this self-selection hypothesis by showing that, firms' tax avoidance is significantly associated with exogenous variation in tax avoidance by their peers. We first adopt a lead-lag change analysis and find that a focal firm's tax avoidance changes in the same direction as the lagged changes in tax avoidance of its CIB peers. Then, we use a subsample of firms that experience exogenous variations in tax avoidance by their peers due to increases in state-level corporate income tax rate.

4.3.1 Change specification – full sample

To mitigate the endogeneity concern that both focal firms' and their peer firms' tax avoidance behaviour are affected by latent firm-level variables, we estimate the following change regression model to keep control variables constant.

$$\begin{aligned}\Delta TaxAvoid_{i,t} = {} & a_0 + b_1 \Delta PTaxAvoid_{i,t-1} + b_2 \Delta INST_{i,t-1} + b_3 \Delta MB_{i,t-1} + b_4 \Delta LEV_{i,t-1} \\ & + b_5 \Delta ROA_{i,t-1} + b_6 \Delta LOGMCAP_{i,t-1} + b_7 \Delta NOL_{i,t-1} + b_8 \Delta INTANG_{i,t-1} \\ & + b_9 \Delta PPE_{i,t-1} + b_{10} \Delta FI_{i,t-1} + b_{11} \Delta EQINC_{i,t-1} + e_{i,t-1}, \end{aligned} \quad (2)$$

where $\Delta TaxAvoid_{i,t}$ is the change in one of the three tax avoidance measures (ΔBTD_F1, ΔBTD_F2, and ΔBTD_MP) over two consecutive years from year t-1 to t; $\Delta PTaxAvoid_{i,t-1}$ is the change in equally-weighted average of peer firms' tax avoidance using one of the three tax avoidance measures ($\Delta PBTD\_F1$, $\Delta PBTD\_F2$, and $\Delta PBTD\_MP$) over two consecutive years from year t-2 to t-1. In the change regression analysis, for focal firm i in year t, we identify its CIB peers using CIBs' holding information in year t-1 and then calculate the changes in tax avoidance of these peers in year t-1. Control variables include the change in institutional ownership ($\Delta INST$), change in market-to-book ratio (ΔMB), change in leverage ratio (ΔLEV), change in profitability (ΔROA), change in firm size ($\Delta LOGMCAP$), change in loss carryforward (ΔNOL), change in intangible assets ($\Delta INTANG$), change in property, plant, and equipment (ΔPPE), change in foreign income (ΔFI), and change in equity income earnings ($\Delta EQINC$).

In Table 3, we present the results of the association between the change in a focal firm's tax avoidance and the change in its CIB peers' for the full sample. Using our measures of tax avoidance,

we find a positive association between changes in tax avoidance measures for focal firms and those for their peers. Specifically, the coefficients of Δ*PBTD_F1* and Δ*PBTD_F2* are positive and significant (0.082, *t*-value = 3.80; 0.094, *t*-value = 3.84), and the coefficient of Δ*PBTD_MP* is 0.063 with a *t*-value of 3.23. The results suggest that the change in tax avoidance behaviour by focal firms is in the same direction as the change in tax avoidance behaviour by their CIB peers. In general, results in Table 3 provide further supports to our argument that firms connected by common equity blockholders exhibit similar tax avoidance behaviour.

4.3.2 State tax increases as exogenous events

The second source of exogenous variations we study is increases in state-level corporate income tax rates (Heider and Ljungqvist, 2015). Using 22 state tax increase events from 1994 to 2012 in Heider and Ljungqvist (2015) and firm headquarters location data from Securities and Exchange Commission's EDGAR service, we conduct analyses to test whether exogenous increases in state-level corporate tax rate affect the tax avoidance of firms located in event states and whether the exogenous changes in tax avoidance of event firms have an impact on the tax avoidance of firms that are not located in the event states but have CIB peers affected by the state tax rate increase events. We refer to these 22 states as event states, and firms with headquarters in these states as event firms.

We first conduct univariate analysis to compare tax avoidance by event firms before and after state tax increase events. Panel A of Table 4 reports the univariate results of tax avoidance changes around state tax increase events for event firms, i.e. firms with headquarters located in tax increase states. Results show that event firms experience a significant increase in tax avoidance after state tax increases. This indicates that firms respond to increases in state-level corporate income tax rate by increasing their tax avoidance.

We next examine whether the firms that are not located in event states take similar tax avoidance policies after state tax increase events if they have CIB peers located in these event states. We first identify firms whose CIB peers are affected by these events, and hence they experience exogenous variations in tax avoidance by their peers. Then, we conduct multivariate analysis to test

the peer effect on tax avoidance around state tax increase events. To be specific, we estimate the following change regression using a subsample of non-event firms.

$$\begin{aligned}\Delta TaxAvoid_{i,t+1} = {} & a_0 + b_1 EVENTPEER_{i,t} + b_2 \Delta INST_{i,t+1} + b_3 \Delta MB_{i,t+1} + b_4 \Delta LEV_{i,t+1} \\ & + b_5 \Delta ROA_{i,t+1} + b_6 \Delta LOGMCAP_{i,t+1} + b_7 \Delta NOL_{i,t+1} + b_8 \Delta INTANG_{i,t+1} \\ & + b_9 \Delta PPE_{i,t+1} + b_{10} \Delta FI_{i,t+1} + b_{11} \Delta EQINC_{i,t+1} + e_{i,t+1.}\end{aligned} \quad (3)$$

The dependent variables and control variables are change variables for firm *i* from year *t-1* to year *t+1*, and year *t* is the event year in which the state corporate tax rate is increased in a certain event state. Firm *i* is a firm not located in event states. The independent variable of interest is $EVENTPEER_{i,t}$, which is an indicator variable that equals one if firm *i* has at least one peer firm that is an event firm in year *t*, and zero otherwise. We expect a positive coefficient on *EVENTPEER* if a focal firm reacts to the exogenous variations in tax avoidance by it CIB peers.

Panel B of Table 4 presents the multivariate results of the changes in tax avoidance behaviour by firms that are connected with event firms around state tax rate increase events. The positive and significant coefficients on *EVENTPEER* when *BTD_F1* (0.009, *t*-value = 6.03), *BTD_F2* (0.009, *t*-value = 5.54), and *BTD_MP* (0.007, *t*-value = 4.96) are used as tax avoidance measures suggest that firms not located in tax-increase states but have event firms as CIB peers respond by changing their book-tax differences in the same direction after state tax rate increase events. Our difference-in-differences analysis suggests that, among all firms located outside event states, firms with CIB peers located in event states increase tax avoidance more than firms without peers located in event states around the event year. These results argue against the self-selection hypothesis.

In the analysis of Table 4, we focus on firms that are not located in tax-increase states, so that these firms are not directly affected by the tax increases although they will be affected indirectly through their peers located in event states. In unreported analysis, we use a larger sample by adding firms located in tax-increase states to our analysis, and we add a new indicator variable that captures whether a firm is located in event states or not. Our main result, i.e., coefficient of *EVENTPEER*, is similar in this alternative sample.

4.4 A placebo test - Impact of past peers

In this section, we present a placebo test by analysing the effects of past peers on the focal firm. Past peers refer to firms that were CIB peers of the focal firm only in the past (before year *t*-3), while their peer relations with the focal firm have been discontinued since year *t*-3. Our expectation is that the tax avoidance of these past peers should have limited, if not none, effect on tax avoidance of the focal firm because of the absence of common CIB. We calculate average tax avoidance of past peers in year *t*-1 (*PBTD_F1_Pastpeer*, *PBTD_F2_Pastpeer*, and *PBTD_MP_Pastpeer*), and add them to our regression model in Eq. (1) to explain the focal firm's tax avoidance in year *t*.

Table 5 provides the results of the placebo test. We find that the coefficients of peer average measures based on past peers are either insignificant or significant but small in magnitude. In contrast, the coefficients of our main peer effect measures, i.e., average tax avoidance of current peers in year *t*-1, remain positive with a significance level of 0.01. This finding suggests that the peer effect we document exists mainly because of the presence of CIBs. After peer relation is broken (i.e., after the CIB exits either the focal firm or the peer firm, or both firms), the peer effect will disappear.

5. Two possible mechanisms

While our main results show that firms connected by common equity blockholders have a similar tax avoidance level, it is unclear whether the similarity exists for the use of tax avoidance strategies. In this section, we focus on two tax avoidance strategies through which firms manage corporate taxes, i.e. lobbying for tax purposes and tax haven strategy, and examine whether peer effect exists in the adoption of these two tax avoidance strategies.

5.1 Peer effect on tax lobbying activities

Prior studies suggest that firms obtain tax benefits through lobbying activities, besides the conventional methods of tax planning to manage corporate taxes (Richter, Samphantharak, and Timmons, 2009). Corporate lobbying for tax purposes is not only effective in reducing tax expenses, but also valued positively by shareholders (Hill, Kubick, and Lockhart, and Wan, 2013). A common shareholder's preference for tax lobbying activities may act as a bridge between peer firms for their

similarity in tax avoidance strategies. Therefore, we examine whether there is peer effect on corporate tax lobbying activities for firms connected via CIBs.

We estimate the following the regression model to examine the peer effect on tax lobbying activities.

$$\begin{aligned} TaxLobby_{i,t} = {} & a_0 + b_1 PTaxLobby_{i,t-1} + b_2 INST_{i,t-1} + b_3 MB_{i,t-1} + b_4 LEV_{i,t-1} + b_5 ROA_{i,t-1} \\ & + b_6 LOGMCAP_{i,t-1} + b_7 NOL_{i,t-1} + b_8 \Delta NOL_{i,t-1} + b_9 INTANG_{i,t-1} \\ & + b_{10} PPE_{i,t-1} + b_{11} FI_{i,t-1} + b_{12} EQINC_{i,t-1} + e_{i,t-1} \end{aligned} \quad (4)$$

Following prior research, we obtain data for corporate tax lobbying activities from the Center for Responsive Politics (CRP) (Richter, Samphantharak, and Timmons, 2009; Hill, Kubick, and Lockhart, and Wan, 2013). We use two proxies for tax lobbying activities. *D_TaxLobby* is an indicator variable equal to one if the firm has reported lobbying activities for tax purposes. *Log(TaxLobbyRpt)* measures the natural log number of reports in which the firm has disclosed lobbying activities for tax purposes. *PD_TaxLobby* is the percentage of peer firms that have engaged in tax lobbying activities. *PLog(TaxLobbyRpt)* is the average log number of reports related to tax lobbying activities by peer firms. We expect b_1 to be positive if the peer effect on tax lobbying exists.

Panel A of Table 6 presents the results of the peer effect on corporate tax lobbying activities. Column (1) presents the logit regression results. The dependent variable in Column (1) is *D_TaxLobby*, and the coefficient of *PD_TaxLobby* is positive and significant (4.342, *t*-value=3.01), suggesting that firms' likelihood of engaging in tax lobbying activities is positively associated with the percentage of peer firms that have lobbied for tax purposes. The positive and significant coefficient of *PLog(TaxLobbyRpt)* shows that firms' tax lobbying activities are positively affected by peer firms' lobbying activities for tax purposes. Taken together, the results above indicate that there exists peer effect on firms' tax lobbying activities.

5.2 Peer effect on the use of tax havens

Another effective strategy to avoid taxes is to establish subsidiaries in tax havens. Firms can significantly reduce U.S. tax burdens by shifting profits to offshore subsidiaries in tax haven countries. We examine whether firms' establishment of subsidiaries incorporated in tax havens is influenced by peer firms' use of tax havens as a tax avoidance strategy.

We estimate the following regression model for firms' use of tax havens.

$$TaxHaven_{i,t} = a_0 + b_1 PTaxHaven_{i,t-1} + b_2 INST_{i,t-1} + b_3 MB_{i,t-1} + b_4 LEV_{i,t-1} + b_5 ROA_{i,t-1} + b_6 LOGMCAP_{i,t-1} + b_7 NOL_{i,t-1} + b_8 \Delta NOL_{i,t-1} + b_9 INTANG_{i,t-1} + b_{10} PPE_{i,t-1} + b_{11} FI_{i,t-1} + b_{12} EQINC_{i,t-1} + e_{i,t-1} \quad (5)$$

Data on firms' subsidiaries incorporated in tax havens are collected from Exhibit 21 of 10-K filings for each firm-year observation (please refer to Dyreng and Lindsey (2009) for the list of tax havens in the world).[10] We use three proxies for the use of tax havens, i.e. *D_TaxHavens*, *Log(TaxHavens)*, and *TaxHaven_Percentage*. *D_TaxHavens* is an indicator variable that equals one if the firm has at least one subsidiary operating in tax havens. *Log(TaxHavens)* is the natural log number of subsidiaries incorporated in tax havens for the firm. *TaxHaven_Percentage* is the percentage of subsidiaries that are located in tax havens, which is the number of tax haven subsidiaries divided by the total number of subsidiaries the firm has. *PD_TaxHavens* is the percentage of peer firms that have tax haven subsidiaries. *PLog(TaxHavens)* is the average log number of tax haven subsidiaries established by the firm's peer firms. *PTaxHaven_Percentage* is the average percentage of tax haven subsidiaries the firm's peer firms have. We predict b_1 to be positive so that peer effect on tax avoidance exists through the use of tax haven strategy.

Panel B of Table 6 presents the results. In Column (1), we report the logit regression analysis results. The dependent variable in Column (1) is *D_TaxHavens*, and our variable of interest is the percentage of peer firms that have tax haven subsidiaries (*PD_TaxHavens*). The positive and significant coefficient of *PD_TaxHavens* (0.609, *t*-value=4.27) suggests that firms' likelihood of establishing subsidiaries in tax havens is positively associated with the proportion of peer firms that have tax haven subsidiaries. In Column (2), when we focus on the number of subsidiaries in tax havens, we find a positive and significant association between the number of tax haven subsidiaries of the focal firm and that of its CIB peer firms, as evidenced by the coefficient of *PLog(TaxHavens)* (0.071, *t*-value=5.11). The coefficient of *PTaxHaven_Percentage* in Column (3) is positive and significant (0.064, *t*-value=3.08), and this indicates a positive association in the use of tax havens between the focal firm and its common blockholder peer firms. Overall, results in Panel B support our

[10] We thank Professor Scott D. Dyreng for providing Exhibit 21 data on his website (https://sites.google.com/site/scottdyreng/Home/data-and-code/EX21-Dataset).

argument for the similarity in tax avoidance behaviour and provide evidence that establishing subsidiaries in tax havens is one possible mechanism through which similarity occurs.

6. Supplementary Analyses

6.1 Peer effect on tax avoidance – Impact of duration of peer relation

To test our second hypothesis, we compare the peer effect on tax avoidance for firms with long-term peers and that for firms with short-term peers. We define long-term peers as peer firms that are connected by a common equity blockholder for more than one year in the past five years, and short-term peers as peer firms that are connected by a common equity blockholder for no more than one year in the past five years. We predict that the similarity in tax avoidance behaviour is more pronounced for peer firms that are connected for a longer period.

Panel A of Table 7 reports the results of peer effect on tax avoidance for long-term peers and short-term peer groups. By comparing the coefficients of *PTaxAvoid* for long-term peers and short-term peers using our measures of tax avoidance, we find consistent evidence that firms react more strongly to tax avoidance behaviour of their long-term peers than to that of their short-term peers. This finding suggests that a long-term peer relationship can strengthen the positive association in tax avoidance between peer firms, and it supports our argument that peer firms' behaviour influences each other. In addition, this result helps mitigate the endogeneity concern that the similarity in tax avoidance behaviour among CIB peers is driven by institutional blockholders' investment preferences beforehand. If the observed peer effect is due to investors' *ex ante* preferences for firms with similar tax avoidance behaviour, we will observe no difference in tax avoidance association between short-term and long-term peer groups.

6.2 Peer effect on tax avoidance – Impact of horizon of common institutional blockholders

In this section, we examine whether peer effect has cross-sectional variations in the type of institutional blockholders. Our third hypothesis predicts that firms that are connected by dedicated common institutional blockholders have a stronger peer effect on tax avoidance, because these

dedicated investors normally have longer horizons and are more likely to exert their influences on corporate tax arrangements, compared with transient investors who care about short-term profits.

Using institutional investor classification data provided by Brian Bushee, we identify peer connection by dedicated and transient institutional blockholders in our sample and examine their impact on the peer effect on tax avoidance.[11] Specifically, we estimate the following regression model.

$$\begin{aligned} TaxAvoid_{i,t} = {} & a_0 + b_1 PTaxAvoid\_DED_{i,t-1} + b_2 PTaxAvoid\_TRA_{i,t-1} + b_3 INST_{i,t-1} + b_4 MB_{i,t-1} \\ & + b_5 LEV_{i,t-1} + b_6 ROA_{i,t-1} + b_7 LOGMCAP_{i,t-1} + b_8 NOL_{i,t-1} + b_9 \Delta NOL_{i,t-1} \\ & + b_{10} INTANG_{i,t-1} + b_{11} PPE_{i,t-1} + b_{12} FI_{i,t-1} + b_{13} EQINC_{i,t-1} + e_{i,t-1}. \end{aligned} \quad (6)$$

PTaxAvoid_DED is the equally-weighted average of tax avoidance for peer firms with common dedicated institutional investors, and *PTaxAvoid_TRA* is the equally-weighted average of tax avoidance for peer firms with common transient institutional investors. We predict that the coefficient on *PTaxAvoid_DED* is higher than the coefficient on *PTaxAvoid_TRA*.

Panel B of Table 7 reports the results of peer effect on tax avoidance for firms linked by different types of institutional investors. Using the three measures of tax avoidance, we find consistent results that the coefficients of *PTaxAvoid_DED* are higher than those of *PTaxAvoid_TRA*. Our results suggest that a firm's tax avoidance is affected more by its peer firms held by common dedicated institutional investors than its peers held by common transient institutional investors, which supports our third hypothesis.

6.3 The impact of peer connections through other channels

In this section, we include the impact of peer connections through other contagion channels as control. To be specific, we control for the impact of industry peers in order to mitigate the concern that peers with common institutional blockholders may overlap with peers in the same industry, as some institutions concentrate their positions in certain industries (e.g., Kacperczyk, Sialm, and Zheng, 2005). We also control for the impact of peer connections by shared board and by common location since tax avoidance knowledge can be shared through board interlocks (Brown and Drake, 2014) or geographic peers.

[11] We thank Professor Bushee for providing institutional investor classification data on his website (http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html).

To mitigate the above concerns that the CIB peer effect on tax avoidance we document is driven by other network ties, we implement the following regression analyses.

$$TaxAvoid_{i,t} = a_0 + b_1 PTaxAvoid_{i,t-1} + b_2 Industry\ PTaxAvoid_{i,t-1} + b_3 INST_{i,t-1} + b_4 MB_{i,t-1} + b_5 LEV_{i,t-1} + b_6 ROA_{i,t-1} + b_7 LOGMCAP_{i,t-1} + b_8 NOL_{i,t-1} + b_9 \Delta NOL_{i,t-1} + b_{10} INTANG_{i,t-1} + b_{11} PPE_{i,t-1} + b_{12} FI_{i,t-1} + b_{13} EQINC_{i,t-1} + e_{i,t-1}. \quad (7)$$

$$TaxAvoid_{i,t} = a_0 + b_1 PTaxAvoid_{i,t-1} + b_2 Geographic\ PTaxAvoid_{i,t-1} + b_3 INST_{i,t-1} + b_4 MB_{i,t-1} + b_5 LEV_{i,t-1} + b_6 ROA_{i,t-1} + b_7 LOGMCAP_{i,t-1} + b_8 NOL_{i,t-1} + b_9 \Delta NOL_{i,t-1} + b_{10} INTANG_{i,t-1} + b_{11} PPE_{i,t-1} + b_{12} FI_{i,t-1} + b_{13} EQINC_{i,t-1} + e_{i,t-1}. \quad (8)$$

$$TaxAvoid_{i,t} = a_0 + b_1 PTaxAvoid_{i,t-1} + b_2 Board\ Interlock\ PTaxAvoid_{i,t-1} + b_3 INST_{i,t-1} + b_4 MB_{i,t-1} + b_5 LEV_{i,t-1} + b_6 ROA_{i,t-1} + b_7 LOGMCAP_{i,t-1} + b_8 NOL_{i,t-1} + b_9 \Delta NOL_{i,t-1} + b_{10} INTANG_{i,t-1} + b_{11} PPE_{i,t-1} + b_{12} FI_{i,t-1} + b_{13} EQINC_{i,t-1} + e_{i,t-1}. \quad (9)$$

Industry PTaxAvoid is a proxy for industry peer average of the tax avoidance measures (*BTD_F1*, *BTD_F2*, and *BTD_MP*). Industry peers are identified as peer firms that share a common 2-digit SIC code with the focal firm. *Geographic PTaxAvoid* is geographic peer average of tax avoidance. Geographic peers are firms with headquarters located in the same state as the focal firm. *Board Interlock PTaxAvoid* is peer average of tax avoidance by firms that share a common director on board with the focal firm.

We report results in Table 8. Panel A reports results after controlling for the impact of peer connections through common industry. We find the coefficients of our common blockholder peer average measures consistent with our baseline results, suggesting that our finding is not driven by industry peer effect. Besides, we find the coefficients of industry peer averages positive and significant across our three tax avoidance measures, and this is consistent with the findings in Bird, Edwards, and Rutchi (2018). In Panel B, we include peer averages of tax avoidance by geographic peers as control. We find the results in support of our main hypothesis. In Panel C, we add the effect of network ties by board interlocks in our analysis. We still find the results consistent with our argument. The coefficients of *PTaxAvoid* across the three columns remain positive and significant. In addition, we find that the coefficients of *Board Interlock PTaxAvoid* are positive and significant, which supports findings in prior literature that tax avoidance knowledge can be shared through board interlocks (Brown and Drake, 2014). Overall, results in Table 8 indicate that the common blockholder peer effect is not driven by other contagion channels.

7. Robustness results

7.1 Results based on value-weighted measures using common ownership as weights

In our main analyses, we measure peer firms' tax avoidance behaviour as the equally-weighted average of tax avoidance. In this section, we repeat our main analyses using the value-weighted average of peer firms' tax avoidance for robustness check. Specifically, we use common blockholder ownership (i.e., ownership held by CIBs) of the focal firm and its peer as the weight for each peer relation.

Assuming there are *n* peers (peers are indexed by j) sharing CIBs with focal firm i in year t-1, we calculate the peers' tax avoidance in fiscal year t-1 as follows,

$$VW\_TaxAvoid_{i,t-1} = \frac{\sum_{j=1}^{n} w_{i,j,t-1} TaxAvoid_{jt-1}}{\sum_{j=1}^{n} w_{i,j,t-1}}, \quad (10)$$

$$w_{i,j,t-1} = \frac{\sum_{f=1}^{F} (S_{i,t-1}^{f} P_{i,t-1} + S_{j,t-1}^{f} P_{j,t-1})}{S_{i,t-1} P_{i,t-1} + S_{j,t-1} P_{j,t-1}}, \quad (11)$$

where *TaxAvoid* indicates any of three tax avoidance measures, *BTD_F1*, *BTD_F2*, and *BTD_MP*. $w_{i,j,t-1}$ is the weight used to generate the value-weighted tax avoidance measures for these peers. In calculation of $w_{i,j,t}$, *F* is the set of CIBs shared by focal firm *i* and peer *j* in year *t*-1. $S_{i,t-1}^{f}$ is number of shares hold by fund *f* in firm *i* in year *t*-1, $S_{i,t-1}$ is firm *i*'s number of shares outstanding in year *t*-1 and $P_{i,t-1}$ is firm *i*'s stock price in year t. $S_{j,t-1}^{f}$ is number of shares hold by fund *f* in firm *j* in year *t*-1, $S_{j,t-1}$ is firm *j*'s number of shares outstanding in year *t*-1 and $P_{j,t-1}$ is firm *j*'s stock price in year *t*-1. If firm *i* and firm *j* share CIBs in multiple quarters in year *t*-1, we use the information of shares held and stock prices in the latest quarter in which such CIBs exist. $VW\_Tax\ Avoidance_{it-1}$ is value-weighed tax avoidance in year *t*-1 among all peers. Since we have three versions of tax avoidance measure of each firm, we also have three corresponding versions of VW_*TaxAvoid*$_{i,t-1}$ (i.e.,*VW_PBTD_F1*$_{i,t-1}$, *VW_PBTD_F2*$_{i,t-1}$, and *VW_PBTD_MP*$_{i,t-1}$).

Panel A of Table 9 reports the results based on value-weighted average of peer firms' tax avoidance using common blockholders' ownership as the weight. We find consistent and robust results supporting our argument that firms that are connected by a CIB have similar tax avoidance.

7.2 Alternative measure of peer firms' tax avoidance

In this section, we offer an alternative measurement of our main explanatory variable to rule out the possibility that the focal firm's tax avoidance follows other fundamentals of its CIB peers, which also drive average tax avoidance of its CIB peers. For example, leverage is an important driver of tax avoidance for each of a firm's CIB peers; hence, our previous results may be interpreted by an alternative explanation that a firm's tax avoidance follows its peers' leverage, which also drives its peers' tax avoidance.

To mitigate this concern, in this section, we use peer average of tax avoidance residual as our independent variables. The tax avoidance residual is calculated by regressing tax avoidance on a set of firm fundamental determinants that are likely to affect a firm's tax avoidance, so that the tax avoidance residual can capture abnormal tax avoidance beyond firm characteristics. The estimation procedure is as follows. We estimate the following regression model for peer firms, and obtain the residual from Eq. (12).

$$\begin{aligned} TaxAvoid_{i,t} = {} & a_0 + b_1 MB_{i,t-1} + b_2 LEV_{i,t-1} + b_3 ROA_{i,t-1} + b_4 LOGMCAP_{i,t-1} + b_5 NOL_{i,t-1} \\ & + b_6 \Delta NOL_{i,t-1} + b_7 INTANG_{i,t-1} + b_8 PPE_{i,t-1} + b_9 FI_{i,t-1} + b_{10} EQINC_{i,t-1} \\ & + e_{i,t-1} \end{aligned} \quad (12)$$

The peer average of residual is calculated as the equally-weighted average of tax avoidance residual by peer firms. We estimate our Eq.(1) using the peer average of residual (*PTaxAvoid_Resd*) in year *t*-1 as independent variables (the dependent variable is unchanged: tax avoidance of the focal firm in year *t*), and the results are provided in Panel B of Table 9. We find that the results remain supportive for our main argument that a focal firm's tax avoidance follows the lagged tax avoidance level of its CIB peers.

7.3 Results with firm fixed effects

In our previous analysis, we control for industry fixed effects following prior literature. Our results are also robust to firm fixed effects which absorb time-invariant omitted variables. Table 9 Panel C presents the results with firm fixed effects. Our argument for peer effects holds in all of the three regression specifications.

7.4 Alternative measures of tax avoidance

We use book-tax difference measures as our proxies for tax avoidance in our main analyses. In the section, we repeat our analysis using alternative tax avoidance measures for robustness check. Specifically, we use current effective tax rate and cash effective tax rate as alternative tax avoidance measures. We calculate current effective tax rate (*ETR*) as total tax expense minus deferred tax expense, and then divided by pretax income with special items excluded. A higher *ETR* realization indicates a lower level of tax avoidance. Cash effective tax rate (*CETR*) is calculated as cash taxes paid divided by pretax income with special items excluded (Dyreng, Hanlon, and Maydew, 2008). A higher *CETR* realization indicates a lower level of tax avoidance. *CETR* is regarded as a better proxy for tax avoidance than *ETR* because it takes into consideration the accrual accounting for stock options (Dyreng, Hanlon, and Maydew, 2008; Chen, Chen, Cheng, and Shevlin, 2010).

We report the results using alternative tax avoidance measures in Panel D of Table 9. The positive and significant coefficients of *PETR* and *PCETR* suggest that our results are robust to alternative tax avoidance measures.

7.5 The impact of peer connections by the largest CIBs

The way we identify CIB peers does not eliminate the possibility that a focal firm may have peer firms that are connected via multiple common institutional blockholders. The peer effect is unclear when the multiple common institutional blockholders have different preferences for tax avoidance. Thus, in this section, we restrict our CIB connection to peer firms that share common ownership on the basis of the CIB that have the highest ownership in the focal firm. We argue that the largest common blockholder is likely to influence firms' tax avoidance policies to a greater extent than other CIBs. The approach provides us a clean setting to examine the existence of common institutional blockholder peer effect.

For each firm *i* in year *t*-1, we first identify the institutional blockholder that holds the largest ownership in this firm over the four quarters ending at the fiscal year end date. Then we identify other firms that are also held by this institutional blockholder in year *t*-1 as largest CIB peers for firm *i*.

PBTD_F1_LargestCIB, *PBTD_F2_LargestCIB*, and *PBTD_MP_LargestCIB* refer to equally-weighted average of *BTD_F1*, *BTD_F2*, and *BTD_MP* over this largest CIB peer, respectively.

We report the results in Table 9 panel E. The coefficients of peer averages of tax avoidance for peers connected by the largest common institutional blockholders remain positive and significant. This finding mitigates the concern of multiple common institutional blockholders and further supports our argument.

8. Conclusion

This paper examines the role of common equity blockholders in facilitating the diffusion of tax avoidance knowledge across firms. Using a novel method to identify peer firms based on common institutional blockholders, we provide evidence that firms with common institutional blockholders have similar tax avoidance behaviour.

We perform several tests to deal with the potential endogeneity issues. First, we adopt a lead-lag technique in our regression analyses to mitigate the concern of concurrent shock on both focal firms and their peer firms. Second, we conduct change analysis to mitigate the endogeneity concern that both focal firms' and their peer firms' tax avoidance behaviour are affected by latent firm-level variables. Third, we introduce state-level corporate income tax rate increase events in certain U.S. states as exogenous events. Our difference-in-differences analysis shows that firms that have peers located in event states increase tax avoidance more than firms without peers located in event states around the event year. Consistent with our main hypothesis that CIBs induce the peer effect of tax avoidance, we find that such peer effect disappears after peer relation through CIBs is terminated in a placebo test by focusing on the effect of peers only connected in the past.

We document two mechanisms of our main findings by showing that firms follow their CIB peers in taking two specific tax strategies: tax lobbying and establishing subsidiaries in tax havens. Consistent with the influence by CIBs, we find that this peer effect is more pronounced for peer firms that are tied via dedicated CIBs and that are connected by CIBs for a longer period of time. We offer a battery of robustness checks and rule out other alternative explanations for our main results.

Responding to Hanlon and Heitzman's (2010) call to further explore the determinants of corporate tax avoidance, we contribute to the literature on tax avoidance, institutional investor, and social learning by showing that institutional investors have a role in the peer effect on tax avoidance. Overall, our study documents a new channel of tax avoidance diffusion through common institutional blockholders between firms. Our analysis of peer effect across economically unrelated firms uncovers a new mechanism of diffusion of tax avoidance knowledge and may provide hints on explaining the recent prevalence of tax avoidance scandals.

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Table 1: Summary statistics

This table presents summary statistics for our sample. Panel A reports descriptive statistics of main variables, including three measures of book-tax differences (*BTD_F1*, *BTD_F2*, and *BTD_MP*), the equally-weighted average of peer firms' tax avoidance (*PBTD_F1*, *PBTD_F2*, and *PBTD_MP*), institutional ownership (*INST*), market-to-book ratio (*MB*), leverage ratio (*LEV*), profitability (*ROA*), market capitalization (*MCAP*), loss carryforward (Δ*NOL*), change in loss carryforward (Δ*NOL*), intangible assets (*INTANG*), property, plant, and equipment (*PPE*), foreign income (*FI*), and equity income earnings (*EQINC*). Panel B reports summary statistics of CIB peer firms for focal firms. *N(Peers)* is the number of CIB peers of a focal firm. *%Peers_SameInd (SIC1)* is the fraction of CIB peers of a focal firm that operate in the same industry, defined by one-digit SIC codes, as the focal firm. *%Peers_SameInd (SIC2)* and *%Peers_SameInd (SIC3)* are defined similarly using two-digit and three-digit SIC codes. *%Peers_Customer* is the fraction of CIB peers of a focal firm that are customers of the focal firms in the same year. *%Peers_Supplier* is the fraction of CIB peers of a focal firm that are suppliers of the focal firms in the same year. *%Peers_BoardInterlock* is the fraction of CIB peers of a focal firm that share at least one common director with the focal firms in the same year. Variable definitions are provided in Appendix A. The sample consists of 58,970 firm-year observations from 1980 to 2014.

Panel A: Summary statistics of key variables

	N	Mean	Q1	Median	Q3	SD
BTD_F1	58,970	-0.037	-0.046	0.006	0.038	0.174
BTD_F2	58,970	-0.038	-0.027	0.003	0.022	0.173
BTD_MP	58,970	-0.039	-0.046	0.001	0.032	0.169
PBTD_F1	58,970	-0.025	-0.031	-0.011	0.003	0.065
PBTD_F2	58,970	-0.026	-0.031	-0.011	0.002	0.062
PBTD_MP	58,970	-0.028	-0.033	-0.014	-0.001	0.063
INST	58,970	0.325	0.000	0.243	0.609	0.331
MB	58,970	2.628	1.099	1.821	3.109	3.437
LEV	58,970	0.213	0.022	0.174	0.335	0.204
ROA	58,970	-0.014	-0.019	0.037	0.077	0.195
MCAP(USD Million)	58,970	1373.198	56.581	211.157	832.441	3954.364
NOL	58,970	0.341	0.000	0.000	1.000	0.474
Δ*NOL*	58,970	0.031	0.000	0.000	0.000	0.163
INTANG	58,970	0.138	0.000	0.044	0.194	0.208
PPE	58,970	0.566	0.245	0.467	0.788	0.419
FI	58,970	0.009	0.000	0.000	0.003	0.028
EQINC	58,970	0.001	0.000	0.000	0.000	0.005

Panel B: Summary statistics of peers for focal firms (N=58,970)

	Mean	Q1	Median	Q3	SD
N(Peers)	659	67	419	1,121	676
%Peers_SameInd (SIC1)	18.340%	9.428%	14.578%	26.011%	0.130
%Peers_SameInd (SIC2)	5.402%	0.962%	3.258%	7.857%	0.075
%Peers_SameInd (SIC3)	2.706%	0.000%	0.685%	2.851%	0.064
%Peers_Customer	0.005%	0.000%	0.000%	0.000%	0.003
%Peers_Supplier	0.004%	0.000%	0.000%	0.000%	0.003
%Peers_BoardInterlock	0.047%	0.000%	0.000%	0.028%	0.006

Table 2: Peer effect on tax avoidance – Baseline results

This table presents the OLS regression results of the association between firms' tax avoidance behaviour and their CIB peers' for the pooled sample. The dependent variables are three tax avoidance measures defined above (*BTD_F1*, *BTD_F2*, and *BTD_MP*) for firm *i* in year *t*. The main explanatory variables, *PBTD_F1*, *PBTD_F2*, and *PBTD_MP*, are defined as the equally-weighted average of one of the three tax avoidance measures of firm *i*'s CIB peers in year *t*-1. We identify CIB peers using CIBs' holding information in year *t*-1 and then calculate the average of tax avoidance of these peers in year *t*-1. Control variables include the institutional ownership (*INST*), market-to-book ratio (*MB*), leverage ratio (*LEV*), profitability (*ROA*), market capitalization (*LOGMCAP*), loss carryforward (Δ*NOL*), change in loss carryforward (Δ*NOL*), intangible assets (*INTANG*), property, plant, and equipment (*PPE*), foreign income (*FI*), and equity income earnings (*EQINC*). Control variables are lagged by one year. Variable definitions are provided in Appendix A. We control for industry and year fixed effects in all specifications. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1) *BTD_F1*	(2) *BTD_F2*	(3) *BTD_MP*
PBTD_F1	0.181***		
	(12.05)		
PBTD_F2		0.170***	
		(10.71)	
PBTD_MP			0.188***
			(12.24)
INST	0.021***	0.020***	0.020***
	(9.33)	(9.04)	(9.08)
MB	-0.003***	-0.003***	-0.003***
	(-8.97)	(-8.06)	(-9.17)
LEV	0.045***	0.046***	0.044***
	(11.00)	(11.30)	(10.64)
ROA	0.514***	0.514***	0.502***
	(53.78)	(52.89)	(52.54)
LOGMCAP	0.001***	0.001	0.002***
	(3.36)	(1.28)	(4.33)
NOL	0.001	-0.001	0.002
	(0.44)	(-0.95)	(1.20)
Δ*NOL*	-0.078***	-0.077***	-0.077***
	(-10.29)	(-9.91)	(-10.15)
INTANG	-0.015***	-0.013***	-0.013***
	(-3.92)	(-3.55)	(-3.25)
PPE	0.013***	0.006***	0.014***
	(6.11)	(2.98)	(6.56)
FI	0.013	0.051*	-0.321***
	(0.44)	(1.79)	(-13.45)
EQINC	0.571***	0.506***	-0.595***
	(4.06)	(3.48)	(-4.31)
Constant	-0.046***	-0.058***	-0.039***
	(-3.48)	(-4.30)	(-2.95)
Observations	58,970	58,970	58,970
R-squared	0.48	0.46	0.46

Table 3: Peer effect on tax avoidance – Change regression results

This table presents the results of the association between changes in firms' tax avoidance behaviour and changes in their peers' tax avoidance behaviour. The dependent variables, Δ*BTD_F1*, Δ*BTD_F2*, and Δ*BTD_MP*, are changes in three tax avoidance measures over two consecutive years from year *t*-1 to *t*. The main explanatory variables, Δ*PBTD_F1*, Δ*PBTD_F2*, and Δ*PBTD_MP*, are changes in equally-weighted average of peer firms' tax avoidance based on the three tax avoidance measures (*BTD_F1*, *BTD_F2*, and *BTD_MP*) over two consecutive years from year *t*-2 to *t*-1. For focal firm *i* in year *t*, we identify its CIB peers using CIBs' holding information in year *t*-1 and then calculate the changes in tax avoidance of these peers in year *t*-1. Control variables include the change in institutional ownership (Δ*INST*), change in market-to-book ratio (Δ*MB*), change in leverage ratio (Δ*LEV*), change in profitability (Δ*ROA*), change in firm size (Δ*LOGMCAP*), change in loss carryforward (Δ*NOL*), change in intangible assets (Δ*INTANG*), change in property, plant, and equipment (Δ*PPE*), change in foreign income (Δ*FI*), and change in equity income earnings (Δ*EQINC*). All control variables are lagged by one year. We control for industry and year fixed effects in all specifications. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	Δ*BTD_F1*	Δ*BTD_F2*	Δ*BTD_MP*
Δ*PBTD_F1*	0.082***		
	(3.80)		
Δ*PBTD_F2*		0.094***	
		(3.84)	
Δ*PBTD_MP*			0.063***
			(3.23)
Δ*INST*	-0.001	0.000	0.001
	(-0.16)	(0.06)	(0.16)
Δ*MB*	-0.000	-0.000	-0.000
	(-0.95)	(-1.07)	(-1.12)
Δ*LEV*	0.043***	0.038***	0.043***
	(3.63)	(2.96)	(3.69)
Δ*ROA*	-0.130***	-0.128***	-0.124***
	(-10.96)	(-10.11)	(-10.61)
Δ*LOGMCAP*	0.009***	0.010***	0.008***
	(4.95)	(4.67)	(4.10)
Δ*NOL*	0.005***	0.006***	0.005***
	(5.11)	(5.02)	(4.69)
Δ*INTANG*	-0.044***	-0.035***	-0.039***
	(-5.88)	(-4.36)	(-5.34)
Δ*PPE*	0.031***	0.036***	0.028***
	(5.43)	(6.06)	(4.99)
Δ*FI*	-0.193***	-0.112***	0.095***
	(-5.13)	(-2.78)	(2.88)
Δ*EQINC*	-0.343*	-0.063	0.140
	(-1.67)	(-0.28)	(0.72)
Constant	-0.009	-0.005	-0.009
	(-1.38)	(-0.80)	(-1.34)
Observations	45,023	45,023	45,023
R-squared	0.03	0.02	0.02

Table 4: Peer effect on tax avoidance – Evidence from state-level tax rate increases

This table presents the results of peer effect on tax avoidance using state-level tax rate increases as exogenous events. Year *t* is the event year in which the tax rate of a certain state is increased. Panel A reports univariate results of changes in tax avoidance for event firms, i.e. firms located in tax rate-increasing states in the event year; Panel B reports the multivariate results of the changes in tax avoidance of non-event firms (i.e., firms not located in event states). The dependent variables and control variables are change variables for firm *i* from year *t-1* to year *t+1*. *EVENTPEER* is an indicator variable that equals one if a firm has at least one peer firm that is an event firm in year *t*, and zero otherwise. Other variable definitions are provided in Appendix A. We include industry and year fixed effects. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Tax avoidance for firms located in states experiencing increases in tax rates

Variable	N	*PRE* (*t–1*)		*POST* (*t+1*)		*POST – PRE*	*t-value*
		Mean	Median	Mean	Median		
BTD_F1	1,058	-0.067	0.000	-0.037	0.010	0.030***	5.97
BTD_F2	1,058	-0.063	0.003	-0.041	0.006	0.021***	3.80
BTD_MP	1,058	-0.080	-0.010	-0.048	-0.001	0.033***	5.75

Panel B: Multivariate results for changes in tax avoidance for firms not located in event states

	(1)	(2)	(3)
	Δ*BTD_F1*	Δ*BTD_F2*	Δ*BTD_MP*
EVENTPEER	0.009***	0.009***	0.007***
	(6.03)	(5.54)	(4.96)
Δ*INST*	-0.013*	-0.011	-0.010
	(-1.83)	(-1.48)	(-1.49)
Δ*MB*	0.001**	0.001*	0.001*
	(2.23)	(1.69)	(1.85)
Δ*LEV*	0.036***	0.042***	0.032***
	(3.05)	(3.26)	(2.72)
Δ*ROA*	0.058***	0.074***	0.056***
	(3.36)	(3.80)	(3.33)
Δ*LOGMCAP*	0.007***	0.005**	0.006***
	(3.05)	(2.09)	(2.98)
Δ*NOL*	0.011***	0.009***	0.009***
	(4.76)	(3.62)	(3.75)
Δ*INTANG*	-0.090***	-0.072***	-0.074***
	(-11.20)	(-8.43)	(-9.36)
Δ*PPE*	0.033***	0.038***	0.032***
	(5.12)	(5.48)	(5.00)
Δ*FI*	0.109***	0.160***	-0.090**
	(2.87)	(3.59)	(-2.46)
Δ*EQINC*	0.518**	0.583***	-0.044
	(2.54)	(2.62)	(-0.23)
Constant	-0.021**	-0.014**	-0.019*
	(-2.01)	(-2.51)	(-1.83)
Observations	30,934	30,934	30,934
R-squared	0.03	0.04	0.03

Table 5: Peer effect on tax avoidance – A placebo test with past peers

This table provides the effect of past CIB peers on tax avoidance of the focal firm in current year. For a firm *i* in year *t*, its past CIB peers are defined as firms that used to be CIB peers of the focal firm before year *t*-3 and the peer relation has been discontinued since year *t*-3. The dependent variables are three tax avoidance measures defined above (*BTD_F1*, *BTD_F2*, and *BTD_MP*) for firm *i* in year *t*. *PBTD_F1_Pastpeer*, *PBTD_F2_Pastpeer*, and *PBTD_MP_Pastpeer*, are defined as the equally-weighted average of one of the three tax avoidance measures of firm *i*'s past CIB peers. We control for *PBTD_F1*, *PBTD_F2*, and *PBTD_MP*, which are defined as the equally-weighted average of one of the three tax avoidance measures of firm *i*'s CIB peers in year *t*-1. Control variables include the institutional ownership (*INST*), market-to-book ratio (*MB*), leverage ratio (*LEV*), profitability (*ROA*), market capitalization (*LOGMCAP*), loss carryforward (Δ*NOL*), change in loss carryforward (Δ*NOL*), intangible assets (*INTANG*), property, plant, and equipment (*PPE*), foreign income (*FI*), and equity income earnings (*EQINC*). Control variables are lagged by one year. Variable definitions are provided in Appendix A. Industry and year fixed effects are controlled for, and standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1	0.221***		
	(10.78)		
PBTD_F1_Pastpeer	0.021**		
	(2.08)		
PBTD_F2		0.208***	
		(9.58)	
PBTD_F2_Pastpeer		0.011	
		(1.10)	
PBTD_MP			0.232***
			(10.88)
PBTD_MP_Pastpeer			0.010
			(1.17)
Control variables	Yes	Yes	Yes
Observations	40,986	40,986	40,986
R-squared	0.43	0.42	0.42

Table 6: Peer effect on tax avoidance – Two possible mechanisms

This table presents the peer effect on tax lobbying activities and tax haven usage. In panel A, the dependent variables are two proxies for tax lobbying activities in year *t*. *D_TaxLobby* is an indicator variable equal to one if a firm has reported lobbying activities for tax purposes. *Log(TaxLobbyRpt)* measures the natural logarithm number of reports a firm has disclosed lobbying activities for tax purposes. *PD_TaxLobby* is the percentage of CIB peers that have engaged in tax lobbying activities in year *t*-1. *PLog(TaxLobbyRpt)* is the average logarithmof the number of reports related to tax lobbying activities by CIB peers in year *t*-1. In panel B, the dependent variables are three proxies for usage of tax havens in year *t*: *D_TaxHavens*, *Log(TaxHavens)*, and *TaxHaven_Percentage*. *D_TaxHavens* is an indicator variable that equals one if a firm has at least one subsidiary operating in a tax haven. *Log(TaxHavens)* is the natural logarithmof the number of subsidiaries incorporated in tax havens for a firm. *TaxHaven_Percentage* is the percentage of subsidiaries that are located in tax havens, which is the number of tax haven subsidiaries divided by the total number of subsidiaries the firm has. *PD_TaxHavens* is the percentage of CIB peers that have tax haven subsidiaries in year *t*-1. *PLog(TaxHavens)* is the average log number of tax haven subsidiaries established by the firm's CIB peers in year *t*-1. *PTaxHaven_Percentage* is the average percentage of tax haven subsidiaries the firm's CIB peers have in year *t*-1. We identify CIB peers of each firm using CIB holding information in year *t*-1. All explanatory variables are lagged by one year. The sample period is from 1998 to 2014. Other variable definitions are provided in Appendix A. We control for industry and year fixed effects. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Peer effect on tax lobbying activities

	(1)	(2)
	D_TaxLobby	*Log(TaxLobbyRpt)*
PD_TaxLobby	4.342***	
	(3.01)	
PLog(TaxLobbyRpt)		0.202***
		(3.62)
INST	-0.303	-0.054***
	(-1.20)	(-3.75)
MB	-0.021*	-0.001*
	(-1.75)	(-1.66)
LEV	1.215***	0.038**
	(3.32)	(2.39)
ROA	-1.349***	-0.046***
	(-3.13)	(-4.36)
LOGMCAP	1.056***	0.035***
	(15.83)	(9.42)
NOL	-0.010	0.000
	(-0.06)	(0.07)
ΔNOL	-0.737**	-0.011**
	(-2.01)	(-2.44)
INTANG	-1.264***	-0.052***
	(-3.46)	(-4.11)
PPE	0.403	0.010
	(1.56)	(1.01)
FI	0.532	0.320**
	(0.28)	(2.02)
EQINC	19.028	2.839**
	(1.12)	(2.17)
Constant	-8.405***	-0.203***
	(-8.74)	(-6.90)
Observations	32,490	34,389
Pseudo R-squared/R-squared	0.36	0.10

Panel B: Peer effect on the usage of tax havens

	(1) *D_TaxHavens*	(2) *Log(TaxHavens)*	(3) *TaxHaven_Percentage*
PD_TaxHavens	0.609***		
	(4.27)		
PLog(TaxHavens)		0.071***	
		(5.11)	
PTaxHaven_Percentage			0.064***
			(3.08)
INST	0.048	-0.005	-0.001
	(0.51)	(-0.25)	(-0.23)
MB	-0.044***	-0.009***	-0.001***
	(-7.93)	(-9.61)	(-3.44)
LEV	0.631***	0.133***	0.029***
	(4.36)	(5.04)	(3.20)
ROA	-0.392***	-0.137***	-0.021**
	(-3.14)	(-7.03)	(-2.28)
LOGMCAP	0.555***	0.125***	0.018***
	(24.16)	(27.14)	(14.43)
NOL	0.272***	0.073***	0.005
	(5.15)	(6.77)	(1.62)
Δ*NOL*	-0.323***	-0.061***	-0.007
	(-3.44)	(-4.57)	(-1.07)
INTANG	-0.007	0.015	-0.017**
	(-0.07)	(0.65)	(-2.37)
PPE	-0.313***	-0.039**	-0.015***
	(-3.59)	(-2.51)	(-2.92)
FI	11.381***	3.395***	0.335***
	(12.83)	(16.60)	(6.00)
EQINC	6.627	3.016**	-0.057
	(1.22)	(2.48)	(-0.19)
Constant	-6.236***	-0.557***	-0.109***
	(-11.39)	(-6.46)	(-6.96)
Observations	39,912	43,776	43,776
Pseudo R-squared/R-squared	0.25	0.32	0.11

Table 7: Peer effect on tax avoidance – Cross-sectional differences in peer relation

This table presents the peer effect on tax avoidance induced by different types of peers. In panel A, we group all peers of each focal firm into two subsets based on duration of peer relation between each peer and the focal firm. Long-term (short-term) peers are defined as peers that share common blockholders with the focal firm for over (no more than) one year in the past five years. *PTaxAvoid_LONG* (*PTaxAvoid_SHORT*) is the equally-weighted average of tax avoidance across long-term (short-term) peers of a firm. In panel B, we group all peers of each firm into two subsets based on horizons of common institutional blockholders. Institutional investors are classified as dedicated (*DED*) and transient (*TRA*) investors according to their investment horizons using data provided by Brian Bushee. *PTaxAvoid_DED* (*PTaxAvoid_TRA*) is the equally-weighted average of tax avoidance across peers that share common dedicated (transient) institutional blockholders with the focal firm. Other variable definitions are provided in Appendix A. We include industry and year fixed effects. Standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Grouping peers by length of peer relation with the focal firm

	(1) *BTD_F1*	(2) *BTD_F2*	(3) *BTD_MP*
PBTD_F1_LONG	0.223***		
	(10.52)		
PBTD_F1_SHORT	0.044***		
	(4.17)		
PBTD_F2_LONG		0.207***	
		(9.31)	
PBTD_F2_SHORT		0.041***	
		(3.79)	
PBTD_MP_LONG			0.226***
			(10.29)
PBTD_MP_SHORT			0.049***
			(4.63)
INST	0.017***	0.017***	0.017***
	(7.68)	(7.45)	(7.55)
MB	-0.002***	-0.002***	-0.002***
	(-7.04)	(-6.32)	(-7.23)
LEV	0.043***	0.044***	0.041***
	(10.01)	(10.24)	(9.65)
ROA	0.485***	0.487***	0.473***
	(44.31)	(43.85)	(43.24)
LOGMCAP	0.002***	0.001*	0.002***
	(3.79)	(1.85)	(4.02)
NOL	0.001	-0.000	0.003
	(0.97)	(-0.28)	(1.64)
Δ*NOL*	-0.079***	-0.077***	-0.079***
	(-9.33)	(-8.80)	(-9.23)
INTANG	-0.015***	-0.013***	-0.011***
	(-3.58)	(-3.20)	(-2.71)
PPE	0.013***	0.006***	0.014***
	(5.57)	(2.84)	(6.13)
FI	0.016	0.057*	-0.311***
	(0.53)	(1.89)	(-12.64)
EQINC	0.479***	0.422***	-0.656***
	(3.20)	(2.74)	(-4.64)
Constant	-0.048***	-0.054***	-0.043***
	(-3.36)	(-3.74)	(-2.94)
Observations	50,375	50,375	50,375
R-squared	0.45	0.44	0.44

Panel B: Grouping peers by horizons of common institutional blockholders

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1_DED	0.130***		
	(3.79)		
PBTD_F1_TRA	0.076***		
	(4.00)		
PBTD_F2_DED		0.138***	
		(3.71)	
PBTD_F2_TRA		0.061***	
		(3.19)	
PBTD_MP_DED			0.138***
			(4.02)
PBTD_MP_TRA			0.081***
			(4.24)
INST	0.014***	0.018***	0.014***
	(2.79)	(3.56)	(2.93)
MB	-0.001	-0.001**	-0.001*
	(-1.63)	(-2.04)	(-1.75)
LEV	0.033***	0.034***	0.028***
	(3.38)	(3.70)	(2.90)
ROA	0.347***	0.348***	0.338***
	(10.45)	(10.39)	(10.46)
LOGMCAP	0.007***	0.006***	0.006***
	(4.27)	(3.91)	(4.20)
NOL	-0.008**	-0.009**	-0.008**
	(-2.07)	(-2.28)	(-2.09)
Δ*NOL*	-0.010	-0.010	-0.009
	(-1.36)	(-1.36)	(-1.16)
INTANG	-0.014*	-0.013*	-0.011
	(-1.70)	(-1.73)	(-1.34)
PPE	0.004	0.001	0.006
	(0.80)	(0.26)	(1.06)
FI	0.124	0.155**	-0.201***
	(1.61)	(2.36)	(-3.17)
EQINC	0.064	0.213	-0.365**
	(0.34)	(1.18)	(-2.53)
Constant	-0.050**	-0.048*	-0.044
	(-2.01)	(-1.70)	(-1.45)
Observations	7,508	7,508	7,508
R-squared	0.37	0.36	0.35

Table 8: Peer effect on tax avoidance – Controlling for other types of peer effects induced by common industry, common location, or board interlock

This table provides the results of blockholder peer effect on tax avoidance after controlling for peer connections through other channels. *Industry PTaxAvd, Geographic PTaxAvd,* and *Board Interlock PTaxAvd* refer to equally-weighted average of tax avoidance for firms sharing common industry affiliation (two-digit SIC codes), common location (headquarter state), and common boards (board interlocks) with the focal firm, respectively. We control for these three variables in panel A, B, and C, respectively. Other variables are defined in Appendix A. Industry and year fixed effects are controlled for, and standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Controlling for common industry effect

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1	0.197***		
	(11.28)		
PBTD_F2		0.189***	
		(10.28)	
PBTD_MP			0.203***
			(11.33)
Industry PTaxAvoid	0.097***	0.082***	0.106***
	(6.77)	(5.43)	(6.77)
Control variables	Yes	Yes	Yes
Observations	51,078	51,078	51,078
R-squared	0.46	0.44	0.45

Panel B: Controlling for common location effect

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1	0.204***		
	(8.49)		
PBTD_F2		0.184***	
		(7.40)	
PBTD_MP			0.212***
			(8.65)
Geographic PTaxAvoid	-0.000	-0.000	-0.000
	(-0.03)	(-0.25)	(-0.01)
Control variables	Yes	Yes	Yes
Observations	28,118	28,118	28,118
R-squared	0.47	0.44	0.46

Panel C: Controlling for board interlock effect

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1	0.219***		
	(7.71)		
PBTD_F2		0.203***	
		(6.64)	
PBTD_MP			0.239***
			(8.16)
Board Interlock PTaxAvoid	0.060***	0.058***	0.058***
	(6.91)	(6.59)	(6.51)
Control variables	Yes	Yes	Yes
Observations	21,766	21,766	21,766
R-squared	0.55	0.51	0.53

Table 9: Peer effect on tax avoidance - Robustness tests

This table presents five robustness tests results. Panel A reports the results of the association between firms' use of tax avoidance and their peers' using value-weighted tax avoidance average measures. We use common blockholder ownership between a focal firm and one of its peer as the weight this peer relation. $VW\_PBTD\_F1_{i,t-1}$, $VW\_PBTD\_F2_{i,t-1}$, and $VW\_PBTD\_MP_{i,t-1}$ refer to lagged value-weighted tax avoidance average measures. Panel B presents the results using averages of tax avoidance residual of peer firms as alternative explanatory variables. The tax avoidance residual is calculated by regressing tax avoidance on firm fundamental determinants that are likely to affect a firm's tax avoidance, so that the tax avoidance residual can capture abnormal tax avoidance beyond firm characteristics. In the first stage, we estimate the following regression model to obtain the tax avoidance residual for each firm *i*:

$$TaxAvoid_{i,t} = a_0 + b_1 MB_{i,t-1} + b_2 LEV_{i,t-1} + b_3 ROA_{i,t-1} + b_4 LOGMCAP_{i,t-1} + b_5 NOL_{i,t-1} + b_6 \Delta NOL_{i,t-1} + b_7 INTANG_{i,t-1} + b_8 PPE_{i,t-1} + b_9 FI_{i,t-1} + b_{10} EQINC_{i,t-1} + e_{i,t-1}, \quad (1)$$

Then, for each focal firm, we calculate the average of peers' residuals as the equally-weighted average of tax avoidance residuals averaged across all of its peer firms. In the second stage, we use the focal firm's own tax avoidance as the dependent variable and the average of its peers' residual as independent variables. *PBTD_F1_resd* is the equally-weighted average of the *BTD_F1* residual for focal firm *i*'s peers in year *t*; *PBTD_F2_resd* is the equally-weighted average of the *BTD_F2* residual for focal firm *i*'s peers in year *t*; *PBTD_MP_resd* is the equally-weighted average of the *BTD_MP* residual for focal firm *i*'s peers in year *t*. Panel C presents the OLS regression results after controlling for firm fixed effect. Panel D reports the results of peer effect using two alternative tax avoidance measures: current effective tax rate (*ETR*) and cash effective tax rate (*CETR*). *ETR* is calculated as (Total tax expense − Deferred tax expense) / (Pretax income – Special items). *CETR* is calculated as Cash taxes paid / (Pretax income – Special items). Panel E presents the peer effect on tax avoidance using peer connections through the largest CIB of the focal firm. For each focal firm *i* in year *t*-1, we first identify the institutional blockholder that holds the largest ownership in this firm over the four quarters ending at the fiscal year end date. Then we identify other firms that are also held by this institutional blockholder in year *t*-1 as largest CIB peers for firm *i*. *PBTD_F1_LargestCIB*, *PBTD_F2_LargestCIB*, and *PBTD_MP_LargestCIB* refer to equally-weighted average of *BTD_F1*, *BTD_F2*, and *BTD_MP* over this largest CIB peers, respectively. Control variables include the institutional ownership (*INST*), market-to-book ratio (*MB*), leverage ratio (*LEV*), profitability (*ROA*), market capitalization (*LOGMCAP*), loss carryforward (Δ*NOL*), change in loss carryforward (Δ*NOL*), intangible assets (*INTANG*), property, plant, and equipment (*PPE*), foreign income (*FI*), and equity income earnings (*EQINC*). Control variables are lagged by one year. Definitions of other variables are provided in Appendix A. Industry and year fixed effects are controlled for, and standard errors are clustered at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Robustness with value-weighted average measures

	(1) *BTD_F1*	(2) *BTD_F2*	(3) *BTD_MP*
VW_PBTD_F1	0.175***		
	(12.00)		
VW_PBTD_F2		0.165***	
		(10.70)	
VW_PBTD_MP			0.182***
			(12.13)
Control variables	Yes	Yes	Yes
Observations	59,019	59,019	59,019
R-squared	0.48	0.46	0.46

Panel B: Robustness with tax avoidance residual

	(1) *BTD_F1*	(2) *BTD_F2*	(3) *BTD_MP*
PBTD_F1_Resd	0.218***		
	(5.65)		
PBTD_F2_Resd		0.191***	
		(4.68)	
PBTD_MP_Resd			0.241***
			(6.27)
Control variables	Yes	Yes	Yes
Observations	58,647	58,647	58,647
R-squared	0.47	0.46	0.46

Panel C: Robustness after controlling for firm fixed effect

	(1) *BTD_F1*	(2) *BTD_F2*	(3) *BTD_MP*
PBTD_F1	0.042**		
	(2.13)		
PBTD_F2		0.035*	
		(1.70)	
PBTD_MP			0.037**
			(1.96)
Control variables	Yes	Yes	Yes
Observations	58,982	58,982	58,982
R-squared	0.65	0.64	0.66

Panel D: Robustness with alternative tax avoidance measures

	(1) *ETR*	(2) *CETR*
PETR	0.136***	
	(7.64)	
PCETR		0.243***
		(11.64)
Control variables	Yes	Yes
Observations	58,970	58,970
R-squared	0.15	0.21

Panel E: Restrict to peers connected through the largest CIB of the focal firm

	(1)	(2)	(3)
	BTD_F1	*BTD_F2*	*BTD_MP*
PBTD_F1_LargestCIB	0.122***		
	(12.26)		
PBTD_F2_LargestCIB		0.116***	
		(10.95)	
PBTD_MP_LargestCIB			0.127***
			(12.30)
Control variables	Yes	Yes	Yes
Observations	58,335	58,335	58,335
R-squared	0.47	0.46	0.46

Appendix A: Variable definitions

Variable	Definition
BTD_F1	Pretax income – ((Current federal tax expense + Foreign tax expense) / Statutory tax rate), deflated by lagged total assets
BTD_F2	Pretax income – ((Current federal tax expense + Foreign tax expense)/ Statutory tax rate) – (Total deferred tax expense/Statutory tax rate), deflated by lagged total assets
BTD_MP	Domestic income – (Current federal tax expense / Statutory tax rate) – State income taxes – Other income taxes – Equity in earnings, deflated by lagged assets
PBTD_F1	Equally-weighted average of *BTD_F1* for a focal firm's peers firms
PBTD_F2	Equally-weighted average of *BTD_F2* for a focal firm's peers firms
PBTD_MP	Equally-weighted average of *BTD_MP* for a focal firm's peers firms
EVENTPEER	An indicator variable that equals one if a firm has at least one peer firm that is an event firm headquartered in a tax rate increase state, and zero otherwise.
INST	Percentage of institutional ownership
MB	Market-to-book ratio
LEV	Leverage, defined as long-term debt divided by total assets
ROA	Profitability, calculated as income before extraordinary items divided by total assets
MCAP	Market capitalization in million (USD) measured as of the fiscal year end.
LOGMCAP	Natural logarithm of market capitalization
NOL	An indicator that equals 1 if the loss carryforward > 0 at the beginning of the year, and 0 otherwise
ΔNOL	Change in loss carryforward, deflated by lagged total assets
INTANG	Intangible assets deflated by total assets
PPE	Property, plant, and equipment, deflated by lagged total assets
FI	Foreign income, deflated by lagged total assets
EQINC	Equity income in earnings, deflated by lagged total assets

Appendix B

Table A1: Sample selection procedure

This table presents our sample selection procedure. Our sample period is from 1980 to 2014. Our final sample has 58,970 firm-year observations.

	Num. of Obs.
Firm-year observations from Compustat with available information for tax avoidance measures and control variables from 1980 to 2014	86,527
Exclude:	
Non-US firm-year observations	(2,193)
Firm-year observations without CIB peers	(16,393)
Firm-year observations in finance and utility industries	(8,971)
	58,970