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Certified Inside Directors and Tax Avoidance: International Evidence

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A thesis submitted in partial fulfillment of the requirements

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DECLARATION

I hereby declare that this thesis represents my own work which has been done after registration for the degree of PhD at Hong Kong Baptist University, and has not been previously included in a thesis or dissertation submitted to this or any other institution for a degree, diploma or other qualifications.

I have read the University's current research ethics guidelines, and accept responsibility for the conduct of the procedures in accordance with the University's Committee on the Use of Human & Animal Subjects in Teaching and Research (HASC). I have attempted to identify all the risks related to this research that may arise in conducting this research obtained the relevant ethical and/or safety approval (where applicable), and acknowledged my obligations and the rights of the participants.

Signature: FAN LYU

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ABSTRACT

Tax avoidance activities are complex, and the effective planning of these activities requires a mix of functional knowledge in business and a good understanding of a firm's operations. Armed with hands-on experience of running their firms' business and experience of other firms through their outside directorship appointments, certified inside directors (CIDs) are able to structure and execute tax avoidance activities for their firms. This study finds that firms with CIDs on their boards avoid more taxes. At the same time, only CIDs with no more than three outside directorships help firm save taxes. This study also supports that CIDs in complex firms and firms with bad environmental corporate social responsibility (CSR) avoid more taxes. This research extends the literature on corporate governance in general and inside directors in particular by examining whether CIDs can help firms save taxes.

Table of Contents

Certified Inside Directors and Tax Avoidance: International Evidence

List of Table

I. Introduction

I examine the impact of certified inside directors (CIDs), who are non-CEO inside directors and have directorships in other firms, on corporate tax avoidance levels across countries. Prior research identifies the effect of firm-level corporate governance characteristics on cross-sectional variation in tax planning within a given country, but few studies explore this impact in an international setting. This is largely because all of the firms operating in a given country are subject to the same tax system and because changes to tax systems are infrequent. However, tax avoidance activities depend heavily on tax systems and other institutional factors. Thus, it is meaningful to consider country-level characteristics in firm level corporate governance and tax strategy research. I fill this gap by examining tax avoidance across countries while focusing on the effects of a special type of inside director: CIDs.

My research is motivated by the debate in the corporate governance and tax planning literature. Prior research has found that the level of tax avoidance is affected by corporate governance, such as ownership, management compensation, and board structure (Chen, Chen, Cheng, and Shevlin 2010; Badertscher, Katz, and Rego 2013; McGuire, Wang, and Wilson 2014). In the literature on board structure and tax strategy, researchers focus on the independence of the board and the monitoring role of outside directors in the tax planning process (Armstrong et

al. 2015). However, researchers have yet to sufficiently explore the role of inside directors.

Recent studies have found that a special kind of inside directors with outside directorships in other firms, CIDs, can enhance firm value (Masulis and Mobbs 2011). The outside director market can certify directors' quality according to their own merits. CIDs obtain outside director seats based on communication, cooperation and management skills, and good performance in their own firms. In addition, tax avoidance is complex, requiring the cooperation of different departments, business/geography/operational segments, and subsidiaries. It is challenging for managers to coordinate and engage in tax planning, especially when firms operate in different countries. Equipped with communication, cooperation and management skills, CIDs are able to conduct tax planning activities more effectively than other insiders. This study explores how CIDs improve firm performance through a specific activity, i.e., tax avoidance that helps firms save real cash.

This thesis also responds to the argument in the literature regarding the interaction between inside directors and outside directors. Prior research has shown that effective communication between these two kinds of directors can decrease verification costs and improve firm performance (Raheja 2005). To keep their reputations, CIDs are more likely to share information with outside directors which helps outside directors understand the tax planning process within a firm and accept a low effective tax rate (ETR). In addition, CIDs are in the outside

director market and have higher reputation than other inside directors do. It is thus easier for outside directors to trust CIDs and accept a low ETR in firms with CIDs. This paper explores how this effective interaction between CIDs and outside directors facilitates the tax planning process.

Two steps lead to firms' final ETRs. The first step is insiders initiating and executing tax planning activities, helping firms pay fewer taxes and save real cash. Insiders can help firms avoid taxes through exports and research and development (R&D) investments, particularly in large, complex, and tax flexible firms. The second step turns to the monitoring role of outside directors in tax avoidance: because of the agency problem, managers may consume cash saved from tax avoidance for their own interests, such as rent extraction and empire building, and hurt shareholders' interests. Because of their monitoring role, outside directors may monitor managers' behavior and mitigate tax planning activities (Minnick and Noga 2010). At the same time, some outside directors may be afraid of becoming involved in tax sheltering and thus decrease their tax avoidance level. As a result, ETRs increase (Armstrong et al. 2015).

Most of the related literature focuses on the second step and finds that board independence decreases tax avoidance (Armstrong et al. 2015). This paper considers the entire process of the tax strategy and explores how inside directors practice tax planning activities and how a special kind of inside directors with outside directorships affects the judgment of outside directors regarding a firm's tax avoidance level.

Most of the prior literature explores tax avoidance problems in the light of agency theory and regards tax planning activities as opportunities for managers to extract rent. As tax planning are complex, they reduce a company's transparency (Balakrishnan, Blouin, and Guay 2012). Managers may take advantage of this information asymmetry, consume cash saved from tax avoidance for their own interests and harm shareholders' interests (Desai and Dharmapala 2006).

However, tax avoidance can benefit firms by lowering tax liability, and increasing after-tax net income and cash flows. Meanwhile, tax avoidance has its costs/risks. Rego and Wilson (2012) suggest that tax avoidance increases uncertainty over future tax outcomes and can impose costs on firms and shareholders. In an extreme situation, firms may become involved in tax shelters which can increase the penalties paid by firms to tax authorities and make firms suffer reputational costs. Thus, tax avoidance activities can be viewed as high-risk, high-return investments.

In addition, as some countries encourage exports and innovation, certain tax strategies are welcomed by the governments, such as export tax rebates and R&D tax incentives. Some tax strategies benefit both individual firms and the countries. For example, it is critical for IT companies to enjoy the tax incentives for R&D investments, especially for their early stage. The development of society depends on the development of technology. Therefore, paying fewer taxes by investing in R&D expenditure can benefit all stakeholders. In this research, tax avoidance is good, at least not bad to a corporation, and is a kind of high risk, high return

investment. This paper explores how CIDs help improve firm performance by investing in tax avoidance and saving real cash.

I use a sample of firms from 2001 to 2015 in 30 countries with available directors and financial data in both BoardEx and Worldscope and unique firm identification to explore the association between CIDs and tax avoidance. This thesis captures how aggressively managers pursue strategies that reduce taxes paid to proxy for the tax avoidance level. Following Atwood, Drake, Myers, and Myers (2012), this study uses the measurement as the difference between the firm's "unmanaged tax amount" (the home-country statutory corporate tax rate times pre-tax earnings before exceptional items) and its "managed tax amount" (current taxes paid).

Overall, I find a positive association between CIDs on a firm's board and the firm's tax avoidance level. This suggests that CIDs have the ability to conduct tax planning activities, clearly explain tax planning process to outside directors, obtain the trust of outside directors to accept a low ETR, and help a firm save cash through avoiding taxes. Firms with CIDs have 5.49 percent lower tax payments than firms without CIDs on their boards. The positive association between CIDs and tax avoidance is robust to alternative proxies, including the existence of CIDs on the board, the proportion of CIDs on the board and the number of CIDs on the board.

To address the endogeneity problem, I use the propensity score matching method to select the sample. This research matches each control firm with one treatment firm with a similar probability of appointing CIDs to its board for the first time in the following year according to the closest propensity score. I then conduct a difference-in-differences (DID) analysis. The result shows that before introducing CIDs on the board, there are no significant differences in the tax avoidance levels between the treatment and control firms. However, after introducing CIDs on the board, the tax avoidance level increases significantly in firms with CIDs. Focusing on the change in CIDs on the board and the following change in the tax avoidance level, I establish a causal association between CIDs and tax planning and find further evidence that CIDs on the board increase the tax avoidance level. This result still holds after considering firm fixed effects in the DID analysis.

The association between CIDs and tax avoidance may be affected by the characteristics of both CIDs and their firms. First, according to busy-board theory, directors with more than three outside directorships may not be able to allocate the necessary time and effort to perform well (Field, Lowry, and Mkrtchyan 2013; Fich and Shivdasani 2006; Pritchard, Adam C., Stephen P. and Ferris 2003). Tax planning activities are particularly complex and time consuming demanding the focus and effort of their implementers. I find that CIDs with more than three outside directorships cannot help firms avoid taxes.

Second, Masulis and Mobbs (2011) find that complex firms need inside directors more than other firms do because the verification costs to outside directors are higher in complex firms. For example, it is easier for outside directors to obtain information and help boards make good decisions in mature firms, and in firms with low technology and more tangible assets. However, it is more difficult for outside directors to play effective monitoring and advisory roles in high-growth firms and in firms with high technology and more intangible assets (Raheja 2005). Thus, inside directors are more valuable to complex firms. At the same time, structuring and executing tax strategy is more difficult for complex firms. CIDs are supposed to be more desirable in complex firms particularly for challenging missions such as tax planning.

Meanwhile, complex firms are more likely to be tax-flexible, where there are more opportunities for tax avoidance. Insiders can avoid taxes through higher exports and more R&D investments. However, in firms with little tax flexibility, both CIDs and other inside directors cannot help with tax planning. Thus, I cannot find a significant difference in tax avoidance levels between tax non-flexible firms with and without CIDs on their boards. In contrast, in tax flexible firms, where there is space for tax planning, whether a firm is served by CIDs matters. I find that CIDs help firms avoid taxes only in tax-flexible firms.

Following the measurements in Masulis and Mobbs (2011) and Hitt (1997), this research uses R&D expense and the foreign sales ratio to proxy for the complexity of a firm and find evidence that CIDs help firms avoid more taxes in

complex firms in which the R&D expense is not zero and the foreign sales ratio is higher. As discussed, firms with R&D expenses and high foreign sales ratios are called "tax-flexible" firms as well. Such firms have greater opportunities to avoid taxes, such as by profit shifting and investing more in tax-deductible projects. With experience running their own firms' business and with other firms through their outside directorship appointments, CIDs are able to structure and execute tax planning activities for their firms where other directors cannot. Thus, there is a more pronounced association between CIDs and tax avoidance levels in complex, or tax flexible firms.

Third, Hoi, Wu, and Zhang (2013) argue that firms with more irresponsible CSR activities avoid more taxes as people in firms with greater corporate social responsibility (CSR) seek to not only benefit shareholders' interests, but also increase the welfare for the whole society. Based on their theory, I want to test whether the association between CIDs and tax avoidance varies in firms with different CSR activities. CSR culture can restrain CIDs from avoiding taxes. However, following the measurement for CSR activities in the Asset 4 database, I do not find significant different tax avoidance levels between high-and-low CSR firms.

Hillman and Keim (2001) classify CSR activities as "stakeholder management" and "social issue participation". According to the instrumental theories of CSR (Kim, Park, and Wier 2012; Keim 2001), profit-chasing firms may take advantage of stakeholder management CSR activities to obtain profit.

CIDs in firms with good stakeholder management may also avoid taxes. However, CIDs in firms with good social issue participation may genuinely seek to improve the welfare of all of society and may not thus avoid taxes. I further separate my sample into firms with more environmental improvement CSR (i.e. social issue participation) activities and firms with fewer such activities and test the different roles of CIDs in these two kinds of firms. I find that CIDs only help avoid taxes in firms with bad environmental improvement CSR which are more likely to be profit-chasing firms.

Tax planning activity varies by industry. Firms have greater incentive to avoid tax in more competitive industries. Furthermore, the practicability of tax planning depends on external monitoring. I therefore conduct other cross-sectional tests and find that CIDs help firms pay fewer taxes if they are in more competitive industries and followed by fewer analysts. This research uses the Herfindahl-Hirschman Index (HHI) to proxy for the competition level of an industry. As firms must compete for all kinds of resources in more competitive (i.e., lower HHI) industries, it is more difficult for them to obtain capital from the capital market (Hou and Robinson 2006). Directors in such firms have greater incentives to help firms avoid taxes and save real cash (Cai and Liu 2009). My result shows that CIDs in firms operating in more competitive industries help firms save more taxes. Firms followed by more analysts are under higher levels of outside supervision and conduct fewer tax planning activities. I differentiate between firms with

higher analyst followings and those with lower analyst followings and find that CIDs help firms avoid taxes only when they have less outside supervision.

Overall, the results of this study contribute to the contemporary research on corporate governance and tax planning in several ways. First, researchers find that inside directors can help firms enhance board decision making and improve their performance (Harris and Raviv 2008; Masulis and Mobbs 2011). Focusing on one type of firm activity, this study extends the corporate governance literature, particularly the literature concerning the role of the board of directors, by exploring the role of inside directors in tax planning.

Second, this study extends the literature on the interaction between inside directors and outside directors. Raheja (2005) finds that efficient communication between inside directors and outside directors decreases verification costs and improves boards' monitoring and advisory function. This study extends the literature by exploring how the information communicated by inside directors to outside directors helps outside directors clearly understand a firm's tax planning process and accept a low ETR.

Third, the majority of studies related to tax avoidance target a specific country, most commonly the United States (US) and the research that explores the determinants of tax avoidance in the international context focuses only on country-level institutional characteristics (Simmons 2006; Gordon and Li 2009; Goncharov and Jacob 2012; Salihu, Annuar, and Obid 2015; Markle 2016). This

study extends the results of their prior study by investigating the effects of the firm-level characteristics of CIDs on tax planning after controlling for the country-level institutional environments. This study thus enriches the literature on the determinants of tax avoidance, especially those related to firm-level corporate governance and tax strategies in an international setting.

The remainder of this dissertation is structured as follows. I review the related literature on boards, directors, and tax planning in Section II. In Section III, I provide arguments for how boards of directors affect the tax avoidance level and develop hypotheses. Section IV describes the data and sample. In Section V, I regress the associations between certified inside directors and tax avoidance. Section VI summarizes the findings.

II. Literature Review

2.1 Certified Inside Directors (CIDs)

Inside directors are full-time employees of the company and, therefore, have two relationships and sets of duties. They work for the company in a senior capacity, usually concerned with policy matters or functional business areas of major strategic importance. Outside directors are not employees of the company and are not involved in its day-to-day running. They usually have full-time jobs elsewhere, or may sometimes be prominent individuals from public life (BPP Learning Media 2015). The role of boards serves two broad functions: (1) advising senior management, and; (2) monitoring senior management

According to agency theory, when there is a separation of ownership and control, managers may behave in their own interests rather than the interests of shareholders' (Jensen and Meckling 1976). Thus, the cost of cash holding is higher in firms with high agency problems. First, managers may choose larger projects rather than projects with positive net present value (NPV) because firm size can represent their value and reputation. This is the empire-building problem. Decreasing cash holdings (e.g., distributing cash dividends) is one way to solve this agency problem and constrain managers' over-investment behaviors. In addition, managers may enjoy perquisites such as luxury cars, first-class flights, and expensive hotels during business trips and extract rent from firms. Outside directors are believed to be better than inside directors at monitoring managers' behavior and mitigating empire building and rent extraction.

The proportion of outside directors on boards reduces the perquisites consumed by managers (Deangelo et al. 1987). A number of studies find that powerful CEOs select inside directors to maximize their welfare, and inside directors may therefore not represent shareholders' interests (Helmich and Brown 1972; Growth and Patterns 1974; Fee and Hadlock 2004). In contrast, independent directors are believed to express more objective views in board meetings. Weisbach (1988) argues that firms with high proportions of outside directors on their boards have higher CEO turnover to performance sensitivity. Outside directors are also supposed to review acquisition proposals, provide objective opinions and help conduct profitable acquisitions (Byrd and Hickman 1992).

The securities laws and stock market regulations on corporate governance assume that outside directors are more effective in monitoring management (Anup and Sahiba 2005). Particularly following the Sarbanes-Oxley Act (SOX) in 2002, have researchers have paid more attention the independence of boards of directors. Even after considering the endogeneity of board structure, Knyazeva, Knyazeva, and Masulis (2013) still conclude that board independence is positively associated with firm value and operation performance.

However, recent literature finds that a higher fraction of outside directors may lower firm value (Fogel, Ma, and Morck 2014). This result is mainly driven by less powerful outside directors, who have fewer networks, are less informed, and rely more on CEOs. Because of the monitoring role of outside directors, inside directors do not like to share information with them. Less informed outside directors cannot play effective monitoring and advisory roles in a firm. In addition, excessive monitoring of outside directors may decrease the trust and willingness of CEOs to share information, lead to worse acquisition performance, and restrain corporate innovation (Faleye, Hoitash, and Hoitash 2011). Drymiotes (2007) suggests that fully independent boards may shortchange managers for their monitoring efforts and shirk monitoring *ex post*. In contrast, with proper motivation, inside directors can more effectively monitor managers' behavior and consider managers' interests at the same time. Therefore, effective inside directors can provide monitoring *ex post* and do not shirk monitoring when agents' productive inputs are sunk.

Moreover, outside directors normally have other full-time jobs and therefore less time and effort to spend on serving their outside directorships duties (Fich and Shivdasani 2006). In contrast, inside directors have private firm information and more time in their full-time posts, and they benefit firms through more effective and efficient management, operation, and advisory functions. Inside directors can also collaborate with outside directors to improve firm performance. If firms have policies to promote CEO successors internally, inside directors have an incentive to provide information to outside directors which helps outside directors identify inferior projects proposed by CEOs with low verification costs (Raheja 2005). Insiders can help the board elicit private information from the CEO at a lower cost and can use private information to help outsiders evaluate investment opportunities and make good decisions (Drymiotes 2007; Laux 2008). Drymiotes (2007) also suggests that outside directors have incentives to shirk monitoring *ex post* when the managers' productive inputs are sunk. Some firms therefore prefer an insider-controlled board to an outsider-controlled board (Harris and Raviv 2008). As discussed above, inside directors can facilitate firm operation and improve firm performance if they are given proper incentives.

Not all the inside directors are equal, however. Non-CEO inside directors with positions as outside directors, are CIDs. The outside director market searches for high-quality inside directors according to their performance as executives (Masulis and Mobbs 2011). Thus, CIDs' valuable talent, managerial skills, and ability are recognized by the outside director market. In other words, the outside

director market is a selection mechanism for high-quality inside directors. In addition, distinguishing the quality of inside directors according to the outside labor market is more objective than qualifying inside directors according to their title and compensation because screening candidates through the outside director market can reduce potential concerns about the endogeneity selection process (Mobbs 2013). Internal promotions to the board may be based on good relationships between insiders and their "bosses" rather than according to the insiders' own merits. The outside director market can help select high-quality candidates more objectively. It is clear that inside directors serving as outside directors are popular in practice.

CIDs are also popular because they can enhance the value of sending firm's (the firm in which the executive is employed) by learning about different management styles or strategies from other firms by sitting on outside boards (Booth and Deli 1996; Carpenter and Westphal 2001). Perry and Peyer (2005) find that sender-firm announcement returns are greater if the executives accept nominations as outside directors of financial firms, firms operating in the same industry, or firms with relatively higher growth opportunities, where executives can obtain sensitive information and relevant knowledge. In addition, sender-firms can benefit from the networks of their executives serving as outside directors and from the monitoring effect of those executives on business relationships (Loderer and Bern 2002). Another reason for the popularity of CIDs is that they care more about their reputation and have greater incentives to

improve firm value. This also means that they can provide more objective opinions in the decision-making process, and reject unprofitable projects that hurt shareholders' wealth and benefit CEOs' interests (e.g., empire building) (Masulis and Mobbs 2011).

CIDs are more valuable for firms than non-CIDs. CIDs are more likely than other inside directors to share information with others (Mobbs 2013) which strengthens the board's monitoring and advising function. Interactions between inside and outside directors are important for firm operations. Raheja (2005) suggests that the verification costs for outside directors decrease if inside directors are willing to provide more private information which helps outside directors identify and reject inferior projects, and improve monitoring. This better monitoring asks insiders to defect from the CEO so that the board can reject the proposed project.

Masulis and Mobbs (2011) find that CIDs are strong in managerial skills and expertise. These characteristics can lessen their reliance on their own CEOs for career development as they can rely on their own capabilities to obtain promotions. Thus, they are better able to provide more objective opinions, more likely to reject proposals initiated by CEOs, and better able to advise and monitor management team. Mobbs (2013) finds that CEOs face more pressure in firms with CIDs. These CEOs are more likely to be replaced by CIDs, and their turnover is higher when their performance is bad. CIDs can earn board positions based more on their own merits than on loyalty to the CEOs. Therefore, CIDs can balance the power

of the CEOs and motivate the CEOs to work harder and act in the interest of shareholders. These two papers suggest that CIDs' high reputation, lower reliance on CEOs, willingness to share information with others, management skills, networks, and role of monitoring other firms make them valuable assets for their firms. These valued inside directors have the talent, managerial skills, and capability to enact complex plans, such as tax avoidance plans.

There are a number of complaints about the role of CIDs in firm performance. According to "busy board" theory, outside directorship duties may occupy the time and effort of executive directors in sender-firms. If firms have an agency problem, executives holding more than two outside director positions may damage sender firms' value (Perry and Peyer 2005). Regulators and policy makers also note this problem. The Council of Institutional Investors, the National Association of Corporate Directors, and Institutional Shareholder Services (2012), suggest various limitations on the number of boards on which directors serve. The National Association of Corporate Directors reports that one directorship took 228 hours on average in 2011 (Lublin, 2012). Many inside directors also admit that multiple directorships consume their time and effort. Therefore, the role of CIDs in firm performance is still an empirical question.

2.2 Tax Avoidance

Following the definition in Dyreng, Hanlon, and Maydew (2008), this research chooses the reduction of explicit taxes as the broad definition of tax avoidance.

There are some words like municipal bond investments as general words and "evasion", "aggressiveness", and "sheltering" as words in the other end for tax planning activities. I use the generic term "tax avoidance" in this research to capture how much less tax is paid according to the country-level corporate income tax rate. "Tax aggressiveness" is a subset of tax avoidance which means there is little legal support for the underlying positions. "Tax sheltering" is an extreme situation of tax aggressiveness that tests the bounds of legality.

There is extensive empirical research on tax avoidance, as researchers are interested in and concerned about the determinants of corporate tax avoidance and tax aggressiveness. Prior literature identifies various determinants of tax avoidance, and the results concerning the association between firm size and the tax avoidance level are inconsistent. Gupta and Newberry (1997) argue that ETRs have no relationship with firm size, while other researchers find that firm size has a positive association with tax sheltering (Lisowsky 2010).

Firm size is correlated with other characteristics that may affect tax strategy. Large firms are more likely to be complex firms with high R&D expenses, new products, broad product domains, high geography diversification, and more subsidiaries in foreign countries. Such firms have high levels of tax flexibility and are more likely to be tax avoidant as these characteristics facilitate tax planning activities (Higgins, Omer, and Phillips 2015).

For example, multinational companies use subsidiaries in tax havens to shift profits and conceal taxes. Companies can obtain greater tax incentive through R&D expenses. These large firms also face lower reputation costs once they are detected as tax shelters, because they invest more in R&D and have fewer substitutes for their products. Thus, a business strategy can affect tax avoidance. Prospectors focus on innovation strategy and avoid more taxes, while defenders are risk averse, face more available substitutes and do not avoid taxes. However, in extreme situations, firms with subsidiaries in tax havens are more likely to engage in tax sheltering (Lisowsky 2010; Wilson 2009). Therefore, the inconsistent results regarding firm size and tax avoidance level may be driven by other factors related to size.

Researchers also explore the determinants of tax avoidance from other perspectives. An important measurement used to capture the tax avoidance level, i.e., ETRs, are likely to be affected by a firm's financing and investment strategy. Firms with higher leverage and a higher percentage of fixed assets among total assets tend to have lower ETRs (Gupta and Newberry 1997). As the cost of debt financing is tax deductible while the cost of equity financing is not, firm with high leverage should have lower ETRs. In addition, the tax code allows firms to write off more capital allowance for tangible assets than the depreciation in the net income statement. Thus, firms with more tangible assets should have lower ETRs. Wilson (2009) finds that book tax differences (BTDs) and discretional accruals are positively related to tax sheltering. Firms avoid taxes by lowering taxable

income leading to higher BTDs. Therefore, we use BTDs to represent the tax avoidance level.

Other external factors may affect the tax avoidance level. In reality, firms mimic the tax outcomes of industry average or leaders firms rather than the most profitable firms which are not the leaders of the industry (Kubick, Lynch, Mayberry, and Omer 2015). Therefore, industry leaders' tax strategies affect the tax avoidance level in a company.

Country-level institutional factors can also affect tax avoidance. First and obviously, home country corporate income tax rates affect the tax avoidance level. When statutory corporate tax rates are higher, firms have higher incentives to avoid taxes (Atwood et al. 2012). Atwood et al. (2012) also point out that when the required book tax conformity is lower and a territory approach is used, firms practice aggressive tax strategies. Governments in such countries provide room for companies to execute tax avoidance.

Similarly, Markle (2016) also finds that firms in countries using the territory approach to tax foreign incomes shift more income to foreign countries and avoid taxes. Foreign reinvestment is one method used to shift profit (Klassen and Laplante 2012). When companies make decisions about whether to re-invest in foreign countries, they consider income shifting and tax avoidance. They also consider lowering their reported ETRs and increasing their net income through shifting profit from high-tax-rate foreign countries to the US.

Meanwhile, multinational companies are likely to extend their international scales of operation to pay fewer taxes in both the host and parent countries (Salihu, Annuar, and Sheikh 2015). Salihu, Annuar, and Sheikh (2015) argue that foreign investors invest in developing countries and raise opportunities for income shifting across their various operating segments, making multinational companies tax avoidant in host countries. Therefore, developing countries need to consider the net benefits of foreign direct investment after tax avoidance behavior in emerging economies' pursuit of economic development.

Regulations issued by the government also affect tax avoidance. Li, Maydew, and Willis (2016) consider how worldwide board reforms affect firm-level tax strategy. They find that those worldwide board reforms which involve the board, audit committee independence, and the separation of the Chair and CEO reduce tax avoidance.

Some fundamental country characteristics affect firm-level tax avoidance behavior. Because of weak institutions, a lack of transparency due to weak media supervision, and weak tax enforcement systems, firms in developing countries pay fewer taxes (Besley and Persson 2014).

Recent literature on corporate governance notes that linking managers' interests to those of shareholders facilitates tax avoidance. Armstrong, Blouin, and Larcker (2012) find that the incentives of capable tax directors are negatively related to GAAP ETRs. Through awarding stock options as part of their

compensation, tax directors are more likely to take risks and help firms avoid paying unnecessary taxes giving rise to shareholders' benefits.

Culture and environment of a firm also affect tax strategy. Perceived CSR is one such culture that may affect the tendency to implement a tax strategy. For example, Hoi, Wu, and Zhang (2013) indicate that highly irresponsible CSR firms are more likely to engage in tax sheltering activities, while that firms promote more responsible CSR activities do not avoid taxes. Senior executives in firms with good CSR activities value not only shareholders' benefits, but also the welfare of society at large. Thus, firms with more responsible CSR activities value fairness and do not intentionally avoid taxes.

The quality of an internal information system is considered as a kind of firm environment that may determine whether a firm will implement a tax avoidance strategy. Good internal information quality (IIQ) is essential for tax planning, especially for complex firms. Thus firms with high IIQ have timely access to accurate information and a high level of transparency which enable the firms to integrate unique information for tax planning (Gallemore and Labro 2014).

As discussed, stock option compensation for top management, good CSR activities, and high IIQ are measures to achieve or at least substitutes for good corporate governance. Good corporate governance can mitigate the agency problem and decrease the risk of tax avoidance behavior. Companies also consider other methods to hedge against the risk related to tax avoidance. For example,

firms using financial derivatives to hedge against high-risk, high-return projects and firms with more financial derivatives implement more aggressive tax strategies (Donohoe 2015).

More pertinently, the literature shows that corporate governance can affect tax avoidance. One stream of corporate governance research explores how ownership structure affects tax avoidance. The separation of ownership and control spurs managers to practice aggressive tax strategies because managers can obtain benefits from the cash flows saved from these strategies and do not need to share the risks associated with their implementation. When ownership and decision-making are concentrated, managers who are also large shareholders tend to be more risk-averse and less likely to invest in risky projects such as tax plannings (Badertscher, Katz, and Rego 2013). When managers own the majority of shares, they have to bear the brunt of the corporate projects' failure and therefore do not like to engage in any investment with high risk. In this sense, concentrating ownership and control in a few hands may mitigate tax avoidance. Similarly, Chen, Shuping, Chen, Cheng, and Shevlin (2010) find that family firms avoid fewer taxes than non-family firms because family firms typically have concentrated ownership and control among a small group of family members.

There are other proxies for the concentration of power in a company, and researchers are continuing to explore how such power affects tax avoidance. McGuire, Sean, Wang, and Wilson (2014) find that dual class share structures entrench managers and make them avoid fewer taxes because such firms

concentrate their voting power in the hand of those shareholders voting class who are also top management of their firms. Thus those firms are operating at a suboptimal level. By studying a sample of private firms with publicly traded debt and firms bought back by private equity (PE) firms, Badertscher, Katz, and Rego (2013) find that compared with PE-backed firms, public or employee-owned and management-owned firms prefer less tax avoidance. From the above review, the copious research shows quite a consistent picture that when someone else takes most of the responsibility for the consequences of bad investments, managers are more likely to take risks and implement more aggressive tax strategy. In contrast, if managers themselves bear such consequences, they will become more conservative in assuming unnecessary risks such as tax avoidance.

Institutional ownership could also affect the tax avoidance level (Desai and Dharmapala 2006; Minnick and Noga 2010) as their ownership enhances corporate governance of an investee by performing monitoring and advisory functions for their related firms. As a kind of monitoring mechanism, introducing institutional stockholders makes firms more transparent, improving the IIQ of their firms with the experience of monitoring their investments, also providing valuable advice or managing the cash flow of the firms they invest, including how to avoidance tax. Thus, institutional investors in the proportion of stockholding in a firm may enhance the value of tax savings to shareholders by increasing the level of tax avoidance.

Another stream of corporate governance research explores how board structure and directors' characteristics affect tax avoidance. Lanis and Richardson (2011) document that the percentage of outside directors on boards has a negative association with tax aggressiveness. According to the agency theory, managers may consume cash saved from tax avoidance for their own interests rat the expense of shareholders. The monitoring role of outside directors mitigates those kinds of the agency problem, by reducing the free cash flows kept in firms through lower tax avoidance level. Another explanation to this result could possibly be due to independent directors' lack of sufficient time and firm-specific knowledge to influence tax policy (Armstrong et al. 2015).

Desai and Dharmapala (2006) find that abnormal returns decrease when book- tax differences are large, as shareholders do not benefit from tax sheltering. They also find evidence that management incentive compensation reduces tax sheltering only in firms with weak corporate governance. In firms with poor governance (high G-scores) and low institutional ownership, the rent extraction problem occurs. Using incentive compensation may mitigate rent extraction and encourage managers to benefit firms by reducing tax sheltering. However, in firms with good corporate governance (low G-scores) and high proportion of institutional ownership, there is little opportunity for rent diversion. Thus, implementing incentive compensation schemes to top management provides less advantage for reducing tax sheltering and the tax avoidance level in good corporate governance firms.

Minnick and Noga (2010) find that staggered boards are less likely to conduct tax management as managers in these boards are less motivated to monitor the tax policy proposed by senior executives. They also find that having a higher proportion of independent directors on the board lowers foreign ETRs. As independent directors have a broader view of the company through their experiences of working in the boards of other firms, they do not simply focus on monitoring the traditional top-line sources of performance growth; they may also help the company pay more attention to tax management as a mean of improving its performance.

Turning to the effects from the board as a whole to individual directors, Dyreng, Hanlon, and Maydew (2010) find that the appointment and departure of executives affect effective tax rates. In addition, executives switching firms in the same industry and executives preferring optimistic wordings in financial reports spur low cash ETRs. Some directors with specialized expertise in taxation have stronger effects on tax avoidance. Robinson, Xue, and Zhang (2012) investigate the role of financial experts in audit committees and find that financial experts serving as members of these committees facilitate tax planning. Specifically, firms with a higher proportion of financial experts in their audit committees have lower ETRs.

III. Hypothesis Development

Tax avoidance can benefit firms by lowering tax liability, and increasing after-tax net income and cash flows; yet it does not necessarily result in rent extraction and empire building. As tax avoidance is expected to benefit firms through real cash, top managers feel pressure to lower firms' effective tax rates (Dyreng et al. 2010).

Certain tax avoidance strategies are encouraged by governments. Some countries encourage exports and allow firms to apply for export tax rebates for international business. Some also encourage innovation and provide tax incentives for R&D including tax deferrals, tax allowances, and tax credits. For example, since 2006, Canada has allowed an additional 35% (20%) of firms' R&D expenses to claim tax allowance for R&D investment under (over) CAD 200 million. This additional tax allowance is 125% in the UK, Australia, and Demark. Some countries (e.g., Canada, the UK, Greece, and Spain) allow immediate or accelerated write-offs for investments in R&D equipment and facilities. All of these tax policies can lead to permanent or temporary book tax differences and low ETRs at the early state of these investments. The government may even welcome a company avoiding taxes through export and R&D investment.

However, Rego and Wilson (2012) suggest that tax avoidance also increases the uncertainty regarding future tax outcomes and may impose costs on firms and shareholders. In an extreme situation, firms may become involved in tax shelters, increasing penalties paid by firms to tax authorities and blemishing the firms' reputation. Thus, there are benefits and costs to tax avoidance planning and tax

avoidance can be viewed as a kind of high-risk, high-return investment (Armstrong et al. 2015).

Prior research shows that the level of tax avoidance is affected by corporate governance, such as ownership structure, management compensation, and board structure (Chen, Chen, Cheng, and Shevlin 2010; Badertscher, Katz, and Rego 2013; McGuire, Wang, and Wilson 2014). Armstrong et al. (2015) find that firms with higher proportions of independent directors on their boards engage in less tax avoidance practices as these directors help firms elude becoming high-risk tax shelters. Their findings suggest that the monitoring mechanism plays a role in the tax planning process. As tax avoidance is initiated by insiders. We should address the tax avoidance problems from their inception and the role of insiders in the whole process.

Tax avoidance is in fact a complex process, requiring the cooperation of different departments, business/geography/operational segments, and subsidiaries. It is challenging for managers to coordinate and engage in tax avoidance, especially when a firm is operating in different countries. Equipped with more firm-specific knowledge, inside directors can implement tax planning activities better than other directors can. Inside directors have better understanding of the competitive nature of the industries in which their firm is operating and the potential for expansion to obtain operational economies of scale (Fama 1980). In contrast, outside directors may not easily obtain all such firm-specific knowledge from insiders (Harris and Raviv 2008). Due to the monitoring role of outside

directors, inside directors are not willing to share information with them, especially the information that can be need to evaluate these inside directors' performances, including financial information. Given that the aforementioned firm-specific information is critical for tax planning and costly to transfer between inside directors and outside directors, inside directors play an irreplaceable role in tax planning.

Furthermore, as mentioned previously, tax planning activities are complex and require the cooperation of different departments, segments, and subsidiaries. Thus, these activities require a high level of management skills to practice. The outside director market provides an objective way to identify candidates with extensive management skills. The director market appoints inside directors as outside directors in other firms according to their management skills in their own firms (Fama and Jensen 1983). This means that CIDs' cooperation, organization, and communication capabilities have been certified by the outside director markets (Masulis and Mobbs 2011). Thus, CIDs are supposed to perform better than other inside directors.

In their own firms, CIDs can exercise their various skills on making important corporate decisions based on their own merits rather than a good relationship with the CEO. In extreme cases, when firm performance is bad, CIDs can replace the CEO and turn around the firm performance in a short time (Mobbs 2013). CIDs are able to handle complex tasks (e.g., tax avoidance activities) and

deal with emergency problems, and are better able to conduct tax planning than other inside directors.

It is sometimes difficult for outside directors to accept a low ETR because they cannot obtain enough firm-specific knowledge to assess tax planning and do not clearly understand a firm's tax planning process. As the tax strategy is complex, only a few individuals within a firm actually understand its full workings (Desai 2005). In addition, as mentioned before, inside directors do not like to share such firm-specific information with outside directors when intensive monitoring is performed by outside directors (Adams and Ferreira 2007). At the same time, outside directors share information among themselves and this information cannot be obtained by insiders (Harris and Raviv 2008). In other words, information is not smoothly or easily transferred between insiders and outside directors. Thus, it is difficult for outside directors to accept a low ETR without sufficient knowledge of the tax planning process to estimate the risk of the outcome.

Information is transferred between inside directors and outside directors more effectively in firms with CIDs than in firms without. First, unlike other inside directors, CIDs are more likely to share information with outside directors (Mobbs 2013). Efficient communication between inside directors and outside directors decreases verification costs and improves the monitoring and advisory functions of the board. If outside directors have enough information shared by CIDs and understand how their firms structure and practice tax strategy, for

example, by shifting profits from high-tax-rate countries to low-tax-rate countries, or increasing investments in tax-deductible activities, such as R&D expenses, then it is easier for them to accept a low ETR. Outside directors also know that the government encourages export and innovation and these strategies are legal and welcomed, and they thus encourage companies to avoid taxes through these strategies.

Second, outside directors are more likely to trust CIDs and the information they share. Multiple boards can be sources of reputational benefit (Fich and Shivdasani 2006). Outside directors care about their reputation in the market. To protect it, they may leave the boards of companies that perform poorly (Fich and Shivdasani 2006). Thus, CIDs that hold outside directorships are reliable as they sincerely desire good firm performance and improved firm value. When firms have low ETRs, outside directors may be afraid of the risk of being involved in tax shelters. CIDs, who have good communication with outside directors, are also experts in their industries, and are well recognized by the managerial market, can clearly explain the process of tax planning to outside directors, and make these directors accept the low ETRs. Due to CIDs' high reputation, outside directors are more likely to trust them and accept low ETRs in firms with CIDs. Moreover, outside directors are more likely to rely on information provided by CIDs in decision making and to more readily accept tax strategies in firms with CIDs on their boards.

As discussed previously, CIDs are able to help firms avoid taxes, clearly explain the tax planning process to outside directors, obtain trust of outside directors, and make low ETRs more acceptable from outside directors. This research thus tests the following hypothesis.

H1: Firms with CIDs have higher levels of tax avoidance.

If CIDs hold too many outside directorships, they may not have sufficient time to extend sufficient effort to take care of the sender firms' business well, implement tax strategies, and thus decrease the firms' value. The National Association of Corporate Directors reports that one directorship took 228 hours on average in 2011 (Lublin, 2012). However, the number of working hours regained by each directorship depends very much on the legal system. Under the litigious culture, directors in the US are more likely sued by the third parties than those in other countries. As a result, the number of hours spent by directors in the US is significantly higher as well.

The debates about busy boards and firm operations date back to Fama and Jensen (1983), who find that multiple directorships certify a director's ability. Correspondingly, directors hold more seats in the future if the performance of their firms is better and hold fewer seats if their firms face financial distress or are targets of hostile takeover attempts (Gilson 1990; Pritchard et al. 2003; Harford 2003). Then, the number of directorships a director holds represents his/her reputational capital and is positively associated with firm performance (Pritchard et al. 2003). These researchers thus support that firms with busy directors perform

better. At the same time, directors obtain diversiform experience, reputation, and social capital through appointments to multiple board seats which increase the effectiveness and efficiency of decision making and firm operations. This valuable advisory function of busy directors is more helpful for firms that conduct merger and acquisition activities and those that have less experience with public markets and are eager for advice from their directors, but it does not work well for most established firms, such as Forbes 500 firms, where monitoring is required to be more extensive than merely advisory. (L. Field, Lowry, and Mkrtchyan 2013).

In contrast to the certification and reputation view, the literature also shows that busy boards are positively related to the probability of accounting fraud (Beasley and Beasley 1996), weaker profitability, lower market-to-book ratios (Fich and Shivdasani 2006), increased diversification discounts (Jiraporn, Kim, and Davidson 2008), high CEO compensation (Core, Holthausen, and Larcker 1999) and decreased firm value. Coincidentally, the National Association of Corporate Directors and the Council for Institutional Investors suggest limits on the number of directorships held by directors of publicly traded companies. At the board level, CEOs prefer to appoint outside directors holding many board seats as these directors are predisposed to monitor managers less due to insufficient time and effort (Shivdasani and Yermack 1999). Jiraporn aet al. (2008) find that busy directors miss more meetings. This observation is consistent with the argument that multiple directorships consume directors' time and energy and reduce their ability to fulfill their responsibilities.

Linking board of directors to capital market, Fich and Shivdasani (2006) find that the capital market reacts positively to the departure of busy directors and negatively to the appointment of a director to his/her third or higher board seat. More relevant to this study, Masulis and Mobbs (2011) find that the market reacts positively to the first outside directorship appointment of inside directors, less positively to the second outside directorship appointment and negatively to the third or higher outside directorship appointment. That is, the capital market can identify the negative effect of busy boards on firm performance. Both institutional officers and researchers have noted that busy boards are detrimental to firms' development. In addition, tax planning is complex and time consuming (Desai and Dharmapala 2006), requiring the focus of their conductors. As discussed previously, CIDs can help firms avoid taxes. However, it is rational to predict that busy CIDs with more than three outside directorships may not perform effectively and cannot conduct tax strategy well. Therefore, a second hypothesis is stated as follows.

H2: Only firms with non-busy CIDs avoid taxes.

Some complex firms, such as larger or more technologically intensive firms, seek directors with more firm-specific knowledge to supervise their operations and make right investment decisions. Core, Holthausen, and Larcker (1999) find that complex firms seek higher-quality managers with attractive compensation packages because it is difficult for outside directors to be fully informed and to monitor this type of firms effectively. In other words, the verification costs to

outside directors are higher in complex firms. It is difficult for outside directors to assess the profitability of an investment and identify inferior projects. For example, it is easier for outside directors to obtain information and help the board make good decisions in mature firms and in firms with low technology and more tangible assets, while it is more difficult for outside directors to play effective monitoring and advisory roles in high-growth firms and in firms with high technology and more intangible assets (Raheja 2005). Thus, complex firms prefer high-quality inside directors with firm-specific knowledge more than outside directors, and talented top managers are thus attracted to complex firms by their handsome compensation package (Rosen 1982). In other words, CIDs are more valuable to complex firms (Masulis and Mobbs 2011).

As firm-specific knowledge is difficult to transfer to outside directors in complex firms, information exchanged between insiders and outside directors is critical. Compared with other inside directors, CIDs are more likely to share information, including firm-specific knowledge, with outside directors (Masulis and Mobbs 2011). CIDs have incentives to maintain their reputations through more communication with other directors. As bad firm performance and financial restatements may damage directors' reputation and lead to a loss of outside board seats (Srinivasan 2005), the number of multiple directorships represents reputational capital of a director. The more reputational capital a director holds, the greater his/her incentive to share information with outside directors which facilitates outside directors to perform more effective monitoring and advisory

functions and improves firm performance. Private information revealed by inside directors is particularly valuable to outside directors in complex firms, where the verification costs for outside directors are high.

As discussed in H1, outside directors sometimes cannot accept a low ETR because they do not clearly understand the tax planning process. This problem is more pronounced in complex firms because it is difficult for outside directors to obtain sufficient firm-specific knowledge to assess the appropriateness of tax planning in this type of firms. With the information shared by CIDs, it is easier for outside directors to understand the tax process in complex firms and to accept low ETRs. Thus, given CIDs' greater labor market reputation and incentives to share information with outside directors, CIDs should be particularly valuable for tax planning in complex firms.

A rich body of literature argues that complex firms are associated with taxes avoidance (Boyton and Wilson 2006; Mills and Plesko 2003; Boynton and Mills 2004). This type of firms has high R&D expenses and more foreign sales, and is thus tax-flexible with many opportunities available to them to avoid taxes. In this context, whether a complex firm has capable CIDs on the board matters a lot for tax planning. In contrast, in simple (typically small) firms which have fewer opportunities to avoid taxes, the existence of CIDs does not change much the tax avoidance level. Thus, even there directors are very capable, no one can help simple firms avoid a significant amount of taxes no matter how the board is

structured. Thus, the existence of CIDs is more likely to affect the tax avoidance levels in complex firms than simple ones.

At the same time, it is difficult for tax authorities to detect tax avoidance activities from complex business transactions, such as foreign income which is included in financial net income but not in taxable net income. Complex firms therefore prefer tax strategies that include foreign sales (Hope, Ma, and Thomas 2013). Even after the implementation of the Statement of Financial Accounting Standards No. 131 (SFAS 131) in 1998 which requires companies to disclosure geographic sales and assets, firms are also to transfer earnings from countries with high corporate tax rates to those with low corporate tax rates. Armstrong, Blouin, and Larcker (2012) find that complex operations seek more talented inside directors to execute a tax strategy and provide more opportunities for tax avoidance. It is reasonable to predict that CIDs are better able than other directors to facilitate tax planning and clearly explain the tax planning process to outside directors in complex firms. I thus refine my main prediction by distinguishing firm types.

H3: The positive association between CIDs and tax avoidance is more pronounced in complex firms.

In reality, some firms do not take advantage of the known tax-saving opportunities. This observation prompts the question why? CSR theories may help to answer this question. Garriga and Mele (2004) classify CSR theories into four

groups: (1) ethical theories, (2) political theories, (3) integrative theories, and (4) instrumental theories.

Ethical theories seek to clarify the relationship between firms and society in terms of ethical values. Donaldson, Preston, and Preston (1995) and Phillips, Freeman, and Wicks (2003) argue that firms should regard CSR as an ethical obligation and give simultaneous attention to the interests of all stakeholders in reference to certain moral principles. Political theories emphasize the social power of corporations, especially in terms of their responsibility in the political fields related to this power. Prior research (Donaldson, Dunfee, and Donaldson 1994; Matten and Crane 2005) argues that a firm should consider the community in which it operates and be willing to improve the welfare of the community, lest it suffer negative consequences (e.g., lose federal contracts) (Mills, Nutter, and Schwab 2013). Integrative theories indicate that because a firm's success and even the existence of business itself are based on society, the firm should integrate social demands into its decision making process and business operations (Swanson 1995).

The first three theories suggest that managers behave in an honest, trustworthy, and ethical way in their business operations. Kim, Park, and Wier (2012) find a positive association between firms with good CSR activities and financial reporting transparency. These firms and their CEOs/CFOs are less likely to be targets of SEC enforcement actions. People in firms practicing more CSR activities value not only economic benefits, but also social, environmental, and

other stakeholders' benefits. In a more relevant paper, Hoi, Wu, and Zhang (2013) indicate that irresponsible CSR firms are more likely to engage in tax sheltering activities, while firms that promote more responsible CSR activities avoid fewer taxes. Overall, CSR culture can restrain CIDs from avoiding taxes. People in firms practicing more responsible CSR may desire to improve social, environmental, and other stakeholders' benefits and not to avoid taxes. It is less likely that CIDs help such firms avoid taxes.

However, according to instrumental theories, the only responsibility of a firm is to create wealth for shareholders. Thus, firms should consider only the economic aspect of their interactions between business and society. Mackey et al. (2007) and McWilliams and Siegel (2001) find that companies accept good CSR proposals only if they can create value. Under instrumental theories, firms view CSR activities as ways to obtain profits. Whether a firm practices CSR depends on the economic benefits it can obtain. In other words, firms conduct CSR activities only if they can create wealth for shareholders. Investors evaluate CSR activities in accordance with their contribution to firm performance, and managers may take advantage of this. Dhaliwal, Li, Tsang, and Yang (2011) point out that after the initiation of CSR disclosures, firms can obtain a lower cost of capital. Preuss (2010) observes that firms disclosing high CSR are tax-avoidant in the US setting. Thus, firms may adopt CSR to cover up engagement in a higher level of tax avoidance. CIDs may also help firms with good CSR performance to avoid more taxes.

Corporate culture may mitigate the agency problem because people in firms share similar beliefs or business practice conventions that persist long (Den and Steen 2005; 2010). As a corporate culture, CSR decreases the agency problem. To prevent rent extraction and empire building by managers, shareholders can accept tax avoidance only in firms with strong corporate governance (Phillips 2003; Armstrong, Blouin, and Larcker 2012; Rego and Wilson 2012; Armstrong, Blouin, Jagolinzer, and Larcker 2015). In good CSR firms, shareholders are less concerned about rent extraction and empire building by managers through tax savings. CIDs then obtain the trust of shareholders when they conduct tax planning and use their knowledge to help firms avoid more taxes.

The effect of CSR on tax avoidance remains an empirical question. This study therefore tests the following hypothesis.

H4: The positive association between CIDs and tax avoidance is more pronounced in firms with less CSR activity.

IV. Research Design

4.1 Data and sample

This study obtains tax and other financial data from Worldscope for the 2001-2015 fiscal years. The sample includes 30 Organization for Economic Co-operation and Development (OECD) countries. The US is not included in the sample because it is too large and makes the distribution among different countries unbalanced. Also, tax avoidance research in the US in quite extensive

and the focus of this study is instead on other countries where their tax avoidance practices are relatively unknown. This research starts from data about CIDs with 23,427 firm-year observations from BoardEx. After merging tax planning data from Worldscope, the sample shrinks significantly to 10,159 observations. More observations are removed after market size, sales growth, audit committee size and other variables are included. Firms operating in the financial industry are also excluded, resulting in a final sample of 7,286 firm-year observations.

Home country corporate income tax rates and the worldwide or territorial approach a country uses to tax foreign income are hand-collected from *PricewaterhouseCoopers Corporate Taxes: A Worldwide Summary Guides* and from the *Ernst & Young Worldwide Corporate Tax Guide* for 2001 through 2015. Tax enforcement data is hand-collected from *World Competitiveness Report*. A higher score means a higher level of tax compliance (Haw, Mu, Hu, Hwang, and Wu. 2004).

In terms of firm-specific characteristics, the information on CIDs is taken from BoardEx and covers worldwide directors' names, unique identifications, ages, majors, original titles, option compensations, and numbers of directorship positions in other companies, in addition to other firm-level board information such as board size, audit committee size, and board independence. Firm level CSR information is taken from ASSET4 and includes firms' Environmental, Social, and Government (ESG) information. This database includes 5,000 global publicly

listed companies, and provides historical data dating back to the fiscal year 2000. All of the firm level variables are trimmed at the upper and lower 1% levels.

4.2 Regression Model

To provide empirical evidence of the effect of CIDs on tax avoidance, this study specifies the following model:

$$TaxAvoid_{it} = \beta_0 + \beta_1 CID_{it-1} + \beta_2 PFemale_{it-1} + \beta_3 Doption_{it-1} + \beta_4 logaveinrole_{it-1} + \beta_5 logaverageage_{it-1} + \beta_6 independent_{it-1} + \beta_7 logboardsize_{it-1} + \beta_8 logauditsize_{it-1} + \beta_9 Leverage_{it-1} + \beta_{10} ROA_{it-1} + \beta_{11} marketsize_{it-1} + \beta_{12} salesgrowth_{it-1} + \beta_{13} RD_{it-1} + \beta_{14} WT + \beta_{15} taxenforcement + \beta_{16} taxrate + \sum_i \beta_{17}\, country_i + \sum_i \beta_{18}\, industry_i + \sum_i \beta_{19}\, year_i + \varepsilon \quad (1)$$

where *TaxAvoid* is a measure of tax avoidance (explained as follows).

Following Atwood et al. (2012), this research uses adjusted ETR to capture the tax avoidance level in an international setting. I measure tax avoidance as the pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided the difference by the pre-tax earnings. It is presented as a percentage of pre-tax earnings. I sum each element in the computation over the past three years. My measure of tax avoidance (*TaxAvoid*) for firm *i* in year *t* is calculated as follows:

$$TaxAvoid_{it} = \frac{\left[\sum_{t-2}^{t} (\mathrm{PTEBX} \times \tau)_{it} - \sum_{t-2}^{t} \mathrm{CTP}_{it}\right]}{\sum_{t-2}^{t} \mathrm{PTEBX}_{it}}$$

PTEBX = pre-tax earnings before exceptional items.

τ=home-country statutory corporate income tax rate.

CTP = current taxes paid.

This measure of tax avoidance indicates the relative tax avoidance level compared with the home country's statutory corporate income tax rate and makes the tax avoidance level comparable across different countries.

Certified inside directors are non-CEO inside directors who have outside director position in other firms. First, I identify "individual role" of directors with words, "independent", "outside" or "external" and classify those directors as outside directors. I further clear individual role with words, such as "external relationship directors" from the category of outside directors. After selecting outside directors, the rest directors are inside directors. Second, I define certified inside directors as inside directors with outside director positions in other companies. *CID* is a dummy variable that equals 1 if there is at least one CID on the board in firm *i*, in year *t*-1, and 0 otherwise. I also use the percentage of CIDs on the board, natural logarithm of one plus the number of CIDs on the board to proxy for the situation of CIDs in firm *i*, in year *t*-1. The data is obtained from BoardEx. The other variables in equation (1) are control variables. I also control for country, industry, and year dummy variables in the regression. As boards of

directors do not change frequently, I do not use firm fixed effects in the main regression. ε is the residual of the regression.

The preceding regression equation tests Hypothesis 1, that is, whether the existence of CIDs/ percentage of CIDs/number of CIDs on the board affects the tax avoidance level. For the number of CIDs on board, I use natural logarithm of one plus the number of CIDs[1] as a measurement. I use an OLS regression to test the association between the CIDs on the board and tax avoidance. Prior literature shows that other factors may also affect the tax avoidance level. Thus, I also take into account country-level characteristics and other firm-level factors.

To control for the country-level characteristics related to tax avoidance, I use a number of institutional factors as controls as described next.

Atwood et al. (2012) find that firms in countries with a worldwide (territorial) approach, and strong (weak) tax enforcement conduct fewer (more) tax avoidance activities. Following their research, I include these two country-level factors as control variables. This study uses a dummy variable, *WT*, to distinguish between firms in home countries with worldwide versus territorial approaches to taxing foreign income. I hand-collect these data from *PricewaterhouseCoopers Corporate Taxes: A Worldwide Summary Guide* and from the *Ernst and Young Worldwide Corporate Tax Guide*.

[1] I use natural logarithm of one plus the number of CIDs to proxy for the size of CIDs on board in case there is no CID on board. The firm-year observation of size of CIDs on board is zero rather than a missing value.

To measure perceived tax enforcement (*taxenforcement*), this study uses the tax evasion index from the *World Competitiveness Report*. This index is derived from a survey of more than 2,000 business executives per country. Respondents report their agreement with statements such as ‘‘Tax evasion is minimal in your country’’ on a scale from 1 to 6 (where 1 indicates strong disagreement and 6 indicates strong agreement). Thus, higher a number indicates that tax evasion is perceived to be lower, and thus that the strength of tax enforcement is perceived to be higher.

I also consider the corporate tax rate in a country as a control. Although I consider the home country's corporate tax rate in my measurement of the tax avoidance level as an independent variable, there is still an underlying association between firm-level tax avoidance and the home country's corporate tax rate. For example, if the home country's corporate tax rate is higher in a country, the tax payment pressure is also higher. Firms are incentivized to avoid taxes to maintain sufficient cash to capitalize on good investment opportunities. In contrast, when the home country's corporate tax rate is lower, the tax payment does not significantly affect financing and investment operations. Therefore, firms are not motivated to avoid taxes to save cash. In addition, the benefits of engaging in tax avoidance strategies are higher when the statutory tax rate is higher, suggesting a positive relation between tax avoidance and statutory tax rates. Kamdar (1997) finds that statutory corporate tax rates have a weak negative effect on corporate tax compliance. The association of firm-level tax avoidance and the home

country's corporate tax rate is not just a linear measurement relationship. I thus also control for home country's corporate tax rate.

To control variables related to board strength, executive reputation, and external governance mechanisms, this research includes some firm-level indicators as controls. Following Desai and Dharmapala (2006), I control for the number of directors on board (*Boardsize*), audit committee size (*auditsize*), average years of directors on the board (*logaveinrole*), and average age of directors on board (*logaverageage*) in my model. Kasipillai and Mahenthiran (2013) support that larger boards decrease deferred tax liability, as board size is positively related to board independence and monitoring function. As discussed in the main hypothesis development, tax avoidance is complex and requires firm-specific knowledge. Thus, long-serving directors have a better understanding of firm operations and can help firms engage in tax avoidance. Older directors have richer experience and can also help firms avoid taxes. I therefore use directors' years in the role and average age as controls. I also control for percentage of female directors on the board (*PFemale*) in my control (Oyenike and Olayinka 2016). Adams and Funk (2012) in a survey paper suggest that female directors are not general female anymore and not necessarily risk-averse. In contrast, female directors like risk and are aggressive. I therefore predict that they prefer risks and help firms save taxes. Armstrong et al. (2015) argue that option compensation can encourage directors to take risks and conduct more tax avoidance activities. I therefore use a dummy variable (*Doption*) to proxy for whether there is option

compensation for directors on the board. All of the variables related to board characteristics can be abstracted from BoardEx.

I further control for fundamental firm variables related to tax avoidance, using leverage (*Leverage*), pre-tax return on assets (*Pre-tax ROA*), market size (*marketsize*), sales growth (*salesgrowth*), and R&D expense ratio (*RD*) as control variables (Donohoe 2015; Kim, Li, and Zhang 2011; Hoi, Wu, and Zhang 2013; Higgins, Omer, and Phillips 2014). High-growth firms, such as firms with higher sales growth ratios and greater R&D expenses, have more opportunities for tax planning (Hanlon 2005). In my sample, I predict that firms with higher sales growth have higher levels of tax avoidance. All of these firm-level characteristics can be abstracted from Worldscope.

Table 1 reports the firm distributions in 30 OECD countries. There is significant variation in the number of firms across countries because of differences in capital market development, country size, and data available in both Worldscope and BoardEx. Australia, Canada, France, and Germany provide the most firms, as each has more than 100 firms in the sample.

[Insert Table 1]

Table 2 provides the descriptive statistics for the different classifications for my sample firms. The sample includes 7,286 firm-year observations with available firm-year observations in both BoardEx and Worldscope with unique firm identification. As Table 2 shows, about 11.9% of firms have CIDs on their

boards, 3.5% of total directors are CIDs, and 8.9% of the total directors are female. Actually, percentage of CIDs of total directors is much lower than the percentage of female directors on the board. Furthermore, 4.4% of firms have designed option compensation for their directors.

[Insert Table 2]

As Table 3 shows, the dummy variable *CID* is associated with the tax avoidance level. The Pearson correlation coefficient is 0.032 and is significant at 5%. More CIDs on a board means more tax avoidance. This table also shows that sales growth and the R&D ratio are positively associated with the tax avoidance level. This result is consistent with the findings in Gao, Yang, and Zhang (2016) and Atwood et al. (2012). High growth firms and firms with more R&D expenses have more space for tax avoidance activities.

[Insert Table 3]

Table 4 shows significant differences between firms with and without CIDs on their boards. Firms with CIDs on their boards have significantly higher adjusted effective tax rates. This is consistent with my prediction. Firms with CIDs also have higher tax avoidance levels. Firms with CIDs also have higher ROA and R&D expense ratios. CIDs are more popular in high-growth and complex firms which is consistent with the argument that high-growth and high R&D firms require directors with exceptional communication, cooperation, and

management skills. We thus see the result that CIDs are preferred by high growth and complex firms.

[Insert Table 4]

V. Empirical Results

5.1 CIDs and Tax Avoidance

To estimate the association between CIDs and tax avoidance, I use OLS regression and two-tailed test, and cluster standard errors at the firm level. My firm-specific variables are trimmed at the upper and lower 1% to exclude the outlier observations, thus, extreme tax avoidance behavior that is likely to lead to tax shelters is deleted. As directors do not change frequently, this study does not use firm fixed effects in the regression. However, firm and country-level characteristics that affect tax avoidance are included as controls. I also use firm fixed effects in difference in differences (DID) analysis to solve omitted variables problem. To mitigate part of the concern of endogenous problem and set up causal relationship, I use the one-year lags of firm-level characteristics in the regression.

Table 5 presents the main results from equation (1), the association between dummy CIDs, the percentage of CIDs, and natural logarithm of one plus the number of CIDs and the tax avoidance level. In Model 1, the coefficient on the dummy variable *CID* is significantly positive with a value of 0.0549. In other words, the effective tax rate avoided in firms with CIDs is 5.49% higher than that in firms without CIDs. Using different measures of CIDs (the percentage of CIDs

on boards and natural logarithm of one plus the number of CIDs on boards), the result in columns 2 and 3 are qualitatively the same. More specifically, increasing the percentage of CIDs on the board by 1% means 0.1685% more tax avoidance. In sum, my main result is robust with all three alternative measurements of CIDs on boards in this study.

[Insert Table 5]

Female directors also avoid more taxes. Adams and Funk (2012) support that female directors are more risk-loving than male directors. Female directors are not general females anymore and need to be more capable than their male counterparts to get a director seat in a company. They are not necessarily risk-averse and they can help firms avoid taxes and save cash. Hillman and Shropshire (2007) support that female directors have more effective communication and collaboration skills. These skills can facilitate tax avoidance activities. It is surprising that large firms avoid fewer taxes according to my main regression which is not consistent with Lisowsky (2010)and Wilson (2009). I summarize market size in detail in Table 2 and find that the 25th percentile of the market value in the sample is more than US $8 million. The firms in the sample are large, and large firms draw more political attention. It is therefore easier for them to be restrained by tax authorities as large firms are typically reluctant to avoid many taxes. I thus find a negative association between firm size and tax avoidance level. Tax avoidance level is also positively related to sales growth. This is consistent

with the prior finding (Badertscher, Katz, and Rego, 2013; Rego and Wilson, 2012) that high-growth firms have more opportunities to avoid taxes.

Overall, my findings indicate that with firm-specific knowledge and critical management and communication skills, CIDs can help firms avoid taxes and make low ETRs more acceptable to outside directors. The evidence in Table 5 indicates that the outside director market's recognition of an inside director's strong management skills facilitates tax avoidance. In addition, CIDs' increased incentives to communicate with other outside directors help outside directors understand a firm's tax avoidance process and more readily accept a low ETR. All in all, I find significantly higher tax avoidance levels in firms with CIDs on their boards.

5.2 Busy board theory

According to the busy board theory, directors with too many outside directorships may not perform effectively. Multiple directorships consume directors' time and effort and can lessen their performance (Fich and Shivdasani 2006; Cashman, Gillan, and Jun 2012; Pritchard, Adam, Stephen and Ferris 2003; Elyasiani and Zhang 2015). Tax avoidance activities are particularly complex and time-consuming and busy directors may not have sufficient time and effort to participate in the planning and decision making process of these activities. To distinguish between the effects of busy CIDs and non-busy CIDs on tax avoidance, this research separates CIDs according to their number of outside directorships

and classifies busy CIDs as holding more than three outside directorships based on the research findings in the US (Masulis and Mobbs 2011).

As Table 6 shows, only non-busy CIDs can help firms save taxes. In Model 1, I define *DbusyCID*, a dummy variable which is equal to 1 when firms only have busy CIDs on their boards and 0 otherwise. *DnonbusyCID* is equal to 1 when firms have non-busy CIDs on their boards (including firms served by both busy and non-busy CIDs) and 0 otherwise. The result indicates that firms with only busy CIDs do not have favorable conditions for conducting tax avoidance activities, while firms with non-busy CIDs have a 0.0569 lower ETR which means that non-busy CIDs help firms save 5.69% of their pre-tax earnings in their tax payments. This result is significant at the 5% level. In Model 2, we can see that if the percentage of non-busy CIDs on a board increases by 10%, the tax avoidance level increases by 1.804%, and this result is significant at the 1% level. In Model 3 of Table 6, I use natural logarithm of one plus the number of busy or non-busy CIDs on the board to proxy for the size of busy or non-busy CIDs in a company. This shows that firms with more non-busy CIDs avoid more taxes. The coefficient on non-busy CIDs is 0.57 and significant at the 1% level. In contrast, the tax avoidance levels of firms are not affected by this measure of busy CIDs. These results are consistent with the proposition that only non-busy CIDs have the time and effort to help firms save taxes.

[Insert Table 6]

5.3 Firm Complexity

By using R&D expense ratios to proxy for the complexity in the operations of a firm, Masulis and Mobbs (2011) argue that CIDs help complex firms perform better than simple firms. Following Masulis and Mobbs, I use R&D expense ratios to capture the complexity in operations of a firm.

Columns 1 and 2 of Table 7 show that only the coefficient of CID in Column 1 is significant. Even though the difference of coefficient is not significant, we can still see that CIDs only help firms avoid taxes if firms have R&D expenses and CIDs play a more important role in complex firms. In firms with zero R&D expense, CIDs do not affect firms' tax avoidance activities significantly. The higher ability of CIDs in non-complex firms does not present as pronouncedly as that in complex firms. Thus, we observe there is no difference in the tax avoidance levels between firms with CIDs and without CIDs in the group with zero R&D expense.

In Columns 3 and 4, we can see that higher percentage of CIDs on a board means more tax avoidance only in complex firms. I obtain a similar result using natural logarithm of one plus the number of CIDs on the board as the independent variable. This means that complex firms with more CIDs on their boards avoid more taxes. This result is consistent with the findings that complex firms need inside directors more, as CIDs can affect firm operations and provide greater benefits through tax savings to complex firms than non-complex ones. Thus, the

incremental benefits of attracting more CIDs to boards are more pronounced in complex firms.

[Insert Table 7]

As the level of international diversification increases, the costs of coordination and information processing demands on managers and administrative systems increase. The complexities of managing information and communication among different units also increase. Such complex firms need CIDs, who have greater cooperation, communication, and organization capabilities, more than non-complex firms do. In other words, CIDs can help execute tax avoidance activities in firms with high international diversification.

International diversification of operations can be another dimension of a complex firm. I use "foreign sales ratio," defined as foreign sales to total sales, to proxy for the international diversification level of a firm. I conduct an additional cross-sectional tests by separating the sample into high and low complexity based on the median of foreign sales ratios of the sample and find same evidence to support the proposition that CIDs help avoid more taxes in firms with higher foreign sales.

Table 8 shows aforementioned result. In Column 1, the coefficient on the dummy variable *CID* is 0.0932 and significant. However, this association of CID and tax avoidance is not significant among firms being classified as non-complex firms. Thus, compared with inside directors without multiple directorships, CIDs

are more likely to have the ability to structure and execute tax avoidance strategies in complex firms. Similar results can be observed when CIDs are measured as natural logarithm of one plus their number (see Columns 5 and 6). The coefficient on the percentage of CIDs is 0.194 and marginally not significant in complex firms (Column 3). Overall, we can see that CIDs have at least some ability to implement tax avoidance activities in firms with higher foreign sales.

[Insert Table 8]

Firms with R&D expense and high foreign sales ratios are highly tax flexible and such firms have more opportunities to avoid taxes. Tax-flexible firms can obtain more tax allowances by investing in R&D and can transfer profit from high-tax-rate countries to low-tax-rate countries through more foreign sales. CIDs can avoid taxes through R&D expense and profit shifting. Thus, the presence of CIDs matters in complex firms. Column 1 of Table 7 shows that CIDs help firms with higher tax flexibility decrease their tax payments. Column 1 of Table 8 also shows similar result with another measure of tax flexibility. Neither CIDs nor other inside directors can help firms with lower tax flexibility avoid any significant amounts of taxes as indicated in both Column 2 of Table 7 and Table 8, where the coefficient on the dummy variable *CID* are statistically insignificant. Thus, I find no significant difference in tax avoidance levels between firms with and without CIDs in simple firms with as measured by their R&D expense ratios and foreign sales ratios.

5.4 CSR and Tax Avoidance

Hoi, Wu, and Zhang (2013) indicate that irresponsible CSR firms are more likely to engage in tax sheltering activities, while firms that promote more responsible CSR activities avoid fewer taxes. Overall, CSR culture may restrain CIDs from promoting tax avoidance even they have the ability to do so. However, as shown in Table 9, there is no significant difference in the results of the associations of CIDs and tax avoidance levels between firms with good and bad CSR. Hillman and Keim (2001) classify CSR activities as "stakeholder management" and "social issue participation". According to the instrumental theories of CSR (Kim, Park, and Wier 2012; Keim 2001), profit-chasing firms can take advantage of stakeholder management CSR activities to obtain more profit. These firms can effectively encourage their CIDs to practice strategies to avoid taxes and save cash.

[Insert Table 9]

However, CIDs in firms with good social issue participation may genuinely seek to improve the welfare of the society at large and thus do not avoid taxes. I further separate my sample into firms with more environmental improvement CSR (i.e., social issue participation) activities and firms with fewer such activities according to the median of environmental improvement CSR to test the different roles of CIDs in these two types of firms. As Columns 1 and 2 in Table 10 show, CIDs help firms avoid more taxes when people engage in bad environmental improvement CSR activities. The coefficient is 0.055, significant at the 10% level.

This means that on average, tax avoidance level is 5.5 percent higher in bad environmental improvement CSR firms with CIDs on the board than those without CIDs. In contrast, CIDs do not help firms with good environmental improvement CSR avoid taxes. The result still holds if I use percentage of CIDs on the board and natural logarithm of one plus the number of CIDs on the board to proxy for CIDs in a firm. In other words, CIDs help firms avoid more taxes only in firms with bad environmental improvement CSR, where directors and the management value the benefits of shareholders more than the welfare of society. Overall, CIDs in firms with bad environmental improvement CSR engage in more tax avoidance activities.

[Insert Table 10]

5.5 Endogenous Problem

There are some endogenous problems with this study. First, there may be omitted variables affecting both my main independent variable, *CID*, and my dependent variable, tax avoidance level. This means my result may be driven by changes in omitted variables. Second, my main finding may have reserve causality problems. Firms with higher levels of tax avoidance may be large and mature, and thus more likely to have CIDs on their boards. In addition, inside directors of large companies are more likely to acquire outside director positions. Thus, tax avoidance levels may affect firms' ability to attract CIDs to their boards and the ability of inside directors to obtain multiple directorships.

To further evaluate the effect of CIDs on tax avoidance levels and to establish a causal relationship between CIDs and tax avoidance, I test the changes in tax avoidance levels for firms with CIDs on their boards and the changes for firms without CIDs on their boards before and after the firms appoint CIDs on their boards. Therefore, I conduct a DID analysis using the following model to explore the underlying association between CIDs and tax avoidance (Equation 3 and 4).

My treatment group is firms with CIDs on their boards in any year during the sample period and my control group is firms never having CIDs on their boards during the sample period. I use a two-year event window and focus on treatment firms with at least one CID on their boards for the first time in the current year (*t*) and without CIDs in the prior year (*t*-1). The control group firms have no CIDs on their boards during this two-year event window. The shock in my DID design is that a firm appoints at least one CID to its board for the first time, because of its pronounced effect on firm operations. I predict that after including CIDs on boards, tax avoidance levels for the treatment firms increase, while tax avoidance behavior in the control group does not change. This provides a more pronounced result regarding CIDs on boards and tax avoidance levels for the treatment firms after the treatment period.

Before practicing the DID analysis, I select my sample using one to one propensity score matching method to select one control firm with the nearest

propensity score for a CID seating firm using the CID prediction model from equation (2).

5.5.1 Determinants of CIDs on the board

The propensity score matching approach provides a pairing treatment for control firms relying on similar observable factors (Dehejia and Wahba 2002). First, I use a logit regression to predict the probability of a firm appointing CIDs to its board with the following model:

$$PreCID_{it} = \beta_0 + \beta_1 independent_{it} + \beta_2 logboardsize_{it} + \beta_3 Leverage_{it} + \beta_4 marketsize_{it} + \beta_5 salesgrowth_{it} + \beta_6 WT_{it} + \beta_7 taxrate_{it} + \beta_8 auditenvironment_{it} + \beta_9 industry + \beta_{10} year + \varepsilon \quad (2)$$

This research matches each control firm with a treatment firm one year before the treatment firms appoint CIDs to their boards for the first time (*t*-1) because the logic of DID analysis is that there is a shock in the treatment group particularly. Before this shock, there are no significant differences between the treatment firms and control firms, however, after the shock, there is a more significant change of in the dependent variable of interest in the treatment group. This change of dependent variable is driven by the shock and I establish a causal association. In the selected sample, a control firm is matched with a treatment firm in year *t*-1 (Li and Tang 2016) with a similar probability of appointing CIDs to boards. In the logit regression, I use $PreCID_{it}$ as my dependent variable which equals 1 if a firm-year observation is one year immediately before the treatment firm appoints CIDs to its board and 0 if the firm never had CIDs on its board

during the sample period. Then, there is only one firm-year observation for each treatment firm if $PreCID_{it}$ equals 1, and I can guarantee that treatment firms cannot match other treatment firms in the following propensity score matching process.

Coles, Daniel, and Naveen (2008) support that leverage and firm size affect inside director proportion. Therefore, I also control for these two variables. I also control for my matched firms in a similar tax system, audit environment (Brown, Preiato, and Tarca 2014) and I control for the worldwide or territory approach a country uses to tax foreign earnings and the home country corporate income tax rate in the logit regression.

5.5.2 Propensity score matching

Roberts and Whited (2013) mention that propensity score matching is among the most popular techniques for addressing endogenous problems in empirical research according to their survey because of the simplicity of its matching methodology. Once the matched sample has been selected, the actual estimation involves only a one-equation system. The key advantage of the matching method is that it avoids the specification of the functional form: matching methods do not rely on a clear source of exogenous variation for identification.

After predicting the probability of a firm appointing CIDs to its board in the following year, I estimate the treatment effect by first matching each treatment firm (a firm appointing CIDs to its board for the first time in the following year) to the non-CID firm with the nearest distance to the CID firm in terms of

propensity score. A control firm is matched with a treatment firm in year *t*-1 of the two-year event window if they have similar propensity scores. This means that a matched non-CID firm has a similar probability of appointing CIDs to its board but has not done so.

The propensity score matching results are presented in Table 11. As Table 11 shows, after matching, the univariate analysis indicates that there are no significantly different characteristics which I have controlled in the logit regression, between the treatment and control firms. These two groups of firms have similar board independence, board size, market size, sales growth, and tax system. After matching, I can control the treatment and control firms with similar fundamental characteristics.

[Insert Table 11]

5.5.3 Difference-in-differences

I conduct a DID analysis using a matched sample with the following equation (3). My event window is two years, the year before my treatment firms appoint CIDs to their board (*t*-1) and the year they appoint at least one CID to their boards (*t*). *Treatment* equals 1 if a firm does not have CIDs on its board in the prior year and appoints at least one CID to its board in this year, and 0 if a firm never has CIDs on its board during these two years. *Post* equals 1 for the post treatment-year and 0 otherwise. The results of the DID analysis are presented in Table 12.

$$TaxAvoid_{it} = \beta_0 + \beta_1 treatment_{it-1} + \beta_2 post_{it-1} + \beta_3 treatment_{it-1} * post_{it-1} + controls + \varepsilon \quad (3)$$

The coefficient of treatment firms before treatment year is not significant in model 3. This means that the treatment and control firms have similar tax avoidance levels before the treatment firms appoint CIDs to their boards. The coefficient of the dummy variable, *Post*, indicates the average change in the tax avoidance level in the control group after the treatment year. This coefficient is negative and marginally not significant. This means the tax avoidance levels of the control firms do not change from the year before to the year after the treatment firms appoint CIDs to their boards.

However, the coefficient of the interaction between the *Treatment* and *Post* dummies is positive and significant, suggesting that average firms that appoint CIDs to their boards do not experience decreased tax avoidance levels after appointing CIDs to their boards. These firms show a 4.23 percentage (0.1884-0.1461) increase in their tax avoidance levels following the change in CID status. This result is robust when I control for only the country level factors and both the firm- and country-level factors in my DID regression.

The coefficient for treatment firms after the treatment year is 0.1884 and significant at the 10% level, representing that after the firms appoint CIDs to their boards, the ETR is 18.84% lower than the value of the average matched firm in which there are no CIDs on the board during the period. The DID estimate of

0.1884 further verifies that not all inside directors are alike. These results reveal opposing relations between inside directors and tax avoidance levels. Although CIDs are related to improved tax avoidance, non-CIDs are related to deteriorating tax avoidance levels, reflecting the management, communication and cooperation skills of CIDs and the inability of non-CIDs to conduct tax avoidance.

I also consider firm fixed effects (α_1) in my DID analysis in Model 4 to solve the omitted variable problem and year fixed effects (α_2) in the regression. The coefficient of interaction is still positive and significant. This means that after eliminating the time-invariant omitted variable, appointing CIDs on boards still helps firms avoid taxes. On average, compared with the control group, firms with CIDs have a 8.71% lower ETR after their first appointment of CIDs to their boards.

$$TaxAvoid_{it} = \beta_0 + \alpha_1 + \alpha_2 + \beta_1 treatment_{it-1} * post_{it-1} + controls_{it-1} + \varepsilon_{it-1} \qquad (4)$$

In sum, the evidence in Table 12 indicates that inside directors' appointments as outside directors in unaffiliated firms are associated with greater tax avoidance levels in their home firms compared with similar firms in which there are no CIDs on the boards. This suggests that outside director market's recognition of an inside director's strong management skills and improved incentives to communicate with other outside directors is associated with a higher level of tax avoidance.

My result may also be driven by time trends, as more inside directors have obtained outside directorships and the ability of firms avoiding tax increases. Thus, there is always a more pronounced association between CIDs and tax avoidance levels after a particular year. To solve these kinds of problems, in the appendix, Table A presents the placebo test and the results for DID analysis. The coefficient of interaction is not significant after moving all of the variables one year ahead. This means that the result is driven not by time trends, but by the causal association between CIDs and tax avoidance.

[Insert Table 12]

5.6 Robustness Test

Extremely small firms have different characteristics from other firms. These small firms may have different operation, financing, and investment problems and may lack the opportunities for tax avoidance. After excluding observations if a firm's total assets are less than $1 million, I re-run my main regression, and the main finding still holds: more CIDs help firms avoid more taxes.

[Insert Table 13]

To mitigate endogeneity concerns, I conduct more cross-sectional tests. According to industry cluster theory, firms in highly competitive industries have greater incentives to avoid taxes (Cai and Liu 2009). Allen et al. (2016) argue that transparent firms conduct fewer tax avoidance activities because it is easier to monitor firms with less information asymmetry. They find that firms with a higher

analyst following engage in less tax avoidance. In addition, the director experience of CIDs may represent the ability of CIDs and affect tax avoidance level. I thus conduct the following tests.

(1) Industry competition (HHI)

Many studies argue that industry competition affects tax avoidance levels. Cai and Liu (2009) argue that firms in more competitive industries avoid more taxes. Due to the pressure that firm managers face in more competitive industries, they have higher incentives to help firms save cash to invest in positive NPV projects through tax savings. Hou and Robinson (2006) also support that industry competition may push managers to search for innovative tax strategies to increase firm performance. As all types of resources are limited in competitive industries for each firm, it is hard for firms in competitive industries to raise capital from the capital market. It is therefore rational to predict that CIDs have higher incentives to help firms save cash and avoid taxes when the firms are in highly competitive industries. This study uses the Herfindahl-Hirschman Index (HHI) to proxy for the competition level of an industry. The result shows that CIDs in firms that operate in more competitive industries have higher incentives to help firms save taxes.

As shown in Table 14, Columns 1 and 2, CIDs help only those firms in the sub-sample with low HHI save taxes. When CIDs are in less competitive industries, they have less pressure to save cash and do not have much incentive to engage in tax avoidance activities. However, in more competitive industries, CIDs

help firms raise more cash through tax avoidance. As Columns 3 and 4 show, the coefficient of the percentage of CIDs and tax avoidance is higher if industry competition is higher (0.1949) than when it is lower (0.1653). This reflects that firms with higher proportions of CIDs on their boards help firms save more taxes if the firms are in more competitive industries. In Columns 5 and 6, Similar results are shown using natural logarithm of one plus the number of CIDs on boards to proxy for the situation of CIDs in a firm. More CIDs seating on boards help firms avoid more taxes if they operate in competitive industries. Thus, CIDs in competitive industries face greater pressure and help firms save more cash through tax avoidance. They can allocate that cash to other positive NPV projects and help firms improve performance.

[Insert Table 14]

(2) Analyst following

Analyst coverage is an outside monitoring mechanism. Financial analysts can decrease information asymmetry between insiders and investors. The probability of insider trading increases only if analysts stop disclosing firm information (Ellul and Panayides 2016). Thus, financial analysts play an important role in monitoring managers' behaviors and improving firm transparency.

In reality, analysts are concerned about corporate tax avoidance behavior in conference calls. Analysts also pay attention to aggressive tax strategies, such as tax reserves and taking advantage of tax heaven (Allen et al. 2016). In addition,

analysts are important scouse of corporate misdeeds for the media (Miller 2006). Managers are more concerned about reverse media attention regarding tax avoidance activities and reputational costs when their firms are followed by more analysts (Graham et al. 2014). Thus, firms with higher analysts followings are under higher levels of outside supervision and engage in fewer tax avoidance activities. It is interesting to investigate the different effects of CIDs on tax avoidance activities in firms with more or fewer analysts following. I separate my sample according to the median number of analysts following for each firm and conduct a cross-sectional test.

In Table 15, Columns 1, 3, and 5 show the sub-samples with lower analysts followings. We can see that CIDs help firms avoid taxes only if they have fewer analysts following and lower external monitoring. The coefficients of CIDs and tax avoidance are significant only in firms with lower analyst followings. The result holds whether I use the dummy variable *CID*, the percentage of CIDs, or the number of CIDs on the board to proxy for the situation of CIDs in a firm. This means CIDs help firms save taxes only when they face less outside monitoring.

[Insert Table 15]

(3) Experienced and non-experienced CIDs

Directors' prior experience can benefit companies with more successful acquisition (Field and Mkrtchyan 2017) and higher firm value (Gray and Nowland 2013). The experience of director affects firm strategy as well. Westphal and

Fredrickson (2001) argue that directors implement similar strategies as those in their prior firms. In this research, I test whether CIDs' prior director experience affects tax avoidance strategy.

First I define experienced CIDs as those who have prior director experience and those without as non-experienced CIDs. If a company has both experienced CIDs and non-experienced CIDs, this company is classified as an experienced CID company. According to the result in Colum 1, Table 16, only firms with experienced CIDs avoid taxes. If a company only have non-experienced CIDs seating on the board, this company does not have the ability to plan and execute tax avoidance activities. In addition, more experienced CIDs on the board means more tax avoidance.

[Insert Table 16]

The empirical evidence supports that prior director experience of CIDs facilitates tax avoidance process. This result shows that CIDs' ability affects tax avoidance level in a company, which is consistent with the argument in the main hypothesis that CIDs' ability benefits firms with more tax savings.

VI. Conclusion

This study finds strong evidence that CIDs on boards are positively associated with tax avoidance levels. The result is robust to three alternative proxies for the

situation of CIDs on boards (i.e., the existence of CIDs on boards, the percentage of CIDs on boards and the number of CIDs on boards).

Tax avoidance activities are complex and require firm-specific knowledge and strong communication, management, and cooperation skills. Equipped with hands-on experience in running the business of their firms and experience with other firms through their outside directorship appointments, CIDs are preferred candidates who are able to conduct tax avoidance. CIDs, who have good reputations and who are willing to maintain those reputations through communications with outside directors, can help outside directors understand a firm's tax avoidance process and make a low effective tax rate more acceptable to them. On average, firms with CIDs have 5.49 percent higher tax avoidance.

This study also uses the propensity score matching and difference in differences methods to address the endogeneity issue and establish a causal interpretation. After matching each control firm with a treatment firm one year immediately before the treatment firm appoints CIDs on its board for the first time, this paper finds that after firms appoint CIDs to boards, their tax avoidance levels increase. This result still holds after controlling for the country-level intuitional factors and controlling for both firm- and country-level characteristics that affect tax avoidance levels. After including firm fixed effects in the DID analysis, the result still indicates that appointing CIDs to boards can increase tax avoidance levels. Overall, firms with CIDs have higher tax avoidance levels.

However, CIDs with more than three outside directorships may not have time to conduct tax avoidance activities and may not be able to help firms save taxes. This result is consistent with busy board theory (Field, Lowry, and Mkrtchyan 2013; Fich and Shivdasani 2006; Pritchard, Adam, Stephen and Ferris 2003). Multiple directorships consume the time and effort of directors and decrease firm value. Only firms served by non-busy CIDs avoid taxes. Moreover, complex firms need inside directors more than other firms do. My findings support that CIDs play a more important role in tax avoidance activities in complex firms than in non-complex firms. In addition, the positive association between CIDs and tax avoidance may be different in firms with good environmental improvement CSR, where people seek not only to benefit shareholders' interests but also to increase the welfare of society. I find that CIDs help firms engage in tax avoidance activities only in firms with bad environmental improvement CSR. I also practice other cross-sectional tests and find that CIDs help firms avoid more taxes when they operate in more competitive industries and are followed by fewer analysts.

In terms of corporate governance and tax avoidance literature, my study is distinguished from prior research in several ways. First, prior research focuses on the independence of the board and tax avoidance. However, tax avoidance activities are initiated by inside directors. These activities are followed by monitoring by outside directors which may mitigate tax avoidance levels. Most of the prior literature omits the first step and focuses on the second step. This study

explores the role of CIDs on tax strategy and how CIDs affect the tax avoidance process in both steps.

Second, prior literature on multiple directorships explores the role of outside director positions and how outside directors with multiple directorships affect firm performance. Some studies have considered the contagion effects of interlocked directorships (Chiu, Teoh, and Tian 2013). I focus on inside director positions and study the role of CIDs in their sender firms and how they affect firm operations through tax avoidance.

Third, my paper extends the literature about the interactions between inside directors and outside directors by exploring how the information inside directors share with outside directors helps outside directors understand firms' tax avoidance process, accept low ETRs, and save real cash.

Fourth, prior literature on tax avoidance focuses more in a given country (e.g., the US) or explores the effects of country-level institutional factors on firm-level tax avoidance using international data. However, this study provides a more comprehensive picture of tax strategy, explores firm-level characteristics on tax avoidance in an international setting, and considers both country-level institutional characteristics and firm-level corporate governance in the tax avoidance process.

There are some caveats for my results. First, regarding international research on tax avoidance, thus far only one measurement from Atwood et al. (2012)

captures firm-level tax avoidance. I follow their measurement in this paper and find that firms with CIDs have higher adjusted effective tax rates. Ideally, there should be more measurements of tax avoidance and make the results of international tax avoidance research more convincing. Second, the database coverage for international boards of directors is limited and some firms are missing from my analysis. This affects my sample size in this thesis. Given sufficient available data, researchers could provide a more comprehensive picture of boards of directors and tax avoidance research in an international setting. Third, I argue that CIDs can enhance a company's tax avoidance level. However, the mechanism of the effect of CIDs on tax avoidance is not clear as some factors (e.g., effective communication between CIDs and outside directors) cannot be measured. Empirical support should be provided for the underlying mechanism and the underlying association between CIDs and tax avoidance should be explored further in the future.

Appendix:

Table A

Variables	
Main variables	
TaxAvoid	TaxAvoid=[∑_(t-2)^t(PTEBX×τ)_it -∑_(t-2)^tCTP_it]/(∑_(t-2)^tPTEBX_it)
PTEBX	pre-tax earnings before exceptional items
T	home-country statutory corporate income tax rate
CTP	current taxes paid
CID	Dummy variable equals 1 if there is at least one CID on the board, 0 otherwise; Percentage of CIDs on the board; Natural logarithm of one plus the number of CIDs on the board
busyCID	Dummy variable equals 1 if there are only CIDs with more than three outside directorships (busy CID) on the board, 0 otherwise; Percentage of busy CIDs on the board; Natural logarithm of one plus the number of busy CIDs on the board.
nonbusyCID	Dummy variable equals 1 if there are CIDs with no more than three outside directorships (nonbusy CID) on the board, 0 otherwise; Percentage of nonbusy CIDs on the board; Natural logarithm of one plus the number of nonbusy CIDs on the board.
expCID	Dummy variable equals 1 if there are CIDs with prior director (experienced CID) on the board, 0 otherwise; Percentage of experienced CIDs on the board; Natural logarithm of one plus the number of experienced CIDs on the board
nonexpCID	Dummy variable equals 1 if there are only CIDs without prior director (non-experienced CID) on the board, 0 otherwise; Percentage of non-experienced CIDs on the board; Natural logarithm of one plus the number of non-experienced CIDs on the board
Firm-level control variables	
PFemale	Percentage of female directors on the board
Doption	It equals one if a firm has option compensation for directors, 0 otherwise
logaveinrole	Natural logarithm of one plus the average years directors have been on the board
logaverageage	Natural logarithm of one plus the average of the age of directors on board
independent	The percentage of outside directors on the board
logboardsize	Natural logarithm of one plus the total number of directors on the board
logauditsize	Natural logarithm of one plus the total number of directors in audit committee
Leverage	Total long-term liabilities divided by total assets
ROA	Pre-tax return on assets.
Marketsize	Natural logarithm of one plus initial market value
SalesGrowth	Change of sales divided by sales in last year
R&D	Research and development expenditure divided by initial total assets
Country-level control variables	
WT	1 for firms in home countries with a territorial approach, and 0 for firms in home countries with a worldwide approach
taxenforcement	Measure perceived tax enforcement, tax evasion index from the 1996 World

	competitiveness Report
taxrate	Country level corporate tax rate measure in Atwood, Drake, and Myers (2010)
auditenvironment	Country level audit environment from Brown, Preiato, and Tarca (2014)

Table B

This table presents difference-in-differences estimates for firms with CIDs. In Model 1, the treatment firms have at least one CID on the board in year t+1 and do not have CIDs on the board in year t. The control firms never have CIDs during these two years. The control firms are matched at the nearest propensity score with replacement. Post is dummy variable which equals one when firms introduce CIDs on the board, and 0 before firms introduce CIDs on the board. The model estimated is

$TaxAvoid_{it-1} = \beta_0 + \beta_1 treatment_{it-2} + \beta_2 post_{it-2} + \beta_3 treatment_{it-2} * post_{it-2} + controls_{it-2} + \varepsilon_{it-1}$ (1)

In Model 2, α_1 is firm fixed effect, α_2 is year fixed effect. The rest variables are same as those in Model 1. The model estimated is

$$TaxAvoid_{it-1} = \beta_0 + \alpha_1 + \alpha_2 + \beta_1 treatment_{it-2} * post_{it-2} + controls_{it-2} + \varepsilon_{it-1} \quad (2)$$

All the other variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	$TaxAvoid_{t-1}$	$TaxAvoid_{t-1}$
$treatment_{t-2}$	-0.0332	
	(-0.35)	
$post_{t-2}$	0. 0284	
	(0.43)	
$treatment_{t-2} * post_{t-2}$	-0. 0975	-0. 0870
	(-0. 97)	(-1.64)
Firm-level controls	yes	yes
Country-level controls	yes	yes
Industry	yes	yes
Country	yes	yes
year	no	yes
firm fixed	no	yes
constant	-2.2639	-1.2802
	(-1.08)	(-0.44)
R-squared	0. 417	0. 0139
N. of cases	186	283

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Table 1

Firm distribution by country

country	firms	country	firms	country	firms
Australia	456	Germany	168	New Zealand	8
Austria	19	Greece	16	Norway	41
Belgium	34	Hungary	1	Poland	9
Bermuda	2	Iceland	2	Portugal	10
Canada	461	Israel	73	Republic Of Ireland	50
Chile	6	Italy	48	Spain	67
Czech Republic	1	Japan	97	Sweden	42
Denmark	22	Korea	21	Switzerland	52
Finland	25	Luxembourg	14	Turkey	6
France	237	Netherlands	41	United Kingdom	3

Table 2

Statistic description

variable	N	mean	sd	p25	p50	p75
TaxAvoid	7,286	0.211	0.41	0.041	0.3	0.301
DCID	7,286	0.119	0.324	0	0	0
PCID	7,286	0.035	0.118	0	0	0
NCID	7,286	0.359	1.253	0	0	0
PFemale	7,286	0.089	0.116	0	0	0.154
Doption	7,286	0.044	0.204	0	0	0
aveinrole	7,286	4.524	2.8	2.56	4.023	5.907
averageage	7,286	57.01	5.56	53.546	57.222	60.714
independent	7,286	0.456	0.286	0.25	0.5	0.667
TotalDirector	7,286	8.543	3.61	6	8	10
Auditmember	7,286	3.141	1.175	3	3	4
Leverage	7,286	18.917	30.765	0	0	27.861
ROA	7,286	-1.551	6.468	0	0	0
marketsize(mil)	7,286	977.482	7600	8.495	34.248	186.916
salesgrowth	7,286	2.886	8.977	0	0	0
RD	7,286	0.001	0.002	0	0	0
WT	7,058	2.806	0.814	3	3	3
taxenforcement	7,203	3.757	0.734	3.53	3.77	4.49
taxrate	7,058	0.25	0.07	0.18	0.275	0.3

Table 3

Pearson correlation

	TaxAvoid	DCID	PCID	logNCID	PFemale	Doption	logaveinrole	logaverage	independent	logboardsize	logauditsize	Leverage	ROA	marketsize	salesgrowth	RD	WT	taxenforcement	taxrate
TaxAvoid	1																		
DCID	0.032*	1																	
PCID	0.031*	0.815*	1																
logNCID	0.041*	0.928*	0.911*	1															
PFemale	0.002	0.049*	0.02	0.033*	1														
Doption	-0.002	-0.005	0.004	0.005	-0.056*	1													
Logaveinrole	-0.006	0.007	0.016	0.012	0.131*	-0.046*	1												
Logaverage	-0.002	-0.076*	-0.064*	-0.057*	-0.022*	-0.036*	0.29*	1											
Independent	-0.018	-0.275*	-0.276*	-0.281*	0.04*	0.029*	0.038*	0.287*	1										
Logboardsize	0.039*	0.216*	0.125*	0.264*	0.076*	0.055*	0.073*	0.105*	-0.14*	1									
Logauditsize	0.015	-0.096*	-0.111*	-0.082*	0.000	0.024*	0.066*	0.103*	0.161*	0.186*	1								
Leverage	-0.006	-0.03*	-0.031*	-0.026*	-0.003	0.016	-0.001	-0.009	-0.005	0.006	0.013	1							
ROA	-0.014	0.018	0.013	0.015	-0.047*	0.002	0.021*	0.018	0.009	0.028*	0.048*	-0.013	1						
Marketsize	-0.038*	-0.027*	-0.029*	-0.033*	0.018	0.031*	0.005	0.002	0.036*	-0.004	0.025*	0.217*	-0.005	1					
Salesgrowth	0.026*	0.005	0.004	0.003	-0.018	-0.001	-0.005	-0.001	0.012	-0.004	-0.003	-0.004	0.081*	-0.011	1				
RD	0.025*	0.055*	0.04*	0.047*	-0.010	-0.017	-0.002	0.012	-0.0180	0.014	0.006	-0.118*	-0.103*	-0.101*	0.212*	1			
WT	0.002	0.017	0.027*	0.031*	-0.131*	-0.02	-0.083*	-0.015	0.040*	-0.092*	0.011	-0.037*	0.055*	-0.012	0.044*	0.019	1		
Taxenforcement	-0.003	0.087*	-0.144*	0.073*	-0.077*	0.037*	-0.004	0.013	0.11*	-0.219*	0.105*	0.03*	0.035*	0.039*	0.057*	-0.006	-0.095*	1	
Taxrate	0.008	-0.006	-0.013	0.000	0.137*	-0.102*	-0.014	-0.028*	-0.039*	-0.056*	-0.128*	0.059*	-0.092*	0.016	-0.032*	-0.05*	-0.05	0.049*	1

Table 4

Univariate Analysis

The sample consists of 7,286 firm-years from fiscal years 2001 to 2015, excluding finance and utility firms. The director data comes from the BoardEx database. Inside directors are employees of the firm who are not the CEO. Certified inside directors are operating officers on the board who hold at least one outside directorship in an unaffiliated firm. Non-certified inside directors do not sit on another independent board. No CID firms are firms with no CIDs on the board, while CID firms are those with CIDs on the board. Other variable definitions are in the Appendix. This table displays the means of various board and firm characteristics for companies within the sample. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively, based on a two-tailed t-test (a Wilcoxon signed rank test) of the difference

Two-sample	No CID firms	CID firms	variances
observations	6486	800	MeanDiff
TaxAvoid	0.208	0.233	-0.032***
PFemale	0.087	0.104	-0.018***
Doption	0.044	0.041	0.003
logaveinrole	1.571	1.588	-0.018
logaverageage	4.059	4.036	0.023***
independent	0.485	0.242	0.243***
logboardsize	2.146	2.384	-0.238***
logauditsize	1.376	1.260	0.116***
Leverage	19.23	16.42	2.816***
ROA	-1.594	-1.231	-0.362*
marketsize (mil)	17.07	16.79	0.287**
salesgrowth	2.873	3.002	-0.129
RD	0.001	0.00100	-0.000***
WT	2.802	2.849	-0.047
taxenforcement	2.673	3.023	-0.351***
Taxrate	0.250	0.248	0.001

Table 5

Main result

OLS regression reflects CIDs on the board and tax avoidance. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. *CID* is Dummy variable equals 1 if there is at least one CID on the board, 0 otherwise; Percentage of CIDs on the board; Natural logarithm of one plus the number of CIDs on the board. *PFemale* is the percentage of female directors on the board. *Doption* is an indicator variable that equals one if a firm has option compensation for directors, 0 otherwise. *logaveinrole* is natural logarithm of one plus the average of number of years of directors on the board. *logaverageage* is natural logarithm of one plus the average of the age of directors on the board. *independent* is the percentage of outside directors on the board. *logboardsize* is natural logarithm of one plus the total number of directors on the board. *logauditsize* is natural logarithm of one plus the total number of directors in audit committee. *Leverage* is total long-term liabilities divided by total assets. *ROA* is pre-tax return on assets. *marketsize* is natural logarithm of one plus initial market value. *salesgrowth* is the change of sales divided by sales in last year. *RD* is research and development expenditure divided by initial total assets. *WT* is country uses worldwide versus territorial approach to tax foreign income. *taxenforcement* is measure perceived tax enforcement, tax evasion index from the 1996 World competitiveness Report. *taxrate* is country level corporate tax rate measure in Atwood, Drake, and Myers (2010). I control country, industry, year factors and cluster by firm to account for serial correlation.

	CID (dummy)	CID (percentage)	CID (natural logarithm one plus the number)
CID_{t-1}	0.0549**	0.1685***	0.0560***
	(2.10)	(2.63)	(2.61)
$PFemale_{t-1}$	0.2035**	0.2079**	0.2131**
	(2.40)	(2.46)	(2.51)
$Doption_{t-1}$	0.0044	0.0021	0.0025
	(0.12)	(0.06)	(0.07)
$logaveinrole_{t-1}$	0.0208	0.0206	0.0207
	(1.28)	(1.27)	(1.28)
$logaverageage_{t-1}$	0.0066	0.0048	0.0059
	(0.06)	(0.04)	(0.05)
$independent_{t-1}$	-0.0279	-0.0188	-0.0197
	(-0.68)	(-0.45)	(-0.48)
$logboardsize_{t-1}$	0.0366	0.0425	0.0268
	(1.23)	(1.44)	(0.90)
$logauditsize_{t-1}$	0.0390	0.0388	0.0388
	(1.48)	(1.47)	(1.47)
$Leverage_{t-1}$	0.0002	0.0002	0.0002
	(0.57)	(0.57)	(0.60)
ROA_{t-1}	-0.0016	-0.0016	-0.0016
	(-1.47)	(-1.42)	(-1.44)
$marketsize_{t-1}$	-0.0039*	-0.0040*	-0.0040*
	(-1.82)	(-1.85)	(-1.86)
$salesgrowth_{t-1}$	0.0009	0.0009	0.0009
	(1.32)	(1.33)	(1.36)
RD_{t-1}	2.6612	2.7819	2.6641
	(0.71)	(0.74)	(0.71)
WT	0.0222	0.0275	0.0276
	(0.17)	(0.21)	(0.21)
$taxenforcement$	0.0680**	0.0682**	0.0644*
	(1.99)	(1.99)	(1.88)

taxrate	-0.9014**	-0.8955**	-0.8781**
	(-2.27)	(-2.25)	(-2.21)
country	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled
constant	0.1347	0.1087	0.1442
	(0.21)	(0.17)	(0.23)
R-squared	0.0427	0.0431	0.0435
N. of cases	5612	5612	5612

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6

Tax avoidance regression after distinguishing firms with non-busy CIDs and with only busy CIDs

OLS regression reflects busy and non-busy CIDs on the board and tax avoidance. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. *BusyCID* is dummy variable equals 1 if there are only CIDs with more than three outside directorships (busy CID) on the board, 0 otherwise; Percentage of busy CIDs on the board; Natural logarithm of one plus the number of busy CIDs on the board. *nonbusyCID* is dummy variable equals 1 if there are CIDs with no more than three outside directorships (nonbusy CID) on the board, 0 otherwise; Percentage of nonbusy CIDs on the board; Natural logarithm of one plus the number of nonbusy CIDs on the board. All other variables are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	CID (dummy)	CID (percentage)	CID (natural logarithm one plus the number)
$busyCID_{t-1}$	-0.0349	-0.1082	-0.0264
	(-0.49)	(-0.55)	(-0.44)
$nonbusyCID_{t-1}$	0.0569**	0.1804***	0.0570***
	(2.18)	(2.98)	(2.79)
$PFemale_{t-1}$	0.2049**	0.2101**	0.2139**
	(2.42)	(2.48)	(2.52)
$Doption_{t-1}$	0.0030	0.0011	0.0013
	(0.08)	(0.03)	(0.04)
$logaveinrole_{t-1}$	0.0208	0.0208	0.0209
	(1.28)	(1.29)	(1.29)
$logaverageage_{t-1}$	0.0059	0.0037	0.0050
	(0.05)	(0.03)	(0.05)
$independent_{t-1}$	-0.0278	-0.0188	-0.0203
	(-0.67)	(-0.45)	(-0.49)
$logboardsize_{t-1}$	0.0375	0.0432	0.0286
	(1.26)	(1.47)	(0.96)
$logauditsize_{t-1}$	0.0377	0.0373	0.0372
	(1.43)	(1.41)	(1.41)
$Leverage_{t-1}$	0.0002	0.0002	0.0002
	(0.63)	(0.63)	(0.67)
ROA_{t-1}	-0.0016	-0.0015	-0.0016
	(-1.46)	(-1.40)	(-1.43)
$marketsize_{t-1}$	-0.0038*	-0.0039*	-0.0039*
	(-1.78)	(-1.81)	(-1.83)
$salesgrowth_{t-1}$	0.0009	0.0009	0.0009
	(1.35)	(1.35)	(1.39)
RD_{t-1}	2.8860	2.9385	2.8838
	(0.76)	(0.78)	(0.77)
WT	0.0486	0.0416	0.0448
	(0.39)	(0.33)	(0.35)
$taxenforcement$	0.0699**	0.0694**	0.0666*
	(2.04)	(2.03)	(1.94)
$taxrate$	-0.9123**	-0.9048**	-0.8878**
	(-2.29)	(-2.27)	(-2.23)
$country$	controlled	controlled	controlled

*Year*industry*	controlled	controlled	controlled
constant	0.0537	0.0676	0.0890
	(0.09)	(0.11)	(0.14)
R-squared	0.0427	0.0435	0.0432
N. of cases	5612	5612	5612

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7

Tax avoidance regression between complex firms and non-complex firms

OLS regression reflects CIDs on the board and tax avoidance across complex firms and non-complex firms. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I classify complex firms as firms with R&D expense and non-complex firms as firms with zero R&D expense. All the variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	High R&D	Low R&D	High R&D	Low R&D	High R&D	Low R&D
	CID (dummy)	CID (dummy)	CID (percentage)	CID (percentage)	CID (natural log one plus number)	CID (natural log one plus number)
CID_{t-1}	0.0759*	0.0478	0.3408***	0.1133	0.0967***	0.0394
	(1.81)	(1.60)	(3.21)	(1.53)	(2.82)	(1.57)
$PFemale_{t-1}$	0.3551**	0.1614*	0.3550**	0.1630*	0.3607**	0.1673*
	(2.33)	(1.67)	(2.35)	(1.68)	(2.39)	(1.72)
$Doption_{t-1}$	0.1555**	-0.0307	0.1641**	-0.0331	0.1593**	-0.0326
	(2.11)	(-0.81)	(2.25)	(-0.87)	(2.16)	(-0.85)
$logaveinrole_{t-1}$	0.0042	0.0242	0.0029	0.0240	0.0038	0.0241
	(0.14)	(1.36)	(0.10)	(1.34)	(0.13)	(1.36)
$logaverageage_{t-1}$	0.1100	0.0232	0.1138	0.0222	0.1100	0.0227
	(0.58)	(0.19)	(0.60)	(0.18)	(0.58)	(0.19)
$independent_{t-1}$	0.0966	-0.0710	0.1312*	-0.0689	0.1168	-0.0683
	(1.32)	(-1.50)	(1.77)	(-1.45)	(1.60)	(-1.44)
$logboardsize_{t-1}$	0.0641	0.0216	0.0736	0.0279	0.0480	0.0165
	(1.13)	(0.64)	(1.31)	(0.84)	(0.84)	(0.49)
$logauditsize_{t-1}$	0.0243	0.0448	0.0189	0.0452	0.0232	0.0448
	(0.47)	(1.53)	(0.37)	(1.55)	(0.45)	(1.53)
$Leverage_{t-1}$	0.0004	0.0001	0.0004	0.0001	0.0004	0.0001
	(0.68)	(0.23)	(0.72)	(0.21)	(0.68)	(0.24)
ROA_{t-1}	-0.0009	-0.0033**	-0.0007	-0.0032**	-0.0007	-0.0032**

	(-0.51)	(-2.55)	(-0.40)	(-2.52)	(-0.41)	(-2.53)
$marketsize_{t-1}$	-0.0016	-0.0042*	-0.0021	-0.0042*	-0.0018	-0.0042*
	(-0.42)	(-1.72)	(-0.56)	(-1.73)	(-0.49)	(-1.75)
$salesgrowth_{t-1}$	0.0000	0.0009	-0.0000	0.0010	0.0000	0.0010
	(0.01)	(1.18)	(-0.02)	(1.19)	(0.02)	(1.21)
RD_{t-1}	-4.6726	-6.6800	-4.2159	-6.3013	-4.7031	-6.3674
	(-0.76)	(-1.02)	(-0.69)	(-0.97)	(-0.77)	(-0.98)
WT	-0.1352	-0.0485	-0.1258	-0.0412	-0.1059	-0.0424
	(-0.73)	(-0.53)	(-0.70)	(-0.47)	(-0.63)	(-0.47)
$taxenforcement$	0.0726	0.1873***	0.0671	0.1916***	0.0633	0.1862***
	(0.98)	(2.97)	(0.92)	(3.05)	(0.86)	(2.96)
$taxrate$	-0.7227	-0.7555*	-0.6849	-0.7568*	-0.6730	-0.7455
	(-0.81)	(-1.65)	(-0.77)	(-1.65)	(-0.75)	(-1.63)
country	controlled	controlled	controlled	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled	controlled	controlled	controlled
constant	-0.4203	0.3939	-0.4548	0.3465	-0.4334	0.3924
	(-0.41)	(0.68)	(-0.45)	(0.60)	(-0.44)	(0.68)
R-squared	0.1611	0.0461	0.1662	0.0459	0.1648	0.0461
N. of cases	1274	4338	1274	4338	1274	4338

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8

Tax avoidance regression between firms with high foreign sales ratio and low foreign sales ratio

OLS regression reflects CIDs on the board and tax avoidance across firms with more foreign sales to total sales and firms with less foreign sales to total sales. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I classify firms with more foreign sales to total sales as firms' foreign sales to total sales are higher than the median foreign sales to total sales of total sample and firms with less foreign sales to total sales as firms' foreign sales to total sales are lower than the median foreign sales to total sales of total sample. All the other variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	High foreign sales ratio	Low foreign sales ratio	High foreign sales ratio	Low foreign sales ratio	High foreign sales ratio	Low foreign sales ratio
	CID (dummy)	CID (dummy)	CID (percentage)	CID (percentage)	CID (natural logarithm one plus the number)	CID (natural logarithm one plus the number)
CID_{t-1}	0.0932*	0.0572	0.1940	0.1095	0.0715*	0.0470
	(1.82)	(0.85)	(1.53)	(0.57)	(1.69)	(0.81)
$PFemale_{t-1}$	0.3875***	0.4100	0.3901***	0.4204	0.3981***	0.4187
	(2.74)	(1.22)	(2.74)	(1.24)	(2.78)	(1.24)
$Doption_{t-1}$	0.0684	0.0088	0.0680	0.0106	0.0598	0.0088
	(0.98)	(0.08)	(0.97)	(0.09)	(0.83)	(0.08)
$logaveinrole_{t-1}$	-0.0367	0.0946*	-0.0383	0.0943*	-0.0379	0.0944*
	(-1.26)	(1.67)	(-1.32)	(1.67)	(-1.30)	(1.67)
$logaverageage_{t-1}$	0.0977	0.2530	0.0945	0.2495	0.0935	0.2472
	(0.56)	(0.72)	(0.54)	(0.70)	(0.54)	(0.70)
$independent_{t-1}$	-0.0711	-0.1140	-0.0701	-0.1164	-0.0713	-0.1098
	(-0.96)	(-1.06)	(-0.93)	(-1.09)	(-0.97)	(-1.03)
$logboardsize_{t-1}$	-0.0248	-0.1391	-0.0121	-0.1329	-0.0280	-0.1431
	(-0.45)	(-1.47)	(-0.22)	(-1.39)	(-0.51)	(-1.50)
$logauditsize_{t-1}$	0.0157	0.1096	0.0128	0.1078	0.0127	0.1074
	(0.34)	(1.35)	(0.28)	(1.33)	(0.27)	(1.33)
$Leverage_{t-1}$	0.0001	0.0004	0.0001	0.0004	0.0001	0.0004
	(0.23)	(0.40)	(0.19)	(0.41)	(0.23)	(0.39)

ROA_{t-1}	-0.0041**	-0.0020	-0.0042**	-0.0019	-0.0042**	-0.0019
	(-2.05)	(-0.52)	(-2.09)	(-0.51)	(-2.07)	(-0.50)
$marketsize_{t-1}$	-0.0116***	0.0090	-0.0117***	0.0088	-0.0116***	0.0089
	(-2.68)	(1.01)	(-2.70)	(0.99)	(-2.70)	(1.00)
$salesgrowth_{t-1}$	-0.0009	0.0048	-0.0009	0.0049*	-0.0009	0.0049*
	(-0.70)	(1.63)	(-0.70)	(1.69)	(-0.70)	(1.68)
RD_{t-1}	10.9234	18.6330	11.4688*	17.7377	11.5220*	18.0414
	(1.58)	(1.30)	(1.67)	(1.25)	(1.68)	(1.27)
WT	-0.1294	-0.1062	-0.1288	-0.1115	-0.1193	-0.1045
	(-0.68)	(-1.40)	(-0.67)	(-1.46)	(-0.63)	(-1.36)
$taxenforcement$	0.1285**	0.4103***	-0.0427	0.4230***	0.1320**	0.4143***
	(2.36)	(3.54)	(-1.24)	(3.72)	(2.41)	(3.61)
$taxrate$	-1.3606	-2.5581	-1.3552	-2.6129	-1.3218	-2.5945
	(-1.58)	(-1.30)	(-1.57)	(-1.35)	(-1.54)	(-1.33)
country	controlled	controlled	controlled	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled	controlled	controlled	controlled
constant	0.5593	-1.0742	1.3562	-1.0845	0.5394	-1.0458
	(0.58)	(-0.76)	(1.39)	(-0.77)	(0.56)	(-0.74)
R-squared	0.1559	0.2645	0.1546	0.2638	0.1555	0.2643
N. of cases	1360	491	1360	491	1360	491

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9

Tax avoidance regression between good CSR and bad CSR firms

OLS regression reflects CIDs on the board and tax avoidance across firms practicing good CSR and firms not practicing good CSR. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I use the score in total score of CSR in Asset 4 to measure the involvement of CSR activities of a firm. I classify firms with good CSR as firms' CSR scores are higher than the median CSR score of total sample and firms with bad CSR as firms' CSR scores are lower than the median CSR score of total sample. All the other variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	Good CSR	Bad CSR	Good CSR	Bad CSR	Good CSR	Bad CSR
	CID (dummy)	CID (dummy)	CID (percentage)	CID (percentage)	CID (natural logarithm of one plus the number)	CID (natural logarithm of one plus the number)
CID_{t-1}	0.0350	0.0461	0.1530	0.1516	0.0480	0.0544
	(0.88)	(1.02)	(1.40)	(1.53)	(1.48)	(1.48)
$PFemale_{t-1}$	0.1587	0.1083	0.1683	0.1163	0.1718	0.1232
	(1.15)	(0.80)	(1.23)	(0.86)	(1.25)	(0.89)
$Doption_{t-1}$	-0.1355*	0.0128	-0.1369*	0.0143	-0.1404**	0.0131
	(-1.94)	(0.29)	(-1.95)	(0.32)	(-1.99)	(0.29)
$logaveinrole_{t-1}$	0.0065	0.0845***	0.0074	0.0833***	0.0075	0.0837***
	(0.26)	(3.05)	(0.30)	(3.02)	(0.30)	(3.03)
$logaverageage_{t-1}$	0.1267	0.0554	0.1284	0.0474	0.1305	0.0441
	(0.84)	(0.30)	(0.86)	(0.26)	(0.87)	(0.24)
$independent_{t-1}$	-0.0489	-0.0209	-0.0407	-0.0065	-0.0404	-0.0068
	(-0.79)	(-0.30)	(-0.67)	(-0.09)	(-0.66)	(-0.10)
$logboardsize_{t-1}$	0.0490	0.0015	0.0488	0.0079	0.0343	-0.0099
	(1.04)	(0.03)	(1.06)	(0.16)	(0.72)	(-0.20)
$logauditsize_{t-1}$	0.0151	-0.0084	0.0158	-0.0086	0.0160	-0.0088
	(0.44)	(-0.18)	(0.46)	(-0.19)	(0.47)	(-0.19)
$Leverage_{t-1}$	0.0004	0.0002	0.0004	0.0002	0.0004	0.0002
	(0.92)	(0.37)	(0.91)	(0.37)	(0.92)	(0.41)

ROA_{t-1}	-0.0013	-0.0023	-0.0013	-0.0023	-0.0013	-0.0023
	(-0.85)	(-1.36)	(-0.82)	(-1.34)	(-0.85)	(-1.37)
$marketsize_{t-1}$	-0.0022	-0.0005	-0.0024	-0.0005	-0.0023	-0.0006
	(-0.68)	(-0.16)	(-0.73)	(-0.15)	(-0.72)	(-0.17)
$salesgrowth_{t-1}$	0.0018**	0.0014	0.0018**	0.0015	0.0018**	0.0015
	(2.01)	(1.25)	(2.00)	(1.28)	(2.04)	(1.27)
RD_{t-1}	5.0966	-7.1138	5.1997	-7.0388	5.0803	-7.3824
	(0.89)	(-1.11)	(0.91)	(-1.10)	(0.89)	(-1.16)
WT	-0.2304***	-0.0184	-0.2377***	-0.0161	-0.2331***	-0.0143
	(-4.28)	(-0.16)	(-4.43)	(-0.14)	(-4.33)	(-0.12)
$taxenforcement$	0.5897***	-0.0352	0.5903***	-0.0370	0.5881***	-0.0430
	(8.01)	(-0.66)	(8.02)	(-0.69)	(8.01)	(-0.80)
$taxrate$	-0.4838	-0.5720	-0.4748	-0.5522	-0.4514	-0.5352
	(-0.59)	(-0.78)	(-0.58)	(-0.75)	(-0.55)	(-0.73)
$country$	controlled	controlled	controlled	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled	controlled	controlled	controlled
$constant$	-2.0436**	0.3596	-2.0429**	0.3649	-2.0329**	0.4280
	(-2.56)	(0.43)	(-2.56)	(0.43)	(-2.56)	(0.51)
R-squared	0.0842	0.0838	0.0850	0.0845	0.0853	0.0848
N. of cases	2272	1774	2272	1774	2272	1774

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10

Tax avoidance regression between good Environmental Improvement and bad Environmental Improvement firms

OLS regression reflects CIDs on the board and tax avoidance across firms practicing good environmental improvement activities (good CSR) and firms not practicing good environmental improvement activities (bad CSR). The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I use the score in environmental improvement section of Asset 4 to measure the involvement of environmental improvement activities of a firm. I classify firms with good CSR as firms' CSR scores are higher than the median CSR score of total sample and firms with bad CSR as firms' CSR scores are lower than the median CSR score of total sample. All the other variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	Bad Environmental Improvement	Good Environmental Improvement	Bad Environmental Improvement	Good Environmental Improvement	Bad Environmental Improvement	Good Environmental Improvement
	TaxAvoid (dummy)	TaxAvoid (dummy)	TaxAvoid (percentage)	TaxAvoid (percentage)	TaxAvoid (natural logarithm of one plus the number)	TaxAvoid (natural logarithm of one plus the number)
CID_{t-1}	0.0550*	0.0163	0.1385*	0.1127	0.0475**	0.0260
	(1.71)	(0.51)	(1.73)	(1.14)	(2.01)	(0.97)
$PFemale_{t-1}$	0.1813	-0.0248	0.1924	-0.0183	0.1872	-0.0219
	(1.47)	(-0.19)	(1.55)	(-0.14)	(1.51)	(-0.17)
$Doption_{t-1}$	-0.0495	-0.1568**	-0.0463	-0.1606**	-0.0477	-0.1627**
	(-1.02)	(-2.39)	(-0.95)	(-2.48)	(-0.98)	(-2.48)
$logaveinrole_{t-1}$	0.0556**	-0.0023	0.0551*	-0.0018	0.0544*	-0.0024
	(1.98)	(-0.09)	(1.96)	(-0.07)	(1.94)	(-0.09)
$logaverageage_{t-1}$	0.0471	0.1607	0.0427	0.1604	0.0434	0.1633
	(0.25)	(1.18)	(0.23)	(1.17)	(0.23)	(1.20)
$independent_{t-1}$	-0.0513	-0.0191	-0.0455	-0.0094	-0.0474	-0.0121
	(-0.90)	(-0.35)	(-0.76)	(-0.17)	(-0.82)	(-0.22)
$logboardsize_{t-1}$	0.0263	0.0518	0.0339	0.0522	0.0213	0.0457
	(0.68)	(1.19)	(0.89)	(1.21)	(0.55)	(1.04)
$logauditsize_{t-1}$	0.0008	0.0112	0.0004	0.0124	0.0004	0.0120
	(0.02)	(0.31)	(0.01)	(0.35)	(0.01)	(0.33)
$Leverage_{t-1}$	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005

	(0.80)	(0.94)	(0.81)	(0.93)	(0.82)	(0.94)
ROA_{t-1}	-0.0009	-0.0027*	-0.0010	-0.0026	-0.0010	-0.0027*
	(-0.54)	(-1.68)	(-0.57)	(-1.64)	(-0.55)	(-1.67)
$marketsize_{t-1}$	-0.0008	-0.0007	-0.0008	-0.0008	-0.0008	-0.0008
	(-0.28)	(-0.19)	(-0.26)	(-0.22)	(-0.27)	(-0.21)
$salesgrowth_{t-1}$	0.0017	0.0021**	0.0018	0.0021**	0.0018	0.0021**
	(1.57)	(2.06)	(1.60)	(2.04)	(1.62)	(2.07)
RD_{t-1}	-8.1621	7.1193	-8.3054	7.2382	-8.3488	7.1654
	(-1.14)	(1.18)	(-1.16)	(1.20)	(-1.17)	(1.19)
WT	-0.5234***	0.0000	-0.5237***	0.0000	-0.5214***	0.0000
	(-2.78)	(.)	(-2.78)	(.)	(-2.77)	(.)
$taxenforcement$	0.0244	-0.0394	0.0258	-0.0438	0.0232	-0.0442
	(0.45)	(-0.35)	(0.48)	(-0.39)	(0.43)	(-0.40)
$taxrate$	5.0864***	1.4976	5.0829***	1.5286	5.0630***	1.5463
	(2.82)	(0.48)	(2.81)	(0.49)	(2.80)	(0.49)
country	controlled	controlled	controlled	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled	controlled	controlled	controlled
constant	-1.0989	-0.7592	-1.0964	-0.7587	-1.0669	-0.7581
	(-1.11)	(-1.06)	(-1.10)	(-1.06)	(-1.07)	(-1.06)
R-squared	0.0829	0.0770	0.0815	0.0775	0.0827	0.0772
N. of cases	1873	1985	1873	1985	1873	1985

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11

Propensity score matching

Logit regression reflects the probability of a firm having CIDs on the board and the propensity score matching result. All the variables below are as described earlier. I control industry, year factors in the regression.

	preCID	treat	control	p>|t|
independent	0.4290	U 0.5255	0.4803	0.68
	(0.59)	M 0.5255	0.5303	0.82
logboardsize	-0.8325	U 1.9427	2.1776	0.69
	(-1.54)	M 1.9427	1.9853	0.68
Leverage	0.0024	U 22.409	17.083	1.41
	(0.50)	M 22.409	18.083	1.17
marketsize	-0.0279	U 16.647	16.938	1.62
	(-0.82)	M 16.647	16.812	1.65
salesgrowth	-0.0046	U 2.6818	3.1091	0.98
	(0.38)	M 2.6818	6.5822	0.58
WT	0.2268	U 2.679	3.0348	1.29
	(0.57)	M 2.679	2.679	0.88
Taxrate	29.8721***	U 0.3051	0.2342	0.08*
	(2.86)	M 0.3051	0.3050	0.72
auditenvironment	0.1308**	U 28.037	17.131	0.17
	(2.33)	M 28.037	28.173	1.14
Industry	controlled			
Year	controlled			
constant	-10.4871***			
	(-5.93)			
Pseudo R2	0.2866			
N. of cases	4301			

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12

Difference in differences analysis

This table presents difference-in-differences estimates for firms with CIDs. In Model 1, the treatment firms have at least one CID on the board in year t+1 and do not have CIDs on the board in year t. The control firms never have CIDs during these two years. The control firms are matched at the nearest propensity score with replacement. Post is dummy variable which equals one when firms introduce CIDs on the board, and 0 before firms introduce CIDs on the board. The model estimated is

$TaxAvoid_{it} = \beta_0 + \beta_1 treatment_{it-1} + \beta_2 post_{it-1} + \beta_3 treatment_{it-1} * post_{it-1} + controls_{it-1} + \varepsilon_{it-1}$ (3)

In Model 4, α_1 is firm fixed effect, α_2 is year fixed effect. The rest variables are same as those in Model 1. The model estimated is

$$TaxAvoid_{it} = \beta_0 + \alpha_1 + \alpha_2 + \beta_1 treatment_{it-1} * post_{it-1} + controls_{it-1} + \varepsilon_{it-1} \quad (4)$$

All the other variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	Model 3 TaxAvoid	Model 4 TaxAvoid
$treatment_{t-1}$	-0. 1461	0
	(-1.33)	0
$post_{t-1}$	-0. 0729	0
	(-0.82)	0
$treatment_{t-1} * post_{t-1}$	0. 1884*	0. 0871*
	(1.69)	(1.66)
Firm-level controls	yes	yes
Country-level controls	yes	yes
Industry	yes	yes
Country	yes	yes
year	no	yes
firm fixed	no	yes
constant	-3.0084	-0.0558
	(-0.9)	(-0.02)
R-squared	0. 4207	0.2052
N. of cases	146	239

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13

Robust Regression (excluding firm size less than $1 milliom)

OLS regression excludes asset size less than $1 million and reflects CIDs on the board and tax avoidance. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. *CID* is Dummy variable equals 1 if there is at least one CID on the board, 0 otherwise; Percentage of CIDs on the board; Natural logarithm of one plus the number of CIDs on the board. *PFemale* is the percentage of female directors on the board. *Doption* is an indicator variable that equals one if a firm has option compensation for directors, 0 otherwise. *logaveinrole* is natural logarithm of one plus the average of number of years of directors on the board. *logaverageage* is natural logarithm of one plus the average of the age of directors on the board. *independent* is the percentage of outside directors on the board. *logboardsize* is natural logarithm of one plus the total number of directors on the board. *logauditsize* is natural logarithm of one plus the total number of directors in audit committee. *Leverage* is total long-term liabilities divided by total assets. *ROA* is pre-tax return on assets. *marketsize* is natural logarithm of one plus initial market value. *salesgrowth* is the change of sales divided by sales in last year. *RD* is research and development expenditure divided by initial total assets. *WT* is country uses worldwide versus territorial approach to tax foreign income. *taxenforcement* is measure perceived tax enforcement, tax evasion index from the 1996 World competitiveness Report. *taxrate* is country level corporate tax rate measure in Atwood, Drake, and Myers (2010). I control country, industry, year factors and cluster by firm to account for serial correlation.

	CID (dummy)	CID (percentage)	CID (natural logarithm of one plus the number)
CID_{t-1}	0.0549**	0.1734***	0.0578***
	(2.02)	(2.60)	(2.59)
$PFemale_{t-1}$	0.2115**	0.2169**	0.2218**
	(2.36)	(2.42)	(2.47)
$Doption_{t-1}$	0.0007	-0.0023	-0.0016
	(0.02)	(-0.06)	(-0.04)
$logaveinrole_{t-1}$	0.0234	0.0233	0.0235
	(1.39)	(1.38)	(1.40)
$logaverageage_{t-1}$	0.0058	0.0038	0.0045
	(0.05)	(0.03)	(0.04)
$independent_{t-1}$	-0.0319	-0.0221	-0.0228
	(-0.75)	(-0.51)	(-0.53)
$logboardsize_{t-1}$	0.0352	0.0406	0.0245
	(1.13)	(1.33)	(0.79)
$logauditsize_{t-1}$	0.0416	0.0417	0.0414
	(1.50)	(1.50)	(1.49)
$Leverage_{t-1}$	0.0002	0.0002	0.0003
	(0.73)	(0.72)	(0.76)
ROA_{t-1}	-0.0017	-0.0017	-0.0017
	(-1.51)	(-1.47)	(-1.49)
$marketsize_{t-1}$	-0.0035	-0.0036	-0.0037
	(-1.48)	(-1.51)	(-1.53)
$salesgrowth_{t-1}$	0.0009	0.0009	0.0009
	(1.34)	(1.35)	(1.37)
RD_{t-1}	2.7707	2.9567	2.8358
	(0.70)	(0.75)	(0.72)
WT	-0.0230	-0.0167	-0.0175
	(-0.23)	(-0.17)	(-0.17)
$taxenforcement$	0.0676*	0.0676*	0.0635*

	(1.91)	(1.91)	(1.79)
taxrate	-0.9173**	-0.9089**	-0.8894**
	(-2.21)	(-2.20)	(-2.15)
country	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled
constant	0.3131	0.2860	0.3335
	(0.42)	(0.38)	(0.45)
R-squared	0.0444	0.0449	0.0453
N. of cases	5375	5375	5375

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14

Cross-sectional tests between high and low HHI firms

OLS regression reflects CIDs on the board and tax avoidance across firms in high competitive industries and in low competitive industries. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I use the Herfindahl-Hirschman index (HHI) to measure the competition of an industry. I classify firms in high competitive industries as firms' HHI scores are higher than the median HHI score of total sample and firms in low competitive industries as firms' HHI scores are lower than the median HHI score of total sample. All the variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	High HHI	Low HHI	High HHI	Low HHI	High HHI	Low HHI
	CID (dummy)	CID (dummy)	CID (percentage)	CID (percentage)	TaxAvoid (natural logarithm of one plus the number)	TaxAvoid (natural logarithm of one plus the number)
CID_{t-1}	0.0875*	0.0460	0.1949*	0.1653**	0.0784**	0.0445*
	(1.86)	(1.56)	(1.75)	(2.15)	(2.12)	(1.73)
$PFemale_{t-1}$	0.0644	0.2953***	0.0647	0.3037***	0.0790	0.3040***
	(0.49)	(2.63)	(0.49)	(2.71)	(0.60)	(2.70)
$Doption_{t-1}$	-0.0057	0.0056	-0.0092	0.0042	-0.0128	0.0055
	(-0.11)	(0.11)	(-0.17)	(0.08)	(-0.23)	(0.11)
$logaveinrole_{t-1}$	0.0198	0.0256	0.0208	0.0252	0.0210	0.0252
	(0.71)	(1.28)	(0.74)	(1.26)	(0.75)	(1.27)
$logaverageage_{t-1}$	0.1071	0.0443	0.0946	0.0513	0.0991	0.0484
	(0.61)	(0.32)	(0.54)	(0.37)	(0.57)	(0.35)
$independent_{t-1}$	-0.0883	0.0042	-0.0852	0.0158	-0.0779	0.0095
	(-1.24)	(0.09)	(-1.19)	(0.34)	(-1.10)	(0.20)
$logboardsize_{t-1}$	0.0383	0.0345	0.0500	0.0395	0.0281	0.0271
	(0.76)	(0.95)	(1.04)	(1.09)	(0.55)	(0.75)
$logauditsize_{t-1}$	0.0103	0.0440	0.0116	0.0434	0.0114	0.0440
	(0.25)	(1.41)	(0.28)	(1.39)	(0.28)	(1.41)
$Leverage_{t-1}$	0.0002	-0.0000	0.0002	-0.0000	0.0002	-0.0000
	(0.36)	(-0.04)	(0.30)	(-0.06)	(0.34)	(-0.04)

ROA_{t-1}	-0.0019	-0.0014	-0.0020	-0.0013	-0.0019	-0.0013
	(-1.07)	(-1.01)	(-1.11)	(-0.95)	(-1.09)	(-0.99)
$marketsize_{t-1}$	-0.0016	-0.0046**	-0.0017	-0.0046**	-0.0016	-0.0046**
	(-0.41)	(-2.00)	(-0.43)	(-2.01)	(-0.41)	(-2.02)
$salesgrowth_{t-1}$	0.0011	0.0009	0.0011	0.0009	0.0011	0.0009
	(1.12)	(1.09)	(1.05)	(1.10)	(1.09)	(1.12)
RD_{t-1}	7.1079	-1.1569	7.7492	-1.0625	7.3485	-1.1365
	(1.21)	(-0.25)	(1.31)	(-0.23)	(1.25)	(-0.24)
WT	-0.0305	-0.2059***	-0.0274	-0.2074***	-0.0251	-0.2051***
	(-0.41)	(-5.76)	(-0.38)	(-5.81)	(-0.33)	(-5.75)
$taxenforcement$	0.1812***	0.5849***	0.1912***	0.5848***	0.1810***	0.5839***
	(3.67)	(8.09)	(4.02)	(8.08)	(3.76)	(8.08)
$taxrate$	0.0758	-0.9771*	0.0461	-0.9677*	0.0711	-0.9614*
	(0.13)	(-1.80)	(0.08)	(-1.79)	(0.12)	(-1.77)
$country$	controlled	controlled	controlled	controlled	controlled	controlled
$Year*industry$	controlled	controlled	controlled	controlled	controlled	controlled
$constant$	-0.8965	-1.7560***	-0.9003	-1.7970***	-0.8574	-1.7592***
	(-1.16)	(-2.68)	(-1.17)	(-2.74)	(-1.11)	(-2.69)
R-squared	0.0834	0.0586	0.0823	0.0592	0.0839	0.0589
N. of cases	2109	3503	2109	3503	2109	3503

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15

Cross-sectional tests between firms with more and fewer analysts following

OLS regression reflects CIDs on the board and tax avoidance across firms with more analysts following and firms with fewer analysts following. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. I classify firms with more analysts following as the number of analysts following the firms is higher than the median number of analysts following a firm in the total sample and firms with fewer analysts following as the number of analysts following the firms is lower than the median number of analysts following a firm total sample. All the variables below are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	Fewer Analysts	More Analysts	Fewer Analysts	More Analysts	Fewer Analysts	More Analysts
	CID (dummy)	CID (dummy)	CID (percentage)	CID (percentage)	CID (natural logarithm of one plus the number)	CID (natural logarithm of one plus the number)
CID_{t-1}	0.1167*	0.0093	0.3759*	0.0295	0.1202*	0.0181
	(1.76)	(0.12)	(1.82)	(0.17)	(1.84)	(0.32)
$PFemale_{t-1}$	-0.1203	0.0294	-0.1061	0.0312	-0.0968	0.0325
	(-0.56)	(0.15)	(-0.50)	(0.16)	(-0.45)	(0.17)
$Doption_{t-1}$	-0.0248	0.0363	-0.0221	0.0348	-0.0230	0.0334
	(-0.28)	(0.36)	(-0.25)	(0.34)	(-0.26)	(0.32)
$logaveinrole_{t-1}$	-0.0140	0.0051	-0.0143	0.0046	-0.0136	0.0053
	(-0.31)	(0.11)	(-0.32)	(0.10)	(-0.30)	(0.12)
$logaverageage_{t-1}$	0.1412	-0.3364	0.1304	-0.3363	0.1388	-0.3345
	(0.60)	(-1.02)	(0.56)	(-1.02)	(0.59)	(-1.02)
$independent_{t-1}$	-0.0072	-0.0796	0.0032	-0.0764	0.0013	-0.0726
	(-0.08)	(-0.70)	(0.03)	(-0.67)	(0.01)	(-0.66)
$logboardsize_{t-1}$	0.0494	0.1519*	0.0596	0.1529*	0.0335	0.1477*
	(0.65)	(1.88)	(0.79)	(1.92)	(0.44)	(1.83)
$logauditsize_{t-1}$	-0.0462	-0.0273	-0.0479	-0.0271	-0.0471	-0.0255
	(-0.67)	(-0.45)	(-0.70)	(-0.45)	(-0.69)	(-0.42)
$Leverage_{t-1}$	-0.0009	-0.0007	-0.0009	-0.0007	-0.0009	-0.0007
	(-1.13)	(-0.97)	(-1.15)	(-0.97)	(-1.16)	(-0.95)
ROA_{t-1}	-0.0028	-0.0048*	-0.0027	-0.0048*	-0.0027	-0.0049*

	(-0.98)	(-1.83)	(-0.96)	(-1.83)	(-0.95)	(-1.84)
$marketsize_{t-1}$	0.0006	-0.0066	0.0012	-0.0067	0.0008	-0.0066
	(0.09)	(-1.18)	(0.17)	(-1.18)	(0.12)	(-1.18)
$salesgrowth_{t-1}$	0.0007	0.0032**	0.0007	0.0032*	0.0007	0.0032**
	(0.40)	(1.97)	(0.38)	(1.96)	(0.39)	(1.99)
RD_{t-1}	12.8155	-8.9955	14.1149	-8.9308	13.6691	-9.2644
	(1.45)	(-0.98)	(1.59)	(-0.98)	(1.55)	(-1.01)
WT	0.2188***	-0.3584***	0.1925***	-0.3581***	0.2033***	-0.3565***
	(3.36)	(-4.86)	(2.91)	(-4.88)	(3.15)	(-4.89)
$taxenforcement$	-0.0135	0.0292	-0.0094	0.0292	-0.0143	0.0257
	(-0.32)	(0.56)	(-0.23)	(0.58)	(-0.34)	(0.49)
$taxrate$	-1.3241	-1.3759	-1.3080	-1.3783	-1.3043	-1.3577
	(-1.44)	(-1.30)	(-1.42)	(-1.32)	(-1.42)	(-1.30)
country	controlled	controlled	controlled	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled	controlled	controlled	controlled
constant	-0.5065	2.8809*	-0.4386	2.8768*	-0.4289	2.8728*
	(-0.56)	(1.95)	(-0.48)	(1.96)	(-0.47)	(1.96)
R-squared	0.1657	0.1712	0.1660	0.1712	0.1665	0.1714
N. of cases	808	827	808	827	808	827

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16

Cross-sectional tests between firms with experienced and non-experienced CIDs

OLS regression reflects experienced and non- experienced CIDs on the board and tax avoidance. The dependent variable is *TaxAvoid* which is equal to pre-tax earnings multiplies by the home country's statutory corporate income tax rate minus the taxes actually paid, and then divided by pre-tax earnings. *expCID* is dummy variable equals 1 if there are CIDs with prior director experience on the board, 0 otherwise; Percentage of experienced CIDs on the board; Natural logarithm of one plus the number of experienced CIDs on the board. *nonexpCID* is dummy variable equals 1 if there are only CIDs with no prior director experience on the board, 0 otherwise; Percentage of non-experienced CIDs on the board; Natural logarithm of one plus the number of non-experienced CIDs on the board. All other variables are as described earlier. I control country, industry, year factors and cluster by firm to account for serial correlation.

	CID (dummy)	CID (percentage)	CID (natural logarithm one plus the number)
$expCID_{t-1}$	0.0722***	0.1830***	0.0567***
	(2.75)	(2.61)	(3.07)
$nonexpCID_{t-1}$	-0.0905	-0.5465	-0.0979
	(-0.82)	(-1.05)	(-1.00)
$PFemale_{t-1}$	0.1888**	0.1989**	0.1957**
	(2.23)	(2.35)	(2.32)
$Doption_{t-1}$	0.0065	0.0066	0.0036
	(0.18)	(0.18)	(0.10)
$logaveinrole_{t-1}$	0.0205	0.0197	0.0203
	(1.28)	(1.22)	(1.26)
$logaverageage_{t-1}$	-0.0023	-0.0026	-0.0023
	(-0.02)	(-0.02)	(-0.02)
$independent_{t-1}$	-0.0378	-0.0337	-0.0338
	(-0.95)	(-0.85)	(-0.85)
$logboardsize_{t-1}$	0.0373	0.0425	0.0317
	(1.27)	(1.44)	(1.08)
$logauditsize_{t-1}$	0.0444*	0.0437*	0.0450*
	(1.70)	(1.66)	(1.72)
$Leverage_{t-1}$	0.0002	0.0002	0.0002
	(0.64)	(0.64)	(0.65)
ROA_{t-1}	-0.0017	-0.0017	-0.0017
	(-1.54)	(-1.55)	(-1.54)
$marketsize_{t-1}$	-0.0040*	-0.0039*	-0.0039*
	(-1.84)	(-1.80)	(-1.82)
$salesgrowth_{t-1}$	0.0008	0.0008	0.0008
	(1.28)	(1.29)	(1.30)
RD_{t-1}	2.6004	2.5082	2.5482
	(0.69)	(0.66)	(0.67)
WT	0.0431	0.0456	0.0414
	(0.32)	(0.33)	(0.31)
$taxenforcement$	0.0750**	0.0763**	0.0739**
	(2.18)	(2.22)	(2.14)

taxrate	-0.8886**	-0.8939**	-0.9033**
	(-2.24)	(-2.25)	(-2.27)
country	controlled	controlled	controlled
*Year*industry*	controlled	controlled	controlled
constant	0.1006	0.0732	0.1219
	(0.16)	(0.11)	(0.19)
R-squared	0.0439	0.0433	0.0444
N. of cases	5612	5612	5612

CURRICULUM VITAE

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