Do Banks Assist Corporate Tax Avoidance ? Evidence from Simultaneous Debt-Equity Holding

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Abstract

This paper analyzes how banks' simultaneous holding of both debt and equity claim of the same firm (dual holding) affect the firm's tax avoidance activities. Using bank mergers as an exogenous shock, we employ difference-in-differences methods to establish the causal effect. The presence of bank dual holder is associated with a significant increase in corporate tax avoidance. The effect is stronger when banks have higher equity stake or lender stake and when banks have higher market share of the related industry.

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Keywords: bank, debt-equity dual holding, tax avoidance

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1. Introduction

Banks may participate in their clients' tax planning activities. This issue has drawn tremendous attentions of policy makers as well as public media.[1] In the 2005 KPMG tax shelter fraud scandal, several banks such as Deutsche Bank, UBS Bank and First Union National Bank, are found to be heavily involved in the development, marketing and implementation of tax products (United States Senate, 2005). OECD (2008; 2009) has also noticed that banks exploit tax avoiding opportunities for their clients. Both OECD and United States Senate recommend that revenue bodies review tax shelter activities in major banks, develop an enhanced relationship with banks to identify aggressive transactions, and prevent banks from aiding or abetting corporate tax avoidance.[2]

What is the role played by banks in their clientele firms' tax avoidance? This is a controversial question. Theoretically, banks have both incentives to curb and assist clients' tax avoidance. Empirically, literature provides support to both views. Under the agency framework, creditors are fixed claimants who are vulnerable to borrowers' risk taking behaviors (Goh, Lee, Lim and Shevlin, 2016; Jensen and Meckling, 1976; Myers, 1977). Tax avoidance activities are risky in the sense that they reduce corporate transparency, increase litigation risk, and may leads to penalties by tax authorities (Balakrishnan, Blouin, and Guay, 2018; Hope, Ma, and Thomas, 2013; Mills, 1998; Wilson, 2009). Hence, creditors loathe tax avoidance behavior. Banks, as the delegated monitor of creditors, should monitor firms to reduce aggressive tax planning

[1] See "HSBC bank 'helped clients dodge millions in tax'," BBC News, February 10, 2015; "Banks' Derivatives Activity Falls Under I.R.S. Scrutiny," New York Times, January 20, 2010; " European Probe Widens into Tax Maneuver," Wall Street Journal, October 29, 2014; "The Wall Street Tactic that Costs German Taxpayers Roughly $1 Billion a Year," Washington Post, May 03, 2016; "A Huge Wall Street Tax Avoidance Scheme Has Deprived Denmark of Millions," Business Insider, July 13, 2016; "German Investigation into Tax Wheeze Spreads to Spain's Santander," Financial Times, October 18, 2018;

[2] "Federal bank regulators, in consultation with the IRS, should review tax shelter activities at major banks, and clarify and strengthen rules preventing banks from aiding or abetting tax evasion by third parties or promoting potentially abusive or illegal tax shelters." (United States Senate, 2005); "This study set out to improve revenue bodies' understanding of complex structured finance transactions (CSFTs), the role banks play in designing and implementing aggressive tax planning and the prevention, detection and response strategies applied by revenue bodies to respond to the challenges posed by banks." (OECD, 2009).

behavior. Consistent with this view, Hasan, Hoi, Wu and Zhang (2014) document that banks charge higher loan spreads for firms with aggressive tax avoidance activities.

On the other hand, banks have incentive to assist clients' tax avoidance because they also benefit from it. Banks can get substantial fees in return for assisting clients with tax avoidance (OECD, 2008; 2009; United States Senate, 2005). In addition, firms' tax savings can improve their solvency and reduce the default risk on bank loans. Most importantly, due to their network of branches across countries and their skills to adapt financial securities, banks themselves have information advantages that allows them to better identify firms' unexploited tax planning opportunities. A few recent papers confirm this argument. Gallemore, Gipper, and Maydew (2019) show that some banks specialize in assisting their corporate clients with tax planning. Kim, Lin, Mao and Wang (2019) show that banks facilitate client's tax planning through their operation in tax haven.

In this paper, we take a new perspective to study how banks treat client's tax planning behavior. Banks not only interact with firms through debt financing. Santos and Rumble (2006) find that US banks make sizeable equity investments in firms through their trust departments although the Glass–Steagall Act restricts banks from buying stocks of firms for their own account. Their research raises questions about the often-adopted assumption that banking is separate from commerce in the United States and attract more attention on the bank-firm equity ties. Since the Glass–Steagall Act was repealed in 1999, more and more commercial banks have developed large asset management divisions through acquisitions and hiring, offering mutual funds and other investment vehicles to invest in publicly listed firms. There is no doubt that banks are exerting growing important influence in firms through equity holding. At the same time, it becomes possible for banks to invest in the same firms to which banks make loans. This leads to a new and increasingly important phenomenon: banks can simultaneously hold both significant debt and equity stake of the same firm, namely debt-equity dual holding. As shown in Figure 1, the percentage of firms with bank dual holders rises in the past two decades, from 20% in 1995 to 50% in 2016.

[Insert Figure 1 here]

This phenomenon of bank dual holding is an ideal setting to study the role of banks in corporate tax avoidance. Banks unfavorite firms with aggressive tax planning because tax avoidance activities reduce information transparency and increase agency risk. The dual holding aligns the creditor and shareholder interest. It reduces bank monitoring incentives to prevent exploitation by shareholders. On the other hand, banks as creditors do not directly benefit from clients' tax saving activities because interest expense is a before-tax item. However, when banks hold equity stake, they have direct monetary interest from tax planning. This encourages banks to use their information advantage to help firms utilize unexploited tax planning opportunities. We therefore posit that the bank dual holding would increase tax avoidance of their clients. In contrast, if banks have no monitoring effect on corporate tax avoidance or have no information advantage in identifying client tax planning opportunities, we should not see any effect of bank dual holding on corporate tax avoidance .

We follow Jiang, Li, and Shao (2010) and Chu (2017) to construct the dual holder. Since our purpose is to examine the role of banks in tax planning of their clients, we focus solely on lead banks of syndicated loans. We use the DealScan syndicated loan database to identify lenders and employ institutional holding (13f) database to identify equity holders. We manually track lenders and institutional holders to their ultimate parents using the Federal Reserve's National Information Center database. A firm-year is identified as with bank dual holder if the firm has outstanding loan from the bank and its equity was held by any funds affiliated to the same bank in any quarter of that fiscal year.

Using a comprehensive sample of U.S. public firms from 1995 through 2016, we examine the relationship between the existence of bank dual holders and firms' tax avoidance. Our multivariate ordinary least-squares (OLS) analysis show that firms have lower cash effective tax rates on average if they have bank dual holders. This result is robustness to alternative measures of tax avoidance, Manzon and Plesko (2002) book-tax difference and Desai and Dharmapala (2006) abnormal book-tax difference and multiple specifications with various controls including firm fixed effects.

To address potential endogeneity concerns, we employ a difference-in-differences (DiD) analysis using bank merger as an identification. When two banks merge, if one bank holds loans of a firm and the other bank holds equity of the same firm, this merge will generate a new bank dual holder for the firm. Firms that establish dual-holding banks due to mergers form treated group. Firms related to banks involved with merger but do not change the status of bank dual holding form controlled group. One concern using bank mergers as identification is that consolidation of banks may change the overall bank monitoring incentive that in turn affect clients tax planning. It is worth noting that we use the same merge to classify treatment and control groups, and in all of our DiD regressions, we control for the merger fixed effect. Therefore, any factors related to mergers themselves should affect both treatment and control groups. In addition, we control for the firm fixed effect. Hence, this DiD setting allows us to pin down the differential effect of the initiation of bank dual holding on firms' tax avoidance activities. Our results assure the casual relation that bank dual holding increase firm's tax avoidance activities.

We further explore the mechanisms that explain the causal relationship and propose two channels. One is the "incentive alignment" channel, which addresses that simultaneous debt-equity holding align the interest of shareholders and debtholders, therefore stimulate bank dual holders to assist tax avoidance. Another is the "information spillover" channel. As simultaneous debt-equity holding allows private information transmitted among different divisions within banks, banks can more effectively use their expertise to identify unexploited opportunities for corporate tax planning. We conduct cross sectional analyses to examine these two channels. Results show that the effect is stronger when banks have higher equity stake or lender stake and when banks' market share in the related industry is higher, which confirm our hypotheses.

To ensure that the effect is indeed driven by tax consideration, we explore whether the effect of bank dual holding is stronger for firms with heavy tax burden and when banks are more expertise in tax planning. Using firms' state tax rate as a measure of tax burden, we find that negative effect of bank dual holding on firms' effective tax rate is more evident for firms

located in states who levy additional state tax. We follow Gallemore et al.(2019) to classify banks as tax intermediaries and non-tax intermediaries. Utilizing the variation in banks from a firm-bank-year sample, we conduct subsample analysis and find that the dual holding effect on tax avoidance is more evident for firms related to a tax intermediary bank. The result rules out the concern that the increased tax avoidance is just a side product of firms' other adjustments.

This paper contributes to literature in several ways. First, our study is closely related to the literature on banks' role in clients' tax planning strategies. Gallemore et al.(2019) show that banks act as tax planning intermediaries to assist corporate clients with tax planning. Kim et al.(2019) suggest that banks play a significant role in corporate tax planning by examining that banking market consolidation affects bank clients' offshore tax haven operations. Our paper extends this line of literature by showing why banks assist clients' tax planning behavior. The equity stake of clients is one major reason that make banks willing to risk creditors benefit to assist tax avoidance.

Second, our study adds to the growing literature on the implications of dual ownership. Prior researches primarily examine how dual holding affects loan pricing. Santos and Wilson(2006) find that commercial banks charge lower rates on loans to firms in which they have a voting stake. Jiang et al.(2010) focused on non-bank dual holders, finding that the presence of non-commercial bank dual holders is associated with lower loan yield spreads. Lim, Minton and Weisbach (2014) also focus on non-bank institutional lenders, but they suggest that hedge fund and private equity dual holders charge higher loan spreads. Chu (2017) show that dual holders mitigate the creditor-shareholder conflict and enhance the payout policy. Yang (2019) show that dual holders affect the corporate innovation activities, also through alleviating the creditor-sharing conflicts. Chava, Wang and Zou (2019) indicate that firms with dual ownership are less likely to have capital expenditure restrictions in loan contracts. All of these papers point out the positive effect of dual holder through mitigating creditor-shareholder agency conflicts. However, we, in this paper, reveal the negative side of dual holder. The existence of bank dual holding reduces the monitoring incentives of banks and encourage risk-taking behavior such as tax avoidance.

Finally, our study responds to the call of Hanlon and Heitzman(2010) adding to literature on determinants of corporate tax avoidance. Researches ever examined the relation between tax avoidance and firm-level characteristics, such as capital structure and international operations (Dyreng, Hanlon, Maydew and Thornock, 2017; Gupta and Newberry, 1997; Jacob, 1996; Rego, 2003). Plenty of literatures pay attention to the effect of shareholders and ownership structure on firms' tax-planning decisions (Badertscher, Katz and Rego, 2013; Bird and Karolyi, 2017; Chen, Chen, Cheng and Shevlin, 2010; Khan, Srinivasan and Tan, 2017). Recent researches explore the effects of more extensive factors such as individual executives (Dyreng, Hanlon and Maydew, 2010), Corporate Social Responsibility (Hoi, Wu and Zhang, 2013), political connection (Kim and Zhang, 2016) and customer-supplier relationship (Cen, Maydew, Zhang and Zuo, 2017). We provide evidence on banks' influence on corporate tax avoidance activities.

The rest of paper proceeds as follows. Section 2 reviews prior research and develops our hypothesis. Section 3 describes the sample selection procedure, the identification strategy and variable definitions. Section 4 presents our main results, including OLS regression results, DiD test results and robustness check. In section 5, we conduct additional cross sectional analysis. Section 6 concludes the paper.

2. Related Literature and Hypothesis Development

2.1. Determinants of corporate tax avoidance.

The theory of corporate tax avoidance focuses on the relationships between the shareholders, management, as well as the government who becomes stakeholder of firms through tax claims. Similar to theory of individual tax compliance, corporate tax avoidance is also a game between the corporate and the government, a gamble for tax savings accompanied by the risk of detection and penalty. While additional agency issues can arise in corporate tax avoidance as separation of ownership and control can lead to corporate tax decisions that reflect the private interests of the managers. Slemrod (2004), Chen and Chu (2005), and Crocker and Slemrod (2005) lay the theoretical foundation for understanding corporate tax avoidance within an agency framework and shed light on the role of manager-shareholder agency conflicts in determining tax avoidance. Desai and Dharmapala (2006) and Desai, Dyck and Zingales (2007)

further propose that tax avoidance would reduce the transparency of firms, facilitating managerial opportunism, such as earnings manipulation and rent diversion. This theory has received considerable attention and motivated literature on the impact of manager, shareholder and corporate governance on tax avoidance (Badertscher, Katz and Rego, 2013; Bird and Karolyi, 2017; Chen, Chen, Cheng and Shevlin, 2010; Dyreng, Hanlon and Maydew, 2010; Khan, Srinivasan and Tan, 2017). Earlier researches ever examined the relation between tax avoidance and firm-level characteristics, such as capital structure and international operations (Dyreng, Hanlon, Maydew and Thornock, 2017; Gupta and Newberry, 1997; Jacob, 1996; Rego, 2003). Although tax avoidance has been linked to various factors, yet the variation in tax avoidance is not explained very well (Hanlon and Heitzman; 2010).[3] Recent researches explore the effects of more extensive factors such as corporate social responsibility (Hoi, Wu and Zhang, 2013), political connection (Kim and Zhang, 2016) and customer-supplier relationship (Cen, Maydew, Zhang and Zuo, 2017).

2.2. Influences of debt-equity dual holding.

The phenomenon that creditors simultaneously hold equity of the borrower becomes widespread, and it provides a very setting to assess the existence and magnitude of shareholder-creditor conflicts, which have important implications and always arise attention (Jensen and Meckling, 1976; Myers, 1977). Along with the growing phenomenon, there is growing literature exploring its impact on firms. Most literature in the area investigates how dual ownership affects the debt costs and covenants. Santos and Wilson (2009) examine that commercial banks that have a voting stake in borrowing firms through their trust business charge lower interest rates on average. Also, Jiang et al. (2010) focus on non-bank dual holders and find similar results. Lim, Minton and Weisbach (2014) also focus on non-bank institutional lenders, but they suggest that hedge fund and private equity dual holders charge higher loan spreads. Ferreira and Matos (2012) find that dual ownership is associated with higher loan

[3] Hanlon and Heitzman (2010) give some plausible explanations: the theory on corporate tax avoidance in an agency framework is relatively young and is not well developed or sufficiently incorporated into the empirical literature; empirical measures of tax avoidance that rely on financial statements have known limitations; reliable empirical measures of some cross-sectional determinants are difficult to obtain; tax avoidance may be highly idiosyncratic.

spreads but can mitigate the effect of credit rationing in the crisis. Chava, Wang and Zou (2019) indicate that firms with dual ownership are less likely to have capital expenditure restrictions in loan contracts.

Besides, Chu (2017) show that dual holders mitigate the creditor-shareholder conflict and enhance the payout policy. Yang (2019) suggest that dual holding affect the corporate innovation activities. Bodnaruk and Rossi (2016) find that targets with larger equity ownership by dual holders have lower M&A equity premia and larger abnormal bond returns. Chen, Zhang and Zhu (2019) identify a causal link between dual ownership and managerial compensation structure, finding that firms with a higher dual ownership adopt compensation policies with lower risk-taking incentives. All of these papers point out the effect of dual holders through mitigating shareholder-creditor agency conflicts.

2.3 The impact of bank dual holding on tax avoidance.

As we mentioned, the variation in tax avoidance is not fully explained. Recently, extra attention is paid to creditors' perception of corporate tax avoidance. How debt holders perceive corporate tax avoidance has caused controversy. On the one hand, debt holders may prefer tax avoidance because tax avoidance can generate tax savings (Mills, 1998; Mills, Erickson, and Maydew, 1998) and reduce the demand of debt (Graham and Tucker, 2006), thereby enhancing corporate financial slack and lowering default risk. Lim (2011) finds a negative relationship between tax avoidance and the interest expense of debt in Korean firms, supporting this argument. On the other hand, debt holders loathe tax avoidance because tax avoidance activities exacerbate information asymmetry (Desai and Dharmapala, 2006; Desai et al., 2007; Hope et al, 2013; Balakrishnan et al, 2018), increase the possibility of managerial rent diversion (Desai and Dharmapala, 2006; 2009; Chen et al., 2010) and lead to penalties by tax authorities (Mills, 1998; Wilson, 2009). Compared with the benefits from tax avoidance, debt holders may perceive tax avoidance-induced risks as more salient as they are fixed claimants and face substantial downside risk (Goh et al, 2016). Consistent with this view, Hasan et al. (2014) and Shevlin, Urcan, and Vasvari (2019) find that firms with greater tax avoidance incur higher cost of debt.

A few recent papers suggest that banks have incentive and ability to assist clients' tax avoidance. Gallemore, Gipper, and Maydew (2019) show that some banks specialize in assisting their corporate clients with tax planning. Kim, Lin, Mao and Wang (2019) show that banks facilitate client's tax planning through their operation in tax haven. Their findings imply that banks could exclusively play a different role in firms' tax avoidance relative to other debt holders. First, banks develop knowledge of clients' business affairs through lending. Both Hasan et al. (2014) and Shevlin et al. (2019) suggest that relative to bond investors, banks are better able to effectively monitor borrowers' tax avoidance activities, therefore, are less sensitive in pricing avoidance-induced risks into interest spreads. Hasan et al. (2014) argue that the negative association between tax avoidance and debt cost shown by Lim (2011) could also arise as firms with greater tax avoidance rely more heavily on loans as opposed to bonds while banks charge these firms a lower incremental interest spread for the same level of risk. Furtherly, banks' private information also allows them to identify unexploited opportunities for tax planning (Gallemore, Gipper, and Maydew, 2018). Second, banks have advantages involving in aggressive tax planning. Their network of branches across countries and their skill to adapt financial securities make them more expertise in tax planning (OECD, 2008; 2009; Kim, Lin, Mao and Wang, 2019). Banks can also transmit tax planning strategies among their clients (Gallemore et al., 2018). Last, helping clients with tax avoidance also earns banks substantial fees (OECD, 2008).

Bank dual holding offers a unique angle to explore the role of banks in corporate tax avoidance. On the one hand, simultaneous holding of equity and debt internalizes the conflicts between the two roles (shareholder and creditor) they assume. Debtholders may against tax planning because they do not benefit directly from tax savings but expose to the risk associated with tax planning. When banks simultaneously hold debt and equity claims, they are no longer fixed claimants and benefit directly from the reduced tax burden as shareholders. The monetary benefit related to equity claim provides incentive for banks to tolerate tax avoidance. Meanwhile, as the shareholder-creditor conflicts mitigated, bank lenders are less concerned that firms' tax avoidance activities would lead to information opacity, rent diversion, penalties, and finally to default on loans. Therefore, bank dual holders would like to prompt firms

participating in tax avoidance activities. We term this as "*incentive alignment*" channel. On the other hand, firms with bank dual holders may better possess and more effectively explore unused tax saving opportunity. As aforementioned, banks develop knowledge of clients' business affairs through lending, which enables them effectively monitor borrowers' tax avoidance activities and identify unexploited opportunities for tax planning. The debt-equity dual holding allows tax-related private information transmitted from commercial bank divisions, who are debt holders, to bank asset management divisions who are equity holders. Together with their expertise in specific industry, banks can take the advantage of the private information they obtain to identify opportunities and transmit tax planning strategies among their clients. We term this as "*information spillover*" channel. Both channels induce the hypothesis as follows:

Hypothesis 1: Firms with bank as equity-debt dual holder are involved with more aggressive tax avoidance than firms without bank dual holder.

We further make predictions based on the mechanisms that explain the relation between dual holding and tax avoidance. First, as the "*incentive alignment*" channel indicates, the monetary benefit related to equity claim provides incentive for banks to tolerate tax avoidance. It's reasonable to expect the incentive to be stronger if banks have higher equity stake in the firm. We therefore propose the following hypothesis:

Hypothesis 2: The positive relation between dual holding bank and firms' tax avoidance is more pronounced when the dual holding banks hold more equity of firm.

Second, bank dual holders are able to assist corporate tax due to "*information spillover*" advantage. They effectively use the private information about firms obtained through lending and the expertise in specific industry to identify opportunities for tax planning and to customize tax strategies. Hence, we propose the following hypothesis:

Hypothesis 3: The positive relation between dual holding bank and firm's tax avoidance is more pronounced for banks, which have more private information about firm or firm's industry.

3. Sample Construction and the Identification Strategy

3.1. Sample construction.

Table 1 describes our sample selection criteria.

[Insert Table 1 here]

We begin with all non-financial, non-utility U.S. incorporated firms in Compustat during the period 1995–2016. We restrict firms with total assets at least $10 million. We start the sample in 1995 because data coverage of DealScan in the early 1990s is relatively limited (Chava and Roberts, 2008). A total of 99,053 firm-years meets these initial requirements. We then require non-missing values of firm-level control variables and positive pretax income, reducing the sample to 48,875 firm-years and 7,334 distinct firms.

Next, we use Dealscan to collect bank loan information. First, we exclude loans with missing maturity or missing amount. We disregard bankers' acceptance, bridge loans, leases, loan style floating rate notes, standby letters of credit, step payment leases, bonds, notes, guidance lines, traded letters of credit, multi-option facilities, and other or undisclosed loans (Jiang et al., 2010). Second, we identify lead lenders of each loan. Following Bharath, Dahiya, Saunders and Srinivasan (2009), we require a lead lender with LeadArrangerCredit = "Yes" or to be indicated as "Lead bank", "Agent", "Admin agent", "Arranger" or "Sole Lender" in LenderRole. Third, we remove lenders that are hedge fund, insurance company, mutual fund, etc., and only include lenders that are banks or owned by bank holding groups. We use the Federal Reserve's National Information Center database and SDC mergers and acquisitions database to manually match these lead banks with historical ultimate parents. "Bank" mentioned afterwards in this article stands for the ultimate parent of bank. Using DealScan-Compustat link file (Chava and Roberts, 2008), we match each firm with banks who are lead lenders on any outstanding loan to the firm during the fiscal year. We consider a loan to be outstanding if any part of the loan begin-date until the end-date overlaps with any portion of the firm's fiscal year (Gallemore et al., 2019).

Finally, we collect the equity holding information of our sample firms using Thompson Reuters 13F ownership database. We link cusip of Thomson Reuters Ownership database to permno, and then link permno to gvkey using CRSP/COMPUSTAT Merged (CCM) Data. Eventually 4,728 firms are covered by Thomson Reuters Ownership database. We require each firm to have at least five years of data. These criteria result in a sample of 24,840 firm-year observations from 2,262 unique firms.

3.2. The identification strategy.

The potential endogeneity problem is that unobservable firm characteristics may correlate with both the establishment of bank-firm relationships and firms' tax avoidance. Another concern is that banks may choose to establish relationship with firms based on their tax avoidance behavior and there could be reverse causality. To deal with these concerns, we use bank merger as a plausibly exogenous shock. When two banks merge, not only the existing borrowers and loans of the target banks are transferred to the acquirer bank, but also the existing portfolios of the target banks. Acquirer generally maintain these acquired holdings for an extended period of time due to liquidity and transaction cost concerns. Therefore, if a firm is borrowing from one of the merging banks before merger, and at the same time the other party of the merger holds significant amount of the firm's equity, then the firm is very likely to be dual held by the merged bank after merger. Besides, there are some firms who are also affected by the merger but the status of bank dual holding not changed. Bank mergers only generate plausibly exogenous variation in treatment firms' dual holding status, which should affect their subsequent tax avoidance level.

We extract all bank merger events from SDC's Mergers and Acquisitions database that announced during 1998-2013 and was completed within one year after the initial announcement.[4] There are 162 mergers relating to banks in DealScan and Thomson Reuters 13f Ownership database. For each bank merger, we identify treatment firms as those that are likely to experience a dual holding status change due to the merger. Specifically, we require

[4] Since we require three years of data before the merger and three years after, our bank merger sample is restricted to the period 1998 - 2013

treatment firms (1) do not have any dual holder within three years before the bank merger announcement date ; (2) have outstanding loans from one of the merging banks within three years before the bank merger announcement date, and significantly held by the other merging bank during the quarter immediately before the bank merger announcement date; (3) do not have any dual holder other than the merged bank during [t-3,t+3]. Because of the strict requirements, only 16 bank mergers generate treatment firms. We list all these bank merger events in Appendix B. Although only 16 bank merges are relevant, these mergers affect a large number of firms, which allows us to conduct DiD tests.

When conducting the DiD analysis using bank mergers as identification, one concern is that consolidation of banks may change the overall bank monitoring incentive that in turn affect clients tax planning. We want to control for such factors that could be related to corporate tax avoidance, so we choose firms affected by the same merger as control group. We require control firms (1) do not have any dual holder during [t-3,t+3]; (2) either have outstanding loans from merging banks within three years before the bank merger announcement date, or significantly held by merging banks during the quarter immediately before the bank merger announcement date. These firms are also affected by bank mergers, but their dual holding status are not changed.

Figure 2 takes the merger between Bank of American and FleetBoston as an example. In 2004, Bank of American acquired FleetBoston Financial, the merger was announced at October 27th , 2003 and completed at April 1st , 2004. Bank of American held significant amounts of equity of Jo-Ann Stores since 1998 but never lend to it before the announcement date, while FleetBoston Financial ever lend to Jo-Ann Stores at April 24th , 2001. After Bank of American acquired FleetBoston Financial, Jo-Ann Stores became borrower of Bank of American. Therefore, Bank of American became dual holder of Jo-Ann Stores. Similarly, FleetBoston Financial held significant amounts of equity of NCI Building Systems since 1996 but never lend to it, while Bank of American had repeated lending relationship with NCI Building Systems before the merger announced. After the merger completed, the equity owned by FleetBoston Financial was transferred to Bank of American and Bank of American became dual holder of NCI Building

Systems. Both Jo-Ann Stores and NCI Building Systems obtain dual holder due to bank merger, thus are classified as treatment group. Firms in control group, such as Murphy Oil Corp, borrow from FleetBoston Financial before the merger and Bank of American after, was also affected by bank merger. However, the dual holding status of Murphy Oil Corp never changed since neither FleetBoston Financial nor Bank of American held its equity before the merger.

[Insert Figure 2 here]

Following the procedure, we generate 3,877 event-firms from 16 bank mergers, with 126 event-firms in treatment group and 3,751 event-firms in control group. For each event-firm, we choose a six-year window around the bank merger, including three years before the bank merger announcement date and three years the bank merger complete date.[5] We exclude years during the bank merger process.

To identify the effect of bank dual holders on corporate tax avoidance, we employ a DiD test using the following equation:

$$\begin{aligned} &\boldsymbol{Tax\ avoidance\ measure_{i,j,t}} \\ &= \alpha + \boldsymbol{\beta_1 Treat * Post} + \beta_2 Post + \beta_3 Treat + \gamma Control_{i,t} + FirmEvent_{i,j} + Year_t \\ &+ \epsilon_{i,j,t}, \end{aligned} \tag{1}$$

Where *i* indexes firm, *j* indexes the bank merger event, and *t* indexes time (-3,-2,-1 for the pre-merger period and 1,2,3 for the after-merger period). *Treat* is a dummy that equals one for treatment firms and zero for control firms. *Post* is a dummy that equals one for the post-merger period and zero for the pre-merger period. *Control* is a vector of firm characteristics that may affect tax avoidance. *FirmEvent* captures firm-event fixed effects and *Year* captures year fixed effects. Actually, *Treat* would be dropped from the regressions under this framework because its effect is fully absorbed by the firm-event fixed effects. Standard errors are clustered by bank merger events.

[5] To ensure that our sample is not affected by survivorship bias, we do not require that firms have six years of non-missing data around mergers.

3.3. Variables and Summary Statistics.

We follow Jiang et al. (2010), Chu (2017), Chava et al.(2019) to define dual holder. If a bank has outstanding loan with a firm and holds "significant" amount of equity in the firm in the same quarter, then we call it a dual holder of the firm. The threshold of "significant" is either exceeding 1% of the borrower's outstanding shares or over the value of $2 million . If a firm has at least one dual holder in any quarter of this year, we identify the firm-year with dual holder and set the dual holding dummy variable, *DUAL_HLD*, to be one. In addition to the indicator on whether a firm-year has a dual holder, we follow Chava et al.(2019) to introduce continuous measures *DUALOWN_MAX* and *DUALOWN_SUM*, which are the percentage of firms' equity held by dual holders.

Notably, prior research study all types of institutions that are dual holders (Chava et al., 2019; Chu, 2017; Yang, 2019) and pay extra attention to non-bank dual holders (Jiang et al., 2010; Lim et al., 2014), whereas we only identify dual holders that are banks since we focus on banks' effect on corporate tax avoidance. We find banks that serve as dual holders are relatively large banks. That's understandable because large banks, relative to small banks, occupy greater market share in the loan market, as well as the equity market, thus are more likely to be dual holders. We list all bank dual holders and the number of firms each bank holds in Appendix C. We can see the frequency of Bank of America, JPMorgan Chase and Wells Fargo become dual holders are much higher than all other banks. To address the concern that large banks themselves have an effect on corporate decisions, we exclude firm-years related to these three banks from our sample in robustness check.

We employ cash effective tax rates (*CETR*) and 3 year average cash effective tax rates (*CETR3*) as tax avoidance proxies. The Cash ETR (*CETR*), developed in Dyreng, Hanlon and Maydew (2008), is the ratio of cash tax paid to pretax income.[6] Compared to prior ETRs, such as GAAP ETR and Current ETR, Cash ETR captures tax deferral strategies, which takes into account the tax benefits of employee stock options and is not affected by changes in estimate such as the

[6] We do not adjust CETR and CETR3 for special items but instead include special items as a control variable in our multivariate regressions. ETRs are difficult to interpret when the denominator is negative, and we already exclude firm-years with negative pretax income when selecting sample. All ETRs are winsorized at zero and one.

valuation allowance or tax cushion. Moreover, Dyreng et al.(2008) develop a long-run Cash ETR to closely track the firm's tax avoidance over long time periods. Follow Dyreng et al.(2008), we define 3-year Cash ETR (*CETR3*) as the sum of cash taxes paid over the current three-year period, divided by the sum of pretax income over the same period. The majority of empirical work studying tax avoidance uses Cash ETR (*CETR*) and long-run Cash ETR (*CETR3*) as its variable of interest (De Simone, Nickerson, Seidman and Stomberg, 2018). We also use Manzon and Plesko (2002) book-tax difference (*MP_BTD*) and Desai and Dharmapala (2006) abnormal book-tax difference (*DD_BTD*) as supplements in robustness tests.

We control for a set of firm-level characteristics that prior research has identified to be important drivers of tax avoidance (Chen et al., 2010; Dyreng et al., 2017; Graham and Tucker, 2006; Hasan et al., 2014; Kim et al., 2011), including total assets (*SIZE*), intangible assets (*INTAN*), leverage (*LEV*), net property, plant, and equipment (*PPE*), capital expenditures (*CAPX*), R&D expense (*R&D*), advertising expenses (*ADVERT*), return on assets (*ROA*), market-to-book ratio (*MTB*), sale growth (*SALEGR*), foreign income (*FORINC*), special items (*SPI*, *LAGSPI*) and tax-loss carryforward (*NOL*, *ΔNOL*). In addition, we try to rule out the possibility that the effect is driven by bank equity owner. Therefore, we control for *BANKOWN*, which is the percentage of firm's equity "significantly" held by bank shareholders (the threshold of "significant" is the same as dual holders, either exceeding 1% of the firm's outstanding shares or over the value of $2 million). We also control for the percentage of firm's equity held by all institutions, *INSTOWN*. As both Khan et al.(2017) and Bird and Karolyi(2017) provide evidence that institutional ownership increases tax avoidance, we need to rule out this disturbance. All variables are defined in Appendix A.

To minimize the effects of outliers, we winsorize all continuous variables at the 1st and 99th percentiles and all ownership percentage at [0,100]. Table 2, Panel A presents summary statistics. The top four rows summarize our main measures for dual ownership. About 36% of the firm-years in our sample are dual-held by at least one bank. Next four rows show the level of corporate tax avoidance. We can see that firms participate a lot in tax avoidance on average. Most firms have an effective tax rate lower than the U.S Statutory tax rate 35% and most firms

actually pay less tax than the amount based on their pretax book income. Standard deviations, however, indicate considerable variation in firms' tax avoidance level. The rest of the panel summarizes our control variables. Table 2, panel B compares the characteristics of firm-years with dual holders and without dual holders. These univariate comparisons show that two subsamples are quite different while the univariate comparisons of tax measures do not show significant differences. That's probably because other drivers of corporate tax avoidance offset the effect of dual holders. For example, dual-held firms on average have larger total assets and lower sale growth, however, small and growing firms may make more investments in tax-favored assets, which generate larger temporary book-tax differences. Therefore, it's necessary to control for all those firm-level characteristics that may affect the level of corporate tax avoidance.

[Insert Table 2 here]

To ensure that the treatment firms and control firms are comparable, we also compare the characteristics of treatment and control firms before the mergers. Table 3 presents the covariate balance of treatment and control group during pre-merger period. Firms in two groups are not significantly different overall.

[Insert Table 3 here]

4. Main Results

4.1. OLS regression.

Before presenting the results of DiD tests, we first present the OLS regression results on the effect of dual holders on firms' tax avoidance level. Because only a relatively small number of firms are affected by bank mergers and the total number of firm-years in our DiD sample is limited, the DiD tests may be subject to the small sample bias. Here we use a comprehensive sample from 1995 through 2016 that we construct in Section 2.1 to examine the relationship between the existence of bank dual holders and firms' tax avoidance. Furthermore, the OLS regression examines the effect of bank dual holders generally, not only limited to the specific source of dual holders generated by the bank mergers.

We estimate the following specification:

$$\boldsymbol{Tax\ avoidance\ measure}_{i,t} = \alpha + \boldsymbol{\beta DUAL\_HLD}_{i,t} + \gamma Control_{i,t} + Firm_i + Year_t + \epsilon_{i,t}, \qquad (2)$$

where *i* indexes firm and t indexes year. The dual holding measure *DUAL_HLD* is a dummy variable which equals to one if the firm has at least one dual holder in this year and zero otherwise. Tax avoidance measure can be either Cash ETR(*CETR*) or 3 year average Cash ETR (*CETR3*). Lower *CETR/CETR3* indicates higher level of tax avoidance. *Control* is a vector of all firm-level control variables used in DiD regression in Equation (1). *Firm* captures firm fixed effects and *Year* captures year fixed effects. We cluster standard errors at the firm level.

Table 3 reports the OLS regression results. In Columns (1) and (2), we do not control for firm level characteristics, while Columns (3) and (4) include. In Columns (5) and (6), we specially include the bank ownership variable *BANKOWN* and institutional ownership variable *INSTOWN* to examine that the effect of dual holding is not driven by bank ownership nor institutional ownership. The significantly negative coefficients on *DUAL_HLD* indicate that firms with dual holders are associated with lower ETR and higher level of tax avoidance, which is consistent with our Hypothesis 1. The results on other control variables are consistent with existing literature. Specifically, firms that are small, fast-growing, more profitable, with more foreign income, special items and tax-loss carryforward have lower effective tax rates.

[Insert Table 4 here]

4.2. Bank merger identification.

While the OLS regression results show the effect of bank dual holding, having bank dual holders can be potentially endogenous. To deal with potential endogeneity problems, we then use bank merger as a plausibly exogenous shock to bank dual holding status. We have already described how bank mergers affect firms' dual holding status and generate treatment group and control group in Section 2.2. Figure 3 validates our DiD tests. As shown in the figure, the dual holding status of our treatment group sharply increase around the M&A while that of control group remain not changed.

[Insert Figure 3 here]

To measure the effect of bank mergers on affected firms' tax avoidance, we first compare the change of tax avoidance level around bank mergers. Table 5 show the t-test results. We can see that for firms in treatment group, *CETR*(*CETR3)* significantly decrease after bank mergers, from 0.255 (0.279) to 0.223 (0.259), while for firms in control group, there is slight decline or even increase. Relative to control firms, *CETR*(*CETR3)* of treatment firms significantly decrease more after bank mergers.

[Insert Table 5 here]

We conduct multivariable regression of Equation (1) in a DiD setting. Table 6, Panel A reports the results of our baseline DiD analysis. The negative and significant coefficient estimates on *Treat*Post* suggest that treatment firms, that is, those whose dual holding status changes (*DUAL_HLD* from zero to one) due to bank mergers exhibit a greater increase in tax avoidance. According to Columns (3) and (4), treatment firms experience around 0.039 (0.058) larger decrease in *CETR* (*CETR3*) compared to control firms after bank mergers, which is economically large given that the average *CETR* (*CETR3*) of treatment firms before merger is 0.255 (0.279). This leads to significant benefit for relevant firms. For example, the 0.039 difference in *CETR* generates 7.74 million dollar tax savings for treatment firms each year (the average pretax income of treatment firms is 198.57 million statistically).

[Insert Table 6 here]

In Table 6, Panel B, we perform a placebo test using a "pseudo-event" three years prior to the actual event. We use the same set of treatment and control firms identified in our baseline DiD analysis and analyze their tax avoidance level during a six-year window around the "pseudo-event" year. The coefficients on *Treat*Post* are not significant, suggesting that the divergent trends in tax avoidance level between treatment and control firms are caused by the real exogenous shocks. We also conduct a placebo test to mitigate the problem of omitted characteristics. We redistribute all firms into treatment group and control group randomly and re-estimate Eq. (1). Specifically, we ensure there are 126 pseudo treatment firms and 3,751

pseudo control firms, which is the same number of actual treatment firms and control firms. After repeating this procedure 5,000 times, we plot the coefficient estimates of *TREAT × POST*. Figure 5 shows that the mean value of the coefficients estimated from the random grouping placebo test is 0. The probability of estimates falling below actual coefficient estimate -0.0392 (-0.0584) in Table 6, Panel A is Only 4.78% (0.62%). This result rules out the possibility that our result is driven by omitted firm-level variables rather than the bank dual holding status.

[Insert Figure 4 here]

4.3. Robustness tests.

We conduct various robustness checks of the OLS results and DiD findings and report the results in Table 7. First, as Appendix C shows, large banks such as Bank of America, JPMorgan Chase and Wells Fargo, are more likely to be dual holders. There is a concern that these banks per se may influence firms' tax avoidance, which confuses the effect of dual holding. Therefore, we exclude firm-years with lending relationship to these three banks when constructing our sample and re-estimate the OLS regression. This criterion removes nearly two thirds of firm-year observations and reduce the percentage of firms with bank dual holders from 35.6% to 17.7%. Whereas the effect holds significant, see Table 7, Panel A. We then use alternative measures for tax avoidance and dual holding status to show that our findings from OLS regression are robust. In Table 7, Panel B, Columns (1) to (4) use continuous variables *DUALOWN_MAX* and *DUALOWN_SUM* as alternative measures for firms' dual holding status. To mitigate heteroskedasticity, we transform the ownership percentage by taking the natural logarithm in the regressions. Columns (5) and (6) use *MP_BTD* and *DD_BTD* as measures for corporate tax avoidance, indicating that firm-years with bank dual holders have larger book-tax differences.

We also use *MP_BTD* and *DD_BTD* to check the robustness of our DiD findings. Table 7, Panel B shows that treatment firms exhibit a greater increase in book-tax differences than control firms. When constructing our DiD sample, we assume a firm to be affected by the bank merger if it has outstanding loans from merging banks within three years before the announcement date. While if the loans have already matured at the time of the merger announcement, the

borrower may be less affected. Therefore, we reconstruct a sample by requiring firms have loans from merging banks that are still outstanding at the time of the merger announcement, and results are presented in Table 7, Panel D.

[Insert Table 7 here]

5. Cross Sectional Analysis

5.1 Underlying mechanisms.

According to the "incentive alignment" channel, bank dual holders have strong incentive to prompt firms participating in tax avoidance activities, especially when they have more equity stake of the firm. We now examine how the equity stake - in firm alters the effects using the DiD sample. We split the sample to firms that are block held by merging banks (the percentage of the firm's equity hold by merging banks is at least 5%) immediately before the merger and firms that are not block held. Table 8, Panel A show that if firms are block held by merging banks before the merge, their tax rate will significantly decrease more. This result is supportive of our *Hypothesis 2*.

Here we also provide evidences for *Hypothesis 3*. As the "information spillover" channel indicates, bank dual holders can effectively take advantage of their private information about firm or firm's industry to identify tax planning opportunities. We expect their impact to be more evident if the merged banks obtain more information of the firm through lending or are more expertise in the specific industry of the firm in *Hypothesis 3*. We use banks' lender stake of the firm, which is merging banks' loan size (the total amount of the loan allocated to the lender) scaled by the firm's total loan size (the total amount of the firm's loan) to gauge their private information of the firm. The results in Table 8, Panel B suggest that the effect is more evident if the merging banks' lender stake in treatment firm is above median. To gauge banks' expertise in the firm' s industry, we measure banks' industry market share, which is the allocation of the banks' loan issued in the pre-merger period for the firm's industry (using the Fama-French 48 industry definition) scaled by total amount of loan for this industry. And the sample is spilt into

subsamples by the median of industry market share. Table 8, Panel C suggests that the effect is more evident if the merging banks' industry market share is higher.

[Insert Table 8 here]

5.2 Tax consideration.

Literature has provided evidence that dual holding will affect firm's decisions and performance such as debt cost, dividend policy, innovation, managerial compensation and the probability of being acquired. There is a concern that the change of CETR(CETR3) is just a side effect of other adjustments. Therefore, we conduct analyses to examine that tax consideration is indeed a driven force.

We use the firms' state tax burden to measure their incentive to avoid taxes. If the decrease of CETR(CETR3) is really driven by firm's tax consideration but not due to the change of other factors, we expect the effect to be less evident for firms in a state levying no state corporate income taxes. In Table 9, Columns (1) and (3) include firms located in a state that levies no state corporate income tax, Columns (2) and (4) include firms located in a state that levies additional state corporate income tax. The state corporate income tax rate of each state in U.S. is obtained from *Book of the States*, primarily the chapter "state finance". The insignificant coefficients in Columns (1) and (3) indicate that if firms have no additional state tax burden, bank dual holders have less incentive to help them avoid taxes. The results can, at least partially, confirm that the decrease of effective tax rate is really driven by tax consideration.

6. Conclusion

In this study, we analyze the impact of the presence of bank dual holders on firms' tax avoidance behavior. We find that firms with bank dual holders experience significantly lower cash effective tax rate than firms without bank dual holders. Using bank mergers as an exogenous shock to firms' dual ownership, we establish causality between dual ownership and tax avoidance. We also find the effect is stronger if banks have higher equity stake and lender stake in the firm and if banks are more expertise in the industry of the firm. Finally, we use

variation in state corporate tax rate to examine that the decrease of cash effective tax rate is driven by tax consideration.

We respond to the call in Hanlon and Heitzman (2010) for evidence on determinants of corporate tax avoidance, adding to research on banks' role in corporate tax avoidance. By exploring the specific mechanisms that explain the impact of simultaneous holding of debt and equity in the same firm, we suggest conflicts of interest and possible collaboration between the role of lender and the role of inside shareholder in a firm. This study also sheds light on the bank-firm equity ties, illustrating that banks are playing a growing important role in firms not only through debt financing but also equity holding.

References

Badertscher, B. A., Katz, S. P., & Rego, S. O. (2013). The separation of ownership and control and corporate tax avoidance. *Journal of Accounting and Economics*, 56(2–3), 228–250.

Balakrishnan, K., Blouin, J. L., & Guay, W. R. (2018). Tax aggressiveness and corporate transparency. *The Accounting Review*, 94(1), 45-69.

Bharath, S. T., Dahiya, S., Saunders, A., & Srinivasan, A. (2009). Lending relationships and loan contract terms. *The Review of Financial Studies*, 24(4), 1141-1203.

Bird, A., & Karolyi, S. A. (2017). Governance and taxes: Evidence from regression discontinuity. *The Accounting Review*, 92(1), 29–50.

Bodnaruk, A., & Rossi, M. (2016). Dual ownership, returns, and voting in mergers. *Journal of Financial Economics*, *120*(1), 58-80.

Cen, L., Maydew, E. L., Zhang, L., & Zuo, L. (2017). Customer–supplier relationships and corporate tax avoidance. *Journal of Financial Economics*, 123(2), 377–394.

Chava, S., & Roberts, M. R. (2008). How does financing impact investment? The role of debt covenants. *The Journal of Finance*, 63(5), 2085–2121.

Chava, S., Wang, R., & Zou, H. (2019). Covenants, Creditors' Simultaneous Equity Holdings, and Firm Investment Policies. *Journal of Financial and Quantitative Analysis*, 54(2), 481–512.

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, 95(1), 41–61.

Chen, K. P., & Chu, C. C. (2005). Internal control versus external manipulation: A model of corporate income tax evasion. *rand Journal of Economics*, 36(1), 151-164.

Chen, T., Zhang, L., & Zhu, Q. (2019). Dual Ownership and Risk-taking Incentives in Managerial Compensation. *Available at SSRN 3427030*.

Chu, Y. (2017). Shareholder-creditor conflict and payout policy: Evidence from mergers between lenders and shareholders. *The Review of Financial Studies*, 31(8), 3098-3121.

Crocker, K. J., & Slemrod, J. (2005). Corporate tax evasion with agency costs. *Journal of Public Economics*, 89(9-10), 1593-1610.

De Simone, L., Nickerson, J., Seidman, J. K., & Stomberg, B. (2018). How Reliably Do Empirical Tests Identify Tax Avoidance?. *Rock Center for Corporate Governance at Stanford University Working Paper*, (200), 15-5.

Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, 79(1), 145–179.

Desai, M. A., & Dharmapala, D. (2009). Corporate tax avoidance and firm value. *The review of Economics and Statistics*, 91(3), 537-546.

Desai, M. A., Dyck, A., & Zingales, L. (2007). Theft and taxes. Journal of financial economics, 84(3), 591-623.

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2008). Long-run corporate tax avoidance. *The Accounting Review*, 83(1), 61-82.

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). The effects of executives on corporate tax avoidance. *The Accounting Review*, 85(4), 1163–1189.

Dyreng, S. D., Hanlon, M., Maydew, E. L., & Thornock, J. R. (2017). Changes in corporate effective tax rates over the past 25 years. *Journal of Financial Economics*, 124(3), 441–463.

Ferreira, M. A., & Matos, P. (2012). Universal banks and corporate control: Evidence from the global syndicated loan market. *The Review of Financial Studies*, 25(9), 2703-2744.

Gallemore, J., Gipper, B., & Maydew, E. L. (2019). Banks as tax planning intermediaries. *Journal of Accounting Research*, 57(1), 169–209.

Goh, B. W., Lee, J., Lim, C. Y., & Shevlin, T. (2016). The effect of corporate tax avoidance on the cost of equity. *The Accounting Review*, 91(6), 1647-1670.

Graham, J. R., & Tucker, A. L. (2006). Tax shelters and corporate debt policy. *Journal of Financial Economics*, 81(3), 563–594.

Gupta, S., & Newberry, K. (1997). Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data. *Journal of Accounting and Public Policy*, 50(16), 1–34.

Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics*, 50(2–3), 127–178.

Hasan, I., Hoi, C. K. S., Wu, Q., & Zhang, H. (2014). Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans. *Journal of Financial Economics*, 113(1), 109–130.

Hoi, C. K., Wu, Q., & Zhang, H. (2013). Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *The Accounting Review*, 88(6), 2025–2059.

Hope, O. K., Ma, M. S., & Thomas, W. B. (2013). Tax avoidance and geographic earnings disclosure. *Journal of Accounting and Economics*, 56(2-3), 170-189.

Jacob, J. (1996). Taxes and transfer pricing: Income shifting and the volume of intrafirm transfers. *Journal of Accounting Research*, 34(2), 301–312.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.

Jiang, W., Li, K., & Shao, P. (2010). When shareholders are creditors: Effects of the simultaneous holding of equity and debt by non-commercial banking institutions. *Review of Financial Studies*, 23(10), 3595–3637.

Khan, M., Srinivasan, S., & Tan, L. (2017). Institutional ownership and corporate tax avoidance: New evidence. *The Accounting Review*, 92(2), 101-122.

Kim, C., & Zhang, L. (2016). Corporate political connections and tax aggressiveness*. Contemporary Accounting Research*, 33(1), 78-114.

Kim, J. B., Li, Y., & Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, 100(3), 639-662.

Kim, J. B., Lin, Y., Mao, Y., & Wang, Z. (2019). Banking market consolidation and tax planning intermediation: Evidence from tax Haven operations of client firms. *Working paper*.

Lim, Y. (2011). Tax avoidance, cost of debt and shareholder activism: Evidence from Korea. *Journal of Banking & Finance*, 35(2), 456-470.

Lim, J., Minton, B. A., & Weisbach, M. S. (2014). Syndicated loan spreads and the composition of the syndicate. *Journal of Financial Economics*, 111(1), 45–69.

Manzon Jr, G. B., & Plesko, G. A. (2002). The relation between financial and tax reporting measures of income. *Tax Law Review*, 55(2), 175-214

Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147-175.

Mills, L. F. (1998). Book-tax differences and Internal Revenue Service adjustments. *Journal of Accounting Research*, 36(2), 343-356.

Mills, L., Erickson, M. M., & Maydew, E. L. (1998). Investments in tax planning. *The Journal of the American Taxation Association*, 20(1), 1-20.

OECD. (2008). Study into the role of tax intermediaries.

OECD. (2009). Building transparent tax compliance by banks

Rego, S. O. (2003). Tax-avoidance activities of US multinational corporations. *Contemporary Accounting Research*, 20(4), 805-833.

Santos, J. A., & Rumble, A. S. (2006). The American keiretsu and universal banks: Investing, voting and sitting on nonfinancials' corporate boards. *Journal of Financial Economics*, 80(2), 419-454.

Santos, J. A., & Wilson, K. E. (2007). Does banks' corporate control benefit firms? Evidence from US banks' control over firms' voting rights (February 2008). *AFA 2007 Chicago Meetings Paper; EFA 2007 Ljubljana Meetings Paper*.

Shevlin, T. J., Urcan, O., & Vasvari, F. P. (2019). Corporate Tax Avoidance and Debt Costs. *Journal of the American Taxation Association*. Forthcoming.

Slemrod, J. (2004). The economics of corporate tax selfishness. *National Tax Journal*, 57(4), 877–899.

United States Senate. (2005). The role of professional firms in the US tax shelter industry report.

Wilson, R. J. (2009). An examination of corporate tax shelter participants. *The Accounting Review*, 84(3), 969-999.

Yang, H. (2019). Institutional dual holdings and risk-shifting : Evidence from corporate innovation (April 9, 2019). *Working Paper*.

Appendix A. Variable definition

Measures of tax avoidance	
CETR	$= \frac{\text{Cash Tax Paid}(TXPD)}{\text{Pretax Income}(PI)}$. Cash ETR is winsorized to the range [0, 1].
CETR3	$= \frac{\text{3 year average Cash Tax Paid}(TXPD)\text{ from t}-2\text{ to t}}{\text{3 year Pretax Income}(PI)\text{ from t}-2\text{ to t}}$, set it to be missing if the denominator is non-positive . 3 year Cash ETR is winsorized to the range [0, 1].
MP_BTD	$= \text{domestic pretax Income}(PIDOM) - \frac{\text{Domestic taxable income}(TXFED)}{0.35} -$ State Income Taxes $(TXS) -$ Other Income Taxes $(TXO) -$ Equity in Earnings$(ESUB)$, scaled by lag(*AT*). We set *MP_BTD* to be missing if total asset is less than $1 million (to mitigate small deflator problem) or taxable income is negative (*TXFED*<0).
DD_BTD	the residual of $MP\_BTD_{i,t} = \beta TA_{i,t} + \mu_i + \varepsilon_{i,t}$, TA is the total accruals measured using the cash flow method in Hribar and Collins (2002): $TA =$ income before extraordinary items$(IBC) -$ operating cash flow$(OANCF - XIDOC)$. *MP_BTD* and *TA* all scaled by lag(*AT*).
Measures of dual holding	
DUAL_HLD	=1 if the firm has at least one dual holder in this year. Dual holder is a bank who has outstanding loan with the firm and simultaneously holds at least 1% of firm's outstanding shares or over the value of $2 million in the same quarter.
DUALOWN_MAX	The maximum percentage of the firm's equity held by its dual holder in this year (The value may vary quarter-to-quarter within a year, and we choose the value of the quarter with maximum percentage) . We use the natural logarithm of (1+ *Dualown_max*) in the regressions.
DUALOWN_SUM	The total percentage of the firm's equity held by its dual holder in this year (The value may vary quarter-to-quarter within a year, and we choose the value of the quarter with maximum total percentage) .We use the natural logarithm of (1+ *Dualown_sum*) in the regressions.
Firm-level Controls	
BANKOWN	The percentage of the firm's equity held by bank shareholders in this year (The value may vary quarter-to-quarter within a year, and we choose the value of the quarter with maximum percentage). Bank shareholder is a bank who holds at least 1% of firm's outstanding shares or over the value of $2.
INSTOWN	The total percentage of the firm's equity held by institutions in this year (The value may vary quarter-to-quarter within a year, and we choose the value of the quarter with maximum percentage).
SIZE	=The natural log of total assets (*AT*)
INTAN	=Intangible assets (*INTAN*), scaled by total assets (*AT*)
LEV	=Long-term debt (*DLTT*), scaled by total assets (*AT*)
PPE	=Net property, plant, and equipment (*PPENT*), scaled by total assets (*AT*)
CAPX	=Capital expenditures(*CAPX*), scaled by net property, plant, and equipment (*PPENT*); if *PPENT* is non-positive, set *CAPX* to be missing.

R&D	=Research and development expense (*XRD*; if missing, it is set to zero), scaled by the sales (*SALE*); if *SALE* is non-positive, set *R&D* to be missing
ADVERT	=Advertising expense (*XAD*; if missing, it is set to zero), scaled by sales(*SALE*); if *SALE* is non-positive, set *ADVERT* to be missing
SPI	=Special items (*SPI*; if missing, it is set to zero), scaled by total assets (*AT*)
LAGSPI	=Lagged special items
NOL	=1 if tax-loss carryforward (*TLCF*; if missing, it is set to zero) at the end of the previous year is not zero.
ΔNOL	=Change in net operating losses (*TLCF*-lag(*TLCF*), scaled by lagged total assets (*AT*)
FORINC	= Pretax foreign income (*PIFO*; if missing, it is set to zero), scaled by total assets (*AT*)
ROA	= (Pretax income (*PI*) - Extraordinary items (XI; if missing, it is set to zero))/ total assets (*AT*)
MTB	= Market value of equity (*PRCC_F*CSHO*)/book value of equity (*CEQ*)
SALEGR	= Sales (*SALE*) /lagged sales (*SALE*) -1; if lagged sales (*SALE*) is non-positive, set *SALEGR* to be missing

Appendix B. List of bank mergers.

Acquirer Bank	Target Bank	Merged Bank	Announcement Date	Effective Date
Travelers	Citicorp	Citigroup	4/6/1998	10/8/1998
NationsBank	BankAmerica	Bank of America	4/13/1998	9/30/1998
Norwest Corp	Wells Fargo	Wells Fargo	6/8/1998	11/2/1998
Deutsche Bank	Bankers Trust	Deutsche Bank	11/30/1998	6/4/1999
Fleet Financial Group	BankBoston	FleetBoston	3/14/1999	10/1/1999
Chase Manhattan	JP Morgan	JPMorgan Chase	9/13/2000	12/31/2000
First Union Corp	Wachovia	Wachovia	4/16/2001	9/4/2001
Bank of America	FleetBoston	Bank of America	10/27/2003	4/1/2004
JPMorgan Chase	Bank One Corp	JPMorgan Chase	1/14/2004	7/1/2004
Bank of America	Charles Schwab	Bank of America	11/20/2006	7/2/2007
Bank of New York	Mellon Financial Corp	BNY Mellon	12/3/2006	7/2/2007
Bank of America	ABN AMRO (North America)	Bank of America	4/23/2007	10/1/2007
JPMorgan Chase	Bear Stearns	JPMorgan Chase	3/16/2008	5/30/2008
Bank of America	Merrill Lynch	Bank of America	9/14/2008	1/1/2009
Barclays	Lehman Brothers (North America)	Barclays	9/16/2008	9/22/2008
Wells Fargo	Wachovia	Wells Fargo	10/3/2008	12/31/2008

This table provides the list of bank mergers in our DiD sample. For each merger, we report the name of the acquiring and target banks, the name of the merged entity, the announcement date and the effective date.

Appendix C. Dual holding banks.

Bank holding group	Number of Firms	Bank holding group	Number of Firms
Bank of America	758	Toronto-Dominion Bank	8
JPMorgan Chase	746	Societe Generale	8
Wells Fargo	423	Bank of New York	8
Citigroup	237	ABN AMRO	6
Deutsche Bank	175	Fleet Financial Group	6
Goldman Sachs	135	NBD Bancorp	5
Wachovia	132	Banc One Corp	5
Morgan Stanley	120	Firstar Corp	5
Barclays	103	Royal Bank of Scotland	4
Chase Manhattan Corp	100	First Interstate Bancorp	4
Credit Suisse	91	CIBC	4
Bank One Corp	75	First Chicago	4
FleetBoston	68	BankBoston	4
JP Morgan	59	NatWest	3
UBS	58	Marshall and Ilsley Corp	3
SunTrust Banks	54	Fortis	3
Bankers Trust	46	Norwest Corp	3
BNP Paribas	35	Northern Trust	3
NationsBank	35	Nordea Bank	2
KeyCorp	30	Bear Stearns	2
Citicorp	29	Lloyds Banking Group	2
HSBC	29	AmSouth Bancorp	2
First Union Corp	28	Swiss Bank	2
Bank of Montreal	27	Bank of Nova Scotia	2
Mellon Financial Corp	26	BPCE	2
General Electric	25	Natixis	2
MUFG	23	BNP	1
First Chicago NBD	23	State Street Corp	1
BNY Mellon	21	Commonwealth Bank of Australia	1
US Bancorp	21	BancWest	1
Royal Bank of Canada	20	Comerica Bank	1
BankAmerica	18	Macquarie	1
Merrill Lynch	17	Bank of Ireland	1
National City Corp	17	BB&T	1
Sumitomo Mitsui Banking Corp	15	DNB ASA	1
Lehman Brothers	13	Star Banc Corp	1
Chemical Banking Corp	13	Regions Financial Corp	1
Allianz	12	CoreStates Financial Corp	1
Mizuho	11	Commerce Bancshares	1
PNC Financial Services	10	Dresdner Bank	1
Commerzbank	9	Prudential Financial (US)	1
ING Groep	9	MTFG	1
Credit Agricole	9		

This table provides the list of banks that are dual holders and the number of firms each bank dual holds during years.

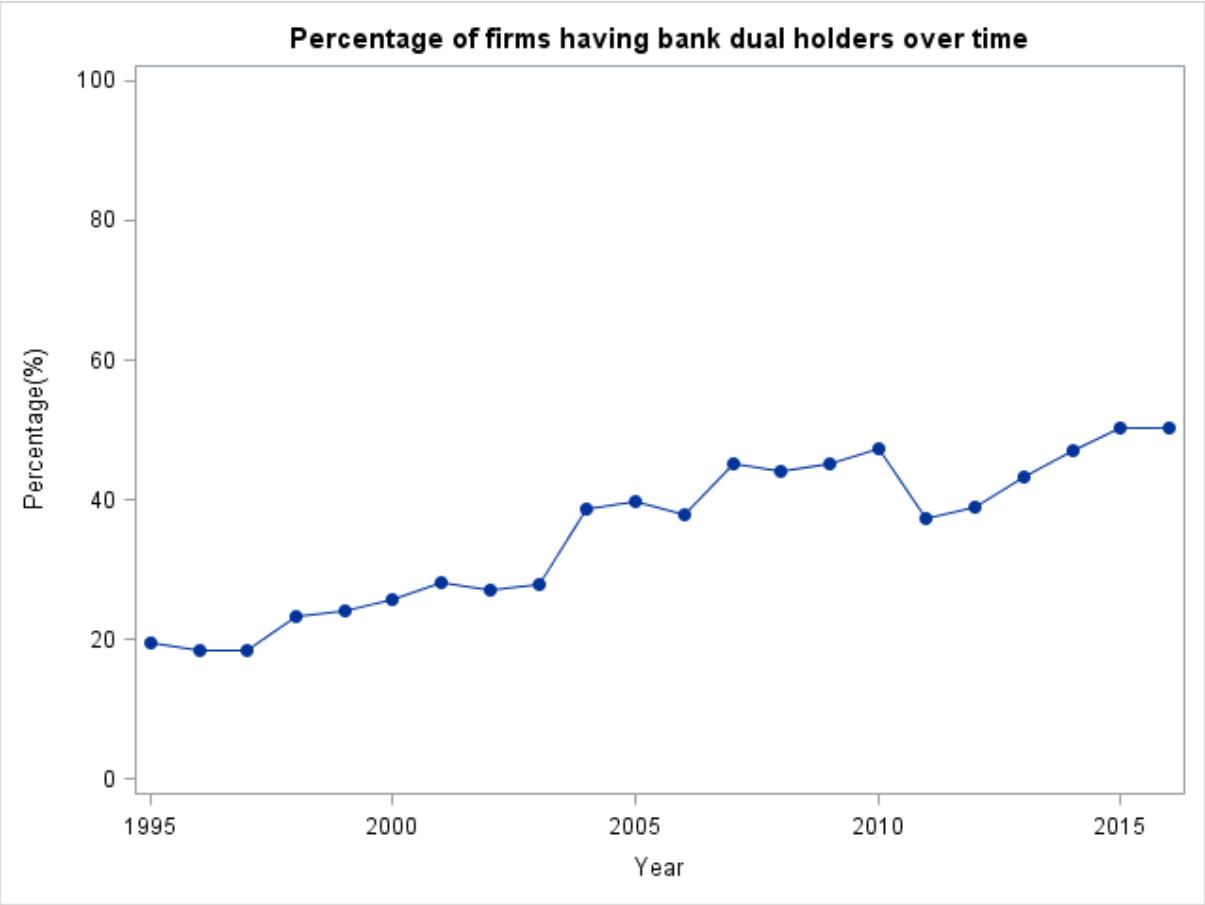

Figure 1. Patterns of bank dual holding over time.
This figure plots the percentage of firms who have bank dual holders in each year from 1995 to 2016. Bank dual holders are banks that simultaneously hold significant debt and equity stake of the same firm.

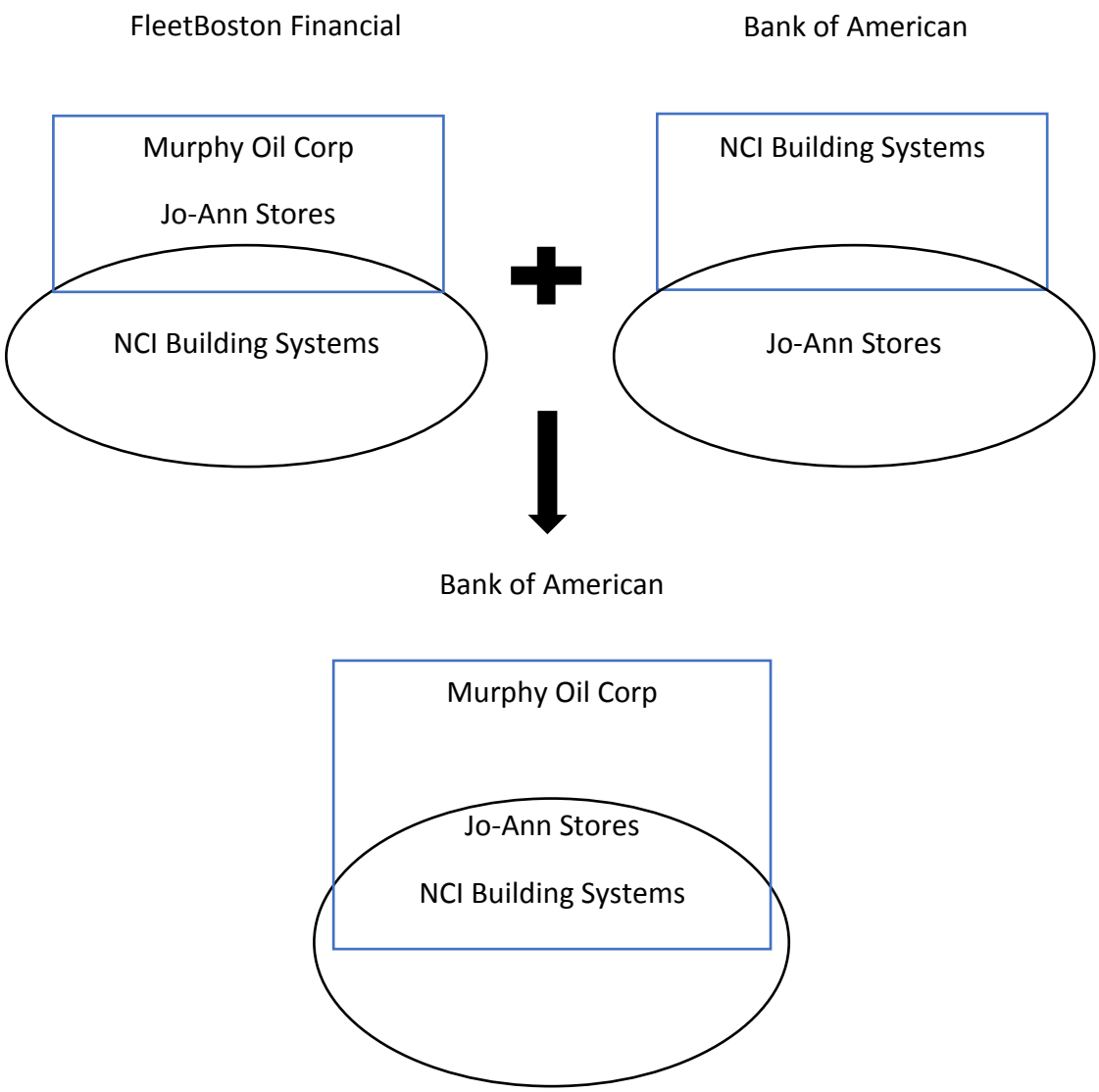

Figure 2. Example of treatment firms and control firms.
This figure shows how we identify treatment firms and control firms, taking the merger between Bank of American and FleetBoston Financial as an example. Banks lend to firms in the above square and hold equity of firms in the below circle. Firms in the overlap part, therefore, is dual held by the bank. Here, Jo Ann Stores and NCI Building Systems are identified as treatment firms and Murphy Oil Corp is control firm.

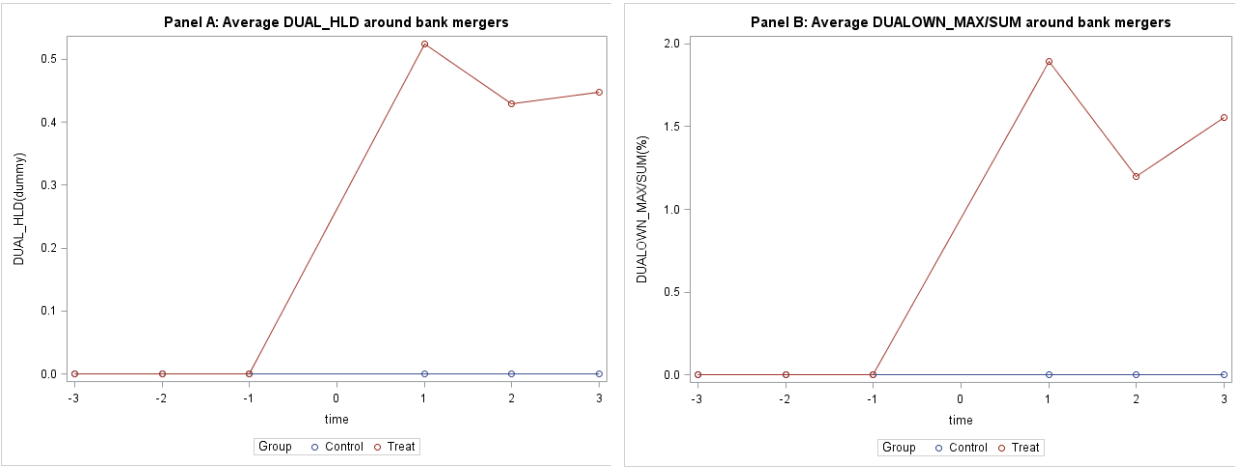

Figure 3. Firms' dual holding status around bank mergers.

This figure plots the dual holding status of treatment group and control group during six-year window around bank mergers. Panel A presents the existence of dual holders and Panel B presents the percentage of dual ownership. As we have removed firms that have dual holders other than revolving banks, firms in the DiD sample have at most one dual holder, *DUALOWN_MAX* and *DUALOWN_SUM* should be the same in panel B.

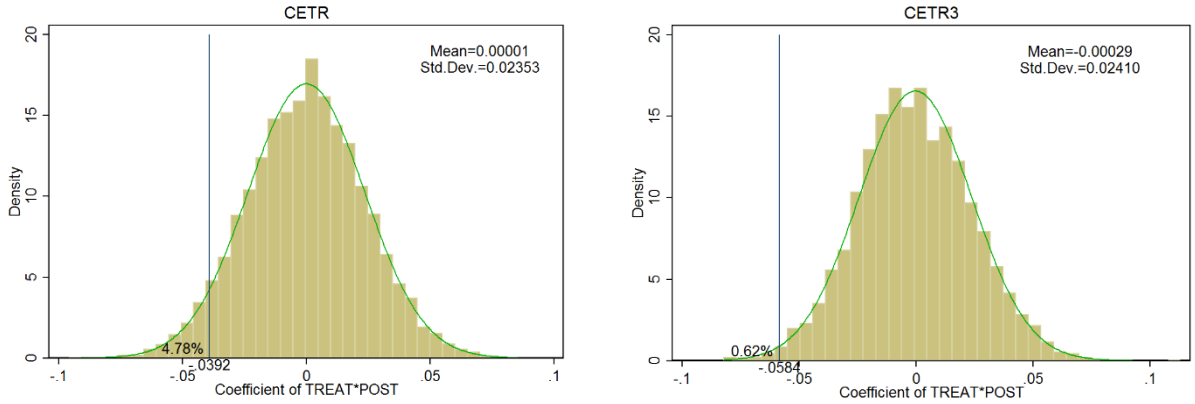

Figure 4. Placebo tests.

This figure plots the distribution of the coefficients of *TREAR*POST* estimated from our placebo tests. We randomly assign all firms in the DiD sample to 126 treatment firms and 3,751 control firms (the same number of actual treatment firms and control firms) and re-estimate Eq. (1). This procedure is repeated 5,000 times. The left figure shows the coefficients of *TREAR*POST* using as *CETR* as dependent variable and the right figure shows the coefficients of *TREAR*POST* using as *CETR3* as dependent variable .

Table 1. Sample selection

Criteria	Number of firms	Firm-years
All US incorporated nonfinancial, non-utilities Compustat observations between 1995 and 2016 with total assets(*AT*) greater than $10 million.	12,044	99,053
Require non-missing values of control variables.	9,767	77,205
Require pretax income(*PI*) to be positive.	7,334	48,875
Match firm-years with outstanding bank loans in DealScan and lead banks.	4,781	30,448
Require non-missing equity holding information.	4,728	30,296
Require each firm to have at least five year observations.	2,262	24,840

This table presents information on the construction of the firm-year panel. We begin with U.S. firms in Compustat with total assets greater than $10 million during 1995-2016, eliminating all financial firms (SIC codes 6000-6999) and all utility firms (SIC codes 4900-4949). Then we require each firm-year observation to have non-missing values of control variables and positive pretax income. These firm-years are merged with loans from Dealscan and the corresponding "lead banks" if any part of the loan begin-date until the end-date overlaps with any portion of the firm's fiscal year. To identify whether a lead bank is the firm's dual holder, we require firms have non-missing equity holding information, which means they have ever been reported as stocks in Thomson Reuters Ownership database. Each firm has at least five year observations in our sample.

Table 2. Summary statistics and sample characteristics

A. Summary statistics

Variable	N	Mean	Sd	p25	p50	p75
DUAL_HLD	24,840	0.356	0.479	0.000	0.000	1.000
DUALOWN_MAX (%)	24,840	1.031	2.707	0.000	0.000	1.369
DUALOWN_SUM (%)	24,840	1.178	2.894	0.000	0.000	1.494
CETR	24,840	0.268	0.217	0.109	0.250	0.357
CETR3	23,212	0.274	0.186	0.159	0.270	0.355
MP_BTD	10,831	0.011	0.035	-0.008	0.009	0.027
DD_BTD	10,830	0.000	0.035	-0.019	-0.002	0.017
BANKOWN(%)	24,840	12.158	8.476	5.921	11.592	17.146
INSTOWN (%)	24,840	67.197	27.888	50.057	74.429	89.688
SIZE	24,840	7.051	1.741	5.860	7.008	8.193
INTAN	24,840	0.204	0.198	0.033	0.148	0.328
LEV	24,840	0.230	0.179	0.092	0.208	0.333
PPE	24,840	0.296	0.230	0.117	0.230	0.422
CAPX	24,840	0.228	0.139	0.129	0.195	0.293
R&D	24,840	0.017	0.037	0.000	0.000	0.015
ADVERT	24,840	0.011	0.025	0.000	0.000	0.008
SPI	24,840	-0.005	0.016	-0.008	0.000	0.000
LAGSPI	24,840	-0.010	0.031	-0.009	-0.000	0.000
NOL	24,840	0.412	0.492	0.000	0.000	1.000
ΔNOL	24,840	0.002	0.044	0.000	0.000	0.000
FORINC	24,840	0.017	0.031	0.000	0.000	0.025
ROA	24,840	0.097	0.069	0.048	0.083	0.131
MTB	24,840	2.904	3.521	1.377	2.163	3.461
SALEGR	24,840	0.130	0.233	0.010	0.083	0.191

B. Characteristics of dual-held and non-dual-held firm

	Dual-held		Non-dual-held		
Variable	N	Mean	N	Mean	Difference
CETR	8,850	0.266	15,990	0.269	-0.003
CETR3	8,430	0.268	14,782	0.277	-0.009***
MP_BTD	4,742	0.011	6,089	0.010	0.001
DD_BTD	4,742	0.001	6,088	0.000	0.001
BANKOWN(%)	8,850	16.509	15,990	9.749	6.759***
INSTOWN (%)	8,850	78.944	15,990	60.695	18.249***
SIZE	8,850	8.119	15,990	6.460	1.658***
INTAN	8,850	0.240	15,990	0.184	0.056***
LEV	8,850	0.248	15,990	0.220	0.028***
PPE	8,850	0.289	15,990	0.301	-0.012***
CAPX	8,850	0.213	15,990	0.237	-0.024***
R&D	8,850	0.020	15,990	0.015	0.005***
ADVERT	8,850	0.013	15,990	0.010	0.003***
SPI	8,850	-0.005	15,990	-0.004	-0.001***
LAGSPI	8,850	-0.010	15,990	-0.010	0.000
NOL	8,850	0.470	15,990	0.381	0.089***
ΔNOL	8,850	0.002	15,990	0.002	0.000

FORINC	8,850	0.024	15,990	0.014	0.010***
ROA	8,850	0.100	15,990	0.096	0.004***
MTB	8,850	3.350	15,990	2.657	0.693***
SALEGR	8,850	0.107	15,990	0.142	-0.035***

This table reports summary statistics based on our sample of firms from 1995 to 2016. Panel A provides summary statistics. All variables are defined in Appendix. Panel B summarizes the characteristics of firm-years with dual holders and without dual holders. ***, **, and * indicate that a two-sample t-test is significant at the 1%, 5%, and 10% levels, respectively.

Table 3. Comparing treated and control firms before bank mergers

	Treat		Control		
Variable	N	Mean	N	Mean	Difference
CETR	267	0.255	7,031	0.266	-0.011
CETR3	249	0.279	6,559	0.266	0.012
MP_BTD	114	0.008	2,272	0.012	-0.004
DD_BTD	114	-0.003	2,272	0.001	-0.004
BANKOWN(%)	267	14.394	7,031	10.95	3.443***
INSTOWN (%)	267	71.063	7,031	58.547	12.515***
SIZE	267	6.798	7,031	6.131	0.667***
INTAN	267	0.171	7,031	0.169	0.002
LEV	267	0.205	7,031	0.2	0.005
PPE	267	0.316	7,031	0.299	0.017
CAPX	267	0.24	7,031	0.255	-0.016*
R&D	267	0.014	7,031	0.014	-0.000
ADVERT	267	0.008	7,031	0.01	-0.001
SPI	267	-0.005	7,031	-0.003	-0.002*
LAGSPI	267	-0.013	7,031	-0.009	-0.003
NOL	267	0.251	7,031	0.306	-0.055*
ΔNOL	267	-0.001	7,031	0.001	-0.001
FORINC	267	0.015	7,031	0.011	0.004**
ROA	267	0.103	7,031	0.103	0.000
MTB	267	3.042	7,031	2.616	0.425**
SALEGR	267	0.172	7,031	0.178	-0.006

This table compares the characteristics of treatment firms and control firms during pre-merger period. ***, **, and * indicate that a two-sample t-test is significant at the 1%, 5%, and 10% levels, respectively.

Table 4. OLS regression of corporate tax avoidance on dual holding status

	(1)	(2)	(3)	(4)	(5)	(6)
	CETR	*CETR3*	*CETR*	*CETR3*	*CETR*	*CETR3*
DUAL_HLD	-0.0086**	-0.0118***	-0.0093**	-0.0106***	-0.0095**	-0.0090**
	(-2.17)	(-3.11)	(-2.44)	(-2.95)	(-2.47)	(-2.48)
SIZE			0.0239***	0.0129***	0.0246***	0.0143***
			(5.41)	(2.90)	(5.46)	(3.19)
INTAN			0.0128	0.0103	0.0127	0.0092
			(0.57)	(0.43)	(0.56)	(0.39)
LEV			-0.0201	0.0117	-0.0215	0.0103
			(-1.14)	(0.69)	(-1.22)	(0.61)
PPE			-0.0179	-0.0139	-0.0181	-0.0135
			(-0.58)	(-0.46)	(-0.59)	(-0.44)
CAPX			0.0656***	-0.0149	0.0664***	-0.0152
			(4.13)	(-1.02)	(4.18)	(-1.04)
R&D			0.4882**	0.0303	0.4917**	0.0388
			(2.24)	(0.16)	(2.26)	(0.20)
ADVERT			-0.2764	-0.1182	-0.2786	-0.1090
			(-1.59)	(-0.66)	(-1.61)	(-0.61)
SPI			-2.9184***	-0.6958***	-2.9202***	-0.7025***
			(-24.42)	(-7.11)	(-24.38)	(-7.17)
LAGSPI			0.4037***	-1.4343***	0.4058***	-1.4329***
			(8.14)	(-17.72)	(8.18)	(-17.69)
NOL			-0.0257***	-0.0192***	-0.0258***	-0.0192***
			(-5.18)	(-3.96)	(-5.20)	(-3.95)
ΔNOL			0.0656**	0.0686**	0.0659**	0.0681**
			(2.07)	(2.06)	(2.07)	(2.05)
FORINC			-0.8088***	-0.4097***	-0.8098***	-0.4114***
			(-7.29)	(-4.13)	(-7.31)	(-4.16)
ROA			-0.3368***	-0.1929***	-0.3371***	-0.1893***
			(-8.19)	(-5.19)	(-8.21)	(-5.10)
MTB			-0.0013***	-0.0007	-0.0013***	-0.0007
			(-2.69)	(-1.57)	(-2.60)	(-1.52)
SALEGR			-0.0745***	-0.0338***	-0.0741***	-0.0342***
			(-10.21)	(-5.44)	(-10.16)	(-5.52)
BANKOWN					0.0003	-0.0004
					(1.07)	(-1.40)
INSTOWN					-0.0001	-0.0001
					(-1.21)	(-0.72)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24840	23208	24840	23208	24840	23208
Adjust R2	0.215	0.334	0.299	0.381	0.299	0.381

This table reports the OLS regression results of *CETR/CETR3* on *DUAL_HLD* (dummy). All variables are as defined in Appendix. Each estimation includes firm and year fixed effect. Standard errors are clustered by firm. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5% and 10% level, respectively.

Table 5. Tax avoidance measures change after bank mergers

	CETR		*CETR3*	
	Treatment	Control	Treatment	Control
Pre	0.255	0.266	0.279	0.266
Post	0.223	0.259	0.231	0.286
Diff	-0.033*	-0.007*	-0.047***	0.019***

This table reports the t-test results on the effect of bank mergers on firms' tax avoidance level, for treatment group and control group respectively. ***, **, and * indicate that a two-sample t-test is significant at the 1%, 5%, and 10% levels, respectively.

Table 6. DiD test of the effect of bank mergers on corporate tax avoidance

A. Baseline DiD test

	(1)	(2)	(3)	(4)
	CETR	*CETR3*	*CETR*	*CETR3*
*TREAT*POST*	-0.0407*	-0.0642**	-0.0392**	-0.0584**
	(-2.03)	(-2.70)	(-2.36)	(-2.45)
POST	-0.0025	0.0248***	-0.0076	0.0185***
	(-0.22)	(3.99)	(-0.73)	(3.10)
Controls	No	No	Yes	Yes
Firm-event FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Observations	13158	11859	13158	11,859
Adjust R2	0.285	0.491	0.370	0.523

B. Placebo test using "pseudo-event" three years prior to the actual event

	(1)	(2)
	CETR	*CETR3*
*TREAT*POST*	-0.0244	-0.0226
	(-1.44)	(-1.72)
POST	0.0124	0.0029
	(-1.32)	(-0.53)
Controls	Yes	Yes
Firm-event FEs	Yes	Yes
Year FEs	Yes	Yes
Observations	13458	12283
Adjust R2	0.371	0.498

This table reports the difference-in-differences (DiD) test results on the effect of bank mergers on firms' tax avoidance. Panel A presents the results of our baseline DiD test using bank merger as an exogenous shock to firms' dual holding status. We identify treatment firms as those (1) do not have any dual holder in the pre-event period; (2) have outstanding loans from one of the merging banks within three years before the bank merger announcement date, and significantly held by the other merging bank during the quarter immediately before the bank merger announcement date; (3) do not have any dual holder other than the merged bank in the post-event period. And we require control firms (1) do not have any dual holder in the pre-event period as well as the post-event period; (2) either have outstanding loans from merging banks within three years before the bank merger announcement date, or significantly held by merging banks during the quarter immediately before the bank merger announcement date. *TREAT* is a dummy variable that equals one if a firm is in treat group and zero if it is a control. *POST* is a dummy that equals one for the post-event period and zero for the pre-event period. We also include all control variables in our main DiD regression, which are defined in Appendix. In Panel B, we perform a placebo test using a "pseudo-event" three years prior to the actual event. We use the same set of treatment and control firms identified in our baseline DiD analysis and analyze their tax avoidance level during a six-year window around the "pseudo-event" year. Each estimation includes firm-event effect. Standard errors are clustered by bank merger event. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5% and 10% level, respectively.

Table 7. Robustness tests.

A. Exclude firm-years have lending relationship with Top3 banks.

	(1) *CETR*	(2) *CETR3*
DUAL_HLD	-0.0147*	-0.0132*
	(-1.81)	(-1.89)
Controls	Yes	Yes
Year FEs	Yes	Yes
Firm FEs	Yes	Yes
Observations	9,583	8,879
Adjust R2	0.322	0.443

B. Alternative measures of dual holding and tax avoidance in OLS regression.

	(1) *CETR*	(2) *CETR3*	(3) *CETR*	(4) *CETR3*	(5) *MP_BTD*	(6) *DD_BTD*
DUAL_HLD					0.0020**	0.0022***
					(2.42)	(2.61)
ln(1+*DUALOWN_MAX*)	-0.0067**	-0.0049*				
	(-2.40)	(-1.80)				
ln(1+*DUALOWN_SUM*)			-0.0055**	-0.0041		
			(-2.04)	(-1.56)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,840	23,208	24,840	23,208	10,755	10,754
Adjust R2	0.299	0.381	0.299	0.381	0.441	0.439

C. Alternative measures of tax avoidance in DiD test.

	(1) *MP_BTD*	(2) *DD_BTD*
*TREAT*POST*	0.0082***	0.0078**
	(3.25)	(2.60)
POST	0.0056**	0.0057**
	(2.62)	(2.60)
Controls	Yes	Yes
Firm-event FEs	Yes	Yes
Year FEs	Yes	Yes
Observations	4,446	4,446
Adjust R2	0.538	0.542

This table reports the robustness test results. Panel A exclude firm-years with lending relationship to Bank of America, JPMorgan Chase and Wells Fargo and re-estimate the OLS regression. Panel B replicates OLS regression in Table 4, using alternative measures of dual holding and corporate tax avoidance. - Panel C uses alternative measures of corporate tax avoidance for the DiD test. Panel D requires treatment firms and control firms have loans from merging banks that are still outstanding at the time of the merger announcement. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5% and 10% level, respectively.

Table 8. Underlying mechanisms.

A. Equity stake.

	(1)	*(2)*	*(3)*	*(4)*
	CETR		*CETR3*	
	Block hold	*Non Block hold*	*Block hold*	*Non Block hold*
*TREAT*POST*	-0.1306**	-0.0321	-0.2114**	-0.0586**
	(-2.69)	(-1.34)	(-2.21)	(-2.25)
POST	0.0729	-0.0109	0.0542	0.0374***
	(1.74)	(-0.62)	(1.65)	(3.96)
Controls	Yes	Yes	Yes	Yes
Firm-event FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Observations	1,012	5,792	913	5,273
Adjust R2	0.435	0.367	0.581	0.517

B. Lender stake.

	(1)	*(2)*	*(3)*	*(4)*
	CETR		*CETR3*	
	High lender stake	*Low lender stake*	*High lender stake*	*Low lender stake*
*TREAT*POST*	-0.0448*	-0.0377	-0.0836**	-0.0305
	(-2.09)	(-1.62)	(-2.87)	(-1.04)
POST	0.0066	-0.0238	0.0106	0.0230
	(0.32)	(-1.05)	(0.85)	(1.49)
Controls	Yes	Yes	Yes	Yes
Firm-event FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Observations	3410	3452	3046	3103
Adjust R2	0.379	0.365	0.532	0.535

C. Industry market share.

	(1)	*(2)*	*(3)*	*(4)*
	CETR		*CETR3*	
	High industry market share	*Low industry market share*	*High industry market share*	*Low industry market share*
*TREAT*POST*	-0.0445**	-0.0143	-0.0480*	-0.0931
	(-2.64)	(-0.21)	(-1.80)	(-1.45)
POST	-0.0121	-0.0211	0.0274**	-0.0054
	(-0.85)	(-1.08)	(3.79)	(-0.54)
Controls	Yes	Yes	Yes	Yes
Firm-event FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Observations	7454	5704	6736	5123
Adjust R2	0.366	0.375	0.512	0.541

This table reports the DiD test results of Eq (1) on subsamples partitioned on measures of the equity stake (Panel A), lender stake (Panel B), bank's industry market share (Panel C). In Panel A, Columns (1) and (3) include firms whose equity hold by merging banks is at least 5%, Columns (2) and (4) include those less than 5%. In Panel B, Columns (1) and (3) include firms whose merging lender's loan size (the total amount of the loan allocated to the lender) scaled by the firm's total loan size (the total amount of the loan of the firm) is above (or equal to)

median, Columns (2) and (4) include those below median. In Panel B, Columns (1) and (3) include firms relating to merging banks with high market share in the industry of the firm. Columns (2) and (4) include firms relating to merging banks with low industry market share. We measure banks' industry market share as the allocation of the banks' loan issued in the pre-merger period for the firm's industry (using the Fama-French 48 industry definition) scaled by total amount of loan for this industry. And the sample is spilt according to the median of industry market share. *TREAT* is a dummy variable that equals one if a firm is in treat group and zero if it is a control. *POST* is a dummy that equals one for the post-event period and zero for the pre-event period. We also include all control variables in our main DiD regression, which are defined in Appendix. Each estimation includes firm-event effect. Standard errors are clustered by bank merger event. The t-statistics are reported in parentheses below the coefficient estimates. $***$, $**$, and $*$ represent statistical significance at the 1%, 5% and 10% level, respectively.

Table 9. Tax consideration.

	(1)	*(2)*	*(3)*	*(4)*
	CETR		*CETR3*	
	No state tax	*With state tax*	*No state tax*	*With state tax*
*TREAT*POST*	-0.0026	-0.0484**	0.0073	-0.0807***
	(-0.07)	(-2.18)	(0.37)	(-3.47)
POST	-0.0403*	0.0003	0.0257	0.0169**
	(-1.98)	(0.03)	(1.54)	(2.52)
Controls	Yes	Yes	Yes	Yes
Firm-event FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Observations	2053	11077	1812	10030
Adjust R2	0.392	0.365	0.567	0.514

This table reports results of Eq (1) on subsamples partitioned on measures of firms' state tax burden. Columns (1) and (3) include firms located in states that levy no state corporate income tax. Columns (2) and (4) include those in states levying additional state corporate income tax. Standard errors are clustered by bank merger event. All control variables are defined in Appendix. The t-statistics are reported in parentheses below the coefficient estimates. ***, **, and * represent statistical significance at the 1%, 5% and 10% level, respectively.