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The Impact of Bank Mergers on Corporate Tax Aggressiveness

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Abstract

We study whether borrowers' opaque practices, such as tax aggressiveness, are affected by their lenders' engagement in mergers and acquisitions (M&As). Our findings suggest that borrowers' tax aggressiveness is negatively associated with bank mergers as banks increasingly rely on hard information in monitoring and lending practices following mergers. This relationship is more pronounced for borrowers that are more opaque in their information environments and have a greater need for credit, and when banks that have a greater intention to monitor borrowers and rely more on soft-information-based monitoring prior to the mergers. Our study contributes to the growing literature on whether and how bank consolidations affect borrowers' decision making.

JEL classification: D82; G21; G30; H26; M41

Keywords: Tax aggressiveness, Banks, Mergers and acquisitions, Information transparency

1. Introduction

Bank mergers and acquisitions (M&As) can result in extensive organizational changes, branch downsizing, and increased information-processing efficiency (Di Patti and Gobbi, 2007; De Franco et al., 2021). These changes, in turn, directly alter the nature of bank lending and monitoring practices (Chen and Vashishtha, 2017). As emphasized in the literature (Diamond, 1984, 1991; Fama, 1985; Billett et al., 1995; Carrizosa and Ryan, 2017), banks have a comparative advantage in obtaining and processing soft information about their borrowers' operations through lending activities, which makes them intermediaries for financial information and delegated monitors for less informed capital providers. As banks become larger and more complex through mergers,[1] their monitoring of borrowers relies more on hard information, such as audited financial statements and information related to corporate misconduct, which can be quantified, transmitted, and shared among various bank management units in making lending decisions (Stein, 2002; Karceski et al., 2005; Berger and Frame, 2007).[2] Accordingly, empirical evidence shows that this shift in the bank monitoring style as a result of bank mergers can lead borrowers to adopt more transparent practices such as timely loss recognition (Gormley et al., 2012) and voluntary disclosure (Chen and Vashishtha, 2017).

[1] Although the concept of mergers differs from the concept of acquisitions, for the research purposes of our paper, we use the terms 'mergers' and 'mergers and acquisitions' interchangeably.

[2] Previous studies suggest that organizations experience higher costs in motivating agents to collect and accurately process and share soft information across different divisions when organizational structures are hierarchical and complex. These arguments are supported by Crawford and Sobel (1982), Radner (1993), Bolton and Dewatripont (1994), Aghion and Tirole (1997), Baker et al. (1999), Garicano (2000), and Dessein (2002), among others. For banks, Cole et al. (2004) find that larger banks are more likely to use hard information from financial statements during the lending process. Liberti and Mian (2009) find that loan approving officers at higher levels of a hierarchy are more likely to focus on hard information in their decision making.

In this paper, we aim to study the relationship between bank mergers and corporate tax avoidance, specifically examining tax planning at the aggressive end of the continuum.[3,4] Prior studies note that tax aggressiveness is usually associated with greater financial complexity and firm opaqueness (Balakrishnan et al., 2019) and can engender significant risks and costs to banks (Dhaliwal et al., 2011; Hasan et al., 2014; Shevlin et al., 2019). More specifically, borrowers who engage in aggressive tax avoidance are at a higher risk of being penalized by tax authorities (Mills et al., 1998), have a higher agency risk (Desai and Dharmapala, 2006), and face a higher stock price crash risk (Kim et al., 2011). Since banks focus increasingly on firms' hard information and financial transparency following mergers, borrowers may face higher costs of engaging in tax aggressiveness because transparency makes accounting manipulation more difficult, and subsequent loans are likely to be more expensive when such activity is caught (Jappelli and Pagano, 2002; Beck et al., 2014; Hasan et al., 2014). Drawing upon these insights, we posit that borrowers may decrease their tax aggressiveness in response to changes in bank monitoring styles and information environments brought about by bank mergers.

We focus on tax avoidance for several reasons. First, corporate tax avoidance practices have important economic implications. For example, recent reports by the Institute on Taxation and Economic Policy (ITEP) (2017, 2019) reveal a marked increase in corporate tax avoidance among Fortune 500 companies over the past decade. This has caused an annual loss of $90 billion in tax revenue for the US government (*The Washington Post*, 2020). Empirical evidence that helps

[3] Dyreng et al. (2008) and Hanlon and Heitzman (2010) provide a broad definition of tax avoidance as the reduction of explicit taxes, including all transactions that may influence the firm's explicit tax liability. According to this characterization, tax avoidance may be considered as a continuum of tax strategies with their possible outcomes including "both certain tax positions and uncertain tax positions that may or may not be challenged and determined illegal" (Hanlon and Heitzman, 2010). The legality of tax avoidance can therefore be determined by the level of tax avoidance taken by a company or the assumed tax risk (e.g., Donohoe and Knechel, 2014).

[4] Hereafter, we use the terms "aggressive corporate tax avoidance", "aggressive tax avoidance", and "tax aggressiveness" interchangeably.

improve our understanding of corporate tax avoidance is therefore timely and pertinent. Second, although anecdotes abound, our knowledge of what contributes to the variation in tax avoidance remains incomplete, as some determinants can be endogenous (Hanlon and Heitzman, 2010). To address this problem, our paper exploits bank mergers as a plausibly exogenous shock to their borrowers and examines the effect of bank mergers on aggressive tax avoidance. Finally, tax avoidance poses both tax and non-tax risks (Scholes et al., 2008; Desai and Dharmapala, 2009; Wilson, 2009; Rego and Wilson, 2012) and can serve as a more generalizable measure of risk-taking than investment in R&D or M&A activity for firms across all industries (Christensen et al., 2015; Baghdadi et al., 2022).[5] Thus, understanding changes in borrowers' tax avoidance practices following their banks' mergers can provide important evidence of the potential impact of bank consolidation on borrowers' risk-taking behavior.

We perform our analysis using a sample of unbalanced panel data with a maximum of 31,170 loan deals from 338 lead banks to 4,951 borrowers in the US over the period 1990 to 2017. Since banks usually issue loans to numerous borrowers, M&As between banks are unlikely to be driven by factors related to specific borrowers and their corporate decisions (Chu, 2018, 2019). We therefore use bank mergers as a setting to engender plausibly exogenous shocks to borrowers' accounting practices. Through a difference-in-differences framework, we compare the changes in tax aggressiveness between borrowers whose lead banks engage in M&As during the loan contract period (the treatment group) and those whose lead banks do not (the control group) during the same period.

[5] As noted in Christensen et al. (2015), for companies presented in Execucomp between 1992 and 2008, 58% of these have reported no spending on R&D over the entire period and 76% of all firm-years reported no significant acquisitions with deal values greater than 1% of the acquiring firm's total assets (Moeller et al. 2005).

Our main measures of tax aggressiveness include the cash effective tax rate (e.g., Hasan et al., 2014; Chen and Lin, 2017; Khan et al., 2017), the book-tax difference (e.g., Manzon and Plesko, 2002; Chyz et al., 2013), the adjusted book-tax difference (e.g., Desai and Dharmapala, 2006; Hoi et al., 2013), and the tax shelter score (e.g., Wilson, 2009; Kim et al., 2011; Balakrishnan et al., 2019).[6] Using all of these measures, our results indicate that the level of tax aggressiveness in borrowing firms significantly decreases when their lead banks engage in M&As. These findings are consistent across a dynamic treatment analysis, a sample consisting of the treated and matched control firms, and additional placebo tests. In terms of economic magnitude, we find that, on average, borrowers experience greater tax costs of about $6.859 million when their lead banks engage in M&As.

We next investigate the cross-sectional heterogeneity in the effect of bank mergers on borrowers' tax aggressiveness. We find that the negative association between bank mergers and corporate tax aggressiveness is more prominent for borrowers who are more informationally opaque and have a greater need to facilitate access to external finance before the merger. We also find that the negative effect of bank mergers on borrowers' tax aggressiveness is stronger when banks have a greater intention to monitor their borrowers and have organizational structures in which soft information used to be transmitted easily prior to the merger. Collectively, these findings are consistent with our prediction that bank mergers lead to a shift towards reliance on hard information, prompting borrowers to reduce tax aggressiveness in response to changes in the bank's lending and monitoring practices.

[6] Though our main measures of tax aggressiveness are widely accepted in the extant literature, in robustness checks we use various alternative measures of tax aggressiveness and find that our main results remain consistent.

We conduct several additional analyses to ensure the robustness of our baseline findings. First, we employ several alternative measures of tax aggressiveness following prior studies (e.g., Frank et al., 2009; Kim et al., 2011; Armstrong et al., 2012; Cheng et al., 2012; Henry and Sansing, 2014). Second, we examine whether our findings are driven by certain bank characteristics or the bank market concentration before the merger. Third, we examine whether changes in local economic conditions that coincide with bank mergers could potentially affect our baseline results. To address this concern, we control for state-level measures of local economic conditions, establish treatment and control groups from the same state and year, and create a propensity score matched sample in which each treatment borrower is matched with an economically similar control borrower from the same state or Metropolitan Statistical Area (MSA). Finally, we address concerns regarding the reliability of the standard two-way fixed effect (TWFE) by controlling for heterogenous treatment effects, as recommended by recent studies such as Callaway and Sant'Anna (2021) and Baker et al. (2022). Our results remain consistent after conducting these additional tests.

Our paper contributes to two important strands of literature. First, it adds to that which examines the real and social effects of financial consolidation. Over the past few decades, waves of bank mergers have profoundly altered the structure of the US banking industry. While the extant literature on bank M&As seeks to study the effects of consolidation on local credit market conditions and borrower welfare (e.g., Berger et al., 1999; Amel et al., 2004; Di Patti and Gobbi, 2007; DeYoung et al., 2009), empirical studies provide limited evidence on the impact of bank mergers on borrowing firms' corporate decision-making and accounting practices. A notable exception is Chen and Vashishtha (2017), who show an increase in borrowers' disclosure when their lending banks are involved in M&As. Our study extends this line of research by providing robust evidence of the relation between bank mergers and corporate tax aggressiveness.

On a related note, using a sample of commercial loans and mergers between large banks in the 1990s, Garmaise and Moskowitz (2006) find that bank mergers may cause economic decline and increase property crime. They further document a negative effect of financial consolidation on the social environment. Since aggressive tax avoidance practices can be costly to society (e.g., Weisbach, 2002; Hoi et al., 2013), our finding that borrowers reduce tax aggressiveness following bank mergers points to a positive externality from bank consolidation.[7]

Second, our paper also contributes to the literature on corporate tax avoidance (e.g., Hanlon and Heitzman, 2010; Cheng et al., 2012; Hoi et al., 2013; McGuire et al., 2014; Higgins et al., 2015; Dyreng et al., 2016; Kim and Zhang, 2016; Chen and Lin, 2017; Khan et al., 2017; Koester et al., 2017; Law and Mills, 2017) by investigating a new factor that can influence aggressive tax avoidance practices. Hanlon and Heitzman (2010) note that "the field cannot explain the variation in tax avoidance very well" and endogeneity issues may create difficulties in exploring the determinants of tax avoidance. In this paper, we use bank mergers as a plausibly exogenous shock to borrowing firms and provide evidence that borrowers significantly reduce the level of aggressive tax avoidance in response to their banks' mergers. Our findings, along with those of Hansen et al. (2014), echo the theme of understanding the role of stakeholders in determining levels of corporate tax aggressiveness, as described in Chyz et al. (2013).

[7] Beck et al. (2014) examine how financial sector development can affect the extent of tax evasion. They reveal that firms in countries with more effective systems of sharing credit information are less likely to evade taxes. We show that the increased bank monitoring arising from borrowers' information transparency decreases their tax aggressiveness practices.

The remainder of the paper is structured as follows. Section 2 develops the hypothesis. Section 3 describes the data and methodology. Section 4 provides the main results. Section 5 presents additional analyses and robustness tests. Section 6 concludes.

2. Hypothesis development

Two lines of research are relevant in considering the effects of bank mergers on tax aggressiveness. First, prior literature provides different views on the role of banks in influencing borrowers' tax avoidance practices. On the one hand, avoidance-induced tax savings might be beneficial to a firm by increasing its after-tax cash flows and reducing financial leverage (Mills, 1998; Graham and Tucker, 2006), thereby boosting its financial slack.[8] For these reasons, several studies argue that when tax avoidance decisions are for the sole purpose of reducing corporate tax obligations, management teams should be encouraged and compensated for participating in such practices (Swenson 2001; Graham and Tucker, 2006). Accordingly, banks might be incentivized to assist their clients in appropriate tax planning. In support of this view, Gallemore et al. (2019) indicate that certain banks may specialize in assisting their clients in tax planning, relying on their access to private information about their financial relationships. Kim et al. (2019) provide additional evidence that banks may assist their clients' tax planning through developing offshore tax haven operations.

On the other hand, tax avoidance, especially in its aggressive form, can lead to significant risks and costs to firms. When aggressive tax avoidance practices are caught by tax authorities, firms may bear the cost of additional taxes, penalties, higher interest rate charges, and financial

[8] However, some studies such as Dhaliwal et al. (2011), Hasan et al. (2014), and Shevlin et al. (2019) argue that the intuition that tax avoidance helps strengthen a firm's financial position by increasing its after-tax cash flow lacks empirical support.

statement revisions (Mills et al., 1998; Graham et al., 2014).[9] In addition, because tax aggressiveness is a complex and opaque practice that aims to reduce the risk of detection and punishment by tax authorities, it can significantly undermine a firm's information environment (Desai and Dharmapala, 2006; Hasan et al., 2014). This view is supported by recent studies, such as Chow et al. (2016), Balakrishnan et al. (2019), and Francis et al. (2019), among others.[10] Therefore, while shareholders may see tax aggressiveness as a value-enhancing, risk-engendering practice (Rego and Wilson, 2012), stakeholders, as fixed claimants, are less likely to share in the rewards of higher risk-taking, and hence are more sensitive to the risks associated with aggressive tax avoidance.[11] Consistent with this view, Chyz et al. (2013) report significant decreases in firms' tax aggressiveness after union election wins, implying that labour unions prefer to maintain the value of their fixed income by lessening tax aggressiveness. Hasan et al. (2014) assert that since tax aggressiveness can result in increased agency risk, information risk, and the risk of being audited by tax authorities, debtholders tend to place a greater emphasis on tax avoidance risk than on the benefits of tax savings and reduced leverage.

[9] Previous studies also suggest that agency risk is associated with tax aggressiveness. For instance, Desai and Dharmapala (2006) and Kim et al. (2011) find that the complexity of tax avoidance may provide management with the tools to manipulate earnings, undertake related-party transactions, hide negative news for extended periods, and commit other opportunistic behaviors. Similarly, Frank et al. (2009) document a strong and positive relationship between tax reporting aggressiveness and aggressive financial reporting. Hanlon and Slemrod (2009) find that the average stock return is negative following news of firms involved in tax sheltering. Chung et al. (2019) report a positive association between tax aggressiveness and insider trading purchase profitability, providing evidence that managers may use tax aggressiveness to opportunistically seek benefits for themselves.

[10] Chow et al. (2016) find that the more target firms seek tax shelters, the lower the merger premiums in M&As they receive, due to acquirers' concerns regarding possible risks and future liabilities when target firms have a higher level of tax avoidance. Balakrishnan et al. (2019) find that the greater financial opaqueness from aggressive tax avoidance is not sufficiently clarified by external communications with investors and analysts. Practices with greater tax aggressiveness are associated with higher information asymmetry and lower earnings quality. Francis et al. (2019) find that tax planning intensifies the complexity of firms' operations and weakens analysts forecasting accuracy.

[11] Stakeholders and shareholders have different risk preferences and return expectations. Unlike shareholders, who may lean toward greater risk given their limited liability and asymmetric payoffs, stakeholders may receive fixed future income but bear significant downside risk (Jensen and Meckling, 1976; Leung et al., 2019).

The second line of research addresses the effects of bank consolidation on bank monitoring and the borrowers' information environment. Banks are a repository of information about borrowers' strategies, projects, and creditworthiness. To maintain such knowledge on their borrowers, loan officers use both public disclosures (i.e., hard information) and their personal contacts (i.e., soft information) to collect and update data (Ramakrishnan and Thakor, 1984; Allen et al., 2015; Liberti and Petersen, 2019). After a bank consolidation, studies find that large and hierarchical banks tend to focus more on hard information, such as audited financial information and information related to corporate misconduct, which can be easily garnered and shared among various banking units during the lending process (Stein, 2002; Karceski et al., 2005; Berger and Frame, 2007). Chen and Vashishtha (2017) support this view and further argue that bank mergers can change the nature of bank monitoring from being more reliant on soft information to more so on hard information. They provide evidence that borrowers significantly increase their level of disclosure when their banks engage in M&As.

Collectively, prior studies suggest that firms weigh the benefits and costs of their tax strategies and only engage in tax avoidance when the benefits of doing so exceed the costs (e.g., Chen et al., 2010; Blouin, 2014; Scholes et al., 2008; Cen et al., 2017). For example, Chen and Lin (2017) indicate that firms may pursue more aggressive tax avoidance when there is increased information asymmetry. Beck et al. (2014) show that when credit information is shared more effectively between lenders and borrowers, the improved information environment significantly increases the costs associated with tax evasion. Following this logic, if bank monitoring relies more on hard information and thereby makes borrowers more informationally transparent following mergers, the costs of aggressive tax avoidance would be higher for borrowers when their

banks engage in M&As. In turn, we hypothesize that there should be a negative relation between bank mergers and the tax aggressiveness of borrowing firms.

3. Data and methodology

3.1 Data

To construct our base sample, we first obtain the syndicated loan data from the Thomson Reuters DealScan database for the 1990-2017 period. DealScan reports two variables, namely "Lead Arranger Credit" and "Lender Role", for all the lenders. Following prior studies such as Adam and Streitz (2016), Amiram et al. (2017), and Prilmeier (2017), we designate as lead arrangers any lender for which the filed "Lead Arranger Credit" is marked "Yes". If the value of the field is unavailable, lenders that act as administrative agents, agents, arrangers, bookrunners, lead arrangers, lead banks, or lead managers are classified as lead arrangers. Similar to Chu et al. (2019), we manually match bank names reported in DealScan with bank legal names in the Call Report by using bank city and state information in both databases. We also use the National Information Center (NIC) and the Federal Deposit Insurance Corporation (FDIC) to aggregate all financial institutions with their parent companies (Chen and Vashishtha, 2017; Chu et al., 2019). These matching procedures enable us to obtain the regulatory identification numbers (RSSD ID) of all lead lenders.[12]

We next obtain information on bank mergers from the Securities Data Company (SDC) database. Our sample selection process consists of the following steps (Becher, 2000; Anderson et

[12] We notice that DealScan provides its own identifiers for lead banks, which may cause difficulties in matching the lender information reported in the DealScan to the bank information reported in other databases used in our study. In order to resolve this issue, we follow previous studies (Faleye and Krishnan, 2017; Bouwman et al., 2018; Fahlenbrach et al., 2018; Chernobai et al., 2021) and obtain each lead bank's RSSD ID code and match it with the bank's corresponding permanent company number (PERMCO) code based on the link table provided by the Banking Research Datasets of the Federal Reserve Bank of New York. The link table can be found from: https://www.newyorkfed.org/research/banking_research/datasets.html

al., 2004; Netter et al., 2011; Houston and Shan, 2022). First, we include all US domestic M&As from 1990 to 2017 where both acquirers and targets have the Standard Industry Classification (SIC) code of 602 (commercial bank) or 671 (bank holding company). Second, we restrict the sample to deals with a completed status. Third, we identify deals that are either disclosed or undisclosed (deal value) mergers and acquisitions (deal type: 1 and 2, as described by the SDC). Fourth, we include only transactions where the percentage of shares acquired in transaction is from 50 to HI. Fifth, we consider only deals where the percentage of shares held by acquirer six months prior to announcement is from 0 to 49. To match the acquirers and targets reported in the SDC with lead lenders reported in the DealScan,[13] we first translate the CUSIP codes of the acquirers and targets in the SDC to their permanent company number (PERMCO) codes in the Center for Research in Security Prices (CRSP).[14] We then match the SDC sample with the DealScan sample based on the PERMCO codes.[15] To ensure accuracy, we also check the company addresses presented in both the DealScan and the SDC databases. After all these matching procedures, we are left with a sample of 423 bank mergers, staggered over the period 1990-2017. Table 1 shows the distribution of lender mergers across the years.

[Please insert Table 1 here]

[13] While we have access to the PERMCO codes of lead lenders reported in the DealScan, we are unable to merge them directly with the acquirers and targets in the SDC because the SDC only reports banks' CUSIP codes.

[14] We identify all PERMCOs based on the "First 6 digits of NCUSIP" from the CRSP tools. When PERMCOs are not available, we manually check them by using the CUSIP codes of acquirers and targets provided by the SDC database and cross-reference them with the CRSP.

[15] Following Sufi (2007), we aggregate target banks with their acquiring banks at the effective date of the merger. Acquiring banks inherit both the previous lead arranger roles and the previous borrowing firm relationships of the target banks.

Finally, we identify borrowing firms by using the DealScan-Compustat link table provided by Chava and Roberts (2008)[16] and extract financial and accounting data from Compustat's North America Fundamentals Annual database (COMPUSTAT). We exclude financial and utility firms from the sample and eliminate firm-year observations with missing COMPUSTAT data necessary to construct our tax aggressiveness variables and control variables. We also exclude observations with negative cash holdings, sales, or total assets. Our final sample contains a maximum of 31,170 loan deals from 338 lead banks to 4,951 borrowers, for which all key financial and accounting variables are available for a baseline estimation equation.

3.2 Empirical specification

We use bank mergers as a shock to the nature of bank monitoring of their borrowers. The increased complexity and larger hierarchies resulting from these mergers place a greater emphasis on the quality of information disclosure and financial transparency (Stein, 2002; Berger et al., 2005; Chen and Vashishtha, 2017), which in turn increases the costs of engaging in tax aggressiveness for borrowing firms exposed to the shock. Thus, bank mergers should be negatively correlated with tax aggressiveness practices. On the other hand, since lenders typically provide loans to hundreds of firms, merger decisions between lenders are unlikely to be driven by factors related to specific borrowing firms (Chu, 2018, 2019).[17] Taken together, the bank merger setting is likely to satisfy both the relevance and exclusion restriction conditions.

[16] The DealScan-Compustat link table can be found at: http://finance.wharton.upenn.edu/~mrrobert/styled-9/styled-12/index.html

[17] A similar argument can be found in Azar et al. (2018), who report that mergers between institutional investors are unlikely to be driven by holding firms of their portfolios. Moreover, Chu (2019) indicates that many bank mergers are driven by financial deregulation and are thereby exogenous to individual firms' corporate decisions.

We estimate the effects of bank mergers on borrowers' tax aggressiveness using the following equation:

$$Y_{i,j,t} = \alpha_{i,j} + \tau_t + \beta MERGER_{i,j,t} + \gamma X_{i,t} + \varepsilon_{i,j,t} \qquad (1)$$

where $Y_{i,j,t}$ represents measures of tax aggressiveness for borrowing firm i that has an ongoing syndicated loan contract with bank j in year t. $MERGER_{i,j,t}$ is a dummy variable equal to one for all years after the merger announcement in which bank j is involved, and zero otherwise. $MERGER_{i,j,t}$ is equal to zero for the entire duration of the loan contract if a borrower's lead bank is not involved in any merger during the period. $X_{i,t}$ is a vector of control variables commonly used in the tax aggressiveness literature. We include bank-firm fixed effects ($\alpha_{i,j}$) to control for unobserved non-random matching between banks and firms, and add year dummies (τ_t) to control for general time trends. Following Bertrand and Mullainathan (2003) and Chen and Vashishtha (2017), equation (1) represents a difference-in-differences specification, where the coefficient estimate of *MERGER* indicates the average treatment effect of bank mergers on their borrowers' tax aggressiveness.[18]

3.3 Variables and summary statistics

Since our study focuses on examining the impact of bank mergers on aggressive tax avoidance practices, we follow prior studies and construct four widely accepted measures of tax aggressiveness. Our first measure is the cash effective tax rate (*CASHETR*) (Hasan et al., 2014; Chen and Lin, 2017; Khan et al., 2017), which is calculated as cash tax paid (*TXPD*) divided by

[18] We exclude borrowers that can be identified as both treated and control at the same time. Moreover, since our analysis is based on the borrower-bank-year level, firms have multiple loans with different lenders can appear multiple times in the sample for a given year. We thus follow Chen and Vashishtha (2017) and cluster standard errors at the borrower level through which arbitrary forms of correlation between observations within the same firm can be allowed. In addition, the results are robust if we instead cluster standard errors at the bank level or firm-bank level.

the difference between pre-tax book income (*PI*) and special items (*SPI*) (Hasan et al., 2014; Khan et al., 2017; Isin, 2018). *CASHETR* is set to missing if the denominator is zero or negative and truncated to the range [0, 1] (Chen et al., 2010; Chen and Lin, 2017). We multiply this value by (-1) so that an increase in *CASHETR* corresponds to more aggressive tax avoidance. The second and third measure of tax aggressiveness refers to the book-tax difference (*MPBTD*) (Manzon and Plesko, 2002; Chyz et al., 2013) and the adjusted book-tax difference (*DDBTD*) (Desai and Dharmapala, 2006; Hoi et al., 2013). The fourth measure is the tax shelter score (*SHELTER*), which follows Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. Detailed variable definitions of these measures are presented in Appendix A.

Similar to previous studies by Cheng et al. (2012), Rego and Wilson (2012), Chyz et al. (2013), Hoi et al. (2013), Law and Mills (2013), Lisowsky et al. (2013), Richardson et al. (2013), Edwards et al. (2016), Chen and Lin (2017), Chi et al. (2017), Khan et al. (2017), Koester et al. (2017), and Balakrishnan et al. (2019), we control for an array of firm characteristics that might correlate with tax aggressiveness. We include firm size (*SIZE*), leverage (*LEV*), profitability (*ROE*), market-to-book ratio (*MTB*), intangibility (*INTAN*), research and development expenditures (*R&D*), acquisition expenditures (*AQC*), firm risk (*FIRM RISK*), presence of a Big-4 auditor (*BIG4*), percentage of shares held by institutional investors (*INSTOWN*), foreign income (*FI*), equity income in earnings (*EQINC*), a dummy variable coded as one if the loss carryforward is positive (*NOL*), and the change in the loss carryforward (Δ*NOL*). Continuous variables are winsorized at the 1st and 99th percentiles. Detailed variable definitions are presented in Appendix A.

Table 2 reports the summary statistics for the variables used in the baseline model. For the main measures of tax aggressiveness, we find that the mean (median) values of *CASHETR*,

MPBTD, *DDBTD*, and *SHELTER* are -0.258(-0.244), -0.003(0.004), 0.001(0.002), and 2.174(2.420), respectively. These values are consistent with those reported in previous studies Chyz et al. (2013), Hoi et al. (2013), Hasan et al. (2014), Khan et al. (2017), Isin (2018), and Balakrishnan et al. (2019). In terms of the borrowing firm characteristics, approximately 33% of the borrowers in our sample experienced bank mergers. The average firm has a logarithm value of total assets of 7.467, a leverage of 31%, a return on equity of 19.1%, a market-to-book ratio of 2.612, an intangibility ratio of 26%, an R&D expenditure ratio of 1.8%, an AQC ratio of 3.1%, firm risk of 0.024, a percentage of Big-4 auditor presence of 86%, a percentage of institutional ownership of 54.9%, a foreign income ratio of 1.6%, and an equity income in earnings ratio of 0.1%. Approximately 51.1% of the sample borrowers have a positive loss carryforward, and the average change in loss carry forward is about 0.009.

[Please insert Table 2 here]

4. Empirical results

4.1 The impact of bank mergers on borrowers' tax aggressiveness

Figure 1 depicts the dynamics of the effect of bank mergers on borrowers' tax aggressiveness. Similar to Acharya et al. (2014) and Serfling (2016), we regress borrowers' tax aggressiveness on year fixed effects and dummy variables indicating the year relative to the bank mergers. Specifically, we create dummy variables ranging from four years before (i.e., -4) and five or more years after (i.e., 5+) the bank mergers. The last dummy variable is set to one if it is five or more years after the bank mergers, and zero otherwise. The y-axis shows the coefficient estimate for each indicator variable. The x-axis represents the year dummies, which correspond to their respective defining years, relative to the bank mergers over the nine-year window (i.e., ±4 years).

The figure illustrates that there is no significant difference in the level of tax aggressiveness between treated and control firms before bank mergers. However, treated firms significantly decrease their tax aggressiveness in the years after bank mergers.

[Please insert Figure 1 here]

Panel A of Table 3 presents the results for the effect of bank mergers on tax aggressiveness based on equation (1). Consistent with our conjecture, the coefficient estimates of *MERGER* are negative and statistically significant at the 1% level across all measures of tax aggressiveness, suggesting a decrease in borrowers' tax aggressiveness when their banks engage in M&As. In terms of the economic significance, the coefficient on *MERGER* in column (1) (coefficient=-0.012, t-statistic=-3.348) suggests that bank mergers, on average, lead to a 4.65% decrease in *CASHETR*. Given the mean pretax income of $571.549 million in our sample (not tabulated), this translates into greater tax costs of approximately $6.859 million for borrowers.[19]

We find significant relations between tax aggressiveness and several control variables in equation (1). The coefficient estimates of *SIZE* are negative and significant in columns (2) and (3) and positive and significant in column (4). This observation suggests that larger firms have lower *MPBTD* and *DDBTD* values and a higher *SHELTER* value, which is consistent with Chyz et al. (2013), Richardson et al. (2015), Chyz et al. (2019), Kim and Zhang (2016), and Koester et al. (2017), among others. Similar to previous studies by Chen et al. (2010), Badertscher et al. (2013), and Arena et al. (2021), we find that firms with a higher *EQINC* ratio are positively related to *CASHETR* and *SHELTER* and are negatively related to *MPBTD* and *DDBTD*. The results also

[19] The mean value of pretax income in our sample is similar to the value reported in prior studies such as Chen et al. (2010), Hoi et al. (2013), and Joshi et al. (2020). It is also worth noting that our estimated bank merger effect on corporate tax aggressiveness is comparable to the impact of other determinants of tax aggressiveness documented in the literature. For instance, Chen et al. (2010) show that family firms in their sample have an average tax saving of $6.7 million.

show that the coefficient estimates of *LEV*, *R&D*, *FIRM RISK*, *BIG4*, and Δ*NOL* are negative and statistically significant, while the coefficient estimates of *ROE*, *MTB*, *AQC*, *INSTOWN*, *FI*, and *NOL* are positive and statistically significant. These findings are consistent with prior studies, such as Chen et al. (2010), Cheng et al. (2012), Rego and Wilson (2012), Chyz (2013), Chyz et al. (2013), Richardson et al. (2013), Francis et al. (2016), Chen and Lin (2017), Chi et al. (2017), and Koester et al. (2017).

We graphically demonstrate in Figure 1 that treated and control borrowing firms exhibit similar pre-treatment trends. To further address concerns about reverse causality and a deferential pre-existing trend, we implement a dynamic treatment model to analyze the timing of changes in borrowers' tax aggressiveness relative to the timing of bank mergers. Specifically, we follow Serfling (2016) and replace our main variable of interest *MERGER* with a set of four dummy variables, namely $MERGER^{-1}$, $MERGER^{0}$, $MERGER^{+1}$, and $MERGER^{2+}$. These variables equal one if it is one year prior, the current year, one year after, or two or more years after the bank mergers, respectively, and zero otherwise. The estimated results are reported in Panel B of Table 3. We find that there is no trend of decreasing tax aggressiveness before bank mergers, and that borrowers only reduce tax aggressiveness after bank mergers (Roberts and Whited, 2013).

Next, we repeat the estimation of equation (1) using a sample that consists of treated and matched control firms. To construct the control group, we first estimate a logit regression of whether a borrower is treated by a bank merger. The propensity score is the probability of being treated derived from the logit regression. We apply the nearest-neighbor method to ensure that the treated firms are sufficiently similar to their matched control firms. We also require control firms to have outstanding bank syndicated loans around the merger dates but not be treated by the mergers of their banks over the entire duration of their loan contracts.

Each firm in the treatment group is then matched to a firm (a one-to-one matching, with no replacement and no ties) from the control group in the same Fama-French 48 industry with the closest propensity score (caliper=0.01) one year before the merger. We eventually identify 552 matched-pair firms for *CASHETR*, 251 matched-pair firms for *MPBTD* and *DDBTD,* and 490 matched-pair firms for *SHELTER*. We perform a diagnostic test to verify that the treated and matched control firms are indistinguishable. The results in Appendix B indicate that none of the differences in means across observable characteristics between the treatment and matched control groups is statistically significant. Panel C of Table 3 presents the estimation results of equation (1) on the matched sample over the period from three years before to three years after (a [-3, +3] time window) the bank merger, excluding the merger announcement year. We find that the coefficient estimates of *MERGER* remain negative and statistically significant for all measures of tax aggressiveness.[20]

[Please insert Table 3 here]

To ensure that our results are not driven by chance, we conduct two placebo tests. The first test uses a "pseudo-event" that occurs three years prior to the actual merger event, following the approach of Chen and Qi (2019). We use the same treated and control borrowers as in Panel A of Table 3 and repeat the baseline regressions using the "pseudo-event" year for all measures of tax aggressiveness. As shown in Table 4, the coefficient estimates of *MERGER* become statistically insignificant, suggesting that the pseudo bank mergers do not have a significant impact on borrowers' tax aggressiveness.

[Please insert Table 4 here]

[20] In untabulated results, we use alternative periods ([-4, +4] and [-5, +5] time windows) and find that our results remain consistent.

In the second test, we randomly assign treatment and control groups, ensuring that we have the same number of pseudo treatment and control borrowers as the number of actual treatment and control borrowers in our baseline regressions. We re-estimate equation (1) and store the coefficient and standard error estimates for each placebo sample. We then repeat this process 5,000 times to obtain a distribution of the placebo estimates for each test, as shown in Figure 2. The results indicate that the effect of placebo bank mergers on tax aggressiveness is small and insignificant for all tax aggressiveness measures. For instance, in the *CASHETR* graph, the actual coefficient on *MERGER* is -0.012, as reported in column (1) in Panel A of Table 3. This value lies to the left of the entire distribution of coefficient estimates from the placebo test and is smaller than 96.98% of the placebo estimates. For the remaining tax aggressiveness measures, the actual estimates are smaller than 99.9% of the placebo estimates. Overall, the placebo tests lend further credence that our baseline findings are not driven by chance or other omitted factors.

[Please insert Figure 2 here]

4.2 Underlying mechanisms

We next explore the cross-sectional heterogeneity in the effect of bank mergers on borrowers' tax aggressiveness. The rationale behind this analysis is that when bank monitoring and lending practices tend to rely more on hard information following mergers, borrowers may alter their tax strategies in response to changes caused by the bank mergers. In other words, if the change in tax aggressiveness is a result of borrowers' reactions to their lead banks' mergers, some firms might be more responsive to the shock of bank mergers than others (Karceski et al., 2005; Degryse et al., 2011; Chen and Vashishtha, 2017).

We estimate the following empirical specification to examine whether the effect of bank mergers varies across different groups defined by the partitioning variables (e.g., Chen and Vashishtha, 2017; Yang et al., 2021):

$$Y_{i,j,t} = \alpha_{i,j} + \tau_t + \beta_1(MERGER_{i,j,t} \times Subsample\ Indicator_1) + \beta_2\ (MERGER_{i,j,t} \times Subsample\ Indicator_2) + \gamma X_{i,t} + \varepsilon_{i,j,t} \quad (2)$$

where $Subsample\ Indicator_1$ and $Subsample\ Indicator_2$ take a value of one if the observation refers to the treatment group as described by the corresponding partitioning variable. That is, we bifurcate the treatment sample into two subgroups based on the partitioning variable and use the entire control group as a benchmark in each subsample analysis. We do not partition the control group since the partitioning variable is only meaningful for borrowers when their banks have engaged in mergers. All partitioning variables are constructed in the last fiscal year before the merger. The coefficient estimate β_1 (β_2) represents the impact of bank mergers on corporate tax aggressiveness for the $Subsample\ Indicator_1$ ($Subsample\ Indicator_2$) when compared to the control group. Thus, the difference between β_1 and β_2 indicates the difference in the effect of bank mergers on corporate tax aggressiveness between two subsamples. For all the subsample analyses, we also test the difference between β_1 and β_2.

4.2.1 Borrowers' information environments

We first use three partitioning variables to proxy for corporate information opacity. We expect the negative bank merger effect on tax aggressiveness to be stronger for borrowers that are more informationally opaque before the merger, as corporate tax aggressiveness is likely to increase when firms have a less transparent information environments (Hope et al., 2013; Chen

and Lin, 2017; Balakrishnan et al., 2019). Following previous studies on assessing information environments (e.g., Amihud, 2002; Peterson et al., 2015; Choi et al., 2019), we use the bid-ask spread (*BID-ASK*) and illiquidity ratio (*ILLIQUIDITY*) as two proxies for corporate information opacity. To identify opaque firms, we construct dummy variables *HIGH BID-ASK* and *HIGH ILLIQUIDITY*, which indicate firms with bid-ask spread and illiquidity ratio above the median of the treatment sample, respectively. Conversely, the dummy variables *LOW BID-ASK* and *LOW ILLIQUIDITY* indicate firms that are more transparent and have bid-ask spread and illiquidity ratio below the median of the treatment sample, respectively.

The third proxy is the ratio of independent directors to the total number of directors in the borrowing firms before the merger (*GOVERNANCE*). The extant evidence suggests that board independence improves corporate transparency by reducing information asymmetry (e.g., Kanagaretnam et al., 2007; Goh et al., 2016), and that having a higher fraction of independent directors significantly reduces corporate tax aggressiveness (Lanis and Richardson, 2011; Richardson et al., 2013). Accordingly, we construct a dummy variable *STRONG GOVERNANCE* (*WEAK GOVERNANCE*) to indicate firms with an above (below) treatment sample median fraction of independent directors. Borrowing firms with a weak (strong) corporate governance system are associated with a worse (better) information environment and are more (less) susceptible to the opaqueness penalty following bank mergers.

Panels A to C of Table 5 present the estimated results. As expected, we find that the coefficient estimates of *MERGER* are negative and statistically significant for borrowers with *HIGH BID-ASK*, *HIGH ILLIQUIDITY*, and *WEAK GOVERNANCE*, while the negative effects of bank mergers are insignificant for borrowers with *LOW BID-ASK*, *LOW ILLIQUIDITY*, and *STRONG GOVERNANCE*. Moreover, in these subsample analyses, the differences between the

two partitioned groups' coefficients are often statistically significant. These findings further support that the negative association between bank mergers and corporate tax aggressiveness is more prominent for informationally opaque borrowers.

We also employ two additional partitioning variables to examine whether and how the effect of bank mergers on tax aggressiveness varies when borrowers' information environments tend to be soft and difficult to parse before a merger. First, we measure soft information as the first principal component of a borrower's intangible assets and R&D, both scaled by the firm's lagged total assets (*SOFT INFO*) (Lo, 2014; Chen and Vashishtha, 2017). The information regarding a borrower is more likely to be soft if the borrower has more intangible assets and invests heavily in R&D. Second, we construct the lending relationship intensity (*LEND REL INTENSITY*) as the number of loans a bank has provided to a particular borrower in the last five years divided by the total number of loans that the borrower has received over the same period (Bharath et al., 2019). Empirical studies (e.g., Berger and Udell, 2002; Uchida et al., 2012) suggest that relationship lending is commonly associated with the collection of soft information and, hence, borrowers with a higher leading relationship intensity are likely to be more reliant on soft information.

We predict that borrowers with more soft information are likely to experience a greater reduction in tax aggressiveness if they are required to provide more hard information following bank mergers. Panels D and E of Table 5 report the results for these partitioning variables. We find that the coefficients on the interaction terms *MERGER×MORE SOFT INFORMATION* and *MERGER×HIGH LEND REL INTENSITY* are generally negative and statistically significant across all measures of tax aggressiveness. Conversely, the coefficients on *MERGER×LESS SOFT*

INFORMATION and *MERGER×LOW LEND REL INTENSITY* are insignificant.[21] As the results further show that the coefficients on the paired interaction terms are statistically different in the subsample analyses, we can conclude that the negative bank merger effect on tax aggressiveness is stronger for borrowers that are more reliant on soft information prior to the merger.

[Please insert Table 5 here]

4.2.2 Borrowers' need for credit

We next examine whether the effect of bank mergers on corporate tax aggressiveness is stronger conditional on borrowers' need for credit. Prior studies document that credit availability decreases following bank mergers (e.g., Sapienza, 2002; Karceski et al., 2005; Di Patti and Gobbi, 2007; Degryse et al., 2011), and that firms with more short-maturity loans and greater financial constraints are particularly sensitive to changes in the availability of bank credit (Campello et al., 2010, Chen and Vashishtha, 2017). Building on these findings, we predict that borrowers seeking to facilitate access to external finance can be more sensitive to the changes in their lenders' monitoring and lending practices caused by mergers.

We use two partitioning variables to test this prediction. The first is the remaining time to maturity of the existing loan contract (*MATURITY*), and the second is the extent of financial constraint that borrowers experience (*CONSTRAINED*), as measured by the KZ index (Kaplan and Zingales, 1997). Panels F and G of Table 5 report the results based on these partitioning variables. We find that the coefficient estimates of *MERGER×SHORT MATURITY* and *MERGER×MORE*

[21] We notice that the coefficient on the interaction term *MERGER×LOWER LEND REL INTENSITY* is also negative and statistically significant at the 10% level for *SHELTER*. However, the difference between the coefficients on interaction terms *MERGER×HIGHER LEND REL INTENSITY* (coefficient=-0.145) and *MERGER×LOWER LEND REL INTENSITY* (coefficient=-0.066) is statistically significant at the 5% level.

CONSTRAINED are negative and statistically significant at the 1% level, whereas those of *MERGER×LONG MATURITY* and *MERGER×LESS CONSTRAINED* are generally insignificant. For each pair of interaction terms, the difference between the two coefficients is statistically significant, indicating that the negative association between bank mergers and tax aggressiveness is stronger for borrowers that have more need for credit before the merger.

4.2.3 Bank monitoring

We use three partitioning variables to proxy for bank monitoring. First, we use the number of covenants in the loan contract prior to the merger (*COVENANTS*). Prior studies document that loan covenants enable banks to force renegotiation more frequently, increase their intention to closely monitor borrowers, and strengthen creditors' influence over borrowers' decision making (e.g., Rajan and Winton, 1995; Park, 2000; Roberts and Sufi, 2009; Nini et al., 2012; Chen and Vashishtha, 2017). Second, we use the pre-merger reputation of the merging bank (*REPUTATION*) as measures of the banks' intention to monitor borrowers. Ahn and Choi (2009) suggest that lenders are acutely concerned with damage to their reputation, which can lead to financial difficulties and undermine their reliability in the financial market. We expect that the negative bank merger effect on corporate tax aggressiveness is greater when banks have a greater intention to monitor their borrowers before the merger.

We also use the pre-merger number of branches for the merging bank (*BRANCHES*) as a measure of the ease with which soft information could be transmitted before the merger. Banks with more branches are typically larger and more hierarchical, which may inhibit their incentives to collect and use soft information. Consequently, they will tend to rely more on hard information with a uniform interpretation and which can be efficiently transmitted (Aghion and Tirole, 1997; Stein, 2002; Liberti and Petersen, 2018). Chen and Vashishtha (2017) similarly indicate that banks

with fewer branches experience greater transformation in their monitoring styles from mergers, as these can cause significant changes to their organizational structure and hierarchy. Following this line of reasoning, we expect the effect of bank mergers to be larger when merging banks have fewer branches before the merger. The results are reported in Panels H to J of Table 5. We find that the coefficients on the interaction terms *MERGER×MORE COVENANTS*, *MERGER×HIGH REPUTATION*, and *MERGER×FEWER BRANCHES* are negative and statistically significant across all measures of corporate tax aggressiveness, whereas those on *MERGER×FEWER COVENANTS*, *MERGER×LOW REPUTATION*, and *MERGER×MORE BRANCHES* are insignificant. Given that the difference between the two coefficients for each pair of interaction terms is statistically significant, we interpret the results as consistent with our prediction.

Taken together, the empirical evidence presented in Table 5 suggests that the reduction in corporate tax aggressiveness is stronger when borrowers are less informationally transparent, more reliant on soft information, and have greater need for credit, and when banks have more intention to monitor borrowers and rely more on soft-information-based monitoring before the merger. These results reinforce the notion that when banks adjust monitoring and lending practices to rely more on hard information following mergers, some borrowers can be more sensitive to the changes caused by their banks' merger activities. However, we also interpret our results with caution since the partitioning variables used in our subsample analyses may not be exogenous to firm characteristics.

5. Additional analysis and robustness checks

5.1 Alternative measures of tax aggressiveness

We also check the robustness of our baseline findings by using several alternative measures of corporate tax aggressiveness. One of these measures is the current effective tax rate (*CURRENT_ETR*), which is calculated as the difference between income tax expenses (TXT) and deferred tax expense (TXDI) divided by the difference between pre-tax book income (PI) and special items (SPI) (e.g., Armstrong et al., 2012; Cheng et al., 2012; Hope et al., 2013). *CURRENT_ETR* is truncated to the range [0, 1] and set to missing if the denominator is zero or negative. To associate an increase in *CURRENT_ETR* with more aggressive tax avoidance, we multiply its original value by (-1).

Since many tax avoidance strategies can generate permanent book-tax differences rather than temporary book-tax differences (e.g., McGill and Outslay, 2004; Frank et al., 2009), we also use permanent book-tax differences (*PERM_DIFF*) and discretionary permanent book-tax differences (*DTAX*) as alternative measures of tax aggressiveness. Further, we use the total book-tax difference (*BTD*), the predicated value of unrecognized tax benefits (*P_UTB*), and the cash tax differential (*CTD*) as additional measures of aggressive tax avoidance (e.g., Kim et al., 2011; Rego and Wilson, 2012; Henry and Sansing, 2014).

We re-estimate equation (1) using these alternative tax aggressiveness measures and report the results in Table 6. Our findings consistently indicate that borrowers significantly reduce tax aggressiveness following bank mergers, as the coefficient estimates of *MERGER* remain negative and statistically significant. Although each of these alternative tax aggressiveness measures may have limitations (e.g., Hanlon and Heitzman, 2010), we are confident that our results are robust

since they remain consistent across different measures of tax aggressiveness that are widely used in the literature.

[Please insert Table 6 here]

5.2 Do bank characteristics and increased competition matter?

Another potential issue with our baseline results is that they might be driven by individual bank characteristics rather than bank mergers per se. For example, large banks could be less likely to obtain and process soft information from borrowers (Berger et al., 2005), or banks with poor performance and inefficient business models are more likely to be acquired (Lo, 2014; Chen and Vashishtha, 2017). Moreover, Bank mergers may change the banking landscape, particularly the market concentration. Banks not involved in mergers could be indirectly affected by such a change in bank competition. Hence, our baseline findings on the impact of bank mergers on borrowers' tax aggressiveness may be biased.

We address this issue by including additional bank characteristics and bank competition in our baseline regression model. Following Ellul and Yerramilli (2013), we construct several measures of pre-merger characteristics of merging banks, including size (*BANK SIZE*), performance (*BANK ROA*), total loans (*BANK LOANS*), percentage of non-performing loans (*BANK NPL*), and non-interest income (*BANK NON-INT INCOME*). We measure bank competition (*BANK COMPETITION*) using the Herfindahl-Hirschman Index, which is the sum of the squared market shares of the banks in the banking sector before the merger. Table 7 presents the results of this analysis. We find that the coefficient estimates of *MERGER* remain negative and statistically significant after controlling for the variables described above. Moreover, the coefficients on the bank characteristic and bank competition variables are generally statistically

insignificant. These results lend further support to the notion that our baseline findings are not driven by bank characteristics or market concentration, but rather by bank M&As themselves.

[Please insert Table 7 here]

5.3 The effect of local economic conditions

Jayaratne and Strahan (1996) show that bank deregulation, which relaxes restrictions on bank branching and ultimately increases the likelihood of bank mergers, significantly promotes economic growth. Other studies provide evidence that changes in local economic conditions trigged by bank deregulation can affect corporate activity, such as innovation (Chava et al., 2013; Cornaggia et al., 2015), cash holdings (Francis et al., 2014), and voluntary disclosure (Burks et al., 2018). Therefore, another possibility is that local economic conditions can influence borrowers' incentives to engage in aggressive tax avoidance, and as a result our baseline estimates of the merger effect may be contaminated by the impact of local economic conditions on corporate tax aggressiveness.

We address this concern by performing several additional tests. First, following Chen and Vashishtha (2017), we control for local economic conditions by adding several state-level characteristics to equation (1), including GDP growth rate (*GDPGR*), personal income growth rate (*PIGR*), unemployment growth rate (*UMGR*), total capital expenditure growth (*CAPXGR*), total R&D growth (*RDGR*), and asset-weighted market-to-book ratio (*AWMTB*).[22] We report the results in Panel A of Table 8. We find that the results remain qualitatively similar, with the coefficient

[22] Following Chen and Vashishtha (2017), we include these measures for each of the three years centered on the fiscal year *t* to absorb the confounding effect of any past or anticipated changes in local economic conditions that may occur in the same periods for bank mergers.

estimates of *MERGER* continuing to be negative and significant across all tax aggressiveness measures.

Second, to mitigate the confounding effects of local economic conditions, we adjust our baseline setting by constructing a sample that consists of observations from control and treatment groups within the same state and year. This means that the adjusted sample includes a control group of borrowers who are in the same state and year as the treated borrowers but do not experience bank mergers. We then enhance the baseline regression analysis by adding state-year interaction fixed effects, which ensure that the estimated merger effect comes from within the state-year. Panels B of Table 8 presents the results. We find again that the coefficient estimates of *MERGER* remain negative and statistically significant.

While the sampling strategy presented above is useful, there is a potential concern that changes in local economic conditions may not affect local firms equally. To address this issue, we create a propensity score matched sample using the same matching criteria as in Section 4.1, and further require that each treatment borrower and its matched control borrower are located in the same state or MSA. This approach ensures that the matched treatment and control borrowers have similar characteristics and are likely to respond similarly to changes in local economic conditions (e.g., Smith and Todd, 2005; Chen and Vashishtha, 2017). We then re-estimate equation (1) using this matched sample and report the results in Panels C and D. Despite some sample attrition, we find the results are consistent with those of the baseline analysis based on the full sample. In sum, the above analyses demonstrate that our baseline findings are not driven by changes in local economic conditions coinciding with bank M&As.

[Please insert Table 8 here]

5.4 Heterogeneous treatment problem

Recent studies on casual inference document certain potential issues with using TWFE regressions in difference-in-differences setups (e.g., Callaway and Sant'Anna, 2021; Baker et al., 2022; Braghieri et al., 2022). The TWFE estimator can produce consistent estimates for the average treatment effect on treated (ATT) if the assumption of homogeneous treatment effects across treated units and over time holds. However, heterogeneous treatment effects may arise when later-treated observations are used as controls before the treatment is identified, and when earlier-treated observations are used as controls after the treatment is identified (Fich et al., 2022). Consequently, the TWFE estimator fails to provide consistent estimates of the ATT when there exist heterogeneous treatment effects. In Online Appendix Tables OA1-OA6, we address this concern by using the robust estimates proposed by Callaway and Sant'Anna (2021). The results show these robust estimates, which ensure that later-treated firms are not compared with early-treated firms, to yield similar results across all our empirical specifications.

6. Conclusion

While there is extensive literature on bank consolidation that studies the effects of bank mergers on local credit market conditions and borrower welfare, little is known about the economic consequences of bank mergers on borrower decision making. This study aims to examine the impact of bank mergers on borrowers' opaque practices such as tax aggressiveness. Since banks tend to rely more on hard information in monitoring and lending practices following mergers (e.g., Chen and Vashishtha, 2017), we predict a negative relationship between bank mergers and borrowers' tax aggressiveness. We find our results consistent with this prediction. Borrowers are less likely to aggressively avoid tax when their lenders engage in M&As. Further, the negative association between bank mergers and corporate tax aggressiveness is more prominent for

borrowers that are more informationally opaque, more reliant on soft information, and have a greater need to facilitate their access to external finance prior to the merger. The negative bank merger effect on tax aggressiveness is also stronger when banks have more intention to monitor borrowers and rely more on soft-information-based monitoring before the merger. Overall, our results highlight the importance of bank consolidation in shaping borrowers' accounting practices.

References

Acharya, V., H. Almeida, F. Ippolito, and A. Perez. 2014. Credit lines as monitored liquidity insurance: Theory and evidence. *Journal of Financial Economics* 112(3): 287-319.

Adam, T., and D. Streitz. 2016. Hold-up and the use of performance-sensitive debt. *Journal of Financial Intermediation* 26, 47-67.

Aghion, P., and J. Tirole. 1997. Formal and real authority in organization. *Journal of Political Economy* 105(1): 1-29.

Ahn, S., and W. Choi. 2009. The role of bank monitoring in corporate governance: Evidence from borrowers' earnings management behavior. *Journal of Banking & Finance* 33(2); 425-434.

Allen, F., E. Carletti, and R. Marquez. 2015. Deposits and bank capital structure. *Journal of Financial Economics* 118(3): 601-619.

Amel, D., C. Barnes, F. Panetta, and C. Salleo. 2004. Consolidation and efficiency in the financial sector: a review of the international evidence. *Journal of Banking & Finance* 28(10): 2493-2519.

Amihud, Y. 2002. Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets* 5(1): 31-56.

Amiram, D., W. Beaver, W. Landsman, and J. Zhao. 2017. The effects of credit default swap trading on information asymmetry in syndicated loans. *Journal of Financial Economics* 126(2): 364-382.

Anderson, C., D. Becher, and T. Campbell II. 2004. Bank mergers, the market for bank CEOs, and managerial incentives. *Journal of Financial Intermediation* 13(1): 6-27.

Arena, M., and M. Dewally. 2012. Firm location and corporate debt. *Journal of Banking & Finance* 36(4): 1079-1092.

Arena, M., B. Wang, and R. Yang. 2021. Securities litigation and corporate tax avoidance. *Journal of Corporate Finance* 66: 101546.

Armstrong, C., J. Blouin, and D. Larcker. 2012. The incentives of tax planning. *Journal of Accounting and Economics* 53(1): 391-411.

Azar, J., M. Schmalz, and I. Tecu. 2018. Anticompetitive effects of common ownership. *Journal of Finance* 73(4): 1513-1565.

Badertscher, B. A., S.P. Katz, and S.O. Rego. 2013. The separation of ownership and control and corporate tax avoidance. *Journal of accounting and economics*, 56: 228-250.

Baghdadi, G., E. Podolski, and M. Veeraraghavan. 2022. CEO risk-seeking and corporate tax avoidance: Evidence from pilot CEOs. Journal of Corporate Finance 76, 102282.

Baker, G., R. Gibbons, and K. Murphy. 1999. Information authority in organizations. *The Journal of Law, Economics, & Organization* 15(1): 56-73.

Baker, A., D. Larcker, and C. Wang. 2022. How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics* 144(2): 370-395.

Balakrishnan, K., J.L. Blouin, and W.R. Guay. 2019. Tax aggressiveness and corporate transparency. *The Accounting Review* 94(1): 45-69.

Becher, D. 2000. The valuation effects of bank mergers. *Journal of Corporate Finance* 6(2): 189-214.

Beck, T., C. Lin, and Y. Ma. 2014. Why do firms evade taxes? The role of information sharing and financial sector outreach. *Journal of Finance* 69(2): 763-817.

Berger, A., R. Demsetz, and P. Strahan. 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance* 23(2): 135-194.

Berger, A., and G. Udell. 2002. Small business credit availability and relationship lending: The importance of bank organisational structure. *The Economic Journal* 112 (477): F32-F53.

Berger, A., N. Miller, M. Petersen, R. Rajan, and J. Stein. 2005. Does function follow organization form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics* 76(2): 237-269.

Berger, A., and W. Frame. 2007. Small business credit scoring and credit availability. *Journal of Small Business Management* 45(1): 5-22.

Bertrand, M., and S. Mullainathan. 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy* 111(5): 1043-1075.

Billett, M., M. Flannery, and J. Garfinkel. 1995. The effect of lender identify on a borrowing firm's equity return. *Journal of Finance* 50(2): 699-718.

Blouin, J. 2014. Defining and measuring tax planning aggressiveness. *National Tax Journal* 67(4): 875-899.

Bøhren, Ø., and S. Staubo. 2016. Mandatory gender balance and board independence. *European Financial Management* 22(1): 3-30.

Bolton, P., and M. Dewatripont 1994. The firm as a communication network. *The Quarterly Journal of Economics* 109(4): 809-839.

Boone, A.L., L.C. Field, J.M. Karpoff, and C.G. Raheja. 2007. The determinants of corporate board size and composition: An empirical analysis. *Journal of Financial Economics* 85(1), 66-101.

Bouwman, C., S. Hu, and S. Johnson. 2018. Differential bank behaviors around the Dodd-Frank Act size thresholds. *Journal of Financial Intermediation* 34, 47-57.

Braghieri, L., R. Levy, and A. Makarin. 2022. Social media and mental health. *American Economic Review* 112(11): 3660-3693.

Burks, J., C. Cuny, J. Gerakos, and J. Granja. 2018. Competition and voluntary disclosure: evidence from deregulation in the banking industry. *Review of Accounting Studies* 23: 1471-1511.

Callaway, B., and P.H.C. Sant'Anna. 2021. Difference-in-differences with multiple time periods. *Journal of Econometrics* 225(2): 200-230.

Campello, M., J. Graham, and C. Harvey. 2010. The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics* 97(3): 470-487.

Carrizosa, R., and S.G. Ryan. 2017. Borrower private information covenants and loan contract monitoring. *Journal of Accounting and Economics* 64(2): 313-339.

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

Cetorelli, N., and P. Strahan. 2006. Finance as a barrier to entry: Bank competition and industry structure in local U.S. markets. *Journal of Finance* 61(1): 437-461.

Chava, S., and M. Roberts. 2008. How does financing impact investments? The role of debt covenants. *Journal of Finance* 63(5): 2085-2121.

Chava, S., A. Oettl, A. Subramanian, and K. Subramanian. 2013. Banking deregulation and innovation. *Journal of Financial Economics* 109(3): 759-774.

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

Chen, Q., and R. Vashishtha. 2017. The effects of bank mergers on corporate information disclosure. *Journal of Accounting and Economics* 64(1): 56-77.

Chen, T., and C. Lin. 2017. Does information asymmetry affect corporate tax aggressiveness? *Journal of Financial and Quantitative Analysis* 52(5): 2053-2081.

Cheng, A., H. Huang, Y. Li, and J. Stanfield. 2012. The effect of hedge fund activism on corporate tax avoidance. *The Accounting Review* 87(5): 1493-1526.

Cheng, S., and Y. Qi. 2019. Do banks assist corporate tax avoidance? Evidence from simultaneous debt-equity holding. City University of Hong Kong Working Paper.

Chernobai, A., A. Ozdagli, and J. Wang. 2021. Business complexity and risk management: Evidence from operational risk events in U.S. bank holding companies. *Journal of Monetary Economics* 117, 418-440.

Chi, S., S. Huang, and J. Sanchez. 2017. CEO inside debt incentives and corporate tax sheltering. *Journal of Accounting Research* 55(4): 837-876.

Choi, J., S. Choi, L. Myers, and D. Ziebart. 2019. Financial statement comparability and the informativeness of stock prices about future earnings. *Contemporary Accounting Research* 36(1): 389-417.

Chow, T., K. Klassen, and Y. Liu. 2016. Targets' tax shelter participation and takeover premiums. *Contemporary Accounting Research* 33(4): 1440-1472.

Christensen, D.M., D.S. Dhaliwal, S. Boivie, and S.D. Graffin. 2015. Top management conservatism and corporate risk strategies: Evidence from managers' personal political orientation and corporate tax avoidance. *Strategic Management Journal* 36(12): 1918-1938.

Christensen, H.B., and V.V. Nikolaev. 2012. Capital versus performance covenants in debt contracts. *Journal of Accounting Research* 50(1): 75-116.

Chu, Y., 2018. Shareholder-creditor conflict and payout policy: Evidence from mergers between lenders and shareholders. *The Review of Financial Studies* 31(8): 3098-3121.

Chu, Y., 2019. Debt recognition and debt overhang: Evidence from lender mergers. *Journal of Financial and Quantitative Analysis*, forthcoming.

Chu, Y., D. Zhang, and Y. Zhao. 2019. Bank capital and lending: Evidence from syndicated loans. *Journal of Financial and Quantitative Analysis* 54(2): 667-694.

Chung, S.G., B.W. Goh, J. Lee, and T. Shevlin. 2019. Corporate tax aggressiveness and insider trading. *Contemporary Accounting Research* 36(1): 230-258.

Chyz, J. 2013. Personally tax aggressiveness executives and corporate tax sheltering. *Journal of Accounting and Economics* 56(2): 311-328.

Chyz, J., W. Leung, Z. Li, and M. Rui. 2013. Labor unions and tax aggressiveness. *Journal of Financial Economics* 108(3): 675-698.

Chyz, J., F. Gaertner, A. Kausar, and L. Watson. 2019. Overconfidence and corporate tax policy. *Review of Accounting Studies* 24: 1114-1145.

Cole, R., L. Goldberg, and L. White. 2004. Cookie cutter vs. character: The micro structure of small business lending by large and small banks. *Journal of Financial and Quantitative Analysis* 39(2): 227-251.

Coles, J., D. Naveen, and L. Naveen. 2014. Co-opted boards. *The Review of Financial Studies* 27(6): 1751-1796.

Cornaggia, J., Y. Mao, X. Tian, and B. Wolfe. 2015. Does banking competition affect innovation? *Journal of Financial Economics* 115(1): 189-209.

Crawford, D., and J. Sobel. 1982. Strategic information transmission. *Econometrica* 50(6): 1431-1451.

Curtis, Q., D. Donelson, and J. Hopkins. 2019. Revealing corporate financial misreporting. *Contemporary Accounting Research* 36(3): 1337-1372.

Dechow, P., R. Sloan, and A. Sweeney. 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13(1): 1-36.

De Franco, G., A. Edwards, and S. Liao. 2021. Product market peers in lending. *Management Science* 67(3): 1876-1894.

Degryse, H., N. Masschelein, and J. Mitchell. 2011. Staying, dropping, or switching: The impacts of bank mergers on small firms. *The Review of Financial Studies* 24(4): 1102-1140.

Demiroglu, C., and C.M. James. 2010. The information content of bank loan covenants. *Review of Financial Studies* 23(10): 3700-3737.

Deng, S., C.X. Mao, and C. Xia. 2020. Bank geographic diversification and corporate innovation: Evidence from the lending channel. *Journal of Financial and Quantitative Analysis*, forthcoming.

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

Desai, M., A. Dyck, and L. Zingales. 2007. Theft and taxes. *Journal of Financial Economics* 84(3): 591-623.

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

Dessein, W. 2002. Authority and communication in organizations. *The Review of Economic Studies* 69(4): 811-838.

DeYoung, R., D. Evanoff, and P. Molyneux. 2009. Mergers and acquisitions of financial institutions: a review of the post-2000 literature. *Journal of Financial Services Research* 36: 87-110.

Dhaliwal, D., S. Huang, W. Moser, and R. Pereira. 2011. Corporate tax avoidance and the level and valuation of firm cash holdings. University of Arizona Working Paper.

Diamond, D.W. 1984. Financial intermediation and delegated monitoring. *The Review of Economic Studies* 51(3): 393-414.

Diamond, D.W. 1991. Monitoring and reputation: the choice between bank loans and directly placed debt. *Journal of Political Economy* 99(4): 689-721.

Di Patti, E.B., and G. Gobbi. 2007. Winners of losers? The effects of banking consolidation on corporate borrowers. *Journal of Finance* 62(2): 669-695.

Donohoe, M., and R. Knechel. 2014. Does corporate tax aggressiveness influence audit pricing? *Contemporary Accounting Research* 31(1): 284-308.

Drucker, S., and M. Puri. 2009. On loan sales, loan contracting, and lending relationships. *Review of Financial Studies* 22(7): 2835-2872.

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

Dyreng, S., J. Hoopes, and J. Wilde. 2016. Public pressure and corporate tax behavior. *The Accounting Review* 54(1): 147-186.

Edwards, A., C. Schwab, and T. Shevlin. 2016. Financial constraints and cash tax savings. *The Accounting Review* 91(3): 859-881.

Ellul, A., and V. Yerramilli. 2013. Strong risk controls, lower risk: Evidence from U.S. bank holding companies. *Journal of Finance* 68(5): 1757-1803.

Fahlenbrach, R., R. Prilmeier, and R. Stulz. 2018. Why does fast loan growth predict poor performance for banks? *The Review of Financial Studies* 31(3): 1014-1063.

Faleye, O., and K. Krishnan. 2017. Risky lending: Does bank corporate governance matter? *Journal of Banking & Finance* 83, 57-69.

Fama, E.F. 1985. What's different about banks. *Journal of Monetary Economics* 15(1): 29-39.

Ferreira, D., M. Ferreira, and B. Mariano. 2018. Creditor control rights and board independence. *Journal of Finance* 73(5): 2385-2423.

Fich, E., and A. Shivdasani. 2006. Are busy boards effective monitors? *Journal of Finance* 61(2): 689-724.

Fich, E., J. Harford, and A. Tran. 2022. Disloyal managers and shareholders' wealth. *The Review of Financial Studies*, forthcoming.

Francis, B., I. Hasan, and H. Wang. 2014. Banking deregulation, consolidation, and corporate cash holdings: U.S. evidence. *Journal of Banking & Finance* 41: 45-56.

Francis, B., Hasan, I., Sun, X, and Q. Wu. 2016. CEO political preference and corporate tax sheltering. *Journal of Corporate Finance* 38: 37-53.

Francis, J., S. Neuman, and N. Newton. 2019. Does tax planning affect analysts' forecast accuracy? *Contemporary Accounting Research* 36(4): 2663-2694.

Frank, M.M., L.J. Lynch, and S.O. Rego. (2009). Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review* 84(2): 467-496.

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

Garicano, L. 2000. Hierarchies and the organization of knowledge in production. *Journal of Political Economy* 108(5): 874-904.

Garmaise, M., and T. Moskowitz. 2006. Bank mergers and crime: The real and social effects of credit market competition. *Journal of Finance* 61(2); 495-538.

Gilson, S. 1990. Bankruptcy, boards, banks, and blockholders: Evidence on changes in corporate ownership and control when firms default. *Journal of Financial Economics* 27(2): 355-387.

Goh, B.W., J. Lee, J. Ng, and K.O. Yong. 2016. The effect of board independence on information asymmetry. *European Accounting Review* 25(1): 155-182.

Gormley, T., B.H. Kim, and X. Martin. 2012. Do firms adjust their timely loss recognition in response to changes in the banking industry. *Journal of Accounting Research* 50(1): 159-196.

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

Graham, J., M. Hanlon, T. Shevlin, and N. Shroff. 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review* 89(3): 991-1023.

Gustafson, M., I. Ivanov, and R. Meisenzahl. 2021. Bank monitoring: Evidence from syndicated loans. *Journal of Financial Economics* 139(2): 452-477.

Hanlon, M., and J. Slemrod. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics* 93(1): 126-141.

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

Hasan, I., C.K. Hoi, Q. Wu, and H. Zhang. 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.

Hasan, I., C.K. Hoi, Q. Wu, and H. Zhang. 2017. Does social capital matter in corporate decisions? Evidence from corporate tax avoidance. *Journal of Accounting Research* 55(3): 629-668.

Henry, E., and R. Sansing. 2014. Data Truncation Bias and the Mismeasurement of Corporate Tax Avoidance. Working paper, University of Tennessee, Knoxville and Dartmouth College.

Higgins, D., T. Omer, and J. Phillips. 2015. The influence of a firm's business strategy on its tax aggressiveness. *Contemporary Accounting Research* 32(2): 674-702.

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

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

Houston, J., and H. Shan. 2022. Corporate ESG profiles and banking relationships. *The Review of Financial Studies* 35(7): 3373-3417.

Institute on Taxation and Economic Policy. 2017. State corporate tax avoidance in the Fortune 500, 2008 to 2015. https://itep.org/3-percent-and-dropping-state-corporate-tax-avoidance-in-the-fortune-500-2008-to-2015/

Institute on Taxation and Economic Policy. 2019.Fotune 500 companies avoided $73.9 billion in tax under first year of Trump tax law. https://itep.org/fortune-500-companies-avoided-73-9-billion-in-tax-under-first-year-of-trump-tax-law/

Isin, A. 2018. Tax avoidance and cost of debt: The case for loan-specific risk mitigation and public debt financing. *Journal of Corporate Finance* 49, 344-378.

Linck, J.S., J.M. Netter, and T. Yang. 2008. The determinants of board structure. *Journal of Financial Economics* 87(2): 308-328.

Lo, A.K. 2014. Do declines in bank health affect borrowers' voluntary disclosure? Evidence from international propagation of banking shocks. *Journal of Accounting Research* 52(2): 541-581.

Jappelli, T., and M. Pagano. 2002. Information sharing, lending and defaults: Cross-country evidence. *Journal of Banking & Finance* 26(10): 2017-2045.

Jayaratne, J., and P. Strahan. 1996. The finance-growth nexus: Evidence from bank branch deregulation. *The Quarterly Journal of Economics* 111(3): 639-670.

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

Johnstone, K., C. Li, and K.H. Rupley. 2011. Changes in corporate governance associated with the revelation of internal control material weakness and their subsequent remediation. *Contemporary Accounting Research* 28(1): 331-383.

Kanagaretnam, K., G. Lobo, and D. Whalen. 2007. Does good corporate governance reduce information asymmetry around quarterly earnings management? *Journal of Accounting and Public Policy* 26(4): 497-522.

Kaplan, S., and L. Zingales. 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics* 112(1): 169-215.

Karceski, J., S. Ongena, and D.C. Smith. 2005. The impact of bank consolidation on commercial borrower welfare. *Journal of Finance* 60(4): 2043-2082.

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

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

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

Kim, J., Y. Lin, Y. Mao, and Z. Wang. 2019. Banking market consolidation and tax planning intermediation: Evidence from tax haven operations of client firms. City University of Hong Kong Working Paper.

Klein, A. 2002. Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics* 33(3): 375-400.

Koester, A., T. Shevlin, and D. Wangerin. 2017. The role of managerial ability in corporate tax avoidance. *Management Science* 63(10): 3147-3529.

Laksmana, I. 2008. Corporate board governance and voluntary disclosure of executive compensation practices. *Contemporary Accounting Research* 25(4): 1147-1182.

Lanis, R., and G. Richardson. 2011. The effect of board of director composition on corporate tax aggressiveness. *Journal of Accounting and Public Policy* 30(1): 50-70.

Law, K., and L. Mills. 2017. Military experience and corporate tax avoidance. *Review of Accounting Studies* 22(1): 141-184.

Leung, W., W. Song, and J. Chen. 2019. Does bank stakeholder orientation enhance financial stability? *Journal of Corporate Finance* 56, 38-63.

Liberti, J., and A. Mian. 2009. Estimating the effect of hierarchies on information use. *The Review of Financial Studies* 22(10): 4057-4090.

Liberti, J., and M. Petersen. 2019. Information: Hard and soft. *The Review of Corporate Finance Studies* 8(1): 1-41.

Lisowsky, P., L. Robinson, and A. Schmidt. 2013. Do publicly disclosed tax revenues tell us about privately disclosed tax shelter activity? *Journal of Accounting Research* 51(3): 583-629.

Manzon, G., and G. Plesko. 2002. The relation between financial and tax reporting measures of income. *Tax Law Review* 55: 175-214.

McGill, G., and E. Outslay. 2004. Lost in translation: Detecting tax shelter activity in financial statements. *National Tax Journal* 57(3): 739-756.

McGuire, S., D. Wang, and R. Wilson. 2014. Dual class ownership and tax avoidance. *The Accounting Review* 89(4): 1487-1516.

Mills, L. 1998. Book-tax differences and internal revenue service adjustments. *Journal of Accounting Research* 36(2): 343-356.

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

Moeller, S., F. Schlingemann, and R. Stulz. 2005. Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *Journal of Finance* 60(2): 757-782.

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

Netter, J., M. Stegemoller, and M. Wintoki. 2011. Implications of data screens on merger and acquisition analysis: A large sample study of mergers and acquisitions from 1992 to 2009. *The Review of Financial Studies* 24(7): 2316-2357.

Nikolaev, V.V. 2010. Debt covenants and accounting conservatism. *Journal of Accounting Research* 48(1): 137-176.

Nini, G., D.C. Smith, and A. Sufi. 2009. Creditor control rights and firm investment policy. *Journal of Financial Economics* 92(3): 400-420.

Nini, G., D.C. Smith, and A. Sufi. 2012. Creditor control rights, corporate governance, and firm value. *Review of Financial Studies* 25(6): 1713–1761.

Park, C. 2000. Monitoring and structure of debt contracts. *Journal of Finance* 55(5): 2157-2195.

Peterson, K., R. Schmardebeck, and T. Wilks. 2015. The earnings quality and information processing effects of accounting consistency. *The Accounting Review* 90(6): 2483-2514.

Phillips, J. 2003. Corporate tax-planning effectiveness: The role of compensation-based incentives. *The Accounting Review* 78(3): 847-874.

Prilmeier, R. 2011. The structuring of financial covenants when lenders acquire soft information. *The Ohio State University Working Paper*.

Prilmeier, R. 2017. Why do loans contain covenants? Evidence from lending relationships. *Journal of Financial Economics* 123(3): 558-579.

Radner, R. 1993. The organization of decentralized information processing. *Econometrica* 61(5): 1109-1146.

Ramakrishnan, R., and A. Thakor. 1984. Information reliability and a theory of financial intermediation. *The Review of Economic Studies* 51(3): 415-432.

Rajan, R., and A. Winton. 1995. Covenants and collateral as incentives to monitor. *Journal of Finance* 50(4): 1113-1146.

Rego, S., and R. Wilson. 2012. Equity risk incentives and corporate tax aggressiveness. *Journal of Accounting Research* 50(3): 775-810.

Richardson, G., G. Taylor, and R. Lanis. 2013. The impact of board of director oversight characteristics on corporate tax aggressiveness: An empirical analysis. *Journal of Accounting and Public Policy* 32(3): 68-88.

Richardson, G., R. Lanis, and G. Taylor. 2015. Financial distress, outside directors and corporate tax aggressiveness spanning the global financial crisis: An empirical analysis. *Journal of Banking & Finance* 52, 112-129.

Roberts, M.R., and A. Sufi. 2009. Control rights and capital structure: An empirical investigation. *Journal of Finance* 64(4): 1657-1695.

Roberts, M.R., and T.M. Whited. 2012. Endogeneity in empirical corporate finance 1. In *Handbook of the Economics of Finance* 2: 493-572.

Rosenstein, S., and J. Wyatt. 1990. Outside directors, board independence, and shareholder wealth. *Journal of Financial Economics* 26(2): 175-191.

Sapienza, P. 2002. The effects of banking mergers on loan contacts. *Journal of Finance* 57(1): 329-367.

Scholes, M., M. Wolfson, M. Erickson, E. Maydew, T. Shevlin. 2008. Taxes and business strategy: A planning approach. (4th Edition) Pearson Prentice-Hall, Upper Saddle River, NJ.

Serfling, M. 2016. Firing costs and capital structure decisions. *Journal of Finance* 71(5): 2239-2286.

Shevlin, T., O. Urcan, and F. Vasvari. 2019. Corporate tax avoidance and debt costs. University of California-Irvine Working Paper.

Smith, J., and P. Todd. 2005. Does matching overcome LaLonde's critique of nonexperimental estimators? *Journal of Econometrics* 125(1): 305-353.

Smith, C., and J. Warner. 1979. On financial contracting: An analysis of bond covenants. *Journal of Financial Economics* 7(2): 117-161.

Stein, J. 2002. Information production and capital allocation: decentralized versus hierarchical firms. *Journal of Finance* 57(5): 1891-1921.

Sufi, A. 2007. Information asymmetry and financing agreements: Evidence from syndicated loans. *Journal of Finance* 62(2): 629-668.

Swenson, D. 2001. Tax reforms and evidence of transfer pricing. *National Tax Journal* 54(1): 7-25.

The Washington Post. 2020. https://www.washingtonpost.com/us-policy/2020/11/19/global-tax-evasion-data/

Uchida, H., G. Udell, and N. Yamori. Loan officers and relationship lending to SMEs. *Journal of Financial Intermediation* 21(1): 97-122.

Weisbach, D. 2002. An economic analysis of anti-tax-avoidance doctrines. *American Law and Economics Review* 4(1): 88-115.

Wilson, R.J. 2009. An Examination of Corporate Tax Shelter Participants. *The Accounting Review* 84(3): 969-999.

Yang, J., Y. Yu, and L. Zheng. 2021. The impact of shareholder litigation risk on equity incentives: Evidence from a quasi-natural experiment. *The Accounting Review* 96(6): 427-449.

Figure 1. Time trend in corporate tax aggressiveness around bank mergers

This figure illustrates the time trend in borrowers' tax aggressiveness around bank mergers. The y-axis shows the coefficient estimate from regressing each corporate tax aggressiveness measure on year fixed effects and dummy variables indicating the years relative to the bank mergers. The x-axis indicates the years relative to bank mergers over the nine-year window. The dashed lines correspond to the 90% confidence intervals of the coefficient estimates, calculated based on standard errors clustered at the borrower level.

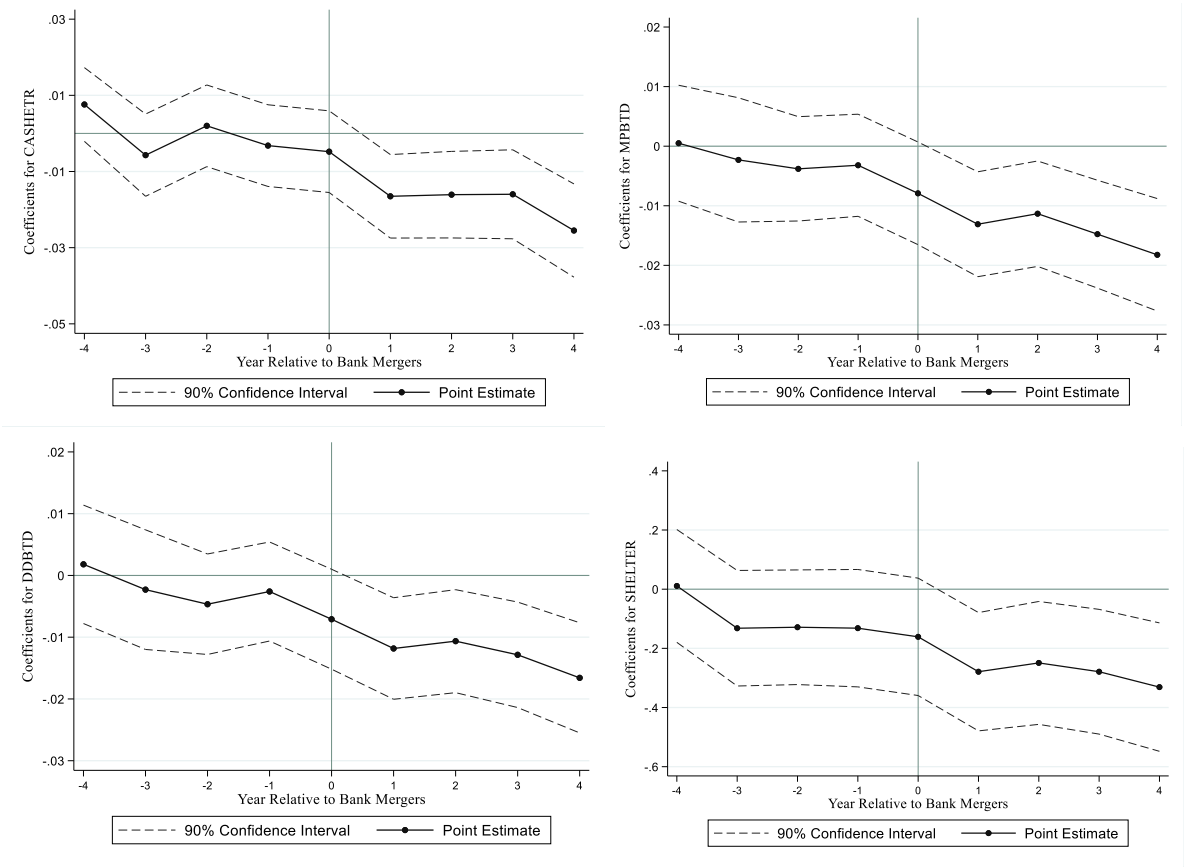

Figure 2. Placebo tests

This figure plots the distribution of the coefficients of *MERGER* estimates from the placebo tests by randomly assigning treatment borrowers and control borrowers. We ensure that the number of pseudo treatment borrowers and pseudo control borrowers is the same as the number of actual treatment borrowers and control borrowers as used in our baseline regressions. We re-estimate the baseline regression model and store the coefficient and standard error estimates for each placebo sample. This procedure is repeated for 5,000 times.

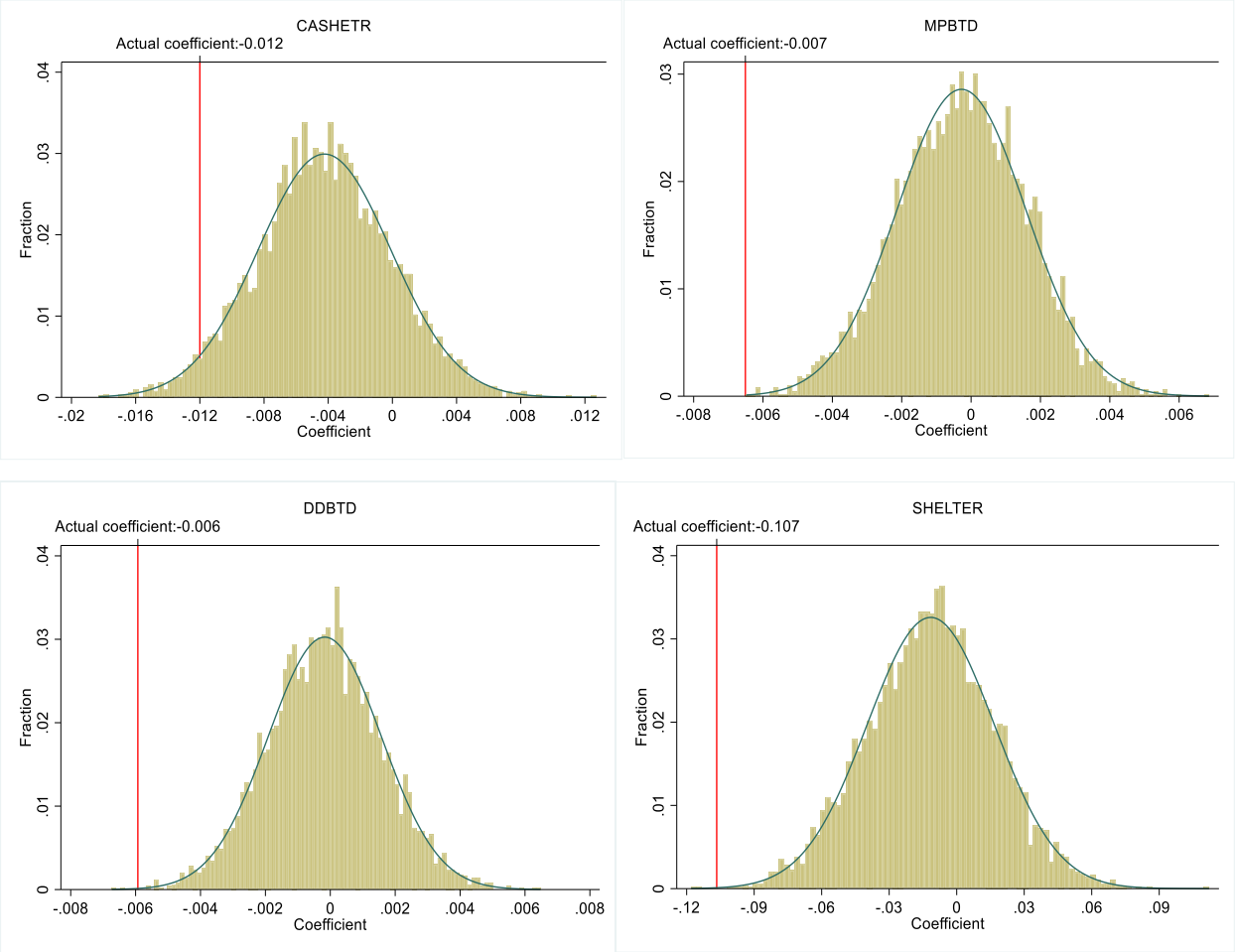

Table 1. Distribution of bank mergers

This table reports the distribution of 423 bank mergers over the period from 1990 to 2017.

Year	N (Mergers)	Percent
1990	10	2.36%
1991	20	4.73%
1992	17	4.02%
1993	30	7.09%
1994	32	7.57%
1995	29	6.86%
1996	25	5.91%
1997	31	7.33%
1998	32	7.57%
1999	23	5.44%
2000	19	4.49%
2001	18	4.26%
2002	10	2.36%
2003	17	4.02%
2004	21	4.96%
2005	18	4.26%
2006	22	5.20%
2007	15	3.55%
2008	6	1.42%
2009	6	1.42%
2010	2	0.47%
2011	4	0.95%
2012	3	0.71%
2013	3	0.71%
2014	4	0.95%
2015	3	0.71%
2016	1	0.24%
2017	2	0.47%
Total	423	100.00%

Table 2. Summary statistics

This table presents descriptive statistics on measures of tax aggressiveness, bank mergers, and firm-level characteristics for the full sample before performing the baseline analysis for the period 1990-2017. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). *MERGER* is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. All the continuous variables are winsorized at the 1st and 99th percentile values. Detailed definitions of these variables and firm-level characteristics are provided in Appendix A.

Variables	N	Mean	Median	Std.Dev.	p25	p75
CASHETR	47,068	-0.258	-0.244	0.185	-0.333	-0.140
MPBTD	24,783	-0.003	0.004	0.064	-0.018	0.024
DDBTD	24,769	0.001	0.002	0.052	-0.017	0.022
SHELTER	40,737	2.174	2.420	2.395	0.697	3.863
MERGER	60,569	0.329	0.000	0.470	0.000	1.000
SIZE	60,569	7.467	7.479	1.901	6.212	8.735
LEV	60,569	0.310	0.284	0.217	0.165	0.421
ROE	60,569	0.191	0.140	0.312	0.093	0.222
MTB	60,569	2.612	1.894	5.018	1.150	3.151
INTAN	60,569	0.260	0.177	0.299	0.038	0.391
R&D	60,569	0.018	0.000	0.043	0.000	0.017
AQC	60,569	0.031	0.001	0.065	0.000	0.028
FIRM RISK	60,569	0.024	0.020	0.017	0.014	0.029
BIG4	60,569	0.857	1.000	0.350	1.000	1.000
INSTOWN	60,569	0.549	0.649	0.356	0.205	0.858
FI	60,569	0.016	0.000	0.035	0.000	0.023
EQINC	60,569	0.001	0.000	0.006	0.000	0.000
NOL	60,569	0.511	1.000	0.500	0.000	1.000
ΔNOL	60,569	0.009	0.000	0.216	0.000	0.001

Table 3. The effects of bank mergers on corporate tax aggressiveness

This table presents the effects of bank mergers on borrowers' tax aggressiveness. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. Panel A reports the regression estimation of equation (1). The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Panel B presents the estimation results of dynamic treatment analysis. $MERGER^{-1}$, $MERGER^{0}$, $MERGER^{+1}$, and $MERGER^{2+}$ are dummy variables equal to one if it is one year prior, the current year, one year after, and two or more years after the announcement of bank merger, respectively. Panel C shows the estimation results of equation (1) based on the matched sample over the period of three years before and after the bank merger, excluding the treatment year. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. The effects of bank mergers on borrowers' tax aggressiveness

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.012***	-0.007***	-0.006***	-0.107***
	(-3.348)	(-3.756)	(-3.691)	(-3.995)
SIZE	0.003	-0.007**	-0.009***	0.710***
	(0.577)	(-2.428)	(-3.331)	(16.009)
LEV	-0.027	-0.080***	-0.075***	-2.846***
	(-1.638)	(-5.796)	(-5.985)	(-17.225)
ROE	0.023*	0.032***	0.029***	0.534***
	(1.833)	(3.641)	(3.703)	(4.724)
MTB	0.001***	0.000**	0.000**	0.009***
	(2.894)	(2.154)	(2.235)	(3.662)
INTAN	-0.001	-0.009	-0.007	-0.027
	(-0.127)	(-0.926)	(-0.783)	(-0.192)
R&D	-0.220*	-0.541***	-0.454***	-5.438***
	(-1.735)	(-6.170)	(-5.594)	(-5.571)
AQC	0.047**	0.019	0.036**	1.114***
	(2.475)	(1.122)	(2.425)	(4.883)
FIRM RISK	-0.769***	-0.908***	-0.801***	-6.938*
	(-3.922)	(-5.491)	(-5.437)	(-1.940)
BIG4	0.003	-0.008*	-0.007	-0.126*
	(0.291)	(-1.710)	(-1.461)	(-1.959)
INSTOWN	0.010	0.002	0.003	0.193**
	(0.821)	(0.316)	(0.573)	(2.206)
FI	0.470***	0.111***	0.010	13.851***
	(7.099)	(3.192)	(0.292)	(28.144)
EQINC	1.606***	-0.626***	-0.720***	15.971***
	(4.617)	(-4.505)	(-5.704)	(6.427)
NOL	0.011**	0.000	0.000	-0.011
	(2.161)	(0.196)	(0.091)	(-0.262)

ΔNOL	-0.008	-0.027	-0.025	-1.409**
	(-1.028)	(-1.614)	(-1.585)	(-2.409)
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.514	0.368	0.193	0.852
Number of observations	47,068	24,783	24,769	40,737

Panel B. The effects of bank mergers on borrowers' tax aggressiveness: dynamic treatment analysis

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
$MERGER^{-1}$	-0.002	0.001	0.002	-0.026
	(-0.375)	(0.393)	(0.654)	(-0.548)
$MERGER^{0}$	-0.004	-0.004	-0.003	-0.040
	(-0.599)	(-1.151)	(-0.870)	(-0.787)
$MERGER^{+1}$	-0.016**	-0.008**	-0.006**	-0.149***
	(-2.128)	(-2.351)	(-2.090)	(-2.818)
$MERGER^{2+}$	-0.016**	-0.008**	-0.007**	-0.139**
	(-1.992)	(-2.428)	(-2.159)	(-2.512)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.514	0.368	0.192	0.852
Number of observations	47,068	24,783	24,769	40,737

Panel C. The effects of bank mergers on borrowers' tax aggressiveness: matched sample analysis

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.022**	-0.020***	-0.019***	-0.191**
	(-2.254)	(-3.387)	(-3.537)	(-2.263)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.538	0.351	0.223	0.856
Number of observations	4,875	2,291	2,288	4,191

Table 4. Placebo test using "pseudo-event"

This table reports the effects of bank mergers on borrowers' tax aggressiveness using a "pseudo-event" three years before the actual merger event. We use the same treated and control borrowers identified in Panel A of Table 3 and repeat the baseline regression based on the "pseudo-event" year. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	0.001	-0.004	-0.004	-0.032
	(0.154)	(-1.098)	(-1.130)	(-0.555)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R2	0.514	0.367	0.192	0.852
Number of observations	47,068	24,783	24,769	40,737

Table 5. Bank mergers and corporate tax aggressiveness: The cross-sectional analysis

In this table, we explore cross-sectional variations in the effect of bank mergers. We use the following empirical specification to test how the effects of bank mergers on borrowers' tax aggressiveness may vary by subsamples as indicated by the partitioning variables:

$$Y_{i,j,t} = \alpha_{i,j} + \tau_t + \beta_1(\text{MERGER}_{i,j,t} \times \text{Subsample Indicator}_1) + \beta_2 (\text{MERGER}_{i,j,t} \times \text{Subsample Indicator}_2) + \gamma X_{i,t} + \varepsilon_{i,j,t}$$

where $Subsample\ Indicator_1$ and $Subsample\ Indicator_2$ take the value of one if the observations are in the treatment group as identified by the partitioning variable. Specifically, we bifurcate the treatment sample into two subgroups based on the partitioning variable and use the entire control group as a benchmark in the subsample analysis. We do not partition the control group since the partitioning variables are only meaningful for borrowers when their banks have engaged in mergers. All partitioning variables are constructed in the last fiscal year before the merger. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Panels A to E show the evidence on cross-sectional variations in the effect of bank mergers conditioned on the information environment of borrowing firms. *BID-ASK* is calculated as the average of daily closing bid-ask spreads scaled by the midpoint calculated over the fiscal year. *HIGH* (*LOW*) *BID-ASK* is an indicator variable for whether the borrower's bid-ask spread is above (below) the sample median prior to the merger. *ILLIQUIDITY* is measured by taking the average of absolute daily stock return divided by trading volume. *HIGH* (*LOW*) *ILLIQUIDITY* is an indicator variable for whether the borrower's illiquidity ratio is above (below) the sample median prior to the merger. *GOVERNANCE* is the board independence, which is calculated as the ratio between the number of independent directors and the number of total directors in borrowing firms. *STRONG* (*WEAK*) *GOVERNANCE* is an indicator variable for whether the borrower's board independence is above (below) the sample median prior to the merger. *SOFT INFO* is measured as the first principal component of a borrowing firm's intangible assets and R&D, both scaled by its lagged total assets (e.g., Lo, 2014; Chen and Vashishtha, 2017). The information of a borrowing firm is more likely to be soft if it has more intangible assets and R&D. *MORE* (*LESS*) *SOFT INFO* is an indicator variable for whether the borrower's *SOFT INFO* is above (below) the sample median before the merger. *LEND REL INTENSITY* is the number of loans by a specific bank to a specific borrower in the last five years divided by the total number of loans by the borrower over the last five years (e.g., Bharath et al., 2019). *HIGH* (*LOW*) *LEND REL INTENSITY* is an indicator variable for whether the borrower's *LEND REL INTENSITY* is above (below) the sample median before the merger. Panels F and G present the evidence of cross-sectional variations in the effect of bank mergers conditioned on the borrower's need for credit. *MATURITY* is the remaining time to maturity of the existing loan contract. *LONG* (*SHORT*) *MATURITY* is an indicator variable for whether the remaining maturity of the loan contract is above (below) the sample median before the merger. *CONSTRAINED* is measured based on the KZ index by Kaplan and Zingales (1997). *MORE* (*LESS*) *CONSTRAINED* is an indicator variable for whether the borrower's KZ index is above (below) the sample median prior to the merger. Panels H to J present the evidence of cross-sectional variations in the effect of bank mergers conditioned on the bank monitoring. *COVENANTS* is the number of covenants in the loan contract prior to the merger. *MORE* (*FEWER*) *COVENANTS* is an indicator variable for whether the number of covenants in the loan contract is above (below) the sample median. *REPUTATION* is the pre-merger reputation of the bank. *HIGH* (*LOW*) *REPUTATION* is an indicator variable for whether the merging bank is ranked (not ranked) in the Fortune 500 annual ranking of America's largest corporations before the merger (e.g., Ahn and Choi, 2009). *BRANCHES* is the pre-merger number of branches for the merging bank. *MORE* (*FEWER*) *BRANCHES* is an indicator variable for whether the number of the merging bank's branches is above (below) the sample median before the merger. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. The borrower's bid-ask spread (*BID-ASK*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH BID-ASK	-0.019***	-0.010***	-0.010***	-0.162***
	(-4.230)	(-4.436)	(-4.520)	(-4.942)
MERGER×LOW BID-ASK	-0.004	-0.003	-0.003	-0.014
	(-0.767)	(-1.569)	(-1.452)	(-0.407)

Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	8.77 (0.003)	7.79 (0.005)	8.39 (0.004)	14.03 (0.000)
Adjusted R^2	0.514	0.367	0.193	0.853
Number of observations	46,477	24,576	24,562	40,244

Panel B. The borrower's illiquidity ratio (*ILLIQUIDITY*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH ILLIQUIDITY	-0.019***	-0.010***	-0.010***	-0.199***
	(-3.882)	(-4.589)	(-4.622)	(-5.792)
MERGER×LOW ILLIQUIDITY	-0.007	-0.001	-0.001	-0.037
	(-1.599)	(-0.740)	(-0.558)	(-1.149)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	4.64 (0.031)	12.45 (0.000)	13.28 (0.000)	18.44 (0.000)
Adjusted R^2	0.514	0.371	0.199	0.853
Number of observations	45,701	24,333	24,319	39,382

Panel C. The borrower's board independence (*GOVERNANCE*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×STRONG GOVERNANCE	-0.005	-0.004	-0.003	-0.030
	(-0.957)	(-1.623)	(-1.574)	(-0.823)
MERGER×WEAK GOVERNANCE	-0.013***	-0.008***	-0.008***	-0.075**
	(-2.651)	(-3.854)	(-3.893)	(-2.061)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	2.84 (0.092)	3.72 (0.054)	3.97 (0.046)	1.54 (0.215)
Adjusted R^2	0.522	0.372	0.198	0.849
Number of observations	41,683	22,368	22,355	36,002

Panel D. The borrower's soft information (*SOFT INFO*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE SOFT INFORMATION	-0.016***	-0.007***	-0.007***	-0.183***
	(-2.629)	(-3.076)	(-3.412)	(-4.507)
MERGER×LESS SOFT INFORMATION	0.001	-0.002	-0.001	0.014
	(0.211)	(-0.768)	(-0.440)	(0.351)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	6.71(0.010)	4.29 (0.039)	7.37 (0.007)	18.79 (0.000)
Adjusted R^2	0.514	0.367	0.192	0.852

Number of observations	46,865	24,629	24,615	40,598
Panel E. The borrower's lending relationship intensity (*LEND REL INTENSITY*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH LEND REL INTENSITY	-0.011**	-0.007***	-0.006***	-0.145***
	(-2.311)	(-3.303)	(-3.143)	(-4.396)
MERGER×LOW LEND REL INTENSITY	-0.003	-0.003	-0.003	-0.066*
	(-0.497)	(-1.281)	(-1.232)	(-1.790)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	3.32 (0.069)	5.19 (0.023)	4.28 (0.039)	6.40 (0.012)
Adjusted R^2	0.510	0.363	0.193	0.850
Number of observations	40,589	22,436	22,423	36,705
Panel F. The borrower's remaining maturity of the loan (*MATURITY*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×LONG MATURITY	-0.007	-0.003	-0.002	-0.066*
	(-1.448)	(-1.278)	(-1.189)	(-1.946)
MERGER×SHORT MATURITY	-0.014***	-0.008***	-0.008***	-0.125***
	(-3.648)	(-4.599)	(-4.573)	(-4.498)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	3.37 (0.067)	9.72 (0.002)	10.00 (0.002)	4.57 (0.033)
Adjusted R^2	0.515	0.368	0.193	0.852
Number of observations	46,997	24,755	24,741	40,658
Panel G. The borrower's financial constraints (*CONSTRAINED*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE CONSTRAINED	-0.021***	-0.014***	-0.013***	-0.230***
	(-4.275)	(-5.833)	(-5.667)	(-6.365)
MERGER×LESS CONSTRAINED	-0.007	0.000	0.000	0.011
	(-1.549)	(0.125)	(0.111)	(0.332)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	6.53 (0.011)	30.37 (0.000)	28.21 (0.000)	37.52 (0.000)
Adjusted R^2	0.517	0.372	0.198	0.852
Number of observations	45,382	23,953	23,939	39,479
Panel H. Bank loan covenants (*COVENANTS*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)

MERGER×MORE COVENANTS	-0.015***	-0.007***	-0.007***	-0.104***
	(-3.790)	(-3.842)	(-3.775)	(-3.497)
MERGER×FEWER COVENANTS	-0.001	-0.003	-0.003	-0.047
	(-0.274)	(-1.467)	(-1.420)	(-1.331)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	8.55 (0.004)	3.07 (0.080)	3.08 (0.079)	2.96 (0.085)
Adjusted R^2	0.514	0.367	0.196	0.852
Number of observations	45,106	24,180	24,166	39,055

Panel I. Bank reputation (*REPUTATION*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH REPUTATION	-0.017***	-0.009***	-0.008***	-0.135***
	(-4.090)	(-4.102)	(-4.181)	(-4.401)
MERGER×LOW REPUTATION	-0.004	-0.003	-0.003	-0.055
	(-0.663)	(-1.383)	(-1.200)	(-1.349)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	3.93 (0.048)	3.36 (0.067)	3.96 (0.047)	3.09 (0.079)
Adjusted R^2	0.514	0.368	0.193	0.852
Number of observations	47,068	24,783	24,769	40,737

Panel J. Bank branches (*BRANCHES*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE BRANCHES	-0.005	-0.003	-0.003	-0.064
	(-0.944)	(-1.438)	(-1.198)	(-1.619)
MERGER×FEWER BRANCHES	-0.017***	-0.007***	-0.007***	-0.151***
	(-3.321)	(-3.661)	(-3.813)	(-4.140)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
F-statistics (P-value) for test: $\beta_1=\beta_2$	3.70 (0.054)	3.40 (0.065)	4.79 (0.029)	3.22 (0.073)
Adjusted R^2	0.514	0.366	0.197	0.852
Number of observations	45,640	23,677	23,664	38,081

Table 6. Alternative measures of tax aggressiveness

In this table, we check the robustness of our baseline results by using several additional measures of corporate tax aggressiveness. *CURRENT_ETR* is the current effective tax rate, which is calculated as the difference between income tax expenses (TXT) and deferred tax expense (TXDI) divided by the difference between pre-tax book income (PI) and special items (SPI) (e.g., Armstrong et al., 2012; Cheng et al., 2012; Hope et al., 2013). *CURRENT_ETR* is set to missing if the denominator is 0 or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CURRENT_ETR* is associated with more aggressive tax avoidance. *PERM_DIFF* is the permanent book-tax differences based on Frank et al. (2009) and Kim et al. (2011). *DTAX* is the discretionary permanent book-tax differences based on Frank et al. (2009). Similar to previous studies such as Kim et al. (2011), Rego and Wilson (2012), and Henry and Sansing (2014), *BTD* is the total book-tax difference, *P_UTB* is the predicated value of unrecognized tax benefits, and *CTD* is the cash tax differential. The main variable of interest across all panels in this table is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CURRENT_ETR	PERM_DIFF	DTAX	BTD	P_UTB	CTD
	(1)	(2)	(3)	(4)	(5)	(6)
MERGER	-0.006*	-0.004**	-0.009**	-0.007***	-0.000**	-0.002***
	(-1.883)	(-2.511)	(-1.983)	(-2.864)	(-2.309)	(-3.130)
Firm controls	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.633	0.45	0.103	0.543	0.916	0.416
Number of observations	52,275	42,978	26,160	41,315	33,031	57,906

Table 7. Do bank characteristics matter?

In this table, we examine whether our baseline findings are driven by certain specific bank characteristics rather than bank mergers per se. We examine this by adding bank characteristics to our baseline regression model. We follow Ellul and Yerramilli (2013) and construct several pre-merger characteristics of merging banks, including size (*BANK SIZE*), performance (*BANK ROA*), total loans (*BANK LOANS*), percentage of non-performing loans (*BANK NPL*), non-interest income (*BANK NON-INT INCOME*), and the sum of squared shares of market shares of the banks in the banking sector (*BANK COMPETITION*). Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.014***	-0.005***	-0.005***	-0.097***
	(-3.413)	(-2.738)	(-2.762)	(-3.191)
BANK SIZE	0.004	-0.000	-0.000	0.034
	(0.551)	(-0.105)	(-0.124)	(0.564)
BANK ROA	-0.190	0.058	0.068	3.738
	(-0.604)	(0.354)	(0.455)	(1.508)
BANK BAD LOANS	-0.007	-0.007	-0.009	-0.214
	(-0.207)	(-0.441)	(-0.613)	(-0.784)
BANK NPL	0.396	0.201	0.222*	3.421
	(1.291)	(1.371)	(1.683)	(1.494)
BANK NON-INT INCOME	-0.032	0.007	0.007	0.097
	(-1.023)	(0.471)	(0.532)	(0.374)
BANK COMPETITION	1.302	-0.158	-0.026	-3.977
	(1.018)	(-0.266)	(-0.046)	(-0.453)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.510	0.372	0.196	0.847
Number of observations	33,951	18,493	18,487	29,179

Table 8. Can local economic conditions explain our main findings?

In this table, we investigate whether local economic conditions may drive our baseline findings on the association between bank mergers and borrowers' tax aggressiveness. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. In Panel A, we control for local economic conditions by adding several state-level measures to equation (1), including GDP growth rate (*GDPGR*), personal income growth rate (*PIGR*), unemployment growth rate (*UMGR*), total capital expenditure growth (*CAPXGR*), total R&D growth (*RDGR*), and asset-weighted market-to-book ratio (*AWMTB*). In Panel B, we adjust our baseline setting by establishing a sample that consists of observations in treatment and control groups that are from the same state and year. We then repeat the baseline regression analysis by further including the state-year dummy, which ensures that the identification comes from within state-year variation. Panels C and D present regression results based on a propensity score matched sample in which each treatment borrower and matched control borrower is further required to be located in the same state or Metropolitan Statistical Area (MSA). In this specification, the matched treatment and control borrowers have similar characteristics, and thus they are likely to have similar responses to changes in local economic conditions (e.g., Smith and Todd, 2005; Chen and Vashishtha, 2017). The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. All detailed definitions of dependent, independent and control variables are provided in Appendix A. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Additional state-level measures of local economic conditions

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.014***	-0.006***	-0.005***	-0.099***
	(-3.664)	(-3.439)	(-3.389)	(-3.636)
GDPGR	-0.075	0.106**	0.100**	2.792***
	(-0.967)	(2.297)	(2.391)	(4.328)
PIGR	0.217**	0.096*	0.081	2.355***
	(2.521)	(1.671)	(1.531)	(3.043)
UMGR	-0.014	-0.002	-0.004	-0.017
	(-0.896)	(-0.188)	(-0.468)	(-0.137)
CAPXGR	0.000	0.000	0.000	-0.000
	(0.322)	(0.762)	(0.484)	(-0.037)
RDGR	-0.000	-0.000	-0.000	0.000
	(-0.363)	(-0.399)	(-0.281)	(1.109)
AWMTB	0.002	-0.003*	-0.003*	-0.034
	(0.579)	(-1.826)	(-1.723)	(-1.233)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.508	0.369	0.200	0.852
Number of observations	44,002	24,101	24,093	37,158

Panel B. State-year interaction dummies

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.013***	-0.007***	-0.007***	-0.097***
	(-3.500)	(-3.926)	(-4.029)	(-3.551)

Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.530	0.392	0.233	0.857
Number of observations	44,348	24,010	24,002	37,548
Panel C. State-PSM sample				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.029**	-0.018***	-0.016***	-0.187**
	(-2.062)	(-3.186)	(-3.060)	(-2.145)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.492	0.476	0.338	0.846
Number of observations	3,036	1,590	1,590	2,612
Panel D. MSA-PSM sample				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.032*	-0.018***	-0.017***	-0.169*
	(-1.952)	(-3.145)	(-3.104)	(-1.762)
Firm controls	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Firm-Bank dummies	YES	YES	YES	YES
Adjusted R^2	0.487	0.442	0.156	0.854
Number of observations	2,207	1,284	1,284	1,978

Appendix A. Variable definitions

Variables	Definition (COMPUSTAT data items in parentheses)
Panel A. Tax aggressiveness variables	
CASHETR	CASHETR is the cash effective tax rate, computed as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI) (e.g., Hasan et al., 2014; Khan et al., 2017; Isin, 2018). CASHETR is set to missing if the denominator is zero or negative and is truncated to the range [0, 1] (e.g., Chen et al., 2010; Chen and Lin, 2017). We multiply the original value by (-1) so that an increase in CASHETR is associated with more aggressive tax avoidance.
MPBTD	Manzon and Plesko (2002) define book-tax difference as (US domestic financial income (PIDOM)-U.S. domestic taxable income - State Income Taxes (TXS) - Other Income Taxes (TXO)-Equity in Earnings (ESUB))/lagged total assets (AT). US domestic taxable income is estimated as the federal tax expense (TXFED)/the statutory maximum corporate tax rate (STR). We remove observations with total assets (AT) less than $1 million (to mitigate the small deflator problem) and observations with negative taxable income (TXFED < 0).
DDBTD	Desai and Dharmapala (2006) derive the residual book-tax difference from the following firm fixed effect regression: $$MP_{BTD_{i,t}} = \beta_1 TACC_{i,t} + \mu_i + \varepsilon_{i,t}$$ where MP_BTD is the Manzon and Plesko (2002) book-tax difference, and TACC is total accruals measured using the cash flow method (Hribar and Collins 2002). Both variables are scaled by lagged total assets (AT) and are winsorized at 1% and 99%; μ_i is the average value of the residual for firm i over the sample period; and $\varepsilon_{i,t}$ is the deviation of the residual in year t from firm i's average residual. We remove observations with total assets less than $1 million (to mitigate the small deflator problem) and observations with negative taxable income (TXFED < 0).
SHELTER	SHELTER=−4.86+5.20×BTD+4.08×DAP−1.41×Lev+0.76×Size+3.51×PTROA+1.72×Foreign Income+2.43×R&D, where BTD is the total book-tax difference; DAP is the discretionary accruals from the performance-adjusted modified cross-sectional Jones (1991) model; Lev is the long-term leverage, defined as long-term debt (DLTT) divided by total assets (AT); Size is the log of total assets; PTROA is measured as pre-tax earnings (PI) divided by lagged assets; Foreign Income is an indicator variable equal to 1 for firm observations reporting foreign income (PIFO), and 0 otherwise; and R&D is R&D expense (XRD) divided by lagged total assets. The formula is based on Wilson (2009).
CURRENT_ETR	CURRENT_ETR is the current effective tax rate, computed as the difference between income tax expenses (TXT) and deferred tax expense (TXDI) divided by the difference between pre-tax book income (PI) and special items (SPI) (e.g., Cheng et al., 2012; Armstrong et al., 2012; Hope et al., 2013). CURRENT_ETR is set to missing if the denominator is 0 or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in CURRENT_ETR is associated with more aggressive tax avoidance.
PERM_DIFF	Permanent book-tax differences is calculated as (PI-((TXFED + TXFO)/STR))-(TXDI/STR), scaled by lagged assets (AT). PI is pretax book income, TXFED is the current federal tax expense, TXFO is the current foreign tax expense, and TXDI is the deferred tax expense. This is based on Frank et al. (2009) and Kim et al. (2011).

DTAX	The residual from the following regression estimated by industry and year is based on the model from Frank et al. (2009): $$PERMDIFF_{it} = \beta_1(\frac{1}{AT_{it-1}}) + \beta_2 INTANG_{it} + \beta_3 UNCON_{it} + \beta_4 MI_{it} + \beta_5 CSTE_{it} + \beta_6 \Delta NOL_{it} + \beta_7 LAGPERM_{it} + \varepsilon_{it}$$ where PERMDDIFF is calculated as (PI - ((TXFED + TXFO)/STR)) - (TXDI/STR), scaled by lagged assets (AT). PI is pretax book income; TXFED is the current federal tax expense; TXFO is the current foreign tax expense; STR is the statutory maximum corporate tax rate; TXDI is the deferred tax expense; INTANG is goodwill and other intangible assets (INTAN), scaled by lagged assets; UNCON is income (loss) reported under the equity method (ESUB), scaled by lagged assets (AT); MI is income (loss) attributable to minority interest (MII), scaled by lagged assets; CSTE is current state tax expense (TXS), scaled by lagged assets; ΔNOL is change in net operating loss carryforwards (TLCF), scaled by lagged assets; and LAGPERM is PERMDIFF in the previous fiscal year.
BTD	Total book-tax difference is calculated by book income less taxable income scaled by lagged assets (AT). Book income is pretax income (PI) in year t. Taxable in- come is calculated by summing the current federal tax expense (TXFED) and current foreign tax expense (TXFO) and dividing by the statutory tax rate and then subtracting the change in net operating loss carryforwards (TLCF) in year t. If the current federal tax expense is missing, the total current tax expense equals the total income taxes (TXT) less deferred taxes (TXDI), state income taxes (TXS), and other income taxes (TXO). We remove observations with total assets less than $1 million and observations with negative taxable income (TXFED < 0).
P_UTB	Predicted unrecognized benefits at the end of year t are based on the model from Rego and Wilson (2012). Predicted UTB =-0.004+0.011×PTROA+0.001×Size+0.010×FOR_SALE+0.092×R&D-0.002×DAP+0.003×LEV+0.014×SG&A-0.018×SALES_GR, where PTROA is pre-tax income (PI) dividend by lagged assets (AT); Size =Natural log of total assets (AT); FOR_SALE is sum of foreign sales reported in the Compustat Segments database scaled by total sales; R&D is R&D expense (XRD) divided by lagged total assets. DAP is the discretionary accruals from the performance-adjusted modified cross-sectional Jones (1991) model; LEV is total debt (DLTT+DLC) scaled by beginning-of-year total assets (AT); SG&A is selling, general and administrative expense (XSGA) scaled by lagged assets; and SALES_GR is the three-year average change in sales.
CTD	Cash tax differential (CTD) measure is developed by Henry and Sansing (2014) and is estimated as the difference between cash taxes paid and the product of the statutory tax rate and pre-tax income, scaled by lagged total assets.
Panel B. Bank merger variable	
MERGER	Dummy variable that equals 1 for all the borrower-bank-year observations after the merger announcement where the lead bank is involved, and zero otherwise.
Panel C. Firm-level variables	
SIZE	Logarithm of the firm's book value of assets (AT).
LEV	Ratio of long-term debt (DLTT) to the book value of assets (AT).
ROE	Operating income (OIBDP) divided by the market value of equity (PRCC_F×CSHO).
MTB	The ratio of the market value of equity to the book value of equity.
INTAN	Intangible assets (INTAN), scaled by lagged total assets.
R&D	Research and development expenditure (XRD) divided by lagged total assets. Missing values of research and development expense are set to 0.
AQC	Acquisition expenditures (AQC) divided by lagged total assets.
FIRM RISK	The standard deviation of residuals from the capital asset pricing model using daily stock returns and value-weighted market returns over the fiscal year.
BIG4	Dummy variable for whether a firm is audited by one of the Big 4 auditors.
INSTOWN	Equity ownership of institutional investors as a percentage of total shares outstanding.

FI	Foreign income, which is measured as pre-tax foreign income (PIFO) divided by lagged assets. Missing values of equity income are set to 0.
EQINC	Equity income in earnings (ESUB) divided by lagged total assets. Missing values of equity income are set to 0.
NOL	Dummy variable coded as 1 if loss carryforward (TLCF) is positive for year t-1, and 0 otherwise.
ΔNOL	Change in loss carryforward (TLCF) is divided by lagged total assets. Missing values of change in loss carryforward are set to 0.
BID-ASK	The average of daily closing bid-ask spreads scaled by the midpoint calculated over the fiscal year.
ILLIQUIDITY	Amihud's (2002) illiquidity ratio is measured by taking an average of absolute daily stock return divided by trading volume.
SOFT INFO	The first principal component of a borrowing firm's intangible assets and R&D, both scaled by its lagged total assets (e.g., Lo, 2014; Chen and Vashishtha, 2017). The information of a borrower is more likely to be soft if it has more intangible assets and R&D.
LEND REL INTENSITY	Lending relationship intensity is measured as the number of loans by bank m to borrower i in the last 5 years divided by the total number of loans by borrower i in last 5 years (Bharath et al., 2019).
CONSTRAINED	The Kaplan and Zingales's (1997) KZ index is computed as −1.002×Cash flow/K+0.283×Tobin's Q+3.139×Leverage–39.368×Dividends/K–1.315×Cash holdings/K, where Cash flow is the sum of income before extraordinary items and depreciation; K is the beginning-of-year capital defined as net property, plant & equipment; Tobin's Q is computed as the sum of total assets and the market value of equity less the sum of the book value of equity and deferred taxes, all divided by total assets; Leverage is the sum of long-term debt and debt in current liabilities, divided by the sum of long-term debt, debt in current liabilities and total stockholders' equity; and Dividends is the sum of common and preferred dividends. Cash holdings is the cash and short-term investments.
GOVERNANCE	Ratio of the number of independent directors to the number of total directors of a firm.
Panel D. Bank-level variables	
BRANCHES	The number of pre-merger branches of the merging bank.
REPUTATION	Dummy variable for whether the merging bank is ranked in the Fortune 500 annual ranking of America's largest corporations before the merger.
BANK SIZE	Natural logarithm of the book value of total assets (BHCK2170).
BANK ROA	Ratio of income before extraordinary items (BHCK4300) to assets.
BANK NPL	Ratio of the sum of loans past due 90 days or more (BHCK5525) and nonaccrual loans (BHCK5526) to assets.
BANK NON-INT INCOME	Ratio of noninterest income (BHCK4079) to the sum of interest income (BHCK4107) and noninterest income (BHCK4079).
BANK COMPETITION	The Herfindahl-Hirschman Index of banks, which is the sum of squares of the market shares of the banks in the banking sector.
Panel E. Loan contract variables	
COVENANTS	The number of covenants in the loan contract.
MATURITY	The remaining time to maturity of the existing loan contract.
Panel F. State-level variables	
GDPGR	The GDP growth rate of the state where the firm is headquartered.

PIGR	The personal income growth rate of the state where the firm is headquartered.
UMGR	The unemployment growth rate of the state where the firm is headquartered.
CAPXGR	The total capital expenditure growth rate of the state where the firm is headquartered. The growth rate for capital expenditure is computed by summing capital expenditure (CAPX) for all firms headquartered in a state.
RDGR	The total R&D growth rate where the firm is headquartered. Growth rate for R&D is computed by summing the research and development expenditure (XRD) for all the firms headquartered in a state.
AWMTB	The asset-weighted market-to-book ratio where the firm is headquartered. The asset-weighted market-to-book ratio is calculated by taking the average market-to-book ratio for all the firms headquartered in a state.

Appendix B. Diagnostic tests for the propensity score matching approach

This table reports the diagnostic test results for the propensity score matching presented in Panel C of Table 3. We report the univariate comparisons between treated firms and their matched control firms. Detailed definitions of variables are provided in Appendix A.

Variables	Treated firms	Matched control firms	Differences	t-statistics
SIZE	6.270	6.233	0.037	0.410
LEV	0.291	0.288	0.003	0.260
ROE	0.211	0.206	0.005	0.230
MTB	2.789	2.649	0.140	0.560
INTAN	0.192	0.184	0.008	0.720
R&D	0.022	0.022	0.000	0.210
AQC	0.027	0.031	-0.004	-1.290
FIRM RISK	0.030	0.030	0.000	-0.310
BIG4	0.787	0.776	0.011	0.580
INSTOWN	0.395	0.402	-0.007	-0.440
FI	0.009	0.010	-0.001	-0.320
EQINC	0.000	0.001	-0.001	-1.490
NOL	0.358	0.347	0.011	0.480
ΔNOL	0.003	0.006	-0.003	-0.340

Online Appendix for Manuscript

"The Impact of Bank Mergers on Corporate Tax Aggressiveness"

Table OA1. Callaway and Sant'Anna (2021): The effects of bank mergers on corporate tax aggressiveness

This table presents the robustness of our baseline findings by using the alternative difference-in-differences estimators as demonstrated in Callaway and Sant'Anna (2021). Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is book-tax difference, which captures the difference between financial statement income and taxable income (Manzon and Plesko, 2002). *DDBTD* is the adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management (Desai and Dharmapala, 2006). *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. Panel A reports the baseline results where the main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Panel B presents the estimation results of dynamic treatment analysis. $MERGER^{-1}$, $MERGER^{0}$, $MERGER^{+1}$, and $MERGER^{2+}$ are dummy variables equal to one if it is one year prior, the current year, one year after, and two or more years after the announcement of bank merger, respectively. Panel C shows the estimation results based on the matched sample over the period of three years before and after the bank merger, excluding the treatment year. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. The effects of bank mergers on borrowers' tax aggressiveness

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.017***	-0.019***	-0.022***	-0.058**
	(-2.840)	(-3.130)	(-3.680)	(-2.380)

Panel B. The effects of bank mergers on borrowers' tax aggressiveness: dynamic treatment analysis

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
$MERGER^{-1}$	0.009	0.004	0.005	-0.010
	(1.350)	(0.650)	(1.080)	(-0.180)
$MERGER^{0}$	-0.005	-0.002	-0.003	-0.007
	(-0.890)	(-0.460)	(-0.720)	(-0.150)
$MERGER^{+1}$	-0.011*	-0.010**	-0.007**	-0.144
	(-1.670)	(-2.520)	(-2.240)	(-1.01)
$MERGER^{2}$	-0.046***	-0.016***	-0.015***	-0.465***
	(-2.970)	(-2.670)	(-3.320)	(-2.610)

Panel C. The effects of bank mergers on borrowers' tax aggressiveness: matched sample analysis

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.018**	-0.038**	-0.015***	-0.537***
	(-2.180)	(-2.210)	(-2.630)	(-2.660)

Table OA2. Callaway and Sant'Anna (2021): Placebo test using "pseudo-event"

In this table, we report the effects of bank mergers borrowers' tax aggressiveness using a "pseudo-event" three years before the actual merger event based on the robust estimates proposed by Callaway and Sant'Anna (2021). Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. We use the same treated and control borrowers identified in our baseline estimation and repeat the regression analysis based on the "pseudo-event" year. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	0.035	-0.008	-0.008	-0.020
	(0.970)	(-1.310)	(-1.110)	(-0.700)

Table OA3. Callaway and Sant'Anna (2021): The cross-sectional analysis of the impact of bank mergers on corporate tax aggressiveness

In this table, we explore cross-sectional variations in the effect of bank mergers Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. We partition the treatment group into subsamples as indicated by the partitioning variables and use the entire control group as a benchmark in the subsample analysis. We do not partition the control group as the partitioning variable is only meaningful for borrowers when their banks engage in mergers. All partitioning variables are constructed in the last fiscal year before the bank merger. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Panels A to E show the evidence on cross-sectional variations in the effect of bank mergers conditioned on the borrowers' information environments. *BID-ASK* is calculated as the average of daily closing bid-ask spreads scaled by the midpoint calculated over the fiscal year. *HIGH* (*LOW*) *BID-ASK* is an indicator variable for whether the borrower's bid-ask spread is above (below) the sample median prior to the merger. *ILLIQUIDITY* is measured by taking the average of absolute daily stock return divided by trading volume. *HIGH* (*LOW*) *ILLIQUIDITY* is an indicator variable for whether the borrower's illiquidity ratio is above (below) the sample median prior to the merger. *GOVERNANCE* is the board independence, which is calculated as the ratio between the number of independent directors and the number of total directors in borrowing firms. *STRONG* (*WEAK*) *GOVERNANCE* is an indicator variable for whether the borrower's board independence is above (below) the sample median prior to the merger. SOFT INFO is measured as the first principal component of a borrowing firm's intangible assets and R&D, both scaled by its lagged total assets (e.g., Lo, 2014; Chen and Vashishtha, 2017). The information of a borrowing firm is more likely to be soft if it has more intangible assets and R&D. *MORE* (*LESS*) *SOFT INFO* is an indicator variable for whether the borrower's *SOFT INFO* is above (below) the sample median before the merger. *LEND REL INTENSITY* is the number of loans by a specific bank to a specific borrower in the last five years divided by the total number of loans by the borrower over the last five years (e.g., Bharath et al., 2019). *HIGH* (*LOW*) *LEND REL INTENSITY* is an indicator variable for whether the borrower's *LEND REL INTENSITY* is above (below) the sample median before the merger. Panels F and G present the evidence of cross-sectional variations in the effect of bank mergers conditioned on the borrower's need for credit. *MATURITY* is the remaining time to maturity of the existing loan contract. *LONG* (*SHORT*) *MATURITY* is an indicator variable for whether the remaining maturity of the loan contract is above (below) the sample median before the merger. *CONSTRAINED* is measured based on the KZ index by Kaplan and Zingales (1997). *MORE* (*LESS*) *CONSTRAINED* is an indicator variable for whether the borrower's KZ index is above (below) the sample median prior to the merger. Panels H to J present the evidence of cross-sectional variations in the effect of bank mergers conditioned on the bank monitoring. *COVENANTS* is the number of covenants in the loan contract prior to the merger. *MORE* (*FEWER*) *COVENANTS* is an indicator variable for whether the number of covenants in the loan contract is above (below) the sample median. *REPUTATION* is the pre-merger reputation of the bank. *HIGH* (*LOW*) *REPUTATION* is an indicator variable for whether the merging bank is ranked (not ranked) in the Fortune 500 annual ranking of America's largest corporations before the merger (e.g., Ahn and Choi, 2009). *BRANCHES* is the pre-merger number of branches for the merging bank. *MORE* (*FEWER*) *BRANCHES* is an indicator variable for whether the number of the merging bank's branches is above (below) the sample median before the merger. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. The borrower's bid-ask spread (*BID-ASK*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH BID-ASK	-0.017**	-0.012***	-0.013***	-0.203***
	(-2.220)	(-2.610)	(-2.710)	(-3.220)
MERGER×LOW BID-ASK	-0.001	0.004	0.005	0.215
	(-0.080)	(0.780)	(0.710)	(1.060)

Panel B. The borrower's illiquidity ratio (*ILLIQUIDITY*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH ILLIQUIDITY	-0.044***	-0.010**	-0.010***	-0.212***
	(-2.900)	(-2.530)	(-3.350)	(-3.490)
MERGER×LOW ILLIQUIDITY	0.007	0.000	-0.001	0.215

	(0.560)	(0.050)	(-0.150)	(0.910)
Panel C. The borrower's board independence (*GOVERNANCE*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×STRONG GOVERNANCE	-0.009	-0.003	0.000	0.045
	(-0.630)	(-0.410)	(0.030)	(0.410)
MERGER×WEAK GOVERNANCE	-0.028***	-0.007***	-0.007***	-0.244**
	(-2.980)	(-2.840)	(-4.500)	(-2.460)
Panel D. The borrower's soft information (*SOFT INFO*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE SOFT INFORMATION	-0.047***	-0.036**	-0.024**	-0.373***
	(-3.670)	(-2.000)	(-2.090)	(-3.130)
MERGER×LESS SOFT INFORMATION	0.010	0.014	0.014	0.032
	(0.710)	(0.750)	(0.670)	(0.250)
Panel E. The borrower's lending relationship intensity (*LEND REL INTENSITY*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×HIGH LEND REL INTENSITY	-0.024***	-0.013**	-0.011**	-0.179***
	(-3.140)	(-2.010)	(-2.090)	(-3.250)
MERGER×LOW LEND REL INTENSITY	0.013	0.003	0.004	0.018
	(0.740)	(0.240)	(0.550)	(0.080)
Panel F. The borrower's remaining maturity of the loan (*MATURITY*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×LONG MATURITY	-0.007	-0.005	-0.006	-0.068
	(-0.570)	(-1.000)	(-1.060)	(-0.370)
MERGER×SHORT MATURITY	-0.009***	-0.015***	-0.040***	-0.159***
	(-3.400)	(-2.790)	(-3.130)	(-2.940)
Panel G. The borrower's financial constraints (*CONSTRAINED*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE CONSTRAINED	-0.029***	-0.018***	-0.020***	-0.324**
	(-2.720)	(--2.780)	(-2.890)	(-2.040)
MERGER×LESS CONSTRAINED	-0.005	-0.002	-0.004	0.166
	(-0.320)	(-0.320)	(-0.640)	(0.910)
Panel H. Bank loan covenants (*COVENANTS*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE COVENANTS	-0.007*	-0.005**	-0.007***	-0.155**
	(-1.880)	(-2.340)	(-2.770)	(-2.070)
MERGER×FEWER COVENANTS	-0.004	-0.004	-0.003	0.011
	(-0.470)	(-0.500)	(-0.390)	(0.060)
Panel I. Bank reputation (*REPUTATION*)				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)

MERGER×HIGH REPUTATION	-0.023***	-0.010***	-0.008***	-0.090**
	(-3.360)	(-3.120)	(-2.760)	(-1.990)
MERGER×LOW REPUTATION	-0.022	0.002	0.008	0.120
	(-1.300)	(0.310)	(0.960)	(0.670)

Panel J. Bank branches (*BRANCHES*)

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER×MORE BRANCHES	-0.014	0.004	-0.003	-0.029
	(-0.980)	(0.530)	(-0.490)	(-0.320)
MERGER×FEWER BRANCHES	-0.033***	-0.011***	-0.010***	-0.136***
	(-4.270)	(-3.110)	(-3.460)	(-2.990)

Table OA4. Callaway and Sant'Anna (2021): Alternative measures of tax aggressiveness

This table presents the robustness of our baseline findings by using several additional measures of tax aggressiveness based on the alternative difference-in-differences estimators as demonstrated in Callaway and Sant'Anna (2021). Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. *CURRENT_ETR* is the current effective tax rate, which is calculated as the difference between income tax expenses (TXT) and deferred tax expense (TXDI) divided by the difference between pre-tax book income (PI) and special items (SPI) (e.g., Armstrong et al., 2012; Cheng et al., 2012; Hope et al., 2013). *CURRENT_ETR* is set to missing if the denominator is 0 or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CURRENT_ETR* is associated with more aggressive tax avoidance. *PERM_DIFF* is the permanent book-tax differences based on Frank et al. (2009) and Kim et al. (2011). *DTAX* is the discretionary permanent book-tax differences based on Frank et al. (2009). Similar to previous studies such as Kim et al. (2011), Rego and Wilson (2012), and Henry and Sansing (2014), *BTD* is the total book-tax difference, *P_UTB* is the predicated value of unrecognized tax benefits, and *CTD* is the cash tax differential. The main variable of interest across all panels in this table is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CURRENT_ETR	PERM_DIFF	DTAX	BTD	P_UTB	CTD
	(1)	(2)	(3)	(4)	(5)	(6)
MERGER	-0.029***	-0.094***	-0.383***	-0.048***	-0.027***	-0.006**
	(-2.620)	(-2.710)	(-5.660)	(-3.730)	(-7.520)	(-2.050)

Table OA5. Callaway and Sant'Anna (2021): Do bank characteristics matter?

In this table, we examine whether our baseline findings are driven by certain specific bank characteristics rather than bank mergers per se based on the robust estimates proposed by Callaway and Sant'Anna (2021). Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. We follow Ellul and Yerramilli (2013) and add several pre-merger characteristics of merging banks, including size (*BANK SIZE*), performance (*BANK ROA*), total loans (*BANK LOANS*), percentage of non-performing loans (*BANK NPL*), non-interest income (*BANK NON-INT INCOME*), and the sum of squared shares of market shares of the banks in the banking sector (*BANK COMPETITION*), to our baseline regression model. Dependent variables are measures of corporate tax aggressiveness. *CASHETR* is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). *CASHETR* is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in *CASHETR* is associated with more aggressive tax avoidance. *MPBTD* is Manzon and Plesko's (2002) book-tax difference. *DDBTD* is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. *SHELTER* is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of *MPBTD*, *DDBTD*, and *SHELTER* indicate greater tax aggressiveness. The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.019***	-0.037***	-0.016***	-0.885***
	(-2.930)	(-3.410)	(-2.800)	(-2.830)

Table OA6. Callaway and Sant'Anna (2021): Can local economic conditions explain our main findings?

In this table, we investigate whether local economic conditions may drive our baseline findings on the association between bank mergers and borrowers' tax aggressiveness based on the robust estimates proposed by Callaway and Sant'Anna (2021). Specifically, the table reports the average treatment effect on treated (ATT) estimators by addressing the potential concern that treatment effects are heterogeneous across treated groups and across time. Dependent variables are measures of corporate tax aggressiveness. CASHETR is the cash effective tax rate, which is calculated as cash tax paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI). CASHETR is set to missing if the denominator is zero or negative and is truncated to the range [0, 1]. We multiply this number by (-1) so that an increase in CASHETR is associated with more aggressive tax avoidance. MPBTD is Manzon and Plesko's (2002) book-tax difference. DDBTD is the Desai and Dharmapala's (2006) adjusted book-tax difference for earnings management by isolating the component of estimated book-tax difference that is due to earnings management. SHELTER is the tax shelter score which relies on Wilson (2009), Kim et al. (2011), and Balakrishnan et al. (2019). Higher values of MPBTD, DDBTD, and SHELTER indicate greater tax aggressiveness. In Panel A, we control for local economic conditions by adding several state-level measures to equation (1), including GDP growth rate (GDPGR), personal income growth rate (PIGR), unemployment growth rate (UMGR), total capital expenditure growth (CAPXGR), total R&D growth (RDGR), and asset-weighted market-to-book ratio (AWMTB). In Panel B, we adjust our baseline setting by establishing a sample that consists of observations in treatment and control groups that are from the same state and year. We then repeat the baseline regression analysis by further including the state-year interaction dummy, which ensures that the identification comes from within state-year variation. Panels C and D present regression results based on a propensity score matched sample in which each treatment borrower and matched control borrower is further required to be located in the same state or Metropolitan Statistical Area (MSA). In this specification, the matched treatment and control borrowers have similar characteristics, and thus they are likely to have similar responses to changes in local economic conditions (e.g., Smith and Todd, 2005; Chen and Vashishtha, 2017). The main variable of interest is *MERGER*, which is a dummy variable equal to one for all the borrower-bank-year observations after the bank merger, and zero otherwise. Definitions of all the variables are provided in Appendix RA. t-statistics are reported in parentheses. Standard errors are clustered at the borrower level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Additional state-level measures of local economic conditions				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.007***	-0.043***	-0.046***	-0.066**
	(-2.360)	(-3.740)	(-3.610)	(-1.990)
Panel B. State-year interaction dummies				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.011*	-0.025**	-0.024**	-0.825***
	(-1.680)	(-2.540)	(-2.300)	(-3.280)
Panel C. State-PSM sample				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.031**	-0.043***	-0.033**	-0.531***
	(-2.030)	(-2.880)	(-2.460)	(-2.700)
Panel D. MSA-PSM sample				
Variables	CASHETR	MPBTD	DDBTD	SHELTER
	(1)	(2)	(3)	(4)
MERGER	-0.018**	-0.049***	-0.012***	-0.315*
	(-2.180)	(-4.350)	(-2.980)	(-2.030)