

THE EFFECT OF SHAREHOLDER TAXES ON BANK RISK-TAKING

A Dissertation

by

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ABSTRACT

This study examines the effect of shareholders' personal taxes on bank risk-taking. Economic theory predicts that personal tax rates affect individual investment risk-taking through risk sharing with the government via loss offsets. I investigate this relation using a sample of S corporation bank holding companies to isolate the effect of shareholder-level taxes and plausibly exogenous changes in dominant shareholders' state income tax rates. I find that increases in shareholder tax rates are positively associated with bank risk-taking when shareholders can use loss offsets to share in risk with the government. This positive relation is concentrated in banks that have lower levels of capital, less external monitoring, few shareholder conflicts, and dominant shareholders who are also their bank's CEO. However, in better-capitalized banks with less external monitoring and few shareholder conflicts, increases in shareholder tax rates are negatively associated with bank risk-taking when shareholders cannot share in risk with the government. Overall, the results suggest that investor-level taxes play an important role in bank risk-taking decisions.

DEDICATION

To my grandmother, Anne, for always believing in me.

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1. INTRODUCTION

This study investigates the relation between shareholder taxes and bank risk-taking. In light of concerns that taxation may have inadvertently exacerbated the financial crisis (e.g., Keen et al. 2010; Slemrod 2009), a burgeoning stream of studies explores the effect of taxes on bank risk-taking (e.g., de Mooji et al. 2013; Gallemore et al. 2017; Schepens 2016). Yet, while these studies enhance our understanding of how corporate-level taxes affect bank risk-taking, an important issue absent from this discussion is the role personal taxes play in these decisions. This is a significant omission given that individual shareholders shape their bank's risk-taking decisions (e.g., Laeven and Levine 2009; Saunders et al. 1990) and economic theory that posits that personal taxes can lessen shareholders' costs of risk-taking through risk-sharing with the government via loss offsets (Domar and Musgrave 1944). Thus, the same individual tax rate change could have different effects on bank risk-taking depending on shareholders' ability to use loss offsets. Accordingly, understanding what role shareholders' personal taxes play in bank risk-taking decisions has important fiscal and public policy implications.

Studying this question is challenging, however, because the tax code generally provides individuals with few opportunities to share investment risk with the government to the extent prescribed by theory (i.e., with full loss offsets) (see Domar and Musgrave 1944; Langenmayr and Lester 2017). To overcome this issue, I exploit the unique tax characteristics of S corporation banks. Corporations that elect Subchapter S

status “pass-through” income, losses, and deductions to their individual shareholders who are then subject to tax only at the individual-level. Hence, this setting provides the potential for shareholder-level risk-sharing with the government via loss offsets and isolates individual-level taxes from corporate-level taxes. Additionally, because top tier bank holding companies (BHCs) file detailed ownership reports (FR Y-6, “Y-6” hereafter), this setting provides a rare opportunity to observe cross-sectional variation in shareholders’ personal tax rates and examine whether changes in these rates affect subsequent bank risk-taking.

I employ a difference-in-differences framework using first differences and state-by-year fixed effects based on the bank’s headquarter state (e.g., Ljungqvist et al. 2017). Importantly, this design mitigates the extent to which other contemporaneous bank-state economic conditions (e.g., concurrent corporate-level state tax rate changes or state-level investment opportunities) may influence my results. I focus on the dominant shareholder in each bank, as these individuals both affect firm financial policy (e.g., Cronqvist and Fahlenbrach 2008; Lin et al. 2012) and enjoy a greater degree of risk-sharing due to their greater ownership. I measure shareholders’ personal taxes by calculating changes in dominant shareholders’ maximum statutory state income tax rates based on their state of residence provided by the Y-6. In addition, I proxy for bank risk-taking using two measures: return on asset (ROA) volatility and Z-score (e.g., Houston et al. 2010; Laeven and Levine 2009; Mayberry et al. 2015). Specifically, ROA volatility captures the variance of returns to investment consistent with the risk construct in Domar and Musgrave (1944) and Z-score measures bank solvency risk. The vast majority of the

BHCs in my sample file unconsolidated (parent only) financial reports which restrict the breadth of my risk measures, so I match each BHC with its respective commercial bank(s) and examine changes in risk at the commercial bank-level. I also use coarsened exact matching (CEM) to ensure that treatment and control banks are similar on several observable dimensions (Iacus et al. 2012).

Theory suggests that the relation between shareholder taxes and risk-taking rests on shareholders' ability to share in risk with the government. For example, increases in shareholders' personal taxes may increase bank risk-taking to the extent shareholders can use loss offsets because, by allowing the investor to deduct his investment losses from his other income, loss offsets reduce the after-tax risk of his returns and function as a form of insurance for risk-taking (Domar and Musgrave 1944; Mossin 1968; Stiglitz 1969). As taxes increase, the value of this deduction increases, thereby incentivizing greater risk-taking. Without a loss offset, increases in shareholders' personal tax rates may decrease bank risk-taking because the government takes a greater share of the investor's profits, thereby reducing the marginal return to investment. I test the effect of shareholder taxes on bank risk-taking by using the passive activity loss limitations to classify shareholders according to their ability to use loss offsets.¹ To the extent that investors' personal income tax rates affect risk-taking decisions as theory predicts, I

¹ The passive activity loss limitations are complex, but generally allow shareholders to deduct their share of the firm's losses to the extent the shareholder either materially participates in the firm or does not materially participate in the firm but has investment income from other passive activities. I explain these rules and my classification in greater detail in Section 3.3.

expect increases in shareholders' personal tax rates to be positively (negatively) associated with bank risk-taking when shareholders can (cannot) use loss offsets.

As a baseline analysis, I first estimate regressions of changes in bank risk on shareholder tax rate increases, regardless of the shareholder's ability to use loss offsets, and tax rate decreases. I find a positive association between shareholder tax rate increases and subsequent year changes in ROA volatility and Z-score, but no evidence of a relation for tax rate decreases. To formally test my hypotheses, I next examine the association between shareholder tax rate changes and bank risk-taking after separately calculating tax rate increases for shareholders who can and cannot use loss offsets. I find a positive and significant relation between tax rate increases and ROA volatility and Z-score for shareholders able to use loss offsets. This implies that shareholder tax rate increases are associated with increased risk-taking when dominant shareholders can share in risk with the government. In terms of economic significance, a one standard deviation increase in the tax rate for a shareholder able to use loss offsets is associated with an increase in ROA volatility and Z-score of about 0.55 percent and 8.92 percent of each measure's mean, respectively. However, I find no evidence of a relation between bank risk-taking and either tax rate increases for shareholders who cannot use loss offsets or tax rate decreases.

These tests implicitly assume that shareholders have the ability to influence their banks' risk-taking decisions. I revisit this assumption by re-estimating my tests after separating tax rate increases for shareholders able to use loss offsets into those for CEOs versus all other non-CEO shareholders. For example, bank risk-taking may be more

responsive to changes in shareholder-CEOs' personal taxes because these individuals control voting power and manage the bank's operational decisions. However, despite not managing the bank's operational decisions, non-CEO shareholders may also use their large blocks of voting power to influence the bank's risk-taking decisions (Shleifer and Vishny 1997). I find a positive and significant relation between ROA volatility and Z-score and tax rate increases for shareholder-CEOs, but no evidence of relation for non-CEO shareholders, although differences in coefficients are not statistically significant. Thus, results are consistent with the positive relation between shareholder taxes and bank risk-taking being driven by shareholders who have both significant influence over the bank's operational decisions and the ability to share in losses with the government.

In cross-sectional analysis, I investigate whether the relation between increases in shareholders state tax rates and bank risk-taking varies with monitoring by external auditors (Allen et al. 2011; Barton et al. 2014; Thakor 2012) and shareholder conflicts and portfolio diversification (Jacob and Michaely 2017; Faccio et al. 2011; Parrino 2005). I find that the positive relation between shareholder tax rate increases and bank risk-taking is primarily concentrated in banks that have less capital and external monitoring, fewer shareholder conflicts, and a dominant shareholder who is also the bank's CEO. In addition, although I fail to find a relation between tax rate increases and bank risk-taking, on average, for shareholders who cannot use loss offsets, I find evidence of a negative relation for better-capitalized banks and those that have less external monitoring and fewer shareholder conflicts.

I acknowledge certain caveats with respect to the generalizability of my findings.

Specifically, because I focus on dominant shareholders of relatively small, closely-held banks, my findings may not generalize to settings with more diffuse ownership structures (e.g., publicly traded banks). In addition, given that the tax code prohibits shareholders of C corporations from offsetting corporate losses from ordinary income on their personal returns, my findings may not be descriptive of how shareholder taxes affect risk-taking in C corporations. Nevertheless, while my data have some limitations, they provide a rare opportunity to uncover new and important insights into an important and policy-relevant question.

This study makes three contributions. First, this study contributes to the literature on the role of taxes in financial institutions. Although a growing stream of studies explores the effect of corporate taxes on bank risk-taking (e.g., de Mooij et al. 2013; Gallemore et al. 2017; Schepens 2016), little attention has been paid to the role of bank owners' personal taxes in influencing these decisions. My findings suggest that increases in shareholders' personal tax rates have an economically significant effect on bank risk-taking, but the direction of this effect depends on shareholders' ability to share in risk with the government and their control over the banks' operational decisions. Moreover, my findings with respect to bank capitalization, shareholder conflicts, and external auditor monitoring suggest that the same individual-level tax rate changes may affect banks in drastically different ways depending on capital regulation, bank ownership structure, and voluntary external auditor requirements. This should be of particular interest to bank regulators and tax policy makers alike.

Second and relatedly, this study contributes to the literature on the determinants of bank risk-taking. While prior research establishes that certain shareholders play an important role in shaping their bank's risk-taking choices (e.g., Laeven and Levine 2009; Saunders et al. 1990), few studies consider how the personal financial incentives of these shareholders influence their decisions. My study fills this gap by examining shareholder-level income taxes, a pervasive financial incentive that applies to nearly *every* individual. In contrast to risk-taking incentives that apply to only one type of shareholder (e.g., CEO compensation in Chen et al. 2006), personal taxes provide a rare opportunity to observe how different owners' personal financial incentives affect bank risk. In doing so, my findings imply that interactive effects of ownership structure are not just limited to governance mechanisms within bank regulators' control (e.g., capital regulation in Laeven and Levine 2009), but also encompass owners' personal financial incentives set by external regulators (e.g., tax policy makers).

Third, I contribute to prior research on taxes and firm risk-taking more broadly. Specifically, my findings that the effect of shareholders' individual taxes on bank risk-taking depends on individual-level risk sharing with the government complements evidence in Langenmayr and Lester (2017), who find similar results with respect to corporate taxes and loss offset rules in non-financial firms. Thus, from a tax policy perspective, my findings suggest that restricting the ability of shareholders to use losses (e.g., through passive activity loss limitations) may have negative implications for firm risk-taking. While related work by Armstrong et al. (2019) also examines the relation between personal taxes and risk-taking, my study differs in that I focus on the effect of

shareholder-level taxes in banks and investigate how this relation varies with shareholder conflicts, portfolio diversification, bank capital, and external monitoring. I discuss these differences in greater detail in Section 2.

The remainder of this paper proceeds as follows. Section 2 reviews prior research and develops the hypotheses. Section 3 describes the setting, data, sample, and research design and Section 4 discusses the main results and cross-sectional analyses. Section 5 describes other analyses and Section 6 concludes.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1. Overview of Literature on Taxes and Risk-Taking

A long stream of research explores the relation between taxes and risk-taking. Early theoretical work on portfolio choice (e.g., Domar and Musgrave 1944; Mossin 1968; Stiglitz 1969) proposes that an increase in personal taxes encourages risk-averse investors to increase risk-taking if the government provides a full loss offset. In other words, by reducing investors' taxable income by the entire amount of the investment loss, a full loss offset effectively compensates investors for the reduction of returns caused by the increase in tax rates, thereby encouraging greater risk-taking.

Two recent studies build upon Domar and Musgrave's (1944) theory by examining how corporate tax rules affects firm risk-taking. For example, Langenmayr and Lester (2017) provide theoretical and empirical evidence that longer tax loss offset periods are associated with greater risk-taking. Further, Langenmayr and Lester (2017) find that taxes increase (weakly decrease) firm risk-taking when firms are able (unable) to use loss offsets, suggesting that risk-sharing with the government induces firms to take on greater risk, consistent with Domar and Musgrave 1944. In related work, Ljungqvist et al. (2017) use changes in U.S. corporate state taxes as plausibly exogenous shocks and find that increases in corporate tax rates are associated with reduced firm risk-taking. However, Ljungqvist et al. (2017) find that this negative effect is partially moderated by the ability of the firm to offset losses through tax loss carrybacks and carryforwards, consistent with evidence in Langenmayr and Lester (2017).

In addition to the literature on taxes and public firm risk-taking, several studies investigate the effect of taxes on bank risk-taking specifically, albeit from different perspectives. For example, Mayberry et al. (2015) find that S corporation banks engage in less risk-taking relative to C corporation banks, suggesting that tax-motivated organizational structures influence bank risk. Other work suggests that corporate taxes affect bank risk-taking through the effect of taxes on bank capital structure. Schepens (2016) finds that higher tax rates are associated with greater aggregate bank leverage, which in turn, is associated with a greater likelihood of financial crisis. In addition, Gallemore et al. (2017) argue that corporate taxes may directly affect bank risk-taking, but this relation varies with economic conditions. Gallemore et al. (2017) find that during economic expansions (recessions), corporate tax rate changes are associated with increases (decreases) in bank risk-taking but find no evidence of a relation on average.

While the research above suggests that corporate taxes affect firm risk-taking broadly, and to a more nuanced or indirect extent, bank risk-taking specifically, two recent studies suggest *personal* tax considerations may also be important. Yost (2018) finds a negative relation between CEO's unrealized capital gain tax burdens and firm risk-taking, suggesting that CEOs reduce firm risk-taking when they are overexposed to firm risk. In related work on the effect of CEOs' personal taxes on risk-taking in large, public firms, Armstrong et al. (2019) find that CEOs' taxes are positively associated with idiosyncratic risk, consistent with taxes reducing risk-averse CEOs' disincentive for risky investment. However, in firms where the CEO's economic incentives are aligned with shareholders (i.e., firms where the CEO has high delta), Armstrong et al. (2019)

find no evidence of a relation between CEOs' taxes and firm risk-taking.²

My study is similar to Armstrong et al. (2019) in that I also investigate the relation between individual-level income taxes and firm risk-taking. However, my study differs in that I focus on banks—which substantially differ from non-financial firms in terms of risk-taking incentives, governance models, and moral hazard issues (see Laeven 2013)—and risk-sharing through the operation of the loss offset rules, rather than as a function of the progressivity of individual income taxes.³ In contrast to CEOs' personal taxes (e.g., Armstrong et al. 2019), which are unaffected by corporate losses, shareholders' personal taxes can lessen some of the cost of bank risk-taking borne by shareholders. In addition, I examine a variety of shareholder roles (e.g., CEOs and non-CEO executives and employees), and show how conflicts among a firm's shareholder base, shareholder diversification, bank capital, and external monitoring interact with shareholder taxes to affect bank risk-taking. Ultimately, I view my study as providing distinct, yet also complementary evidence to Armstrong et al. (2019).

² Theoretically, the effect of CEO delta is ambiguous, as it may incentivize or discourage risk-taking (e.g., see Armstrong et al. 2013). However, Armstrong et al. (2019) find theoretical and empirical evidence that the negative effect dominates.

³ Specifically, CEOs in Armstrong et al. (2019) are limited in their ability to deduct losses because they are employees of the firm (and corporate losses are not deductible by employees). However, as Langenmayr and Lester (2017) show, in the absence of loss offsets, increases in tax rates increase risk-taking only if the CEO is very risk averse (see footnote 8 on page 13 of Langenmayr and Lester (2017)). Given the difficulty in empirically measuring risk aversion, I only assume shareholders are risk-averse in my main tests, rather than imposing restrictions on shareholders' specific level of risk aversion.

2.2. Hypothesis Development

As key equity suppliers and residual claimants of the bank, shareholders have both economic incentives to encourage risk-taking that maximizes bank value and the ability to align bank policy with their incentives through monitoring, managing the bank, or controlling significant voting power (e.g., Laeven and Levine 2009; Saunders et al. 1990; Shleifer and Vishny 1997). For example, by managing the bank's day-to-day operations, shareholders who also serve as top executives can align the operational decisions of the bank with their own incentives (Jensen and Meckling 1976; Saunders et al. 1990). However, even without a formal role in the organization, shareholders may affect bank decision-making by voting on changes to the bank's structure or policies, through discussions with management (Cronqvist and Fahlenbrach 2008), or by influencing the agenda of and topics discussed during board meetings (Chase 2019). Collectively, this suggests that shareholders have the *ability* to change their bank's risk-taking decisions in response to their personal tax incentives.

However, whether shareholders use their influence to change bank risk-taking in response to changes in their personal taxes is unclear, *ex ante*. On one hand, to the extent the shareholder can fully deduct losses from his income, an increase in individual income tax rates may incentivize him to increase firm risk (Domar and Musgrave 1944). In other words, because the government allows the shareholder to deduct losses resulting from risky investment directly from his income, the shareholder can reduce his current or future tax liability by the product of the loss and the tax rate. When tax rates increase, the amount of this deduction increases. This reduces the after-tax risk of the investor's

returns and results in the government effectively becoming a partner in the risky investment by sharing in both gains and losses with the investor (Domar and Musgrave 1944; Langenmayr and Lester 2017).⁴ Thus, to the extent shareholder can offset losses, increases in shareholders' personal taxes may be positively associated with bank risk-taking. I state this in the alternative, as follows:

H1a: Shareholders' personal tax rate increases are positively associated with bank risk-taking to the extent shareholders can offset losses.

On the other hand, if the shareholder cannot deduct losses, risk sharing with the government is reduced (Domar and Musgrave 1944). In this case, when taxes increase, the government will take a greater share of the shareholder's income, but will not share in the losses arising from risky investment (Langenmayr and Lester 2017).⁵ Consequently, a shareholder may reduce bank risk-taking to minimize the reduction in his after-tax returns. Thus, if shareholders are limited in their ability to deduct losses, the relation between their personal income taxes and bank risk-taking may be negative. I state this in the alternative, as follows:

H1b: Shareholders' personal tax rate increases are negatively associated with bank risk-taking to the extent shareholders cannot offset losses.

However, there are several reasons why shareholder taxes may have little effect on bank risk-taking. First, coordination issues among shareholders or heterogeneity in shareholders' tax preferences may create conflicts of interest between shareholders.

⁴ Specifically, Domar and Musgrave (1944) posit that without a loss offset, a tax rate increase reduces the yield of the investment, but has no effect on the degree of risk, thereby decreasing the compensation per unit of risk-taking. In contrast, a tax rate increase with a full loss offset reduces both the yield and the risk of the investment by the tax rate and therefore does not affect the return per unit of risk-taking.

⁵ As Langenmayr and Lester (2017) note, the effect of increases in taxes on risk-taking when there is no loss offset depends on the level of risk aversion.

This, in turn, may mute a firm's sensitivity to changes in shareholder taxes (Jacob and Michaely 2017; Shleifer and Vishny 1986). Second, shareholders' ability to diversify their portfolios lessens their exposure to firm-specific firm, and consequently, their sensitivity to personal taxes (Yost 2018). Third, bank capital plays a key role in supporting the bank's risk-taking appetite (Matten 2000). Thus, to the extent certain banks (e.g., S corporations) are limited in their ability to raise external capital and take on greater risk (Mayberry et al. 2015), this may reduce the extent to which the bank may increase risk-taking in response to their shareholders' personal taxes. Finally, monitoring mechanisms such as director stock ownership guidelines (e.g., Bhagat and Bolton 2019) may potentially constrain bank risk-taking not in the best interest of shareholders.

3. RESEARCH DESIGN

3.1. Setting

I exploit the unique tax characteristics and rich ownership data available for BHCs organized as S corporations, as this setting provides several empirical advantages. S corporations are corporations that elect to be treated as flow-through entities under Subchapter S of the IRC.⁶ In contrast to C corporations, which are taxed first on profits at the corporate level and then again at the shareholder-level once these profits are distributed, S corporations effectively escape double taxation by “passing through” income, losses, deductions, and credits to their shareholders, who are then subject to tax only at individual ordinary income rates. Thus, by removing the influence of double taxation, the S corporation setting mitigates the extent to which my results may be attributable to corporate-level tax policy changes, rather than shareholder-level taxes.⁷ In addition, because shareholders of S corporations can generally also use their pro-rata share of the corporation’s losses to offset other personal income, subject to certain limitations, the S corporation setting more closely approximates a full loss offset, an important component in the theoretical relation between personal taxes and risk-taking.

This setting also offers a rare opportunity to observe cross-sectional variation in shareholders’ states of residence, tax-status, and personal income tax rates. Specifically,

⁶ To qualify for the S corporation election, a corporation must be incorporated domestically, and have only one class of stock, only individual and tax-exempt shareholders (e.g., trusts, estates, and employee stock ownership plans), and a maximum of 100 shareholders.

⁷ In some instances, states may also tax S corporations (e.g., franchise taxes). However, the inclusion of headquarters state by year fixed effects in my analyses largely mitigates the influence of contemporaneous state-level S corporation-specific taxes.

all top-tier BHCs file FR Y-6 with the Federal Reserve each year. This form contains the name, city, state, and percentage of voting ownership in the BHC for shareholders who own five percent or more of any class of voting securities. In addition, the Y-6 contains each insider's name, city, state, principal occupation, and percentage of voting ownership and role in the BHC, bank subsidiaries, and other businesses.^{8,9} Thus, this setting enables me to match shareholders to their respective banks and investigate how changes in shareholder tax rates affect banks' subsequent risk-taking decisions. See Appendix B for an example of a Y-6.

3.2. Data and Sample

I use bank financial data from the Federal Reserve's dataset of Reports of Condition and Income (call reports), Consolidated Financial Statements for Holding Companies (FR Y-9C), Parent Only Financial Statements for Small Holding Companies (FR Y-9SP), ownership and insider information from Y-6s provided by SNL, state tax rate and S election conformity information from CCH's *State Tax Handbook* and the Tax Foundation, county-level unemployment and CPI inflation adjustment data from the Bureau of Labor Statistics (BLS), county-level population, wages, and personal income data from the Bureau of Economic Analysis (BEA), and compensation data from PayScale.com and Indeed.com. To derive my sample, I begin with all Y-6s in the SNL database from 2002 through 2014. My sample begins in 2002 because this is the first

⁸ For purposes of the Y-6, an insider is a principal securities holder, director, trustee, partner, executive officer, or person with similar functions. A principal securities holder is an individual who directly or indirectly controls 10 percent or more of the voting power of a member bank or company.

⁹ Specifically, the Y-6 requires that the BHC provide the name and job title for any company for which an insider is a director, trustee, partner, or executive officer and the name and ownership for any company in which an insider holds 25 percent or more of the voting securities.

year for which SNL has Y-6s widely available in its database and ends in 2014 to allow sufficient time for a risk-taking response. The Y-6 is not machine-readable, so I hand-collect a stratified random sample of Y-6s using the Cochran (1977) formula to determine the optimal sample size for my risk measures, similar to Xie (2016).^{10, 11}

To maximize the power of the risk measures available for my analyses, I match each Y-6 with call report data for its respective commercial bank(s) and examine risk-taking at the bank-level.¹² I require all bank-year observations have data necessary for my control variables and correspond to an S corporation BHC that does not convert to a C corporation in later years. To mitigate the effects of bank acquisitions on my results, I require all bank-year observations have quarterly asset growth not exceeding 10 percent in that year (Cornett et al. 2011). I also eliminate bank-year observations where the bank does not appear to have a CEO per its Y-6, dominant shareholder information is redacted, or the dominant shareholder lives in a state that does not conform to the

¹⁰ The Cochran formula is computed as $n = \frac{t^2 PQ/d^2}{1 + (\frac{t^2 PQ}{d^2} - 1)/N}$, where n is the sample size, t is the t-value for a particular confidence level, P is the bank-year-level average of each risk measure based on all banks with a top-tier S corporation BHC in a given year, $Q = 1 - P$, d is the margin of error, and N is the total number of banks with a top-tier S corporation BHC in a given year. I set t equal to 1.96 and d equal to 0.05, such that for each bank-year, I am 95% confident that the value of each risk measure in the stratified random sample will differ from the mean risk measure for the population of banks with top-tier S corporation BHCs in a given year by more than 0.05 less than 5% of the time. I employ two measures of bank risk-taking, so I estimate the Cochran formula for each risk measure and use the highest sample size computed for each year (Cochran 1977, 81). I use each bank-year as a stratum.

¹¹ Specifically, I use a combination of ABBYY Flexi-Capture, Python, and manual hand-collection to transform Items 3 and 4 from the Y-6s into machine readable data. Some information does not tie between Item 3 and Item 4, so I manually inspect and reconcile all hand-collected data. As some banks manually redact certain information on the Y-6s, I use Y-6s in nearby years to ensure the data is complete. However, in rare instances that key information necessary for my analyses is missing from Item 3 and Item 4, I exclude these Y-6s from my sample.

¹² Approximately 85 percent of my sample files FR Y-9SP, rather than FR Y-9C. As a condensed version of the Y-9C, FR Y-9SP provides limited financial information for the parent entity only. Thus, examining changes in risk at the BHC-level significantly reduces the number of risk measures available for my analyses.

Federal passive loss rules and does not either recognize the Federal S election or provide a state-specific S election.¹³ Finally, I drop any bank-year observations where the dominant shareholder changes or changes roles (e.g., is the CEO and chairman of the BHC in one year and only the chairman the following year), or the dominant shareholder moves to a different state. My final sample consists of 3,321 bank-years from 2003 through 2014, corresponding to 683 unique banks, 584 unique BHCs, and 650 unique dominant shareholders.

3.3. Measure of Shareholder Tax Rate Changes

I focus on dominant shareholders when computing changes in shareholder tax rates because these individuals both enjoy a greater degree of risk-sharing due to their higher ownership and have economically significant effects on firm financial policy (e.g., Cronqvist and Fahlenbrach 2008; Lin et al. 2012). I identify the dominant shareholder in each bank using voting power listed on the Y-6.¹⁴ As a large portion of my sample has family ownership, I follow Anderson and Reeb (2003) and compute the total ownership for all members of the family. Because the overwhelming majority of banks do not identify familial relations, I utilize bank websites, local newspaper articles, and other public information searches to determine relations between bank owners. If two or

¹³ Subsidiary banks may also elect S corporation status provided they satisfy certain requirements (e.g., the subsidiary is 100 percent owned by BHC). In general, almost all BHCs in my sample also elect S corporation status for their subsidiaries. Nonetheless, because certain tax rules concerning flow-through of the subsidiary bank's assets, liabilities, income, and deductions differ for S corporation BHCs with C corporation subsidiaries relative to S corporation BHCs with qualified subchapter-S subsidiaries, I re-estimate my analyses after excluding the former and obtain similar results (untabulated).

¹⁴ Although S corporations are prohibited from having more than one class of stock, they can issue stocks with different voting rights. To my knowledge, no bank in my sample has a class of stock with different voting rights. Thus, owners' voting rights should also equal their cash flow rights for banks in my sample.

more owners have the most voting power in the BHC, I assume that the dominant owner is the one with the highest role, using the *2017 Robert Half Salary Guide for Accounting and Finance* to rank each role.

To measure dominant shareholders' personal tax rates, I hand-collect maximum statutory state tax rates on ordinary income from CCH's *State Tax Handbook* and the Tax Foundation.¹⁵ Using each shareholder's state of residence listed on the Y-6 and a filing status of married filing jointly, I calculate changes in each shareholder's tax rate, and classify these changes as increases or decreases.¹⁶ To the extent that the dominant shareholder is non-taxable for federal tax purposes (e.g., a foundation), I compute these owners' tax rates using the state rate, if any, applicable to each type of entity. Thus, shareholder taxes vary cross-sectionally based on shareholders' tax status and state of residence, and temporally with plausibly exogenous changes in these rates over my sample period.

¹⁵ I use statutory tax rates because recent survey evidence suggests that corporate executives use statutory rather than marginal tax rates (Graham et al. 2017). In addition, although many of the top tax brackets for shareholders in my sample correspond to relatively low taxable income (e.g., Illinois, Iowa, and Missouri), in Appendix B, I validate that the maximum statutory state income tax rate is largely representative of shareholders in my sample.

¹⁶ FR Y-6 requires that the bank list each shareholder's or insider's state, but does not specify whether this refers to the state of residence or the state of employment. I assume this is the shareholder's state of residence for two reasons. First, where the shareholder lives in the same state as the bank, the difference would be negligible. However, in cases where the shareholder lives in a different state than the bank, typically these shareholders' states are several states away from where the bank is headquartered and in states where the bank does not have any branches (e.g., for a bank headquartered in Illinois, a shareholder may live in Florida). Second, I randomly sample the Y-6s that list their shareholders' full addresses and use Google Maps to verify that these addresses correspond to personal residences, rather than the bank. As almost all of these addresses correspond to homes and apartment complexes, treating the state listed on the Y-6 as the shareholder's state of residence appears to be a reasonable assumption.

3.4. Measures of Bank Risk-Taking

I proxy for bank risk-taking using two measures commonly used in prior research: return on asset volatility (*ROAV*) and Z-score (*ZSCORE*) (e.g., Houston et al. 2010; Laeven and Levine 2009; Mayberry et al. 2015). To capture the volatility of accounting earnings to investment consistent with the risk construct in Domar and Musgrave (1944), I use return on asset volatility (*ROAV*), computed as the natural logarithm of the standard deviation of seasonally adjusted quarterly pre-tax ROA. As a measure of bank solvency risk and distance to default, Z-score is computed as the natural logarithm of the sum of average return on assets (*ROA*) and average Tier 1 capital, scaled by *ROAV* and multiplied by negative one. I measure both measures over the four quarters in year t (e.g., Bouwman and Malmendier 2015; Shim 2013).¹⁷ Higher (lower) values of *ROAV* and *ZSCORE* suggest greater (less) risk-taking, respectively.

3.5. Empirical Model

To estimate the effect of shareholder taxes on banks' risk-taking choices, I employ a difference-in-differences design using staggered changes in shareholder state income taxes, similar to the approach used in prior research (e.g., Heider and Ljungqvist 2015; Ljungqvist et al. 2017). My baseline regression is as follows:

¹⁷ Prior research (e.g., Berger et al. 2017; Ljungqvist et al. 2017; Yost 2018) calculates ROA volatility using quarterly data over a three-year period from t to $t+2$. However, because many banks in my sample experience consecutive shareholder tax rate changes within the three-year period from t to $t+2$ and because sample banks elect to become S corporations at different points in time, I use an annual measure to mitigate the influence of multiple-year tax rate changes and the possibility that changes in organization structure affect the construction of my measures. Consistent with multi-year tax rate changes or timing differences in S corporation conversions inducing noise, I find no evidence that changes in ROA volatility or Z-score are associated with shareholder tax rate increases or decreases when I compute these measures over eight- or 12-month periods (untabulated).

$$\Delta RISK_{it+1} = \beta_0 + \beta_1 INCREASE_{it} + \beta_2 DECREASE_{it} + \beta_k \Delta CONTROLS_{it} + STATE*YEAR FE + \varepsilon_{it}, \quad (1)$$

where subscripts i and t represent banks and years, respectively, $\Delta RISK$ refers to changes in the risk-taking measures described above (first difference), $INCREASE$ ($DECREASE$) represents increases (decreases) in shareholders' maximum state statutory income tax rates, and $STATE*YEAR FE$ is based on the state of the bank's headquarters and removes time-varying state economic shocks by comparing treatment and control banks in the same state at the same point in time (second difference).

Importantly, this design aids a causal interpretation by identifying plausible counterfactuals. That is, under certain identifying assumptions, this design enables me to compare risk changes of banks whose shareholders experience a tax rate change to risk changes of banks in the same state and year whose shareholders do not experience a tax rate change. To illustrate my research design, assume two banks are both headquartered in Iowa and the dominant shareholder of one bank lives in Iowa while the dominant shareholder of the other bank lives in Minnesota. In 2013, Minnesota increased its individual income tax rate from 7.85 percent to 9.85 percent. My research design compares the subsequent risk change from 2013 to 2014 for the bank whose shareholder lives in Minnesota with contemporaneous risk changes for the bank whose shareholder lives in Iowa. Thus, by holding the state of the bank's headquarters constant, this design also mitigates the extent to which other contemporaneous bank-state economic conditions (e.g., concurrent state-level taxes or state-specific investment opportunities) may influence my results.

Theory suggests that the relation between personal taxes and risk-taking depends upon shareholders' ability to use losses to offset other income (Domar and Musgrave 1944; Langenmayr and Lester 2017). Specific to my setting, shareholders can deduct their pro-rata share of the firm's losses from their other personal income if they satisfy three sequential tests: the basis limitations (IRC §1366), the "at risk" limitations (IRC §465), and the passive activity loss rules (IRC §469).¹⁸ Although I cannot observe whether shareholders meet the basis or at risk limitations, Y-6 information on shareholders' roles within the bank and outside ownership interests enables me to test my hypotheses by exploiting variation in loss offsets under the passive activity loss rules.

In general, a taxpayer's income falls into one of two mutually exclusive categories: active and passive. Active (passive) income arises from a trade or business in which the taxpayer materially participates (does not materially participate) on a regular, continuous, and substantial basis, respectively. Under the passive loss rules, a bank shareholder generally can offset other active income with bank losses if the shareholder either 1) materially participates in the bank or 2) does not materially participate but has income from other passive (non-bank) activities. Using Y-6 information, I classify

¹⁸ The basis limitation rules under §1366(d) require shareholders have a stock basis in excess of the amount of their pro-rata loss at the end of the tax year. Assuming this test is met, shareholders are then subject to the "at risk" limitations under IRC §465(b). That is, shareholders are allowed to deduct the loss only up to the amount of money and adjusted basis of property contributed to the S corporation by the shareholder and any amount loaned by the shareholder to the S corporation. Finally, under the passive activity loss rules of IRC §469, the shareholder must materially participate in the trade or business on a "regular, continuous, and substantial" basis (§469(h)(1)). To the extent the loss is disallowed under either the at-risk or the passive activity rules, the loss can be carried forward and deducted in a subsequent year when the shareholder meets both these tests (§465(a)(2); §469(b)).

shareholders as being able to use loss offsets if they either 1) work for the bank as executives, officers, or other employees or 2) do not hold a role or hold only a limited role within the bank, but have other passive investments outside of the bank. I consider all other shareholders unable to use loss offsets.^{19, 20} I separately calculate tax rate increases for shareholders who can use loss offsets (*INCREASE_OFFSET*) and those unable to use loss offsets (*INCREASE_NOOFFSET*). I also include tax rate decreases (*DECREASE*) to allow for possible asymmetry in the effect of shareholder taxes on bank risk-taking (e.g., Ljungqvist et al. 2017). I then estimate the following model:

$$\Delta RISK_{it+1} = \beta_0 + \beta_1 INCREASE_OFFSET_{it} + \beta_2 INCREASE_NOOFFSET_{it} + \beta_3 DECREASE_{it} + \beta_k \Delta CONTROLS_{it} + STATE * YEAR FE + \varepsilon_{it}, \quad (2)$$

Following prior research (e.g., Cantrell and Yust 2018), I also include a vector of bank-specific financial characteristics that may affect bank risk-taking. Specifically, I include bank size (*SIZE*), the square of bank size (*SIZE*²), and loan portfolio size (*LOANS*) to control for the possibility that banks with greater resources and different

¹⁹ IRC §469 does not formally define what constitutes material participation, but Reg. §1.469-5T provides seven tests to determine whether a taxpayer materially participates in a trade or business. This includes that the taxpayer participated in the business for more than 500 hours during the tax year or participated in the activity for more than 100 hours during the tax year and at least as much as any other individual. Thus, I consider all shareholders who only serve as a member of the board of directors or chairman of the board to be passively involved in the bank because these individuals generally spend approximately 250 hours a year in their duties (McCormick 2019), which, while over 100 hours, would likely not be at least as much as any other individual within the bank.

²⁰ Despite their lack of a formal role in the organization, shareholders who do not have the ability to use loss offsets still appear to have significant influence on the firm's business decisions. For example, the average dominant shareholder in my sample who does not work for the business controls approximately 40 percent of the bank (untabulated). In addition, many of these shareholders are also founders and/or retired executives or directors of the firm who have left the day-to-day operations of the bank to their children, but still have the ability to influence bank decisions. Conversations with a CFO of an S corporation bank whose dominant shareholder would not be able to use loss offsets in my sample support this assumption.

asset mixes have different risk-taking opportunities and *NPL* to capture realized economic losses in the bank's loan portfolio. I also control for bank performance by including the net interest margin on interest bearing assets (*NIM*). In addition, the Tier 1 capital ratio (*TIER1*) controls for bank capitalization. To control for the possibility that changes in the bank's governance structure may influence bank risk-taking (e.g., Pathan 2009), I include the number of directors on the board (*BDSIZE*) and an indicator for whether the CEO also serves as the chairman of the board (*CEOCHAIR*). I also control for any contemporaneous changes in the dominant shareholder's ownership (*SHOWN*), as large changes in ownership rights may affect shareholders' ability to influence their bank's risk-taking.

Although interacted state-by-year fixed effects largely control for state economic trends in a given year, I also include several county-level economic variables that may affect bank risk-taking at the local-level. This includes personal income per capita (*PERSINC*), unemployment (*UNEMP*) and the total population in the county (*TOTPOP*), all based on the county of the bank's headquarters. To mitigate the risk of outliers influencing the results, I winsorize continuous variables at the 1st and 99th percentiles. I cluster standard errors by dominant shareholder and use CEM in my tests to ensure that treatment and control banks are similar on several observable dimensions (e.g.,

Balsmeier et al. 2017; Gallemore et al. 2019; Iacus et al. 2012).²¹ Appendix A provides detailed variable definitions.

²¹ In contrast to other matching methods such as propensity score matching, which matches treatment firms to a specific number of control firms, coarsened exact matching focuses on minimizing differences among covariates without regard to the number of matches. To mitigate over-controlling and dimensionality issues and maximize my sample, I match on changes in *SIZE* and *SIZE*² (given that these variables are correlated with most variables in my tests) and the bank's headquarters state (to ensure paired treatment and control banks share similar state-level economic conditions). However, as discussed in Section 5.6, results are robust to matching along other dimensions.

4. UNIVARIATE STATISTICS AND RESULTS

4.1 Geographical Distribution of Sample

Table 4.1 provides the number and percent of banks and shareholders by state in my sample. Based on the bank's headquarters location, banks in my sample are headquartered in 35 different states, with all Federal Reserve branches except Philadelphia represented.²² In terms of shareholders' states, shareholders in my sample live in 40 different states, with Iowa, Illinois, and Minnesota occurring most frequently. In approximately 10 percent of the sample (334 bank-year observations), the dominant shareholder resides outside of the bank's headquarters state (untabulated). Overall, my sample appears to provide a wide cross-section of geographic regions and tax jurisdictions for both shareholders and banks.

²² While requiring banks have shareholders located in states that recognize the S corporation election and the Federal passive activity loss limitations increases identification of the effect of personal taxes on bank risk-taking, this design choice also reduces variation in bank- and shareholder-states. For example, before sample restrictions, there are 41 different states with at least one bank and 46 different states with at least one dominant shareholder in my sample. In addition, although states in the northeastern portion of the U.S. (e.g., Maine, New York, and Pennsylvania) are not widely represented in my sample, these states also tend to have the lowest amount of S corporation BHCs of any Federal Reserve District (Kahn 2018).

Table 4.1 Banks by Headquarters' State and Shareholder State of Residence

State	Bank State		Shareholder State	
	# of Bank-Years	% of Bank-Years	# of Bank-Years	% of Bank-Years
AK	3	0	3	0
AL	70	2	68	2
AR	74	2	74	2
AZ	7	0	17	1
CA	45	1	57	2
CO	69	2	71	2
CT	12	0	12	0
FL	44	1	89	3
GA	55	2	57	2
IA	544	16	510	15
ID	0	0	8	0
IL	489	15	441	13
IN	20	1	27	1
KS	151	5	149	4
KY	99	3	97	3
MD	6	0	6	0
ME	0	0	1	0
MI	2	0	2	0
MN	355	11	360	11
MO	234	7	218	7
MT	76	2	79	2
NC	0	0	5	0
ND	62	2	62	2
NE	114	3	133	4
NM	85	3	82	2
NV	1	0	28	1
NY	2	0	6	0
OH	15	0	18	1
OK	166	5	147	4
OR	10	0	3	0
SC	2	0	2	0
SD	30	1	30	1
TX	229	7	214	6
UT	17	1	17	1
VA	0	0	11	0
VT	0	0	11	0
WA	16	0	28	1
WI	159	5	147	4
WV	5	0	5	0
WY	53	2	26	1
Total	3,321	100	3,321	100

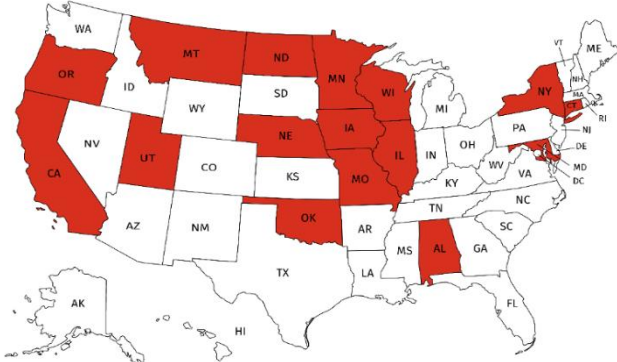
4.2 Magnitude of State Tax Rate Changes

I next report on the prevalence and magnitude of state tax rate increases and decreases in my sample. As shown in Appendix D and E, my sample includes 20 state tax rate increases in 16 states and 34 state tax rate decreases in 19 states. The average tax increase raises rates by 96 basis points while the average tax decrease lowers rates by 55 basis points. Figures 4.1 and 4.2 illustrate the geographical dispersion of tax rate changes in my sample. In general, tax rate changes in my sample are geographically dispersed, with both tax rate increases and decreases spanning most major portions of the U.S.

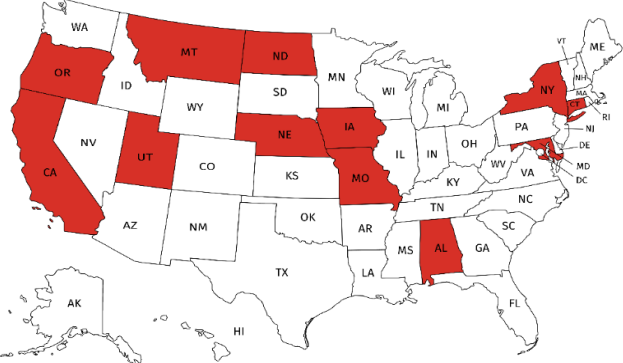
Table 4.2 presents the distribution of my sample by year. Each year of my sample is fairly well represented, with each accounting for at least five percent of all bank-year observations in my sample. Table 4.3 provides additional information on the number and type of shareholders in my sample and their tax rate changes. In about 95 percent (five percent) of bank-years, the dominant shareholder can (cannot) use loss offsets. Of the shareholders who can use loss offsets, approximately 77 percent also serve as the bank's CEO while the remaining 23 percent are non-CEO executives, employees, or shareholders without a formal role in the bank. Shareholder tax rate increases occur in approximately five percent of bank-year observations in my sample, with five percent (four percent) of bank-years involving tax rate increases for shareholders who can (cannot) use loss offsets. In contrast, about seven percent of the sample experiences a tax rate decrease during my sample period.

Figure 4.1 Geography of State Tax Rate Increases by Shareholder State

Tax Rate Increases, Full Sample



Tax Rate Increases, 2003 - 2008



Tax Rate Increases, 2009 - 2014

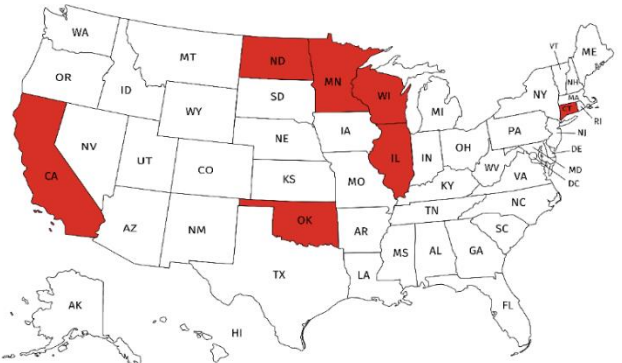


Table 4.2 Observations by Year

Year	# of Bank-Years	% of Bank-Years
2003	156	5
2004	208	6
2005	225	7
2006	256	8
2007	257	8
2008	284	9
2009	312	9
2010	368	11
2011	362	11
2012	322	10
2013	310	9
2014	261	8
Total	3,321	100%

Table 4.3 Bank-Year Observations with Shareholder Tax Rate Changes

Item	All Shareholders Total N = 3,321		Loss Offset Total N = 3,162		No Loss Offset Total N = 159		CEO Total N = 2,431		Non-CEO Total N = 731	
	Mean Δ	N	Mean Δ	N	Mean Δ	N	Mean Δ	N	Mean Δ	N
State tax increase	1.27%	172	1.28%	166	0.80%	6	1.25%	128	1.43%	38
State tax decrease	0.60%	234	0.60%	230	0.83%	4	0.57%	168	0.66%	62

4.3. Descriptive Statistics

Table 4.4 presents descriptive statistics of the raw values of variables in my analyses. The average bank in my sample has ROA volatility of -6.07, a Z-score of -3.83, non-performing loans of 1.6 percent, and assets of approximately \$105 million, similar to prior research (Cantrell and Yust 2018; Mayberry et al. 2015). With average ROA of 0.012 and an average Tier 1 capital ratio of 10 percent, banks in my sample are profitable and well capitalized. Additionally, dominant shareholders control an average of 66 percent of the voting power in the BHC, which is consistent with prior research (Hope et al. 2011) and suggests these shareholders have significant influence relative to other bank shareholders. Moreover, dominant shareholders possess an average of two other ownership interests outside of the bank, suggesting these individuals are also somewhat diversified. Finally, the average bank in my sample has approximately five shareholders, implying that banks in my sample have relatively small ownership bases.

Table 4.5 presents the covariate balance for variables used in my analysis. After reweighting observations using CEM, my total sample includes 2,710 observations, which includes 406 treatment observations (i.e., banks whose shareholders experience a tax rate increase or decrease) and 2,304 control observations. I find no significant differences between treated and control observations across matched dimensions (changes in *SIZE* or *SIZE*²) and several other covariates (e.g., changes in *NIM*, *BDSIZE*, and *UNEMP*), although there are some significant differences in other variables (e.g.,

changes in *NPL*, *LOANS*, and *TIER1*).²³ Overall, the results provide some evidence of covariate balance between treatment and control observations.

Table 4.4 Bank- and County-Level Descriptive Statistics

Variables	N	Mean	Std. Dev.	p25	p50	p75
ROAV	3,321	-6.069	0.907	-6.670	-6.132	-5.539
ZSCORE	3,321	-3.833	0.986	-4.507	-3.907	-3.245
SIZE	3,321	11.564	0.916	10.873	11.545	12.163
SIZE ²	3,321	134.556	21.450	118.222	133.282	147.938
NPL	3,321	0.015	0.019	0.003	0.008	0.020
ROA	3,321	0.012	0.009	0.008	0.012	0.017
LOANS	3,321	0.631	0.151	0.539	0.649	0.745
TIER1	3,321	0.100	0.028	0.083	0.093	0.110
NIM	3,321	0.037	0.007	0.032	0.036	0.040
LYIELD	3,321	0.050	0.011	0.042	0.050	0.058
PERSINC	3,321	35.769	8.726	30.033	34.761	40.169
UNEMP	3,321	0.062	0.023	0.045	0.057	0.074
TOTPOP	3,321	194.235	733.119	15.077	29.699	88.812
BDSIZE	3,321	4.964	2.523	3.000	5.000	6.000
CEOCHAIR	3,321	0.764	0.425	1.000	1.000	1.000
SHOWN	3,321	0.663	0.302	0.400	0.717	0.980
OWNINTS	3,321	2.073	4.936	0.000	0.000	2.000
NUMSH	3,321	4.671	3.829	1.000	4.000	7.000

²³ I do not match on variables such as changes in *NPL*, *LOANS*, and *TIER1* as doing so may induce over-control issues to the extent banks increase their risk-taking through lending activities (see Acharya et al. 2016). In addition, including these variables as covariates when using CEM may lead to dimensionality problems, as it reduces the sample size for my main analyses by approximately 72 percent. However, in untabulated analysis, I re-estimate my tests after separately adding each variable which significantly differs between treatment and control observations in Table 4.5 and find similar results.

Table 4.5 Covariate Balance using Coarsened Exact Matching

Variables	Treatment Obs.		Control Obs.		Diff in Means	
	N	Mean	N	Mean	Diff	t-stat
Δ SIZE	406	0.030	2,304	0.030	0.000	0.29
Δ SIZE ²	406	0.710	2,304	0.694	0.016	0.21
Δ NPL	406	-0.002	2,304	0.000	-0.002***	3.20
Δ LOANS	406	0.002	2,304	-0.004	0.006**	2.54
Δ TIER1	406	0.002	2,304	0.001	0.001**	2.21
Δ NIM	406	0.000	2,304	-0.000	0.000	1.62
Δ BDSIZE	406	-0.002	2,304	-0.011	0.009	0.27
Δ CEOCHAIR	406	0.012	2,304	-0.002	0.014	1.49
Δ SHOWN	406	-0.014	2,304	-0.001	-0.012***	-4.55
Δ PERSINC	406	0.035	2,304	0.043	-0.008***	-2.63
Δ TOTPOP	406	0.003	2,304	0.002	0.000	0.76
Δ UNEMP	406	0.000	2,304	0.001	-0.000	-0.35

4.4. Main Results

As a baseline analysis of the relation between shareholder taxes and bank risk-taking, Table 4.6 presents the results of estimating equation (1) using shareholder tax rate increases calculated without regard to the shareholder's ability to use loss offsets and tax rate decreases. The coefficient on *INCREASE* is significant for *ROAV* and *ZSCORE* ($p < 0.10$), suggesting that shareholder tax rate increases are associated with greater bank risk-taking. However, I find no evidence of a relation for tax rate decreases ($p = 0.10$), consistent with findings from prior research that the risk-taking response to tax rate changes is asymmetric (Ljungqvist et al. 2017).

Table 4.6 Shareholder Taxes and Bank Risk-Taking Baseline Analysis

Variables	(1) $\Delta ROAV$	(2) $\Delta ZSCORE$
INCREASE	0.020* (1.764)	0.203* (1.767)
DECREASE	-0.037 (-1.634)	-0.380 (-1.585)
$\Delta SIZE$	-0.006 (-1.593)	-0.055 (-1.379)
$\Delta SIZE^2$	0.000 (1.583)	0.002 (1.427)
ΔNPL	0.001 (0.397)	0.012 (0.767)
$\Delta LOANS$	-0.000 (-0.349)	-0.002 (-0.260)
$\Delta TIER1$	-0.003 (-0.697)	
ΔNIM	0.010 (1.013)	0.066 (0.701)
$\Delta BDSIZE$	-0.000 (-0.950)	-0.000 (-1.172)
$\Delta CEOCHAIR$	0.000 (0.066)	-0.000 (-0.019)
$\Delta SHOWN$	0.000 (0.325)	0.001 (0.389)
$\Delta PERSINC$	-0.001* (-1.913)	-0.009* (-1.890)
$\Delta TOTPOP$	-0.001 (-0.533)	-0.005 (-0.284)
$\Delta UNEMP$	-0.002 (-0.507)	-0.017 (-0.390)
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.094	0.101

To test my hypotheses, I estimate equation (2) after calculating tax rate increases separately based on shareholders' ability to use loss offsets. As shown in Table 4.7, the coefficient on *INCREASE_OFFSET* is positive and significant for changes in *ROAV* and *ZSCORE* ($p < 0.10$). This suggests that shareholder tax rate increases are positively associated with bank risk-taking for shareholders who can use loss offsets, consistent with H1a. In terms of

economic significance, a one standard deviation increase in the tax rate for shareholders able to use loss offsets is associated with a 0.03 percent (0.34 percent) increase in subsequent year ROA volatility (Z-score), or approximately 0.55 percent (8.92 percent) of each measure's mean, respectively. However, I find no evidence of a relation between bank risk-taking and *INCREASE_NOOFFSET* or *DECREASE* ($p = 0.10$). Overall, this evidence is consistent with shareholder tax rate increases being positively associated with bank risk-taking when shareholders can share in risk with the government via loss offsets.

Table 4.7 Shareholder Taxes, Bank Risk-Taking, and Loss Offsets

Variables	(1)	(2)
	Δ ROAV	Δ ZSCORE
INCREASE_OFFSET	0.020*	0.204*
	(1.771)	(1.775)
INCREASE_NOOFFSET	-0.050	-0.617
	(-0.728)	(-0.944)
DECREASE	-0.037	-0.380
	(-1.634)	(-1.585)
Δ SIZE	-0.006	-0.055
	(-1.584)	(-1.367)
Δ SIZE ²	0.000	0.002
	(1.571)	(1.412)
Δ NPL	0.001	0.013
	(0.402)	(0.772)
Δ LOANS	-0.000	-0.002
	(-0.362)	(-0.276)
Δ TIER1	-0.003	
	(-0.713)	
Δ NIM	0.011	0.070
	(1.051)	(0.742)
Δ BDSIZE	-0.000	-0.000
	(-0.983)	(-1.212)
Δ CEOCHAIR	0.000	-0.000
	(0.056)	(-0.031)
Δ SHOWN	0.000	0.001
	(0.332)	(0.398)
Δ PERSINC	-0.001*	-0.009*
	(-1.891)	(-1.865)
Δ TOTPOP	-0.001	-0.005
	(-0.526)	(-0.276)
Δ UNEMP	-0.002	-0.014
	(-0.452)	(-0.325)
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.094	0.101

4.4.1. Parallel Trends Assumption for Main Results

A key assumption of difference-in-differences estimation is that treatment and control groups exhibit similar trends in the outcome variables of interest prior to the treatment (Roberts and Whited 2013). To examine the validity of the parallel trends assumption for my main results, I re-estimate equation (2) after including lagged tax rate increase and decrease variables.²⁴ To the extent that treatment and control firms follow similar trends prior to shareholders' tax rate changes, I expect the coefficient on the tax rate change variables at $t-1$ to be not statistically different from zero (Ljungqvist et al. 2017). Figures 4.3 through 4.5 plot the regression coefficients and 90 percent confidence intervals and Table 4.8 presents the results. The coefficients on *INCREASE_OFFSET*, *INCREASE_NOOFFSET*, and *DECREASE* at year $t-1$ are insignificant for changes in *ROAV* and *ZSCORE* ($p = 0.19$), which is inconsistent with the notion that treatment banks anticipate their shareholders' tax rate changes.

I also test for reversals and delays in risk-taking responses by including tax rate changes at year $t+1$. The coefficient on *INCREASE_OFFSET* at $t+1$ is negative and significant for changes in *ROAV* and *ZSCORE* ($p < 0.10$), consistent with a reversal of the initial increase in bank risk-taking for shareholders who can share in risk with the government. Although the coefficient on *INCREASE_NOOFFSET* is insignificant at year t for changes in *ROAV* and *ZSCORE*, it is negative and significant at year $t+1$ ($p < 0.10$). This implies that there is a one-year delay in the risk-taking response for tax rate increases for shareholders who cannot offset losses, potentially because these shareholders' lack of a formal role within the bank may make it

²⁴ To maximize the sample size for these tests, I set the shareholder's state and status as the bank's dominant shareholder is equal to that for year t and separately calculate each shareholder's state tax rate increase at $t-1$ and $t+1$. Given that ownership and shareholders' states of residence are relatively stable from year to year for the banks in my sample, holding these variables constant appears to be a reasonable assumption.

difficult to immediately affect the organization's risk-taking decisions. Consistent with my main results, I find no evidence of a significant association between tax rate decreases for year $t+1$ or year t and either risk-taking measure ($p = 0.14$). Overall, the evidence suggests that treatment and control groups exhibit similar trends in *ROAV* and *ZSCORE* before treatment, consistent with the parallel trends assumption.

Figure 4.3 Parallel Trends Assumption for Tax Rate Increases with Loss Offset

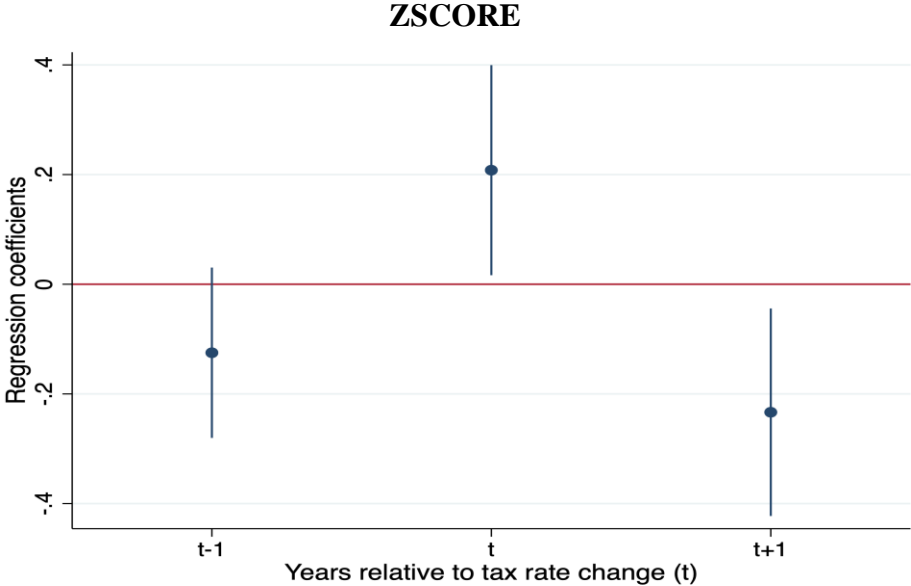
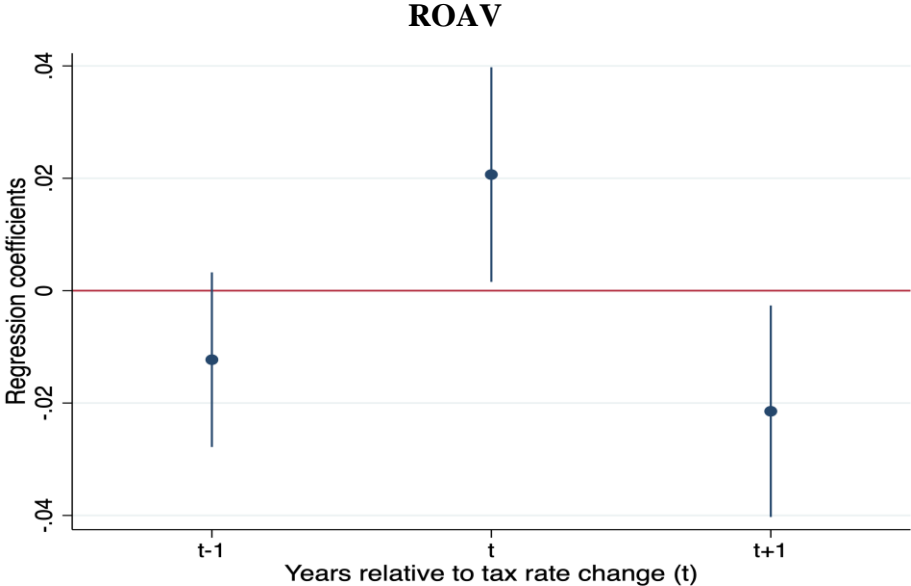


Figure 4.4 Parallel Trends Assumption for Tax Rate Increases without Loss Offset

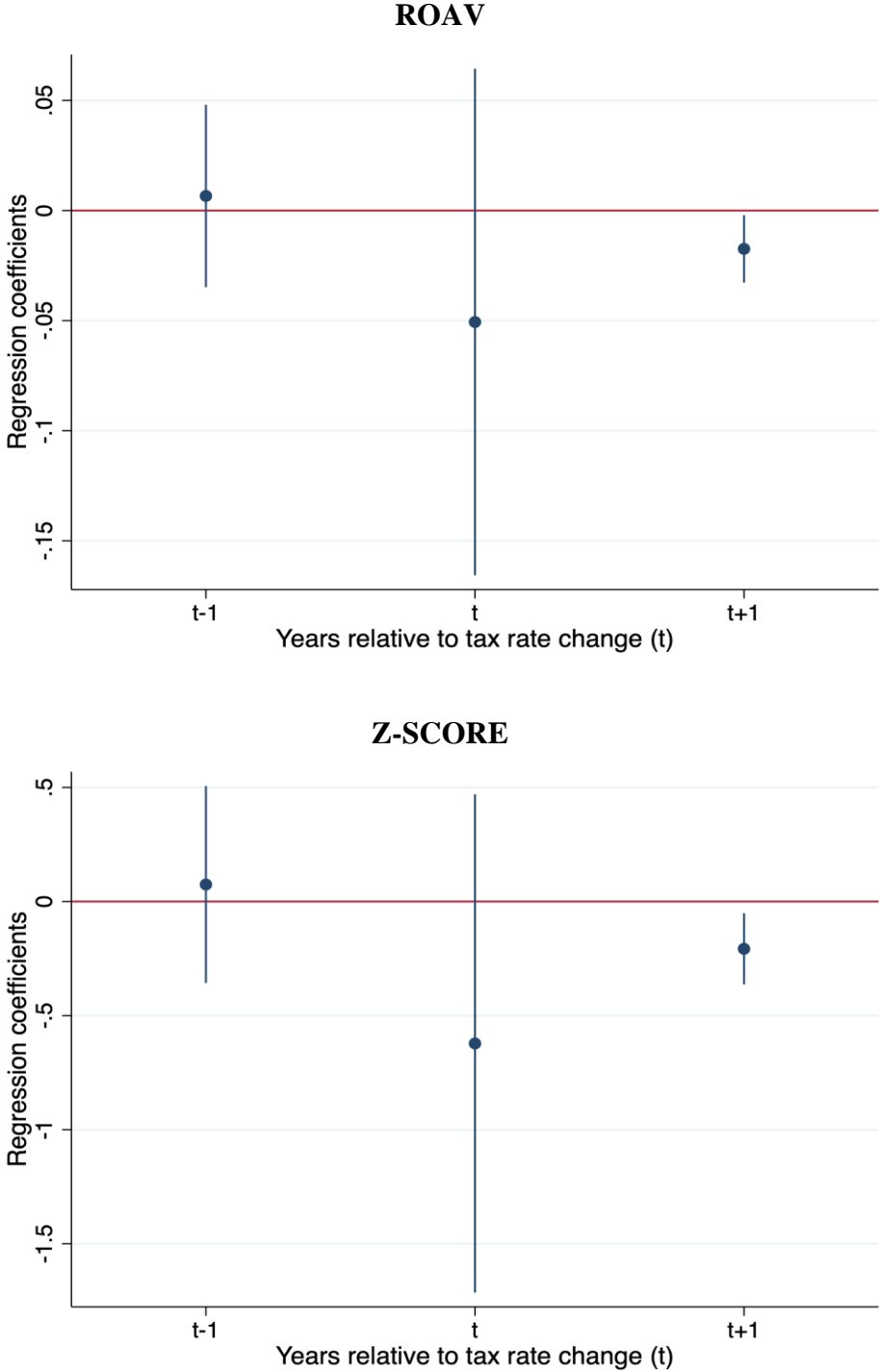


Figure 4.5 Parallel Trends Assumption for Tax Rate Decreases

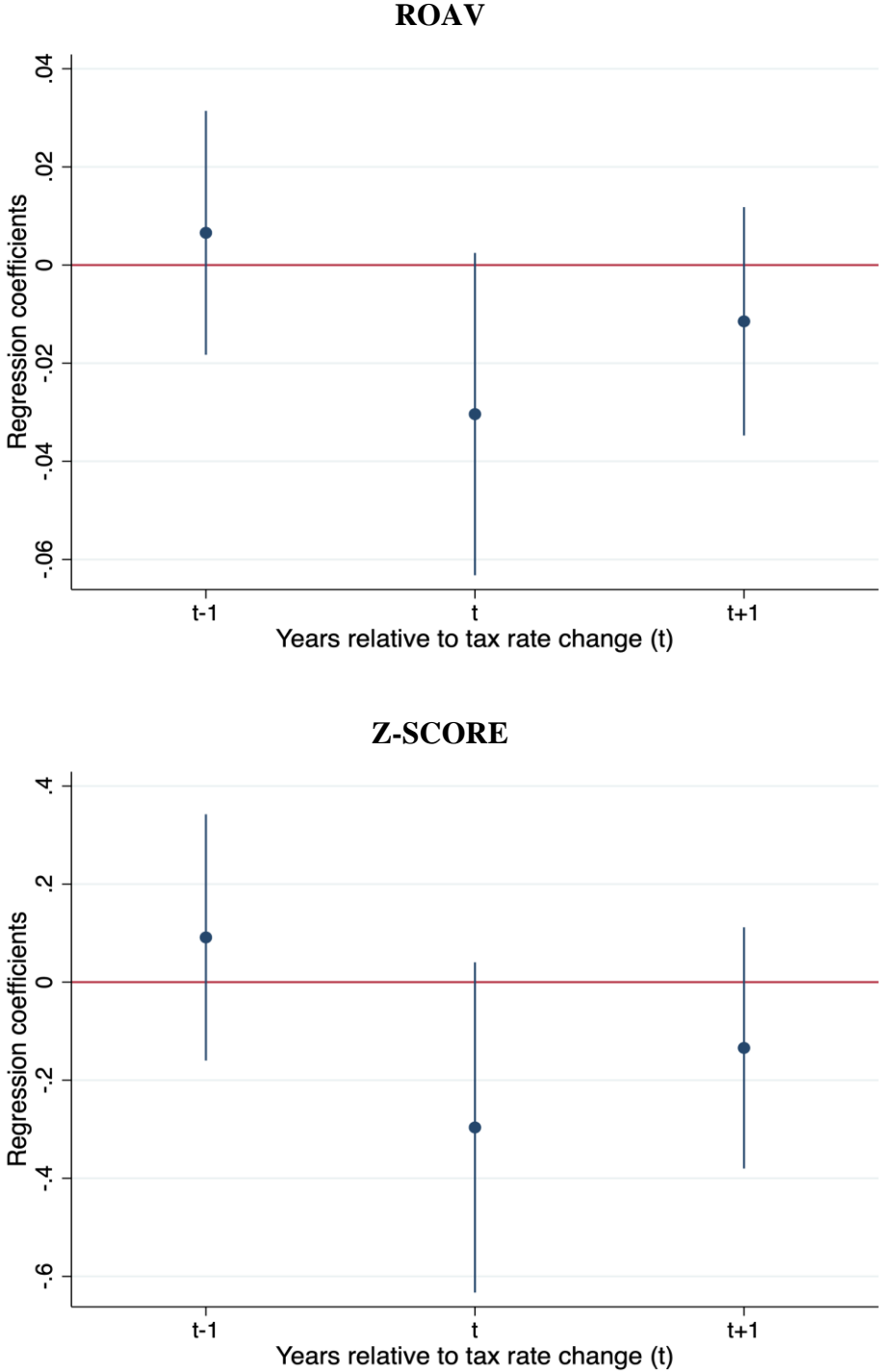


Table 4.8 Anticipation and Reversal Effects of Shareholder Taxes on Bank Risk-Taking

Variables	(1)	(2)
	Δ ROAV	Δ ZSCORE
INCREASE_OFFSET (t-1)	-0.012 (-1.302)	-0.125 (-1.325)
INCREASE_OFFSET (t)	0.021* (1.782)	0.208* (1.789)
INCREASE_OFFSET (t+1)	-0.021* (-1.879)	-0.233** (-2.033)
INCREASE_NOOFFSET (t-1)	0.007 (0.263)	0.075 (0.285)
INCREASE_NOOFFSET (t)	-0.051 (-0.725)	-0.622 (-0.938)
INCREASE_NOOFFSET (t+1)	-0.017* (-1.871)	-0.207** (-2.190)
DECREASE (t-1)	0.007 (0.435)	0.091 (0.599)
DECREASE (t)	-0.030 (-1.524)	-0.296 (-1.450)
DECREASE (t+1)	-0.011 (-0.812)	-0.134 (-0.898)
Δ SIZE	-0.006 (-1.397)	-0.048 (-1.191)
Δ SIZE ²	0.000 (1.370)	0.002 (1.212)
Δ NPL	0.001 (0.391)	0.012 (0.761)
Δ LOANS	-0.000 (-0.298)	-0.001 (-0.202)
Δ TIER1	-0.002 (-0.477)	
Δ NIM	0.010 (0.952)	0.067 (0.703)
Δ BDSIZE	-0.000 (-0.925)	-0.000 (-1.153)
Δ CEOCHAIR	0.000 (0.054)	-0.000 (-0.026)
Δ SHOWN	0.000 (0.380)	0.001 (0.434)
Δ PERSINC	-0.001* (-1.880)	-0.009* (-1.848)
Δ TOTPOP	-0.001 (-0.678)	-0.007 (-0.405)
Δ UNEMP	-0.001 (-0.333)	-0.009 (-0.216)
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.098	0.106

4.4.2. Shareholder Taxes and Bank Risk-Taking by Shareholder Role

While the results above suggest a positive relation between shareholders' personal tax rates and bank risk-taking for shareholders able to use loss offsets, I next examine whether this relation depends on shareholders' specific roles within the bank. For example, to the extent that the bank's dominant shareholder also serves as the CEO, the shareholder can use both their voting power and control of the bank's operational decisions to align the bank's risk-taking decisions with their personal tax incentives. Consistent with this, evidence in Armstrong et al. (2019) suggests that increases in CEOs' personal taxes—but not those of middle managers—are associated with greater firm risk-taking. In contrast, although non-CEO shareholders generally do not manage the bank's operational decisions, they may use their large blocks of voting power to influence the bank's risk-taking decisions (Shleifer and Vishny 1997), regardless of their formal role within the bank.

To test this possibility, I separate *INCREASE_OFFSET* into tax rate increases for dominant shareholders who also serve as the bank's CEO (*INCREASE_OFFSET_CEO*) and all other non-CEO dominant shareholders (*INCREASE_OFFSET_NONCEO*) and estimate the following equation:

$$\begin{aligned} \Delta RISK_{it+1} = & \beta_0 + \beta_1 INCREASE_OFFSET_CEO_{it} + \beta_2 INCREASE_OFFSET_NONCEO_{it} + \\ & \beta_3 INCREASE_NOOFFSET_{it} + \beta_4 DECREASE_{it} + \beta_k \Delta CONTROLS_{it} + \\ & STATE*YEAR FE + \varepsilon_{it}, \end{aligned} \tag{3}$$

To the extent that CEOs' and non-CEOs' personal taxes affect bank risk-taking, I expect a positive relation between *INCREASE_OFFSET_CEO* and *INCREASE_OFFSET_NONCEO* and changes in *ROAV* and *ZSCORE*.²⁵

Table 4.9 presents the results. The coefficient on *INCREASE_OFFSET_CEO* is positive and significant for changes in both *ROAV* and *ZSCORE* ($p < 0.10$), consistent with evidence in Armstrong et al. (2019) that CEOs' personal taxes are positively associated with firm risk-taking. In contrast, the coefficient on *INCREASE_OFFSET_NONCEO* is insignificant ($p = 0.16$), potentially because management of the operational decisions outweighs ownership power for the banks in my sample. However, the difference in coefficients is not statistically significant ($p = 0.85$).²⁶ Collectively, these results suggest that the positive relation between shareholder tax rate increases and bank risk-taking is concentrated in bank-years where the dominant shareholder is also the CEO.

²⁵ For simplicity, *INCREASE_OFFSET_NONCEO* includes tax increases for any non-CEO dominant shareholder who is able to use loss offsets, including other executives and employees and shareholders with a limited or no formal role in the bank (but who have the ability to offset losses due to other passive income). However, in untabulated analysis, I re-estimate equation (3) after further separating *INCREASE_OFFSET_NONCEO* into tax rate increases for other executives and bank employees and shareholders with a limited or no formal role in the bank. I continue to find a positive and significant relation between changes in CEOs' personal tax rate increases and changes in *ROAV* and *ZSCORE*, but no evidence of a relation for shareholders who are other executives and employees of the bank or for shareholders with a limited or no formal role in the bank.

²⁶ Given that ownership structure is endogenous, it is possible that banks where the dominant shareholder is also the CEO are inherently different from banks where the dominant shareholder holds a non-CEO role. To test this possibility, I re-estimate equation (2) separately for each subset. Results (untabulated) are similar to those reported.

Table 4.9 Shareholder Taxes and Bank Risk-Taking by Shareholder Role

Variables	(1) Δ ROAV	(2) Δ ZSCORE
INCREASE_OFFSET_CEO	0.021* (1.757)	0.211* (1.774)
INCREASE_OFFSET_NONCEO	0.019 (1.403)	0.190 (1.388)
INCREASE_NOOFFSET	-0.050 (-0.723)	-0.613 (-0.938)
DECREASE	-0.037 (-1.632)	-0.380 (-1.582)
Δ SIZE	-0.006 (-1.581)	-0.055 (-1.364)
Δ SIZE ²	0.000 (1.568)	0.002 (1.410)
Δ NPL	0.001 (0.405)	0.013 (0.775)
Δ LOANS	-0.000 (-0.361)	-0.002 (-0.275)
Δ TIER1	-0.003 (-0.715)	
Δ NIM	0.011 (1.051)	0.070 (0.742)
Δ BDSIZE	-0.000 (-0.987)	-0.000 (-1.216)
Δ CEOCHAIR	0.000 (0.048)	-0.000 (-0.039)
Δ SHOWN	0.000 (0.326)	0.001 (0.391)
Δ PERSINC	-0.001* (-1.889)	-0.009* (-1.863)
Δ TOTPOP	-0.001 (-0.528)	-0.005 (-0.278)
Δ UNEMP	-0.002 (-0.451)	-0.014 (-0.324)
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.094	0.101

4.5. Cross-Sectional Analysis

Prior research suggests that certain bank-level and investor-level characteristics can affect bank risk-taking and firm sensitivity to shareholder tax rate changes, respectively (Allen et al. 2011; Barton et al. 2014; Faccio et al. 2011; Jacob and Michaely 2017; Thakor 2012). Thus, in this section, I explore whether the relation between shareholder tax rate increases and bank risk-taking varies with bank capital, external monitoring by auditors, and shareholder conflicts and diversification.

4.5.1. Bank Capital

Bank capital plays an important role in determining banks' risk-taking appetite (Matten 2000). For instance, theory proposes that by increasing banks' incentives to monitor borrowers or decreasing the appeal of risky, innovative products that may increase the likelihood of financial crisis, greater bank capital leads to lower bank risk (Allen et al. 2011; Thakor 2012). Consistent with this view, Berger and Udell (1994) find evidence of a negative association between higher capital requirements and bank lending. Similarly, banks' risk-taking response to changes in their shareholders' personal tax rates may vary based on capital.²⁷ To the extent higher bank capital leads to less bank risk, I expect that lower (higher) capitalized banks increase (decrease) their risk-taking in response to increases in their shareholders' taxes when shareholders can (cannot) share in risk with the government through loss offsets, respectively. To test this possibility, I create an indicator variable, *HICAP*, which equals one for bank-years where Tier 1 capital is in the highest tercile of the distribution in a given year, and zero

²⁷ While other research suggests that greater bank capital encourages risk-taking (e.g., Koehn and Santomero 1980), empirical evidence is generally consistent with bank capital decreasing bank risk (see Thakor 2012 for a discussion).

otherwise. I re-estimate equation (2) in each subsample after separately using CEM in each sample, excluding *TIER1* from the *ROAV* regressions due to the design.²⁸

Table 4.10 presents the results. After reweighting observations using CEM, my total sample includes 2,399 observations, which includes 141 treatment observations and 737 control observations in the high capitalization subsample and 252 treatment observations and 1,269 control observations in the low capitalization subsample (untabulated). Beginning with banks in which *HICAP* = 0, the coefficient on *INCREASE_OFFSET* is positive and significant for changes in both *ROAV* and *ZSCORE* ($p < 0.10$), but insignificant for *INCREASE_NOOFFSET* ($p = 0.13$). This implies that increases in shareholder tax rates are positively associated with bank risk-taking in less-capitalized banks where shareholders can share in risk with the government, but not for shareholders without a similar risk-sharing ability.

In contrast, for banks with high levels of capital (*HICAP* = 1), the coefficient on *INCREASE_OFFSET* is insignificant for *ROAV* and *ZSCORE* ($p = 0.35$), while the coefficient on *INCREASE_NOOFFSET* is negative and significant for both measures ($p < 0.05$). Thus, while highly capitalized banks appear to decrease their risk-taking in response to tax rate increases for shareholders who cannot use loss offsets, I find no evidence of a relation for shareholders who can share in risk with the government. Differences in coefficients between subsamples are significant for *INCREASE_NOOFFSET* ($p < 0.05$), but insignificant for *INCREASE_OFFSET* ($p = 0.26$). Overall, the evidence suggests that increases (decreases) in bank risk-taking in response

²⁸ I use Tier 1 capital to partition the sample because of the difficulty of incorporating changes in capital requirements into my research design with changes in state tax rates. However, a potential concern is that Tier 1 capital is a component of Z-score, which may induce a mechanical correlation in this test. In untabulated analysis, I find that the correlation between changes in *ZSCORE* and *HICAP* is approximately 1 percent and statistically insignificant ($p = 0.51$), suggesting that *HICAP* is likely not inducing a mechanical association between shareholder tax rate changes and *ZSCORE* for banks in this test.

to shareholder tax rate increases are concentrated in banks with low (high) levels of capital, respectively, consistent with the view that bank risk-taking decreases as capital increases (Allen et al. 2011; Thakor 2012).

Table 4.10 Shareholder Taxes, Bank Risk-Taking, and Bank Capital

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	HICAP = 0		HICAP = 1		Tests of Differences	
	Δ ROAV	Δ ZSCORE	Δ ROAV	Δ ZSCORE	(1) vs (3)	(2) vs (4)
INCREASE_OFFSET	0.023* (1.658)	0.243* (1.776)	0.029 (0.938)	0.255 (0.829)	-0.006 (1.300)	-0.012 (0.980)
INCREASE_NOOFFSET	0.196 (1.512)	1.176 (0.913)	-0.171** (-2.011)	-1.838** (-2.222)	0.367** (6.250)	3.014** (5.153)
DECREASE	-0.141** (-2.107)	-1.459** (-2.110)	-0.046*** (-3.145)	-0.450*** (-2.943)		
Δ SIZE	0.003 (0.545)	0.048 (0.840)	-0.011 (-1.140)	-0.107 (-1.060)		
Δ SIZE ²	-0.000 (-0.535)	-0.002 (-0.706)	0.000 (1.085)	0.004 (1.039)		
Δ NPL	0.004 (1.411)	0.049* (1.774)	0.001 (0.460)	0.018 (0.579)		
Δ LOANS	-0.001 (-1.534)	-0.014 (-1.450)	-0.001 (-0.519)	-0.006 (-0.599)		
Δ TIER1	-0.016** (-2.161)		-0.004 (-0.628)			
Δ NIM	0.026* (1.688)	0.150 (1.039)	-0.002 (-0.122)	-0.088 (-0.473)		
Δ BDSIZE	0.000 (0.107)	-0.000 (-0.076)	-0.000** (-2.586)	-0.002** (-2.559)		
Δ CEOCHAIR	0.000 (1.573)	0.002 (1.346)	-0.001** (-2.197)	-0.007** (-2.108)		
Δ SHOWN	0.000 (0.358)	0.002 (0.243)	0.000 (0.969)	0.004 (1.142)		
Δ PERSINC	-0.001** (-2.061)	-0.012** (-1.991)	0.001 (1.035)	0.012 (1.165)		
Δ TOTPOP	-0.002 (-0.817)	-0.015 (-0.536)	0.005 (1.434)	0.056 (1.406)		
Δ UNEMP	0.005 (0.632)	0.063 (0.881)	-0.007 (-0.840)	-0.064 (-0.782)		
State*Year FE	Yes	Yes	Yes	Yes		
Observations	1,521	1,521	878	878		
Adjusted R ²	0.112	0.113	0.203	0.203		

4.5.2. External Auditor Monitoring

Monitoring by external financial statement auditors may also affect banks' sensitivity to changes in their shareholders' personal tax rates, as independent audits serve as a bonding mechanism to protect the interests of minority shareholders (Jensen and Meckling 1976). For instance, Barton et al. (2014) find that voluntary financial statement audits are associated with lower rates of bank failure in a sample of privately-held commercial banks, which they attribute to the monitoring value of external auditors constraining managers' ability to change the bank's risk-taking decisions. Similarly, banks with external audits may have less leeway with which to alter the bank's risk-taking decisions in response to their shareholders' tax rate changes. Thus, to the extent that external auditors serve as form of monitoring of bank risk-taking, I expect banks without external audits to be more responsive to increases in their shareholders' personal taxes, relative to banks with voluntary financial statement audits. To test this possibility, I follow Barton et al. (2014) and Nicoletti (2018) and set an indicator variable, *EXTAUDIT*, equal to one if the bank has its financial statements verified by an external auditor, and zero otherwise. The Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) requires an independent financial audit of banks with assets less than \$500 million.²⁹ Thus, to capture variation in audit status, I limit my sample to banks with assets less than \$500 million and re-estimate equation (2) for each subsample of *EXTAUDIT* after using CEM to balance each subsample.

Table 4.11 presents the results. After reweighting observations using CEM, my total sample includes 2,403 observations, which includes 63 treatment observations and 441 control

²⁹ See §363 of Title 12 of the CFR available at: <https://www.law.cornell.edu/cfr/text/12/363.1>.

observations in the external audit subsample and 298 treatment observations and 1,601 control observations in the subsample without an external audit (untabulated). With respect to banks where *EXTAUDIT* = 0, the coefficient on *INCREASE_OFFSET* (*INCREASE_NOOFFSET*) is positive and significant (negative and significant) for changes in *ROAV* and *ZSCORE* ($p < 0.01$), respectively. This implies that in banks with less external monitoring, increases in shareholder tax rates are positively (negatively) associated with risk-taking to the extent shareholders can (cannot) use loss offsets, respectively. In contrast, I find a negative relation between *INCREASE_OFFSET* and both risk measures for audited banks (*EXTAUDIT* = 1) ($p < 0.01$), potentially due to auditor monitoring reducing incentives to take on greater risk (Barton et al. 2014) or because banks which choose external audits may be less risky in general (e.g., Lennox and Pittman 2011). I also find no evidence of a significant association for *INCREASE_NOOFFSET* ($p = 0.52$) in banks where *EXTAUDIT* = 1. Differences between subsamples are statistically significant ($p < 0.01$). Overall, increases in shareholder taxes increase (decrease) risk-taking in banks whose shareholders can (cannot) share in losses with the government, but greater monitoring from external auditors appears to mitigate or even reverse this response (Barton et al. 2014; Lennox and Pittman 2011).

Table 4.11 Shareholder Taxes, Bank Risk-Taking, and External Monitoring by Auditors

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	EXTAUDIT = 0		EXTAUDIT = 1		Tests of Differences	
	Δ ROAV	Δ ZSCORE	Δ ROAV	Δ ZSCORE	(1) vs (3)	(2) vs (4)
INCREASE_OFFSET	0.036*** (3.347)	0.368*** (3.586)	-0.038*** (-3.274)	-0.397*** (-3.532)	0.074*** (4.244)	0.765*** (6.656)
INCREASE_NOOFFSET	-0.130*** (-2.771)	-1.356*** (-2.975)	0.030 (0.648)	-0.102 (-0.229)	-0.160*** (14.900)	-1.254*** (12.816)
DECREASE	-0.062* (-1.923)	-0.642* (-1.876)	0.107 (1.024)	1.252 (1.190)		
Δ SIZE	0.002 (0.296)	0.029 (0.431)	-0.034* (-1.870)	-0.332 (-1.653)		
Δ SIZE ²	-0.000 (-0.362)	-0.001 (-0.472)	0.001* (1.855)	0.015* (1.723)		
Δ NPL	0.005** (2.553)	0.059*** (2.824)	-0.001 (-0.285)	-0.011 (-0.288)		
Δ LOANS	0.000 (0.189)	0.002 (0.313)	-0.002* (-1.657)	-0.023 (-1.593)		
Δ TIER1	0.000 (0.087)		-0.013 (-1.284)			
Δ NIM	0.006 (0.485)	0.036 (0.331)	0.027 (1.175)	0.218 (0.951)		
Δ BDSIZE	-0.000 (-0.947)	-0.001 (-1.094)	-0.000 (-0.723)	-0.001 (-0.658)		
Δ CEOCHAIR	-0.000 (-0.182)	-0.001 (-0.343)	-0.000 (-1.180)	-0.004 (-1.022)		
Δ SHOWN	0.001* (1.786)	0.010* (1.788)	0.002 (0.935)	0.022 (1.024)		
Δ PERSINC	-0.001 (-0.866)	-0.005 (-0.796)	-0.003** (-1.990)	-0.024* (-1.890)		
Δ TOTPOP	-0.001 (-0.412)	-0.004 (-0.165)	-0.004 (-1.074)	-0.045 (-1.183)		
Δ UNEMP	0.002 (0.409)	0.022 (0.394)	-0.011 (-1.357)	-0.094 (-1.171)		
State*Year FE	Yes	Yes	Yes	Yes		
Observations	1,899	1,899	504	504		
Adjusted R ²	0.108	0.111	0.175	0.191		

4.5.3. Shareholder Conflicts

Jacob and Michaely (2017) argue that the complexity of choosing the optimal outcome for all shareholders increases with the size of a firm's shareholder base. This, in turn, may impose greater coordination costs on the firm and reduce the firm's sensitivity to changes in shareholder taxes. Consistent with this view, Jacob and Michaely (2017) find firms' dividend

payout responses to a reduction in shareholder dividend taxes in Sweden decreases as the firm's number of shareholders increases. Similarly, for banks with diverse ownership bases, differences in shareholders' risk preferences (e.g., risk aversion) and tax rates may increase the difficulty of selecting the level of risk-taking that optimizes benefits for all shareholders. To the extent that shareholder conflicts mitigate banks' response to shareholder taxes, I expect banks with smaller shareholder bases to be more responsive to changes in their shareholders' personal taxes.

I test this by creating an indicator variable, *CONFLICT*, which is set equal to one if the bank's number of shareholders is in the highest tercile of the distribution, and zero otherwise.³⁰ I then estimate equation (2) in both subsamples after using CEM to separately balance each subsample. Table 4.12 presents the results. After reweighting observations using CEM, my total sample includes 2,510 observations, which includes 112 treatment observations and 564 control observations in the high shareholder conflict subsample and 278 treatment observations and 1,556 control observations in the low shareholder conflict subsample (untabulated). Beginning with banks with relatively few shareholder conflicts (*CONFLICT* = 0), the coefficient on *INCREASE_OFFSET* (*INCREASE_NOOFFSET*) is positive and significant (negative and significant) for changes in *ROAV* and *ZSCORE* ($p < 0.05$), respectively. This implies that banks with relatively few conflicts of interest among shareholders increase (decrease) their risk-taking in response to tax rate increases for shareholders who can (cannot) use loss offsets.

In contrast, for banks where *CONFLICT* = 1, the coefficients on *INCREASE_OFFSET* and *INCREASE_NOOFFSET* are insignificant for both risk measures ($p = 0.63$). Differences in coefficients between subsets are statistically significant for *INCREASE_OFFSET* ($p < 0.10$), but

³⁰ Jacob and Michaely (2017) show that firms' dividend response begins to weaken for firms with four or more shareholders. Because banks in the highest tercile of my sample have at least four five percent or greater shareholders (untabulated), I use the highest tercile as my sample partition.

insignificant for *INCREASE_OFFSET* ($p = 0.27$). In addition, I find no evidence that shareholder conflicts affect the relation between shareholder tax rate decreases and bank risk-taking, as the coefficient on *DECREASE* is insignificant for both subsamples ($p = 0.13$). Thus, while increases in shareholders' tax rates increase (decrease) bank risk-taking when shareholders can (cannot) share in losses with the government, coordination issues among a bank's shareholder base appear to dampen this risk-taking response.³¹

³¹ In untabulated analysis, I re-estimate these tests after forming tercile partitions using only shareholders that own at least five percent of the BHC's voting power and find similar results.

Table 4.12 Shareholder Taxes, Bank Risk-Taking, and Shareholder Conflicts

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	CONFLICT = 0		CONFLICT = 1		Tests of Differences	
	Δ ROAV	Δ ZSCORE	Δ ROAV	Δ ZSCORE	(1) vs (3)	(2) vs (4)
INCREASE_OFFSET	0.029*** (2.833)	0.285*** (2.805)	-0.007 (-0.330)	-0.070 (-0.341)	0.036** (4.203)	0.355* (3.610)
INCREASE_NOOFFSET	-0.093** (-2.056)	-0.943** (-2.179)	-0.014 (-0.238)	-0.323 (-0.489)	-0.079 (1.464)	-0.620 (0.922)
DECREASE	-0.048 (-1.018)	-0.543 (-1.060)	-0.095 (-1.515)	-0.904 (-1.407)		
Δ SIZE	0.008 (1.313)	0.083 (1.359)	-0.008 (-0.851)	-0.055 (-0.586)		
Δ SIZE ²	-0.000 (-1.306)	-0.003 (-1.283)	0.000 (0.938)	0.003 (0.700)		
Δ NPL	0.000 (0.080)	0.007 (0.353)	-0.001 (-0.193)	-0.001 (-0.018)		
Δ LOANS	-0.000 (-0.003)	0.001 (0.094)	0.001 (0.753)	0.012 (0.833)		
Δ TIER1	-0.008 (-1.521)		-0.004 (-0.431)			
Δ NIM	0.027** (2.295)	0.183* (1.677)	-0.041* (-1.660)	-0.468* (-1.919)		
Δ BDSIZE	-0.000 (-1.584)	-0.001* (-1.813)	-0.000 (-0.349)	-0.000 (-0.414)		
Δ CEOCHAIR	0.000 (0.473)	0.001 (0.377)	-0.000 (-0.076)	-0.000 (-0.060)		
Δ SHOWN	0.000 (0.272)	0.002 (0.483)	-0.002 (-1.502)	-0.017 (-1.511)		
Δ PERSINC	-0.001** (-2.159)	-0.012** (-2.178)	-0.001 (-0.607)	-0.006 (-0.597)		
Δ TOTPOP	0.002 (0.813)	0.027 (1.038)	-0.001 (-0.347)	-0.012 (-0.418)		
Δ UNEMP	-0.005 (-0.952)	-0.047 (-0.934)	-0.002 (-0.273)	-0.017 (-0.214)		
State*Year FE	Yes	Yes	Yes	Yes		
Observations	1,957	1,957	610	610		
Adjusted R ²	0.104	0.112	0.154	0.163		

4.5.4. Shareholder Diversification

Faccio et al. (2011) argue that risk-averse, poorly diversified shareholders may direct their firms to decrease risk-taking while shareholders with diversified portfolios may be more risk tolerant to the extent they can diversify away any increased firm-specific risk. Consistent with this, Faccio et al. (2011) find that dominant shareholders increase their firms' risk-taking

relative to undiversified, dominant shareholders. Similarly, shareholder portfolio diversification may increase banks' sensitivity to changes in their shareholders' personal tax rate changes because these shareholders may be less affected by firm-specific risk. However, given that greater diversification makes individuals less risk-averse (Parrino et al. 2005), banks whose shareholders hold diversified portfolios outside of the bank may exhibit less risk-aversion and consequently, may be less sensitive to increases in shareholder taxes, relative to banks whose shareholders are undiversified. To investigate the effect of shareholder diversification on the relation between shareholder tax rate changes and bank risk-taking, I create an indicator variable, *DIV*, which equals one if the dominant shareholder's number of outside ownership interests is in the highest tercile of the distribution, and zero otherwise. I then estimate equation (2) in both subsamples after using CEM in each sample.

After reweighting observations with CEM, my total sample includes 2,501 observations, which includes 95 treatment observations and 486 control observations in the diversified subsample and 291 treatment observations and 1,629 control observations in the undiversified (untabulated). As shown in Table 4.13, I find no evidence of a relation between *INCREASE_OFFSET* or *INCREASE_NOOFFSET* and bank risk-taking for either subset of banks ($p = 0.26$). In contrast, the coefficient on *DECREASE* is negative and significant (positive and significant) for *ROAV* and *ZSCORE* in banks where $DIV = 0$ ($DIV = 1$), respectively ($p < 0.10$). This suggests that shareholder tax rate decreases are associated with less (greater) bank risk-taking when shareholders hold undiversified (more diversified) portfolios, respectively. Overall, I find little evidence that shareholder portfolio diversification affects the relation between shareholder tax rate increases and bank risk-taking. However, the evidence suggests that tax rate decreases are associated with less bank risk-taking for banks with undiversified shareholders, but

the ability to diversify any increased risk appears to reverse this response.

Table 4.13 Shareholder Taxes, Bank Risk-Taking, and Shareholder Diversification

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	DIV = 0		DIV = 1		Tests of Differences	
	Δ ROAV	Δ ZSCORE	Δ ROAV	Δ ZSCORE	(1) vs (3)	(2) vs (4)
INCREASE_OFFSET	0.005 (0.290)	0.039 (0.240)	0.024 (0.903)	0.247 (0.992)	-0.019 (0.314)	-0.208 (0.423)
INCREASE_NOOFFSET	0.162 (1.125)	1.120 (0.776)	-0.052 (-0.633)	-0.589 (-0.762)	0.214 (1.538)	1.709 (0.980)
DECREASE	-0.059* (-1.704)	-0.600* (-1.665)	0.067** (2.071)	0.681** (2.160)		
Δ SIZE	-0.009 (-1.599)	-0.087 (-1.521)	0.001 (0.071)	0.008 (0.060)		
Δ SIZE ²	0.000 (1.539)	0.004 (1.492)	0.000 (0.042)	0.000 (0.057)		
Δ NPL	0.004** (2.135)	0.041** (2.264)	0.004 (0.965)	0.053 (1.175)		
Δ LOANS	0.000 (0.049)	0.001 (0.142)	0.000 (0.222)	0.003 (0.173)		
Δ TIER1	-0.002 (-0.396)		0.001 (0.069)			
Δ NIM	0.007 (0.558)	0.040 (0.331)	0.028 (1.153)	0.282 (1.186)		
Δ BDSIZE	-0.000 (-0.410)	-0.000 (-0.548)	-0.000* (-1.754)	-0.002* (-1.690)		
Δ CEOCHAIR	-0.000 (-0.072)	-0.000 (-0.191)	0.000 (1.328)	0.004 (1.485)		
Δ SHOWN	-0.000 (-0.427)	-0.001 (-0.340)	0.001 (0.835)	0.014 (0.889)		
Δ PERSINC	-0.001 (-1.190)	-0.007 (-1.153)	-0.002 (-1.295)	-0.016 (-1.230)		
Δ TOTPOP	0.001 (0.347)	0.009 (0.403)	0.001 (0.100)	0.011 (0.208)		
Δ UNEMP	-0.005 (-0.941)	-0.048 (-0.885)	0.004 (0.436)	0.036 (0.373)		
State*Year FE	Yes	Yes	Yes	Yes		
Observations	1,920	1,920	581	581		
Adjusted R ²	0.095	0.104	0.168	0.173		

Combining Tables 4.3 through 4.13, I find that increases in dominant shareholders' state income taxes are positively associated with bank risk-taking when shareholders can share in risk with the government via loss offsets. This relation is concentrated in less-capitalized banks, as

well as those where the dominant shareholder is the bank's CEO, external monitoring is lower, and there are relatively few conflicts among shareholders. In contrast, I find a negative relation between shareholder tax rate increases and bank risk-taking for banks with higher levels of capital, less external monitoring, and few shareholder conflicts.

5. OTHER ANALYSIS

5.1. Alternative Risk Measures

Although my primary tests focus on ROA volatility and Z-score as measures of bank risk, I also examine other risk-taking measures used in prior literature: non-performing loans (*NPL*), net charge-offs (*NCO*), and risk-weighted assets (*RWA*) (e.g., Bouwman and Malmendier 2015; Cantrell and Yust 2018; Kanagaretnam et al. 2014). I then re-estimate equation (2) using *NPL*, *NCO*, and *RWA* as the dependent variable and including *ROA* to control for bank performance.

Table 5.1 presents the results. The coefficient on *INCREASE_OFFSET* is positive and significant for changes in *RWA* ($p < 0.05$), but insignificant for *NPL* and *NCO* ($p = 0.12$). With respect to risk-weighted assets, this suggests that increases in shareholder tax rates are positively associated with risk-weighted assets when shareholders can use loss offsets, consistent with my primary findings. The coefficient on *INCREASE_NOOFFSET* is negative and significant for changes in *NPL* ($p < 0.05$), consistent with theory that personal tax rate increases for shareholders unable to share in risk with the government are associated with less risk-taking (Domar and Musgrave 1944). In contrast, the coefficient on *INCREASE_NOOFFSET* is positive and significant for *RWA* ($p < 0.01$) and insignificant for *NCO* ($p = 0.67$), suggesting that the bank risk-taking response for these shareholders' tax rate increases may not be consistent across different measures of risk-taking. The positive coefficient on *DECREASE* for changes in *RWA* ($p < 0.05$) but insignificant relations for *NPL* and *NCO* ($p = 0.226$) suggest a similar mixed effect of shareholder tax rate decreases on bank risk-taking. Overall, the results provide some, albeit mixed, support for my main findings that shareholder tax rate increases are positively associated with bank risk-taking for shareholders who can share in risk with the government via loss offsets.

Table 5.1 Other Risk-Taking Measures

Variables	(1)	(2)	(3)
	Δ NPL	Δ NCO	Δ RWA
INCREASE_OFFSET	0.245 (1.552)	0.054 (0.975)	1.109** (2.389)
INCREASE_NOOFFSET	-1.708*** (-3.287)	0.089 (0.428)	6.786*** (4.188)
DECREASE	-0.402 (-1.213)	-0.091 (-0.947)	1.919** (2.246)
Δ SIZE	-0.069 (-1.174)	-0.025 (-0.917)	-0.099 (-0.473)
Δ SIZE ²	0.003 (1.386)	0.002 (1.521)	0.007 (0.745)
Δ NPL		0.112*** (5.820)	-0.143 (-1.431)
Δ ROA	-0.142* (-1.688)	0.160*** (2.633)	0.120 (0.488)
Δ LOANS	0.020** (1.997)	0.023*** (5.563)	-0.033 (-1.139)
Δ TIER1	-0.035 (-0.479)	0.012 (0.436)	-0.057 (-0.265)
Δ NIM	0.114 (0.627)	-0.062 (-0.860)	0.411 (0.737)
Δ BDSIZE	-0.000 (-0.280)	-0.000 (-0.262)	0.004* (1.782)
Δ CEOCHAIR	0.000 (0.199)	-0.003*** (-2.908)	-0.004 (-0.311)
Δ SHOWN	-0.008* (-1.788)	-0.002 (-1.106)	-0.002 (-0.143)
Δ PERSINC	0.011* (1.730)	-0.002 (-0.756)	-0.022 (-0.857)
Δ TOTPOP	0.011 (0.350)	-0.009 (-0.701)	-0.063 (-0.475)
Δ UNEMP	0.041 (0.517)	0.018 (0.606)	0.189 (0.900)
State*Year FE	Yes	Yes	Yes
Observations	2,710	2,710	2,710
Adjusted R ²	0.106	0.214	0.195

5.2. Tax Rate Decreases and Loss Offsets

I focus on the effect of tax rate increases on bank risk-taking in my primary analysis because prior research generally finds little evidence that tax rate decreases affect corporate risk-taking (e.g., Ljungqvist et al. 2017; Blouin et al. 2020). However, it is possible that tax rate decreases may also differentially affect bank risk-taking depending on shareholders' ability to use loss offsets. For example, although tax rate decreases would benefit all investors by increasing their after-tax returns, shareholders without the ability to offset losses would have less ability to offset the cost of risk-taking relative to shareholders able to use loss offsets. Thus, decreases in shareholder tax rates may lead to a greater decrease in risk-taking for shareholders who are unable to use loss offsets.

To test this possibility, I repeat my main analyses after separating *DECREASE* into 1) *DECREASE_OFFSET* and *DECREASE_NOOFFSET* and 2) *DECREASE_OFFSET_CEO*, *DECREASE_OFFSET_NONCEO*, and *DECREASE_NOOFFSET*, respectively. Tables 5.2 and 5.3 present the results, with coefficients on control variables omitted for brevity. As shown in Table 5.2, I continue to find a positive and significant coefficient on *INCREASE_OFFSET* for both *ROAV* and *ZSCORE* ($p < 0.10$) and no evidence of an effect for tax rate decreases ($p = 0.10$). Similarly, in Table 5.3, I continue to find a positive and significant coefficient on *INCREASE_OFFSET_CEO* for both *ROAV* and *ZSCORE* ($p < 0.10$) and limited evidence that tax rate decreases affect bank risk-taking, although the coefficient on *DECREASE_OFFSET_NONCEO* is negative and significant ($p < 0.10$). Collectively, this evidence is consistent with tax rate decreases having a limited effect on bank risk-taking, consistent with my primary findings and prior literature (e.g., Ljungqvist et al. 2017; Blouin et al. 2020).

Table 5.2 Tax Rate Decreases and Loss Offsets Without Regard to Shareholder Role

Variables	(1) Δ ROAV	(2) Δ ZSCORE
INCREASE_OFFSET	0.020* (1.771)	0.204* (1.775)
INCREASE_NOOFFSET	-0.050 (-0.727)	-0.616 (-0.943)
DECREASE_OFFSET	-0.037 (-1.634)	-0.380 (-1.584)
DECREASE_NOOFFSET	-0.024 (-1.007)	-0.242 (-0.951)
Controls	Yes	Yes
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.094	0.101

Table 5.3 Tax Rate Decreases and Loss Offsets Based on Shareholder Role

Variables	(1) Δ ROAV	(2) Δ ZSCORE
INCREASE_OFFSET_CEO	0.021* (1.763)	0.213* (1.779)
INCREASE_OFFSET_NONCEO	0.019 (1.409)	0.192 (1.394)
INCREASE_NOOFFSET	-0.050 (-0.720)	-0.612 (-0.935)
DECREASE_OFFSET_CEO	-0.029 (-1.126)	-0.304 (-1.137)
DECREASE_OFFSET_NONCEO	-0.041* (-1.783)	-0.412* (-1.716)
DECREASE_NOOFFSET	-0.018 (-0.707)	-0.187 (-0.694)
Controls	Yes	Yes
State*Year FE	Yes	Yes
Observations	2,710	2,710
Adjusted R ²	0.093	0.100

5.3. Falsification Tests

Although the results in Section 4.4.1 are consistent with the validity of the parallel trends

assumption, I also conduct falsification tests to provide further evidence that my results are attributable to changes in shareholder tax rates and not an unknown prior event (Roberts and Whited 2013). Specifically, following Kubick et al. (2016), I re-estimate equations (1) through (3) after replacing actual event years (i.e., bank-years in which the bank’s dominant shareholder experiences a change in his state tax rate) with pseudo-events that are deemed to occur one year before the shareholders’ actual tax rate change. To the extent that increases in shareholders’ personal taxes prompt increases in bank risk, I expect the coefficient on each tax increase variable to be statistically insignificant (Roberts and Whited 2013). Tables 5.4 and 5.5 present the results, with coefficients on control variables omitted for brevity. Consistent with my expectations, I find insignificant coefficients on *INCREASE*, *INCREASE_OFFSET*, and *INCREASE_OFFSET_CEO* for both *ROAV* and *NPL* ($p > 0.21$). This is consistent with the effect of increases in shareholder taxes on bank risk-taking occurring in the year of the tax rate change rather than in past periods.

Table 5.4 Shareholder Taxes and Bank Risk-Taking Falsification Test

	(1)	(2)
Variables	$\Delta ROAV$	$\Delta ZSCORE$
INCREASE	0.017 (1.250)	0.156 (1.172)
DECREASE	-0.059* (-1.964)	-0.607* (-1.942)
Controls	Yes	Yes
State*Year FE	Yes	Yes
Observations	2,207	2,207
Adjusted R ²	0.088	0.098

Table 5.5 Shareholder Taxes, Bank Risk-Taking, and Loss Offsets Falsification Test

Variables	(1) $\Delta ROAV$	(2) $\Delta ZSCORE$
INCREASE_OFFSET	0.017 (1.255)	0.157 (1.178)
INCREASE_NOOFFSET	-0.049 (-0.685)	-0.612 (-0.889)
DECREASE	-0.059* (-1.964)	-0.606* (-1.941)
Controls	Yes	Yes
State*Year FE	Yes	Yes
Observations	2,207	2,207
Adjusted R ²	0.088	0.098

5.4. Validity of Other Assumptions

In this section, I revisit the validity of two key assumptions in my tests: shareholder risk aversion and the loss offset mechanism. Although difficulties in measuring risk aversion make it challenging to conclusively show that shareholders in my sample are risk-averse, this assumption is likely descriptive of my sample for two reasons. First, Fama and Jensen (1983) posit that shareholder-managers tend to be risk-averse when both corporate decision-making and equity ownership are concentrated in a small number of shareholders because these individuals are less diversified relative to organizations with more diffuse ownership structures. Because my sample is largely composed of small, privately-held banks with relatively little separation of ownership from control, shareholders in my sample are more likely to be risk-averse, on average. Second, given that the vast majority of shareholders in my sample hold relatively undiversified portfolios, this similarly suggests that individuals are likely more risk-averse, on average.

To further validate this assumption, in untabulated analysis, I re-estimate my main tests after excluding highly diversified shareholders from my sample, as these shareholders are

generally risk neutral because they can diversify their shareholdings across many firms (Coffee 1986).³² Similar to my main results, I find that increases in state tax rates for shareholders who can use loss offsets—and particularly those who are the bank’s CEO—are associated with higher ROA volatility and Z-score. However, I also find evidence that increases in state tax rates for shareholders unable to use loss offsets are associated with decreased ROA volatility and Z-score. Collectively, the evidence is consistent with results likely being driven by risk-averse shareholders.

In addition, while my results suggest that banks increase risk-taking in response to tax rate increases for shareholders able to use loss offsets, this implicitly assumes that these shareholders have an existing loss with which to offset the tax rate increase. Thus, to the extent that the mechanism behind the positive relation between shareholder tax rate increases and bank risk-taking is the loss offset as theory predicts, I expect this result to be concentrated in banks with a history of losses. Accordingly, I re-estimate my tests after partitioning my sample based on whether the bank has a history of at least one loss-year in the preceding ten-year period.³³ I find a positive and significant relation between *INCREASE_OFFSET* and changes in *ROAV* banks with a history of at least one loss year ($p < 0.10$), but no evidence of a similar relation for *ZSCORE* or for banks without previous losses ($p = 0.25$) and differences in coefficients are not statistically significant ($p = 0.53$). Overall, this evidence is consistent with the positive relation

³² Specifically, firm-specific (idiosyncratic) risk is generally eliminated with a portfolio size of between 10 to 15 securities (Evans and Archer 1968). Thus, I re-estimate my tests after eliminating bank-year observations where the dominant shareholder has at least 10 outside ownership interests listed on the bank’s Y-6.

³³ I require banks to be S corporations at the time of the loss because shareholders cannot deduct losses incurred when the bank was a C corporation. To maximize variation in loss-years, I use a ten-year period when partitioning my sample, as only a small proportion of my sample have a history of losses (e.g., approximately 14 percent of my sample has at least one loss year in the preceding ten year-period). However, results are similar, albeit weaker, if I use a five year-period to partition my sample. In addition, given limited variation in *INCREASE_NOOFFSET* for banks with a history of losses, I omit this variable for both subsamples in these tests. However, results are similar if I control for *INCREASE_NOOFFSET* in the sample of banks without losses (untabulated).

between shareholder tax rate increases and bank risk-taking being concentrated, at least in part, by banks whose shareholders have existing loss offsets to offset their tax rate increases.³⁴

5.5. Financial Crisis Years

Although I control for state-by-year fixed effects in my analyses, it is possible that extreme levels of risk-taking around the financial crisis may influence my results. To address this possibility, I re-estimate my tests excluding crisis years (i.e., years 2007 through 2009).³⁵ In contrast to my main results, I find no evidence of a significant association between increases in shareholders' personal tax rates and ROA volatility and Z-Score for shareholders who can use loss offsets ($p = 0.28$), but a positive and significant relation for shareholders who cannot use loss offsets ($p < 0.01$). In addition, the coefficient on *DECREASE* is also negative and significant, suggesting that decreases in shareholder tax rates are negatively associated with bank risk-taking. Although inconsistent with my main findings, these results may be due to reduced power, given that my sample size and number of tax rate changes is each reduced approximately 30 percent in these tests (untabulated).

5.6. Other Robustness Tests

I also conduct several additional tests to ensure the robustness of my results. First, although almost all dominant shareholders in my sample are taxable individuals, approximately one percent are tax-exempt foundations, trust, or other non-taxable entities. Because banks with

³⁴ However, even without an existing loss, loss offsets may still lead to greater risk-taking to the extent shareholders are incentivized by the promise of a future loss offset.

³⁵ Similarly, it is possible that the effect of changes in shareholders' personal taxes also vary during the financial crisis relative to other periods (Gallemore et al. 2017). In untabulated analysis, I re-estimate equation (2) after restricting my sample to only crisis years. I find no evidence of a relation between shareholder tax rate increases and decreases and either measure of bank risk-taking ($p = 0.19$). However, given the relatively limited variation in tax rate changes during this period, these tests may have lower power.

non-taxable dominant shareholders may be inherently different from banks whose largest shareholders are taxable individuals, I re-estimate my analyses after excluding these observations from my sample. Second and similarly, banks whose dominant shareholder lives in a state with an income tax (e.g., New Jersey) may also be inherently different from banks whose largest shareholder lives in a state without an income tax (e.g., Florida and Texas). Thus, I re-estimate my analyses after excluding observations where the largest shareholder lives in Alaska, Florida, Nevada, South Dakota, Texas, Washington, or Wyoming. Third, I re-estimate my analyses after separately excluding each shareholder state of residence to confirm that results are not driven by certain states.

Fourth, while my analyses use coarsened exact matching based on banks' change in size, size squared, and headquarters' state, I also re-estimate my analyses after matching on other dimensions: 1) matching on the bank headquarters' state and changes in *SIZE* and *PERSINC*, the only statistically significant variable in OLS regressions of equation (2) (untabulated), 2) matching on changes in *SIZE* and *LOANS* and the bank headquarters' state, 3) matching on lagged, raw values of *SIZE*, *SIZE*², and *LOANS*, and the headquarters' state, 4) separately supplementing the current matched dimensions with each variable that is significantly different between treatment and control observations in Table 4.5, and 5) substituting the banks headquarters' state for the interaction of headquarters' state and year. Fifth, I repeat my analyses using entropy balancing rather than CEM to mitigate differences on observable dimensions between treatment and control observations (e.g., Hainmueller 2012). Results (untabulated) of all tests are consistent with those described above.

6. CONCLUSION

In this study, I exploit plausibly exogenous changes in individual state income taxes and detailed ownership data from banks organized as S corporations to examine whether shareholders' personal tax rate increases affect bank risk-taking. Despite the importance of risk-taking to both bank profitability and long-term macroeconomic growth and rich economic theory underpinning the relation between personal taxes and investment risk-taking, there is limited understanding of how shareholder taxes affect banks' risk-taking decisions.

My findings suggest that shareholders' personal taxes have an economically significant, positive effect on banks' risk-taking decisions when shareholders can share in risk with the government via loss-offsets. This positive relation is concentrated in less-capitalized banks where the dominant shareholder is the bank's CEO, external monitoring is lower, and there are relatively few conflicts among shareholders. In contrast, I find a negative relation between shareholder tax rate increases and bank risk-taking for better-capitalized banks with less external monitoring and fewer shareholder conflicts. Given the pervasiveness of shareholder taxes and the importance of risk-taking to banks specifically and the economy more generally, this study should be of interest to tax policy makers, bank regulators, and academics alike.

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APPENDIX A

VARIABLE DEFINITIONS

<i>Variable</i>	<i>Definition</i>
<i>BDSIZE</i>	The number of directors on the board. (Y6)
<i>CEOCHAIR</i>	An indicator variable set equal to one if the bank's dominant shareholder is also CEO of the bank, and zero otherwise. (Y6)
<i>CONFLICT</i>	An indicator variable set equal to one if the bank's number of shareholders is in the highest tercile of the distribution, and zero otherwise. (Y6)
<i>DECREASE</i>	The absolute value of the decrease in the highest statutory individual state income tax rate for the bank's dominant shareholder. The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH)
<i>DIV</i>	An indicator variable set equal to one if the dominant shareholder's number of outside ownership interests is in the highest tercile of the distribution, and zero otherwise. (Y6)
<i>EXTAUDIT</i>	An indicator variable set equal to one if the bank holding company engaged in a full-scope independent external audit during the year, and zero otherwise. (C)
<i>HICAP</i>	An indicator variable set equal to one if the bank's Tier 1 capital ratio is in the highest tercile of the distribution, and zero otherwise. (C)
<i>INCREASE</i>	The absolute value of the increase in the highest statutory individual state income tax rate for the bank's dominant shareholder. The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH, TF)
<i>INCREASE_NOOFFSET</i>	The absolute value of the increase in the highest statutory individual state income tax rate for shareholders who cannot use loss offsets. Shareholders who cannot use loss offsets are those who either do not hold a role in BHC or bank or only hold one role that would not constitute full-time employment under the passive loss activity limitations (e.g., if the shareholder only serves as a director, chairman, or secretary/treasurer) and do not have any other source of passive income. Shareholders who do not have another source of passive income are those with investments listed on FR Y-6 that are also accompanied by full-time roles

	(e.g., as managers or other employees). The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH, TF)
<i>INCREASE_OFFSET</i>	The absolute value of the increase in the highest statutory individual state income tax rate for shareholders who can use loss offsets. Shareholders who can use loss offsets are those who are the CEO or a non-CEO executive or officer of the BHC or bank (e.g., an executive vice president) or those who both have another source of passive income and either do not hold a role in BHC or bank or only hold one role that would not constitute full-time employment under the passive loss activity limitations. Shareholders who have another source of passive income are those with investments listed on FR Y-6 that are not also accompanied by full-time roles (e.g., as managers or other employees). The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH, TF)
<i>INCREASE_OFFSET_CEO</i>	The absolute value of the increase in the highest statutory individual state income tax rate for shareholders who serve as the bank or BHC's CEO. The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH, TF)
<i>INCREASE_OFFSET_NONCEO</i>	The absolute value of the increase in the highest statutory individual state income tax rate for shareholders who are not the CEO of the bank or BHC. Non-CEO shareholders are either other executives, officers, or other employees of the BHC or bank (e.g., an executive vice president) or those who both have another source of passive income and either do not hold a role in BHC or bank or only hold one role that would not constitute full-time employment under the passive loss activity limitations. Shareholders who have another source of passive income are those with investments listed on FR Y-6 that are not also accompanied by full-time roles (e.g., as managers or other employees). The highest statutory individual state income tax rate is adjusted for state deductibility of federal income taxes, if applicable, and assumes a filing status of married filing jointly. (Y6, CCH, TF)

<i>LOANS</i>	Loan portfolio size at the end of year t, computed as total gross loans divided by total assets. (C)
<i>NCO</i>	Net charge-offs in year t divided by gross loans. (C)
<i>NIM</i>	Net interest margin, computed as total interest income less total interest expense divided by total average interest earning assets. (C)
<i>NPL</i>	Non-performing loans scaled by total loans, where non-performing loans are defined as loans that are past due, have been modified in a troubled debt restructuring, or are in non-accrual status. (C)
<i>NUMSH</i>	The total number of shareholders listed on the Y-6 in a given year. (Y6)
<i>OWNINTS</i>	The total number of outside ownership interests for a given shareholder. (Y6)
<i>PERSINC</i>	Personal income per capita in year t for the county in which the bank is headquartered (in thousands). Personal income includes income from wages, proprietors' income, dividends, interest, rents, and government benefits. Changes are computed as the percentage change in personal income from year t-1 to t. (BEA)
<i>ROA</i>	Return on assets, computed as pre-tax income divided by total assets. (C)
<i>ROAV</i>	Return on asset volatility, computed as the standard deviation of the difference between logged quarterly <i>ROA</i> and <i>ROA</i> for the same quarter of the previous year, computed over the four quarters in year t. (C)
<i>RWA</i>	Total risk-weighted assets scaled by total assets. (C)
<i>SHOWN</i>	The total ownership percentage for the dominant shareholder of the BHC. If more than one member of the same family is a shareholder, the family is treated as a group and ownership for all members of the family is added together. (Y6)
<i>SIZE</i>	The natural logarithm of total assets (in thousands) for the bank at the end of year t. (C)
<i>SIZE²</i>	The square of <i>Size</i> at the end of year t. (C)
<i>TIER1</i>	Tier 1 capital ratio at the end of year t, computed as total Tier 1 capital divided by total assets. (C)
<i>TOTPOP</i>	The total population in year t for the county in which the bank is headquartered (in thousands). Changes are computed as the percentage change in total population from year t-1 to t. (BEA)
<i>UNEMP</i>	The unemployment rate in year t for the county in which the bank is headquartered. (BLS)

<i>ZSCORE</i>	The natural logarithm of the average of the bank's ROA plus <i>TIER1</i> , computed over the four quarters in year <i>t</i> , scaled by <i>ROAV</i> , and multiplied by negative one. (C)
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Data Sources:

BEA: BEA Local Area Personal Income Database

BLS: BLS Local Area Unemployment Statistics Database

C: Call Reports

CCH: *CCH State Tax Handbook*

SNL: SNL bank data

TF: The Tax Foundation's State Individual Income Tax Rate Data

Y6: FR Y-6

APPENDIX B

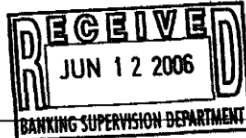
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FR Y-6
OMB Number 7100-0124
Expires March 31, 2007

LB

Board of Governors of the Federal Reserve System



OFFICIAL RECORD COPY

Annual Report of Bank Holding Companies—FR Y-6

Report at the close of business as of the end of fiscal year

This Report is required by law: Section 5(c)(1)(A) of the Bank Holding Company Act (12 U.S.C. § 1844(c)(1)(A)); Section 8(a) of the International Banking Act (12 U.S.C. § 3106(a)); Sections 11(a)(1), 25 and 25A of the Federal Reserve Act (12 U.S.C. §§ 248(a)(1), 602, and 611a); Section 211.13(c) of Regulation K (12 CFR 211.13(c)); and Section 225.5(b) of Regulation Y (12 CFR 225.5(b)).

This report form is to be filed by all top-tier bank holding companies organized under U.S. law, and by any foreign banking organization that does not meet the requirements of and is not treated as a qualifying foreign banking organization under section 211.23 of Regulation K (12 CFR 211.23). The Federal Reserve may not conduct or sponsor, and an organization (or a person) is not required to respond to, an information collection unless it displays a currently valid OMB control number.

NOTE: The Annual Report of Bank Holding Companies must be signed by one director of the top-tier bank holding company. This individual should also be a senior official of the top-tier bank holding company. In the event that the top-tier bank holding company does not have an individual who is a senior official and is also a director, the chairman of the board must sign the report.

Date of Report (top-tier bank holding company's fiscal year-end):

12/31/2005
Month / Day / Year

Filings Services

AUG 01 2006

1. GARY COX, PRESIDENT / CEO
Name and Title of the Bank Holding Company Director and Official

TEXAS BANK CORP, INC. SNL Financial, I.C.
Legal Title of Bank Holding Company 1-800-969-4121

certify that this Annual Report of Bank Holding Companies has been prepared in conformance with the report instructions.

P.O. Box 3186
(Mailing Address of the Bank Holding Company) Street / P.O. Box

Gary Cox
Signature of Bank Holding Company Director and Official

SAN ANGELO, TX 76902
City / State / Zip Code

6/8/06
Date of Signature

2201 Sherwood Way, San Angelo, TX
Physical location (if different from mailing address) 76901

Return to the appropriate Federal Reserve Bank the original and the number of copies specified.

For bank holding companies not registered with the SEC—

Person to whom questions about this report should be directed:

Indicate status of Annual Report to Shareholders:

- Is included with the FR Y-6 report
- will be sent under separate cover
- Is not prepared

MARK STEVENSON
Name / Title

325 / 944-7544
Area Code / Phone Number

325 / 942-7017
FAX Number

marks@txbank.com
E-mail Address

For Federal Reserve Bank Use Only
RSSD Number 2472973
C.I. _____

Public reporting burden for this information collection is estimated to vary from 1.3 to 101 hours per response, with an average of 4.25 hours per response, including time to gather and maintain data in the required form and to review instructions and complete the information collection. Comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing the burden, may be sent to Secretary, Board of Governors of the Federal Reserve System, Washington, D.C. 20551, and Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.

FR Y-G

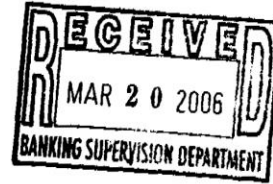
For Use By Tiered Bank Holding Companies

(Tiered bank holding companies must list the names, mailing address and physical locations of subsidiary bank holding companies below.)

<p><u>SAN ANGELO BANK CORP, INC.</u> Legal Title of Bank Holding Company</p> <p><u>P.O. Box 3186</u> (Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p><u>SAN ANGELO, TX 76901</u> City / State / Zip Code</p> <p><u>103 FOULK ROAD, SUITE 200</u> Physical location (if different from mailing address)</p> <p><u>WILMINGTON, DE 19803</u></p>	<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>
<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>	<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>
<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>	<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>
<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>	<p>Legal Title of Bank Holding Company</p> <p>(Mailing Address of the Bank Holding Company) Street / P.O. Box</p> <p>City / State / Zip Code</p> <p>Physical location (if different from mailing address)</p>

Form FR Y-6

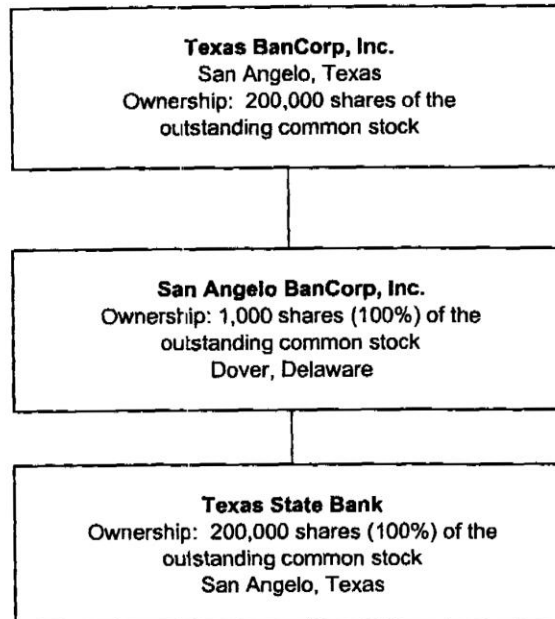
Texas Bancorp, Inc.
San Angelo, Texas
Fiscal Year Ending December 31, 2005



Report Item

1: Texas Bancshares, Inc. prepares an annual report to stockholders and is attached.

2: Organizational Chart:



Form FR Y-6
Texas BanCorp, In.
San Angelo, Texas
Fiscal Year Ending December 31, 2005

Report Item 3: Shareholders

(1)(a) (1)(b) (1)(c) (2)(a) (2)(b) (2)(c)

Current Shareholders with ownership, control or holdings of 5% or more of the power to vote as of December 31, 2005		
(1)(a) Name / Address	(1)(b) Country of Citizenship	(1)(c) Number and Percentage of each class of voting securities
J. Mark McLaughlin San Angelo, Texas 76904	USA	21,342 shares - 11.03% common stock
Brian Thomas McLaughlin Midland, Texas 79705	USA	9,910 shares - 7.77% common stock
J. Matthew McLaughlin Fort Worth, Texas 76107	USA	9,832 shares - 7.71% common stock
Laure McLaughlin Austin, Texas 78731	USA	9,993 shares - 7.78% common stock
Evelyn McLaughlin Davies Lubbock, Texas 79416	USA	8,820 shares - 6.91% common stock
Jean Millspaugh San Angelo, Texas 76903	USA	9,706 shares - 7.61% common stock
Jean McLaughlin Kahle Fort Worth, Texas 76107	USA	7,276 shares - 5.70% common stock

Shareholders not listed in Item 3(1)(a) through Item 3(1)(c) that had ownership, control or holdings of 5% or more of the power to vote during the fiscal year ending December 31, 2005		
(1)(a) Name / Address	(1)(b) Country of Citizenship	(1)(c) Number and Percentage of each class of voting securities

Form FR Y-6

Texas Bancorp, Inc.
San Angelo, Texas
Fiscal Year Ending December 31, 2005

Report Item 4: Directors and Officers
(1) (2) (3)(a)(b)(c) and (4)(a)(b)(c)

(1) Names/Address	(2) Principal Occupation	(3)(a) Title & Position w/ BHC	(3)(b) Title & Position w/ Subsidiaries	(3)(c) Title & Position w/ Other Business	(4)(a) Percentage of voting shares in BHC	(4)(b) Percentage of voting shares in Subsidiaries	(4)(c) Names of other companies if 25% or more of voting securities are held
Beck, Bernard San Angelo, Texas 76901	Retired	Director	Director Texas State Bank	N/A	0.58%	None	N/A
Black, Arch San Angelo, Texas 76901	Retired	Director	Director Texas State Bank	N/A	1.96%	None	N/A
Cox, Gary D. San Angelo, Texas 76904	Banking	Director/President	Director, CEO & President Texas State Bank	N/A	1.06%	None	N/A
Dolliver, Roger San Angelo, Texas 76901	Retired	Director	Director Texas State Bank	Partner	1.23%	None	223 West Harris Company
Gibson, Patrick E. San Angelo, Texas 76901	Physician	Director	Director Texas State Bank	N/A	0.00%	None	N/A
Ingram, Sara San Angelo, Texas 76904	Real Estate Adjuster Ranching	Director	Director Texas State Bank		3.34%	None	N/A
McLaughlin, Brian Midland, Texas 79702	Attorney	Director	Director Texas State Bank	N/A	7.77%	None	N/A
McLaughlin, J. Mark San Angelo, Texas 76901	Attorney	Director & Chairman	Director Texas State Bank Director, President San Angelo Bancorp, Inc.	Partner Partner Owner Owner	11.03%	None	McLaughlin Partnership Double M Ranch Company, Ltd. Baron Airplane Co. Perth Company

Form FR Y-6

San Angelo Bancorp, Inc.
San Angelo, Texas
Fiscal Year Ending December 31, 2005

Report Item 4: Directors and Officers - Continued
(1) (2) (3)(a)(b)(c) and (4)(a)(b)(c)

(1) Names/Address	(2) Principal Occupation	(3)(a) Title & Position w/ BHC	(3)(b) Title & Position w/ Subsidiaries	(3)(c) Title & Position w/ Other Business	(4)(a) Percentage of voting shares in BHC	(4)(b) Percentage of voting shares in Subsidiaries	(4)(c) Names of other companies if 25% or more of voting securities are held
Pfluger, Robert L. San Angelo, Texas 76904	Rancher	Director	Director Texas State Bank	N/A	0.88%	None	N/A
May, Brian San Angelo, Texas 76905	Professor	Director	Director Texas State Bank	N/A	0.00%	None	N/A
Jones, Vance San Angelo, Texas 76904	N/A	N/A	Executive Vice President Texas State Bank	N/A	0.00%	None	N/A
Harrison, David E. San Angelo, Texas 76902	N/A	Vice President	Senior Vice President Texas State Bank	N/A	0.00%	None	N/A
Payne, Joe San Angelo, Texas 76904	N/A	N/A	Senior VP / Trust Officer Texas State Bank	N/A	0.00%	None	N/A
Hoelscher, Ann San Angelo, Texas 76901	N/A	Sec./Treas.	Senior VP / Cashier Texas State Bank	N/A	0.00%	None	N/A

APPENDIX C

TAX RATE CHANGE CALCULATION AND VALIDATION

This appendix provides further details for computing and validating shareholder tax rate changes. For each BHC in my sample, I first identify the dominant shareholder in each bank using voting power listed on the Y-6. For banks with family ownership, I treat the family as a group and compute total ownership as the sum of ownership of all members of the family. If two or more owners have the most voting power in the BHC, I assume that the dominant shareholder is the owner with the highest role, which I define using the *2017 Robert Half Salary Guide for Accounting and Finance*. I link each dominant shareholder with their respective individual state tax rate using the shareholder's state of residence listed on the Y-6 and the highest individual state tax rate hand-collected from CCH's *State Tax Handbook* and data from the Tax Foundation.³⁶ To the extent there are discrepancies between the two sources, I use state revenue department websites and individual state income tax codes to settle disputes. I adjust each tax rate for state deductibility of federal income taxes, if applicable, and assume a filing status of married filing jointly.

To validate that the highest statutory state income tax rate is an appropriate measure for my sample, I randomly sample 30 bank-years and estimate each dominant shareholder's total income using information included on the Y-6. Specifically, I first identify each shareholder's highest role within the BHC or bank using the *2017 Robert Half Salary Guide for Accounting and Finance* to rank each role. I then use Payscale.com's and Indeed.com's salary estimators to estimate salary for each role. To mitigate double counting salary for executives and officers with

³⁶ See <https://taxfoundation.org/state-individual-income-tax-rates/>.

similar roles at the bank, I include salary for the highest role between the bank and BHC (e.g., if the shareholder is both the CEO and secretary, I include the compensation corresponding to just the CEO role). I also include any directorship, using BankDirectors.com's Compensation Survey Summary Report to determine approximate compensation for the bank directors and chairmen (see McCormick 2019).³⁷ I CPI-adjust each amount using historical CPI adjustment factors from the BLS to derive approximate salary as of the date of the Y-6. When estimating each shareholder's applicable I conduct extensive internet searches to identify each shareholder's spouse. To the extent the shareholder's spouse also works for the BHC or bank, I include the spouse's salary, computed using the steps above; if the spouse is not employed by the bank, I set the spouse's wages equal to the average compensation in the shareholder's state and year using BEA data.

Second, I include income from other employment outside the BHC and bank. The Y-6 provides the name of other businesses in which the shareholder is a director, trustee, partner, or executive officer and the name and corresponding ownership stake of other businesses in which the shareholder owns 25 percent or more of the voting securities. Ideally, I would measure income from other employment by using each business' tax returns to calculate either the shareholder's salary or the shareholder's pro-rata allocation of income or losses if these other businesses are flow-through entities. However, this information is generally not publicly available and time consuming to collect. Thus, for each dominant shareholder's business listed on the Y-6, I use internet searches and salary information from Payscale.com and Indeed.com to approximate compensation and CPI-adjust each amount to the year of the Y-6. Some Y-6s state

³⁷ I do not use Payscale.com or Indeed.com to estimate salaries for directors because director salaries in these estimators are largely reflective of directors of public banks and thus grossly overstated relative to what directors of small, private banks earn from these roles.

that their shareholders do not hold any other roles in other businesses, but these shareholders' principal occupations list roles outside the BHC or bank (e.g., an shareholder who is chairman of the BHC's board of directors may also be a dentist). In these cases, I assume that this is the shareholder's other business and calculate the shareholder's income using Payscale.com and Indeed.com, as described above.

Finally, S corporation shareholders are taxed on their pro-rata share of the firm's income, losses, and credits, regardless of whether the income is ultimately distributed. Thus, I also include the shareholder's pro-rata share of the BHCs net income in my calculation. Specifically, I multiply the shareholder's ownership percentage as listed on the Y-6 by the bank's net income over my sample period. To arrive at total income, I compute the sum of the shareholder's (and spouse's, if applicable) BHC or bank salary, the spouse's BEA income if applicable, income from other jobs, and the pro-rata share of bank income.³⁸ I then compare each shareholder's estimated income with their state's top tax brackets in that year. For 26 of the 30 bank-years, the shareholder's estimated income is within the state's highest tax bracket, while the remaining four bank-years are in the second highest tax bracket. Thus, the highest statutory state income tax rate appears to provide a reasonable measure of shareholders' personal income tax rates for my sample.

³⁸ I do not account for each shareholder's distributions from the S corporation because I focus solely on changes in income taxes and shareholders of S corporations are taxed on their share of the S corporation's tax items, regardless of whether the income was distributed. Thus, in general, a distribution to an S corporation shareholder does not cause the shareholder to recognize income. However, to the extent the shareholder's distribution from the S corporation exceeds his or her basis in the S corporation stock, the excess will be taxed as a capital gain under IRC §1368(b). Alternatively, if the S corporation has earnings and profits (from previous years as a C corporation or acquired through a reorganization or liquidation), the distribution will be treated as a dividend.

APPENDIX D

LIST OF INDIVIDUAL STATE TAX RATE INCREASES DURING SAMPLE

Panel A: Tax Rate Increases				
Year	State	Previous Rate	New Rate	Change
2003	AL	3.07%	3.25%	0.18%
2003	CT	4.50%	5.00%	0.50%
2003	IA	5.51%	5.84%	0.32%
2003	MO	3.68%	3.90%	0.22%
2003	MT	6.75%	7.15%	0.40%
2003	ND	3.40%	3.60%	0.20%
2003	NE	6.68%	6.84%	0.16%
2003	NY	6.85%	7.70%	0.85%
2003	OR	5.53%	5.85%	0.32%
2005	CA	9.30%	10.30%	1.00%
2008	MD	4.75%	6.25%	1.50%
2008	UT	4.54%	5.00%	0.46%
2009	CA	10.30%	10.55%	0.25%
2009	CT	5.00%	6.50%	1.50%
2009	OK	3.58%	5.50%	1.93%
2009	WI	6.75%	7.75%	1.00%
2011	IL	3.00%	5.00%	2.00%
2013	CA	10.30%	13.30%	3.00%
2013	ND	2.59%	3.99%	1.40%
2014	MN	7.85%	9.85%	2.00%
Mean Change				0.96%

APPENDIX E

LIST OF INDIVIDUAL STATE TAX RATE DECREASES DURING SAMPLE

Year	State	Previous Rate	New Rate	Change
2003	NM	8.20%	7.70%	-0.50%
2004	NM	7.70%	6.80%	-0.90%
2004	OK	7.00%	6.65%	-0.35%
2005	MT	7.15%	4.49%	-2.67%
2005	NM	6.80%	6.00%	-0.80%
2005	OH	7.50%	7.19%	-0.32%
2006	AZ	5.04%	4.79%	-0.25%
2006	NM	6.00%	5.30%	-0.70%
2006	NY	7.70%	6.85%	-0.85%
2006	OK	6.65%	4.06%	-2.59%
2006	UT	4.55%	4.54%	-0.01%
2007	AZ	4.79%	4.54%	-0.25%
2007	NC	8.25%	8.00%	-0.25%
2007	OK	4.06%	3.67%	-0.39%
2008	NM	5.30%	4.90%	-0.40%
2008	OK	3.67%	3.58%	-0.10%
2009	NC	8.00%	7.75%	-0.25%
2009	ND	3.60%	3.16%	-0.44%
2009	VT	9.50%	9.40%	-0.10%
2011	CA	10.55%	10.30%	-0.25%
2011	MD	6.25%	5.50%	-0.75%
2011	OH	6.24%	5.93%	-0.32%
2012	ID	7.80%	7.40%	-0.40%
2012	ND	3.16%	2.59%	-0.57%
2012	OK	5.50%	5.25%	-0.25%
2013	AL	3.25%	3.02%	-0.23%
2013	IA	5.84%	5.42%	-0.41%
2013	KS	6.45%	4.90%	-1.55%
2013	MO	3.90%	3.62%	-0.28%
2013	MT	4.49%	4.17%	-0.32%
2013	OR	6.44%	5.98%	-0.46%
2014	KS	4.90%	4.80%	-0.10%
2014	ND	3.99%	3.22%	-0.77%
2014	WI	7.75%	7.65%	-0.10%
Mean Change				-0.55%