Taxes Under Stress: Bank Stress Tests and Corporate Tax Avoidance*

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Abstract

We investigate the impact of mandatory transparency disclosure requirements on tax avoidance in US bank holding companies. We use the implementation of the Dodd-Frank bank stress tests as our identification strategy. Using regression discontinuity to exploit the quasi-experimental properties of the regulation around the bank-size policy thresholds, we find that bank stress tests have the unintended consequences of increasing aggressive tax planning and tax avoidance activities in stress-test banks resulting in a 0.48 to 1.3 percentage point reduction in cash tax paid relative to non-stress test banks. We find that tax uncertainty in the form of tax risk or volatility, political tax risk, and political risk sentiment also increases relative to non-stress test banks. Additionally, we find that banks with a large post-Dodd-Frank surge in tax avoidance tend to be riskier, as reflected by increases in risk densities, investments in high-risk-weight assets, and lending in riskier loans. Consequently, these banks experience increases in accounting, audit, and legal fees relative to other banks. Our results deviate from the literature by highlighting that more transparency can increase tax avoidance. These findings are consistent with tax minimization conditions in banking under added regulatory supervision.

Keywords: Dodd-Frank Act, Banks, Tax Avoidance, Tax Aggressiveness, Tax Risk, Regression Discontinuity
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1 Introduction

Corporate tax avoidance constitutes a legal activity through which a firm explicitly tries to reduce or defer its income tax liabilities.[1] This common business practice can help firms increase their after-tax net income, thus improving the corporate bottom line. However, such practices decrease tax revenue and can hurt taxpayers particularly when corporate bailouts are needed. Hence, tax avoidance and corporate bailouts represent two forms of costs to taxpayers. Recognizing these potential costs, policymakers introduced several new rules on corporate transparency and tax reporting positions that applied to all financial firms to protect consumers, and in particular taxpayers, by signing the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act).[2] The Act, which essentially outlaws future bailouts,[3] also established the implementation of bank stress tests for large US banks to increase transparency and reduce excessive risk-taking in the banking system with the hope of reducing the probability of bailouts. The recent stress test literature has focused on solvency or "preventing future bailout" side of the story by analyzing their impact on bank financial performance, risk-taking, cost of capital, and corporate culture (Clark et al., 2019; Garcia and Steele, 2020; Schuermann, 2014; Hirtle et al., 2020; Acharya et al., 2018; Berrospide et al., 2019; Aswani and Fiordelisi, 2020; Garcia et al., 2021). However, there has been scant academic attention on Dodd-Frank's impact via bank stress tests on the prevalence of bank tax planning activities – tax avoidance and tax aggressiveness. Hence, in this paper, we seek to contribute by bridging this existing gap in the literature.

This paper investigates the impact of exogenously imposed Dodd-Frank-related transparency and stress-testing regulations on bank tax avoidance activities. First, we provide evidence of the effects of macroprudential bank stress testing on tax avoidance and tax aggressiveness. Second, we investigate the impact of bank stress tests on tax risk, firm-level political tax risk, and tax risk sentiments for US stress-test banks relative to non-stress test banks. Lastly, we examine the

[1] We make a distinction between corporate tax avoidance and tax evasion, the former being a legal practice and the latter a fraudulent one as defined by Hanlon and Slemrod (2009). For formal definitions stipulated by the Internal Revenue Service, refer to `https://apps.irs.gov/app/understandingTaxes/whys/thm01/les03/media/ws_ans_thm01_les03.pdf`.

[2] (Dodd-Frank, 2010)

[3] While it remains to be seen how this provision will actually hold up in practice, policymakers behind the Dodd-Frank Act say that taxpayers won't foot the bill the next time a bank fails: https://www.marketplace.org/2018/09/19/no-more-bailouts-lawmakers-behind-dodd-frank-say-taxpayers-won-t-foot-bill-next/

implications of the exhibition of tax avoidance on bank performance and behavior under the Dodd-Frank Act. Given the central roles banks and financial institutions played in exacerbating the subprime mortgage crisis of 2007-2009, for which US taxpayers' money was used to bail them out, studying the tax avoidance activities of banks under the added regulatory attention is important to taxpayers, policymakers, and researchers.

We exploit the Dodd-Frank's Comprehensive Capital Analysis Review (henceforth, CCAR) stress tests as our identification strategy. The CCAR regulation's primary goals are to: (i) ensure that banks are capable of maintaining appropriate capital buffers during adverse simulated stress testing scenarios, (ii) plan their capital allocation and maintain specific capital ratio minimums, and (iii) reclaim public trust in the financial system. Initially, under CCAR, banks with total assets above $100B were required to be stress-tested, and in 2013 the total assets threshold was reduced to $50B to encompass more banks (Tarullo, 2014; Schuermann, 2014; Clark et al., 2019; Garcia and Steele, 2020). We use these policy thresholds for the mandatory disclosure requirements as a quasi-experimental setting of stress tests and implement a regression discontinuity design. As far as we are aware, our paper is the first scholarly work to document the impact of macroprudential regulatory bank stress testing on corporate tax avoidance activities in the banking sector.

We conjecture that CCAR stress testing can impact bank tax planning activities through several mechanisms. First, aggressive tax avoidance activities require complexity and obfuscation to hide rent extraction such as earnings management (Chen et al., 2010; Desai and Dharmapala, 2006).[4] Hence, more transparency brought in by stress testing could reduce aggressive tax avoidance activities. Second, the imposed CCAR stress tests require stress-test banks to maintain higher capital ratios and are held to higher capital planning standards (for example, increases in loan loss reserves).[5] Tax avoidance is one capital-preserving channel through which banks can plan their capital budgeting and maintain capital reserve requirements. Hence, CCAR stress testing requirements can increase tax avoidance activities in stress-test banks compared to non-stress test banks. Third, the increased transparency and added regulatory attention might increase the probability of receiving a penalty by the IRS hence reducing aggressive tax planning. For example, more regula-

[4]For example, bank management can benefit themselves by obtaining assets at higher prices, borrowing at higher interest rates, paying higher consulting fees, in the name of saving taxes for the bank.

[5]From an IRS perspective, higher capital requirements and loan loss reserves have the negative implication of reducing taxable income.

tory attention associated with stress testing and political tax risk could reduce tax aggressiveness. Therefore, ex-ante, it is not clear whether bank stress testing would result in more or less tax avoidance in stress-test banks relative to non-stress test banks. Hence, the net impact of stress testing on taxes paid is an empirical question.

One of the empirical challenges associated with studying the causal impact of CCAR stress testing on bank tax avoidance is that we need sound tax avoidance measures. We employ the cash effective tax rate, *Cash ETR*, as our primary measure of tax avoidance and triangulate our results with the GAAP effective tax rate (*GAAP ETR*) measure of tax avoidance (Dyreng et al., 2008). *Cash ETR* is defined as cash tax paid divided by pre-tax book income net of special items.[6] *GAAP ETR* is defined as total tax expense divided by pre-tax book income. We follow Balakrishnan et al. (2019) to construct our measure of tax aggressiveness (*Cash TA* and *GAAP TA*), which are size-year-adjusted variables.[7] Banks with more aggressive tax planning activities have lower ETRs and higher measures of tax aggressiveness.

We implement a regression discontinuity design. We follow Garcia and Steele (2020), who argue that our RDD setting helps us circumvent potential endogeneity concerns while capturing the local treatment effect of stress tests. They argue in favor of employing a regression discontinuity design over other designs such as difference-in-differences (DiD). While the DiD is a sound model, particularly when it comes to finding differential trends due to a time-varying shock between a treatment and a control group, in our study, the methodology would not be as successful in attributing the difference exclusively to the Dodd-Frank stress testing mandate given that large and regional banks are on differential growth trends with respect to asset size, and other key variables. Hence, we use a regression discontinuity design to capture the impact of bank stress testing on bank tax avoidance and attribute significant results to the regulation in question.

Our findings document that supervisory bank stress tests have the unintended consequences of increasing the treated banks' tax avoidance and aggressive tax planning activities in the form of lower taxes paid in cash and lowered tax expenses relative to non-stress test banks in the control group. We find that the cash-effective tax rates decrease between 0.188 to 2.386 percentage points.

[6]By focusing on *Cash ETR* we avoid potential overstatement of current tax expense due to accounting for income tax benefits such as employee stock options (Chen et al., 2010).

[7]There are other measures of tax avoidance, such as Unrecognized Tax Benefits (UTB) (Rego and Wilson, 2012), Book-to-Tax Differences (Desai and Dharmapala, 2009; Frank et al., 2009), and pro-tax shelters (Lisowsky, 2010) in literature, however, we refrain from employing them due to data availability issues for bank holding companies.

Using the 3-year *Cash ETR* rolling sum, we see a significant drop of 0.169 percentage points. Similarly, when we use the *GAAP ETR* measure, we find a decline of 0.67 to 1.395 percentage points, while the 3-year *GAAP ETR* rolling sum and shows a 0.577 to 0.874 percentage points decrease. The results corroborate with our measures of tax aggressiveness, which we constructed by following Balakrishnan et al. (2019), finding an increase of 0.216 to 1.001 percentage points for the contemporary measure and an increase in the range of 0.014 to 0.934 percentage points for the 3-year *Tax Aggressiveness Index* rolling sum – treated banks tend to be more tax aggressive than the non-stress test banks, the effect is sizable and statistically significant at the 1% level.

Our tax risk findings confirm that mandatory transparency via stress tests increases the tax risk for banks. We generate a Tax Policy Uncertainty Index by aggregating the political tax risk, the political risk, and the political risk sentiment measures generated by Hassan et al. (2019). We find that uncertainty, as measured by our index, increases significantly in the range of 0.080 to 0.46 standard deviations at the contemporary level, and in the range of 0.229 to 1.682 standard deviations at the 3-year rolling sum level. We report the findings for each of the components of the Tax Policy Uncertainty Index – the political tax risk (which increases approximately 0.004 to 0.024 percentage points for treated banks relative to banks in the control group), the political risk (significant increase), and the political risk sentiment measures (the latter two of which serve as proxies for regulatory attention). While the political risk sentiment decreases at the contemporary-level, we find that they increase for stress-test banks relative to non-stress test banks in the range of 17.6% to over 100% for the 3-year rolling sum measures – these findings provide evidence that regulatory attention relatively increases for the treated banks. Second, using the standard deviation for our *Cash ETR* measure, we find a decrease in tax risk at the contemporary level, but an increase in tax risk - increasing 1.4-2.7% at the three-year level. These results corroborate the findings of Dyreng et al. (2019).

Lastly, we analyze how bank behavior and performance has been impacted in the tercile of banks that had the largest surge in tax avoidance post-CCAR, when compared to the pre-CCAR period (the years 2011-2016 minus tax avoidance in the years 2005-2010). These banks: (1) take on more risk, evidenced by the higher risk density and lower capital ratio and Tier 1 ratio, transfer from lesser risk weight assets to holding more risk weight assets; (2) increase lending, particularly to the commercial and industrial sector; (3) increase their OBS Assets and other Assets while decreasing

their HFS, AFS, and HTM Securities; (4) exhibit a lower Tobin's Q while their ROA, ROE, and Net Charge-Offs is higher; (5) have an increased cost of capital and payout fewer dividends; and (6) pay more fees in accounting and audit expenses, legal fees, and consulting and advisory fees.

We validate our results by running robustness checks. First, we test to ensure that the banks in our sample are not violating local continuity by choosing which side of the threshold they fall under, as evidenced by the standard McCrary manipulation test. Second, we find that our baseline tax avoidance results are not driven by only one of the two policy thresholds – the cut-offs of \$100B for years 2011-2012 or \$50B for 2013 through 2016. Our results for the measures of tax avoidance (contemporaneous and three-year rolling sum cash ETRs) and tax risk measures remain significant even under the condition of the inclusion and exclusion of covariates, hence showing the stability of our results. We also conduct pre-tests, in which we employ the regression discontinuity design for our banks in pre-regulation periods (in the years 2004-2010). The purpose of the pre-test is to validate the stress testing mandate under the Dodd-Frank Act as a significant driver of changes to tax avoidance in our baseline results. Our pretests confirm the same by exhibiting no significant changes to tax avoidance in the pretest periods. Lastly, we implement falsification tests in which we create false policy thresholds of $\pm 10\%$ of the true policy thresholds. Our falsification tests either change signs or lose significance, proving the impact on tax avoidance at the thresholds is due to the passage of the stress testing policy under the Dodd-Frank Act.

We contribute to three strands of literature. Our findings show that there is a higher degree of tax avoidance activities in banks for which stress testing is a mandatory requirement compared to non-stress test banks. Hence, we add to the existing literature on tax avoidance and value it brings to the firm, both costs and benefits (Desai and Dharmapala, 2006, 2009; Hanlon and Slemrod, 2009; Rego and Wilson, 2012; Wahab and Holland, 2012; Chyz, 2013; Graham et al., 2014; Goh et al., 2016; Tang, 2019), and to the broader field of regulation in taxation and tax structure (Serrato and Zidar, 2018; Garrett et al., 2020; Chen et al., 2019). We are primarily contributing to sparse literature in tax avoidance and bank holding companies (Gallemore et al., 2019; Gawehn and Müller, 2020), especially considering the systemic importance of the banking industry to the economy. Second, we contribute to the growing macroprudential stress test and bank characteristics literature (Gambacorta and Shin, 2016; Bassett and Berrospide, 2017; Acharya et al., 2018; Clark et al., 2019; Garcia and Steele, 2020; Hirtle et al., 2020) by studying the impact of stress testing

on tax avoidance.

Finally, we contribute to an emerging strand of literature on tax risk and its treatment separately from tax avoidance itself (Drake et al., 2019; Dyreng et al., 2019). Since Dodd-Frank captures tail risk and uncertainty aspects of bank functioning, it is prudent to analyze the impact of stress testing uncertainties on tax uncertainties. Thus far, tax risk is not given sufficient attention in the literature, is likely an important metric of firm valuation by shareholders and bank transparency. The firm-level political risk and political tax risk dataset is obtained from Hassan et al. (2019), who employ textual analysis on earnings call transcripts. Hence the employment of this dataset in our paper contributes to growing tax avoidance and tax literature that employs machine learning techniques to extract features from text-based documents (Inger et al., 2018; Nguyen, 2020).

The rest of our paper is laid out as follows, Section 2 provides background on the Dodd-Frank regulation. Section 3 provides a survey of extant literature and our theoretical arguments, Section 4 introduces our sources of data and definitions of our variables, Section 5 introduces the identification strategy employed in this paper, Section 6 discusses our findings, with further robustness checks provided in Section 7. Section 8 concludes.

2 Stress Testing Institutional Background

Stress tests of banks are examinations with the objective to capture and remedy shortcomings in their functioning, hence ensuring viability and long-term sustainability. The early stress tests were conducted internally by the banks and were backward-looking till a more forward-looking approach to capture changing trends in banking was adopted in the early 1990s (Hirtle et al., 2020).

However, the financial crisis of 2007-2009 brought about a regulatory upheaval to the system. The banking industry played a role in exacerbating the Financial Crisis of 2007-2009 that led to the passage of the Dodd-Frank Act of 2010, which included provisions for macroprudential stress testing and oversight of the banking sector. Under a program known as the Supervisory Capital Assessment Program (SCAP), the Federal Reserve supervised stress tests for all banks with at least $100 billion in assets.[8] The SCAP evolved into the CCAR in 2011, which was then expanded in 2013 to include banks with at least $50 billion or more in total assets (Berrospide et al., 2019; Clark

[8]Federal Reserve Report: The Supervisory Capital Assessment Program: Design and Implementation.

et al., 2019; Garcia and Steele, 2020).

The Federal Reserves and other regulatory bodies involved in stress testing work to ensure that banks maintain sufficient capital under simulated and unpredictable adverse scenarios. At all times, US banks have to maintain minimum requirements on the capital ratio, tier 1 ratio, common equity tier 1 (CET1) ratio, the leverage ratio, and supplemental leverage ratio; large banks above the policy thresholds are required to comply with stress testing in addition to maintaining these capital ratio requirements.

The adverse scenarios can include distresses to economic variables such as the GDP, or housing prices, among others (Clark et al., 2019). The stress test scenarios are altered each year to ensure unpredictability (Goldstein, 2017), although evidence in recent literature suggests an element of predictability to the tests (Neretina et al., 2015; Ahnert et al., 2018; Schuermann, 2014). However, the tests are similar across banks to maintain consistency. The results are disclosed to bolster public confidence in the banking system post-crisis (Kohn and Liang, 2019; Cornett et al., 2018; Nguyen et al., 2019). The tests have evolved to ensure that tail risk is being adequately captured and tested for, in addition to testing for adequate capital planning. However, the strict discipline imposed on stress test banks have some unintended consequences, such as a reduction in analyst following and firm-specific information from analysts (Heitz and Wheeler, 2021).

3 Related Literature and Theoretical Arguments

In the US, firms can expect that around one-third of their pre-tax profits will go to the government in the form of federal, state, and local taxes. Hence, tax avoidance tends to be viewed as a desirable firm behavior. Hanlon and Heitzman (2010) define tax avoidance as 'a [legal] reduction of explicit taxes.' Tax avoidance has been empirically found to impact firm value positively (Desai and Dharmapala, 2009; Wilson, 2009; Blaylock, 2016; Drake et al., 2019; Garrett and Suárez Serrato, 2019). A higher degree of firm tax avoidance positively impacts the firm by lowering the cost of equity (Goh et al., 2016). Hedge fund activists demand higher tax efficiency of their inefficient targets, resulting in higher tax avoidance (Cheng et al., 2012). Exogenously-imposed removal of corporate tax haven access negatively impacts employment and local investments (Serrato, 2018). High tax aggressive firms are less likely to commit accounting-related fraud (Lennox et al., 2013).

However, the benefits of tax planning to shareholders come with certain costs like increased risk-taking activities (Rego and Wilson, 2012), increased cost of debt (Hasan et al., 2014), and reduced corporate transparency (Balakrishnan et al., 2019), as well as lower information transparency (He et al., 2020). The inverse is also true; more transparent countries and firms are found to have a correspondingly significant lower level of tax avoidance (Kerr, 2019). There is a positive correlation between managerial rent extraction and lowered corporate transparency as a result of increased tax avoidance (Desai and Dharmapala, 2006). Hanlon and Slemrod (2009) posit a decline in stock price for firms that display high levels of tax avoidance and Wahab and Holland (2012) find tax planning as being detrimental to firm value. Concerns about reputation may prevent firms from engaging in tax planning and tax sheltering activities (Bankman, 2004; Graham et al., 2014). For instance, family firms are wary of the costs of tax-related price discounts, such as penalties from the IRS, and consequentially, potential harm to their reputation (Chen et al., 2010). Firms that have a higher advertising spending are less likely to indulge in tax sheltering due to reputational concerns, a relationship that is positively moderated by higher firm transparency (Mansi et al., 2020). Overall, the benefits of increased tax savings are likely to far outweigh the cost, as documented by Tang (2019). Despite the dominant impact of benefits over the drawbacks of tax planning, some firms still choose to be less tax-avoiding than others (Shackelford and Shevlin, 2001).

Executives set "the tone at the top" as far as firm tax avoidance practices are concerned (Dyreng et al., 2010; Desai and Dharmapala, 2006; Rego and Wilson, 2012; McGuire et al., 2014; Jia et al., 2020). More capable managers are less likely to indulge in tax sheltering activities (Francis et al., 2013). A firm having CFOs with accounting experience and CFOs incentivized by compensation design is positively and statistically correlated to higher tax planning in firms (Chen et al., 2020). Firms with highly experienced audit committees engage in more tax planning, but lower risky tax planning Robinson et al. (2012). While Drake et al. (2019) finds a positive correlation between tax avoidance and firm value, they also find that investors negatively value tax risk. One of the concerns of tax planning would be a negative impact on firm or managerial reputation; Gallemore et al. (2014) finds little to no evidence to suggest that tax sheltering results in loss of reputation, contrary to the aforementioned studies in literature that find evidence of reputational concerns of tax avoidance.

We argue that bank stress tests that mandate transparency in asset holdings and projected

plans in periods of distress could affect bank behavior. For example, bank stress tests impact firm value, bank performance, bank portfolio characteristics, and loan portfolios, reporting standards, and bank transparency and governance (Garcia, 2018; Clark et al., 2019; Garcia and Steele, 2020). Hence, such behavioral change can affect taxes, particularly since the goal of stress tests is to reduce bank risk, which could affect bank profitability. Consequently, banks can use tax avoidance as a measure to ameliorate potential profit losses while complying with the regulation. Additionally, we posit that the added regulatory attention from stress test increases bank window-dressing, further augmenting or reducing bank activities in tax avoidance and aggressive tax planning. Recent descriptive literature has shown both types of results, that higher transparency correlates with lower tax avoidance and that higher tax avoidance leads to a reduction in transparency (Kerr, 2019; He et al., 2020). Hence, the impact of stress tests on bank tax avoidance is an empirical question which we attempt to answer within a causal setting.

The positive relationship between bank liquidity and risk-taking is documented in extant literature (Khan et al., 2017; Delis and Kouretas, 2011). While some strands of literature posit that a higher capital buffer reduces moral hazard behavior (Berger et al., 1995; Lee and Hsieh, 2013), others argue that a larger capital buffer to offset short-term, temporary losses will enable banks to shrug a risk-averse approach in picking investment projects (Shrieves and Dahl, 1992; Hellmann et al., 2000; Jokipii and Milne, 2011). For a sample of 135 Chinese banks, Jiang et al. (2020) find a non-linear, U-shaped relationship with risk-taking; higher the bank is capitalized, lower the riskiness is, till a certain point, after which the more the bank is capitalized, the more risk-taking it exhibits. Although the literature on the impact of bank tax avoidance on risk-taking is sparse, we conjecture that the increased cash-savings from tax avoiding leads to increased risk-taking by banks through the channel of increased bank capital buffers.

Higher capitalized banks are also more likely to increase their lending. One can argue that the primary function of banks is to supply credit; an increase in cash holdings from tax avoidance should enable them to increase liquidity. Several studies in literature find evidence of banks increasing lending when they are better capitalized, especially when spurred by expansionary monetary policy. The result is more strongly significant for large banks (Berger and Bouwman, 2009; Jiménez et al., 2012; Altunbaş et al., 2016; Kim and Sohn, 2017; Chu et al., 2019). However, robust levels of liquidity may have 'unintended consequences; an expansionary monetary policy increases risky

lending, and overall lending by banks, which might lead to financial crises if left unchecked (Acharya and Naqvi, 2012; Berger and Bouwman, 2017). In our results, significantly increased lending is driven by an increase in bank commercial lending (real estate and industrial loans), while consumer lending decreases. Expansionary monetary policies also lead to an unchecked loan growth, including bad quality loans. We hypothesize that increased cash savings from tax avoiding can contribute to a significant increase in Net Charge-Offs, which indicates a growth in poor quality loans (Jin et al., 2019).

Goh et al. (2016) finds that higher tax avoidance is significantly related to an lowered cost of capital. They hypothesize that the cash savings from tax avoiding activities can help increase the firm future cash flows, which will decrease the cost of equity capital. Meanwhile, they also recognize that increased tax avoidance can result in increased cash flow risk through 'wealth expropriation' (Desai and Dharmapala, 2006) and higher penalties from the IRS (Hanlon and Slemrod, 2009), which can increase the cost of capital, which is consistent with our findings in Panel B of Table 8 (See Section 6.2.3). Cook et al. (2017) find that ex-ante increases in cost of capital in increasing tax avoidance is affected by investor perceptions of tax avoidance, while Hutchens and Rego (2015) do not find a significant impact of tax avoidance on cost of capital. Firms often invest in Off-Balance-Sheet (OBS) assets to obfuscate high levels of debt financing and their percentage of risky assets, and to ensure they do not violate any covenant ratio restrictions (El-Gazzar et al., 1989). OBS activities also enable banks to increase their lending, and thereby not have to forego positive NPV projects (James, 1990). Our sample of banks with large increase in tax avoidance post-Dodd Frank significantly increase their OBS Assets and Other Assets, which allows them to adhere to debt covenant restrictions. It is likely that the cost of debt will decrease as a result of banks adhering to their covenant contracts, through the channel of increased OBS assets.

Tax avoidance is an activity that requires detailed accounting knowledge and legal and advertising expertise. Aggressive tax planning can lead to an increase in audit risk due to lowered accounting quality, as well as litigation risk from shareholders (Weber, 2009; Hu et al., 2018). This increased audit and litigation risk in turn increases the fees incurred by the tax avoiding firm. Hanlon et al. (2012) empirically find that Book-Tax Differences is positively associated with auditor fees, although the results are driven more by earnings management than by tax avoidance.

Additionally, the Dodd-Frank brought in new rules for financial firms on how to invest and

report their taxes.[9] One example is the Volcker Rule - which regulates how banks can invest using their own accounts and their relationships with hedge funds and private equity funds. Recent literature has shown that new investment and tax rules can trigger lumpy investments and affect tax planning (Chen et al., 2019). Hence, banks might change the level of their lumpy investments (investments characterized as large, infrequent ones, or sparse - see Bazdresch (2005)) as a direct result of exogenously imposed tax-related reforms. Literature on tax avoidance and banks is limited, despite potential clients preferring banks that are tax-intermediary compared to banks that do not perform tax-intermediary activities in addition to their traditional financial intermediary roles (Gallemore et al., 2019). Gawehn (2020) provide several reasons why banks might try to keep their tax expenses low, such as lower profits from lending and deposits due to low interest rates, pressure on jobs due to automation, compliance with Fed-mandated capital ratios, and shareholder expectations. Gawehn and Müller (2020) find that banks have higher Cash ETR than non-bank firms, a difference that is even more pronounced for banks that are not well capitalized. Banks perceive tax avoidance negatively, which results in the imposition of higher loan costs and spreads for firms that display aggressive tax planning (Hasan et al., 2014). While Hasan et al. (2014) examine the impact of tax avoidance on bank loans, they do not study the phenomenon of tax avoidance within banks themselves. Hence, we contribute to a sparse literature on changes in tax avoidance practiced by bank holding companies as a result of exogenously imposed bank stress testing.

4 Data and Variable Definitions

We collect data on bank characteristics, such as the consolidated loan-related variables, risk ratio-related variables, portfolio characteristics, and bank performance-related variables from the FR Y-9C Consolidated Statements for Financial Companies data report generated by the Federal Reserve. In our dataset spanning the years 2000-2016, there are 35 Bank Holding Companies (BHCs) with assets that surpass $50B in value, thus forming the treated group in our quasi-experimental setup. We obtain the variables required to construct our tax avoidance and tax aggressiveness measures

[9] While taxation-related reforms are ideally a welcome change for firms and individuals, the 2018 stress tests found that latest tax reforms involving the treatment of loss carry-forwards will be detrimental to firm income in a recession. See https://www.spglobal.com/marketintelligence/en/news-insights/trending/l2eycva8wilf2g2eu$_k$*cbw*2.

from Compustat for the years spanning 2000 to 2016.

We refer to existing literature to construct the tax avoidance measures - the cash effective tax rate (*Cash ETR*) and the *GAAP ETR* (Dyreng et al., 2008; Hanlon and Slemrod, 2009). The cash-effective tax rate, our primary measure, is constructed as the cash taxes paid, scaled by pre-tax income net of special items. The *Cash ETR* is more robust to accrual manipulation of the two measures and accounts for some tax-related benefits that are not recorded on the income statement (Cheng et al., 2012). *GAAP ETR* is the income tax scaled by pre-tax income. We create our bank size-year controlled measure of tax aggressiveness by following Balakrishnan et al. (2019). We generate three-year rolling sum variables to measure longer-run tax avoidance and tax aggressiveness. Refer to Table 1 for more detailed variable construction and definitions. We note that a negative sign on Cash ETR indicates an increase in tax avoidance, which is the expected sign consistent with our hypothesis (wherein we conjecture that stress tests lead to an increase in tax avoidance, which is a decrease in cash paid in taxes). Our hypothesis conjectures a positive sign on the tax aggressiveness index.

Finally, we obtain the publicly available firm-level political risk dataset provided by Hassan et al. (2019). The authors use textual analysis to develop the firm-level measures for different types of political risks faced by public firms in the United States; we employ the political risk, the political risk sentiment, and the political tax risk in our paper.

Table 2 presents the descriptive statistics of the tax avoidance and tax aggressiveness measures (Panel A), the bank characteristics for stress tested and non-stress tested banks (Panel B), and the tax risk measures (Panel C). The data spans the years 2011-2016. Table A2, in our Online Appendix, presents the same for the years post-implementation of the Dodd-Frank Act, from 2000-2016.

Panel A of Table 2 presents the effective tax rates for stress tested versus non-stress tested banks. On average, all the banks in our dataset have a *Cash ETR* and *GAAP ETR* of 22.28% and 25.5%, respectively. According to Balakrishnan et al. (2019), the ETRs being lower than the corresponding statutory tax rate (35%) might indicate tax planning or high levels of foreign operations. The *Cash ETR* (*GAAP ETR*) is 19.85% (24.6%) in stress-test banks, versus 23.4% (25.9%) in non-stress tested banks, which is indicative of more tax avoidance on average in stress-test banks. Interestingly, the descriptive statistics reveal that stress-test banks' tax aggressiveness

is at least twice that of non-stress test banks. Panel B shows some of the bank characteristics such as risk density (or risk-weighted assets), capital ratios, lending variables, balance sheet variables, among others. It shows that treated banks tend to have lower risk density (0.72%) than non-stress test banks (0.76%). Treated banks tend to have have a net income that is roughly 24 times the average net income for non-stress test banks. The dividend payout ratio of stress test banks (0.944) is nearly three times that of the non-stress test banks (0.34). Panel C shows that stress-test banks, on average, have high tax risk when compared to non-stress test banks.

5 Empirical Strategy

We use a regression discontinuity design (RDD) to measure the effects of mandatory transparency disclosure requirements via stress tests on bank tax avoidance, aggressive tax planning, and tax risk. The RDD is a non-parametric approach, wherein the treatment is measured at the threshold. We implement a sharp RDD approach given policymakers have strictly defined a fixed policy cut-off for total asset size above which banks have to be stress tested. As discussed in Section 2, this cutoff is \$100B in 2011 and 2012, and lowered to \$50B for the years 2013-2016. We conduct robustness checks to ensure that banks are not manipulating their total assets held in size in an attempt to fall under the threshold to evade added attention and regulation from the Federal Reserve. Banks show no evidence of trying to manipulate their total assets to avoid complying with stress testing, see Section 7.

In addition to tests for manipulation of the assignment variable, we conduct a battery of other robustness tests, namely, we conduct balanced covariate and covariate sensitivity tests, along with pre-tests and falsification tests, to confirm that bank characteristics are not driving the treatment effect at the policy thresholds. Pre-tests are conducted to ensure that the implementation of CCAR stress tests is driving the results. Falsification tests are run using different false policy thresholds to test whether the actual policy thresholds are the ones driving the results. Refer to Section 7 for a discussion of these results.

Our baseline model implements the following regression discontinuity design (RDD) in which β_1 is the average local treatment effect of interest:

$$Y_{it} = \beta_0 + \beta_1 Stress_{it} + \beta_2 AssetsNorm_{it} \tag{1}$$
$$+ \beta_3 Stress_{it} * AssetsNorm_{it} + \boldsymbol{\beta}_4 \mathbf{X}_{it} + \boldsymbol{\delta} + \epsilon_{it}$$

$$Y_{it} = \beta_0 + \beta_1 Stress_{it} + \beta_2 AssetsNorm_{it}^2 \tag{2}$$
$$+ \beta_3 Stress_{it} * AssetsNorm_{it}^2 + \boldsymbol{\beta}_4 \mathbf{X}_{it} + \boldsymbol{\delta} + \epsilon_{it}$$

We execute our RDD using linear (Refer to Equation (1)) and quadratic (in Equation (2)) specifications to achieve functional form flexibility. We normalize total assets by subtracting the policy cut-off from the total assets for the given year and bank. Total assets are expressed in logs, hence, our normalized assets variable $AssetsNorm$ is equal to $ln(Assets_{it}) - ln(p)$, where p denotes the policy cutoff.[10] $Stress_{it}$ (a binary variable) is equal to 1 if the bank's size is larger than the threshold p, and 0 if lower (in other words, $Stress_{it} = 1$ for stress test banks and 0 otherwise). $\mathbf{X}_{it}$ is a vector of bank characteristics that include different bank performance and lending ratios. $\boldsymbol{\delta}$ is a vector of fixed effects that includes bank and year fixed effects. We also included state-year fixed effects as robustness checks, and the results remain consistent.[11] Fixed effects help us control for unobserved bank-level attributes (such as bank business practices, compensation, auditors, executive composition, and ability, among others) and state levels (varying state and federal tax regulations, federal district regulatory attention, macroeconomics conditions that may impact the demand for credit from local municipal banks and credit unions, among others). In all specifications, we cluster our standard errors at the bank level. The interaction terms $Stress_{it} * AssetsNorm_{it}$ and $Stress_{it} * NAssetsNorm_{it}^2$ allow for functional form flexibility.

We include bank-covariates and fixed effects to reduce estimate variability, following Pettersson-Lidbom (2012) and Lee and Lemieux (2010). In addition, our relatively smaller sample size may raise concerns over whether treatment and comparison groups are balanced or if the scales are tipped slightly towards pre-treatment characteristics (Bruhn and McKenzie, 2009). For example,

[10] We change the threshold p from 100 in 2011-2012 to 50 in 2013-2016, following changes to the policy (Cornett et al., 2018)

[11] Due to redundancy, the robustness check results are not displayed in the paper

a potential concern could be that tax avoidance is correlated with bank risk levels, corporate transparency measures, and business practices (Garcia and Steele, 2020). A fixed-effect approach with covariates should ensure comparable treatment and control groups since the comparison is made within the same subject rather than between different subjects. We add a series of controls to account for certain bank characteristics that might correlated with tax avoidance, for example banks with more foreign income on average have lower ETRs (higher tax avoidance), and that public non-family-owned banks are more tax aggressive than public family-owned banks (Chen et al., 2010). As part of our control variables, following Garcia and Steele (2020), we include performance ratios (net income, equity, and deposits by assets, total costs/income, loan loss reserves and problem by loans), and lending ratios scaled by loans (Commercial Real Estate loans, Residential Real Estate loans, agricultural loans, CI loans, consumer loans, and foreign government loans). As seen in our balanced covariate and covariate sensitivity tests in Tables 12 - 14, discussed in Section 7, our results remain robust and consistent. It is possible that CCAR regulation also impacts some of the bank characteristics used as controls. To circumvent the possibility of reverse causality, we include one-period lags of the bank characteristic and lending variables as controls.

We employ a quadratic regression, following Porter (2003), who posits that a form lower than a quadratic one faces issues with boundary bias in a regression discontinuity form. Hence, we execute Equation (2) as a local pooled cross-section with a quadratic form of estimation. Although we recognize the linear form's boundary bias weakness, we nevertheless test a local linear regression, which we report in our robustness checks. However, we do not employ high-order polynomials to avoid misleading estimations, here we follow the recommendation of Gelman and Imbens (2014). Furthermore, following recommended RDD practices of checking for bandwidth sensitivity, we report standard regression results using different bandwidths. We report the results for each local regression specification (linear and quadratic) by estimating the mean square error (MSE) optimal bandwidth by taking the minimum optimal bandwidth of the most common MSE-optimal procedures as described in Imbens and Kalyanaraman (2012); Calonico et al. (2014); and in the cross-validation, the algorithm proposed by Ludwig and Miller (2007).[12]

One of the drawbacks of using optimal bandwidths is the automatic bandwidth selection which

[12]We implement our optimal bandwidth measures for the MSE specifications in Stata, using the *rdrobust* command (part of the rdrobust package). *msecomb1* and *cercomb1* are specified in the model as the bandwidth selectors.

can result in widely varying bandwidth size according to covariates or dependent variables that are under examination. Hence, to ensure a balance in the number of observations across the different dependent variables we are studying, we employ two solutions. First, we tune our model to require our optimal bandwidth to include at least 65 observations. This ensures we maintain a balance and consistency between stress test and non-stress test banks. A bandwidth with 65 observations is slightly larger than the ±15% bandwidth of the natural log of the bank size policy threshold, which corresponds to an asset range of -$25B to +$40B around a bank size threshold of $50B (Garcia and Steele, 2020). Asset bandwidths vary on each side of the threshold due to the logged nature of total assets. Second, to circumvent concerns regarding highly localized findings, we encompass a wider window of banks by specifying a bandwidth to include all banks between $10B and $200B in asset size (labeled as 'All Relevant Banks' in our tables). Most of our main findings remain consistent upon increasing the bandwidth of banks under study.

6 Results

6.1 Regression Discontinuity Design

We begin our discussion by comparing the trends in tax avoidance between stress-test and non-stress test banks. Figure 1 illustrates trends in tax avoidance (using both *Cash ETR* and *GAAP ETR* measures of tax avoidance) between treated and control banks for the years 2007-2016. In the recession years between 2007 and 2010, we observe that treated banks drastically reduce the cash taxes paid, while the regional banks exhibit less tax avoidance by increasing cash taxes paid – as measured by the *Cash ETR* in the upper panel and by the *GAAP ETR* in the lower panel. After 2011, the first year of stress tests, treated banks pay more cash in taxes and hence decrease their levels of tax avoidance, however, they still demonstrate higher levels of tax avoidance than their counterparts in the control group. After the introduction of CCAR stress testing, treated banks also display more tax aggressiveness than banks in the control group. Our event study graphs, in Figures 2 - 3, The event study results show that stress-test banks reduce their cash taxes paid and income tax expenses around the recession years and increase them after the implementation of CCAR, relative to non-stress test banks.

Our quasi-experimental setting supports the RDD assumption that banks close to the policy

thresholds possess similar characteristics, hence emphasizing that only the treatment of stress testing is what drives the behavioral effects. Figure 4 presents the local-average treatment effect for Risk-Weighted Assets. We find that stress test banks close to the cut-off reduce their risk density after the implementation of the regulation. Our regression discontinuity plot (see Figure 5) shows the local-mean treatment effect for tax avoidance and cash taxes paid, illustrating the specification in Equations 1-2. Figure 5 show that our primary measure of tax avoidance, *Cash ETR*, is lower for banks immediately above the policy threshold relative to those right below and the discontinuity is significant at the 95% level. This corroborates the findings of our hyopthesis. Similarly, we observe a statistically significant discontinuity for cash taxes paid.

Tables 3 and 4 presents the results of our regression discontinuity design, following Equation (1), for the annual and three-year rolling sum bank tax avoidance and tax aggressiveness measures, respectively. We employ the annual and three-year rolling sum *Cash ETR* and *GAAP ETR* as our measures of tax avoidance, refer to Section 4 for the definitions. The variables are winsorized at the 1% and the 99% level for the lower and the upper bound. We find that the average treatment effect for cash taxes paid decreases between 0.66 - 2.386 percentage points for banks under an optimal bandwidth, and between 0.188 - 0.467 percentage points for all relevant banks between \$10B and \$200B in asset size, at the 1% level of significance. This implies that banks in the treated group increase their level of tax avoidance by paying lower cash in taxes under the Dodd-Frank regulation, when compared to banks in the control group. Given that the mean pre-tax income for banks in our sample is \$581 million, a reduction in the *Cash ETR* of 0.66 - 2.386 percentage points represents \$3.84 - \$13.86 million in annual tax savings for an average bank. This relationship persists when we employ a three-year rolling sum for tax avoidance for all relevanr banks (a drop between 0.17 points). These findings are corroborated when we use the *GAAP ETR* as a measure of tax avoidance, based on income tax expenses. The *GAAP ETR* decreases between 0.67 to 1.395 points for the annual measure and between 0.577 - 0.874 percentage points using the three-year measure. However, upon including more banks by relaxing the optimal bandwidth condition, we find no significance for GAAP ETR. Regarding tax aggressiveness, we find that our index of tax aggressiveness increases for both the annual and the three-year measures, indicating under stress testing banks actively engage in aggressive tax planning to minimize potential costs related to the increase in transparency via stress testing.

Our tax risk findings confirm that mandatory transparency via stress tests increases the tax risk for banks, see Tables 5 - 6. We create a Tax Policy Uncertainty Index at the contemporary and the three-year level by aggregating and subsequently standardizing the tax political risk, political risk, and the political risk sentiment measures, which are generated by Hassan et al. (2019). We find that the contemporary (3-year moving sum) Tax Policy Uncertainty increases by 0.08 (0.229) standard deviations for all relevant banks, and by 0.460 (1.682) standard deviations for banks in the optimal bandwidth specification, significant at the 95% (99%) level. We find that contemporary (3-year moving sum) tax political risk increases approximately 0.004 to 0.024 (0.199 to 0.575 for all relevant banks) percentage points for treated banks relative to banks in the control group. The general political risk and the political risk sentiment measures both serve as proxies for regulatory attention. Hence, we find that the contemporary (3-year moving sum) political risk increases by 0.007 – 0.027 (0.11 to 0.25) percentage points for all relevant banks. At the contemporary level, an increase in political risk corresponds to a significant decrease in political risk sentiment (0.001 to 0.018 points). However, for the three-year rolling sum, there is a significant increase of political risk sentiment (0.17 to 0.42 percentage points). These findings provide evidence that regulatory attention relatively increases for the treated banks. Using the standard deviations of our main measure of tax avoidance, *Cash ETR*, we find an increase in tax risk-related volatility – which increases 1.4% for the three-year rolling sum measure.[13] These results corroborate the findings of Dyreng et al. (2019), who find that firms with relatively low *Cash ETRs*, bear significantly greater tax uncertainty than firms that have higher *Cash ETRs*.

We summarize our key baseline results in Table 9. For simplicity and ease of readability, and to avoid redundancy, we select our main measure from each of our baseline results tables on tax avoidance (*Cash ETR*), tax aggressiveness (*Tax Aggressiveness*), and tax uncertainty or risk (both the (*Tax Policy Uncertainty* and the *Cash ETR volatility*) - as defined above. The table shows that tax avoidance (Cash ETR) increases given the negative sign and significance of the coefficient; while *Tax Aggressiveness* and *Tax Policy Uncertainty* increases. We use these baseline results as our benchmarks in our robustness checks discussed below.

[13] Although not tabulated, we also find consistent results using the standard deviation of the *GAAP ETR*.

6.2 Implications of Large Surge in Tax Avoidance post-recession

What is the impact of increased tax avoidance on bank characteristics under the CCAR stress test regime? What are the characteristics of banks that are exhibiting high tax avoidance post implementation of the Dodd-Frank Act? For example, does the exhibition of tax avoidance post CCAR implementation impact bank profitability or riskier asset allocation? In this section, we study these implications to determine whether tax planning activities impact bank riskiness, profitability, cost of capital, loan and portfolio characteristics, and bank restatements and advisory-related fees.

To determine the impact of those banks that increase their tax avoidance activities the most on bank performance, we use Ordinary Least Squares (OLS) regressions using a sample of banks with total assets between $10B to $200B. We first sort banks in the time frame following the implementation of the CCAR stress tests (for the years 2011 - 2016) by the average cash paid in taxes scaled by pre-tax income net of special items (which is the average *Cash ETR*). This average *Cash ETR* for the years 2011-2016 is the post-Dodd Frank implementation *Cash ETR*. Similarly, we create an average of the *Cash ETR* for the years 2005-2010, which we identify as the pre-Dodd Frank implementation *Cash ETR*. We create a measure which tracks the difference in tax avoidance between the post and the pre-Dodd Frank period. Then, we create a variable labeled ***Large Surge Tax Avoidance*** based on this measure, wherein the lowest tercile of banks in terms of an increase in *Cash ETR* represent the top tercile of high tax avoidance banks.

6.2.1 Capital Ratios and Risk Weight Asset Allocation

We employ the OLS methodology to analyze the impact of the top tercile of banks with the highest increase in tax avoidance post-Dodd Frank Act on bank risk ratios. We show banks with higher increases in tax avoidance, under stress tests, exhibit significantly higher risk density (0.43 percentage points) and Leverage Ratio (2.73 points), while the Capital Ratio (decreases by 1.30 points) and the Tier 1 Ratio (2.75 points) decrease. The results are strongly significant at the 1% level, refer to Panel A of Table 7. This indicates that banks that increase their tax avoidance with additional transparency requirements (brought on by the Dodd-Frank Act) increase their risk taking on average by increasing risk density and their leverage ratio. Consistent with the hypothesis of increased risk taking, the Tier 1 Ratio decreases, which is a measure scaled by risk-weight assets.

One explanation for this increase in the leverage ratio might be tax avoiding banks increasing the debt incurred for the tax benefits of debt. Overall, the results suggest that high tax avoidance banks increase their risk-taking activities. It is likely that an increased cash savings from tax planning enables banks to take on more risk. Our results are in line with the findings of Hutchens et al. (2020), who find that tax avoidance activities are positive and significantly related to firm risk, especially for larger, more mature firms. The increased risk density of banks is further illustrated in Panel B of Table 7, where we find that high increase tax avoidance banks reallocate assets from the lowest risk weighted categories (0% and 20%) into the two highest risk-weighted assets (50% and 100%).

6.2.2 Bank Performance

Financial performance is a key indicator of the financial health of a firm. We measure profitability as Earnings Before Interest, Taxes, Depreciation, Amortization (EBITDA), scaled by Total Assets. We define gross profitability as (Revenue – Cost of Goods Sold) scaled by Total Assets. For definitions of bank risk ratios and profitability, refer to Table 1. We find that banks with high increase in tax avoidance in the CCAR stress tests period, compared to the prior period, exhibited lower Tobin's Q (14.7% lower) and net interest margin (nearly 4% lower). The negative, significant Net Interest Margin may indicate weakness in the financial health of the tax avoiding stress-test bank over the long-term, as the interest earned from loans exceeds interest paid on deposits. These findings may indicate that banks that are tax-avoiding do so as they are cash strapped. However, these banks exhibit increased return on equity (7.6%), increased return on assets (0.9%), and an increased net non-interest margin (1.3%), which complements the findings of increasing return-on-assets with an increase in tax avoidance by Blaylock (2016). See Panel A of Table 8 for the results on the impact of high increase tax avoidance on bank profitability. Additionally, banks that have increased their exhibited tax avoidance decrease the quality of the loans, as evidenced by a significantly increased net charge-offs (0.3% increase). This can be seen as evidence of banks, which now have more cash on hand in lieu of tax planning activities, increasing their loans – even the ones to bad quality customers. This further corroborates our findings of increased risk-taking, as seen in Panel A of Table 7.

6.2.3 Bank Cost of Capital

We now look at the impact of banks with a high increase in tax avoidance in the years 2011-2016 (post-implementation of stress-test mandates) on the bank cost of capital. An analysis of the cost of capital can help banks solve the Debt-Equity ratio puzzle and shareholder appeasement depending on the impact of their levels of tax avoidance activities. Our results show that high tax avoidance banks exhibit a increased cost of capital (driven by a increase in the cost of equity and slightly attenuated by a decrease in the cost of debt), contrary to the main findings of Goh et al. (2016). Hence, it might be favorable for these sample of banks to raise capital by borrowing versus through issuing equity. This increase in the cost of equity might be interpreted as shareholders finding the news of high increase of tax avoidance in these banks as unfavorable, which leads to an increase in this 'hurdle rate'. Additionally, tax avoidance is considered to be an activity that increases information risk, which can lead to an increase in cost of capital (Chen et al., 2011; Shin and Woo, 2017). The Dividend Payout Ratio of high tax avoidance banks, however, decreases with higher tax avoidance. This shows that cash savings from employing tax planning strategies are likely not being distributed back to the shareholders. The negative correlation can be seen as non-profitable banks both tax avoiding as well as decreasing dividends in order to increase their cash holding reserves. Refer to Panel B of Table 8.

6.2.4 Bank Lending and Portfolio Allocation

The key function of banks is to supply capital to the economy. One of the feared "unintended consequences" of stringency in capital requirements for stress test banks is the potential reduction in bank lending in order to satisfy capital reserve conditions. However, extant literature shows that banks mandated under regulatory requirements to increase capital ratios do not suffer these consequences; in fact, they increase their loans (Bassett and Berrospide, 2017; Chu et al., 2019; Bahaj and Malherbe, 2020; Garcia and Steele, 2020), also corroborated by a sample of Dutch banks upon the imposition of a Liquidity Balance Rule (LBR) (Ananou et al., 2021).[14] Inversely, a decrease in regulatory capital requirements in the 2012 CCAR exercise generated a decrease in Commercial and

[14]To the contrary, Boissay and Collard (2016), Acharya et al. (2018), and Cortés et al. (2020) find that the quantity of bank loans may decrease or remain unchanged. However, banks shift lending away from risky borrowers, indicating that the quality significantly improves.

Industrial Loans. In this section, we observe bank lending for the tercile of banks that exhibited the highest increase in tax avoidance activities under CCAR stress test period (2011-2016) when compared to a pre-CCAR period (2005-2010). Consistent with extant literature, increased bank tax avoidance behavior in lieu of stress test mandates results in a significant increase in overall bank loans (0.15 points), which is driven by an increase in CRE loans and C&I Loans (increase of 24.5% and 10%, respectively). Residential real estate loans and consumer loans decreased (by 6.7% and 32.6%). Refer to Panel C of Table 7. Banks with large increases in tax avoidance were increasing loans in the commercial and industrial sector, while decreasing residential and consumer loans. Hence, the cash-savings from banks' tax planning lead to an increased ability to supply credit to the economy. This boost to loan growth also contributes to a significant increase in bad quality loans, as evidenced by an increase in Net Charge-Offs (See Panel A of Table 8).

Panel D of Table 7 shows the correlation between banks that exhibit high increase in tax avoidance activities in the CCAR stress test years (2011-2016) compared to previous years (2005-2010) and bank portfolio variables. We find that high tax avoidance banks increase their off-balance-sheet (OBS) asset items and Other Assets (by 9.5%, and 0.8%, respectively), while decreasing their HFS loans (- 0.2%), AFS and HTM Securities (by -1.3% and -0.2% respectively), and Cash & Deposits due (by 3.4%). Banks that increase their tax planning activities are taking on substantially more risk (this behavior is seen in sample of high tax avoidance banks, refer to Panel A and B of Table 7) and more debt, and as a consequence, increase their holdings of OBS Assets, consistent with the findings of (El-Gazzar et al., 1989). Tax avoidance practices enable banks to increase their cash holdings, which helps them significantly reduce their cash and deposits due. While increased tax avoidance enables banks to have more cash on hand, banks choose to increase their overall lending function rather than increase their AFS and HTM Securities holdings till maturity.

6.2.5 Restatements, Accounting and Audit Fees, Legal Fees, and Consulting Fees

We now look at the impact of banks with a high increase in tax avoidance between the years 2011-2016 (post-implementation of stress-test mandates) on restatements, accounting or audit expenses, legal fees, and consulting/advisory fees. Our results show that while high increase tax avoidance banks do not have a significant impact on restatements, they exhibit a increased log of accounting and audit fees by 7.92 points, legal expenses (+9.29 points), and Consulting and Advising Expenses

(+10.39 points). Our results suggest that banks require resources in the form of accounting expertise and consulting to conduct tax planning, which is why these related expenses increase. Extant literature suggests that firms with CFOs that have higher accounting expertise exhibit significantly higher tax aggressiveness (Chen et al., 2020). While Mansi et al. (2020) find that firms that have higher advertising expenses are wary of the negative impact of tax planning on reputation, and hence do not tax avoid as much. We find the inverse to not be true; in our findings, high tax avoidance banks have higher expenses (in the form of legal, consulting and advisory, and audit expenses) with respect to embellishing firm reputation; it is likely they do so to correct the plausible damage of tax avoiding to reputation. Navigating tax loopholes requires legal expertise, which also increases for our sample of banks with the most increase in tax avoidance related to banks that do not increase tax avoidance as much. This increase in accounting and audit fees to compensate for audit risk and litigation risk can also be a reason for reduced accounting fraud observed in high tax avoidance firms (Lennox et al., 2013). Refer to Panel C of Table 8.

6.3 Bank Stress Test: Difference-in-Differences

We interact the *Large Surge in Tax Avoidance* variable with the dummy variable proxy for stress test banks, to observe the impact of large increase in tax avoidance in banks on bank characteristics, driven by the policy cut-off. Thus, our interacted measure examines the role of the marginal effect of the Dodd-Frank Act on bank risk ratios, lending and portfolio characteristics, profitability, cost of capital, and restatements and audit fees. See Tables A4-A5 in the Online Appendix for the results. Similar to our baseline results (in Section 6.2), we find that the marginal impact of stress tests on large surge in tax avoidance is, (1) an increase in risk density (by nearly 5%), a decrease in Tier 1 Ratio, and a decrease in 0% Risk-weighted Assets (increase in risk-taking), (2) an increase in C&I loans and a 2.7% decrease in CRE loans, (3) an increase in OBS Assets (5.3%), Loans Held-for-Sale, and AFS Securities, while HTM Securities, Cash & Desposits Due, and Federal Funds decrease, and (4) legal expenses increase (6.67 points). Stress tests do not have a marginal impact when interacted with tax avoidance on profitability ratios, or cost of capital.

7 Robustness Checks

Using our key baseline measures, we implement a series of robustness checks to test our findings. First, since the policy threshold changes in the middle of our sample from being applied to banks with asset sizes over $100B in 2011, to include all banks with $50B or above in total assets in 2013, we test to see if our results are driven mainly by one of our policy thresholds given our unusual RDD setting with varying cut-offs, as discussed in Garcia and Steele (2020).

Due to this varying policy cutoff in our sample period of study, there may be concerns that one of the thresholds is dominating the results. We alleviate this concern by running robustness tests wherein we implement our RDD specification restricting the period to 2013-2016 during which there is only one policy threshold at $50B as in (Garcia and Steele, 2020). Table 11 presents the results for our tax avoidance, tax aggressiveness, and tax uncertainty measures, which are consistent with our original baseline results. Hence, our results are not being driven solely by the $100B threshold implemented in 2011, or by the $50B threshold implemented in 2013.[15]

In the subsequent subsections, we present the results of additional robustness checks where we test the RDD assumptions using our baseline results.

7.1 Manipulation of Assignment Variable Test

The RDD operates under a key assumption of local continuity in the variable under study (Garcia and Steele, 2020). Hence, one of our robustness check is to test to see that banks are not violating local continuity. There is documented evidence that banks below regulation thresholds of $10B slow down growth by engaging in divestitures, to avoid costs that are imposed on banks above certain asset size thresholds (Ballew et al., 2021). If banks were to manipulate asset size and hence choose which side of the threshold they fall under, our results would not be accurate considering the violation in measuring the causal impact of stress testing on tax avoidance. Hence, the assumption of local continuity is imperative to highlight the causal treatment effect of CCAR stress testing on bank tax avoidance, tax aggressiveness, and tax risk.

We use the standard McCrary (2008) manipulation test to evaluate the hypothesis of continuity

[15] As in Garcia and Steele (2020), Figure 6, and Table A1 in our Online Appendix, indicates that the standard RDD assumption of no manipulation of the running variable hold in this setting as well.

of the running variable's density against the alternative hypothesis of a discontinuity at the cutoff.[16] If a discontinuity exists, it would suggest that banks sort themselves below the policy cutoff to avoid having to comply with stress tests. As shown by Garcia and Steele (2020), and confirmed by our results in Figure 6, there does not appear to be a discontinuity in the density. These results help to ensure that the only reason for different outcomes around the threshold is the treatment.[17]

7.2 Balanced Covariate and Covariate Sensitivity Tests

A main assumption of the RD design is that the baseline covariates should be balanced to maintain a local natural experiment's special characteristics. That is, bank characteristics should have similar distributions on both sides of the cutoff as long as the bandwidth is sufficiently small. A typical test for this is to implement a simple RDD, as in Equation (1), with each of the covariates as the dependent variables for different bandwidth sizes. Coefficients that are insignificant from zero would indicate balanced covariates. As in Garcia and Steele (2020), our set of controls include different performance and lending ratios. We follow Garcia and Steele (2020) and recreate their results in Table 12, which shows the balanced covariate tests. The findings show that apart from the ratio of foreign government loans, the control variables are balanced and persistent even though some of them could be endogenous. Hence, stress testing likely affects these variables as well. Similarly, to reduce potential reverse causality concerns, we include the one-period lags as our controls.

Another key assumption of the RD design is the robustness of the results to inclusion and exclusion of baseline covariates. Hence, we test the sensitivity of our tax avoidance, tax aggressiveness, and tax risk results to the inclusion and exclusion of covariates. Tables 13-14 show that when we use partial controls or remove the full set of covariates, our results remain robust for our primary measure of tax avoidance (*Cash ETR*) and tax aggressiveness measures. However, the coefficient for our tax uncertainty measure is sensitive to the inclusion and exclusion of covariates, showing a loss of statistical significance once the covariates are removed. This result suggests that tax uncertainty under Dodd-Frank is driven by time-varying bank characteristics.

[16] See McCrary (2008) and Garcia and Steele (2020) for a description of the procedure of the test.

[17] Table 10 in our Online Appendix presents results for the McCrary manipulation test for the years 2011 to 2016.

7.3 Pre-Tests and Other Falsification Tests

Our next set of robustness tests to validate our baseline RDD results consist of conducting pre-tests, wherein we conduct the same regression discontinuity experiments for a period prior to the passage of the CCAR stress testing regulation. Since we claim that the Dodd-Frank regulation causes stress-test banks to be more aggressive in their tax planning, any significant increases in bank tax avoidance in the pre-test, non-Dodd Frank period would invalidate our hypothesis. Table 15 replicates the results for our key tax avoidance, tax aggressiveness, and tax uncertainty baseline variables, but now for the years prior to the Dodd-Frank, for years 2003-2010 only. The coefficients for our primary measure of tax avoidance, *Cash ETR*, are statistically insignificant across all bandwidth-specifications, validating our hypothesis. Our tax aggressiveness and tax uncertainty measures show some significance however they is sensitivity to the model specification. It is possible that since we are including the recession years in the sample, some banks were being more tax aggressive due to the tax uncertainty prior to the Dodd-Frank. Additionally, it is important to point out that our tax aggressiveness measure is a function of both the *Cash ETR* and *GAAP ETR* and the latter tend to be less stable over time of not due to the inclusion of deferred taxes, application of tax benefits and accruals, and tax reserves (Dyreng et al., 2008; Hanlon and Heitzman, 2010).

We also conduct falsification tests, wherein we run our RDD model with false cutoffs. We use false thresholds that are at $\pm 10\%$ of the true thresholds of \$100B for the years 2011-2012, and \$50B for the years 2013-2016. Hence, we are implementing Equation (1), based off the suggested method by Lee and Lemieux (2010), and also executed by Garcia and Steele (2020). By running falsification tests, we are exploring whether the policy thresholds are the ones driving the results. Hence, if we do find that the effects of stress testing on tax avoidance are similar in significance to our baseline results, our main experimental findings are invalidated, hence showing it is likely that the differential outcomes are being driven by external factors other than bank stress tests.

Table 16 show the results for our falsification tests for our annual tax avoidance, tax aggressiveness, and our tax uncertainty measures. Using a false cut-off of 10% below the true policy thresholds (Columns 1-4), we find a change in signs across the different optimal bandwidth specifications for tax avoidance and tax aggressiveness measures, supporting our baseline results. When we look at the false cut-off of 10% above the true policy thresholds (Columns 5-8), we see no

statistical significance for our measure of tax avoidance. While our tax aggressive measure shows some significance but when comparing the below and the above false cut-offs, observe that signs shift from being negative and significant to positive and significant, further validating our baseline results that our true cut-off is responsible for the signs switching. We find similar effects on tax uncertainty risk which signs switch when comparing the below and the above false cutoffs, hence providing credence to our hypothesis of impact at the true policy thresholds are due to the passage of CCAR stress testing.

8 Conclusion

In this paper, we present our results on the impact of mandatory disclosure requirements on bank tax avoidance. There are costs to aggressive tax planning, as well as benefits to reducing the taxes required to be paid. Our hypothesis is driven by the argument that disclosure requirements associated with stress testing and mandatory capital requirements are likely to lead to window-dressing, and subsequently tax planning by regulated banks. One of the benefits of tax planning for stress tested banks is tax savings, which will potentially contribute to the required capital buffer to comply with and pass the stress tests.

To this effect, we find that the implementation of stress tests results in large banks employing higher levels of tax avoidance and tax aggressiveness, at the contemporaneous level as well as at the three-year rolling sum level. Our primary measure of tax avoidance is the Cash ETR, following Dyreng et al. (2008) and Drake et al. (2019). We adopt our measure of tax aggressiveness from Balakrishnan et al. (2019), who benchmark firm tax-burden according to the asset size bracket they belong to. Our results are robust to alternative measures of tax avoidance (GAAP ETR), as well as to a battery of robustness checks such as pre-tests, falsification tests, manipulation of cut-offs, and covariate sensitivity tests. We also find that tax risk and firm-level political risk and sentiment increases as a result of stress testing for banks that are treated under the regulation. Finally, we find that banks that have large increases in tax avoidance after the CCAR stress tests take on more risk, hold onto riskier assets, lend more, increase their bad quality loans, and subsequently also spend more on legal fees, accounting and audit expenses, and consulting and advisory fees.

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9 Figures

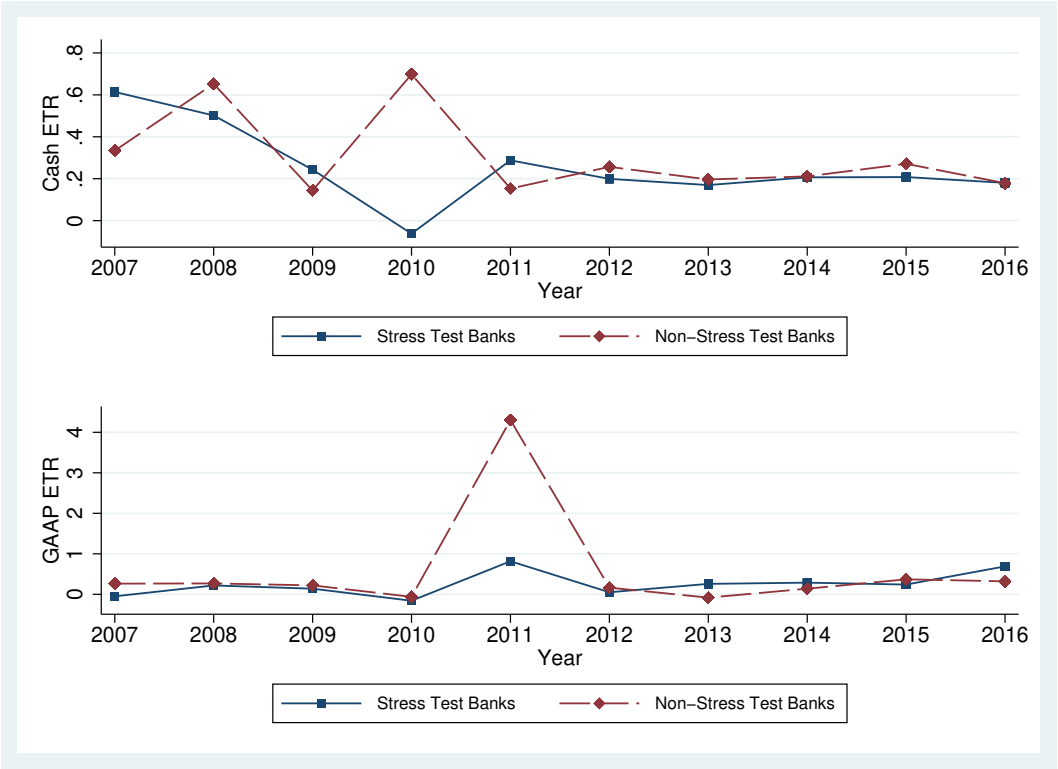


Figure 1: **Cash ETR and GAAP ETR**

The figure shows the mean cash taxes paid scaled by pre-tax income net of special items for CCAR banks versus non-CCAR banks over the period of analysis post recession years. The vertical dash line in blue represents large banks with $100B or more of total assets for the years 2011-2012, and banks with $50B or more in total assets for the rest of the years. Treated banks, which are paying less cash in taxes, are exhibiting higher levels of tax avoidance.

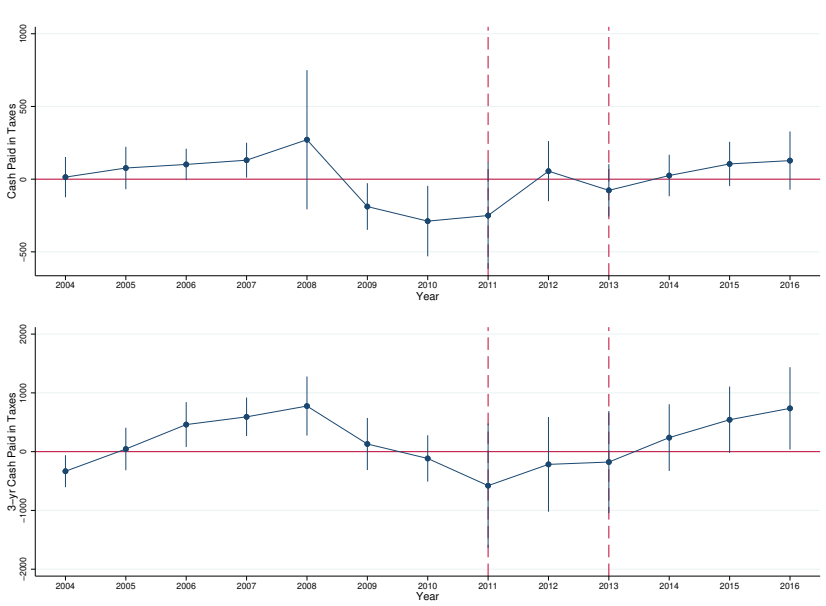


Figure 2: **Cash Taxes Paid: Event Studies**

The figure shows the relative performance of CCAR banks versus non-CCAR banks over the period of analysis for cash taxes paid and three year moving sum cash taxes paid as annual trends. To obtain the trend differences between the CCAR stress test banks (those banks immediately above the threshold for a given year) and the non-stress test banks (those banks immediately below the threshold for a given year), the following regression with bank fixed effects is used: $y_{it} = \alpha_0 + \alpha_1 I_i + \epsilon_{it}$, where I is a vector of the interactions between the CCAR treatment dummy and each of the years. The bandwidth size is $\pm$ 25% of ln($50B). The first vertical dash line represents the first year of CCAR stress test implementation for large banks with $100B or more of total assets. The second vertical dash line represents the year CCAR stress test implementation was expanded to include all large banks with $50B or more of total assets. The year 2001 was omitted to avoid multicollinearity.

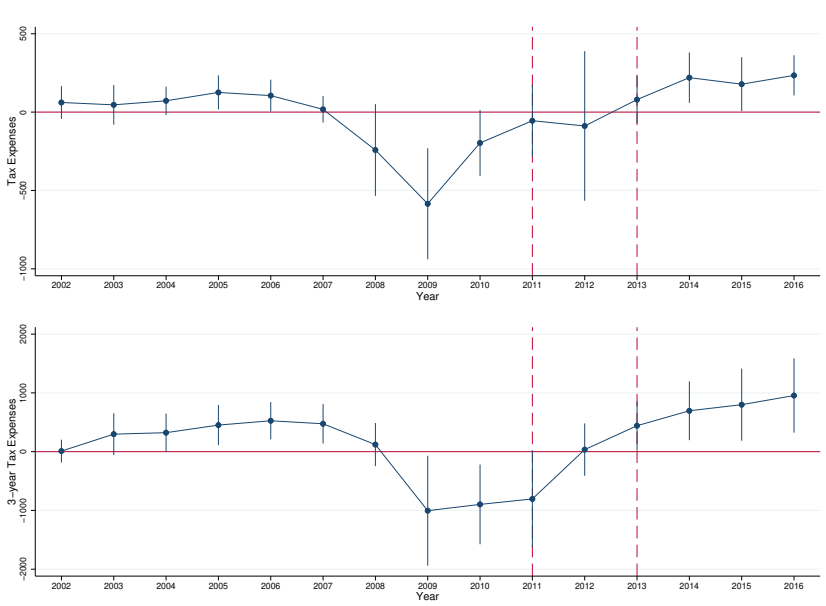


Figure 3: **Income Tax Expenses: Event Studies**

The figure shows the relative performance of CCAR banks versus non-CCAR banks over the period of analysis for income tax expenses and three year moving sum income tax expenses as annual trends. To obtain the trend differences between the CCAR stress test banks (those banks immediately above the threshold for a given year) and the non-stress test banks (those banks immediately below the threshold for a given year), the following regression with bank fixed effects is used: $y_{it} = \alpha_0 + \alpha_1 I_i + \epsilon_{it}$, where I is a vector of the interactions between the CCAR treatment dummy and each of the years. The bandwidth size is $\pm$ 25% of ln($50B). The first vertical dash line represents the first year of CCAR stress test implementation for large banks with $100B or more of total assets. The second vertical dash line represents the year CCAR stress test implementation was expanded to include all large banks with $50B or more of total assets. The year 2001 was omitted to avoid multicollinearity.

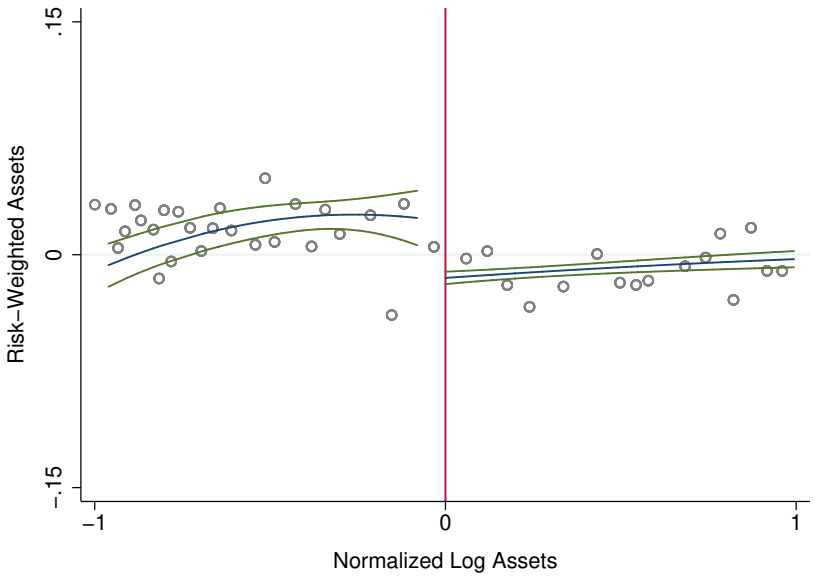


Figure 4: **Risk Density**

This figure shows regression discontinuity of CCAR banks versus non-CCAR banks around the policy cut-off for the Cash ETR. The central line is a spline second-order polynomial fit; the lateral lines represent the 95 percent confidence interval. In this window, we created size of 250 bins. Scatter points we observe are the average across the total 250 bins across that window.

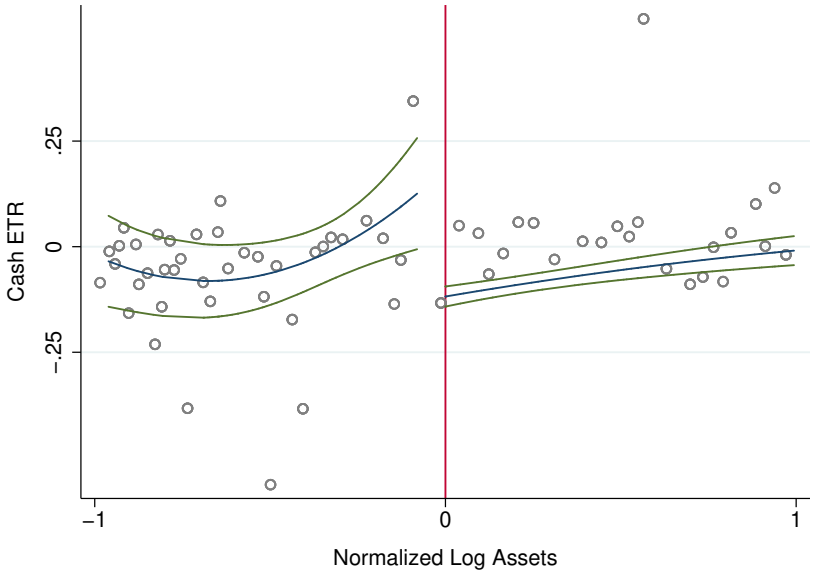


Figure 5: **Tax Avoidance (Cash ETR)**

This figure shows regression discontinuity of CCAR banks versus non-CCAR banks around the policy cut-off for the Cash ETR. The central line is a spline second-order polynomial fit; the lateral lines represent the 95 percent confidence interval. In this window, we created size of 250 bins. Scatter points we observe are the average across the total 250 bins across that window.

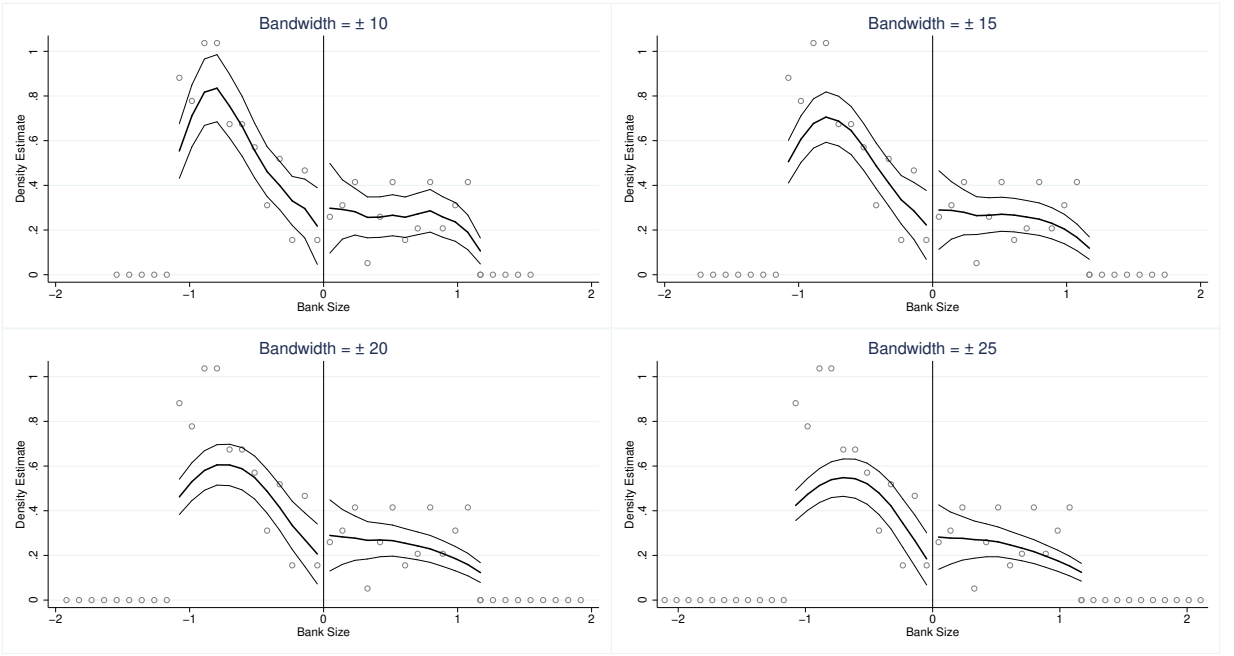


Figure 6: McCrary(2008) Test Graphs Around the Policy Threshold for 2011-2016.

The McCrary (2008) discontinuity test results are shown above for each of the corresponding bandwidths. The McCrary (2008) test estimates the density of the running variable separately on both sides of the policy cutoff and tests for a discontinuity at the cutoff. It first partitions the assignment variable into bins and calculates frequencies (number of observations) in each bin. It then treats those frequency counts as a dependent variable in a local linear regression with a triangular kernel and an optimal bin size as in McCrary (2008). Circles are the estimated density within each bin. Solid black lines are estimates from the local linear regressions in various bandwidths and light gray lines are confidence interval bands, also as calculated in McCrary (2008)

10 Tables

Table 1: **Key Variable Definitions.**
This table reports definitions for our key independent and dependent variables. **Panel A** comprises of the definitions for our tax avoidance measures, which include the Cash ETR, the GAAP ETR, the Cash and GAAP Tax Aggressiveness, the three-year rolling sums of these four measures, the tax aggressiveness index, and the tax avoidance surge. **Panel B** contains our bank characteristic variables, such as risk ratios, profitability measures, balance sheet items, loans, and other financial ratios. Finally, **Panel C** constitutes the definitions for our tax uncertainty measures, including the firm-level political risk measures obtained from Hassan et al. (2019).

Variable	Variable Definition
Panel A: Tax Avoidance Measures	
Cash ETR	Cash taxes paid (TXPD) divided by Pretax book income (PI) before Special Items (SPI) (defined by Dyreng et al. (2008)).
GAAP ETR	Total tax expense (TXT) divided by pretax income (PI).
3-year Cash ETR	Three-year rolling sum of cash taxes paid (TXPD) over years t, t-1, and t-2 scaled by the sum of pretax income (PI) minus special items (SPI) over years t, t-1, and t-2.
3-year GAAP ETR	Three-year rolling sum of total tax expense (TXT) over years t, t-1, and t-2 scaled by the sum of pretax income (PI) over years t, t-1, and t-2.
Cash Tax Aggressiveness (TA)	Bank's mean asset size by year Cash ETR less the Bank's Cash ETR, where Cash ETR is the cash taxes paid (TXPD) scaled by the pretax income (PI) minus special items (SPI), following Balakrishnan et al. (2019).
GAAP TA	Bank's mean asset size by year GAAP ETR less the firm's GAAP ETR, where GAAP ETR is the total tax expense (TXT) scaled by the pretax income (PI), following Balakrishnan et al. (2019).
3-year Cash TA	Bank's mean asset size by year Cash ETR less the Bank's Cash ETR, where Cash ETR is the three-year rolling sum of cash taxes paid (TXPD) over years t, t-1, and t-2 scaled by the sum of pretax income (PI) minus special items (SPI) over years t, t-1, and t-2, following Balakrishnan et al. (2019).
3-year GAAP TA	Bank's mean asset size by year GAAP ETR less the firm's GAAP ETR, where GAAP ETR is the three-year rolling sum of total tax expense (TXT) over years t, t-1, and t-2 scaled by the sum of pretax income (PI) over years t, t-1, and t-2, following Balakrishnan et al. (2019).
Tax Aggressiveness Index	A composite measure that is the sum of the Cash TA and the GAAP TA.
3-yr Tax Aggressiveness Index	A composite measure that is the sum of the 3-year Cash TA and the 3-year GAAP TA.
Large Surge Tax Avoidance	Terciles based on highest increase in tax avoidance (measured using Cash ETR) after the implementation of Dodd-Frank when compared to pre-Dodd Frank period.
Panel B: Bank Characteristics	
Risk Density	Risk-weight Assets scaled by Total Assets.
Capital ratio	Total Capital / Risk Weighted Assets.
Tier 1 ratio	Tier 1 Capital / Risk Weighted Assets.
Leverage Ratio	Tier 1 Capital / Total Assets.
Total Equity / Assets	Shareholder Equity to Asset Ratio.
Total Deposits / Assets	Total Deposits scaled by Total Assets.
Available Loan Loss Reserves / Total Loans	Reserves available to cover loan losses scaled by Total Loans.
Problem Loans %	Percentage of loans that are problem loans.
Loans / Assets	Total Loans scaled by Total Assets.
CRE Loans / Assets	Commercial Real Estate Loans scaled by Total Assets
RRE Loans / Assets	Residential Real Estate Loans scaled by Total Assets
Consolidated Agricultural loans / Assets	Consolidated Agricultural loans scaled by Total Assets
C&I Loans / Assets	Commercial & Industrial Loans scaled by Total Loans
Consumer Loans / Assets	Consumer Loans scaled by Total Assets
Consolidated Loans to foreign govts/Total Loans	Consolidated Loans to foreign governments scaled by Total Loans
Off Balance Sheet Assets / Assets	Off Balance Sheet Assets scaled by Total Assets
Loans HFS / Assets	Held-For-Sale Loans scaled by Total Assets
AFS Securities / Assets	Available-For-Sale Securities scaled by Total Assets
HTM Securities / Assets	Held-To-Maturity Securities scaled by Total Assets
Cash & Deposits Due / Assets	Cash & Deposits Due scaled by Total Assets
Federal Funds / Assets	Federal Funds scaled by Total Assets
Other Assets / Assets	Other Assets scaled by Total Assets
Return on Equity	Profitability measure, calculated as net income by Shareholder Equity.
Return on Assets	Profitability measure, calculated as net income by total assets.
Net Interest Margin	Long-term Profitability measure, measured as the difference between interest received and interest paid.
Net Non-Interest Margin	measured as the difference between non-interest earnings received and non-interest paid. Non-interest earnings include subscription fees, penalty fees, transaction fees, . and inactivity fees
Net income	Revenue net of expenses, interest, and taxes.
Profitability	EBITDA / Total Assets
Gross Profitability	(Revenue – Cost of Goods Sold) / Total Assets
Net Charge-Offs	Debt that bank is not likely to recover by Total Assets
Dividend Payout Ratio	Dividends paid by the bank divided by net income.
Panel C: Tax Risk and Sentiment	
Tax Risk (Cash ETR)	Standard deviation of Cash ETR, by year.
3-year Tax Risk (Cash ETR)	Standard deviation of 3-year Cash ETR, by year.
Tax Risk (GAAP ETR)	Standard deviation of GAAP ETR, by year.
3-year Tax Risk (GAAP ETR)	Standard deviation of 3-year GAAP ETR, by year.
Tax Uncertainty Index	A composite tax risk measure that is the sum of the Cash ETR volatility, the firm-level political tax risk, and the firm-level political risk sentiment. The firm-level political tax risk and risk sentiment is obtained from Hassan et al. (2019), who use computational linguistics tools to quantify political risk from firms' earnings conference call transcripts.
Political Risk	Hassan et al. (2019) use a pattern-based sequence-classification method on earnings call transcripts to determine risk surrounding political-related discourse in earnings conference call transcripts.
Political Tax Risk	Political risk focused on tax policies, extracted using computational linguistic tools on bank earnings call by Hassan et al. (2019).
Firm Political Risk Sentiment	Hassan et al. (2019) use the positive and negative sentiments from the Loughran and McDonald (2011) Sentiment Word List to extract sentiments related to political risk in earnings calls.

Table 2: **Summary Statistics for 2011-2016.**
This table reports summary statistics for the effective tax rate for publicly traded bank holding companies over the period 2011 to 2016. The sample is restricted to banks that have at least $10B in assets, the federal reserve cutoff for community banks. Balance sheet data comes from FR Y-9C reports. Dollar amounts are in 2010 thousands of dollars, and equity price data/forecasts come from CSPS and I/B/E/S databases. Banks are stress-tested if they have at least $100B in assets in years 2011 and 2012, and if they have at least $50B in assets in the following years.

	All Banks			Stress Tested			Non-Stress Tested		
Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Panel A: Tax Avoidance Measures									
Cash ETR	381	0.2229	0.2214	122	0.1985	0.2050	259	0.2343	0.2282
GAAP ETR	381	0.2545	0.2721	122	0.2481	0.2438	259	0.2575	0.2849
3-year Cash ETR	381	0.2363	0.2712	122	0.1663	0.1805	259	0.2693	0.2994
3-year GAAP ETR	381	0.2414	0.3041	122	0.2033	0.2833	259	0.2593	0.3124
Tax Aggressiveness Index	381	-0.0022	0.2331	122	0.0315	0.2302	259	-0.0181	0.2332
3-yr Tax Aggressiveness Index	381	-0.0011	0.2435	122	0.0867	0.1928	259	-0.0424	0.2540
Cash Tax Aggressiveness	381	-0.0038	0.1605	122	0.0213	0.1481	259	-0.0157	0.1649
GAAP Tax Aggressiveness	381	0.0016	0.1219	122	0.0101	0.1454	259	-0.0024	0.1092
3-year Cash Tax Aggressiveness	381	-0.0030	0.1749	122	0.0529	0.1289	259	-0.0294	0.1873
3-year GAAP Tax Aggressiveness	381	0.0020	0.1521	122	0.0337	0.1291	259	-0.0130	0.1598
Large Surge Tax Avoidance	381	0.1969	0.3981	122	0.2295	0.4223	259	0.1815	0.3862
Panel B: Bank Characteristics									
Risk Density	299	0.7495	0.1756	100	0.7217	0.2164	199	0.7635	0.1496
Capital ratio	299	15.8416	5.4749	100	15.5727	2.3519	199	15.9768	6.5033
Tier 1 ratio	299	13.9438	5.5440	100	13.1251	2.2225	199	14.3551	6.5789
Total Equity / Assets	299	0.1209	0.0618	100	0.1101	0.0188	199	0.1263	0.0740
Total Deposits / Assets	299	0.6542	0.2012	100	0.5102	0.2349	199	0.7265	0.1326
Available Loan Loss Reserves / Total Loans	299	0.0141	0.0073	100	0.0146	0.0085	199	0.0139	0.0066
Problem Loans %	299	0.0134	0.0155	100	0.0179	0.0170	199	0.0112	0.0141
Loans / Assets	299	0.5189	0.1959	100	0.4225	0.2299	199	0.5673	0.1557
CRE Loans / Assets	299	0.1789	0.1398	100	0.0665	0.0712	199	0.2354	0.1315
RRE Loans / Assets	299	0.1443	0.0952	100	0.1114	0.0838	199	0.1609	0.0965
Consolidated Agricultural loans / Assets	299	0.0020	0.0066	100	0.0010	0.0017	199	0.0024	0.0080
C&I Loans / Assets	299	0.1340	0.0879	100	0.1159	0.0906	199	0.1430	0.0853
Consumer Loans / Assets	299	0.0667	0.1209	100	0.1277	0.1713	199	0.0361	0.0671
Consolidated Loans to foreign governments / Total Loans	299	0.0001	0.0006	100	0.0003	0.0008	199	0.0001	0.0003
Off Balance Sheet Assets / Assets	299	0.1563	0.1425	100	0.2621	0.1794	199	0.1031	0.0772
Loans HFS / Assets	299	0.0081	0.0210	100	0.0068	0.0112	199	0.0087	0.0245
AFS Securities / Assets	299	0.1410	0.0993	100	0.1051	0.0571	199	0.1590	0.1106
HTM Securities / Assets	299	0.0413	0.0754	100	0.0222	0.0259	199	0.0508	0.0891
Cash & Deposits Due / Assets	299	0.0555	0.0469	100	0.0769	0.0530	199	0.0447	0.0396
Federal Funds / Assets	299	0.0147	0.0521	100	0.0379	0.0846	199	0.0031	0.0101
Other Assets / Assets	299	0.0614	0.0435	100	0.0622	0.0417	199	0.0611	0.0445
Return on Equity	299	0.2179	0.1133	100	0.2503	0.1427	199	0.2017	0.0914
Return on Assets	299	0.0278	0.0357	100	0.0281	0.0190	199	0.0277	0.0417
Net Interest Margin	299	0.0682	0.0283	100	0.0625	0.0398	199	0.0710	0.0196
Net Non-Interest Margin	299	-0.0225	0.0557	100	-0.0144	0.0294	199	-0.0265	0.0647
Net income	299	5.4e+06	1.2e+07	100	1.5e+07	1.7e+07	199	6.3e+05	7.7e+05
Net Charge-Offs	248	-0.0026	0.0033	65	-0.0029	0.0027	183	-0.0026	0.003
Dividend Payout Ratio	299	0.5437	3.7832	100	0.9438	6.5323	199	0.3426	0.2908
Panel C: Tax Risk and Sentiment									
Tax Risk (Cash ETR)	323	1.0986	5.1045	113	0.4773	0.4927	210	1.4329	6.3002
3-year Tax Risk (Cash ETR)	323	1.2304	1.0730	113	1.2166	1.0849	210	1.2378	1.0690
Tax Risk (GAAP ETR)	323	11.6013	23.1526	113	11.5881	23.1478	210	11.6083	23.2105
3-year Tax Risk (GAAP ETR)	323	2.8764	2.7376	113	2.9130	2.7624	210	2.8567	2.7306
Tax Uncertainty Index	323	0.8822	2.3946	113	0.6151	0.5229	210	1.0259	2.9374
Political Tax Risk	323	5.9e+03	7.4e+03	113	6.1e+03	5.4e+03	210	5.8e+03	8.3e+03
Political Risk	323	177.0439	151.4904	113	197.6972	144.5387	210	165.9304	154.2958
Firm Political Risk Sentiment	323	873.3951	778.1532	113	705.4617	709.5261	210	963.7593	799.7989

Table 3: **Tax Avoidance.**

The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the contemporary Cash and GAAP Effective Tax Rate in ***Panel A***, and the 3-year Cash (GAAP) Effective Tax Rate in ***Panel B***. A negative Cash and GAAP ETR indicates an increase in tax avoidance. Regressions are triangular kernel weighted and are restricted to having at least 65 observations within the selected optimal bandwidth in the first two columns, and are allowed to capture more banks in a larger bandwidth in the last two columns. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance Measures				
Cash ETR	-0.660***	-2.386***	-0.188***	-0.467***
	(0.036)	(0.183)	(0.047)	(0.056)
	[67]	[67]	[223]	[223]
GAAP ETR	-0.670***	-1.395***	0.034	-0.078
	(0.090)	(0.189)	(0.052)	(0.085)
	[69]	[69]	[226]	[226]
Panel B: Tax Avoidance Three Year Moving Sum				
3yr Cash ETR	-0.033	0.110	-0.169**	-0.238
	(0.084)	(0.176)	(0.085)	(0.145)
	[67]	[67]	[223]	[223]
3yr GAAP ETR	-0.577***	-0.874***	0.068	0.055
	(0.057)	(0.085)	(0.076)	(0.099)
	[69]	[82]	[226]	[226]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 4: **Tax Aggressiveness.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for our contemporary measure of Tax Aggressiveness, which is an index constructed by aggregating the Cash and GAAP Tax Aggressiveness in ***Panel A***, and the 3-year Tax Aggressiveness in ***Panel B***. Regressions are triangular kernel weighted and are restricted to having at least 65 observations within the selected optimal bandwidth in the first two columns, and are allowed to capture more banks in a larger bandwidth in the last two columns. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Aggressiveness Index				
Tax Aggressiveness Index	0.067	1.001***	-0.001	0.216***
	(0.059)	(0.166)	(0.063)	(0.092)
	[67]	[67]	[223]	[223]
Panel B: Tax Aggressiveness Three Year Moving Sum				
3-yr Tax Aggressiveness	0.491***	0.934***	0.017***	0.014***
	(0.052)	(0.075)	(0.058)	(0.084)
	[67]	[67]	[223]	[223]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 5: **Tax Risk Measures.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the following tax risk measures: our constructed measure called the 'Tax Policy Uncertainty Index', (which is an aggregate of the firm-level political tax risk, political risk, and political risk sentiment, as provided by Hassan et al. (2019)), the standard deviation for the contemporary Cash Effective Tax Rate, and the standardized firm-level political tax risk, political risk, and political risk sentiment. Regressions are triangular kernel weighted and are restricted to having at least 70 observations within the selected optimal bandwidth in the first two columns, and are allowed to capture more banks in a larger bandwidth in the last two columns. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Tax Policy Uncertainty	0.116	0.460**	0.056	0.080**
	(0.120)	(0.185)	(0.112)	(0.143)
	[78]	[93]	[225]	[225]
Cash ETR Volatility	-0.000	-0.000***	-0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
	[80]	[80]	[225]	[225]
Political Tax Risk	0.007	0.024**	0.003	0.004**
	(0.006)	(0.010)	(0.006)	(0.007)
	[78]	[97]	[225]	[225]
Political Risk	0.029***	0.049***	0.007***	0.027***
	(0.007)	(0.013)	(0.007)	(0.010)
	[78]	[106]	[225]	[225]
Political Risk Sentiment	-0.037**	-0.079**	-0.018**	-0.001**
	(0.016)	(0.031)	(0.022)	(0.032)
	[78]	[78]	[225]	[225]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 6: **Tax Risk Measures (3 year moving sum).**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a sub-sample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the following three-year rolling sum tax risk measures: our constructed measure called the 'Tax Policy Uncertainty Index', (which is an aggregate of the firm-level political tax risk, political risk, and political risk sentiment, as provided by Hassan et al. (2019)), the standard deviation for the contemporary Cash Effective Tax Rate, and the standardized firm-level political tax risk, political risk, and political risk sentiment. Regressions are triangular kernel weighted and are restricted to having at least 70 observations within the selected optimal bandwidth in the first two columns, and are allowed to capture more banks in a larger bandwidth in the last two columns. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
3-yr Tax Policy Uncertainty	-0.047	1.682***	0.043	0.229***
	(0.206)	(0.303)	(0.192)	(0.287)
	[68]	[68]	[225]	[225]
3-yr Cash ETR Volatility	0.027**	0.042	0.014**	0.025
	(0.012)	(0.050)	(0.021)	(0.027)
	[77]	[77]	[256]	[256]
3-yr Political Tax Risk	0.569***	2.035***	0.199***	0.575***
	(0.124)	(0.188)	(0.142)	(0.208)
	[68]	[70]	[225]	[225]
3-yr Political Risk	0.290*	1.040***	0.111*	0.251***
	(0.148)	(0.204)	(0.154)	(0.208)
	[68]	[92]	[225]	[225]
3-yr Political Risk Sentiment	0.670***	1.183***	0.176***	0.419***
	(0.057)	(0.120)	(0.126)	(0.146)
	[62]	[86]	[217]	[217]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

11 Large Surge in Tax Avoidance and Bank Characteristics

Table 7: **Large Surge in Tax Avoidance and Risk Ratios, Lending, and Portfolio Characteristics.**
Table 7 exhibits the impact of banks with a large surge in tax avoidance post-Dodd Frank compared to the pre-Dodd Frank period on risk ratios, bank loans, and balance sheet items. The risk ratios in **Panel A** include Risk Density (risk weighted assets/assets), Capital Ratio, Tier 1 Ratio, Leverage Ratio and **Panel B** shows the impact on risk weight asset categories (100%, 50%, 20%, and 0% Risk Weights) over total assets. **Panel C** shows the impact of large surge in tax avoidance in the Dodd-Frank era on Total Loans, Commercial and Residential Real Estate Loans, Commercial & Industrial (C&I) Loans, and Consumer loans over total assets. Finally, **Panel D** shows the portfolio characteristics such as Off Balance Sheet Assets, Held for Sale Loans, Available for Sale Securities, Held to Maturity Securities, Cash & Deposits Due and Federal Funds. The portfolio characteristic variables are scaled by total assets. Large surge tax avoidance is a dummy variable equal to 1 for categories of large banks and regional banks in the top tercile increase in tax avoidance activities in the post-implementation of Dodd-Frank period (2011-2016) compared to the years 2005-2010. Control variables include all bank characteristics as shown in the balanced covariates tests in Table 12 and defined in Table 1. Bank and year fixed effects are dropped due to multicollinearity. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Risk Ratios	Risk Density	Capital Ratio	Tier 1 Ratio	Leverage Ratio
Large Surge Tax Avoidance	0.432***	-1.302***	-2.753***	2.729***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	343	343	343	343
Adjusted R^2	0.901	0.853	0.861	0.938

Panel B: Risk Weights	100% Risk Weight Assets/Assets	50% Risk Weight Assets/Assets	20% Risk Weight Assets/Assets	0% Risk Weight Assets/Assets
Large Surge Tax Avoidance	0.027***	0.104***	-0.053***	-0.043***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	269	269	269	269
Adjusted R^2	0.889	0.952	0.868	0.918

Panel C: Bank Loans	Loans / Assets	CRE Loans / Assets	RRE Loans / Assets	C&I Loans / Assets	Consumer Loans / Assets
Large Surge Tax Avoidance	0.153***	0.245***	-0.067***	0.100***	-0.326***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	337	453	453	453	453
Adjusted R^2	0.947	0.966	0.947	0.866	0.992

Panel D: Portfolio Characteristics	Off Balance Sheet Assets	Loans HFS	AFS Securities	HTM Securities	Cash & Deposits Due	Federal Funds	Other Assets
Large Surge Tax Avoidance	0.095***	-0.002***	-0.013***	-0.206***	-0.034***	-0.000	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	337	337	337	337	337	337	337
Adjusted R^2	0.885	0.225	0.901	0.895	0.803	0.524	0.959

The table reports the effect of bank stress tests on

Table 8: **Large Surge in Tax Avoidance and Profitability, Cost of Capital, and Restatement and Advisory Fees.**
Table 8 exhibits the impact of banks with a large increase in tax avoidance post-Dodd Frank compared to the pre-Dodd Frank period on profitability, Cost of Capital, and restatements and advisory-related fees. The profitability measures in **Panel A** include the Tobin's Q, gross profitability, Return on Equity, Return on Assets, Net Interest Margin, Net Non-Interest Margin, and Net Charge-Offs. **Panel B** reports our findings for Cost of Capital- cost of debt and equity, and the Dividend Payout Ratio. Finally, **Panel C** displays the impact of large surge in tax avoidance in the Dodd-Frank era on bank reporting quality (restatements), Accounting and Auditing Expenses, Legal Expenses, Consulting, and Advisory Expenses. Large surge tax avoidance is a dummy variable equal to 1 for categories of large banks and regional banks in the top tercile increase in tax avoidance activities in the post-implementation of Dodd-Frank period (2011-2016) compared to the years 2005-2010. Control variables include all bank characteristics as shown in the balanced covariates tests in Table 12 and defined in Table 1. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Profitability	Tobin-Q	Profitability	Return on Equity	Return on Assets	Net Interest Margin	Net Non-Interest Margin	Net Charge-Offs
Large Surge Tax Avoidance	-0.147***	0.007	0.076***	0.009***	-0.039***	0.013***	0.003***
	(0.015)	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Observations	328	333	453	453	453	453	296
Adjusted R^2	0.910	0.931	0.612	0.883	0.876	0.952	0.755

Panel B: Cost of Capital	Cost of Capital	Cost of Equity	Cost of Debt	Dividend Payout Ratio
Large Surge Tax Avoidance	0.017***	0.046***	-0.003***	-0.331*
	(0.000)	(0.000)	(0.000)	(0.181)
Observations	339	339	453	316
Adjusted R^2	0.795	0.873	0.698	0.861

Panel C: Restatements and Advisory-related fees	Restatement Dummy	Acct Audit Expenses	Legal Expense	Consult Advisory Expenses
Large Surge Tax Avoidance	0.000	7.921***	9.288***	10.390***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	369	453	453	453
Adjusted R^2	0.326	0.763	0.632	0.698

12 Robustness Check Tables

Table 9: **Baseline results of key variables of interest.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the tax avoidance measure (Cash ETR) in **Panel A**, the Tax Aggressiveness Index (composite measure by equally weighting the cash tax aggressiveness and the GAAP Tax aggressiveness) in **Panel B**, and two measures of tax risk in in **Panel C**. The first measure is the Tax Policy Uncertainty, which is a composite of the political tax risk, the political risk, and the political risk sentiment (The political risk measures are obtained from the dataset provided by Hassan et al. (2019)). The second measure is the Cash ETR volatility. Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance				
Cash ETR	-0.660***	-2.386***	-0.188***	-0.467***
	(0.036)	(0.183)	(0.047)	(0.056)
	[67]	[67]	[223]	[223]
Panel B: Tax Aggressiveness				
Tax Aggressiveness Index	0.067	1.001***	-0.001	0.216***
	(0.059)	(0.166)	(0.063)	(0.092)
	[67]	[67]	[223]	[223]
Panel C: Tax Risk Measures				
Tax Policy Uncertainty Index	0.106	0.460**	0.056	0.080**
	(0.100)	(0.185)	(0.112)	(0.143)
	[68]	[93]	[225]	[225]
Cash ETR Volatility	-0.000**	-0.000***	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
	[69]	[69]	[225]	[225]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 10: **McCrary(2008) test around the policy threshold for 2011-2016.**
The McCrary discontinuity coefficients are shown below for each of the corresponding bandwidths together with the standard errors, t-statistics, and the optimal bin size as in McCrary (2008). The McCrary test estimates the density of the running variable separately on both sides of the policy cutoff and tests for a discontinuity at the cutoff. It first partitions the assignment variable into bins and calculates frequencies (number of observations) in each bin. It then treats those frequency counts as a dependent variable in a local linear regression with a triangular kernel and an optimal bin size as in McCrary (2008).* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	±10%	±15%	±20%	±25%
Discontinuity	0.648	0.506	0.546	0.708
Standard errors	0.705	0.559	0.509	0.499
t-stat	0.918	0.905	1.074	1.417
Bin size	0.076	0.076	0.076	0.076
N	47	77	116	173

Table 11: **Baseline results – Around the $50B threshold for 2013–2016 only.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the tax avoidance measure (Cash ETR) in **Panel A**, the Tax Aggressiveness Index (composite measure by equally weighting the cash tax aggressiveness and the GAAP Tax aggressiveness) in **Panel B**, and two measures of tax risk in in **Panel C**. The first measure is the Tax Policy Uncertainty, which is a composite of the political tax risk, the political risk, and the political risk sentiment (The political risk measures are obtained from the dataset provided by Hassan et al. (2019)). The second measure is the Cash ETR volatility. Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance				
Cash ETR	-0.657***	-2.347***	-0.067***	-0.231***
	(0.054)	(0.188)	(0.019)	(0.034)
	[61]	[61]	[188]	[188]
Panel B: Tax Aggressiveness				
Tax Aggressiveness Index	-0.002	0.956***	-0.101	0.023
	(0.073)	(0.182)	(0.064)	(0.101)
	[61]	[61]	[188]	[188]
Panel C: Tax Risk Measures				
Tax Policy Uncertainty Index	0.212***	0.724***	0.120**	0.173**
	(0.072)	(0.176)	(0.054)	(0.072)
	[56]	[56]	[185]	[185]
Cash ETR Volatility	0.000**	-0.000***	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
	[61]	[61]	[188]	[188]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 12: **Balanced covariate tests for set of control variables.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results of the balanced covariate test for each control variable used in our analysis testing for discontinuity. Panel A shows bank-level characteristics: Net Income/Assets, Equity/Assets, Deposits/Assets, Cost/Income, Loan Loss Reserves/Loans, and Problem Loans/Loans. Panel B shows bank lending characteristics: Commercial Real Estate (CRE) Loans/Loans, Residential Real Estate Loans/Loans, Agricultural Loans/Loans, Commercial and Industrial (CI) Loans/Loans, Consumer Loans/Loans, and Foreign Government Loans/Loans. Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. No controls are included in the regression discontinuity. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Linear		Quadratic	
Variable	MSE Optimal	CER Optimal	MSE Optimal	CER Optimal
Panel A: Bank-Level Characteristics				
Net Income/Assets	0.007*	0.008	0.010	0.006
	(0.004)	(0.005)	(0.006)	(0.008)
	[215]	[137]	[204]	[116]
Equity/Assets	0.003	0.001	0.000	-0.000
	(0.003)	(0.004)	(0.004)	(0.006)
	[112]	[75]	[206]	[117]
Deposits/Assets	0.006	0.006	0.003	0.001
	(0.017)	(0.019)	(0.023)	(0.023)
	[228]	[151]	[215]	[131]
Costs/Income	-0.027	-0.024	-0.028	-0.008
	(0.019)	(0.022)	(0.024)	(0.026)
	[218]	[145]	[245]	[156]
Loan Loss Reserves/Loans	-0.000	0.001	0.002	0.004
	(0.002)	(0.003)	(0.003)	(0.005)
	[105]	[68]	[137]	[79]
Problem Loans/Loans	-0.001	0.002	-0.001	0.007***
	(0.002)	(0.002)	(0.003)	(0.002)
	[79]	[53]	[116]	[73]
Panel B: Bank Lending Characteristics				
CRE Loans/Loans	-0.002	-0.004	-0.007	-0.014
	(0.014)	(0.015)	(0.018)	(0.021)
	[175]	[109]	[237]	[148]
RRE Loans/Loans	0.023	0.025	0.023	0.024
	(0.016)	(0.019)	(0.020)	(0.024)
	[137]	[82]	[238]	[148]
Agricultural Loans/Loans	0.000	-0.000	-0.000	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
	[126]	[79]	[148]	[82]
C&I Loans/Loans	-0.004	-0.009	-0.009	-0.020
	(0.014)	(0.015)	(0.017)	(0.018)
	[144]	[89]	[231]	[142]
Consumer Loans/Loans	-0.020	-0.017	-0.010	0.005
	(0.016)	(0.018)	(0.020)	(0.016)
	[301]	[209]	[204]	[116]
Foreign Gov't Loans/Loans	-0.000***	-0.000***	-0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
	[53]	[77]	[108]	[66]
Controls	N	N	N	N
Fixed-Effects	Y	Y	Y	Y

Table 13: **Baseline results – Covariates Sensitivity Tests (Partial Controls).**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the tax avoidance measure (Cash ETR) in **Panel A**, the Tax Aggressiveness Index (composite measure by equally weighting the cash tax aggressiveness and the GAAP Tax aggressiveness) in **Panel B**, and two measures of tax risk in in **Panel C**. The first measure is the Tax Policy Uncertainty, which is a composite of the political tax risk, the political risk, and the political risk sentiment (The political risk measures are obtained from the dataset provided by Hassan et al. (2019)). The second measure is the Cash ETR volatility. Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance				
Cash ETR	-0.413***	-1.640***	-0.160***	-0.402***
	(0.060)	(0.195)	(0.057)	(0.071)
	[67]	[67]	[223]	[223]
Panel B: Tax Aggressiveness				
Tax Aggressiveness Index	0.114	0.821***	0.017	0.210***
	(0.071)	(0.174)	(0.068)	(0.096)
	[67]	[67]	[223]	[223]
Panel C: Tax Risk Measures				
Tax Policy Uncertainty Index	-0.024	0.058	-0.105	-0.137
	(0.140)	(0.209)	(0.105)	(0.135)
	[68]	[105]	[225]	[225]
Cash ETR Volatility	-0.000*	-0.000	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[71]	[87]	[225]	[225]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 14: **Baseline results – Covariates Sensitivity Tests (No Controls).** The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results for the tax avoidance measure (Cash ETR) in **Panel A**, the Tax Aggressiveness Index (composite measure by equally weighting the cash tax aggressiveness and the GAAP Tax aggressiveness) in **Panel B**, and two measures of tax risk in in **Panel C**. The first measure is the Tax Policy Uncertainty, which is a composite of the political tax risk, the political risk, and the political risk sentiment (The political risk measures are obtained from the dataset provided by Hassan et al. (2019)). The second measure is the Cash ETR volatility. Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance				
Cash ETR	-0.490***	-1.670***	-0.182***	-0.411***
	(0.080)	(0.235)	(0.063)	(0.081)
	[67]	[67]	[225]	[225]
Panel B: Tax Aggressiveness				
Tax Aggressiveness Index	0.139	0.219	0.002	0.165
	(0.110)	(0.180)	(0.073)	(0.111)
	[67]	[97]	[225]	[225]
Panel C: Tax Risk Measures				
Tax Policy Uncertainty Index	0.033	0.111	-0.160	-0.232
	(0.113)	(0.168)	(0.104)	(0.131)
	[68]	[96]	[227]	[227]
Cash ETR Volatility	-0.000**	-0.000*	-0.000**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
	[68]	[96]	[227]	[227]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 15: **Baseline results – Pre-test period of 2004 to 2010.**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the pre-CCAR (2003-2010) results for the contemporary Cash Effective Tax Rate, the Cash Tax Aggressiveness, and two measures of tax risk, that are the 'Tax Policy Uncertainty Index', which is an aggregate of the firm-level political tax risk, political risk, and political risk sentiment, (as provided by Hassan et al. (2019)), and the standard deviation for the Cash Effective Tax Rate (in Panels A, B, and C respectively). Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance				
Tax Avoidance Index	-0.133	0.040	-0.259	-0.394
	(0.189)	(0.327)	(0.080)	(0.171)
	[62]	[62]	[176]	[176]
Panel B: Tax Aggressiveness				
Tax Aggressiveness Index	0.340**	0.186	0.208**	0.315
	(0.140)	(0.207)	(0.045)	(0.105)
	[62]	[62]	[176]	[176]
Panel C: Tax Risk Measures				
Tax Uncertainty Index	-0.620***	-0.679***	0.359***	0.421***
	(0.064)	(0.138)	(0.057)	(0.150)
	[47]	[47]	[148]	[148]
Cash ETR Volatility	-0.000**	-0.000	-0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[65]	[65]	[192]	[192]
Controls	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y

Table 16: **Baseline results – Falsification tests (10% below and 10% above).**
The regression discontinuity coefficients are shown below. The table reports both the local linear and quadratic regression discontinuity coefficients first by using the mean square error (MSE) optimal bandwidth measure, and second, by specifying a subsample of 'All Relevant Banks', which includes banks between $10B and $200B in total asset size. The table reports the results of the threshold falsification tests (10% below and 10% above of the natural logarithm of the bank-size policy thresholds) for the contemporary Cash Effective Tax Rate, the Tax Aggressiveness Index, and two measures of tax risk, that are the 'Tax Policy Uncertainty Index', which is an aggregate of the firm-level political tax risk, political risk, and political risk sentiment, (as provided by Hassan et al. (2019)), and the standard deviation for the Cash Effective Tax Rate (in Panels A, B, and C respectively). Regressions are triangular kernel weighted and are restricted to having at least 50 observations within the selected optimal bandwidth. Control variables include all bank characteristics as shown in Table A2. All regressions include bank and year fixed effects. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	10% False Cutoff Below				10% False Cutoff Above			
	MSE Optimal		All Relevant Banks		MSE Optimal		All Relevant Banks	
Variable	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
Panel A: Tax Avoidance								
Tax Avoidance Index	1.296***	1.677**	0.366***	0.724**	0.053	0.157*	-0.078**	-0.071
	(0.164)	(0.219)	(0.147)	(0.310)	(0.045)	(0.076)	(0.042)	(0.074)
	[79]	[79]	[243]	[243]	[60]	[60]	[205]	[205]
Panel B: Tax Aggressiveness								
Tax Aggressiveness Index	-0.912***	-1.106***	-0.342***	-0.509**	-0.003	0.043	-0.035	-0.010
	(0.091)	(0.133)	(0.104)	(0.199)	(0.073)	(0.095)	(0.068)	(0.101)
	[79]	[79]	[243]	[243]	[60]	[60]	[205]	[205]
Panel C: Tax Risk Measures								
Tax Policy Uncertainty Index	0.385***	0.463	0.137***	0.339**	-0.441***	-0.874	0.048***	-0.110
	(0.121)	(0.126)	(0.109)	(0.143)	(0.110)	(0.175)	(0.117)	(0.160)
	[76]	[76]	[239]	[239]	[64]	[64]	[214]	[214]
Cash ETR Volatility	-0.000	0.000	-0.000	-0.000*	0.000**	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[81]	[81]	[245]	[245]	[62]	[62]	[207]	[207]
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Fixed-Effects	Y	Y	Y	Y	Y	Y	Y	Y

Online Appendix

Online Appendix: Not For Publication

Table A1: **McCrary (2008) test around the $50B for 2013 - 2016.**
The McCrary discontinuity coefficients are shown above for each of the corresponding bandwidths together with the standard errors, t-statistics, and the optimal bin size as in McCrary (2008). The McCrary test estimates the density of the running variable separately on both sides of the policy cutoff and tests for a discontinuity at the cutoff. It first partitions the assignment variable into bins and calculates frequencies (number of observations) in each bin. It then treats those frequency counts as a dependent variable in a local linear regression with a triangular kernel and an optimal bin size as in McCrary (2008).* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	±10%	±15%	±20%	±25%
Discontinuity	0.298	0.149	0.256	0.460
Standard errors	1.070	0.720	0.647	0.629
t-stat	0.279	0.207	0.397	0.732
Bin size	0.090	0.090	0.090	0.090
N	34	57	89	139

Table A2: **Summary Statistics: 2000-2016.**
This table reports summary statistics for the effective tax rate for publicly traded bank holding companies over the period 2000 to 2016. The sample is restricted to banks that have at least $10B in assets, the federal reserve cutoff for community banks. Balance sheet data comes from FR Y-9C reports. Dollar amounts are in 2010 thousands of dollars, and equity price data/forecasts come from CSPS and I/B/E/S databases. Banks are stress-tested if they have at least $100B in assets in years 2011 and 2012, and if they have at least $50B in assets in the following years.

	All Banks			Stress Tested			Non-Stress Tested		
Variable	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Panel A: Tax Avoidance Measures									
Cash ETR	691	0.2543	0.3025	260	0.2396	0.3112	431	0.2632	0.2972
GAAP ETR	691	0.2476	0.2979	260	0.2351	0.3082	431	0.2552	0.2917
3-year Cash ETR	691	0.2359	0.3257	260	0.2060	0.3156	431	0.2539	0.3307
3-year GAAP ETR	691	0.2603	0.2780	260	0.2417	0.2528	431	0.2715	0.2919
Tax Aggressiveness Index	691	-0.0013	0.2582	260	0.0242	0.2346	431	-0.0167	0.2706
3-yr Tax Aggressiveness Index	691	-0.0025	0.2361	260	0.0421	0.2121	431	-0.0295	0.2459
Cash Tax Aggressiveness	691	-0.0032	0.1933	260	0.0151	0.1859	431	-0.0143	0.1970
GAAP Tax Aggressiveness	691	0.0019	0.1366	260	0.0092	0.1425	431	-0.0025	0.1330
3-year Cash Tax Aggressiveness	691	-0.0008	0.1814	260	0.0258	0.1665	431	-0.0169	0.1882
3-year GAAP Tax Aggressiveness	691	-0.0017	0.1453	260	0.0163	0.1214	431	-0.0125	0.1571
Large Surge Tax Avoidance	691	0.2171	0.4126	260	0.2385	0.4270	431	0.2042	0.4036
Panel B: Control Variates									
Risk Density	663	0.7114	0.1650	256	0.7145	0.1956	407	0.7094	0.1426
Capital ratio	663	14.7078	5.6178	256	14.1542	2.9030	407	15.0561	6.7714
Tier 1 ratio	663	12.4295	5.8842	256	11.2648	3.1468	407	13.1621	6.9888
Total Equity / Assets	663	0.1100	0.0568	256	0.1031	0.0261	407	0.1144	0.0692
Total Deposits / Assets	663	0.6192	0.2019	256	0.4824	0.2220	407	0.7052	0.1276
Available Loan Loss Reserves / Total Loans	663	0.0149	0.0085	256	0.0165	0.0112	407	0.0139	0.0061
Problem Loans %	663	0.0142	0.0144	256	0.0184	0.0163	407	0.0116	0.0123
Loans / Assets	663	0.5160	0.1915	256	0.4276	0.2193	407	0.5716	0.1469
CRE Loans / Assets	663	0.1786	0.1350	256	0.0885	0.0855	407	0.2352	0.1296
RRE Loans / Assets	663	0.1542	0.0991	256	0.1385	0.1034	407	0.1641	0.0950
Consolidated Agricultural loans / Assets	663	0.0022	0.0051	256	0.0014	0.0023	407	0.0026	0.0062
C&I Loans / Assets	663	0.1304	0.0817	256	0.1197	0.0906	407	0.1370	0.0748
Consumer Loans / Assets	663	0.0727	0.1100	256	0.1138	0.1521	407	0.0469	0.0587
Consolidated Loans to foreign governments / Total Loans	663	0.0002	0.0005	256	0.0003	0.0007	407	0	0.0003
Off Balance Sheet Assets / Assets	663	0.1588	0.1637	256	0.2666	0.1995	407	0.0910	0.0822
Loans HFS / Assets	663	0.0116	0.0258	256	0.0163	0.0288	407	0.0086	0.0233
AFS Securities / Assets	663	0.1559	0.1014	256	0.1201	0.0812	407	0.1783	0.1064
HTM Securities / Assets	663	0.0309	0.0655	256	0.0102	0.0193	407	0.0439	0.0795
Cash & Deposits Due / Assets	663	0.0454	0.0394	256	0.0536	0.0445	407	0.0402	0.0349
Federal Funds / Assets	663	0.0160	0.0458	256	0.0323	0.0692	407	0.0057	0.0116
Other Assets / Assets	663	0.0630	0.0479	256	0.0707	0.0617	407	0.0581	0.0360
Return on Equity	663	0.2643	0.1345	256	0.2872	0.1400	407	0.2499	0.1291
Return on Assets	663	0.0291	0.0303	256	0.0294	0.0171	407	0.0290	0.0363
Net Interest Margin	663	0.0717	0.0248	256	0.0673	0.0325	407	0.0745	0.0179
Net Non-Interest Margin	663	-0.0203	0.0476	256	-0.0117	0.0275	407	-0.0258	0.0560
Net income	663	4.8e+06	1.1e+07	256	1.2e+07	1.5e+07	407	5.5e+05	6.2e+05
Net Charge-Offs	579	-0.0032	0.0040	190	-0.0041	0.0045	389	-0.0028	0.0036
Dividend Payout Ratio	663	0.5058	2.5948	256	0.6871	4.1496	407	0.3918	0.3599
Panel C:									
Tax Risk (Cash ETR)	619	0.9838	4.5344	250	0.4435	0.4756	369	1.3498	5.8347
3-year Tax Risk (Cash ETR)	619	2.0090	2.7572	250	2.0650	2.8606	369	1.9711	2.6882
Tax Risk (GAAP ETR)	619	6.4310	17.5754	250	5.6501	16.4509	369	6.9602	18.3011
3-year Tax Risk (GAAP ETR)	619	4.0253	9.6026	250	4.3173	10.4346	369	3.8275	9.0046
Tax Uncertainty Index	619	0.8185	2.1518	250	0.5463	0.4930	369	1.0029	2.7436
Political Tax Risk	619	5.8e+03	6.2e+03	250	6.2e+03	5.2e+03	369	5.5e+03	6.8e+03
Political Risk	619	175.0541	142.1887	250	194.7373	134.3258	369	161.7186	145.9528
Firm Political Risk Sentiment	619	675.1238	923.9002	250	478.9794	816.7723	369	808.0130	968.6287

Table A3: List of Banks with Assets larger than $10B.

No.	Bank RSSD ID	Bank Name	Average Total Assets	2011	2012	2013	2014	2015	2016
1	1039502	JPMorgan Chase & Co.	2235.899	1	1	1	1	1	1
2	1073757	Bank of America Corporation	1995.917	1	1	1	1	1	1
3	1951350	Citigroup Inc.	1700.617	1	1	1	1	1	1
4	1120754	Wells Fargo & Company	1492.364	1	1	1	1	1	1
5	2380443	The Goldman Sachs Group, Inc.	828.8345	1	1	1	1	1	1
6	2162966	Morgan Stanley	737.1973	1	1	1	1	1	1
7	1119794	U.S. Bancorp	359.6389	1	1	1	1	1	1
8	3587146	The Bank of New York Mellon Corporation	335.9847	1	1	1	1	1	1
9	1069778	The PNC Financial Services Group, Inc.	303.9653	1	1	1	1	1	1
10	2277860	Capital One Financial Corporation	280.3632	1	1	1	1	1	1
11	3606542	TD Group US Holdings LLC	277.2464	1	1	1	1	1	1
12	3232316	HSBC North America Holdings Inc.	274.6815	–	–	1	1	1	1
13	1111435	State Street Corporation	223.2003	1	1	1	1	1	1
14	1074156	BB&T Corporation	178.8663	1	1	1	1	1	1
15	1131787	SunTrust Banks, Inc.	171.9856	1	1	1	1	1	1
16	1562859	Ally Financial Inc.	153.652	1	1	1	1	1	1
17	1275216	American Express Company	145.1497	1	1	1	1	1	1
18	1132449	Citizens Financial Group, Inc.	123.8516	–	–	–	1	1	1
19	1070345	Fifth Third Bancorp	121.9861	1	1	1	1	1	1
20	3242838	Regions Financial Corporation	114.2715	1	1	1	1	1	1
21	1245415	BMO Financial Corp.	110.4587	–	–	1	1	1	1
22	1378434	MUFG Amers Holds Corp	103.4482	–	–	–	1	1	1
23	1378434	UnionBanCal Corporation	103.4482	–	–	1	–	–	–
24	1199611	Northern Trust Corporation	100.628	–	–	1	1	1	1
25	3981856	Santander Holdings USA, Inc.	100.5399	–	–	1	1	1	1
26	1068025	KeyCorp	97.25495	1	1	1	1	1	1
27	5005998	BancWest Corporation	93.49782	–	–	–	–	1	1
28	1037003	M&T Bank Corporation	90.84114	–	–	1	1	1	1
29	3846375	Discover Financial Services	74.86415	–	–	1	1	1	1
30	1078529	BBVA Compass Bancshares, Inc.	71.69733	–	–	1	1	1	1
31	1199844	Comerica Incorporated	62.82734	–	–	1	1	1	1
32	1068191	Huntington Bancshares Incorporated	62.75407	–	–	1	1	1	1
33	1032473	Deutsche Bank Trust Corporation	56.40474	–	–	–	1	1	1
34	1027004	Zions Bancorporation	53.30488	–	–	1	1	1	1
35	1036967	CIT Group Inc.	48.75936	–	–	–	–	–	1
36	2132932	New York Community Bancorp, Inc.	43.3861	–	–	–	–	–	–
37	3412583	ETrade Financial, Llc	43.08384	–	–	–	–	–	–
38	2367556	Hudson City Bancorp, Inc.	35.95644	–	–	–	–	–	–
39	2307280	Utrecht-America Holdings Llc	35.40258	–	–	–	–	–	–
40	5034792	Mizuho Americas Llc	35.33874	–	–	–	–	–	–
41	2648693	First Niagara Financial Group, Inc.	34.68899	–	–	–	–	–	–
42	1129382	Popular, Inc.	33.60432	–	–	–	–	–	–
43	3650152	People'S United Financial, Inc.	32.96272	–	–	–	–	–	–
44	1031449	SVB Financial Group	30.44553	–	–	–	–	–	–
45	3843075	John Deere Capital Corporation	29.39223	–	–	–	–	–	–
46	1883693	BOK Financial Corporation	26.94704	–	–	–	–	–	–
47	1027518	City National Corporation	26.84708	–	–	–	–	–	–
48	1078846	Synovus Financial Corp.	25.68361	–	–	–	–	–	–
49	2734233	East West Bancorp, Inc.	25.46716	–	–	–	–	–	–
50	1075612	First Citizens Bancshares, Inc.	24.34857	–	–	–	–	–	–
51	1102367	Cullen/Frost Bankers, Inc.	23.94891	–	–	–	–	–	–
52	1094640	First Horizon Corporation	23.89493	–	–	–	–	–	–
53	1199563	Associated Banc-Corp	23.68002	–	–	–	–	–	–
54	3815157	Raymond James Financial, Inc.	23.38153	–	–	–	–	–	–
55	3242735	Scottrade Financial Services, Inc.	22.4375	–	–	–	–	–	–
56	3923614	IMB Holdco Llc	22.15264	–	–	–	–	–	–
57	1049341	Commerce Bancshares, Inc.	21.6697	–	–	–	–	–	–
58	3838857	TIAA Fsb Holdings, Inc.	20.59316	–	–	–	–	–	–
59	1145476	Webster Financial Corporation	20.54402	–	–	–	–	–	–
60	2938451	Barclays Delaware Holdings Llc	19.796	–	–	–	–	–	–
61	1086533	Hancock Whitney Corporation	19.45992	–	–	–	–	–	–
62	1070804	Firstmerit Corporation	19.30651	–	–	–	–	–	–
63	2260406	Wintrust Financial Corporation	18.53274	–	–	–	–	–	–
64	2389941	TCF Financial Corporation	18.13331	–	–	–	–	–	–
65	4028712	Bankunited, Inc.	18.07038	–	–	–	–	–	–
66	1048773	Valley National Bancorp	16.92	–	–	–	–	–	–
67	1109599	Prosperity Bancshares, Inc.	16.78058	–	–	–	–	–	–
68	1117156	Susquehanna Bancshares, Inc.	16.43993	–	–	–	–	–	–
69	2747644	Umpqua Holdings Corporation	16.2796	–	–	–	–	–	–
70	1117129	Fulton Financial Corporation	16.01837	–	–	–	–	–	–
71	1020902	First National Of Nebraska, Inc.	15.88802	–	–	–	–	–	–
72	1049828	Umb Financial Corporation	15.84237	–	–	–	–	–	–
73	2477754	Investors Bancorp, Inc.	15.6817	–	–	–	–	–	–
74	2291914	Iberiabank Corporation	14.66606	–	–	–	–	–	–
75	1839319	Privatebancorp, Inc.	14.42141	–	–	–	–	–	–
76	2504128	Astoria Financial Corporation	14.31546	–	–	–	–	–	–
77	3005332	F.N.B. Corporation	13.99455	–	–	–	–	–	–
78	1025309	Bank Of Hawaii Corporation	13.70453	–	–	–	–	–	–
79	1246216	Franklin Resources, Inc.	13.64005	–	–	–	–	–	–
80	1095674	Arvest Bank Group, Inc.	13.50769	–	–	–	–	–	–
81	2706735	Texas Capital Bancshares, Inc.	13.3603	–	–	–	–	–	–
82	3065617	Washington Federal, Inc.	13.17813	–	–	–	–	–	–
83	1060627	Firstbank Holding Company	13.12563	–	–	–	–	–	–
84	1097614	Bancorpsouth, Inc.	12.57404	–	–	–	–	–	–
85	1090987	MB Financial, Inc.	12.0913	–	–	–	–	–	–
86	2744894	First Bancorp	11.78563	–	–	–	–	–	–
87	2875332	Pacwest Bancorp	11.78287	–	–	–	–	–	–
88	3852022	Flagstar Bancorp, Inc.	11.26261	–	–	–	–	–	–
89	3828036	Third Federal Savings And Loan Association Of Cleveland, Mhc	11.13278	–	–	–	–	–	–
90	1104231	International Bancshares Corporation	11.06122	–	–	–	–	–	–
91	1843080	Cathay General Bancorp	11.0598	–	–	–	–	–	–
92	1079562	Trustmark Corporation	10.75062	–	–	–	–	–	–
93	3842957	Hawaiian Electric Industries, Inc.	10.29654	–	–	–	–	–	–
94	3446412	Apple Financial Holdings, Inc.	10.2497	–	–	–	–	–	–
95	1098303	Old National Bancorp	10.21315	–	–	–	–	–	–
96	2349815	Western Alliance Bancorporation	10.12557	–	–	–	–	–	–
97	1076217	United Bankshares, Inc.	10.02116	–	–	–	–	–	–
				19	19	30	32	33	34

12.1 Correlation between Large Surge Tax Avoidance Banks and Bank Characteristics

Table A4: **Large Surge in Tax Avoidance and Risk Ratios, Lending, and Portfolio Characteristics.**
Table A4 exhibits the marginal impact of the Dodd-Frank stress tests for banks with a large surge in tax avoidance post-Dodd Frank compared to the pre-Dodd Frank period on risk ratios, bank loans, and balance sheet items. The portfolio characteristic variables are scaled by total assets. The risk ratios in **Panel A** include Risk Density (risk weighted assets/assets), Capital Ratio, Tier 1 Ratio, Leverage Ratio and **Panel B** shows the impact on risk weight asset categories (100%, 50%, 20%, and 0% Risk Weights) over total assets. **Panel C** shows the marginal impact of stress tests when interacted with a large surge in tax avoidance in the Dodd-Frank era on Total Loans, Commercial and Residential Real Estate Loans, Commercial & Industrial (C&I) Loans, and Consumer loans over total assets. Finally, **Panel D** shows the portfolio characteristics such as Off Balance Sheet Assets, Held for Sale Loans, Available for Sale Securities, Held to Maturity Securities, Cash & Deposits Due and Federal Funds. The portfolio characteristic variables are scaled by total assets. *Large surge tax avoidance* is a dummy variable equal to 1 for categories of large banks and regional banks in the top tercile increase in tax avoidance activities in the post-implementation of Dodd-Frank period (2011-2016) compared to the years 2005-2010. *StressTest* is a dummy variable equals to 1 for a CCAR stress test banks and zero for Non-CCAR stress test banks. Bank and year fixed effects are dropped due to multicollinearity. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Risk Ratios	Risk Density	Capital Ratio	Tier 1 Ratio	Leverage Ratio
Large Surge Tax Avoidance=1 × StressTest=1	0.049**	-0.598	-1.410**	-0.615
	(0.019)	(0.599)	(0.675)	(0.645)
Observations	343	343	343	343
Adjusted R^2	0.896	0.825	0.843	0.934

Panel B: Risk Weights	100% Risk Weight Assets/Assets	50% Risk Weight Assets/Assets	20% Risk Weight Assets/Assets	0% Risk Weight Assets/Assets
Large Surge Tax Avoidance=1 × StressTest=1	0.051	-0.007	-0.008	-0.054*
	(0.037)	(0.009)	(0.011)	(0.030)
Observations	269	269	269	269
Adjusted R^2	0.916	0.887	0.837	0.943

Panel C: Bank Loans	Loans / Assets	CRE Loans / Assets	RRE Loans / Assets	C&I Loans / Assets	Consumer Loans / Assets
Large Surge Tax Avoidance=1 × StressTest=1	-0.000	-0.027***	0.009	0.012*	0.004
	(0.020)	(0.009)	(0.013)	(0.007)	(0.010)
Observations	337	453	453	453	453
Adjusted R^2	0.939	0.962	0.957	0.911	0.987

Panel D: Portfolio Characteristics	Off Balance Sheet Assets	Loans HFS	AFS Securities	HTM Securities	Cash & Deposits Due	Federal Funds	Other Assets
Large Surge Tax Avoidance=1 × StressTest=1	0.053**	0.005*	0.047***	-0.027***	-0.057***	-0.015***	-0.006
	(0.022)	(0.003)	(0.011)	(0.008)	(0.013)	(0.000)	(0.006)
Observations	337	337	337	337	337	337	337
Adjusted R^2	0.879	0.500	0.885	0.923	0.820	0.544	0.940

Table A5: **Large Surge in Tax Avoidance and Profitability, Cost of Capital, and Restatement and Advisory Fees.**
Table A5 exhibits the marginal impact of the Dodd-Frank stress tests for banks with a large surge in tax avoidance post-Dodd Frank compared to the pre-Dodd Frank period on on profitability, Cost of Capital, and restatements and advisory-related fees. The profitability measures in **Panel A** include the Tobin's Q, gross profitability, Return on Equity, Return on Assets, Net Interest Margin, Net Non-Interest Margin, and Net Charge-Offs. **Panel B** reports our findings for Cost of Capital- cost of debt and equity, and the Dividend Payout Ratio. Finally, **Panel C** displays the marginal impact of stress tests over a large surge in tax avoidance in the Dodd-Frank era on bank reporting quality (restatements), Accounting and Auditing Expenses, Legal Expenses, Consulting, and Advisory Expenses. *Large surge tax avoidance* is a dummy variable equal to 1 for categories of large banks and regional banks in the top tercile increase in tax avoidance activities in the post-implementation of Dodd-Frank period (2011-2016) compared to the years 2005-2010. *StressTest* is a dummy variable equals to 1 for a CCAR stress test banks and zero for Non-CCAR stress test banks. Bank and year fixed effects are dropped due to multicollinearity. Standard errors are clustered at the bank level and are reported in parentheses while observation counts are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Profitability	Tobin-Q	Profitability	Return on Equity	Return on Assets	Net Interest Margin	Net Non-Interest Margin	Net Charge-Offs
Large Surge Tax Avoidance=1 × StressTest=1	-0.024	0.005	0.013	0.001	-0.006	0.003	0.001
	(0.016)	(0.006)	(0.025)	(0.003)	(0.008)	(0.008)	(0.001)
Observations	328	333	453	453	453	453	296
Adjusted R^2	0.927	0.947	0.553	0.860	0.873	0.924	0.636

Panel B: Cost of Capital	Cost of Capital	Cost of Equity	Cost of Debt	Dividend Payout Ratio
Large Surge Tax Avoidance=1 × StressTest=1	0.010	0.020	0.001	0.016
	(0.013)	(0.014)	(0.009)	(0.041)
Observations	339	339	453	316
Adjusted R^2	0.819	0.891	0.734	0.696

Panel C: Restatements and Advisory-related fees	Restatement_dummy	Acct Audit Expenses	Legal Expense	Consult Advisory Expenses
Large Surge Tax Avoidance=1 × StressTest=1	-0.008	-0.021	6.668***	-0.617
	(0.010)	(0.051)	(0.888)	(1.147)
Observations	369	453	453	453
Adjusted R^2	0.306	0.708	0.624	0.691