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Tax Avoidance - Are Banks Any Different?

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Abstract

While the public has noticed the need for the detection of potential tax loopholes and demand further improvement in the taxation of banks, there is scarce empirical evidence of whether banks' degree of tax avoidance actually differs from that of non-banks. We try to close this gap by investigating U.S. banks' tax avoidance behavior for a sample period from 2004 to 2016. To anchor banks' tax avoidance, we use annual Cash ETRs and GAAP ETRs and compare them to the tax avoidance behavior of non-banks. As there are various channels of tax avoidance, we account for differences in several areas such as corporate fundamentals, the degree of multinationality and regulatory scrutiny. We provide cautious evidence that banks have significantly larger Cash ETRs than non-banks. Via the use of quantile regression we find evidence that the assocation between banks and ETRs is not constant over the whole tax avoidance distribution, but shows a positive association for lower parts of the tax avoidance distribution and a negative association for higher parts. In line with recent research, we provide some evidence that the difference in Cash ETRs between banks and non-banks is more pronounced for worse-capitalized, than for better-capitalized banks.

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1 Introduction

In this study we assess whether the overall degree of tax avoidance of banks[1] is comparable to that of non-banks[2] (holding all else constant) and whether we observe differences in frequently used tax avoidance variables (letting variables differ between bank and non-bank).

Our motivation stems from the fact that banks are still under a lot of public scrutiny due to the latest financial crisis. Politicians and the public wonder whether banks fairly make up for the public financial aid they received and whether they pay their fair share of taxes[3]. We do not touch on the argument that banks should pay their fair share in taxes. However, banks play a crucial role in a country's economy and higher taxes or additional taxes (like bank levies) on the banking sector might decrease banks' available cash. This in turn could curtail lending activity of banks and deteriorate the economic situation in a region. Although banks are an integral part of the economy, tax avoidance studies generally exclude financial institutions and thus banks from their sample[4]. There are only a few studies which address to whether banks' income is responsive to tax rate differentials, i.e. whether banks engage in profit shifting and hence, reduce their tax base (Meeks and Meeks (2014),Merz and Overesch (2016), Schandlbauer (2017), Langenmayr and Reiter (2017)) or whether banks act as a channel for tax avoidance (Gallemore et al. (2019)). Our study is different to the aforementioned studies as they focus on specific parts of banks' tax avoidance (i.e. profit shifting as one channel of tax avoidance or their inclination to assist in tax avoidance), while we are interested in whether banks' *general* degree of tax avoidance differs from that of non-banks.

There are usually two arguments for excluding banks: differences in business models resulting in accounting differences and banks' being subject to industry-specific regulation that might cause differences in tax avoidance behavior. The first reason generally renders the problem for tax avoidance researchers that some control variables are not available for banks which might lead to biased inferences. However, regularly included variables like research and development expense or tax loss carryforward are often missing. To overcome this problem, researchers replace variables by adequate proxies or by setting missing values of the respective variable to zero.

Another significant key concern in those studies, however, seem to be regulatory differences. Implicitly, those studies assume that regulatory oversight and regulatory requirements cause the tax avoidance behavior of banks to differ from that of non-banks. Banks are, besides complying with accounting

[1] Banks comprise of all firms with SIC codes 6020, 6021, 6022, 6035 and 6036. Credit unions (SIC codes 6061 and 6062) are excluded as they are non-profit and therefore treated differently than other banking institutions.

[2] Non-banks are all companies listed in Compustat NA except for other than above defined financial institutions, REITs, insurances and utilities.

[3] E.g. various OECD studies (OECD (2009)) as well as the latest introduction of the article 89 in the CRD IV show this concern

[4] See for example Mills et al. (1998), Rego (2003), Hanlon (2005), Frank and Vidhan (2009), Dyreng et al. (2017), Gallemore et al. (2017)

regulations of the FASB and the supervision by the SEC (to which public non-banks are subject as well), also subject to regulation by either the FDIC or the FED. The FDIC's and FED's main concern is whether banks are able to meet certain regulatory requirements (e.g. capital and leverage ratio requirements, stress test simulation). From a theoretical point of view, the effect of regulation on the tax avoidance behavior of banks is not clear upfront. If a tax strategy might result in additional tax payments upon audit and the bank has failed to build up sufficient reserves, bank's available cash might decrease. This in turn might weaken reserves which originally should buffer capital ratios. Due to the fact of supervision and regulation, banks might therefore be less inclined to engage in aggressive or risky tax avoidance (like aggressive profit or debt shifting) compared to non-banks. Opposed to this scenario, banks strive, within their bounderies, to increase after-tax cash flows[5]. In contrast to non-banks, banks might have other tax avoidance strategies at hand than non-banks. Langenmayr and Reiter (2017), for example, show that banks are able to shift proprietary trading gains to low-tax countries while keeping the employees conducting the trades at the headquarters in a high-tax country. Especially banks with a sustainable capital ratio that are not prone to tight supervision could make use of more aggressive tax avoidance strategies (Scholes et al. (1990), Collins et al. (1995)). Due to the theoretical considerations above, it is an empirical question whether banks' degree of tax avoidance actually differs compared to non-banks and if banks have a higher or lower level of tax avoidance.

To address our research question, we rely upon an U.S. sample of publicly listed banks and non-banks sample from 2004 to 2016. We choose an U.S. setting as it exhibits some advantages like the huge amount of publicly listed banks, fewer regulatory differences than in cross-country studies and, for comparability reasons, the large amount of tax avoidance studies that focus on tax avoidance determinants[6]. Although prior studies exclude all financial institutions (one-digit SIC code=6) in general, we center on banks as a) they comprise the largest group (with about 79.78%) among the financial institutions and b) to refrain from other regulations (e.g. different taxation rules with respect to REITs or credit unions/ trusts, supervision of insurance corporations) that might affect the inferences of our analyses with respect to other tax avoidance studies.[7]

Methodologically, we first use graphical evidence showing that, expect for the financial crisis, banks seem to have equal levels of Cash and GAAP ETR[8] as non-banks. Due to a rather homogenous industry, banks' ETRs bulge close to the 35 % U.S. statutory tax rate and are less spread out than those of non-banks.

In our multivariate regressions we first report unstandardized coefficients and show in a second step

[5]Implicit evidence can be found in Gallemore (2012) who assesses whether the inclusion of deferred tax assets (DTA) in a bank's capital ratio increases a bank's probability to default. He cites a comment letter of the banking industry to U.S. regulatory agencies that argues for the inclusion of DTAs as they want to be treated as a going concern.

[6]E.g. Gupta and Newberry (1997), Mills et al. (1998), Rego (2003), Dyreng et al. (2008), and Dyreng et al. (2017)

[7]Numbers and calculations are based on table 1: 20.76%=(5,678/26,203+1,148)*100; 79.78% is taken from Panel B.

[8]For the sake of brevity, we use the term "ETR" interchangeably for Cash ETR and GAAP ETR if not otherwise stated.

demeaned and standardized coefficients, respectively, to infer whether being a bank has a differential effect while holding other tax avoidance determinants fixed at their averages. In our main analyses we provide evidence that being a bank coincides with a significantly higher Cash ETR, but not with GAAP ETRs. An explanation for this finding might be that banks try to report similar GAAP ETRs as publicly listed non-banks to not attract the attention of investors and IRS. Depending on the specification, banks, on average, seem to have a 4 to 5 percentage points higher Cash ETR than non-banks. In economic terms this effect amounts to 16 % or rather 20 % of mean Cash ETR. Another important finding, however, is that average inferences of how tax avoidance variables (in terms of magnitude) are associated with ETRs once banks and non-banks are combined in a joint sample do not strongly differ from average inferences of a separate non-bank sample. To assess whether tax avoidance variables are differently associated with ETRs for banks and non-banks, we use interactions to analyze incremental effects. We observe incremental differences for variables measuring financial constraint and operating expense in both ETR specifications.

As the difference between banks and non-banks is only significant for Cash ETRs, we use quantile regression to analyze whether there are regions in the tax avoidance distribution where being a bank has a stronger association with ETRs in terms of significance and magnitude. In general, banks report higher ETRs in lower levels of the tax avoidance distribution indicating that they are relatively worse at keeping low levels of tax avoidance compared to non-banks. We observe further that the association between banks and GAAP ETRs is significant for below and above median quantiles, but not for the median itself. For above median quantiles (low degree of tax avoidance) banks depict lower GAAP ETRs than non-banks. As banks are a rather homogenous industry and concerned about investors' reaction to their reported GAAP ETR they might be inclined to report GAAP ETRs which are close to the industry-mean.

To assess whether regulatory differences between banks and non-banks might drive ETRs, we adapt an approach from prior literature that splits banks into worse- and better-capitalized according to different cut points in the combined capital ratio (Schandlbauer (2017), Giroud and Mueller (2015)). In line with Scholes et al. (1990) and Gropp and Heider (2010) we assume that banks with a sufficiently high capital ratio are less concerned about regulatory interventions and should therefore be interested in a similar degree of tax avoidance as non-banks. The opposite should hold for worse-capitalized banks. We find evidence that worse-capitalized banks pay a larger share of cash taxes paid than non-banks. Contrary to our predictions we observe that better-capitalized banks still show significantly, higher Cash ETR than non-banks. The magnitude with about 4 percentage points is, however, smaller compared to the one of worse-capitalized banks of about 8 percentage points. With respect to GAAP ETRs there is almost no significant difference between worse-capitalized/ better-capitalized banks and

non-banks, except when we split at the median. Here, worse-capitalized banks seem to report a higher share of income tax expense than non-banks.

We contribute to the literature by answering the call of Hanlon and Heitzman (2010) to sharpen the understanding of financial institutions' tax avoidance. We are the first[9] to thouroughly analyze banks' and non-banks' degree of tax avoidance in separate and joint samples and shed light on whether frequently used tax avoidance variables differ between banks and non-banks. Implicitly, we contribute to the literature on methodological issues of tax avoidance studies. As few tax avoidance studies keep banks in their sample and account for differences across industries via the inclusion of e.g. industry-fixed effects (e.g. Mills et al. (1998) and Bird et al. (2018)) we provide guidance on whether the inclusion of banks changes standard inferences.

Our findings are especially informative for researchers that are interested in how the inclusion of banks would alter their inferences. Furthermore, we show that the average bank probably does not engage in tax avoidance, but actually pays a higher amount of cash taxes than the average non-bank. For that reason, our study is of interest as an isolated analysis of banks' tax avoidance might lead to biased inferences for curtailing suitable tax legislation.

The remainder of the paper is structured as follows: Section 2 contains our hypotheses development. Section 3 outlines our methodology, variables and sample selection. Section 4 contains results of our multivariate regression, quantile regression and the impact of capital ratio on tax avoidance. Section 5 present some robustness checks. Section 6 concludes the paper.

2 Hypothesis development and related literature

We define tax avoidance according to Dyreng et al. (2008) as paying a low amount of income taxes relative to pretax income. Figure 1, panel B shows that a large amount of firms has an ETR which is lower than the statutory tax rate of 35 % which is why we rely upon a relative comparison in distinguishing whether the firm is better able to avoid taxes than another firm. In general, tax avoidance studies exclude banks and primarily argue that they are different with respect to their business model and accounting items as well as to regulation. For that matter, we do not know to date, at least to the best of our knowledge, whether the overall level of tax avoidance (i.e. measured by a firm's ETR) of banks differs compared to that of non-banks. A reasonable question is why banks would behave differently anyway. One the one hand, several studies (e.g. Demirgüç-Kunt and Huizinga (2001), Merz and Overesch (2016), Langenmayr and Reiter (2017), Shaxson (2018)) and governmental reports (e.g. OECD (2009), OECD (2010), and OECD (2011)) emphasize that banks have either more or other

[9] As far as we know there is no study that explicitly looks at the level of tax avoidance and tax avoidance determinants for banks and compares the outcomes to non-banks.

possibilities at hand (like tax planning through financial derivatives, setting up special purpose entities in tax havens) to effectively avoid taxes than non-banks. Additionally, Gallemore et al. (2019) provide some evidence in the direction that banks are interested in a high level of tax avoidance as they find that banks promote tax avoidance among their customers. While banks are interested in an optimal level of tax avoidance among their customers, they most likely favor a high level of tax avoidance for themselves. This would suggest at least an equal or even higher level of tax avoidance compared to non-banks.

On the other hand, banks are also heavily regulated and have to comply with a battery of rules. A key concern of banks is certainly maintaining adequate capital and leverage ratios as well as required reserve ratios[10]. The adherence of those rules is supervised either by the FDIC or FED. The FED indicates on their website that they use "automated screening systems to conduct routine monitoring of the financial condition and performance [...] This surveillance process ensures that these institutions receive timely supervisory attention and that examination resources can be directed to weak and potentially troubled institutions to supplement on-site examinations and inspections"[11]. Implicitly, supervisory authorities might therefore be interested in tax-induced intra-group debt shifting (either across U.S. states or internationally) as shifting debt to low-tax subsidiaries would increase their leverage ratio. Hence, banks like non-banks (due to e.g. covenants with banks) cannot indefinitively shift debt. Additionally, aggressive tax strategies that might be threatened by the IRS could cause a substantial cash outflow to a bank. This might deteriorate a bank's reserve as well as capital ratio. For that reason the FED and FDIC might be especially attentive to those banks with a relatively low reserve and capital ratio. When banks might fear timely regulatory interventions by the FED or FDIC due to e.g. a non-sustainable capital ratio, banks might not be able to choose (tax) investment opportunities freely (Merz and Overesch (2016); Schandlbauer (2017)). In sum, regulatory intervention would decrease, ceteris paribus, a bank's potential for tax avoidance in comparison to non-banks. Due to the two opposing arguments it remains an empirical question of whether banks' level of tax avoidance differs from that of non-banks.

We, however, assume that banks with a relatively low capital ratio (our proxy for regulatory oversight) have a lower degree of tax avoidance than non-banks. Our reasoning stems from Gropp and Heider (2010) who find evidence that banks with sustainable capital ratios depict a similar pattern in capital structures as non-banks. This finding is opposed to prior research assuming that banks' capital structure is predefined by regulations. Banks' capital would thus not strongly deviate from predefined

[10] U.S. banks are subject to maintaining a Tier 1 capital ratio of 4 %, a total capital ratio of 8 %, a leverage ratio of 3 to 4 % and a reserve ratio of 3 % and 10 %, respectively. The reserve ratio indicates the amount of cash reserves over specified deposits banks are subject to hold in light of possible bank runs. (FED, `https://www.federalreserve.gov/monetarypolicy/reservereq.htm`, last accessed: 2019-07-09)

[11] `https://www.federalreserve.gov/supervisionreg/topics/surveillance.htm`, last accessed: 2019-05-10.

levels. Gropp and Heider (2010)'s findings are in line with Scholes et al. (1990) who conclude that when regulatory costs are low, banks are regulatorily free and more likely to engage in tax-minimizing actions. As the banks in our sample are generally above the capital ratio threshold of 8 %, we are only able to evaluate "being constraint" in relative terms. We predict that worse-capitalized banks weigh risky tax investments differently than those banks whose capital ratio is relatively well above the 8 % cut points.

Prior tax avoidance studies (e.g. Gupta and Newberry (1997), Mills et al. (1998), Rego (2003), and Dyreng et al. (2017)) show that the level of tax avoidance not only depends on a firm's industry classification, but also on other factors like e.g. a firm's outcomes of its business model (i.e. profitability, depreciation expense, lease expense, employee intensity, loss history), size (i.e. exploitation of economies of scale) and foreign operations (i.e. a proxy for profit shifting opportunities). As the aforementioned studies generally exclude financial institutions and hence, banks from their sample, we jointly rely upon findings from non-bank's and bank's tax avoidance or ETR studies to form predictions on how frequently used tax avoidance variables might differ when being a bank.

[Figure 1 about here.]

[Table 1 about here.]

Since Modigliani and Miller (1963) a vast amount of studies assessed the relation between tax shield and capital structure of non-banks (see Heider and Ljungqvist (2015) for an overview). The common intuition is that interest expense creates a tax shield if interest expense is deductible for tax purposes. With respect to banks, studies generally assume that banks due to regulatory boundaries would not heavily rely on debt-financing and therefore exclude them from their analyses (Gropp and Heider (2010)). However, some studies show (e.g. Scholes et al. (1990); Gropp and Heider (2010)) that well-capitalized banks structure their capital structures like non-banks. Implicitly, this would mean that banks also draw on the tax shield created by relying on debt-financing. Heckemeyer and de Mooij (2017) directly analyze this notion in a joint sample (bank and non-bank). They are interested in whether the incentive of debt bias is as pronounced for banks as it is for non-banks. Debt bias refers to the preference of debt-financing over equity-financing due to tax reasons. They find evidence for a positive effect of taxes on a bank's leverage ratio similar to that of non-banks. However, the tax responsiveness between non-banks and banks heavily depends on the size distribution as large banks seem to be less tax responsive than small banks while the reverse holds for large non-banks. In a similar vein, Schandlbauer (2017) shows in a bank-only setting that banks increase their non-depository debt around a state tax increase. This finding is driven by well-capitalized banks that are able to benefit from an enlarged tax shield. Schandlbauer (2017) also finds evidence that better-capitalized banks increase their loan supply while worse-capitalized banks decrease them. He argues that better-capitalized

banks are able to trade off the increased costs of funding by the tax-deductibility of increased debt. Based on the findings above, we predict that leverage is negatively related to a bank's ETR. We further assume that there is no incremental difference when we allow leverage to differ between banks and non-banks.

With respect to size, profitability and losses, we do not assume that they differently affect banks' and non-banks' ETRs. On the on hand, larger banks should be able to exploit economies of scale fostering efficient tax planning while at the other hand, they are presumably more visible to the public and therefore might fear a tax scandal with negative feedback effects on their reputation (Gupta and Newberry (1997) and Zimmerman (1983)). Hence, we make no prediction on the coefficient of size.

A more profitable firm should pay more taxes assuming a constant capital input (i.e. the firm is getting more efficient). We therefore assume a positive relation between profitability and ETRs.

Previous losses indicate the potential for tax loss carryforwards which reduce a firm's tax burden. We therefore predict a negative relation between losses and ETR. As banks suffered more from the financial crisis than non-banks and accumulated large losses during the financial crisis (OECD (2010)) we expect that the impact of previously incurred losses on ETRs should be more pronounced for banks than for non-banks.

Depreciation on property, plant and equipment, SG&A expense and partially intangibles cause operating expense which is generally tax deductible and should therefore negatively impact ETRs. As banks rely more heavily on SG&A expense, we assume that the incremental effect of SG&A is stronger for banks. We make no predictions on the incremental differences of PP&E and the usage of intangibles.

Although we know from prior literature that banks seem to have similar capital structures as non-banks, we do not know how banks set up their tax structure in financial distress. There is recent evidence that non-banks who are in financial distress actually use more cash tax avoidance (Edwards et al. (2016)). Banks themselves play down the relevance of their cash flow statement as the information provided herein was not useful in valuing the firm. Burke and Wieland (2017), however, find evidence that the information actually is value-relevant. As we are, however, interested in banks' financial constraint we do not use operating cash flow, but the cash flow from financing activities. We make no predictions on how financial cash flow is related to ETRs.

A key focus of tax avoidance studies is the reduction in the tax base via profit- or debt-shifting (see Dharmapala (2014) for an overview on non-banks). Quite a few studies arose recently that assess in a banks-only setting their inclination to engage in profit shifting. Demirgüç-Kunt and Huizinga (2001) provide first evidence in an international sample that multinational banks pass on fewer of the born tax burden to their customers compared to merely domestic banks. They assume that multinational banks have different channels at hand to circumvent taxation like the strategic set-up of intra-group transfer

prices. In a small, one-country setting Meeks and Meeks (2014) assess what explains the discrepancies between HMRC tax revenues from banks and tax expense recorded on banks' financial statements. The decrease in tax revenue from banks does not result from a decline in the UK statutory tax rate, reduced operating profits or tax-deductible impairments, but presumably from UK bank profits that are earned overseas. While the decline in UK originated profits is rather substantial, the share of UK assets to total assets stays fairly constant over their sample period. Meeks and Meeks (2014) see this as some evidence for multinational bank's engaging in profit shifting. Merz and Overesch (2016) are the first to directly test banks' profit shifting behavior in a large, cross-country setting. They analyze the inclination of multinational bank holding companies to shift profits measured as the elasticity of net income or a component of it to a one percent increase in a corporate statutory tax rate. Their key findings are that banks' response to taxation is stronger compared to a consensus estimate of studies analyzing non-banks' profit shifting and that trading gains are highly responsive. This finding is corrobated by Langenmayr and Reiter (2017) who show that German banks relocate their trading gains to low-tax countries to benefit from the low tax rate while the employees conducting the trade remain in the headquarter, i.e. the high-tax country. In sum, we predict a negative association between foreign operations and a bank's ETR. It is, however, unclear whether banks are incrementally better in setting up international tax structures than non-banks. We therefore make no predictions concerning that relationship.

We differ from the aforementioned studies on profit shifting as they analyze a) banks' profit shifting behavior (one channel of how to target a high level of tax avoidance) and b) they use separate bank samples for their analyses which makes direct comparisons between banks and non-banks difficult. We contribute by descriptively analyzing whether the overall degree of tax avoidance is comparable to that of non-banks (holding other drivers constant) and whether we observe differences in frequently used tax avoidance variables (letting drivers differ between bank and non-bank).

3 Methodology

3.1 Variables and methodology

We calculate different models to appropriately compare banks' and non-banks' tax avoidance. In a first step, we simply regress ETRs on unstandardized variables in separate bank and non-bank samples to be able to compare the direction of the coefficients to prior studies. Second, we combine the bank and non-bank samples and include the binary variable BANK to analyze whether the inclusion of banks in the non-bank sample would yield different inferences. Third, we include interaction terms as they allow us to draw conclusions on which tax avoidance determinant incrementally differs between banks

and non-banks. Essentially all models, we are estimating, are a variant of the following model:

$$ETR_{it} = \alpha + \beta_1 \times BANK_{it} + \sum\nolimits_k \beta_k \times X_{it} + \sum\nolimits_m \beta_m \times BANK_{it} \times X_{it} + \xi_t + \lambda_s + \varepsilon_{it} \quad (1)$$

where ETR_{it} is either the annual CASH ETR or GAAP ETR. CASH ETR is calculated as cash taxes paid over the sum of pretax income and special items. GAAP ETR is total income tax expense over the sum of pretax income and special items. We investigate both, GAAP ETR and Cash ETR, as we believe that the GAAP ETR is of interest to investors and the public in general while the Cash ETRs better reflect the taxes a firm actually pays.

Our variable of interest, $BANK_{it}$, is a binary variable which takes the value of 1 if the firm has a SIC code of 6020, 6021, 6022, 6035, and 6036. This variable indicates whether banks generally have different ETRs than non-banks. Our additional analyses focus on the interaction between $BANK_{it}$ and the placeholder X_{it} which refers to our various tax avoidance variables.

The calculation and inclusion of standard tax avoidance variables is taken from prior research (see e.g. Dyreng et al. (2010), Kubick et al. (2016), and Bird et al. (2018)). To cope with the fact that banks are larger than non-banks, we calculate $SIZE_{it}$ as the natural logarithm of total assets. Furthermore, we deflate all variables where indicated with total assets to account for heterogeneity due to size effects. ROA_{it} approximates a firm's profitability and is calculated as pretax income over total assets.

Unfortunately, we are not able to identify tax loss carryforwards for banks from the Compustat database as this item is neither filled in the industry nor bank format (indfmt=INDUSTRY/BANK). Tax loss carryforwards show a firm's potential to offset losses from the past against future taxable income. We therefore approximate tax loss carryforwards for banks and non-banks with the binary variables $LOSS_{i,t-1}$ and $LOSS_{i,t-2}$ indicating whether the firm incurred a loss in the previous year or the year before that.

According to Frank and Vidhan (2009), there is generally no uniform measure of leverage in the non-bank literature. Gropp and Heider (2010) define a bank's leverage ratio as one minus the ratio of equity to the book value of assets. As this ratio also includes deposits which non-banks usually do not report, Gropp and Heider (2010) modify the leverage ratio to only include non-deposit liabilities which is comparable to long-term debt of non-banks. However, we define $LEVERAGE_{it}$ according to Heckemeyer and de Mooij (2017) as total debt over total assets since we are interested in the tax shield of total corporate debt in relation to corporate equity and its impact on ETRs. While LEVERAGE is a proxy for a firm's capital structure, we use FINANCIAL CASH FLOW as an indicator of financial distress. The correlation between LEVERAGE and FINANCIAL CASH FLOW is low (correlation

coefficient: 0.14 (bank), 0.03 (non-bank)) which is why we believe that those two items measure different concepts of financing (funding of capital vs. managing capital). FINANCIAL CASH FLOW$_{it}$ is comprised of changes in common stock, in long-term debt and in current debt. For banks the item also includes changes in deposits. We do not correct for this item as deposits in FINANCIAL CASH FLOW account for a large portion of banks' financial activities and a huge drop in those would cause financial distress to a bank. The deletion of changes in deposits, hence, would make it difficult to compare financial activities of banks to that of non-banks.

FOREIGN$_{it}$ accounts for potential channels of profit shifting. The variable is of 1 if the items *"Current foreign income tax"* or *"International sales"* gathered from Thomson Reuters Geographic Segments are neither missing nor zero.

NET PP&E, INTANGIBLES and SG&A EXPENSE approximate operating expense which is tax deductible as well. NET PP&E$_{it}$ is calculated as net property, plant & equipment over total assets. INTANGIBLES$_{it}$ is intangibles over total assets and includes among others, licenses, patents and goodwill. SG&A EXPENSE$_{it}$ is selling, general and administrative expense over net sales. This item includes personnel expense and other administrative expenses needed to secure operating income. Table 2 provides guidance on how we define and calculate our variables.

[Table 2 about here.]

To control for confounding effects such as the financial crisis or differences across U.S. states, we include year- and state-fixed effects (ξ_t, λ_s) where indicated. Our standard errors are clustered at the firm level. As we are interested whether being a bank is differently associated with ETRs than being a non-bank, we do not control for industrial differences via the inclusion of industry-fixed effects as we would test BANK against the different industries rather than against non-banks as a whole.

In addition to the standard approach above, we demean and standardize, respectively, all non-binary control variables in the interaction regression model by substracting the yearly, industry-specific mean from each variable and divide by the yearly, industry-specific standard deviation. Industry-specific refers to the split between bank and non-bank. The unstandardized approach helps us to assess whether average inferences in standard regressions would change upon the inclusion of banks while demeaning yields a better basis to interpret the variable BANK more sensibly across the different specificaitons. The demeaned coefficient, BANK, then depicts the influence of being a bank on tax avoidance under the assumption that all other variables are fixed at their means. In our unstandardized regressions BANK represents the partial influence of being a bank on tax avoidance when all other variables are at zero[12]. Standardization (dividing by the standard deviation) makes the assessment of changes in

[12]For further information refer to Afshartous and Preston (2017), Bring (1994).

coefficients across specifications easier. A standardized OLS coefficient describes the average change in the dependent variable if the independent variable increases by one standard deviation. In sum, we are able to assess whether BANK is differently associated with ETRs while we control for the average impact of the tax avoidance variables and adjust the interpretation basis to one standard deviation.

To gain further insights in the difference between banks and non-banks, we apply quantile regression to our sample. With the help of this approach we are able to analyze the extreme parts of the tax avoidance distribution. While OLS assesses the response of the dependent variable at the mean, quantile regression is a potent tool to assess the outcome of the dependent variable at different points of the underlying distribution. We rely on conditional quantile regression to be in line with our standardized regression approach (Borah and Basu (2013)). We are furthermore able to investigate whether determinants that show a significant/ insignificant impact on ETRs at the mean still significantly/not significantly impact ETRs at different quantiles.

To analyze whether banks' degree of tax avoidance differs upon regulatory intervention and hinders them from undertaking preferred tax investments, we use banks' most visible accounting item in this respect, the combined capital ratio, as a proxy. Scholes et al. (1990) indicates that banks behave in a similar way as non-banks when they have a sufficiently high capital ratio. Gropp and Heider (2010) find evidence that well-capitalized banks show a similar capital structure than non-banks. In order to identify potential differences between banks with relatively better and relatively worse capital ratios in comparison to non-banks, we rely upon the specification in Schandlbauer (2017)[13]:

$$ETR_{it} = \alpha + \beta_1 \times BANK_{it} \times WORSECAPRATIO + \beta_2 \times BANK \times BETTERCAPRATIO + \sum\nolimits_k \beta_k \times X_{it} + \xi_t + \lambda_s + \varepsilon_{it} \quad (2)$$

ETR_{it} and X_{it} are defined as above. $\text{WORSECAPRATIO}_{\text{it}}$ is one if the the capital ratio of a bank is below a certain quantile threshold [14] and zero otherwise. The reverse holds for $\text{BETTERCAPRATIO}_{\text{it}}$. With this approach, we are measuring the relative regulatory constraint rather than actual constraint. The interaction between BANK_{it} and $\text{WORSECAPRATIO}_{\text{it}}$ shows whether banks with a relatively lower capital ratio behave differently than non-banks. The same intuition applies to the interaction between BANK_{it} and $\text{BETTERCAPRATIO}_{\text{it}}$. In sum, we are not testing whether worse-capitalized banks are different from better-capitalized banks, but the indicator variables split banks according to

[13] We follow Schandlbauer (2017) in terminology of how we define banks that are below (worse-capitalized) and above a certain threshold (worse-capitalized).

[14] We use different cut points to assess whether we can observe a phase-in effect.

their capital ratio and display the difference between the respective banks and non-banks.

3.2 Sample selection

Table 3 shows our sample selection process. Our sample comprises of data from Compustat North America (NA), Compustat Bank and Thomson Reuters Worldscope and EIKON[15]. The sample ranges from 2004 to 2016. The year 2004 is a natural lower bound for our analysis as neither Compustat NA nor Compustat Bank cover cash taxes paid (item "txpd") for banks before that point in time[16]. We therefore rely mainly on the years 2004 to 2016 to have a similar time horizon both for banks and non-banks. We only keep U.S. incorporated firms.

[Table 3 about here.]

We include those firms in our sample which have non-missing observations to construct our ETR measures. Hence, we drop income taxes paid, income tax expense, pretax income, total assets if missing and common equity if either missing or negative[17]. As we would lose observations due to missing special items, we replace a missing special item with zero.[18] We add back special items due to their one-time character. We do not drop those observations where the negative value of pretax income is caused by special items. Firms with negative or zero common equity might be in financial distress and therefore might have different incentives than solvent firms. The same applies to banks whose capital ratio is missing. To have the same data basis and not confound our results with the inclusion of other financials (like insurance companies, brokerage firms) we drop all observations, except those for banks, with one-digit SIC code 6. The same argument holds for the exclusion of utilities (one-digit SIC code 4). We truncate Cash ETRs and GAAP ETRs at 0 and 1 as observations above and below this threshold are difficult to interpret. In our main analyses we refrain from treating outliers in the control variables. We know that our internal validity might suffer from this decision. We believe, however, that for our research question generalizability of our results based on a broader set of observations is more important. To draw equal inferences on Cash ETR and GAAP ETR, we require that each firm-year observation has non-missing values of both Cash ETR and GAAP ETR. In a last step we delete observations that have missing values for our tax avoidance variables.

[15] Thomson Reuters provides us with data to proxy for a bank's degree of internationality. We delete those observations in the banking sample where the match was not successful.

[16] As other studies (e.g. Burke and Wieland (2017)) also notice Compustat only started to collect information from banks' cash flow statements in 2004.

[17] Income taxes paid is equal to Compustat item TXPD (data317), income tax expense to TXT (data16), pretax income to PI (data170) and special items to SPI (data17).

[18] We randomnly checked whether the firm reported special items as defined by Compustat and are fairly certain that the alterations we made are consistent with the reported items. The alterations apply to approximately 449 observations.

4 Results

4.1 Descriptive evidence

Figure 1, panel A shows average Cash ETRs and GAAP ETRs of banks and non-banks. In panel B we split non-banks across one-digit SIC codes. First of all, all industries are, on average, well below the U.S. average corporate tax rate of around 39 % and the federal statutory tax rate of 35 %[19]. Graphical evidence suggests that averaged over the sample period banks' Cash ETR and GAAP ETR in Figure 1 are somewhere in the middle range of the tax avoidance distribution when measured in GAAP ETR terms and at the highest end when measured in Cash ETR terms. A first interesting finding is that average Cash and GAAP ETR of banks are almost identical, for GAAP ETRs being marginally lower than Cash ETRs. This is surprising as in comparison to non-banks and other financial institutions we see that GAAP ETRs are always higher in magnitude than Cash ETRs. The fact that Cash ETRs and GAAP ETRs are less dispersed in the banking sample might be due to rather homogenous industry characteristics than the melting pot of "non-banks". However, even after disaggregating non-banks into more specific industry categories non-banks' GAAP ETR is always substantially larger than Cash ETRs. Striking in this context is the huge difference in the industry "MINING" with a Cash ETR of below 15 % and a GAAP ETR of over 28 %. As all tax avoidance studies generally analyze the cross-section of non-banks, we compare banks' outcomes to the group of non-banks (instead of disaggregating them) in the following analyses.

Figure 2 shows how average Cash ETRs and GAAP ETRs of banks and non-banks evolve over our sample period. While GAAP ETRs are less volatile, the large peak around 2008 in banks' Cash ETRs is striking. The spike probably represents the outbreak of the financial crisis causing pretax income to decline and special items to increase. This one-time effect leads to a larger Cash ETR than GAAP ETR as deferred taxes presumably absorb the shock and take future tax loss carryforwards into consideration. Figure 3 provides evidence for our reasoning. Here, we observe that while income taxes are smaller in magnitude cash taxes paid slightly increase until 2009. With reference to figure 2, non-banks' ETRs show some convergence in the financial crisis years, but unsurprisingly not as large as banks. Interestingly, banks and non-banks' ETRs seem to converge after 2012. We are unfortunately not able to infer whether this pattern was already existent in the years prior to our sample period.

[Figure 2 about here.]

[Figure 3 about here.]

[19] The average corporate tax rate approximately amounts to 39 % until the year 2018 and consists of federal taxes such as the corporate statutory tax rate and local taxes. For a detailed look at the combined statutory tax rate: OECD.Stats, Table II.1: Statutory corporate income tax rate. `https://stats.oecd.org/index.aspx?DataSetCode=TABLE_II1#`

Figure 4 displays frequency distributions of annual Cash ETRs and GAAP ETRs for banks and non-banks. The shape of the frequency distribution of non-banks' Cash ETRs is similar to Dyreng et al. (2008): We observe a bunching in the bin between 0 and 10 % and a rather equal distribution for the bins up to the 35 % for non-banks. There are few observations with a Cash ETR over 40 %. The picture looks similar for banks, though the bunching occurs between 25 % and 30 %. Interestingly, banks' and non-banks' GAAP ETRs are skewed towards the 35 % corporate statutory tax rate. In sum, we cautiously conclude with regard to graphical evidence that banks are less able to keep lower levels (e.g. due to fewer observations in the lower tails of the distribution) of tax avoidance than non-banks, at least on average.

[Figure 4 about here.]

Table 4 shows summary statistics for banks (panel A), non-banks (panel B) and the combined sample (panel C) for our main variables. Comparing panel A and panel B, it is evident that Cash ETRs and GAAP ETRs in the bank sample are very close. Banks, on average, have a higher annual Cash ETR compared to non-banks. In terms of GAAP ETRs, banks and non-banks are on average fairly similar with non-banks showing a larger standard deviation than banks. As mentioned before, we explain this by banks being a rather homogenous group compared to non-banks. Differences between Cash ETR and GAAP ETR in the non-bank sample might be driven by differences in business models (e.g. different depreciation rates, different usage of intangibles)[20].

Banks are less profitable than non-banks when measured by ROA. Gallemore (2012) reports similar results of 2 % for banks. The lower profitability is also not surprising against the backdrop of the financial crisis from which banks probably suffered stronger than non-banks. Negative values of ROA at the lowest end of the distributions are due to the fact that our ETR measures are not constrained to positive pretax income, but to a positive sum of pretax income and special items. This means that firms experience a one-time shock reflected in negative special items that when added back outweighs the loss[21]. As mentioned above, LOSS indicates whether the firms incurred a pretax loss in the previous year or the year before that. Surprisingly, we observe that a larger portion of the non-bank sample encountered some kind of losses in the past. We admit that this might result from a survivorship bias in our banking sample. Due to a bank's business model, banks are on average larger than non-bank firms and their leverage ratio is close to 90 %. Not surprising is the low amount of intangibles to total assets and net property, plant and equipment in the banking sample. Due to their business model banks have less licences or patents and machinery on their balance sheets. In contrast, banks rely

[20] Figure 1, panel B shows Cash ETRs and GAAP ETRS split across industries.

[21] There are 561 loss observations in our sample. Their ETRs range from 1 % to 95 %. At the median they show ETRs which are well behaved (20 %). The corresponding special items are in a range which suggests that the pretax loss only occurred due to them.

more heavily on personnel expense than non-banks which shows in the larger ratio of SG&A expense to total sales of about 34 % compared to a non-banks' ratio of 25 %. About 2 % of the observations in the banking sample show some kind of multinationality against 50 % of the non-bank sample. As our banking sample seems highly domestic, we admit that inferences with respect to how foreign operations impact a bank's ETR compared to that of non-banks are limited.

[Table 4 about here.]

In panel C of table 4 we observe that the inclusion of banks in the sample does not severly change the distributional properties in comparison to the non-bank sample. Comparing means across the bank and non-bank sample (panel D), we observe however that the mean difference for Cash ETRs is highly significant and rather large with 6 percentage points. The difference in GAAP ETRs, though also highly significant, seems to be in economic terms less pronounced with only 0.6 percentage points. In sum, descriptive evidence as graphical evidence suggests that banks pay a higher amount of taxes (GAAP and cash taxes) relative to their pretax income than non-banks.

[Table 5 about here.]

4.2 Multivariate analysis

In table 6 we provide the findings of our main regressions for unstandardized variables. Normally tax avoidance studies use unstandardized OLS regression. For that matter, we first want to assess whether the inclusion of banks would substantially change average inferences in an unstandardized analysis. We acknowledge that our adjusted R^2 is in a similar range of e.g. Dyreng et al. (2010) or Dyreng et al. (2017). Surprisingly, our tax avoidance variables seem to explain a larger portion of variation in the banking than in the non-bank sample providing some confidence that our determinants also fit for banks' ETRs. The column *Hypothesis* provides predictions on the coefficients' signs.

In presenting our results we start with the regression of Cash ETR (table 6). When comparing the outcomes of the separate samples, we observe that, except for ROA and SIZE which are only significant in the non-bank specification, all variables are associated as predicted. The positive association of SIZE and Cash ETR might result from the public scrutiny of the IRS who investigate larger firms more regularly resulting in higher cash taxes paid. Rather than with the prevalence of economies of scale this finding might be explained by the political cost theory (Zimmerman (1983)) and the findings in Hoopes et al. (2012) who show that audit probability raises with firm size. The variables FINANCIAL CASH FLOW and Cash ETR show a different association in the bank and non-bank sample[22]. Table 4

[22]According to the Compustat Bank balancing models, FINCF consists of the change in deposits, sale and purchase of

already shows that banks' financial cash flow is positive while the one of non-banks is negative. Banks' revenues primarily result from financing activities. Hence, the positive association between Cash ETR and FINANCIAL CASH FLOW implicitly induces higher profits and therefore, higher taxes that have to be paid. Non-banks' FINANCIAL CASH FLOW mostly consists of interest expense paid on debt which is probably offset against taxable income. The association between non-banks' Cash ETR and FINANCIAL CASH FLOW, for that matter, is negative. The key difference between banks' and non-banks' FINANCIAL CASH FLOWs stems from the change in deposits. As we approximate financial constraint of firms with FINANCIAL CASH FLOW, we believe that deposits play an important role for banks' flexibility in liquidity. Due to that, we do not exclude the change in deposits.

[Table 6 about here.]

Column 3 and 4 of the Cash ETR specification display the results of our main analysis. In column 3 our coefficient of interest, BANK, is positive and highly significant corroborating our graphical evidence that banks, on average, have a higher Cash ETR than non-banks. Being a bank results in a 4 percentage points higher Cash ETR which translates in an economic effect of about 16 %[23].

Besides analyzing whether being a bank is associated with another degree of tax avoidance, we are also interested in whether average inferences on the association of tax avoidance variables and ETRs would change once we re-introduce banks in the sample. For that matter, we compare the outcomes of the combined sample (column 3) with those of the non-bank sample (column 2), rather than with the bank sample. In this context FINANCIAL CASH FLOW is worth mentioning whose positive effect in the banking sample is outweighed by the negative effects of non-banks. As already mentioned further above, FINANCIAL CASH FLOW is positive for banks and negative for non-banks which explains the adverse effects. In general, the direction of almost all coefficients, expect for FOREIGN (insignificant), do not change. In terms of magnitude the coefficients change slightly, especially for ROA, 2-year ahead losses and FINANCIAL CASH FLOW. The economic significane of ROA, LOSSES and FINANCIAL CASH FLOW does not change strongly when increasing those variables by 1%[24]. In line with Heckemeyer and de Mooij (2017) we do not find that leverage is significantly associated with Cash ETRs of banks and non-banks.

Although the inclusion of banks does not alter magnitude and direction of signs for the different kinds of operating expense in the joint sample, we observe significant incremental differences for $LOSS_{t-2}$,

common stock, issuance and extinguishment of long-term debt, changes in current debt, receipt or payment of cash dividends, other financing activities and excess tax benefit of stock options. The industrial definition of FINCF is similar exclusive the change in deposits.

[23] Calculation: 0.04/0.25=0.16. 0.25 is the average Cash ETR from the joint sample

[24] ROA: (0.04*0.01)/0.24=0.002 -> 0.2 % (non-bank), 0.1 % (joint); $LOSS_{t-2}$: 16.25 % (non-bank), 18 % (joint), FINANCIAL CASH FLOW: 0.5 % (non-bank), 0.3 (joint)

FINANCIAL CASH FLOW, NET PP&E, INTANGIBLES and SG&A EXPENSE in column 4. In terms of magnitude and economic significance only lagged losses seem to be important: being a bank and having accumulated losses in t-2 results in a 3.7 percentage points lower Cash ETR compared to non-banks. The overall effect amounts to 30 % of mean Cash ETR. The significant differences between banks and non-banks for the other variables, however, are not surprising as a bank's key operating expense is, besides their personnel expenses, the depreciation or leasehold expenses on buildings in which their branches are located[25]. The same argument holds for SG&A expense which includes personnel expense and is tax deductible.

Turning to the separate regressions in the GAAP ETR specification, inferences on directions and magnitudes of coefficients are generally similar to those in the Cash ETR specification. ROA, however, is now highly significant and seems to have a strong, positive (as predicted) association on GAAP ETRs (column 5 and 6). Again, FINANCIAL CASH FLOW exhibits a positive sign in the bank sample and negative sign in the non-bank sample.

Similar to columns 3 and 4, columns 7 and 8 contain our results of interest. Opposed to the findings in the Cash ETR specification, being a bank is not significantly differently associated with GAAP ETRs. There are two explanation for our findings: Either public banks do not want to differ strongly in terms of reporting behavior from their non-bank counterparts or deferred tax expense equalizes differences in business models. SIZE is now insignificant while FOREIGN enters the regression significantly and in the predicted way. The latter might provide evidence for the exploitation of tax rate differential which then decreases current and deferred tax expense. The effect seems stronger in the bank sample than in the non-bank sample. This finding is in line with Merz and Overesch (2016) and Langenmayr and Reiter (2017) who suggest that banks with foreign operations exploit tax rate differentials to decrease their taxes due. The incremental difference between BANK and FOREIGN, though, is not significant indicating no significant differential effect between banks and non-banks. As mentioned above, we acknowledge though that inferences with respect to how multinationality affects ETRs are limited due to the limited amount of banks operating internationally.

All in all, the analysis in table 6 provides evidence that banks seem to have significantly different Cash ETRs, but not GAAP ETRs. The inclusion of banks (i.e. a the joint sample with unstandardized variables) would for most parts not significantly alter average inferences.

To corroborate our findings, we show regression results based on demeaned and standardized variables. In table 6 the coefficients show the association of being a bank with the ETRs if the other variables were fixed at zero. Demeaning helps us to better interpret these findings. In table 7 we observe

[25]The numerator of NET PP&E includes banking companies' and savings and loan companies' office premises and equipment. INTANGIBLES includes leases and lease acquisition costs, leasehold expense when company is the lessee and operating rights.

that the association of BANK with CASH ETRs increases slightly while the effect for GAAP ETR is still insignificant. When accounting for the average influence of the other variables, being a bank renders a 5.5 percentage points higher Cash ETR compared to non-banks and amounts to 21.2 % of the mean Cash ETR. Going a step further, in table 8 we report standardized coefficients which additionally facilitate interpretation of changes in variables as the common ground is set to standard deviations. With respect to BANK, the results stay the same for both, Cash ETR and GAAP ETR. A key difference between table 6, 7 and 8 can be observed when looking at the interaction of ROA and BANK in the GAAP ETR specification. While the large coefficient in table 6 and 7 would indicate a strong, incremental effect of ROA, the coefficient in table 8 accounts for the difference in variances of banks and non-banks and facilitates interpretation across specifications. With reference to table 8, column 8, if ROA increases by one-standard deviation when being a bank than the GAAP ETR increases by 1.9 percentage points.

[Table 7 about here.]

[Table 8 about here.]

In sum, the results that being a bank matters for CASH ETRs, but not for GAAP ETRs. The economic significance amounts up to one fifth of mean Cash ETR.

4.3 Similarities and differences across the response distribution

Although being a bank seems to be significantly associated with Cash ETRs, but not with GAAP ETRs, the association between being a bank and ETRs might vary across the tax avoidance distribution. For that matter, we present results of quantile regressions in table 10 and figure 5. Quantile regression helps us to analyze whether the influence of being a bank is weaker/stronger at specific quantiles of the tax avoidance distribution. Furthermore, as quantile regression only calculates the association at a specific quantile, the results are less prone to the influence of outliers. In our calculations we stick to conditional quantile regressions opposed to unconditional quantile regression as we are interested in whether being a bank is associated with certain quantiles of ETRs while the other variables are held constant at their means. An overview of the specific quantiles of the tax avoidance distribution for banks and non-banks is presented in 9.

[Table 9 about here.]

[Figure 5 about here.]

Figure 5 graphs the coefficient of BANK for different quantiles of ETRs. The bolt, broken, horizontal line depicts the regression coefficient from OLS regression. The OLS coefficient is constant across

quantiles as OLS regression calculates average assocations of dependent variables with independent variables. The dotted lines show OLS confidence intervals. Figure 5 and, in particular, table 10 show a strong and positive association of BANK and ETRs in the lower parts of the tax avoidance distribution. This indicates that banks in relatively low areas of the tax avoidance distribution still have a significantly higher ETR than non-banks in the same region of the distribution. With respect to the GAAP ETR it is evident that while being a bank has, on average, no significant association with GAAP ETRs, we see that there are significant differences across the tax avoidance distribution. Taking table 9 into consideration, we already observe that banks have a higher value of Cash ETR and GAAP ETR for lower quantiles of the tax avoidance distribution compared to non-banks.
For higher quantiles the picture is not uniform for Cash ETRs and GAAP ETRs. The association between BANK and Cash ETR becomes insignificant while BANK and GAAP ETRs are negatively correlated for quantiles above the median. This pattern again might be explained by banks being a homogenous industry causing less dispersion in GAAP ETRs in relation to non-banks. At the median banks' and non-banks' association with ETRs significantly differs in the Cash ETR specification, but not in the GAAP ETR specification. When being a bank the median Cash ETR is 7.7 percentage points higher compared to a non-bank. In economic terms, this increase amounts to about 32 % of median Cash ETR and is substantially larger than the 20 % in our demeaned regressions.

[Table 10 about here.]

Briefly assessing the evolution of our tax avoidance variables for different quantiles, table 10 shows that SIZE and ROA depict similar patterns as BANK with a positive association in the lower parts of the tax avoidance distribution and a negative association in the higher parts. Losses are still negatively associated with ETRs over almost the whole response distribution. One explanation for the positive coefficient in the 90th quantile of GAAP ETRs might be that those firms are subject to other difficulties (financial distress) as here, LEVERAGE is significantly and positively associated with GAAP ETRs as well. The coefficient of FOREIGN seems to be positively correlated in lower parts of the Cash ETR specification and negatively associated in higher parts. A positive finding of FOREIGN in the lower parts might be explained by the presence of repatriated earnings which are subject to taxation and would increase ETRs in particular for those firms that already have a low level of ETRs. In the GAAP ETR specification FOREIGN shows the predicted negative sign for almost all quantiles, expect for the lowest. Surprisingly, INTANGIBLES seem to increase ETRs, except for those observation which are in the upper part of the tax avoidance distribution. While the coefficient of FINANCIAL CASH FLOW consistently impacts Cash ETRs negatively, the picture is mixed for GAAP ETRs. In sum, the analysis shows that being a bank shows different associations with ETRs in different regions of the response distribution. Furthermore, banks report significantly higher ETRs compared to non-banks in

those regions of the tax avoidance distribution which are regularly classified as "high tax avoidance"[26].

4.4 Association of regulatory scrutiny and tax avoidance

In this subsection we analyze the relation between regulatory oversight and tax avoidance. Regulatory differences are a key argument for excluding banks from the sample. Due to the lack of other publicly available information on the regulatory scrutiny to which are banks subject, we use the combined capital ratio as a proxy. Table 11 shows our sample banks are all well above the 8% threshold and we are thus not able to sort out banks that are truly in distress. Therefore, we only assess the relative constraint of a bank by splitting the sample in different quantiles of capital ratio. Although our analysis is of relative nature, we believe that banks closer to the 8 % threshold react differently than and are more concerned about keeping sustainable levels of capital ratios than those banks that are further away. With the help of this analysis, we want to assess whether banks, in anticipation of regulatory interventions, then refrain from setting up efficient tax-planning structures. According to Scholes et al. (1990), Gropp and Heider (2010), and Schandlbauer (2017), we assume that banks with a sufficiently high capital ratio should have similar investment possibilities as non-banks and that there should be no significant difference between banks and non-banks. Worse-capitalized banks should, however, display a different association with their ETRs than non-banks.

[Table 11 about here.]

Table 12 reports results on the association of regulatory constraint and tax avoidance for different thresholds with "5" indicating a split of banks' capital ratios at the median[27]. For consistency we also report the cut points at quantiles 1 and 2 although there are only a few observations of worse-capitalized banks in these regions[28]. We therefore settle on interpreting the results of the 3_{rd} to 5_{th} quantile.

In panel A, we observe that both, worse- and better-capitalized banks, have significantly higher Cash ETRs in comparison to non-banks. An interesting finding is though that the difference in Cash ETRs between banks and non-banks is higher for worse-capitalized banks than for better-capitalized banks. A worse-capitalized bank has an about 8 percentage points higher Cash ETR compared to non-banks while better-capitalized banks only show an about 3 to 4 percentage points higher Cash ETR. This finding partially supports our hypothesis that worse-capitalized banks have some troubles in keeping lower levels of cash tax avoidance. However, also better-capitalized banks have higher Cash ETRs

[26] See for example Dyreng et al. (2008) who classify all firms with an ETR of below or equal to 20 % as "low tax rate firm". In turn, this means that firms are able to maintain a high level of tax avoidance.

[27] In this analysis we exclude LEVERAGE as LEVERAGE and a bank's capital ratio are strongly correlated (see table 7) which would probably lead to multicollinearity issues.

[28] The bin "WORSECAPRATIO1" and "WORSECAPRATIO2" only comprises 4 and 12 observations, respectively, against 140 and 453 observations in "WORSECAPRATIO3" and "WORSECAPRATIO4".

compared to non-banks, though not as pronounced as worse-capitalized banks.

Turning to panel B of table 12, we only find a significant difference for worse-capitalized banks when splitting at the median and yields an 1.4 percentage point higher GAAP ETR. The economic significance (5 % of mean GAAP ETR) of this difference, however, is low compared to our findings in panel A (32 % and 14 %).

[Table 12 about here.]

[Table 13 about here.]

4.5 Exclusion of financial crisis years

As our sample is prone to the financial crisis and the spike in figure 2 already shows that Cash ETRs of banks are presumably affected by this event, we exclude observations of fiscal years 2007 to 2009. Although the financial crisis is a key event for banks in our sample, table 13 shows that the results stay almost qualitatively the same. An exception is the relation between GAAP ETRs and BANK in the combined sample which now becomes significant at a 10 % significance level. The economic significance of this association, however, is low with only 3 %. Another interesting finding is that the incremental difference between banks that report losses in previous years and non-banks becomes weaker in terms of significance and magnitude indicating that the sample presumably becomes more profitable. Larger banks now seem to have an advantage in comparison to non-banks at keeping lower levels of Cash ETRs.

[Table 14 about here.]

4.6 Robustness tests

Tables 15 and 16 show that after truncating all continuous variables at the 1^{st} and 99^{th} percentiles our results stay almost qualitatively the same, at least with respect to the magnitude of the coefficients and economic significance of BANK.

[Table 15 about here.]

[Table 16 about here.]

[Table 17 about here.]

[Table 18 about here.]

5 Conclusion

To the best of our knowledge, we are the first to study whether banks' tax avoidance behavior differs from that of non-banks and whether re-introducing banks into the sample would affect average inferences with respect to the association of ETRs and frequently used tax avoidance variables.

The picture on whether banks exhibit a different degree of tax avoidance across our two measures, Cash ETR and GAAP ETR, is not uniform. While banks seem to have a substantially lower degree of cash tax avoidance compared to non-banks, we do not find evidence for a differential effect on GAAP ETRs. The inclusion of banks in a combined sample does not substantially change average inferences on how frequently used tax avoidance variables are associated with ETRs compared to a pure non-bank setting. In quantile regressions we find that being a bank shows different associations with ETRs across the tax avoidance distribution. In high tax avoidance regions (low ETRs) banks depict significantly higher ETRs than non-banks.

As regulatory differences are the key reason in tax avoidance studies to exclude banks, we try to analyze whether relatively worse-capitalized banks provide different degrees of tax avoidance compared to non-banks than relatively better-capitalized banks to non-banks. We find that there is a significant difference between worse-capitalized banks and non-banks as well as for better-capitalzed banks and non-banks in our Cash ETR specification and almost no significant difference in the GAAP ETR specification. The effect in terms of magnitude and economic significance is more pronounced for worse-capitalized banks. These findings are partially in line with recent studies suggesting that banks in terms of capital structure decisions are not significantly different from non-banks (Gropp and Heider (2010) and Schandlbauer (2017)) when their financial flexibility allows them to invest as they please.

Although our setting presumably has some limitations as e.g. the low amount of multinationality in the banking sample and the vague identification of regulatory differences, we believe that our findings still provide some valuable first insights for researchers in that the re-introduction of banks into a non-bank sample does not alter average inferences of tax avoidance variables. A possibility to keep banks in the sample is to use industry-fixed effects as some tax avoidance studies already did.[29]. If researchers are thus interested at analyzing tax avoidance at the mean, based on our analyses we are confident to say that including banks would not substantially alter overall inferences.

[29] See for example Mills et al. (1998) and Bird et al. (2018)

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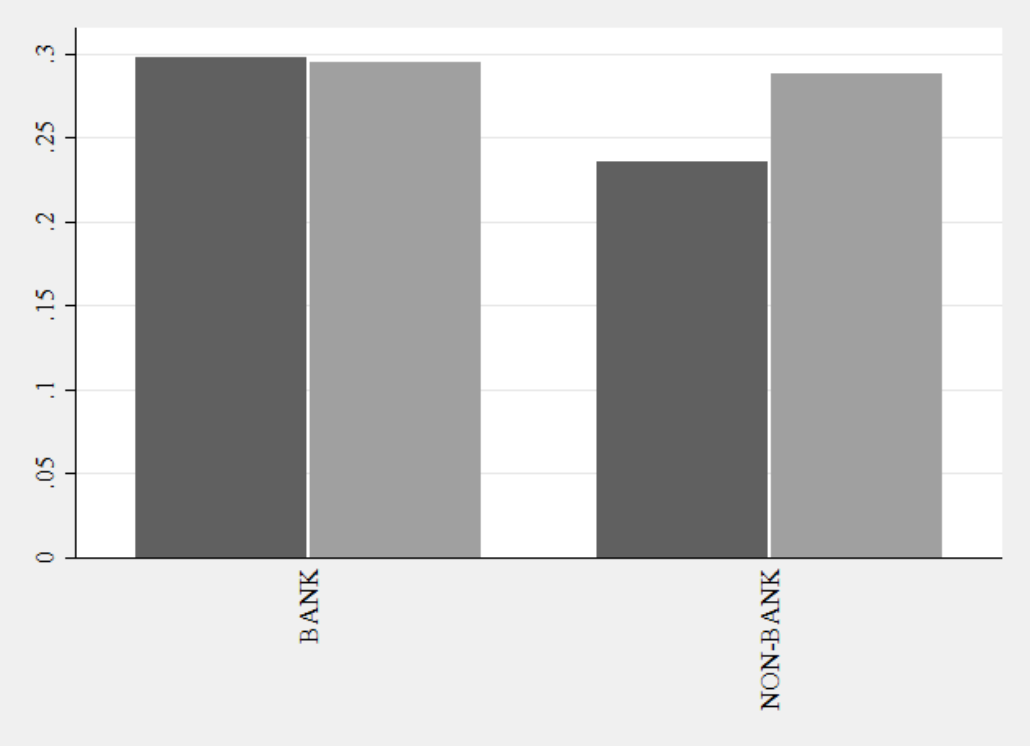
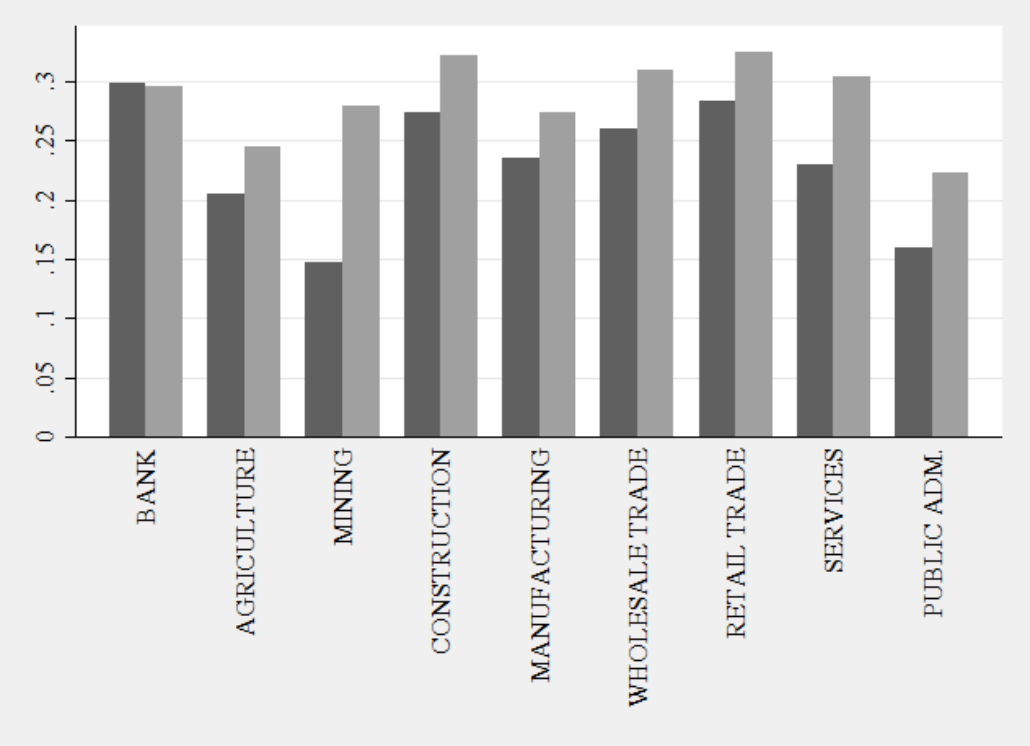
Figure 1: Average Cash and GAAP ETRs over industries between 2004 and 2016

Panel A: Banks vs. non-banks (total)

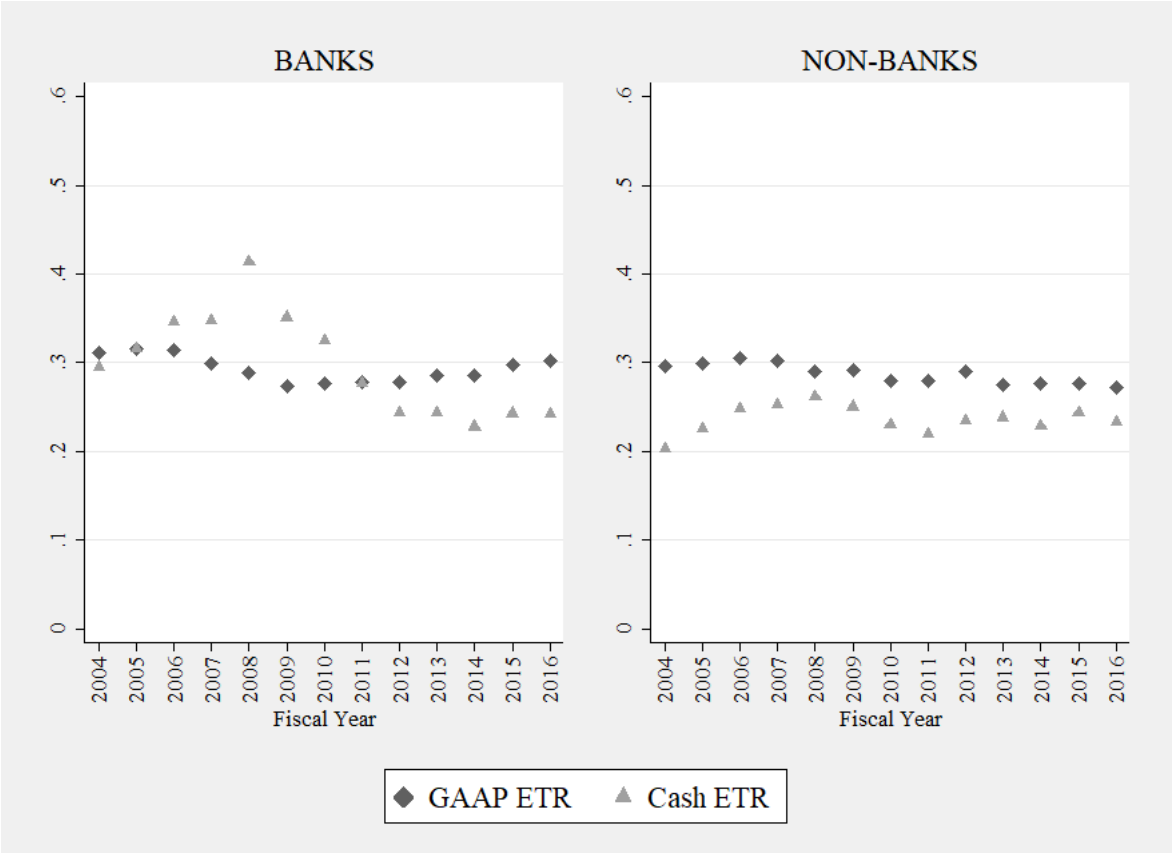


Panel B: Banks vs. non-banks (split by industries)



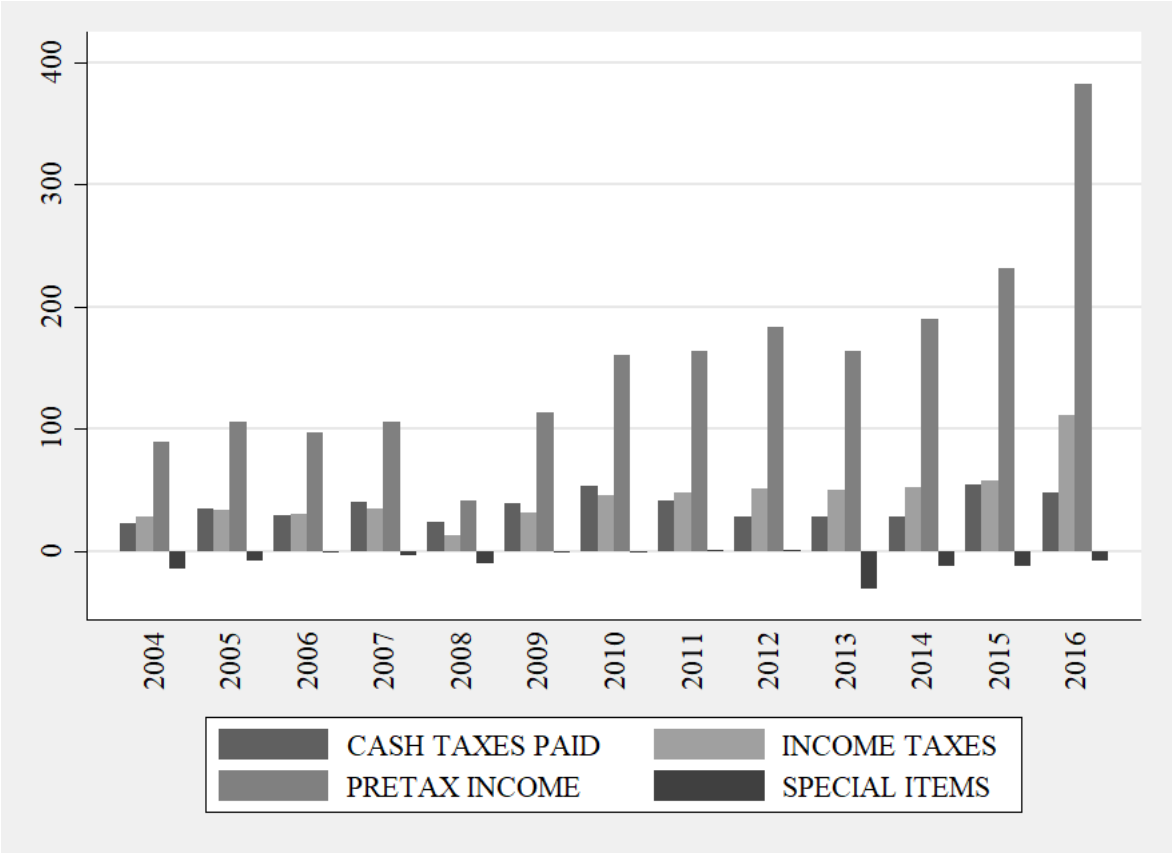
The dark grey bar indicates Cash ETRs. Conversely, the light grey bar indicates GAAP ETRs. **BANK** comprises 2-digit SIC code 60. **NON-BANK** comprises SIC codes 0 = Agriculture, forestry and fishing , 1 = Mining and construction, 2/3 = Manufacturing, 5 = Wholesale and retail trade, 7/8 = Services, 9 = Public administration.

Figure 2: Cash ETRs and GAAP ETRs over time



This figure shows annual, average Cash ETRs and annual, average GAAP ETRs separately for banks and non-banks over the sample period of 2004 to 2016.

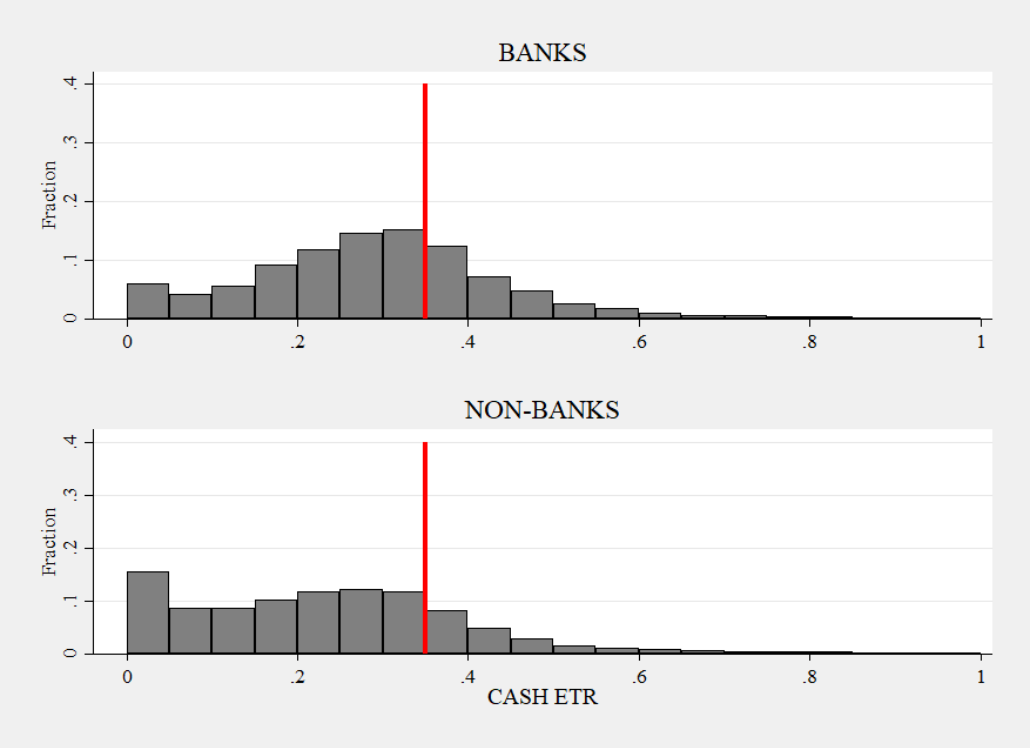
Figure 3: Cash taxes paid, income taxes, pretax income and special items over time



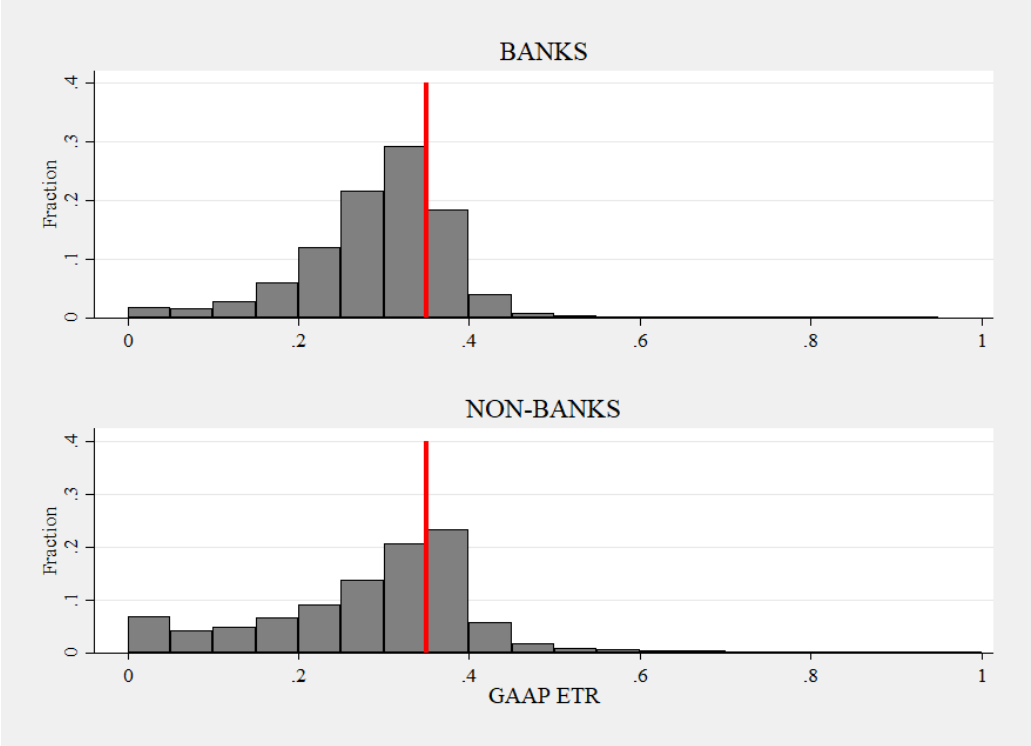
This figure shows annual averages for banks only of the Compustat items "Cash taxes paid", "Income taxes", "Pretax income" and "Special Items".

Figure 4: Histogram: Fractions of Cash ETRs and GAAP ETRs

Panel A: Cash ETR



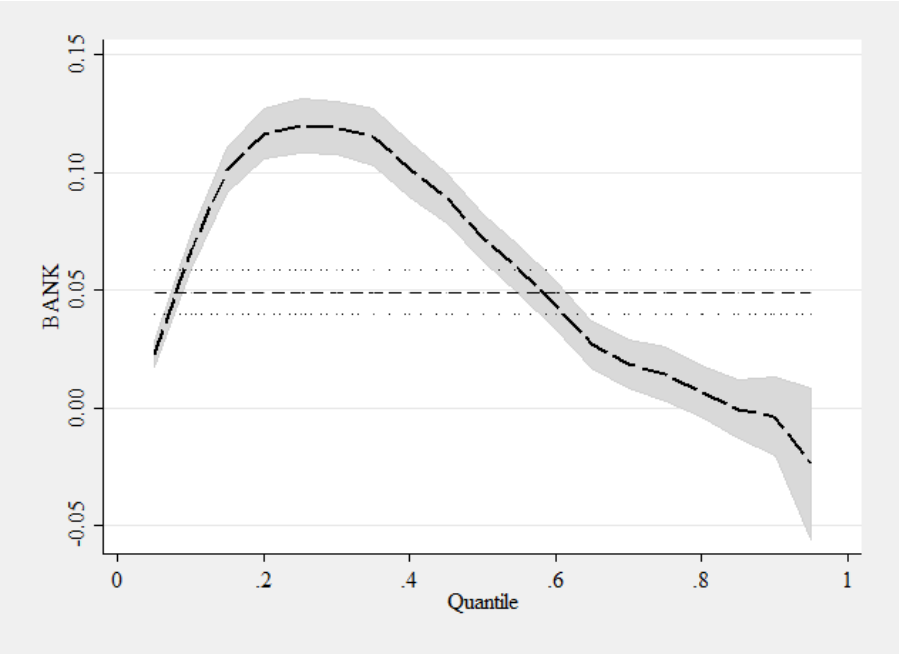
Panel B: GAAP ETR



This figure shows fractions of Cash ETRs and GAAP ETRs separately for banks and non-banks. The red line indicates the U.S. statutory, corporate tax rate of 35 %.

Figure 5: Evolution of bank coefficient over tax avoidance distribution

Panel A: Cash ETR



Panel B: GAAP ETR

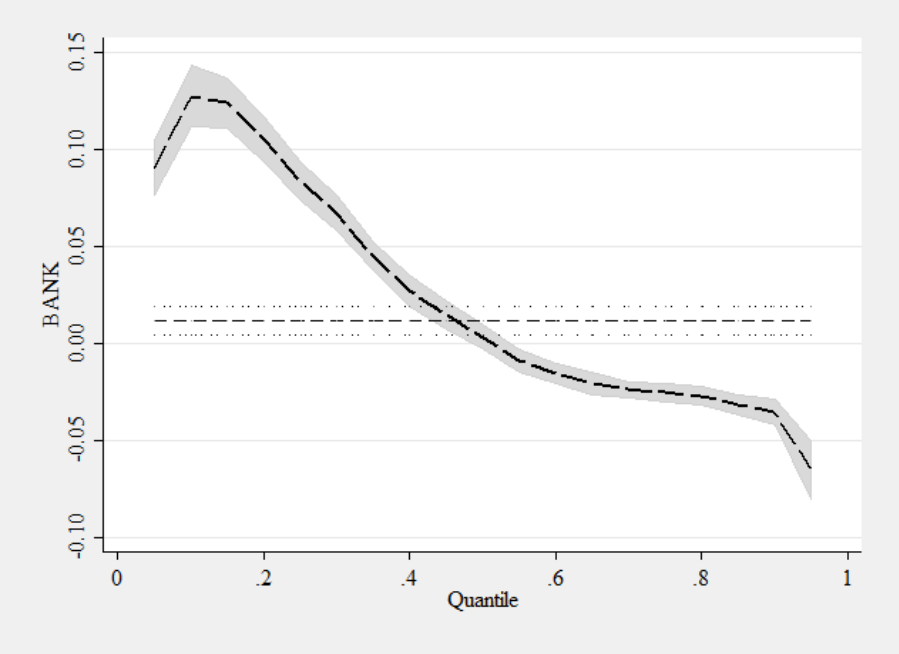


Table 1: Frequency distributions of observations with meaningful Cash and GAAP ETRs

PANEL A	**Obs. subgroups**	**Percent subgroups**
BANK	4530	17.29
NON-BANK	21673	82.71
TOTAL OBS.	26203	100.00

PANEL B	**Obs. subgroups**	**Percent subgroups**
BANK	4530	79.78
FINANCE (OTHER)	1148	20.22
TOTAL OBS.	5678	100.00

BANK comprises 2-digit SIC code 60. **NON-BANK** comprises SIC codes 0 = Agriculture, forestry and fishing, 1 = Mining and construction, 2/3 = Manufacturing, 5 = Wholesale and retail trade, 7/8 = Services, 9 = Public administration. **FINANCE** comprises 2-digit SIC codes as indicated above where 61 = Non-depository credit institutions, 62 = Security and commodity brokers, dealers, exchanges, and services, 63 = Insurance carriers, 64 = Insurances agents, brokers, and service, 65 = Real estate 67 = Holding and other investment offices. SIC codes are taken from `https://www.osha.gov/pls/imis/sic_manual.html`.

Table 2: Variable description

Name	**Calculation**
CASH ETR	Ratio of cash taxes paid (txpd) over sum of pretax income (pi) and special items (spi). Special items is set to 0 if missing.
GAAP ETR	Ratio of income tax expense (txt) over sum of pretax income and special items. Special items is set to 0 if missing.
BANK	Indicator variable set to 1 if SIC code (sic) is equal to 6020, 6021, 6022, 6035, and 6036, and 0 otherwise. Other financial institutions (one-digit SIC code=6) or utilities (one-digit SIC code=4) are not included
SIZE	Natural logarithm of total assets (at)
ROA	Pretax income (pi) over total assets (at)
$LOSS_{t-1}$	Indicator variable set to 1 if firm incurred a loss ($pi_{t-1}<0$) in t-1
$LOSS_{t-2}$	Indicator variable set to 1 if firm incurred a loss ($pi_{t-2}<0$) in t-2
LEVERAGE	Ratio of total debt (lt) over total assets (at)
FINANCIAL CASH FLOW	In main analysis: Net cash flow from financing activities (fincf) over total assets. For banks fincf also includes changes in deposits according to Compustat's Balancing Models for banks.
FOREIGN	Indicator set to 1 if the items "Current foreign income tax" (item18187) or "International sales" (item7101) from Thomson Reuters Geographic Segments are neither missing nor zero.
NET PP&E	Net property, plant & equipment (ppent) over total assets (at)
INTANGIBLES	Intangibles (intan) over total assets (at)
SG&A EXPENSE	Selling, general and administrative expense (xsga) over net sales (sale)
CAPITAL RATIO	Combined capital ratio as reported by the banks (capr3)

Table 3: Sample selection

	BANK	NON-BANK
All observations in Compustat Bank or NA between 2004 and 2016	9,313	158,956
Observations where merge was not successful (after merging Thomson Reuters to Compustat Bank)	6,340	/
Observations where txt, txpd, pi, at, lt, ceq and capr3 are missing	5,953	88,978
Firms that are not incorporated in the U.S. (FIC!=USA) and if ceq is <=0	5,933	59,999
Observations with missings in determinants	5,676	46,943
Exclusive observations where Cash ETR or GAAP ETR <0 or >1 and where Cash ETR and/or GAAP ETR are missing	4,530	30,600
Exclusive other financials in Compustat NA	/	21,673

Table 4: Summary statistics

PANEL A: BANKS

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	4530	0.30	0.16	0.00	0.04	0.20	0.29	0.38	0.57	1.00
GAAP ETR	4530	0.30	0.09	0.00	0.13	0.25	0.31	0.35	0.41	0.92
ROA	4530	0.01	0.01	-0.16	0.00	0.01	0.01	0.02	0.02	0.08
PRETAX INCOME	4530	150.84	1376.68	-707.98	1.76	5.69	13.65	39.92	242.20	34536.00
LOSS, t-1	4530	0.04	0.19	0.00	0.00	0.00	0.00	0.00	0.00	1.00
LOSS, t-2	4530	0.05	0.21	0.00	0.00	0.00	0.00	0.00	0.00	1.00
INCOME TAXES PAID	4530	35.34	317.40	0.00	0.22	1.44	3.80	11.89	76.03	9747.00
INCOME TAXES	4530	44.35	387.56	0.00	0.39	1.57	4.07	12.62	78.13	9803.00
SIZE	4530	7.35	1.36	4.29	5.63	6.42	7.09	8.05	9.75	14.76
LEVERAGE	4530	0.90	0.03	0.10	0.84	0.88	0.90	0.92	0.93	0.98
FINANCIAL CASH FLOW	4530	0.05	0.08	-0.55	-0.06	0.00	0.04	0.09	0.19	0.63
NET PP&E	4530	0.02	0.01	0.00	0.00	0.01	0.01	0.02	0.03	0.07
INTANGIBLES	4530	0.01	0.02	0.00	0.00	0.00	0.01	0.02	0.05	0.16
SG&A EXPENSE	4530	0.34	0.09	0.05	0.19	0.28	0.34	0.40	0.49	0.67
FOREIGN	4530	0.02	0.14	0.00	0.00	0.00	0.00	0.00	0.00	1.00
CAPITAL RATIO	4530	15.34	5.20	8.30	10.81	12.33	14.03	16.44	24.47	98.39

PANEL B: NON-BANKS

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	21673	0.24	0.17	0.00	0.00	0.10	0.23	0.33	0.51	1.00
GAAP ETR	21673	0.29	0.13	0.00	0.03	0.22	0.31	0.37	0.45	1.00
ROA	21673	0.11	0.11	-2.83	0.01	0.05	0.09	0.14	0.27	4.87
PRETAX INCOME	21673	452.55	2024.59	-11933.00	0.74	11.42	51.32	208.54	1690.00	72515.00
LOSS, t-1	21673	0.08	0.28	0.00	0.00	0.00	0.00	0.00	1.00	1.00
LOSS, t-2	21673	0.08	0.28	0.00	0.00	0.00	0.00	0.00	1.00	1.00
INCOME TAXES PAID	21673	118.05	558.66	0.00	0.03	1.83	11.96	50.73	447.57	19130.00
INCOME TAXES	21673	133.74	617.84	0.00	0.15	3.27	16.15	64.88	508.00	20626.00
SIZE	21673	6.46	2.02	-3.08	3.03	5.14	6.52	7.80	9.77	13.59
LEVERAGE	21673	0.46	0.21	0.00	0.13	0.30	0.46	0.61	0.83	1.02
FINANCIAL CASH FLOW	21673	-0.01	0.13	-2.10	-0.18	-0.07	-0.02	0.02	0.21	1.92
NET PP&E	21673	0.23	0.21	0.00	0.02	0.08	0.16	0.32	0.72	0.98
INTANGIBLES	21673	0.20	0.20	0.00	0.00	0.02	0.14	0.33	0.62	0.98
SG&A EXPENSE	21673	0.25	1.15	-3.89	0.04	0.11	0.21	0.33	0.57	163.97
FOREIGN	21673	0.58	0.49	0.00	0.00	0.00	1.00	1.00	1.00	1.00

PANEL C: JOINT SAMPLE

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	26203	0.25	0.17	0.00	0.01	0.12	0.24	0.34	0.53	1.00
GAAP ETR	26203	0.29	0.13	0.00	0.04	0.23	0.31	0.36	0.44	1.00
ROA	26203	0.09	0.11	-2.83	0.01	0.02	0.07	0.13	0.25	4.87
PRETAX INCOME	26203	400.39	1931.56	-11933.00	0.93	9.18	39.18	169.00	1444.00	72515.00
LOSS, t-1	26203	0.07	0.26	0.00	0.00	0.00	0.00	0.00	1.00	1.00
LOSS, t-2	26203	0.08	0.27	0.00	0.00	0.00	0.00	0.00	1.00	1.00
INCOME TAXES PAID	26203	103.75	525.87	0.00	0.04	1.70	9.28	41.16	374.35	19130.00
INCOME TAXES	26203	118.28	585.52	0.00	0.19	2.59	12.31	52.22	429.11	20626.00
SIZE	26203	6.62	1.95	-3.08	3.21	5.44	6.67	7.85	9.77	14.76
LEVERAGE	26203	0.54	0.25	0.00	0.14	0.34	0.52	0.76	0.92	1.02
FINANCIAL CASH FLOW	26203	-0.00	0.13	-2.10	-0.16	-0.06	-0.01	0.04	0.20	1.92
NET PP&E	26203	0.19	0.21	0.00	0.01	0.03	0.12	0.27	0.68	0.98
INTANGIBLES	26203	0.17	0.20	0.00	0.00	0.01	0.08	0.28	0.59	0.98
SG&A EXPENSE	26203	0.27	1.05	-3.89	0.04	0.13	0.24	0.36	0.55	163.97
FOREIGN	26203	0.48	0.50	0.00	0.00	0.00	0.00	1.00	1.00	1.00

PANEL D: MEAN COMPARISON TEST

	BANK	NON-BANK	Diff.	t-value
CASH ETR	0.298	0.236	-0.062	-23.094
GAAP ETR	0.295	0.289	-0.006	-3.058
Observations	26203			

Table 5: Correlation table

PANEL A: BANK

	CASH ETR	GAAP ETR	ROA	PRETAX INCOME	LOSS, t-1	LOSS, t-2	INCOME TAXES PAID	INCOME TAXES	SIZE	LEV.	FINANCIAL CASH FLOW	NET PP&E	INTAN.	SG&A EX-PENSE	FOREIGN	CAPITAL RATIO
CASH ETR	1															
GAAP ETR	0.342***	1														
ROA	0.0299*	0.325***	1													
PRETAX INCOME	-0.0507***	-0.0142	0.0443**	1												
LOSS, t-1	-0.118***	-0.113***	-0.182***	-0.0144	1											
LOSS, t-2	-0.149***	-0.114***	-0.143***	-0.0142	0.269***	1										
INCOME TAXES PAID	0.0114	-0.00567	0.0447**	0.816***	-0.0165	-0.0175	1									
INCOME TAXES	-0.0479**	-0.00423	0.0468**	0.993***	-0.0148	-0.0149	0.814***	1								
SIZE	-0.0643***	0.0293*	0.187***	0.405***	-0.0373*	-0.0157	0.374***	0.412***	1							
LEVERAGE	0.0322*	-0.0447**	-0.0448**	0.0132	-0.0657***	-0.0502***	0.0185	0.0134	0.0164	1						
FINANCIAL CASH FLOW	0.177***	0.172***	0.0265	-0.0227	-0.102***	-0.107***	-0.0190	-0.0188	-0.0902***	0.141***	1					
NET PP&E	-0.0859***	-0.119***	-0.135***	-0.0847***	0.0122	0.000318	-0.0792***	-0.0873***	-0.223***	0.0403**	-0.103***	1				
INTANGIBLES	-0.103***	-0.0633***	0.0635***	0.113***	-0.0546***	-0.0503***	0.118***	0.117***	0.469***	-0.230***	-0.177***	-0.00638	1			
SG&A EXPENSE	-0.281***	-0.167***	-0.217***	-0.0260	0.0505***	0.0989***	-0.0449**	-0.0305*	-0.0192	-0.0942***	-0.124***	0.206***	0.0315*	1		
FOREIGN	-0.00300	-0.00870	0.0564***	0.416***	-0.0205	-0.0178	0.402***	0.421***	0.383***	0.0467**	-0.0123	-0.0380*	0.130***	-0.0123	1	
CAPITAL RATIO	-0.0177	0.0263	-0.0296*	-0.0207	0.0658***	0.0754***	-0.0205	-0.0215	-0.153***	-0.723***	-0.151***	-0.0745***	-0.163***	0.0467**	-0.0148	1

PANEL B: NON-BANK

	CASH ETR	GAAP ETR	ROA	PRETAX INCOME	LOSS, t-1	LOSS, t-2	INCOME TAXES PAID	INCOME TAXES	SIZE	LEV.	FINANCIAL CASH FLOW	NET PP&E	INTAN.	SG&A EX-PENSE	FOREIGN
CASH ETR	1														
GAAP ETR	0.368***	1													
ROA	0.0192**	0.0819***	1												
PRETAX INCOME	0.0107	-0.00954	0.0917***	1											
LOSS, t-1	-0.114***	-0.0949***	-0.150***	-0.0548***	1										
LOSS, t-2	-0.0902***	-0.0861***	-0.125***	-0.0490***	0.300***	1									
INCOME TAXES PAID	0.0858***	0.0206**	0.0701***	0.885***	-0.0510***	-0.0476***	1								
INCOME TAXES	0.0399***	0.0430***	0.0782***	0.932***	-0.0513***	-0.0464***	0.951***	1							
SIZE	0.0644***	-0.00136	-0.117***	0.411***	-0.111***	-0.1000***	0.383***	0.387***	1						
LEVERAGE	-0.00579	-0.0154*	-0.215***	0.0833***	0.0432***	0.0301***	0.0784***	0.0807***	0.384***	1					
FINANCIAL CASH FLOW	-0.0995***	-0.0542***	-0.303***	-0.0718***	0.0182**	0.0205**	-0.0721***	-0.0674***	-0.0492***	0.0295***	1				
NET PP&E	-0.0706***	0.0149*	-0.0147*	0.0297***	-0.00371	-0.00894	0.0505***	0.0579***	0.120***	0.131***	0.0159*	1			
INTANGIBLES	0.0415***	-0.00286	-0.187***	0.0166*	-0.00963	-0.0258***	0.0179**	0.00565	0.269***	0.180***	0.0550***	-0.377***	1		
SG&A EXPENSE	-0.0168*	-0.0133	0.00837	-0.00629	0.0322***	0.00602	-0.00804	-0.00949	-0.0370***	-0.0500***	-0.00161	-0.0542***	0.00967	1	
FOREIGN	0.0510***	-0.0386***	-0.0728***	0.122***	-0.0195**	-0.00226	0.113***	0.111***	0.340***	0.0292***	-0.0689***	-0.203***	0.166***	0.0212**	1

Table 6: Banks, tax avoidance and tax avoidance determinants

		CASH ETR				GAAP ETR			
	Hypothesis	BANK	NON-BANK	COMB.	INTER.	BANK	NON-BANK	COMB.	INTER.
BANK	+/-			0.040***	0.37***			0.0094	0.13
				(0.01)	(0.09)			(0.01)	(0.10)
SIZE	-	0.00063	0.0032***	0.0028**	0.0036***	-0.0010	-0.00065	0.00010	-0.00051
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	+	-0.18	-0.040**	-0.034**	-0.042**	3.97***	0.067***	0.075***	0.067***
		(0.46)	(0.02)	(0.02)	(0.02)	(0.96)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-	-0.092***	-0.057***	-0.060***	-0.058***	-0.024**	-0.033***	-0.033***	-0.033***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-	-0.086***	-0.039***	-0.045***	-0.039***	-0.025***	-0.026***	-0.026***	-0.026***
		(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LEVERAGE	-	-0.19*	-0.010	-0.0019	-0.0069	-0.15	-0.0014	-0.0016	-0.00019
		(0.11)	(0.01)	(0.01)	(0.01)	(0.10)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	+/-	0.19***	-0.11***	-0.082***	-0.11***	0.10***	-0.036***	-0.023*	-0.037***
		(0.04)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
FOREIGN	-	-0.0019	-0.00019	0.0035	0.0010	-0.022*	-0.011***	-0.011***	-0.011***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
NET PP&E	-	-1.24***	-0.057***	-0.058***	-0.058***	-0.42	0.0075	0.0060	0.0080
		(0.39)	(0.01)	(0.01)	(0.01)	(0.33)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-	-0.89***	-0.0033	-0.0045	-0.0035	-0.38***	0.013	0.011	0.013
		(0.23)	(0.01)	(0.01)	(0.01)	(0.15)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-	-0.20***	-0.0023**	-0.0030*	-0.0024*	-0.075**	-0.0012	-0.0014	-0.0012
		(0.05)	(0.00)	(0.00)	(0.00)	(0.04)	(0.00)	(0.00)	(0.00)
BANK × SIZE					-0.0053				0.0031
					(0.00)				(0.00)
BANK × ROA					-0.75				3.94***
					(0.47)				(0.89)
BANK × LOSS, t-1					-0.017				0.013
					(0.02)				(0.01)
BANK × LOSS, t-2					-0.037**				0.0047
					(0.01)				(0.01)
BANK × LEVERAGE					-0.15				-0.19*
					(0.10)				(0.10)
BANK × FINANCIAL CASH FLOW					0.34***				0.17***
					(0.04)				(0.03)
BANK × FOREIGN					0.020				-0.0078
					(0.02)				(0.01)
BANK × NET PP&E					-0.98**				-0.83**
					(0.42)				(0.35)
BANK × INTANGIBLES					-0.71***				-0.46***
					(0.23)				(0.15)
BANK × SG&A EXPENSE					-0.39***				-0.021
					(0.04)				(0.03)
Constant		0.60***	0.13***	0.26***	0.29***	0.44***	0.24***	0.32***	0.31***
		(0.09)	(0.01)	(0.01)	(0.01)	(0.09)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		4530	21673	26203	26203	4530	21673	26203	26203
Adjusted R^2		0.216	0.053	0.071	0.087	0.240	0.034	0.035	0.045

This table shows the results for our main analyses of CASH ETRs and GAAP ETRs, respectively, with unstandardized coefficients. Predictions on the variables' sign are inferred from prior literature. Variable definitions are provided in table 2. The model title "BANK" indicates that we run our regression on the separate bank sample, "NON-BANK" on the separate non-bank sample, "COMB." on the joint bank and non-bank sample and "INTER." refers to our interaction model. Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 7: Banks, tax avoidance and tax avoidance determinants - Demeaned coefficients

		CASH ETR				GAAP ETR			
	Hypothesis	BANK	NON-BANK	COMB.	INTER.	BANK	NON-BANK	COMB.	INTER.
BANK	+/-			0.053***	0.055***			-0.0032	-0.0038
				(0.01)	(0.01)			(0.00)	(0.00)
SIZE	-	0.00063	0.0032***	0.0029***	0.0032***	-0.0010	-0.00065	0.000019	-0.00044
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	+	-0.18	-0.040**	-0.033**	-0.041**	3.97***	0.067***	0.073***	0.066***
		(0.46)	(0.02)	(0.02)	(0.02)	(0.96)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-	-0.092***	-0.057***	-0.060***	-0.058***	-0.024**	-0.033***	-0.033***	-0.033***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-	-0.086***	-0.039***	-0.045***	-0.039***	-0.025***	-0.026***	-0.027***	-0.026***
		(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LEVERAGE	-	-0.19*	-0.010	-0.0056	-0.0072	-0.15	-0.0014	-0.0011	0.000039
		(0.11)	(0.01)	(0.01)	(0.01)	(0.10)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	+/-	0.19***	-0.11***	-0.084***	-0.11***	0.10***	-0.036***	-0.024**	-0.037***
		(0.04)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
FOREIGN	-	-0.0019	-0.00019	0.0034	0.0028	-0.022*	-0.011***	-0.011***	-0.011***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
NET PP&E	-	-1.24***	-0.057***	-0.058***	-0.057***	-0.42	0.0075	0.0060	0.0078
		(0.39)	(0.01)	(0.01)	(0.01)	(0.33)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-	-0.89***	-0.0033	-0.0072	-0.0041	-0.38***	0.013	0.011	0.013
		(0.23)	(0.01)	(0.01)	(0.01)	(0.15)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-	-0.20***	-0.0023**	-0.0027*	-0.0024**	-0.075**	-0.0012	-0.0014	-0.0012
		(0.05)	(0.00)	(0.00)	(0.00)	(0.04)	(0.00)	(0.00)	(0.00)
BANK × SIZE					0.0013				0.0017
					(0.00)				(0.00)
BANK × ROA					0.077				3.80***
					(0.48)				(0.91)
BANK × LOSS, t-1					-0.018				0.0071
					(0.02)				(0.01)
BANK × LOSS, t-2					-0.050***				-0.000082
					(0.01)				(0.01)
BANK × LEVERAGE					-0.25**				-0.18*
					(0.12)				(0.11)
BANK × FINANCIAL CASH FLOW					0.33***				0.16***
					(0.04)				(0.03)
BANK × FOREIGN					-0.0031				-0.0040
					(0.02)				(0.01)
BANK × NET PP&E					-1.51***				-0.72**
					(0.42)				(0.34)
BANK × INTANGIBLES					-0.97***				-0.43***
					(0.24)				(0.16)
BANK × SG&A EXPENSE					-0.16***				-0.061*
					(0.05)				(0.04)
Constant		0.35***	0.13***	0.25***	0.27***	0.32***	0.25***	0.33***	0.32***
		(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
YEAR FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		4530	21673	26203	26203	4530	21673	26203	26203
Adjusted R^2		0.216	0.053	0.071	0.081	0.240	0.034	0.035	0.045

This table shows the results for our main analyses of CASH ETRs and GAAP ETRs, respectively, with demeaned coefficients. We demean our variables by substracting the an annual, industry-specific (bank/ non-bank) mean. Predictions on the variables' sign are inferred from prior literature. Variable definitions are provided in table 2. The model title "BANK" indicates that we run our regression on the separate bank sample, "NON-BANK" on the separate non-bank sample, "COMB." on the joint bank and non-bank sample and "INTER." refers to our interaction model. Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 8: Banks, tax avoidance and tax avoidance determinants - Standardized coefficients

		CASH ETR				GAAP ETR			
	Hypothesis	BANK	NON-BANK	COMB.	INTER.	BANK	NON-BANK	COMB.	INTER.
BANK	+/-			0.053***	0.056***			-0.0031	-0.0035
				(0.01)	(0.01)			(0.00)	(0.00)
SIZE	-	0.0016	0.0057**	0.0049**	0.0055**	-0.0022	-0.0016	0.000060	-0.0012
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	+	0.0018	-0.0039**	-0.0014	-0.0040**	0.028***	0.0084***	0.012***	0.0084***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LOSS, t-1	-	-0.090***	-0.056***	-0.058***	-0.057***	-0.019*	-0.032***	-0.030***	-0.032***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-	-0.086***	-0.038***	-0.044***	-0.038***	-0.023**	-0.025***	-0.024***	-0.025***
		(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
LEVERAGE	-	-0.0077**	-0.0028	-0.0014	-0.0023	-0.0057**	-0.00043	-0.00039	-0.00019
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FINANCIAL CASH FLOW	+/-	0.015***	-0.015***	-0.0081***	-0.015***	0.0084***	-0.0044**	-0.00077	-0.0045***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FOREIGN	-	-0.0027	0.00079	0.0054	0.0039	-0.019	-0.011***	-0.010***	-0.010***
		(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
NET PP&E	-	-0.011***	-0.013***	-0.016***	-0.013***	-0.0036	0.0011	-0.0018	0.0010
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
INTANGIBLES	-	-0.017***	-0.00026	-0.0045**	-0.00038	-0.0070***	0.0032*	0.00081	0.0031*
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SG&A EXPENSE	-	-0.013***	-0.0072***	-0.0092***	-0.0078***	-0.0034	-0.0034**	-0.0053***	-0.0038***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
BANK × SIZE					0.0012				0.0021
					(0.01)				(0.00)
BANK × ROA					0.0071*				0.019***
					(0.00)				(0.00)
BANK × LOSS, t-1					-0.017				0.010
					(0.02)				(0.01)
BANK × LOSS, t-2					-0.050***				0.0014
					(0.01)				(0.01)
BANK × LEVERAGE					-0.0080**				-0.0068**
					(0.00)				(0.00)
BANK × FINANCIAL CASH FLOW					0.032***				0.014***
					(0.00)				(0.00)
BANK × FOREIGN					-0.0043				-0.0017
					(0.02)				(0.01)
BANK × NET PP&E					-0.00069				-0.0072**
					(0.00)				(0.00)
BANK × INTANGIBLES					-0.018***				-0.011***
					(0.00)				(0.00)
BANK × SG&A EXPENSE					-0.0026				0.0012
					(0.00)				(0.00)
Constant		0.35***	0.13***	0.27***	0.27***	0.32***	0.25***	0.32***	0.31***
		(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
YEAR FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		4530	21673	26203	26203	4530	21673	26203	26203
Adjusted R^2		0.218	0.055	0.074	0.082	0.258	0.035	0.042	0.047

This table shows the results for our main analyses of CASH ETRs and GAAP ETRs, respectively, with standardized coefficients. We standardize our variables by substracting the annual, industry- specific (bank/ non-bank) mean and dividing by the annual, industry-specific standard deviation. Predictions on the variables' sign are inferred from prior literature. Variable definitions are provided in table 2. The model title "BANK" indicates that we run our regression on the separate bank sample, "NON-BANK" on the separate non-bank sample, "COMB." on the joint bank and non-bank sample and "INTER." refers to our interaction model. Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.011

Table 9: Distribution of CASH ETR and GAAP ETR over different quantiles

PANEL A: BANK						
	N	p10	p25	p50	p75	p90
CASH ETR	4530	0.10	0.20	0.29	0.38	0.48
GAAP ETR	4530	0.19	0.25	0.31	0.35	0.38
PANEL B: NON-BANK						
	N	p10	p25	p50	p75	p90
CASH ETR	21673	0.02	0.10	0.23	0.33	0.43
GAAP ETR	21673	0.09	0.22	0.31	0.37	0.40
PANEL C: JOINT SAMPLE						
	N	p10	p25	p50	p75	p90
CASH ETR	26203	0.03	0.12	0.24	0.34	0.44
GAAP ETR	26203	0.10	0.23	0.31	0.36	0.40

This table shows the distribution of CASH ETRs and GAAP ETRs for the bank sample, the non-bank sample and the joint sample. We present those quantiles that are used in the quantile regression in table 10.

Table 10: Quantile regression

PANEL A: CASH ETR					
	0.1	0.25	0.5	0.75	0.9
BANK	0.067***	0.12***	0.072***	0.015	-0.0035
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SIZE	0.0072***	0.0085***	0.0045***	-0.0027*	-0.013***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.036*	0.17***	0.15***	-0.064***	-0.26***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)
LOSS, t-1	-0.026***	-0.050***	-0.094***	-0.068***	-0.011
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
LOSS, t-2	-0.020***	-0.041***	-0.061***	-0.049***	-0.015
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
LEVERAGE	-0.0049	-0.013	-0.013	0.0077	0.052***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	-0.028***	-0.073***	-0.10***	-0.084***	-0.078***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
FOREIGN	0.027***	0.036***	0.0022	-0.016***	-0.0078
	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)
NET PP&E	-0.038***	-0.064***	-0.082***	-0.058***	-0.021
	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)
INTANGIBLES	0.023***	0.036***	-0.0017	-0.032***	-0.023
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
SG&A EXPENSE	-0.019*	-0.064**	-0.044	-0.0016	0.00018
	(0.01)	(0.03)	(0.04)	(0.02)	(0.01)
Constant	-0.016***	0.024	0.19***	0.36***	0.50***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	26203	26203	26203	26203	26203
PANEL B: GAAP ETR					
	0.1	0.25	0.5	0.75	0.9
BANK	0.13***	0.084***	0.0030	-0.025***	-0.035***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
SIZE	0.010***	0.0027**	-0.0027***	-0.0047***	-0.0082***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.22***	0.30***	0.15***	0.033***	-0.061***
	(0.05)	(0.03)	(0.02)	(0.01)	(0.02)
LOSS, t-1	-0.044***	-0.086***	-0.054***	-0.0020	0.036***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
LOSS, t-2	-0.045***	-0.055***	-0.032***	-0.0032	0.015***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
LEVERAGE	-0.039***	-0.025**	0.0010	0.018***	0.029***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	-0.058***	-0.035**	0.0088	0.0100	-0.000069
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
FOREIGN	0.024***	-0.0088	-0.027***	-0.019***	-0.0053**
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
NET PP&E	-0.033	0.034*	0.021**	0.0063	0.0022
	(0.02)	(0.02)	(0.01)	(0.00)	(0.01)
INTANGIBLES	0.053***	0.061***	0.018*	-0.0024	-0.015***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.053**	-0.056*	-0.0061	-0.00090	0.00081
	(0.02)	(0.03)	(0.02)	(0.00)	(0.01)
Constant	0.028*	0.20***	0.34***	0.40***	0.45***
	(0.02)	(0.02)	(0.01)	(0.00)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	26203	26203	26203	26203	26203

The model titles "0.1" to "0.9" indicate the quantile of the tax avoidance distribution under assessment. Variable definitions are provided in table 2. Year-fixed effects are included. Bootstrapped standard errors are shown in parentheses (Replication size = 500). Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 11: Quantiles of capital ratio

Quantile	Capital ratio
1^{st}	9.07
2^{nd}	9.90
3^{rd}	10.58
4^{th}	11.26
5^{th}	11.98
6^{th}	12.72
7^{th}	13.60
8^{th}	14.88
9^{th}	16.81

This table reports the magnitude of capital ratios for different quantiles. Quantiles 1 to 5 are used as cut points to distinguish worse- from better-capitalized banks in table 12.

Table 12: Worse- and better-capitalized banks against non-banks

PANEL A: CASH ETR					
BANK × WORSECAPRATIO1	0.043				
	(0.06)				
BANK × BETTERCAPRATIO1	0.039***				
	(0.01)				
BANK × WORSECAPRATIO2		0.10			
		(0.08)			
BANK × BETTERCAPRATIO2		0.039***			
		(0.01)			
BANK × WORSECAPRATIO3			0.083***		
			(0.02)		
BANK × BETTERCAPRATIO3			0.038***		
			(0.01)		
BANK × WORSECAPRATIO4				0.083***	
				(0.01)	
BANK × BETTERCAPRATIO4				0.034***	
				(0.01)	
BANK × WORSECAPRATIO5					0.073***
					(0.01)
BANK × BETTERCAPRATIO5					0.031***
					(0.01)
SIZE	0.0027**	0.0027**	0.0027**	0.0027**	0.0026**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	-0.033**	-0.033**	-0.033**	-0.033**	-0.034**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.060***	-0.060***	-0.060***	-0.060***	-0.060***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-0.045***	-0.045***	-0.045***	-0.045***	-0.045***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FINANCIAL CASH FLOW	-0.082***	-0.082***	-0.082***	-0.083***	-0.084***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FOREIGN	0.0036	0.0035	0.0035	0.0035	0.0035
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NET PP&E	-0.058***	-0.058***	-0.058***	-0.058***	-0.058***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-0.0047	-0.0047	-0.0048	-0.0049	-0.0049
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.0030*	-0.0030*	-0.0030*	-0.0029*	-0.0029*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.26***	0.26***	0.26***	0.26***	0.26***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	26203	26203	26203	26203	26203
Adjusted R^2	0.071	0.071	0.071	0.072	0.072

WORSECAPITALRATIO* and BETTERCAPITALRATIO* refer to the different quantiles that we use as cut points. Not to be confused: E.g. WORSECAPRATIO1 and BETTERCAPRATIO9 indicate that the cut point for the capital ratio is the first percentile (i.e. WORSECAPRATIO=1 if capr3<q1(capr3) and BETTERCAPRATIO=9 if capr3>=q1(capr3)). With this technique we are able to directly infer the incremental impact of the lower part of the distribution on ETR and the higher part of the distribution. This is an advantage over splitting the sample as we do not have to test the coefficients for significance. Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

PANEL B: GAAP ETR					
BANK × WORSECAPRATIO1	-0.089***				
	(0.03)				
BANK × BETTERCAPRATIO1	0.0089				
	(0.01)				
BANK × WORSECAPRATIO2		-0.020			
		(0.06)			
BANK × BETTERCAPRATIO2		0.0089			
		(0.01)			
BANK × WORSECAPRATIO3			0.0050		
			(0.01)		
BANK × BETTERCAPRATIO3			0.0089		
			(0.01)		
BANK × WORSECAPRATIO4				0.012	
				(0.01)	
BANK × BETTERCAPRATIO4				0.0083	
				(0.01)	
BANK × WORSECAPRATIO5					0.014**
					(0.01)
BANK × BETTERCAPRATIO5					0.0074
					(0.01)
SIZE	0.000050	0.000049	0.000052	0.000048	0.000038
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.075***	0.075***	0.075***	0.075***	0.075***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.033***	-0.033***	-0.033***	-0.033***	-0.033***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-0.027***	-0.026***	-0.026***	-0.026***	-0.026***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FINANCIAL CASH FLOW	-0.023*	-0.023*	-0.023*	-0.023*	-0.023*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FOREIGN	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NET PP&E	0.0058	0.0058	0.0058	0.0058	0.0058
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
INTANGIBLES	0.011	0.011	0.011	0.011	0.011
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.0014	-0.0014	-0.0014	-0.0014	-0.0014
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.31***	0.31***	0.31***	0.32***	0.32***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	26203	26203	26203	26203	26203
Adjusted R^2	0.035	0.035	0.035	0.035	0.035

WORSECAPITALRATIO* and BETTERCAPITALRATIO* refer to the different quantiles that we use as cut points. Not to be confused: E.g. WORSECAPRATIO1 and BETTERCAPRATIO9 indicate that the cut point for the capital ratio is the first percentile (i.e. WORSECAPRATIO=1 if capr3<q1(capr3) and BETTERCAPRATIO=9 if capr3>=q1(capr3)). With this technique we are able to directly infer the incremental impact of the lower part of the distribution on ETR and the higher part of the distribution. This is an advantage over splitting the sample as we do not have to test the coefficients for significance. Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 13: Banks, tax avoidance and tax avoidance determinants - Crisis years excluded

	CASH ETR				GAAP ETR			
	BANK	NON-BANK	COMB.	INTER.	BANK	NON-BANK	COMB.	INTER.
BANK			0.030***	0.31***			0.013*	0.029
			(0.01)	(0.11)			(0.01)	(0.11)
SIZE	-0.0028	0.0030**	0.0021*	0.0033***	-0.0027	-0.00075	0.00012	-0.00060
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	1.62**	-0.014	-0.0031	-0.016	5.60***	0.082***	0.091***	0.082***
	(0.63)	(0.02)	(0.02)	(0.02)	(0.44)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.099***	-0.059***	-0.063***	-0.059***	-0.021*	-0.036***	-0.036***	-0.036***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
LOSS, t-2	-0.070***	-0.040***	-0.045***	-0.041***	-0.020**	-0.027***	-0.027***	-0.027***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)
LEVERAGE	-0.18	-0.012	-0.0041	-0.0094	-0.059	-0.0055	-0.0059	-0.0045
	(0.13)	(0.01)	(0.01)	(0.01)	(0.11)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	0.19***	-0.099***	-0.069***	-0.10***	0.11***	-0.030**	-0.014	-0.030**
	(0.04)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
FOREIGN	-0.0055	-0.0011	0.0030	0.000038	-0.023*	-0.012***	-0.012***	-0.011***
	(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
NET PP&E	-1.26***	-0.064***	-0.066***	-0.066***	-0.54*	0.00081	-0.0017	0.00089
	(0.43)	(0.01)	(0.01)	(0.01)	(0.30)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-1.04***	-0.0044	-0.0039	-0.0044	-0.28*	0.0037	0.0011	0.0028
	(0.25)	(0.01)	(0.01)	(0.01)	(0.15)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.19***	-0.018***	-0.026***	-0.019***	-0.040	-0.014***	-0.017***	-0.015***
	(0.05)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
BANK × SIZE				-0.0082**				0.0019
				(0.00)				(0.00)
BANK × ROA				1.34**				5.37***
				(0.65)				(0.46)
BANK × LOSS, t-1				-0.019				0.019
				(0.02)				(0.01)
BANK × LOSS, t-2				-0.017				0.0098
				(0.01)				(0.01)
BANK × LEVERAGE				-0.12				-0.11
				(0.12)				(0.12)
BANK × FINANCIAL CASH FLOW				0.32***				0.16***
				(0.04)				(0.03)
BANK × FOREIGN				0.019				-0.0084
				(0.02)				(0.01)
BANK × NET PP&E				-1.14**				-0.92***
				(0.45)				(0.32)
BANK × INTANGIBLES				-0.88***				-0.38**
				(0.26)				(0.16)
BANK × SG&A EXPENSE				-0.33***				0.019
				(0.04)				(0.03)
Constant	0.56***	0.14***	0.24***	0.26***	0.32***	0.25***	0.32***	0.31***
	(0.11)	(0.01)	(0.01)	(0.01)	(0.10)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3623	16521	20144	20144	3623	16521	20144	20144
Adjusted R^2	0.207	0.054	0.063	0.081	0.274	0.036	0.038	0.051

Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 14: Summary statistics - Truncation of all variables

PANEL A: BANKS

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	4040	0.30	0.15	0.00	0.05	0.20	0.29	0.38	0.56	1.00
GAAP ETR	4040	0.30	0.08	0.01	0.15	0.25	0.31	0.35	0.40	0.91
ROA	4040	0.01	0.01	0.00	0.00	0.01	0.01	0.02	0.02	0.03
PRETAX INCOME	4040	47.31	119.81	0.58	2.19	6.01	13.68	37.53	197.09	2210.00
LOSS, t-1	4040	0.03	0.17	0.00	0.00	0.00	0.00	0.00	0.00	1.00
LOSS, t-2	4040	0.04	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00
INCOME TAXES PAID	4040	13.36	33.64	0.00	0.31	1.52	3.76	10.97	57.00	489.00
INCOME TAXES	4040	14.83	37.87	0.04	0.50	1.66	4.06	11.83	63.31	636.00
SIZE	4040	7.30	1.17	5.09	5.73	6.44	7.08	8.01	9.53	11.84
LEVERAGE	4040	0.90	0.03	0.77	0.85	0.88	0.90	0.92	0.93	0.94
FINANCIAL CASH FLOW	4040	0.05	0.08	-0.55	-0.05	0.00	0.04	0.08	0.19	0.46
NET PP&E	4040	0.02	0.01	0.00	0.00	0.01	0.02	0.02	0.03	0.05
INTANGIBLES	4040	0.01	0.01	0.00	0.00	0.00	0.01	0.02	0.04	0.07
SG&A EXPENSE	4040	0.34	0.08	0.13	0.20	0.28	0.34	0.41	0.48	0.56
FOREIGN	4040	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.00	1.00
CAPITAL RATIO	4040	15.06	4.39	8.30	10.85	12.31	13.98	16.31	23.15	48.98

PANEL B: NON-BANKS

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	19333	0.24	0.16	0.00	0.01	0.11	0.23	0.33	0.51	1.00
GAAP ETR	19333	0.29	0.13	0.00	0.04	0.23	0.32	0.37	0.44	1.00
ROA	19333	0.11	0.08	-0.04	0.02	0.05	0.09	0.14	0.26	0.44
PRETAX INCOME	19333	281.97	707.93	-32.60	1.34	13.21	54.67	206.19	1344.00	8128.70
LOSS, t-1	19333	0.08	0.27	0.00	0.00	0.00	0.00	0.00	1.00	1.00
LOSS, t-2	19333	0.08	0.27	0.00	0.00	0.00	0.00	0.00	1.00	1.00
INCOME TAXES PAID	19333	72.45	190.23	0.00	0.06	2.14	12.53	49.98	358.00	2082.00
INCOME TAXES	19333	83.96	207.45	0.00	0.24	3.66	16.88	63.73	402.60	2192.60
SIZE	19333	6.47	1.86	1.77	3.25	5.20	6.53	7.76	9.54	11.15
LEVERAGE	19333	0.46	0.20	0.07	0.14	0.30	0.46	0.61	0.81	0.94
FINANCIAL CASH FLOW	19333	-0.01	0.12	-1.86	-0.17	-0.07	-0.02	0.02	0.20	0.85
NET PP&E	19333	0.23	0.20	0.01	0.02	0.08	0.17	0.32	0.69	0.88
INTANGIBLES	19333	0.20	0.20	0.00	0.00	0.03	0.14	0.33	0.60	0.76
SG&A EXPENSE	19333	0.24	0.15	0.01	0.04	0.12	0.21	0.33	0.55	0.74
FOREIGN	19333	0.59	0.49	0.00	0.00	0.00	1.00	1.00	1.00	1.00

PANEL C: JOINT SAMPLE

	N	Mean	Std.D.	Min	p5	p25	p50	p75	p95	Max
CASH ETR	23373	0.25	0.16	0.00	0.01	0.13	0.25	0.34	0.52	1.00
GAAP ETR	23373	0.29	0.12	0.00	0.05	0.23	0.31	0.36	0.44	1.00
ROA	23373	0.09	0.08	-0.04	0.01	0.03	0.07	0.13	0.24	0.44
PRETAX INCOME	23373	241.41	651.83	-32.60	1.54	10.20	41.31	165.78	1134.20	8128.70
LOSS, t-1	23373	0.07	0.26	0.00	0.00	0.00	0.00	0.00	1.00	1.00
LOSS, t-2	23373	0.07	0.26	0.00	0.00	0.00	0.00	0.00	1.00	1.00
INCOME TAXES PAID	23373	62.23	175.00	0.00	0.08	1.90	9.60	40.10	304.10	2082.00
INCOME TAXES	23373	72.01	191.12	0.00	0.29	2.81	12.68	51.00	341.00	2192.60
SIZE	23373	6.61	1.79	1.77	3.43	5.49	6.67	7.81	9.54	11.84
LEVERAGE	23373	0.54	0.25	0.07	0.15	0.34	0.52	0.75	0.92	0.94
FINANCIAL CASH FLOW	23373	-0.00	0.12	-1.86	-0.16	-0.06	-0.01	0.04	0.19	0.85
NET PP&E	23373	0.19	0.20	0.00	0.01	0.04	0.13	0.27	0.65	0.88
INTANGIBLES	23373	0.17	0.19	0.00	0.00	0.01	0.09	0.28	0.58	0.76
SG&A EXPENSE	23373	0.26	0.15	0.01	0.05	0.13	0.24	0.35	0.53	0.74
FOREIGN	23373	0.49	0.50	0.00	0.00	0.00	0.00	1.00	1.00	1.00

PANEL D: MEAN COMPARISON TEST

	BANK	NON-BANK	Diff.	t-value
CASH ETR	0.297	0.239	-0.058	-20.821
GAAP ETR	0.295	0.292	-0.003	-1.646
Observations	23373			

Table 15: Banks, tax avoidance and tax avoidance determinants - Truncation

	CASH ETR				GAAP ETR			
	BANK	NON-BANK	COMB.	INTER.	BANK	NON-BANK	COMB.	INTER.
BANK			0.050***	0.46***			0.018**	0.25***
			(0.01)	(0.11)			(0.01)	(0.07)
SIZE	0.0036	0.0012	0.00088	0.0016	-0.0016	-0.0032***	-0.0022**	-0.0031***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	-0.24	0.0038	0.0086	-0.00090	5.87***	0.18***	0.20***	0.18***
	(0.66)	(0.02)	(0.02)	(0.02)	(0.44)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.088***	-0.056***	-0.057***	-0.057***	0.0035	-0.027***	-0.025***	-0.027***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-0.088***	-0.038***	-0.043***	-0.038***	-0.0035	-0.022***	-0.020***	-0.022***
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
LEVERAGE	-0.40***	-0.011	-0.0093	-0.0089	-0.33***	0.0096	0.0071	0.010
	(0.12)	(0.01)	(0.01)	(0.01)	(0.08)	(0.01)	(0.01)	(0.01)
FINANCIAL CASH FLOW	0.22***	-0.12***	-0.086***	-0.12***	0.14***	-0.034***	-0.018*	-0.035***
	(0.04)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
FOREIGN	-0.0040	-0.00085	0.0033	0.00039	-0.010	-0.012***	-0.012***	-0.012***
	(0.03)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
NET PP&E	-1.44***	-0.056***	-0.065***	-0.059***	-0.48	0.0058	0.0016	0.0050
	(0.45)	(0.01)	(0.01)	(0.01)	(0.32)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-1.06***	-0.0052	-0.0059	-0.0055	-0.55***	0.024***	0.021**	0.023***
	(0.27)	(0.01)	(0.01)	(0.01)	(0.16)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.19***	-0.044***	-0.078***	-0.050***	-0.021	-0.017	-0.026***	-0.021*
	(0.05)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)
BANK × SIZE				-0.000021				0.0057**
				(0.00)				(0.00)
BANK × ROA				-1.03				5.50***
				(0.67)				(0.45)
BANK × LOSS, t-1				-0.013				0.033***
				(0.02)				(0.01)
BANK × LOSS, t-2				-0.037**				0.023**
				(0.02)				(0.01)
BANK × LEVERAGE				-0.30**				-0.38***
				(0.12)				(0.08)
BANK × FINANCIAL CASH FLOW				0.38***				0.20***
				(0.04)				(0.02)
BANK × FOREIGN				0.020				0.0092
				(0.02)				(0.01)
BANK × NET PP&E				-0.97**				-0.69**
				(0.47)				(0.33)
BANK × INTANGIBLES				-0.91***				-0.66***
				(0.27)				(0.16)
BANK × SG&A EXPENSE				-0.37***				0.020
				(0.04)				(0.03)
Constant	0.78***	0.15***	0.31***	0.33***	0.55***	0.25***	0.33***	0.31***
	(0.11)	(0.01)	(0.01)	(0.01)	(0.07)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4040	19333	23373	23373	4040	19333	23373	23373
Adjusted R^2	0.225	0.048	0.068	0.082	0.297	0.042	0.042	0.055

Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01

Table 16: Worse- and better-capitalized banks against non-banks - Truncation

PANEL A: CASH ETR					
BANK × WORSECAPRATIO1	0.057				
	(0.06)				
BANK × BETTERCAPRATIO1	0.047***				
	(0.01)				
BANK × WORSECAPRATIO2		0.12			
		(0.08)			
BANK × BETTERCAPRATIO2		0.046***			
		(0.01)			
BANK × WORSECAPRATIO3			0.093***		
			(0.02)		
BANK × BETTERCAPRATIO3			0.045***		
			(0.01)		
BANK × WORSECAPRATIO4				0.092***	
				(0.01)	
BANK × BETTERCAPRATIO4				0.041***	
				(0.01)	
BANK × WORSECAPRATIO5					0.079***
					(0.01)
BANK × BETTERCAPRATIO5					0.038***
					(0.01)
SIZE	0.00058	0.00058	0.00059	0.00056	0.00051
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.014	0.014	0.014	0.014	0.013
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.057***	-0.057***	-0.057***	-0.057***	-0.057***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
LOSS, t-2	-0.043***	-0.043***	-0.043***	-0.043***	-0.043***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FINANCIAL CASH FLOW	-0.086***	-0.086***	-0.086***	-0.087***	-0.088***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FOREIGN	0.0036	0.0036	0.0036	0.0035	0.0034
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NET PP&E	-0.065***	-0.065***	-0.065***	-0.065***	-0.065***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
INTANGIBLES	-0.0068	-0.0068	-0.0069	-0.0071	-0.0071
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.076***	-0.076***	-0.075***	-0.074***	-0.073***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	0.30***	0.30***	0.30***	0.31***	0.31***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	23373	23373	23373	23373	23373
Adjusted R^2	0.068	0.068	0.068	0.069	0.069

PANEL B: GAAP ETR					
BANK × WORSECAPRATIO1	-0.072***				
	(0.03)				
BANK × BETTERCAPRATIO1	0.021***				
	(0.01)				
BANK × WORSECAPRATIO2		-0.025			
		(0.04)			
BANK × BETTERCAPRATIO2		0.021***			
		(0.01)			
BANK × WORSECAPRATIO3			0.022**		
			(0.01)		
BANK × BETTERCAPRATIO3			0.021***		
			(0.01)		
BANK × WORSECAPRATIO4				0.029***	
				(0.01)	
BANK × BETTERCAPRATIO4				0.020***	
				(0.01)	
BANK × WORSECAPRATIO5					0.028***
					(0.01)
BANK × BETTERCAPRATIO5					0.019***
					(0.01)
SIZE	-0.0020**	-0.0020**	-0.0020**	-0.0020**	-0.0020**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.19***	0.19***	0.19***	0.19***	0.19***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
LOSS, t-1	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LOSS, t-2	-0.020***	-0.020***	-0.020***	-0.020***	-0.020***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FINANCIAL CASH FLOW	-0.018*	-0.018*	-0.018*	-0.019*	-0.019*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FOREIGN	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
NET PP&E	0.0020	0.0020	0.0020	0.0021	0.0022
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
INTANGIBLES	0.022**	0.022**	0.022**	0.022**	0.022**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
SG&A EXPENSE	-0.028***	-0.028***	-0.028***	-0.028***	-0.027***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	0.33***	0.33***	0.33***	0.33***	0.33***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
YEAR FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
STATE FIXED EFFECTS	Yes	Yes	Yes	Yes	Yes
Observations	23373	23373	23373	23373	23373
Adjusted R^2	0.042	0.042	0.042	0.042	0.042

Year- and state-fixed effects are included where indicated. One-way clustered (firm level) standard errors are shown in parentheses. Significance levels are as follows: * 0.1 ** 0.05 *** 0.01