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Bank Size and Effective Tax Rates. Evidence from the U.S. Banks

Abstract. *This paper investigates the effect of bank size and the corresponding tax deduction rules of loan loss provisions (reserve method vs. charge-off method) on bank-specific effective tax rates (ETRs) for U.S. commercial and savings banks over 2011-2020. By exploiting the single-country scenario of the U.S. that sets different tax deduction rules for banks' loan loss provisions according to the size of the banks (small vs. large banks with $500 million assets threshold as a cut-off) within the same regulatory framework, we document that while size is positively associated with bank-specific ETR (supporting political cost theory), large banks that are required to deduct loss provisions under the charge-off method enjoy a lower tax reduction effect than small banks that can deduct losses under the reserve method. The findings remain consistent both for small and large banks, across a battery of robustness checks, including alternative definitions of ETR and different estimators, both static and dynamic, in which we account for endogeneity concerns. Results bear critical policy implications for both policymakers and bank executives.*

Keywords: *bank size, effective tax rates, loan loss provisions, net charge-offs.*

JEL Classification: G21, G28, H25, M41.

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1. Introduction and related literature

The relationship between taxes and firm size has a long history, especially in the United States (U.S.), where originated almost 50 years ago. Two well-established alternative theories have emerged: (i) political power theory and (ii) political cost

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theory. The former states that larger firms are more likely to influence the political process in their favor, therefore, they pay lower taxes, while the latter argues that larger firms are subject to extensive public scrutiny, which causes them to be exposed to greater regulatory actions by the government (Zimmerman, 1983), resulting in higher taxes.

Over time, research on the relationship between taxes and firm size has expanded to other countries around the world. An excellent review can be found in Belz et al. (2019). From 56 primary studies worldwide, the authors find 20 studies that provide evidence for the political cost theory, 11 studies that provide evidence for the political power theory, 14 studies that show no clear tendency towards either, while 11 studies show evidence in favor of both theories. If this heterogeneity can be explained by different country-specific regulatory frameworks, sticking to the specific case of the U.S. provides evidence in favor of political cost theory (Belz et al., 2019).[1]

Research on the association between firm size and taxation has progressively extended beyond the U.S. to a broader international context. Belz et al. (2019) provide a comprehensive review of 56 studies worldwide and report substantial heterogeneity: 20 studies support the political cost hypothesis, 11 support the political power hypothesis, 14 yield no clear directional evidence, and 11 find support for both perspectives. This variation likely reflects differences in institutional and regulatory environments across countries. When the focus is restricted to the U.S., however, the empirical evidence aligns more consistently with the political cost theory (Belz et al., 2019).

An investigation by Dyreng et al., 2017 on corporate effective tax rates (ETRs) development in the U.S. over the 1988-2012 period found a significant downward trend in ETRs for publicly traded U.S. companies, with no significant difference in the declining rate between purely domestic and multinational companies. When size is accounted for, the results show that for domestic firms only, there is a positive association between size and taxes paid, while for multinationals, there was no statistically significant effect detected. However, large domestic firms have a faster rate of ETR decline over time compared to large multinationals. While there is evidence in favor of political cost theory, having both domestic and multinational firms enjoy a reduction in ETR over time, despite the constant U.S. statutory corporate tax rate, further contributed to the controversy around the "fair share of taxes" paid by corporations.

In the case of U.S. non-financial firms, political cost theory seems to have an edge over political power theory. However, little is known about U.S. financial institutions, and little can be inferred from non-financial companies. As Hanlon and Heitzman (2010) argue, in ETR-related research, "financial institutions are dropped

[1] Belz et al. (2019) find in their meta-regression analysis that a 10 percent increase in firm size roughly leads to a 0.2 percentage point increase in ETR. However, after the introduction of the check-the-box rule in the U.S. in 1997, which increased tax planning opportunities, large firms effectively decreased their ETR to a significantly higher degree than did small firms.

from the sample because of concerns over regulatory differences". Being a highly regulated industry, banks are mostly preoccupied with maintaining the regulators' required level of equity in conformity with the risk of their assets. Consequently, tax planning strategies (e.g., interest deductions from debt) become less important at the industry level (Lazăr and Andrieș, 2022). Studies investigating the determinants of bank-specific ETRs are scarce (Gawehn and Mueller, 2019; Lazăr and Andrieș, 2022). However, knowing the relationship between firm size and taxes within the banking industry is crucially important because banks, especially large banks, are systemically important (Laeven et al., 2016) and are subject to government intervention to save them from bankruptcy (Berger et al., 2020)[2].

Moreover, investigating size as a determinant of ETR for U.S. banks brings another important industry-specific aspect into the spotlight, namely the different tax deduction rules set by the U.S. tax law regarding the loan loss provisions (LLPs) for bank entities. LLPs are the largest banks' accruals on which they have substantial freedom to manipulate and have a significant effect on earnings and regulatory capital (Balla and Rose, 2015), but also on taxes, conditional on tax deduction rules. In this respect, following the 1986 tax reform, the U.S. tax code differentiates between large (total assets more than \$500 million) and small banks (total assets under \$500 million). Large banks *should use the charge-off method,* which allows tax deductions of LLPs only upon the occurrence of the final event that clearly makes the recovery of the corresponding loan impossible (e.g., the borrower has declared bankruptcy), or in other words, when the loan was charged-off. Given the different financial accounting and tax treatments of LLPs, this method is over-restrictive (especially when the bankruptcy country-specific procedures require a long time), in the sense that it delays the potential tax deduction of LLPs by creating a deferred tax asset equal to the value of the future tax deduction. However, because of deferred tax accounting, banks' overall earnings are not affected. Alternatively, small banks are not required to use the charge-off method and *may deduct LLPs under the reserve method* in the current period, as any other normal business expenditure. This method provides a timely tax deduction of LLPs compared to the charge-off method by allowing small banks to (partially) deduct[3] the cost of provisions in the current period rather than waiting until loans are charged-off. Moreover, given the highly regulated character of the banking industry, meant to preserve financial stability, most net charge-offs (NCOs) are pre-mapped by LLPs, but not all LLPs translate into NCOs, which means that the numbers for NCOs are smaller than those for LLPs, as confirmed by descriptive statistics (see Table 1). Thus, small banks clearly prefer the reserve method because it provides both simplicity and more generous and timely tax deductions. The key distinction between the reserve and charge-off methods is that under the former, loan loss provisions are tax-deductible when recognized, whereas under the charge-off method, the deduction is deferred and matched to the

[2] See, for instance, the Troubled Asset Relief Program (TARP).

[3] There is no conformity requirements between LLPs for book purposes and the LLPs for tax purposes (Collins et al., 1995). Not all LLPs for financial purposes are allowed for tax deductions, even in the case of the reserve method.

loan that is actually charged-off. Importantly, this difference does not mechanically alter overall reported earnings, as deferred tax accounting offsets the mismatch between book and taxable income (Andries et al., 2017). Because the U.S. financial sector is the second-largest source of federal corporate income tax revenue (after manufacturing)[4], understanding how bank-level ETRs respond to size-dependent rules on the tax deductibility of loan loss provisions helps anticipate potential declines in tax receipts during periods of economic stress, when LLPs, the most important accrual for banks (Ahmed et al., 1999), tend to rise.

The literature on banks LLPs is vast and is dealing mostly with the effect of provisions on earnings management, capital regulation, signalling and taxes. An excellent review on banks' LLPs related literature can be found in Wall and Koch (2000) and more recently in Ozili and Outa (2017). Regarding the specific US nexus between taxes and banks' LLPs, Andries et al. (2017) documented that the U.S. 1986 tax reform had real effects on bank size and growth, because in order to maintain provision tax deduction, banks experiencing a restrictive change in the tax deduction of loan loss provisions (large banks with assets greater than $500 million) reduced their provisioning relative to banks that did not experience the change (assets at or below $500 million). This implies that when LLPs are no longer immediately tax deductible, banks are less inclined to provision. Even though the threshold of $500 mil. is exogenously fixed by tax authorities, banks may choose to self-select themselves below or above the $500 mil. threshold to maintain the preferred provision tax deduction regime. However, (Andries et al., 2017) found no evidence that after the 1986 tax reform, banks managed their assets around the $500 mil. cut-off point, therefore, we argue that self-selection bias is not a significant concern.

Considering the above arguments, we proceed to formulate our research hypotheses. First, we check whether there is a positive relationship between bank size and bank-specific ETR as empirical evidence for U.S. non-financial companies asserts. Therefore, our first research hypothesis is stated as follows:

H1: The size of banks is positively associated with bank-specific ETR (larger size triggers higher taxes).

Second, we want to see whether size-dependent LLPs tax deduction rules have different effects on bank-specific ETRs for larger banks than for smaller ones. Small banks are allowed to immediately deduct loan loss provisions (LLPs) under the reserve method, while larger banks, which are confined to the charge-off method, should deduct only net charge-offs (NCOs), which are lower than LLPs (see summary statistics in Table 1). Therefore, since smaller banks presumably can deduct more, we expect that the reduction effect of LLPs on bank-specific ETRs is

[4] The share of corporate income tax paid by financial sector in total corporate income taxes paid varied from 16% in 2008 (first Great Recession year) to 22.34% in 2019 (last pre-pandemic year). See https://www.irs.gov/statistics/soi-tax-stats-corporation-income-tax-returns-complete-report-publication-16

higher for smaller banks than for larger banks. Consequently, our second research hypothesis is formulated as follows:

H2: ETR reduction is greater under the reserve method (i.e., for small banks) than under the charge-off method (i.e., for large banks).

To the best of our knowledge, our study is the first to assess bank-specific ETR as a response to the provisioning strategy of banks within a single-country scenario, thus exploiting the homogeneity triggered by the same regulatory and economic framework and better isolating the effect of size and size-triggered LLP tax deduction rules. To check for the robustness of the effect of LLPs on the bank tax burden, we build three versions of ETRs and employ various estimation strategies, including an instrumental variable approach to deal with the endogeneity issues. We find that size and bank-specific ETRs are strongly positively associated, and that the diminishing effect on ETR is higher for small banks than for large banks.

A limitation of our study is that we used accounting data rather than actual tax data. Tax data is confidential; therefore, we use financial accounting figures of LLPs for the reserve method and of NCOs for the charge-off method, but presumably, within a single-country scenario, tax deduction rules are the same for banks with similar characteristics, which we controlled for. We contribute to the literature by empirically investigating if bank-specific ETRs are sensitive to 1) bank-size and to 2) the subsequent size-specific loan loss provisions tax deduction rules. It uses the distinctive characteristics of the U.S. banking and tax systems to contribute to the ongoing debate on size-related tax equity. While the findings are not generalizable, the lessons drawn from the largest market-regulated banking industry in the world may nonetheless offer valuable insights for other jurisdictions as well.

The rest of the paper is structured as follows: section 2 describes the sample, data, and methodology, section 3 discusses the results, section 4 provides robustness tests, and section 5 concludes.

2. Data and Methodology

2.1 Data

We started with 4959 U.S. commercial and savings banks included in the Orbis database over the period between 2011 and 2020. Owing to the missing or incomplete data necessary to compute our variables of interest, the final sample comprises 4953 banks (4505 commercial and 449 savings banks) with a mean size of USD 4.3 billion at the end of 2020 and 48581 bank-year observations.

To capture the tax burden of U.S. banks, we use three versions of ETRs. Being a ratio, choosing the proper numerator and denominator and interpreting the results according to what those numbers say is often the trickiest part of any ETR-related research (Dyreng et al., 2017; Graham et al., 2012; Hanlon and Heitzman, 2010). As ETRs are challenging to interpret when the denominator is negative, we have eliminated such records, similarly to Dyreng et al. (2017), and we set ETRs to 0 when the numerator is negative.[5]

Regarding the numerator, three proxies for tax liabilities are widely used in the ETR literature: total tax expense (TTE), current tax expense (CTE), and cash taxes paid (CTP), while regarding the denominator there is a large consensus on using pre-tax book income. Correspondingly, the GAAP ETR, current ETR, and cash ETR are the most well-established versions of ETRs in the literature. An excellent description of each version of the ETR version can be found in Hanlon and Heitzman, 2010. The GAAP ETR captures only the permanent differences between taxable income and book income, leaving aside any tax deferral or tax acceleration strategies (Chen et al., 2019), while the current ETR and cash ETR capture both permanent and temporary book-tax differences. This distinction has significant consequences for the interpretation of the results. For instance, since GAAP ETR is not altered by accelerated depreciation for tax purposes, any statistically significant effect of fixed capital intensity on GAAP ETR could not be attributed to firm-specific depreciation policy (e.g., accelerated depreciation), but to other underlying factors, thus sorting out the purely mechanical temporary effects triggered by different tax and accounting rules. We do not have access to CTE or CTP, nor can we estimate them.[6] Therefore, we construct all three versions of ETR around the TTE as a numerator.

Having pre-tax book income as the denominator (as quasi-unanimously is the case) only captures the effects of non-conforming tax avoidance, thus excluding the effects of conforming[7] tax avoidance. Moreover, pre-tax book income (denominator) is often subject to earnings management manipulation, and consequently, the interpretation of ETRs dynamics solely based on taxes (numerator) may not be accurate. Therefore, to overcome these shortcomings and, since our primary research focus is not on tax avoidance activities specifically undertaken to reduce taxes[8], but rather on the bank-specific tax expense relative to the size of the banks, we scaled the TTE to operating income (ETR1), which in the Orbis database for bank entities is the equivalent of turnover (income statement top line) for non-financial companies. We argue that this ETR version better isolates the tax-induced effects of bank provisioning policy (only at the numerator), is less sensitive to both earnings

[5] Because negative values of taxes (numerator) mean that no taxes were paid, setting the corresponding ETR to 0 has an economic meaning and allows for a rational interpretation of the results.

[6] We use data from the Orbis Database of Bureau van Dijk. Data on deferred tax assets or deferred tax liabilities are not available; therefore, we cannot estimate the current tax expense.

[7] Conforming tax avoidance strategies consist of reducing tax liabilities by reducing both book income and taxable income, whereas non-conforming tax avoidance consists of reducing taxes by reducing only taxable income and not book income.

[8] As Hanlon and Heitzman (2010) point out, ETRs reflect all transactions that have any effect on the firm’s explicit tax liability and do not distinguish between real activities that are tax-favored, avoidance activities specifically undertaken to reduce taxes, and targeted tax benefits from lobbying activities.

and accruals manipulations, and, as the denominator is always positive, it makes both the interpretation of its economic meaning and sample data cleaning more meaningful.[9] Despite having no benchmark to compare it against (such statutory tax rate), it reflects the "share of the pie" (turnover) that goes to taxes, thus being useful especially for cross-industry or cross-country comparisons. In addition to ETR1, which is our main dependent variable, we use two alternative ETR versions as robustness checks. ETR2 is the TTE scaled by pre-tax book income before any LLP deduction[10], ETR3 is the standard version of GAAP ETR (TTE scaled by pre-tax book income).

By adding back LLPs to pre-tax book income for ETR2, we did not only isolate the tax-induced effects of LLPs only at the numerator of the ETR, and thus mitigating the cancelling effect of having both the numerator and the denominator affected in the same way (negative) by the LLPs bank operations,[11] but we also have been able to control for the potential manipulation effect of banks earnings through LLPs (Andries et al., 2017). Given that LLPs likely affect both the numerator and denominator of ETR3 in the same way (negatively), the aggregate effect is ambiguous. Consequently, we had no expected sign for ETR3 but reported the results as a robustness check.

Finally, we use the log of taxes (results not reported, but available upon request) as a proxy for firm-level tax liabilities. While the log of taxes does not allow the scaling of taxes to some corporate metrics meant to "normalize" the tax burden relative to the size of the company (turnover, profit before taxes, etc.), it provides the benefit of automatically removing negative values of taxes from the sample, thus eliminating the need for any tax recoding data strategies. In this process, a new data sample is obtained, which adds to the robustness of the results.

2.2 Methodology

Under the U.S. tax code, small banks may deduct provisions under the reserve method, whereas large banks should deduct provisions under the charge-off method (Andries et al., 2017). Consequently, our main variables of interest are LLPs and NCOs. LLPs are the amounts set aside as income statement expenses, representing an allowance for uncollected loans. This does not mean that the loan will not be reimbursed, but rather acts as a prudential cushion if the bank appreciates that a loan

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[9] Negative ETRs are difficult to interpret and are usually set to zero or removed. Having fewer negative values preserves a higher number of observations and improves sample quality.

[10] Basically, the ETR2 denominator is pre-tax book income at which we add back the LLPs.

[11] The reasoning behind this construct is like that of interest deduction. Since interest, being tax-deductible, affects both the numerator and the denominator in the same way (negatively), its potential tax benefits are not proper captured by the standard GAAP ETR, but by an ETR that has as a denominator a measure of earnings *before* interest deductions (e.g., EBIT). Similarly, because our main variable of interest is LLPs, we scale taxes to earnings before LLPs (EBLLP). Andries et al. (2017) also used the EBLLP in a related but different context.

will not be reimbursed in full. On the other hand, NCOs are the amounts written off from the books when it becomes evident for the bank that a loan will not be reimbursed. Some LLPs are mapped into future NCOs, and some NCOs are not necessarily anticipated by LLPs, but generally the numbers for NCOs are smaller than those for LLPs, as confirmed by descriptive statistics (see Table 1). Consequently, the charge-off method, which is based on NCOs deduction is more restrictive than the reserve method, based on LLPs deduction.

Our empirical models can be specified as follows:

$$ETR_{it} = \beta_0 + \beta_1 \times LLP_{it} + \beta_2 \times Size_{it} + \beta_3 \times Bank\ Characteristics_{it} + \eta_i + \varphi_t + \varepsilon_{it} \quad (1)$$

$$ETR_{it} = \beta_0 + \beta_1 \times NCO_{it} + \beta_2 \times Size_{it} + \beta_3 \times Bank\ Characteristics_{it} + \eta_i + \varphi_t + \varepsilon_{it} \quad (2)$$

where Equation (1) tests the reserve method, whereas Equation (2) tests the charge-off method.

ETR_{it} is the bank-specific effective tax rates for bank i in year t computed as described in Section 2.1, LLP_{it} are the loan loss provisions scaled by operating income, and NCO_{it} are net charge-offs over operating income. $Size_{it}$ (natural logarithm of total assets) is our primary variable of interest, while $Bank\ Characteristics_{it}$ is a vector of bank-specific factors that are likely to be linked to tax deduction patterns across banks (Gross Loans/Total Assets, Total Earning Assets/Total Assets, Common Equity/Total Assets, Fixed Assets/Total Assets, and Return on Assets). η_i are the bank fixed effects to account for time-invariant heterogeneity at the bank level, φ_t are the year fixed effects to capture aggregate time shocks that would affect all banks, and ε_{it} is the idiosyncratic error term. The bank-specific control variables are scaled by the total assets if they come from the balance sheet, or by the operating income (equivalent of turnover for non-financial companies as reported by Orbis database) if they come from the income statement. Table A1 in the Appendix describes all the variables used in the empirical setting and presents their sources, whereas Table A2 shows the correlation matrix.

To deal with the influence of potential outliers, all variables are winsorized between 5th and 95th percentiles. Standard errors are clustered at the bank level to correct for any form of heteroskedasticity and autocorrelation in the residuals.

In addition, we run the regressions with an interaction term between Size and LLPs/NCOs, to capture the joint effect of both variables on ETR as well, according to the following equations:

$$ETR_{it} = \beta_0 + \beta_1 \times LLP_{it} + \beta_2 \times Size_{it} + \beta_3 \times LLP_{it} \times Size_{it} + \beta_4 \times Bank\ Characteristics_{it} + \eta_i + \varphi_t + \varepsilon_{it} \quad (3)$$

$$ETR_{it} = \beta_0 + \beta_1 \times NCO_{it} + \beta_2 \times Size_{it} + \beta_3 \times NCO_{it} \times Size_{it} + \beta_4 \times Bank\ Characteristics_{it} + \eta_i + \varphi_t + \varepsilon_{it} \quad (4)$$

3. Empirical Findings

3.1 Descriptive Statistics

Table 1 exhibits the descriptive statistics of the variables used in the empirical setting. The average of the ETR1 variable, computed as the total tax expenses over the operating income, is 4.47% with a standard deviation of 4.74%, ranging from 0% to 14.7%. ETR2, defined as the total tax expense scaled by the total income before any loan loss provision takes values from 0% to 37.35%, with a mean of 13.73% and a standard deviation of 13.08%. ETR3, i.e., the total tax expense over the pre-tax book income ranges from 0% to 39.23%, with a mean of 15.39% and a standard deviation of 14.3%. The mean for NCOs is lower than the mean for LLPs, which is in line with the theoretical assumption that NCOs are on average lower than LLPs. Consequently, banks deduct less under NCOs than under LLPs, which supposedly must have different effects on their tax burden.

Table 1. Summary Statistics

	Mean	**St. Dev.**	**Median**	**Min**	**Max**	**Obs.**
Full Sample						
ETR1	4.4739	4.7432	2.8401	0.0000	14.6955	48607
ETR2	13.7262	13.0843	12.9032	0.0000	37.3542	48211
ETR3	15.3944	14.2958	15.9284	0.0000	39.2308	48088
LLPs	3.6455	4.2784	2.2406	-0.2857	15.7242	48581
NCOs	2.9220	4.4691	1.0947	-1.0514	16.2644	48581
Size	12.3245	1.1848	12.1979	10.4276	14.9135	48618
Gross Loans	62.8582	15.4667	65.2088	30.0718	85.1826	48589
Total Earning Assets	92.6490	3.7535	93.6507	82.8468	97.1597	48618
Common Equity	11.4720	2.8884	10.7631	7.8395	19.0888	48618
Fixed Assets	1.5506	1.0462	1.3623	0.1460	3.8781	48604
ROA	1.1123	0.5964	1.1203	-0.0362	2.2689	48618
Large Banks						
ETR1	6.8531	4.8439	6.8785	0.0000	14.6955	11479
ETR2	19.0512	12.1228	20.4288	0.0000	37.3542	11434
ETR3	21.6217	12.9969	23.8140	0.0000	39.2308	11400
LLPs	4.3359	4.4158	2.9694	-0.2857	15.7242	11479
NCOs	3.1746	4.4493	1.4309	-1.0514	16.2644	11479
Size	14.0032	0.6278	13.8602	13.1225	14.9135	11479
Gross Loans	67.6757	13.5742	70.3026	30.0718	85.1826	11479
Total Earning Assets	91.3373	4.2425	92.3371	82.8468	97.1597	11479
Common Equity	11.1992	2.5317	10.6441	7.8395	19.0888	11479
Fixed Assets	1.5177	0.9193	1.4246	0.1460	3.8781	11479
ROA	1.2816	0.5409	1.2826	-0.0362	2.2689	11479
Small Banks						
ETR1	3.7379	4.4612	1.6312	0.0000	14.6955	37102
ETR2	12.0706	12.9299	5.0955	0.0000	37.3542	36777
ETR3	13.4594	14.1278	5.7889	0.0000	39.2308	36688
LLPs	3.4319	4.2123	1.9986	-0.2857	15.7242	37102
NCOs	2.8439	4.4724	0.9742	-1.0514	16.2644	37102
Size	11.8036	0.7554	11.8478	10.4276	13.1223	37102
Gross Loans	61.3735	15.7071	63.2455	30.0718	85.1826	37102
Total Earning Assets	93.0620	3.4803	93.9178	82.8468	97.1597	37102
Common Equity	11.5512	2.9792	10.8022	7.8395	19.0888	37102
Fixed Assets	1.5608	1.0820	1.3358	0.1460	3.8781	37102
ROA	1.0597	0.6024	1.0621	-0.0362	2.2689	37102
Difference in means (large – small)						
ETR1	3.1153***					
ETR2	6.9806***					
ETR3	8.1624***					

	Mean	St. Dev.	Median	Min	Max	Obs.
LLPs	0.9039***					
NCOs	0.3307***					
Size	2.1995***					
Gross Loans	6.3022***					
Total Earning Assets	-1.7247***					
Common Equity	-0.3520***					
Fixed Assets	-0.0431***					
ROA	0.2220***					

Note: This table presents summary statistics of the variables used in the empirical analysis, winsorized between 5th and 95th percentiles. A complete description of variables can be found in Table A1 in the Appendix. *** denotes statistical significance at the 1% level.

Source: Own elaboration.

In terms of the differences in means between large and small banks, we note that all indicators differ in a statistically significant manner based on bank size. Bank-specific ETRs are systematically higher for larger banks, as well as LLPs and NCOs.

3.2 Results and Discussions

Table 2 summarizes the estimation results of Equations (1) and (2), in which we test the influence of the LLPs/reserve method and NCOs/charge-off method on bank-specific ETRs. We find that size is positively associated with ETR1 in all scenarios. When the size of a bank increases, ETR1 also increases, more so for small banks than for large banks, given the magnitude of the estimated coefficients. We document that both LLPs and NCOs have a negative effect on ETR1, findings that hold for the full sample (Models (1) and (4)), as well as for large (Models (2) and (5)) and small banks (Models (3) and (6)). The results are also economically meaningful: a one-standard-deviation increase in LLPs leads to a 2.72% standard deviation reduction in ETR1, whereas a one-standard-deviation increase in NCOs is associated with a 2.23% standard deviation decrease in bank-specific ETRs. For large banks, a one-standard-deviation increase in LLPs leads to a 5.98% standard deviation reduction in ETR1, whereas a one-standard-deviation increase in NCOs is associated with a 4.77% reduction in ETR1. For small banks, a one-standard-deviation increase in LLPs/NCOs leads to a 1.39%/1.69% standard deviation reduction in the ETR1. Thus, the diminishing effect of LLPs deductions under the reserve method on ETR1 is higher for both all banks and large banks. This implies that if large banks were allowed to deduct LLPs instead of NCOs, their ETR1 would have been lower by 0.0136 p.p. (0.0656 – 0.0520). The results for small banks are the opposite, in the sense that in their case, the charge-off method resulted in a higher reduction in ETR1 than the reserve method. However, this result is not robust to various estimators (see Section 4), whereas the results for large banks remain robust.

Table 2. Baseline Model Results

	Full Sample	Large Banks	Small Banks
Dependent: ETR1	(1)	(2)	(3)
LLPs			
(reserve method)	-0.0302***	-0.0656***	-0.0148***
	(0.0049)	(0.0120)	(0.0054)

	Full Sample	**Large Banks**	**Small Banks**
Dependent: ETR1	(1)	(2)	(3)
Size	0.9460***	0.7004***	0.9716***
	(0.1104)	(0.2456)	(0.1527)
Gross Loans	0.0010	-0.0050	0.0001
	(0.0029)	(0.0074)	(0.0031)
Total Earning Assets	0.0243***	0.0252**	0.0224***
	(0.0068)	(0.0122)	(0.0083)
Common Equity	-0.1237***	-0.1806***	-0.1090***
	(0.0173)	(0.0387)	(0.0190)
Fixed Assets	-0.1730***	-0.5134***	-0.1131**
	(0.0420)	(0.1100)	(0.0464)
ROA	3.4587***	4.1835***	3.2062***
	(0.0718)	(0.1400)	(0.0835)
Constant	-11.2540***	-6.8643*	-11.4804***
	(1.5371)	(3.6269)	(2.0258)
Bank-year observations	48581	11479	37102
R-squared	0.3033	0.4202	0.2644
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

	Full Sample	**Large Banks**	**Small Banks**
Dependent: ETR1	(4)	(5)	(6)
NCOs			
(charge-off method)	-0.0236***	-0.0520***	-0.0168***
	(0.0042)	(0.0111)	(0.0045)
Size	0.9044***	0.6913***	0.9453***
	(0.1102)	(0.2450)	(0.1522)
Gross Loans	-0.0014	-0.0099	-0.0007
	(0.0028)	(0.0072)	(0.0031)
Total Earning Assets	0.0233***	0.0258**	0.0208**
	(0.0068)	(0.0122)	(0.0083)
Common Equity	-0.1233***	-0.1737***	-0.1097***
	(0.0172)	(0.0381)	(0.0189)
Fixed Assets	-0.1687***	-0.4916***	-0.1132**
	(0.0418)	(0.1086)	(0.0463)
ROA	3.4908***	4.2694***	3.1989***
	(0.0707)	(0.1351)	(0.0825)
Constant	-10.6115***	-6.7988*	-10.9580***
	(1.5346)	(3.6204)	(2.0208)
Bank-year observations	48581	11479	37102
R-squared	0.3030	0.4190	0.2647
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: This table displays the results of the base models described in Equation (1) and Equation (2). The dependent variable is ETR1, as defined in Table A1 in the Appendix. Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

Turning to control variables, we cannot attribute the negative sign of Fixed Assets/Total Assets to accelerated depreciation, because our figure for taxes comprises the total tax expense (and not current tax expense or cash taxes), therefore not capturing the temporary differences between book income and taxable income (Chen et al., 2019) triggered by the differences between book depreciation and tax depreciation. Our results regarding the effect of Return on Assets (ROA) are in line with previous literature, according to which ROA is positively associated with ETR (Chen et al., 2010; Fernandez-Rodrıguez and Martınez-Arias, 2011; Gupta and Newberry, 1997; Janssen, 2005; Plesko, 2003; Richardson and Lanis, 2007; Stickney and McGee, 1982). Usually, when it comes to financial structure (equity vs. debt), the majority of ETR studies (which investigate non-financial companies) use debt as a variable of interest based on the assumption that the larger the debt, the larger the interest expenses, which are tax deductible, and thus reduce ETR. Such an interpretation is questionable in the context of an ETR version based on pre-tax book income as the denominator since it captures only non-conforming tax avoidance[12]. Moreover, in the case of banking entities, maintaining an appropriate level of equity in relation to the risks of their assets is far more important than using debt for tax minimization purposes. Banks are subject to stricter capital requirements that limit their level of debt, which is not the case for non-financial companies. Nevertheless, the extremely robust negative sign of equity (see the next section) and the differences in the size of the coefficients between large and small banks are a matter of interest for future research.

In terms of interaction regression, Table 3 shows the conditional effects on size of both LLPs and NCOs over bank-specific ETRs. The coefficient of interest is the interaction term which suggests that the ETR reducing effect of LLP is greater than of NCO at the same level of size (-0.0417 vs -0.0296). This finding is illustrated in Figure 1.

Table 3. Interaction Model Results

	LLP	**NCO**
Dependent: ETR1	**(1)**	**(2)**
LLPs	0.4826***	
	(0.0427)	
NCOs		0.3369***
		(0.0429)
Size	1.1346***	0.9799***
	(0.1115)	(0.1102)
LLPs × Size	-0.0417***	
	(0.0035)	
NCOs × Size		-0.0296***
		(0.0035)
Gross Loans	0.0010	-0.0015
	(0.0029)	(0.0028)

[12] Interest expense reduces both taxable income and pre-tax book income (conforming tax avoidance). This means lower numerator (lower taxes) and lower denominator (lower book income), therefore the aggregate effect of interest expense on ETR is ambiguous, if any.

	LLP	NCO
Dependent: ETR1	**(1)**	**(2)**
Total Earning Assets	0.0218***	0.0226***
	(0.0068)	(0.0068)
Common Equity	-0.1253***	-0.1217***
	(0.0173)	(0.0172)
Fixed Assets	-0.1740***	-0.1637***
	(0.0422)	(0.0420)
ROA	3.4475***	3.4793***
	(0.0717)	(0.0707)
Constant	-13.2736***	-11.4412***
	(1.5462)	(1.5373)
Bank-year observations	48581	48581
R-squared	0.3084	0.3056
Bank FE	Yes	Yes
Year FE	Yes	Yes

Note: This table displays the results for the interaction model. The dependent variable is ETR1, as defined in Table A1 in the Appendix. Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

The positive coefficients for both LLPs and NCOs have no real meaning in the context of our data, since they show the effects on ETRs when the size is zero, which is objectively impossible. The vertical dotted lines from Figure 1 mark the actual range of size within our dataset, which is the only part of the graph that should be considered. The predicted marginal effect on ETR1 is negative once the size is above $100 million, and the negative effect is more important for LLPs than for NCOs, which further confirms our H2 hypothesis.

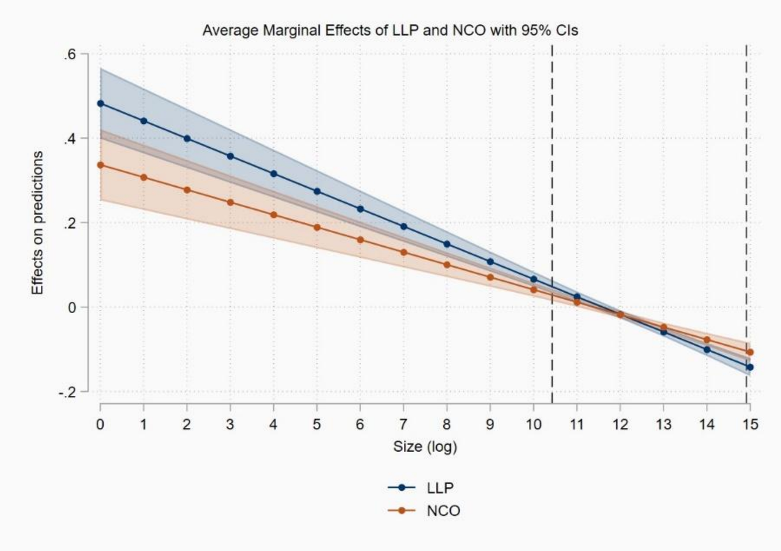

Figure 1. The Marginal Effects on ETR of LLPs and NCOs Conditional on Size

Source: Own elaboration.

4. Robustness Checks

In addition to the fixed effects[13] estimator, we employ several alternative estimation models to test the robustness of our findings. First, to account for cross-sectional dependence due to unobserved common shocks, spillover effects, or omitted observed common factors, we run a regression with Driscoll and Kraay (1998) standard errors. In this framework, the error structure is assumed to be heteroskedastic, autocorrelated up to some lag, and correlated between panels. As shown in Table 4, our main conclusions remain unchanged.

Second, given the endogeneity concerns of the LLP and NCO variables that may arise from reverse causality or omitted variable bias, we address this issue by using the limited-information maximum likelihood (LIML) estimator with the Z-score as the instrument, which is robust to weak instruments. The Z-score is computed as the sum of ROA and equity divided by the three-year standard deviation of ROA, similar to Chiaramonte et al. (2016), and reflects a bank's probability of insolvency (Bouvatier et al., 2023). For an instrument to be considered valid, it must meet two specific criteria. (i) relevance and (ii) exogeneity, i.e., it must be correlated with LLPs and NCOs but not a direct cause of bank-specific ETRs. By including only one instrument, the equation is exactly identified.

Table 4. Robustness checks: Driscoll and Kraay (1998) standard errors

	Full Sample	**Large Banks**	**Small Banks**	**Full Sample**	**Large Banks**	**Small Banks**
Dependent: ETR1	(1)	(2)	(3)	(4)	(5)	(6)
LLPs						
(reserve method)	-0.0302***	-0.0656***	-0.0148*			
	(0.0082)	(0.0100)	(0.0077)			
NCOs						
(charge-off method)				-0.0236***	-0.0520***	-0.0168***
				(0.0051)	(0.0142)	(0.0040)
Size	0.9460***	0.7004***	0.9716***	0.9044***	0.6913***	0.9453***
	(0.1631)	(0.0912)	(0.1466)	(0.1718)	(0.0906)	(0.1494)
Gross Loans	0.0010	-0.0050	0.0001	-0.0014	-0.0099	-0.0007
	(0.0028)	(0.0050)	(0.0026)	(0.0033)	(0.0062)	(0.0027)
Total Earning Assets	0.0243***	0.0252*	0.0224**	0.0233**	0.0258**	0.0208**
	(0.0073)	(0.0114)	(0.0075)	(0.0075)	(0.0113)	(0.0074)
Common Equity	-0.1237***	-0.1806***	-0.1090***	-0.1233***	-0.1737***	-0.1097***
	(0.0199)	(0.0286)	(0.0188)	(0.0203)	(0.0297)	(0.0189)
Fixed Assets	-0.1730***	-0.5134***	-0.1131***	-0.1687***	-0.4916***	-0.1132***
	(0.0322)	(0.1005)	(0.0237)	(0.0329)	(0.1029)	(0.0236)
ROA	3.4587***	4.1835***	3.2062***	3.4908***	4.2694***	3.1989***
	(0.1346)	(0.1834)	(0.1361)	(0.1266)	(0.1831)	(0.1400)
	-		-	-		-
Constant	11.2540***	-6.8643***	11.4804***	10.6115***	-6.7988***	10.9580***
	(1.7570)	(1.1861)	(1.7259)	(1.7551)	(1.3088)	(1.6959)

[13] By replacing bank fixed effects with state fixed effects, the findings remain consistent. In addition, we include a dummy variable to capture the tax reform implemented in 2018 in the U.S., i.e., the *Tax Cuts and Jobs Act*. In both specification the results remain consistent and are available upon request.

	Full Sample	Large Banks	Small Banks	Full Sample	Large Banks	Small Banks
Dependent: ETR1	(1)	(2)	(3)	(4)	(5)	(6)
Bank-year observations	48581	11479	37102	48581	11479	37102
R-squared	0.3033	0.4202	0.2644	0.303	0.419	0.2647
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table displays the results of the base model described in Equation (1) and Equation (2) with Driscoll and Kraay (1998) standard errors. The dependent variable is ETR1, as defined in Table A1 in the Appendix. Driscoll and Kraay (1998) standard errors in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

We evaluate the appropriateness of our instrument using several tests. The first-stage F-test has the null hypothesis that the instrument does not explain the variation in LLPs and NCOs. The Kleibergen-Paap rk LM statistic, which tests whether an excluded instrument is correlated with the endogenous regressors, with the null hypothesis that the model is under-identified. Both tests reject the null hypotheses and confirm that our instrument satisfies relevance and exogeneity requirements. In addition, the Kleibergen-Paap rk Wald F statistic is the weak identification test that is compared with the critical values of Stock and Yogo (2005), showing that our instrument is strong. Finally, the GMM distance test statistic of endogeneity indicates the adequate treatment of both LLPs and NCOs as endogenous. Looking at the estimated results displayed in Table 5, we note that both LLPs and NCOs continue to have a negative and highly significant impact on ETR1. However, the coefficients display even smaller negative figures compared to the benchmark specification, which is in line with other studies that follow the same approach (e.g., Berger et al., 2017).

Table 5. Robustness checks: limited-information maximum likelihood estimation

	Full Sample	Large Banks	Small Banks
Dependent: ETR1	(1)	(2)	(3)
LLPs	-0.4498***	-0.3642**	-0.3778***
(reserve method)	(0.0784)	(0.1670)	(0.0853)
Size	1.5886***	0.8431***	1.8499***
	(0.2043)	(0.2911)	(0.2980)
Gross Loans	0.0488***	0.0329	0.0407***
	(0.0098)	(0.0226)	(0.0104)
Total Earning Assets	0.0108	0.0083	0.0207**
	(0.0087)	(0.0154)	(0.0100)
Common Equity	-0.1170***	-0.1950***	-0.0862***
	(0.0222)	(0.0462)	(0.0233)
Fixed Assets	-0.2668***	-0.6147***	-0.1874***
	(0.0547)	(0.1407)	(0.0579)
ROA	1.8014***	2.9751***	1.7480***
	(0.3061)	(0.6529)	(0.3372)
Bank-year observations	43614	10341	33000
F-test (first stage)	117.5500***	28.3500***	88.3500***

	Full Sample	Large Banks	Small Banks
Dependent: ETR1	(1)	(2)	(3)
Kleibergen-Paap rk LM statistic	115.0550***	27.6830***	86.4540***
Kleibergen-Paap rk Wald F statistic	117.5520	28.3540	88.3520
GMM distance test statistic of endogeneity	36.2040***	3.6370*	21.6640***
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

	Full Sample	Large Banks	Small Banks
Dependent: ETR1	(4)	(5)	(6)
NCOs *(charge-off method)*	-0.4056***	-0.3437**	-0.3359***
	(0.0703)	(0.1585)	(0.0750)
Size	0.9046***	0.8235***	0.9853***
	(0.1402)	(0.2867)	(0.1858)
Gross Loans	0.0148***	0.0091	0.0127**
	(0.0047)	(0.0133)	(0.0050)
Total Earning Assets	-0.0072	0.0094	-0.0077
	(0.0101)	(0.0152)	(0.0125)
Common Equity	-0.1058***	-0.1589***	-0.0958***
	(0.0203)	(0.0439)	(0.0214)
Fixed Assets	-0.2194***	-0.5112***	-0.1716***
	(0.0495)	(0.1182)	(0.0543)
ROA	2.0698***	3.3231***	1.9373***
	(0.2603)	(0.5019)	(0.2932)
Bank-year observations	43614	10341	33000
F-test (first stage)	128.3700***	29.5500***	94.9100***
Kleibergen-Paap rk LM statistic	125.4250***	28.7510***	92.7140***
Kleibergen-Paap rk Wald F statistic	128.3700	29.5460	94.9070
GMM distance test statistic of endogeneity	37.5060***	4.0020**	21.4570***
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Note: This table displays the results of the base model described in Equation (1) and Equation (2) controlling for the endogeneity of main independent variables, using limited-information maximum likelihood (LIML) estimator that is robust to weak instruments. The dependent variable is ETR1, as defined in Table A1 in the Appendix. The F-test tests the excluded exogenous variable in the first-stage regression, with the null hypothesis that the instrument does not explain the variation in *LLPs* and *NCOs*, respectively. The Kleibergen-Paap rk LM statistic is the underidentification test of whether the equation is identified (i.e., excluded instruments are correlated with the endogenous regressors) with the null hypothesis that the model is underidentified. The GMM distance test statistic of endogeneity has the null hypothesis that endogenous regressors can be treated as exogenous. The Kleibergen-Paap rk Wald F statistic is the weak identification test which rejects the null hypothesis that the instrument is weak based on Stock and Yogo (2005) critical values. Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

Third, given the fact that the ETRs can be persistent across time, we employ a dynamic model, i.e., the bias-corrected linear dynamic panel data (BCLDPD) estimator of Breitung et al. (2022). Monte Carlo simulations show that the bias-corrected method of moment estimator outperforms the General Method of Moments (GMM) estimator in terms of efficiency and correctly sized tests. The results exhibited in Table 6 confirm the persistence across time of ETR1, the main findings maintaining their sign and significance.

All in all, irrespective of the bank size and the corresponding tax deduction rules for loans provisions, both LLPs and NCOs have a negative effect on the bank-specific ETR1. However, the negative effect of LLPs is greater than that of NCOs, which provides empirical evidence that the more restricting deduction rules for larger banks trigger a lower reduction in ETR1 compared to smaller banks. Furthermore, the positive relationship between the bank size and ETR1 holds regardless of the estimator, for both large and small banks.

Table 6. Robustness Checks: BIAS-Corrected Linear Dynamic Panel Data Estimation

	Full Sample	**Large Banks**	**Small Banks**	**Full Sample**	**Large Banks**	**Small Banks**
Dependent: ETR1	(1)	(2)	(3)	(4)	(5)	(6)
LLPs	-0.0368***	-0.0630***	-0.0264***			
(reserve method)	(0.0047)	(0.0125)	(0.0051)			
NCOs				-0.0183***	-0.0221*	-0.0201***
(charge-off method)				(0.0040)	(0.0113)	(0.0043)
Size	0.2889***	0.4159**	0.2781**	0.2283**	0.3922*	0.2169*
	(0.1015)	(0.2073)	(0.1287)	(0.1015)	(0.2076)	(0.1274)
Gross Loans	0.0007	-0.0032	-0.0002	-0.0027	-0.0097	-0.0023
	(0.0024)	(0.0074)	(0.0025)	(0.0024)	(0.0072)	(0.0025)
Total Earning Assets	0.0129**	0.0066	0.0139*	0.0129**	0.0088	0.0123*
	(0.0059)	(0.0108)	(0.0072)	(0.0059)	(0.0107)	(0.0072)
Common Equity	-0.1014***	-0.1560***	-0.0868***	-0.1007***	-0.1522***	-0.0875***
	(0.0141)	(0.0334)	(0.0154)	(0.0140)	(0.0329)	(0.0152)
Fixed Assets	-0.0827**	-0.3237***	-0.0421	-0.0764**	-0.3017***	-0.0403
	(0.0334)	(0.0874)	(0.0376)	(0.0333)	(0.0868)	(0.0374)
ROA	2.6840***	3.4629***	2.4817***	2.7594***	3.6352***	2.5082***
	(0.0704)	(0.1486)	(0.0802)	(0.0697)	(0.1460)	(0.0794)
ETR1 (t-1)	0.3925***	0.3567***	0.3951***	0.3918***	0.3557***	0.3944***
	(0.0096)	(0.0197)	(0.0116)	(0.0096)	(0.0196)	(0.0116)
Constant	-3.3507**	-3.2268	-3.5535**	-2.5998*	-3.2203	-2.6242
	(1.4379)	(3.1450)	(1.7529)	(1.4402)	(3.1493)	(1.7367)
Bank-year observations	43590	9939	32876	43590	9939	32876
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table displays the results of the base model described in Equation (1) and Equation (2) controlling for the endogeneity of main independent variables, using bias-corrected linear dynamic panel data (BCLDPD) estimator of Breitung et al. (2022). Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

Finally, we use different versions of bank-specific ETR as dependent variables, i.e., ETR2 (Table 7) and ETR3 (Table 8). ETR2 is computed as total tax expense over pre-tax book income before any loan loss provisions, whereas ETR3 is computed by scaling total tax expense by pre-tax book income.

The effect of the size remains positive and statistically significant for the full sample as well as for small and large banks. This means that within the banking industry, the political cost theory (positive relationship between firm size and firm-specific ETR) documented in previous ETR literature for non-financial companies, holds for both small and large banks, regardless of the estimators or ETR versions. Both LLPs and NCOs show negative coefficients, with larger negative effects for LLPs than for NCOs in the case of ETR2, in line with our H2 hypothesis.

Table 7. Robustness Checks: Alternative Dependent Variable (ETR2)

	Full Sample	**Large Banks**	**Small Banks**	**Full Sample**	**Large Banks**	**Small Banks**
Dependent: ETR2	(1)	(2)	(3)	(4)	(5)	(6)
LLPs	-0.4369***	-0.5964***	-0.3802***			
(reserve method)	(0.0155)	(0.0337)	(0.0177)			
NCOs						
(charge-off method)				-0.2674***	-0.3944***	-0.2348***
				(0.0134)	(0.0329)	(0.0148)
Size	1.8254***	0.6314	2.1329***	1.2149***	0.4853	1.3142***
	(0.3255)	(0.6359)	(0.4651)	(0.3247)	(0.6405)	(0.4626)
Gross Loans	0.0328***	0.0207	0.0285***	-0.0058	-0.0304	-0.0041
	(0.0090)	(0.0219)	(0.0100)	(0.0088)	(0.0212)	(0.0098)
Total Earning Assets	0.0663***	0.0428	0.0828***	0.0602***	0.0534	0.0668***
	(0.0201)	(0.0344)	(0.0252)	(0.0201)	(0.0345)	(0.0251)
Common Equity	-0.2315***	-0.3285***	-0.1958***	-0.2227***	-0.2739***	-0.2039***
	(0.0514)	(0.1050)	(0.0599)	(0.0504)	(0.1012)	(0.0589)
Fixed Assets	-0.1251	-0.7838**	-0.0122	-0.0458	-0.5661*	0.0388
	(0.1295)	(0.3253)	(0.1450)	(0.1287)	(0.3145)	(0.1445)
ROA	5.9949***	6.0949***	5.8874***	6.7599***	7.1601***	6.5345***
	(0.1856)	(0.3624)	(0.2192)	(0.1854)	(0.3618)	(0.2206)
Constant	-18.4925***	5.6246	-24.6169***	-10.4216**	6.1577	-13.3009**
	(4.5808)	(9.3032)	(6.1881)	(4.5481)	(9.4023)	(6.1306)
Bank-year observations	48211	11434	36777	48211	11434	36777
R-squared	0.2440	0.4015	0.2011	0.2269	0.3781	0.1882
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table displays the results of the base model described in Equation (1) and Equation (2). The dependent variable is ETR2, as defined in Table A1 in the Appendix. Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

We find a negative and statistically significant effect of both LLPs and NCOs on ETR3, which we did not necessarily expect since ETR3, having pre-tax book income as denominator, does a poor job in isolating the tax-induced effects of banks' loans provisioning policy only at the numerator, and thus making the aggregate effect elusive to predictions. Any increase in LLPs has a diminishing effect on the numerator, but also on the denominator by reducing book income and thus increasing ETR3. The only explanation we can see is that the tax-reducing effects in the numerator are greater than those in the denominator, so that an increase in loan provisions would ultimately have a negative effect on ETR3.

Table 8. Robustness Checks: Alternative Dependent Variable (ETR3)

	Full Sample	Large Banks	Small Banks	Full Sample	Large Banks	Small Banks
Dependent: ETR3	(1)	(2)	(3)	(4)	(5)	(6)
LLPs *(reserve method)*	-0.1053***	-0.0948***	-0.1026***			
	(0.0165)	(0.0349)	(0.0190)			
NCOs *(charge-off method)*				-0.0944***	-0.1126***	-0.0916***
				(0.0149)	(0.0360)	(0.0164)
Size	1.9267***	0.3725	2.3478***	1.7938***	0.3916	2.1493***
	(0.3888)	(0.7361)	(0.5378)	(0.3884)	(0.7331)	(0.5368)
Gross Loans	0.0422***	0.0207	0.0407***	0.0346***	0.0168	0.0335***
	(0.0099)	(0.0247)	(0.0109)	(0.0097)	(0.0241)	(0.0106)
Total Earning Assets	0.0801***	0.0595	0.1008***	0.0755***	0.0583	0.0930***
	(0.0230)	(0.0393)	(0.0285)	(0.0229)	(0.0390)	(0.0284)
Common Equity	-0.2612***	-0.2860**	-0.2307***	-0.2588***	-0.2724**	-0.2335***
	(0.0591)	(0.1207)	(0.0687)	(0.0588)	(0.1197)	(0.0684)
Fixed Assets	-0.0648	-0.6731*	0.0110	-0.0516	-0.6463*	0.0171
	(0.1464)	(0.3788)	(0.1610)	(0.1458)	(0.3760)	(0.1604)
ROA	6.3145***	6.2007***	6.2669***	6.3764***	6.1918***	6.3198***
	(0.2067)	(0.4237)	(0.2411)	(0.2032)	(0.4141)	(0.2386)
Constant	-21.0915***	7.7355	-29.0631***	-18.8220***	7.8021	-25.7545***
	(5.4543)	(10.7289)	(7.1978)	(5.4372)	(10.6985)	(7.1741)
Bank-year observations	48088	11400	36688	48088	11400	36688
R-squared	0.1698	0.2847	0.1446	0.1698	0.2853	0.1446
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table displays the results of the base model described in Equation (1) and Equation (2). The dependent variable is ETR3, as defined in Table A1 in the Appendix. Robust standard errors clustered at the bank level in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Source: Own elaboration.

5. Conclusions

This paper provides the first empirical evidence on the effects of bank size and subsequent size-dependent tax deduction rules for loan loss provisions on the bank-specific tax burden for a large sample of U.S. commercial and savings banks over the 2011–2020 period. Introducing new measures of bank-specific effective tax rates (ETRs) that are less sensitive to earnings and accruals manipulations, we find that size and bank-specific ETRs are strongly positively related. These results hold for the full sample as well as for small and large banks separately, regardless of the estimators or the ETR design. Moreover, the diminishing effect on ETR1 and ETR2 is higher for LLPs than for NCOs, suggesting that the reserve method provides more tax reduction effects in favor of banks that can use it (e.g., small banks).

We document a high sensitivity of all ETR versions to the tax treatment of LLPs. Irrespective of the ETR design and the size of the banks, having more LLPs/NCOs leads to a lower ETR, which means less money from the banking industry to the public finance. For large banks, the negative coefficients for LLPs are higher (in absolute and standardized terms) than those for NCOs, suggesting that if large banks had been allowed to deduct LLPs instead of NCOs (or, in other words, to use the reserve method instead of the charge-off method, as it is actually the case), their ETR would have been even lower. Larger banks, which must deduct loan loss provisions under the charge-off method, enjoy smaller tax reduction effect than small banks, which can deduct losses under the reserve method. This provides evidence that the current U.S. tax deduction rules for loan loss provisions under the charge-off method are indeed more restrictive.

To sum up, larger banks pay higher taxes relative to their size, while also benefiting less from loan loss tax deduction rules to reduce their tax burden. Therefore, the political cost theory also applies to the U.S. banking industry, in addition to the non-financial industry (Belz et al., 2019). This brings more equity into the U.S. tax system, but at the risk of exacerbating the procyclical lending policies induced by limited and delayed tax deductions of banks' loan losses (Beatty and Liao, 2011). Our results are specific to the U.S. scenario and therefore cannot be generalized. Nevertheless, lessons can still be drawn from our investigation, mainly regarding the implications of setting different tax deduction rules for bank loan loss provisions depending on the size of banks.

References

[1] Ahmed, A.S., Takeda, C., Thomas, S. (1999), *Bank loan loss provisions: A reexamination of capital management, earnings management, and signaling effects. Journal of Accounting and Economics,* 28(1), 1-25.

[2] Andries, K., Gallemore, J., Jacob, M. (2017), *The effect of corporate taxation on bank transparency: Evidence from loan loss provisions. Journal of Accounting and Economics,* 63, 307-328.

[3] Balla, E., Rose, M.J. (2015), *Loan loss provisions, accounting constraints, and bank ownership structure. Journal of Economics and Business,* 78, 92-117.

[4] Beatty, A., Liao, S. (2011), *Do delays in expected loss recognition affect banks' willingness to lend? Journal of Accounting and Economics,* 52, 1-20.

[5] Belz, T., Hagen, D.V., Steffens, C. (2019), *Taxes and firm size: Political cost or political power? Journal of Accounting Literature,* 42, 1-28.

[6] Berger, A.N., El Ghoul, S., Guedhami, O., Roman, R.A. (2017), *Internationalization and Bank Risk. Management Science,* 63, 2283-2301.

[7] Berger, A.N., Roman, R.A., Sedunov, J. (2020), *Did TARP reduce or increase systemic risk? Journal of Financial Intermediation*, 43, 100810.

[8] Bouvatier, V., Lepetit, L., Rehault, P.-N., Strobel, F. (2023), *Time-varying Z-score measures for bank insolvency risk*. *Journal of Empirical Finance*, 73, 170-179.

[9] Breitung, J., Kripfganz, S., Hayakawa, K. (2022), *Bias-corrected method of moments estimators for dynamic panel data models. Econometrics and Statistics*, 24, 116-132.

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

[11] Chen, S., Huang, Y., Li, N., Shevlin, T. (2019), *How does quasi-indexer ownership affect corporate tax planning? Journal of Accounting and Economics*, 67, 278-296.

[12] Chiaramonte, L., Liu, H., Poli, F., Zhou, M. (2016), *How Accurately Can Z-score Predict Bank Failure?. Financial Markets, Institutions & Instruments*, 25, 333-360.

[13] Collins, J.H., Shackelford, D.A., Wahlen, J.M. (1995), *Bank Differences in the Coordination of Regulatory Capital, Earnings, and Taxes. Journal of Accounting Research*, 33, 263.

[14] Driscoll, J.C., Kraay, A.C. (1998), *Consistent Covariance Matrix Estimation. The Review of Economics and Statistics*, 80, 549-560.

[15] Dyreng, S.D., Hanlon, M., Maydew, E.L., Thornock, J.R. (2017), *Changes in corporate effective tax rates. Journal of Financial Economics*, 124, 441-463.

[16] Fernandez-Rodrıguez, E., Martınez-Arias, A. (2011), *Determinants of Effective Tax Rate. Intertax*, 39, 381-395.

[17] Graham, J.R., Raedy, J.S., Shackelford, D.A. (2012), *Research in accounting for income taxes. Journal of Accounting and Economics*, 53, 412-434.

[18] Gawehn, V., Mueller, J. (2019), *Tax Avoidance—Are Banks Any Different? SSRN Electronic Journal*, https://doi.org/10.2139/ssrn.3418506.

[19] Gupta, S., Newberry, K. (1997), *Determinants of the variability in corporate effective tax rates. Journal of Accounting and Public Policy,* 16, 1-34.

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

[21] Janssen, B. (2005), *Corporate Effective Tax Rates in the Netherlands. De Economist* 153, 47-66.

[22] Laeven, L., Ratnovski, L., Tong, H. (2016), *Bank size, capital, and systemic risk. Journal of Banking and Finance*, 69, S25-S34.

[23] Lazăr, S., Andrieș, A.M. (2022), *Effective tax rates for bank entities across European Union. Economic Research-Ekonomska Istraživanja*, 35, 1581-1603.

[24] Ozili, P.K., Outa, E. (2017), *Bank loan loss provisions research: A review. Borsa Istanbul Review*, 17(3), 144-163.

[25] Plesko, G.A. (2003), *An evaluation of alternative measures of corporate tax rates. Journal of Accounting and Economics,* 35, 201-226.

[26] Richardson, G., Lanis, R. (2007), *Determinants of the variability in corporate effective tax rates. Journal of Accounting and Public Policy*, 26, 689-704.

[27] Stickney, C.P., McGee, V.E. (1982), *Effective corporate tax rates. Journal of Accounting and Public Policy*, 1, 125-152.

[28] Stock, J., Yogo, M. (2005), *Testing for Weak Instruments. In: Identification and Inference for Econometric Models. Cambridge University Press*, Cambridge, UK, 80-108.

[29] Wall, L.D., Koch, T.W. (2000), *Bank loan loss accounting: A review of theoretical and empirical evidence. Economic Review*, 2, 1-19.

[30] Zimmerman, J.L. (1983), *Taxes and firm size. Journal of Accounting and Economics*, 5, 119–149.

APPENDIX

Table A1. Description of Variables

Variable name	Definition	Source
Dependent variables		
ETR1 (%)	Bank-specific Effective Tax Rate computed as Total Tax Expense/Operating Income	Own calculation; Data from Orbis
ETR2 (%)	Bank-specific Effective Tax Rate computed as Total Tax Expense/ Pre-tax Book Income before any Loan Loss Provisions	Own calculation; Data from Orbis
ETR3 (%)	Bank-specific Effective Tax Rate computed as Total Tax Expense/Pre-tax Book Income	Own calculation; Data from Orbis
Independent variables		
LLPs (%)	Loan Loss Provisions/Operating Income	Own calculation; Data from Orbis
NCOs (%)	Net Charge-Offs/Operating Income	Own calculation; Data from Orbis
Size	Natural logarithm of Total Assets expressed in U.S. dollars	Own calculation; Data from Orbis
Gross Loans (%)	Gross Loans/Total Assets	Own calculation; Data from Orbis
Total Earning Assets (%)	Total Earning Assets/Total Assets	Own calculation; Data from Orbis
Common Equity (%)	Common Equity/Total Assets	Own calculation; Data from Orbis
Fixed Assets (%)	Fixed Assets/Total Assets	Own calculation; Data from Orbis
ROA (%)	Profit Before Tax/Total Assets	Own calculation; Data from Orbis

Source: Own elaboration.

Table A2. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ETR1	1.00										
(2) ETR2	0.89*	1.00									
(3) ETR3	0.88*	0.97*	1.00								
(4) LLPs	-0.05*	-0.14*	-0.01*	1.00							
(5) NCOs	-0.08*	-0.13*	-0.03*	0.71*	1.00						
(6) Size	0.33*	0.26*	0.28*	0.12*	0.04*	1.00					
(7) Gross Loans	0.14*	0.12*	0.16*	0.20*	0.09*	0.25*	1.00				
(8) Total Earning Assets	-0.01	-0.04*	-0.05*	-0.10*	-0.17*	-0.14*	0.07*	1.00			
(9) Common Equity	0.11*	0.11*	0.09*	-0.09*	-0.06*	-0.12*	-0.16*	-0.02*	1.00		
(10) Fixed Assets	-0.11*	-0.03*	-0.02*	0.04*	0.06*	0.04*	0.16*	-0.29*	-0.19*	1.00	
(11) ROA	0.36*	0.18*	0.15*	-0.19*	-0.23*	0.23*	0.12*	0.05*	0.16*	-0.13*	1.00

Note: This table presents correlation matrix of the variables used in the empirical analysis. A complete description of variables can be found in Table A1 in the Appendix. * denotes statistical significance at the maximum level of significance of 10%.

Source: Own elaboration.