Multiple facets of tax burden among brazilian banks based on Effective Tax Rate Variations

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Abstract

Objective: To examine the behavior of the effective tax burden on the profits of Brazilian banks, comparing Effective Tax Rate [ETR] proxies in the short and long terms. Tax aggressiveness is considered the ability to present/maintain ETR below the nominal rate, regardless of whether it complies with the legislation.
Method: Analyses were performed using an illustrative example and descriptive statistics of four variations of the ETR—Gaap, Adjusted Gaap, Current, and Adjusted Current—over one, five, and ten years.
Results: Tests with data from 2000 to 2022 show that the ETR ranges between 26% and 48%, on average, depending on the proxy and measurement period. The results suggest that banks adopt tax-planning strategies and can defer tax payments in the long term. Gaap measures proved suitable for analyzing tax aggressiveness, as the effects of temporal differences do not influence them.
Contributions: This study contributes to the literature on tax aggressiveness, especially in the banking sector, suggesting proxies adapted to the Brazilian context to capture the banks' ability to avoid taxes. It also supports recurring discussions, including in political terms, about the level of tax burden on the banking industry.
Keywords: Effective Tax Rate; Banks; Tax Burden; Tax aggressiveness.

1. Introduction

This study aimed to examine the behavior of the effective tax burden on the profits of Brazilian banks by comparing variations in the Effective Tax Rate [ETR] proxy – based on tax expenses arising from the accrual basis (accounting expenses) or cash (current expenses) in the short and long terms. The premise is that using different tax rate measures on profit allows a broader understanding of the phenomenon, mainly by recognizing the limitations of each proxy. Despite such limitations, using ETR is justified because it is considered one of the most frequently used metrics to measure the effective taxation of entities (Martinez, 2017; Schwab, Stomberg & Xia, 2022).

This study contributes to the literature on tax avoidance, which is defined as the use of transactions to reduce explicit tax liability – the value of taxes collected from tax authorities – without distinguishing between legal and illicit transactions (Dyreng, Hanlon & Maydew, 2008; Hanlon & Heitzman, 2010). This paper indicates that tax aggressiveness results from agency problems – shareholders, administration, and government – and is positively related to earnings management or diversion of resources. It is a topic of interest to researchers, regulators, and governments, considering that evidence indicates that the practice directly affects a country's tax revenue (De Simone, Nickerson, Seidman & Stomberg, 2020; Santos & Rezende, 2020; Silva Filho, Cavalcante, Bomfim & Leite Filho, 2018). The distinction between tax avoidance practices (lawful transactions) and tax evasion (illegal transactions) is not discussed here, which is why the term tax aggressiveness is applied in a broad sense, equivalent to the concept of tax avoidance, as set out in Dyreng, Hanlon, and Maydew (2008).

Most studies adopt estimates or proxies of the marginal tax rate to analyze this phenomenon (Shackelford & Shevlin, 2001). However, whether these proxies capture this phenomenon and whether they are helpful for organizations' decision-making process remain unclear because tax information is not publicly available and, in most cases, tax aggressiveness measures are obtained from data provided in financial statements (De Simone *et al.*, 2020; Hanlon, 2003; Hanlon & Heitzman, 2010; Shackelford & Shevlin, 2001). Moreover, even if such information were disclosed, it would be challenging to determine how much tax is being paid on the accounting profit or cash flow disclosed in the financial statements due to the differences between accounting and tax rules for estimating taxable profit (Hanlon, 2003). Another aspect is that tax regulations and applications are conducted at jurisdictional levels, hindering research reapplication and comparability in other economic contexts (Hanlon & Heitzman, 2010).

Thus, researchers adopt the ETR to measure tax aggressiveness despite the limitations of interpreting it among entities with losses and the need for specific studies on the causes that determine the gap between the ETR and the nominal tax rate (De Simone *et al.*, 2020; Henry & Sansing, 2018). Awareness of such limitations led to the development of alternative metrics that combine accrual and cash accounting regimes with short- and long-term horizons (De Simone *et al.*, 2020; Dyreng *et al.*, 2008). The main issue is that not all measures are appropriate for all research questions, and it is up to the researcher to justify the proxy used (Hanlon & Heitzman, 2010). In this sense, financial institutions are suitable for assessing tax compensations as they belong to a regulated sector with more extensive mandatory disclosures than other entities, presenting relatively simple production functions (Shackelford & Shevlin, 2001).

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Compared to non-financial entities, the banking industry has characteristics that suggest topics for research, such as the degree of leverage, governance structure, portfolio and financial instrument risks, and regulation, among others (Santos & Rezende, 2020; Vrzina, 2018; Vržina, 2019). Due to these specificities, the financial sector is usually excluded from the samples of studies addressing taxation (Santos & Rezende, 2020). Hence, studies are needed to focus on the banking industry, considering its relevance to the economy (Goodspeed, 2017) and jurisdictions' level of revenue.

In a literature review on tax aggressiveness in banks, Gawehn (2019) indicates two research axes: the role of banks as a channel for clients' tax planning (Gallemore, Gipper & Maydew, 2019) and the involvement of banks in transferring profits (Langenmayr & Reiter, 2017). Santos and Rezende (2020) analyzed the determinants of tax aggressiveness in financial institutions using the Book Tax Difference [BTD] and ETR Cash proxies in Brazil. In general, research has analyzed profit transfer behavior, the means to achieve the highest level of tax savings, or determinants of tax aggressiveness among financial institutions. This study, however, is interested in comparing proxies used in the literature to evaluate the effective tax burden of the Brazilian banking industry and the consequent degree of tax aggressiveness.

Houlder, Paker, and Mishkin (2010) consider that high levels of tax aggressiveness lead to the impression that entities are not paying taxes as they should, leading to questions about the actual role of these entities in society. Pêgas (2021) states that decreased effective taxation on the profits of large business groups, especially banks, is among the problems affecting the Brazilian taxation system. Using Current ETR – current income tax expense – the previous author found an effective rate corresponding to 14.3% of profit between 2010 and 2019, which would be much lower than the nominal rate, which was between 40% and 45% in the period. The Brazilian Federation of Banks [Febraban] (2021) challenges the methodology adopted by Pêgas (2021), stating that it leads to erroneous conclusions about the tax burden of banks.

By recognizing that specific metrics might lead to interpretation biases, this study contributes to the debate, as it seeks to obtain empirical evidence that clarifies Brazilian banks' taxation levels. Furthermore, fiscal policy and improving the regulation and monitoring of markets and financial institutions are among the objectives of the United Nations (UN) 2030 Agenda for the sustainable development of Brazil.

Therefore, the behaviors of four proxies for ETR – Gaap, Adjusted Gaap, Current, and Adjusted Current – were analyzed in the short (one year) and long (five and ten years) terms, from 2000 to 2022, to perform empirical tests. The test results show that the median ETR ranges between 26% and 48% among institutions that report profit, depending on the proxy and measurement period. The dispersion of these metrics reveals how the method used to measure tax practices can be critical to the conclusions and even lead studies to biased interpretations. In any case, the empirical analysis suggests that Brazilian banks use tax-planning strategies that reduce the effective tax burden and can defer the payment of taxes in the long term (five and ten years).

This article contributes to the advancement of literature on taxation in the banking industry, especially regarding the adoption of aggressive tax practices – understood as the adoption of strategies that allow decreasing profits taxation. It fills a significant gap by exploring different proxies that assess the effective tax rate, including short- and long-term perspectives, acknowledging the risk of bias in interpreting results if the method adopted does not consider the nuances of different metrics. It suggests the use of proxies adapted to the Brazilian context, which allows checking the sensitivity of the measures on the ability of banks to avoid income taxes for a given period. Furthermore, it responds to Hanlon and Heitzman's (2010) call to deepen the understanding of banks' tax aggressiveness. Empirical evidence allows investors, clients, and regulators to assess the degree of tax aggressiveness of banks and helps researchers develop hypotheses involving research questions relating to the taxation of financial institutions. This study also supports the debate between Pêgas (2021) and Febraban (2021) by recognizing that different metrics may lead to different conclusions, justifying the need to contextualize the findings regarding the tax burden on the banking industry; each metric reveals specific "truths" about taxation.

2. Literature Review

The combination of political, economic, and technological factors increased the population's awareness of tax activities and the interest of researchers in topics such as corporate tax planning (Wilde & Wilson, 2018). An entity that decreases tax obligations through tax planning does not necessarily have illegal behavior, as the legislation allows entities to plan their tax payments (Dyreng *et al.*, 2008). Therefore, decreasing tax costs may be part of an entity's long-term strategy, constituting a source of internal financing (Martinez, 2017). Moreover, it is essential to note that adopting aggressive tax planning measures may increase political or reputational costs related to agents, which is why entities are expected to evaluate their strategies considering the effects of tax aggressiveness (Shin & Woo, 2017).

In a literature review, Shackelford and Shevlin (2001) requested more analyses on the determinants of tax aggressiveness, while Wilde and Wilson (2018) found an increase in research addressing ways to measure it. One such measure is the ETR, calculated as the ratio of an estimate of tax liability to a measure of pretax profit. This proxy captures the average tax rate on profit (Hanlon & Heitzman, 2010). Due to limitations to the calculation of taxable profit estimates and the identification of taxes paid or payable on current profit, some variations of ETR are found in the literature. For example, Hanlon and Heitzman (2010) discussed the measures most frequently used in academic research and variations of the ETR, especially Gaap, Current, and Adjusted Cash.

ETR Gaap is calculated by the ratio of total tax expense to profit before taxes (PBT), based on the financial statements. Total tax expense is the sum of current amounts (taxes that will be paid or reimbursed/compensated in the tax period) and deferred amounts (amounts that will be paid or reimbursed/compensated in the future). Thus, tax deferral strategies will not change the value of this proxy (Hanlon & Heitzman, 2010). Current ETR, on the other hand, is affected by tax deferral strategies that do not represent temporary differences; this measure represents the tax rate concerning accounting profit and current taxes (Hanlon & Heitzman, 2010). Hanlon (2003) explains that although users of financial statements often adopt current tax expense to estimate taxable income, it is the additional disclosures in the explanatory notes that can provide information about why taxable income is different from accounting income, which serves as the basis for Adjusted ETR measurements.

Long-term ETR produces a tax rate that more closely tracks long-term tax costs. This does not involve calculating the average of a series of effective tax rates from a single year—the average would tend to overestimate the effects of years with unusually large or small (even negative) effective tax rates. The measure's main benefits are the long-term nature of the calculation, which avoids volatility in annual ETR rates, and the incorporation of permanent and temporary tax savings (Dyreng *et al.*, 2008).

In analyzing changes in ETRs between 1988 and 2012, Dyreng, Hanlon, Maydew, and Thornock (2017) found that the effective rates of entities have been significantly reduced and that potential explanations for this effect are the entities' characteristics and a decline in legal rates in some countries. Due to the changing nature of ETR over time, the previous authors suggest that researchers examine whether results are period-specific or relatively constant in the analyzed series to interpret them appropriately. This type of questioning reinforces the convenience of using long-term metrics to analyze the behavior of tax rates, as we did in this study.

Contrary to Dyreng *et al.* (2017), Drake, Hamilton, and Lusch (2020) suggest that the downward trend in ETRs is related to the treatment the variable undergoes in academic research, in which periods with losses are excluded. This counterpoint indicates that the periods in which entities report losses influence the inferences of tax aggressiveness proxies (Drake *et al.*, 2020).

Although the literature shows that more studies have been conducted on this topic (Hanlon & Heitzman, 2010; Shackelford & Shevlin, 2001; Wilde & Wilson, 2018), there is little empirical evidence on tax aggressiveness among financial institutions (Gawehn, 2019; Gawehn & Mueller, 2019; Hanlon & Heitzman, 2010). Even though banks play a crucial role in the economy, several studies exclude financial institutions from the sample (Armstrong, Blouin, Jagolinzer & Larker, 2015; De Simone *et al.*, 2020; Richardson, Taylor & Lanis, 2013; Shuping, Xia, Quiang & Terry, 2007; Taylor, Richardson & Lanis, 2015), which restricts knowledge about how tax rates behave in this economic segment.

These studies provide two reasons for excluding banks from their samples: (i) distinct business models, which result in accounting differences, and (ii) the financial sector's specific regulations, which lead to differences in how tax aggressiveness behaves (Gawehn & Mueller, 2019). Different business models might be a problem for researchers, as banks do not disclose some control variables. For this reason, Gawehn and Mueller (2019) suggest replacing these variables with proxies that reflect the effect one wishes to control. When such exclusion is associated with regulatory differences, supervision, and regulatory requirements are assumed to cause differences in tax-aggressive behavior between banks and non-banks (Gawehn, 2019; Gawehn & Mueller, 2019; Santos & Rezende, 2020). This second argument reinforces the interest in studies focused exclusively on the banking industry, as is the case of this study.

In theoretical terms, the effect of regulation can be analyzed from two perspectives. When a bank's fiscal strategy results in additional tax payments, it might weaken the reserves protecting capital ratios. Due to regulatory aspects, banks may be less inclined to engage in aggressive tax practices than non-financial entities (Gawehn & Mueller, 2019).

On the other hand, within regulatory limits, banks are interested in increasing after-tax cash flows to report profits to stakeholders, which is why they have a few more tax strategies than non-bank entities. For example, Langenmayr and Reiter (2017) show that banks can shift profits to countries with lower taxes, even when conducting trade in a country with high taxes.

Ricotti, Burroni, Cuciniello, Padovani, Pisano, and Zotteri (2016) found significantly different ETRs in banks from five developed European Union countries despite all being members of the Eurozone and participating in the Single Supervisory Mechanism. When analyzing the exclusion of banks in research on tax aggressiveness, Gawehn and Mueller (2019) compared the behavior of entities classified as banks and non-banks in the USA between 2004 and 2006, using the ETR Gaap and Cash proxies. They found differences between entities, suggesting that the association between banks and ETR is not constant throughout the data distribution.

Santos & Rezende (2020) analyzed the determinants of tax aggressiveness in financial institutions, including Brazilian and American entities, in the sample. They found an ETR Cash average of 18% between 2008 and 2017 for the Brazilian sample, which the authors considered the first evidence of the aggressive tax practice of these institutions in the country. Furthermore, Dyreng *et al.* (2008), who implemented the concept of long-term ETR, found considerable differences between sectors and long-term ETRs, revealing that banks are among the sectors with the lowest long-term ETRs.

In short, regulatory aspects and differences between the proxies measuring the effective burden of taxes on profit suggest a difference in the short- and long-term ETR. This discussion motivated the decision of using ETR proxies in this study to analyze the level of tax aggressiveness of Brazilian banks and identify the margin by which these entities can reduce the tax burden.

3. Methodological Procedures

3.1 Study design

This article is structured in two stages: (i) an illustrative example using Brazilian tax standards facilitates a discussion of the differences between ETR metrics, and (ii) the behavior of these metrics among Brazilian banks is calculated and analyzed considering the 2000-2022 period.

The first stage discusses the dynamics of measuring each ETR variant – Gaap, Adjusted Gaap, Current, and Adjusted Current. As the Secretariat of the Federal Revenue does not disclose taxpayers' data, the literature uses proxies to study tax aggressiveness, estimating taxable profit and tax obligations based on financial statements. Understanding the differences between metrics reduces the error of biased conclusions about tax aggressiveness.

In the second stage, the sample was subjected to three treatments following De Simone *et al.* (2020): (i) including all observations, (ii) omitting observations concerning losses, and (iii) using winsorization [0,1], assuming 0 for negative observations and 1 for outliers with tax rates greater than 1.

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3.2 Definition of Proxies and ETR

Considering the limitations and differences of the proxies previously discussed, this study analyzes four different forms for ETR – Gaap, Adjusted Gaap, Current, and Adjusted Current – with each proxy calculated and analyzed in three periods – one, five, and ten years – according to equations (3.1) to (3.4).

$$ETRgaap_n = \frac{DspIRCSLL_n}{PBT_n} \tag{3.1}$$

$$ETRgaapAdj_n = \frac{DspIRCSLL_n}{PBT_n - IEsp_n} \tag{3.2}$$

$$ETRcorr_n = \frac{DspCorIRCSLL_n}{LPBT_n} \tag{3.3}$$

$$ETRcorrAdj_n = \frac{DspCorIRCSLL_n}{PBT_n - IEsp_n} \tag{3.4}$$

Where:

$ETRgaap_n$: Effective tax rate, period n, considering the application of accounting standards – accrual basis;

$ETRgaapAj_n$: Effective tax rate, period n, considering the application of accounting standards – accrual basis – but excluding special items;

$ETRcorr_n$: Effective tax rate, period n, exclusively considering current income tax expenses;

$ETRcorrAj_n$: Effective tax rate, period n, exclusively considering current tax expenses on profit, but excluding special items;

$DspIRCSLL_n$: Total accounting expenses for taxes on profit, period n;

$DspCorIRCSLL_n$: Current expenses with taxes on profit, period n;

PBT_n: Profit before taxes, period n;

$IEsp_n$: Special items, representing permanent tax differences – the result of equity interests and interest on equity [JCP] – period n;

n: Number of exercises in the period, assuming, alternately, 1, 5, and 10 moving years.

According to Dyreng *et al.* (2008), special items representing permanent differences are excluded from the denominator because they can be large and introduce volatility to the one-year ETR measure compared to long-term ETR measures. Thus, using measures with and without this adjustment works as a sensitivity analysis to verify the level of taxation on the profits of Brazilian banks.

Regarding the terms of the ETR metrics considered (n = 1, 5, and 10 moving years), both the numerators and denominators of formulas (3.1) to (3.4) are accumulated in the reference period n. Thus, for example, when calculating the 5-year *ETRgaapAj*, the variables relating to total accounting expenses with taxes on profit (*DspIRCSLL*), profit before taxes (*PBT*), and special items representing permanent tax differences (*IEsp*), according to formula (3.2), are measured by the values accumulated over the last five years. The same reasoning is applied to the other ETR measures and deadlines.

3.3 Sample and Data Treatment

The initial sample includes 246 banking financial conglomerates operating in Brazil between 2000 and 2022. The annual accounting information in the FI report on the Banco Central do Brasil (BCB) website and financial statements were considered to calculate the variables. Although taxation takes place within individual entities, using consolidated data enables capturing intra-group tax strategies – through transactions that may eventually occur between conglomerate subsidiaries.

Due to the different periods used to calculate the ETR proxies, the number of institutions that meet the data availability criteria varies. Hence, to ensure comparability, only entities with information available for the entire time window—2000 to 2022—were considered in the discussion of the results. The final sample comprises 110 banks, as summarized in Table 1.

Table 1:
Sample characterization according to *proxy* and treatment

Sample/Observations	ETR *Gaap*			ETR *Gaap* Aj			ETR *Corr*			ETR *Corr* Aj		
	Years			Years			Years			Years		
	1	5	10	1	5	10	1	5	10	1	5	10
Number of banks		110			110			110			110	
(i) All observations	2.233	1.920	1.440	2.146	1.863	1.389	2.115	1.739	1.208	2.105	1.739	1.208
(ii) PBT or PBT Adj >0	2.063	1.768	1.346	1.951	1.690	1.278	1.803	1.495	1.067	1.705	1.425	1.009
(iii) Winsorization [0,1]	2.063	1.768	1.346	1.951	1.690	1.278	1.803	1.495	1.067	1.705	1.425	1.009

The first procedure excludes observations concomitantly presenting negative values in the numerator (deferred credit values greater than current and deferred expenses) and denominator (negative PBT or Adjusted PBT) in the three treatments.

Then, the observations relating to items (ii) and (iii) were subjected to treatment to deal with non-intuitive information that is difficult to interpret - primarily associated with the registration of negative ETR, the predominant causes of which are accounting loss before taxes and the presence of deferred amounts (temporary difference) greater than the amount of tax due in the period.

Following De Simone *et al*. (2020), observations with PBT or Adjusted PBT ≤ 0 are excluded from item (ii). The reason is that the ETR obtained for cases with a negative denominator is considered counterintuitive (Dyreng *et al*., 2008), leading to distorted interpretations. In item (iii), another possibility is considered for negative ETR – different from negative PBT or Adjusted PBT – associated with the difference between accounting and tax standards, in which the entity may not pay taxes in the period, even in the presence of accounting profit. Furthermore, the observation may assume values greater than 1.0 – a situation that can be translated into tax expenses greater than the reference profit itself. These events are atypical, as the ETR is generally expected to assume values close to the legal rate. Thus, data in procedure (iii) were subjected to winsorization to treat outliers, according to the criteria proposed by De Simone *et al*. (2020) and Dyreng *et al*. (2008), which consists of assigning 0 (zero) when data are negative, and 1.0 for ETR above 1.0.

After processing data, the descriptive statistics, specifically central tendency measures, of the ETR were analyzed to identify the level of taxation on the profits of Brazilian banks in the period, considering the combination of proxies and deadlines.

4. Analysis of Results

4.1 Illustrative Example of the Impact of Conceptual Differences and ETR Metrics

One of the explanations for the differences between taxable and accounting profits is the distinction between the objectives of financial and tax accounting (Hanlon, 2003; Hanlon & Heitzman, 2010). According to CPC 00 – R2/2019, financial statements aim to "provide financial information about the reporting entity that is useful to investors, existing and potential loan creditors, and other creditors in making decisions regarding the provision of resources." Regulation on the taxation of Income and Revenues of Any Kind aims to consolidate the legislation on the taxation, inspection, and collection of taxes (Decree No. 9,580, of November 22, 2018).

The differences occur due to adjustments made to the PBT to meet the tax legislation criteria. These differences may be temporary when there is a divergence between the accounting and tax perspectives of the period in which certain income/expenses must be recognized, or permanent, which are income/expenses recorded by accounting but not considered taxable or deductible for calculating taxes.

CPC 32 (2009, item 79) establishes that the main components of tax expenses must be disclosed separately, which is why entities disclose the current and deferred portion of income taxes. The sum of these two installments represents the total tax expense related to PBT, with the current portion being used to represent the tax liability for the current period – the value of current taxes would represent the actual tax liability in the absence of temporary and permanent differences – while the deferred portion represents the amount paid or to be compensated in future periods as a result of differences between the accounting and tax bases (Hanlon, 2003).

To exemplify the effects of these temporary and permanent differences on ETR metrics, consider the illustrative example of a fictitious bank, Exemplar Bank, which calculates accounting profit in three consecutive periods and, for simplicity, records only one type of temporary difference and another with a permanent difference. The premises are as follows:

- Profit before recognizing expenses with estimated losses on doubtful debts (PECLD) constant of $14,000 in the three years.
- PECLD represents the possibility of loss when receiving credits and due to its uncertain nature, it is generally not considered by tax legislation as an expense in the same period recognized by accounting. For the tax authorities, outstanding credits are deductible after meeting the requirements of arts. 9 and 10 of Law No. 9,430, from December 27, 1996. Therefore, the recognition of this accounting expense by Exemplar Bank represents a temporary addition at the time of calculating taxes. For this illustrative example, PECLD expenses recognized in accounting reach the deductibility conditions provided for in tax legislation in the following period. These are the only events characterized as generating temporary differences (TD).
- On the other hand, JCP payments, which are not recorded as expenses, are considered by the Tax Authorities as deductible and can be extracted from the calculation base (IN RFB No. 1,515, from November 24, 2014, art. 28, § 6), characterizing a permanent exclusion or difference [PD].
- Over the three years analyzed, the tax rate on profit, for estimating IT and CSLL, was 45%, which represents the nominal rate in force since March/2020.

Considering these illustrative premises, the calculation of the four ETR metrics, equations (3.1) to (3.4), are explained in Table 2, based on the statement of the accounting result for the period and the calculation of the tax base, including additions and exclusions of a temporary and permanent nature. Simulations are performed for each exercise and the consolidated interval of the three periods, representing the fundamentals of what would be the long-term ETR (in this case, with three exercises).

Table 2:
Illustrative example (Exemplar Bank) of the effects of temporary and permanent differences in the calculation of ETR metrics

	Period X1	Period X2	Period X3	Period X1/X3
Income Statement – Accounting				
Profit Before Provision for Losses	14,000	14.000	14.000	42.000
(-) Expenses with PECLD	(4,000)	(3.000)	(1.000)	(8.000)
= PBT	10,000	11.000	13.000	34.000
(-) Current IT and CSLL	(4,950)	(2.925)	(3.150)	(11.025)
(+) Deferred IT and CSLL	1,800	(450)	(900)	450
= Net Profit	6,850	7.625	8.950	23.425
Tax Calculation Base – Lalur				
PBT	10.000	11.000	13.000	34.000
(+) Additions:				
Non-deductible PECLD expenses (TD)	4.000	3.000	1.000	8.000
(-) Deductions:				
Deductible PECLD expenses (TD)	-	(4.000)	(3.000)	(7.000)
Interest on Equity (PD)	(3.000)	(3.500)	(4.000)	(10.500)
= Taxable Income	11.000	6.500	7.000	24.500
Tax rate on profit	45,0%	45,0%	45,0%	45,0%
Effective Tax Rate *Proxies*				
ETR Gaap	31,5%	30,7%	31,2%	31,1%
Adjusted ETR *Gaap*	45,0%	45,0%	45,0%	45,0%
Current ETR	49,5%	26,6%	24,2%	32,4%
Adjusted Current ETR	70,7%	39,0%	35,0%	46,9%

The following evidence can be established as a result of these simulations:

Tax strategies that do not result in permanent differences are not captured by the ETR Gaap and Current ETR measures. The difference between these and the respective adjusted measures represents the net effect of tax savings related to accounting profit.

1. Annual measures are naturally more volatile, as they immediately suffer the effects of temporary and permanent differences. The greater the relevance of these differences, the greater the impact on ETR measures.
2. Long-term measures, on the other hand, reveal more uniform and stable behavior than an entity's average level of taxation would represent.
3. Current ETR measures, including the Adjusted variable, are more subject to volatility than Gaap ETRs, as both temporary and permanent differences impact them. Gaap ETRs are only affected by permanent differences.
4. The Adjusted ETR Gaap metric represents the tax rate on profit exactly. It is important to note that this is only possible because all events representing a permanent difference were isolated in the illustrative example, which is not always possible in financial statements.
5. The ETR Gaap and Current ETR metrics are similar in the accumulated periods due to the reversal/compensation of temporary differences, reinforcing the need for a joint analysis of the measures in the long term.
6. Tax strategies that do not result in permanent differences are not captured by the ETR Gaap and Current ETR measures. The difference between these and the respective adjusted measures represents the net effect of tax savings related to accounting profit.

This simulation indicates that there is no "right" or "wrong" tool to measure the level of taxation on the profit of a given entity or industry. Each metric has its limitations and restrictions, especially considering the difficulties in estimating taxable profit, but they also provide insights into assessing the fiscal cost of an entity or industry. ETR Gaap indicates the total expenditure on taxes related to PBT, and the deviation from the nominal rate reveals how many permanent differences can produce tax gains (losses). The Adjusted ETR Gaap, in turn, reproduces the composition of the nominal tax rate on profit when the items that represent permanent differences are identified. In addition to considering the effects of permanent differences, the current ETR allows checking the volume/impact of deferred taxes. Finally, the Current Adjusted ETR assesses the degree of tax aggressiveness, excluding the effects of identified permanent differences.

Hence, the situations described in the illustrative example are restricted to one type of temporary difference and one type of permanent difference and do not exhaust the possibilities of events with impacts on the different ETR metrics. However, they are sufficient to conceptually show how temporary and permanent additions and exclusions are reflected in effective tax rate measures and how they can communicate different perceptions about the tax burden on banking entities.

4.2 Analysis of ETR Behavior in Brazilian Banks

4.2.1 Descriptive Statistics

The analysis initially focuses on the ETR Gaap and Adjusted ETR Gaap, which were calculated for one, five, and ten years. Table 3 presents the descriptive statistics for the three data treatments: (i) all observations, (ii) observations with PBT or Adjusted PBT > 0, and (iii) winsorization [0,1].

Table 3:

Descriptive Statistics – ETR *Gaap* and Adjusted ETR *Gaap* – 2000 to 2022

Treatment	All observations			PBT or PBT Adj >0			Winsorization [0,1]		
Proxy	*Gaap*								
(n)	1	5	10	1	5	10	1	5	10
Mean	0,01	0,19	0,14	0,05	0,29	0,23	0,27	0,26	0,23
Standard deviation	6,51	3,32	1,93	6,76	3,18	1,69	0,19	0,17	1,69
Minimum	-298,63	-53,56	-36,94	-298,63	-45,19	-36,94	0,00	0,00	-36,94
Maximum	41,90	121,27	29,64	41,90	121,27	29,64	1,00	1,00	29,64
1st = Quartile	0,08	0,10	0,11	0,14	0,16	0,15	0,14	0,16	0,15
Median	0,26	0,25	0,25	0,27	0,27	0,26	0,27	0,27	0,26
3rd Quartile	0,36	0,35	0,35	0,37	0,36	0,36	0,37	0,36	0,36
Proxy	Adjusted *Gaap*								
(n)	1	5	10	1	5	10	1	5	10
Mean	0,17	0,20	0,25	0,26	0,34	0,35	0,36	0,35	0,36
Standard deviation	2,93	2,08	1,49	2,91	1,36	1,18	0,21	0,18	0,19
Minimum	-110,19	-57,79	-27,30	-110,19	-36,38	-11,94	0,00	0,00	0,00
Maximum	41,90	24,12	29,64	41,90	24,12	29,64	1,00	1,00	1,00
1st = Quartile	0,19	0,23	0,25	0,28	0,29	0,29	0,28	0,29	0,29
Median	0,35	0,35	0,36	0,37	0,37	0,37	0,37	0,37	0,37
3rd Quartile	0,44	0,41	0,41	0,44	0,42	0,42	0,44	0,42	0,42

The statistics describing the observations' mean show a relevant difference between the treatments adopted. The ETR Gaap – 1 year, presents a mean of approximately 1% in the treatment with all observations. The mean was 5% in treatment 2, considering only observations with positive profit reporting, and reached 27% with winsorized data. These initial results indicate an effect similar to the findings of Drake *et al.* (2020), in which observations in periods where entities reported losses influence the inferences of tax aggressiveness proxies.

When considering the medians as references, proxies and periods present approximate values in all the treatments: ETR Gaap ranges between 25% and 27%, and ETR GaapAj from 35% to 37%. Considering the particularities of the proxies, treatments, and periods, these results suggest that the Brazilian banks' degree of tax aggressiveness between 2000 and 2022 was approximately 18% (difference between nominal rate and ETR Gaap). Additionally, the results of shareholdings and equity interest represented tax savings close to 10% related to the total expense of taxes on profit related to PBT or adjusted PBT in periods of 1, 5, and 10 years.

The difference between the adopted nominal rate of 45% and ETR Gaap reflects the impact of permanent differences between accounting and taxable profits. In this study, it is considered a metric of tax aggressiveness. In the case of Adjusted ETR Gaap, the idea is to measure the effective tax rate on profit, already excluding items that are not part of the tax base. Ultimately, the Adjusted Gaap ETR would be the nominal rate exactly, as highlighted in the illustrative example in section 4.1, if all permanent differences were identified. Thus, the difference between the nominal rate and Adjusted Gaap ETR indicates the representativeness of other income items treated as permanent differences.

Based on these results, assessing the system's standard behavior related to the level of taxation is suggested by taking the median as a reference to prevent the effect of extreme values on the mean. The means, especially in items (i), (ii), and (iii), are close to the median precisely because of the treatment applied to the outliers. The minimum ETR Gaap (-298.63) in items (i) and (ii), an observation that refers to Banco Itaú in 2020, is an example of the effect of outliers. At the time, the entity recorded a substantial reduction in PBT compared to the previous year (from R$27.4 billion to R$53 million), mainly due to the reinforcement of provisions for credit risk losses associated with the COVID-19 pandemic. When combining this new level of profit, which is insufficient to absorb the effects of permanent differences, with the volume of provisions for expected losses generating temporary differences, there was an inversion of the sign of the Gaap ETR metric at a very significant level. Drake *et al.* (2020) use Borderline situations to highlight that researchers should pay attention when determining the method to measure ETR to avoid bias resulting from unintuitive extreme values.

Similar to the Gaap ETR and Adjusted Gaap, the descriptive statistics of the Current and Adjusted ETR were calculated considering the same combinations of treatment and deadlines, as shown in Table 4.

Table 4:

Descriptive statistics Descriptive statistics of the Current ETR and Adjusted Current ETR – 2000 to 2022

Treatment	All Observations			PBT or PBT Adj > 0			Winsorization [0,1]		
Proxy	*Current*								
(n)	1	5	10	1	5	10	1	5	10
Mean	0,29	0,38	0,34	0,43	0,52	0,56	0,34	0,36	0,40
Standard Deviation	1,62	2,89	2,48	1,40	3,05	2,26	0,25	0,20	0,20
Minimum	-36,91	-8,92	-23,28	-4,57	-0,09	0,01	0,00	0,00	0,01
Maximum	54,08	99,55	64,34	54,08	99,55	64,34	1,00	1,00	1,00
1st Quartile	0,06	0,16	0,22	0,16	0,24	0,26	0,16	0,24	0,26
Median	0,25	0,30	0,33	0,30	0,33	0,36	0,30	0,33	0,36
3rd Quartile	0,40	0,42	0,45	0,44	0,44	0,47	0,44	0,44	0,47
Proxy	*Adjusted Current*								
(n)	1	5	10	1	5	10	1	5	10
Mean	-0,78	0,40	0,44	0,63	0,69	0,78	0,43	0,49	0,53
Standard Deviation	38,55	2,24	2,47	1,68	1,97	2,13	0,28	0,23	0,21
Minimum	-1571,88	-34,47	-31,72	-8,88	-0,37	0,01	0,00	0,00	0,01
Maximum	43,83	50,09	50,29	43,83	50,09	50,29	1,00	1,00	1,00
1st Quartile	0,04	0,22	0,30	0,24	0,34	0,41	0,24	0,34	0,41
Median	0,33	0,40	0,44	0,39	0,44	0,48	0,39	0,44	0,48
3rd Quartile	0,51	0,54	0,57	0,57	0,58	0,61	0,57	0,58	0,61

Still, with the median as a reference, data reveal a standard interval between 25% and 36% of Current ETR in the period for the Brazilian banking industry, a percentage of current taxes on profit. It is noteworthy that, unlike ETR Gaap, when the measurement periods of 1, 5, and 10 years record relatively constant medians, higher values are found as the measurement period is extended in the case of Current ETR. It suggests that although tax expenses may be deferred in the short term, the institutions cannot avoid paying taxes on profits in subsequent periods, restricting tax aggressiveness practices. As expected, in the case of the Adjusted Current ETR, when the profit measure is adjusted for extraordinary items, taxation levels increase to an interval between 33% and 48%. The medians approach or exceed the nominal rate in longer-term measures.

4.2.2 Effect of Data Processing on the Analysis of ETR Proxies

To highlight the influence of data processing on the analysis of results, the timeline (2000-2022) for ETR Gaap in the three treatments adopted in this study is presented in Figure 1, also using the median as a reference.
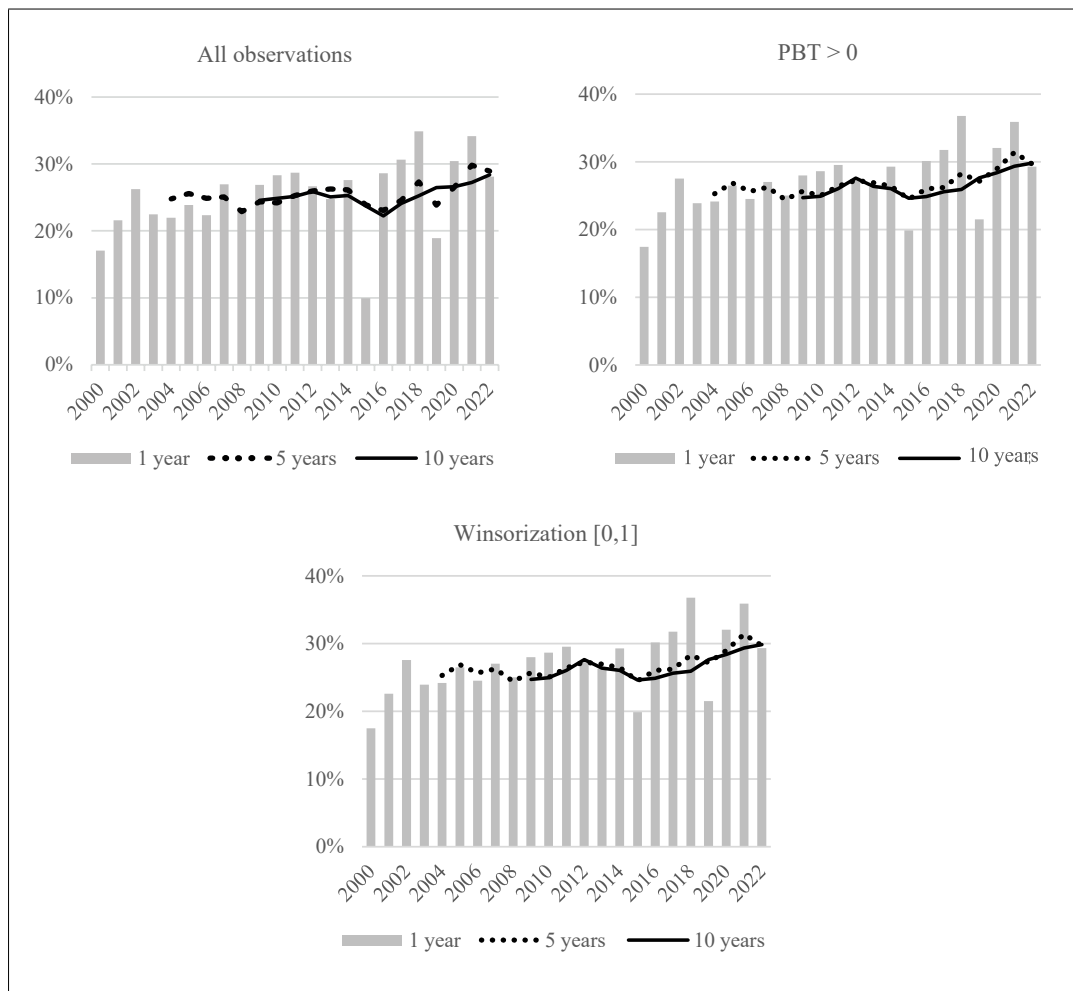

Figure1. Temporal analysis of the ETR Gaap median – 2000 to 2022

Dyreng *et al.* (2017) and Drake *et al.* (2020) warn about the consequences of excluding periods with losses to make inferences about tax aggressiveness. For example, in 2015, in the first treatment, the median for ETR Gaap (1 year) was 10.0%; in the second and third treatments, when observations with negative PBT and winsorization at [0.1] were excluded, the median was equal to 20.0%. This event occurred in September 2015, after a change in the nominal tax rate on profit (from 40% to 45%), causing a relevant correction in the stock of deferred tax assets, as highlighted in Guia and Dantas (2020), resulting in the recognition of gains that reversed the sign in the "expenses with taxes on profit" of most entities.

Dyreng *et al.* (2008) argue that such situations are one of the reasons for using long-term measures, as the metric reduces the impact of volatility presented by annual rates. When considering the 2015 example, the temporal analysis in Figure 1 reveals that the effect of data processing in the 5 and 10-year measurements is smoothed in the long term, compared to the annual measurement.

This set of evidence reinforces the multifaceted nature of ETR metrics, which increases researchers' concern about the bias or distortion that the choice of a proxy may produce in research results.

4.2.3 Comparison of ETR Proxies According to the Estimation Periods

If the descriptive statistics offer a general idea about the pattern of taxation on profits by Brazilian banks in the period, the comparison between the four ETR proxies in the same measurement period can provide information on the different perceptions of each of them in the Brazilian banking industry. This analysis is summarized in Figure 2, using the winsorized database [0,1] taking the median of the metrics as a reference, for the same reasons discussed previously.
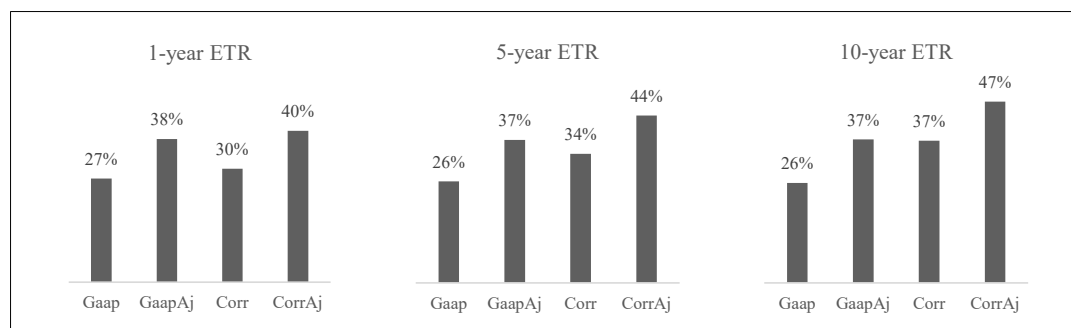

Figure 2. Comparison of the ETR proxies' medians, according to calculation periods

Evidence shows that the value of the ETR Gaap metrics is systematically lower than the ETRs Current for the same period, suggesting that tax aggressiveness seems more effective in the Gaap metrics than in the Current measures. In other words, tax aggressiveness would be influenced mainly by temporary differences. Another aspect to note is that the median of the Gaap metrics reduced 1 p.p. in the long term, while the medians of the Current ETR increased in the same period (five and ten years). The combination of these factors suggests that an entity's tax planning is more effective considering permanent differences and that payment postponements in the short term are compensated by higher payments in the long term. In the case of the impact of permanent differences – JCP and the result of equity interests –they represented a net saving of 11 p.p. in the Adjusted Gaap metric and 10 p.p. in the Adjusted Current.

This evidence indicates that the data processing method and the chosen proxy influence the ETR analysis, including the perspectives of the time horizon for measuring these proxies, which requires researchers to pay attention to select a study design appropriate to the research interest. The choice of the median and the comparison between the different metrics in this study was intended to ensure the identification of the level of taxes on profit in the Brazilian banking industry and contribute to elucidating the debate between Pêgas (2021) and Febraban (2021).

Pêgas (2021) concluded that taxes paid by the leading Brazilian banks from 2010 to 2019 represented 14.3% of the profit obtained in the period; this statement is based on the calculation of the Current ETR. Considering the same proxy, this study shows that half of the institutions have an effective tax rate of 30%. A potential explanation for this difference would be the treatment of data and the small sample adopted in that study.

Considering that the leading banks reported profits in the period, the sample used by Pêgas (2021) has characteristics similar to this study's treatment 2 – observations with PBT>0. The descriptive statistics for Current ETR, n=1, indicate in the 1st quartile an effective tax rate close to that found by the previous author, approximately 16%, suggesting that the leading Brazilian private banks belong to this quartile and use more aggressive tax strategies than their peers.

Febraban (2021) refutes the findings of Pêgas (2021), stating that the methodology is incorrect, arguing that although current ETR represents one of the facets of tax aggressiveness, it cannot be considered the "only" and " true" tax rate measure.

4.2.4 Level of Tax Aggressiveness Among Brazilian Banks from the ETR's Perspective

The last analysis set aimed to identify the degree of tax aggressiveness from the ETR's perspective using the distribution of observations according to quartiles as the criterion. Hence, data with PBT or Adjusted PBT>0 were used to avoid a counterintuitive interpretation resulting from the negative results and the fact that winsorization of data could influence the rates in the first and fourth quartiles.
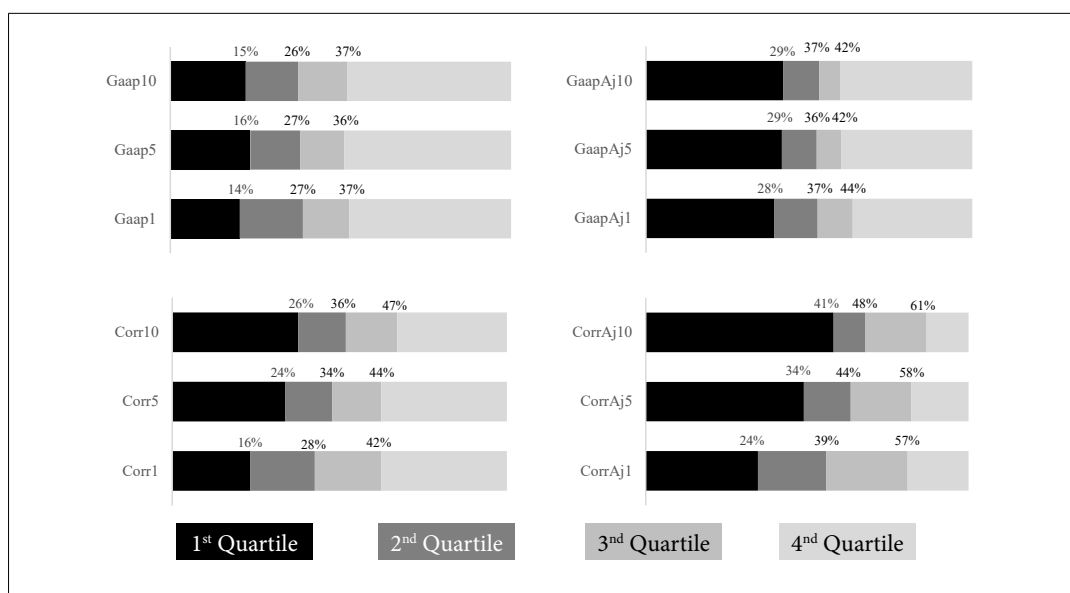

Figure 3. Distribution of ETRs of Brazilian banks according to quartiles – 2000 a 2020

Focusing specifically on the extreme points, data from the 1st quartile represent observations with greater evidence of tax aggressiveness, with ETR further away from the nominal tax rate. The transition point between the 1st and 2nd quartiles changes depending on the proxy and measurement period adopted, consistent with what was previously documented in Figure 2, resulting in a minimum of 14% in the 1-year Gaap ETR and a maximum of 41% in the case of the 10-year Adjusted Current ETR. In general, the signs of tax aggressiveness are more evident in the Gaap and Adjusted Gaap metrics, in which the differences related to the nominal rate (between 40% and 45% in the period) are more relevant. In the case of Current and Adjusted Current ETRs, they become naturally more volatile as they absorb the effects of temporary differences.

At the other extreme, in the 4th quartile, data show that 25% of observations reveal a tax rate on profit close to or even higher than the nominal rate. The transition point from the 3rd to the 4th quartile ranges from 36% of the 1- and 5-year Gaap ETR to 61% of the 10-year Current Adjusted ETR. Here, it is also worth highlighting that the effects of temporary differences influence the Current and Adjusted Current ETR statistics and naturally cause more pronounced fluctuations in the metrics, which may justify specific values above the tax rate.

At first glance, such evidence seems to confirm that the Gaap and Adjusted Gaap ETRs are more appropriate to conclude on entities' tax aggressiveness practices, as they are not influenced by the effects of these temporary differences. However, tax aggressiveness may also manifest through the postponement of tax payments. Thus, we may say that an entity's level of tax aggressiveness cannot be sustained solely from the perspective of a proxy or a period. Therefore, a joint analysis of metrics and deadlines should be encouraged to identify the degree of tax aggressiveness of Brazilian banks.

5. Conclusions

This study aimed to identify the effective tax burden on the profits of Brazilian banks from 2000 to 2022 in the short and long terms. The ETR analysis enabled us to verify that institutions managed to reduce the effective tax burden on profit, indicating the use of tax planning; however, the level of tax aggressiveness is determined by several factors: the proxy, period, and data processing adopted.

Based on the data treatment that excludes observations in which the PBT is negative, income tax and CSLL expenses represented approximately (27%) of the accounting profit in 1, 5, or 10 years for half of the institutions in the sample. This means these companies reduced their effective tax burden on profit by 19% on average compared to the nominal rate of close to 45%. Regarding current taxes, some institutions avoid payment in the first year, but due to offsets and reversals of deferred taxes, the postponement of payment of taxes in the long term does not occur progressively. A quarter of the sample manages to defer tax payment by 29% within a year, but for most companies (three quarters), tax payment is close to the nominal rate considered in this study, from 40% to 45%.

On the other hand, fiscal strategies' impact has increased in the long term. Considering the difference between the Current and Adjusted Current ETRs measures, in treatment 2, the JCP payment and the result of corporate participation reduced tax payments by 9%, 11.0%, and 12% in one, five, and ten years, respectively. This finding aligns with Pêgas' (2021) statement that legal permissions in Brazil effectively reduce the taxation of institutions.

Thus, this study concludes that no single measure can address the multiple aspects of the tax burden of Brazilian banks and that variations in ETR proxies complement the interpretation of the ability of Brazilian banks to avoid income taxes. Furthermore, we cannot state that the tax-planning scenario is exclusively an ex-ante process in which managers consciously consider ways to manage results or divert resources. The ETR analysis enabled identifying one of the facets of financial institutions' effective tax burden, but not affirming that tax aggressiveness is good or bad for shareholders, management, or the government. For example, even from the perspective of government revenue, a tax benefit that may initially appear to be a loss of tax revenue may encourage the reporting of certain operations, prevent potential cases of fraud, and thus maintain a standard level of revenue.

One of this study's limitations is that it adopted only income taxes from the perspective of the ETR and descriptive statistics to analyze the tax burden. For this reason, we cannot state that the results found here refer to the total tax burden of financial institutions. Moreover, all calculations were performed considering Brazilian tax rules, and there may be variations in the measurement of proxies (current and deferred) if other economic contexts are analyzed. This study contributes to the literature by proposing an adjustment in the ETR denominator representing a legitimate tax planning effect in the Brazilian context. Future studies are suggested to analyze other characteristics that may influence effective rates, such as the effect of consolidated and individual statements, the differences between privately held and publicly traded institutions, and the potential determinants and causes of banks' tax aggressiveness, such as the capacity of transferring profits to countries with lower taxation fees.

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