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# THE EFFICIENCY OF FISCAL MONITORING THROUGH SPED IN REDUCING THE VAT GAP

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## ABSTRACT

This article examines the relationship between the implementation of SPED by tax authorities and the reduction of the VAT gap. While some of the literature indicates a positive influence in this relationship (ALMUNIA et al., 2015; CASABURI et al., 2016; RACZKOWSKI, 2015), there is a suggestion that the implementation of such practices without complementary policies may not produce the desired effects (JOHNSON; MASCLET; MONTMARQUETTE, 2010). Given this divergence, this study aims to evaluate whether the supposed reduction of informational asymmetry aimed at with the implementation of SPED was effective in reducing the ICMS tax gap in Brazilian federative units between 2006 and 2019, using quantification models developed by the OECD with adaptations to Brazilian legislation. The results indicate that there was a reduction in the proportion of VAT collection in relation to the taxable base during the period, suggesting that the implementation of SPED was not effective in reducing the VAT gap without complementary policies.

**Keywords:** tax gap; SPED; fiscal monitoring; tax compliance.

**JEL Classification:** H26; H21; H29.

**SUMMARY**

## 1. INTRODUCTION

In recent decades, tax administrations have established special bodies and developed tools aimed at fiscal monitoring of taxpayers and increasing tax compliance, following the guidance of the IMF and the OECD (ALMUNIA et al., 2015 cited in BENON; BAER; TORO, 2002). To this end, they have benefited from the popularization of technology, which has brought about the multiplication of information flows, which has been exploited by tax administrations in their favor in the desire to reduce informational asymmetry with taxpayers. In Brazil, SPED was the digital tool implemented for information collection and fiscal monitoring of taxpayers.

With the use of digital tools that enable the development of taxpayer monitoring, the goal is to optimize revenue based on current tax legislation, so as to avoid the need for an increase in the tax burden (CASABURI et al., 2016; RACZKOWSKI, 2015). This intention is so relevant that it has been excessively cited in political speeches (ALM; SOLED, 2017). Evidence on declared taxable bases suggests that stricter fiscal monitoring creates a compliance effect in large companies, which is equivalent to increasing legal tax bases (ALMUNIA et al., 2015). Nevertheless, the revenue generated from increased collection alone is not sufficient; it is necessary for the State to function, and the most reliable way for this to happen is through an effective tax administration (BIRD, 2015).

The implementation of fiscal monitoring was conceived by tax administrations to address the tax gap, one of the main obstacles to optimal revenue. Considering the endemic nature of one of its components, tax evasion, there has been renewed international interest in the problem by policymakers such as the OECD (GEMMELL; HASSELDINE, 2012). However, the efficiency of monitoring is questioned by Johnson, Masclet, and Montmarquette (2010), who argue that increased monitoring only increases revenue when implemented together with complementary policies, and Almunia et al. (2015) indicate the need for its association with traceable information trails.

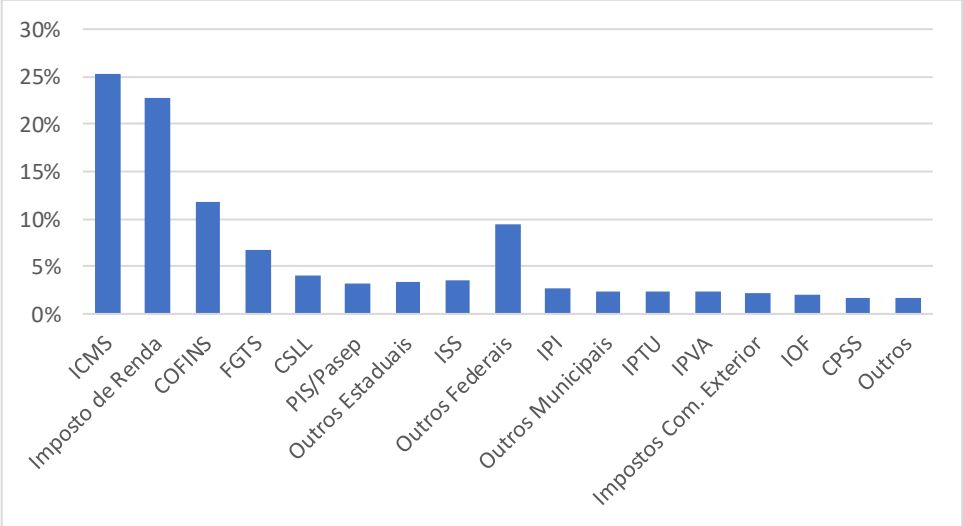
Thus, part of the literature converges on the assumption that the implementation of increased fiscal monitoring without complementary policies does not necessarily result in increased compliance, which is a necessary condition for increasing tax revenue and consequently reducing the tax gap. In this regard, considering the existence of SPED and the tax gap, the objective of this study is to assess whether the VAT gap is affected by the implementation of fiscal monitoring without complementary policies.

Tax gap and tax compliance, from which the need for monitoring arises, have an intrinsic relationship, leading researchers and policymakers to agree that satisfactory compliance depends on the monitoring policies implemented (TELLE, 2013). Examples of complementary policies include increasing penalties and the likelihood of inspection (ALLINGHAM; SANDMO, 1972), adopting policies for equity in the tax system (ERARD; FEINSTEIN, 1994), or policies that result in better citizen assessment of governance quality (CUMMINGS et al., 2009). These policies were not adopted or developed in conjunction with SPED, as observed in federal and state tax legislation. In light of this, the following hypothesis was developed:

***$H_1$:*** *The isolated implementation of fiscal monitoring does not reduce the VAT gap.*

The analysis of the VAT contributes to the literature dealing with the dominant taxation model in emerging economies. With this premise, the selection of value-added taxes analyzed considered the criterion of economic relevance, which led to the choice of ICMS, a state-level value-added tax, as it represents the largest tax revenue in Brazil, accounting for 25% of total revenue in the calendar year 2019, excluding social security revenues (BRASIL, 2022). Figure 1 shows the contribution of each tax to the total collection.

**Figure 1**- Representation of taxes in revenue collection in 2019




Source: Brazil (2022)

Figure 1 shows that the taxes classified as VAT, which include ICMS, PIS/PASEP, COFINS, and IPI, accounted for 44% of Brazil's tax revenue in 2019, excluding social security revenues. This highlights their economic relevance in the adopted revenue collection model.

The study employed the calculation model developed by the OECD for measuring the VAT gap, adapted for this research, serving as a tool to generate indicators on the outcomes of the enforcement process in question, namely SPED. This allows for a comparison with the expectations placed on SPED regarding the reduction of the tax gap. The OECD calculation model is the most relevant in studies on the VAT gap due to its representativeness, as demonstrated by studies conducted by Keen (2013) and Zídková (2014), as well as reports published by the CASE - Center for Social and Economic Research of the European Union (PONIATOWSKI et al., 2020).

The results of this study contribute to the literature addressing the effects of fiscal monitoring (ALMUNIA et al., 2015; JOHNSON; MASCLET; MONTMARQUETTE, 2010), particularly emphasizing its capacity to provide digital inputs to tax administrators for increasing compliance and revenue through the development of targeted fiscal policies (POMERANZ, 2015). In this regard, the study also contributes information on the effects of monitoring on tax evasion and the parallel economy of legal sectors, which are topics of interest in other social and human sciences such as psychology, public finance, and economics.

This study is grounded in agency theory, based on the informational asymmetry between the state and taxpayers. In the case of self-assessed taxes, the principal (state) delegates to the agent (taxpayer) the responsibility for determining and paying taxes to expedite revenue collection (POHLMANN, 2005). This relationship has been analyzed from various perspectives, as exemplified by the study of Beck and Jung (1989) on uncertainties in taxpayers' reporting decisions in conjunction with economic factors.

Lastly, the study presents new elements that contribute to the understanding of the tax gap, a permanent feature of the tax system, by considering that some taxpayers pay less tax than they should, and incentives for tax evasion tend to persist. Nonetheless, there are strong reasons to believe that the tax gap will be reduced, especially with the advancements in technology, such as traceability of transactions, fiscal monitoring, the ability to cross-reference with third parties, and the increasing concentration of economic activity in large companies (ALM; SOLED, 2017). Therefore, new perspectives emerge regarding the use of tax gap estimates to support fiscal policies.

# 2. LITERATURE REVIEW

## 2.1 Tax Compliance

All revenue-collecting entities share the common objective of ensuring a high level of compliance by using tax legislation as a tool to influence the behavior of taxpayers, assisting those who wish to comply with the law while also dissuading those who do not (OECD, 2010). Therefore, attention to tax compliance is as old as taxes themselves, and finding ways to reduce non-compliance and understanding the observed patterns are of evident importance to nations (ANDREONI; ERARD; FEINSTEN, 1998).

Non-compliance with tax obligations is associated, ceteris paribus, with a reduction in tax revenue, but it is not limited to that. It can also lead to a decrease in well-being, the curtailment of desirable publicly provided goods and services, an increased tax burden on compliant taxpayers, higher deficits and consequent financial environment deterioration, excessive allocation of resources to combat tax evasion and fiscal monitoring, an increase in the tax burden on the poor due to the ability of the rich to avoid taxation, which exacerbates vertical inequality and hinders the growth of small businesses and economic growth, among other consequences (DAMJANOVIC; ULPH, 2010).

Tax compliance is a complex issue with various implications, based on two main approaches that aim to stimulate compliance with the tax system: economic and behavioral. The economic approach relies on applying penalties to enforce compliance without imposing severities that could reduce taxpayers' willingness to comply due to perceiving the system as unfair. In the behavioral approach, taxpayers are encouraged to perceive tax payment as a means to a public benefit end. Striking a balance between these two approaches is crucial to encourage compliance, with the challenge of identifying the optimal equilibrium (JAMES; ALLEY, 2002).

The importance of compliance lies in the fact that information is key to developing appropriate fiscal policies and reducing the tax gap. However, access to information for tax administrations engaged in reducing the tax gap can incur costs equivalent to 10% of their budget. Furthermore, tax administrations must seek information through all possible means, such as the Scandinavian countries (Denmark, Norway, and Sweden), which require taxpayers to file their own declarations but also obtain information from third parties, including

employees, other companies, and the financial sector, which accounts for 95% of the information obtained, making illegal activities very difficult (RACZKOWSKI, 2015).

Governments have been striving for perfect monitoring of their taxpayers, which implies having timely access to all information regarding their transactions. Therefore, the analysis of the effects resulting from the implementation of monitoring should be done systematically. Introducing monitoring for a single revenue source without complementary policies is unlikely to increase revenue collection since there may be an increase in evasion for other less-monitored revenue sources. Less-monitored income streams exhibit higher levels of non-compliance (JOHNSON; MASCLET; MONTMARQUETTE, 2010), which questions the position of Allingham and Sandmo (1972), who suggested that increasing the probability of detection would lead to a reduction in tax evasion.

Moreover, the compliance rate of taxpayers who are informed about an audit increase, while compliance decreases for those who know they will not be audited. It is important to note that increased productivity of audits alone is not sufficiently effective if it is not associated with a higher probability of occurrence (ALM; MCKEE, 2006).

As a result, it is important to emphasize that tax penalties or fines arising from inspections have as their primary function the promotion of tax compliance. In other words, penalties set the limit of tax compliance, even though issues such as why taxpayers comply and how fines should be structured to promote compliance remain uncertain and controversial. As a complementary function, albeit often overlooked but fundamental, penalties must define tax compliance by determining the standards of conduct that the law imposes on taxpayers (DORAN, 2009).

Therefore, enforcement must be sufficiently strong: for a given level of sanction, taxpayers should expect a sufficiently high risk of detection. Threats of punishment directed at potential evaders have a considerable impact on compliance but reveal that moral and social appeals have no significant effects. This indicates that personalized treatment of threats reduces the transaction cost of recording debts and signals to evaders a higher risk of sanctions. Threats demonstrate the effect of monitoring and, together with transaction costs and a possible reminder effect, have an impact on compliance (FELLNER; SAUSGRUBER; TRAXLER, 2013).

In this aspect, although there is a common belief that inspections, the risk of detection, and the severity of penalties are the ways revenue authorities use to foster compliance, there is evidence indicating that deterrence activities actually encourage taxpayers to behave

compliantly in subsequent years, while others suggest that recurrent enforcement activities may be necessary for habitual non-compliers (OCDE, 2010).

In a monitored environment, inspections and self-reporting are central elements. Inspections, although there is evidence of reductions in infractions after their implementation, have proven insignificant in a Norwegian regulatory environment, considering that in a monitored environment there is an extensive policy of sending notices. In general, a shift towards relying on cheaper and softer monitoring and self-reporting-based applications can discourage compliance (TELLE, 2013).

Taxpayers who are aware that there is more incisive fiscal monitoring based on a certain revenue threshold artificially stay below that limit to avoid stricter inspections. This response is stronger in sectors that have paper traceability, suggesting as a result that fiscal monitoring and the traceability of declared information are complementary. However, this response is heterogeneous depending on the traceability of their information, with a higher response (greater compliance) where the trails were easier to verify through monitoring. Despite this, there is a conformity effect in companies that exceed the operational revenue threshold and, consequently, are subject to greater monitoring. These companies declare higher taxable bases, indicating that this policy is effective in reducing tax evasion (ALMUNIA et al., 2015).

In addition to monitoring, there is also an indication that cultural differences in tax compliance behavior may result from government tax management and citizens' assessment of governance quality. Tax compliance is a complex behavioral issue that requires the use of a variety of methods and data sources. One of the biggest challenges for policymakers in emerging economies is to encourage high levels of tax compliance. Reducing tax evasion requires an understanding of taxpayers' behavior in their decision-making process regarding tax compliance, not limited to increasing penalties and inspection frequency (CUMMINGS et al., 2009).

Among the factors that may affect the taxpayers' honest declaration decision is the perception of the fairness of the tax system, that is, whether the tax burden is equal for all regardless of their characteristics, and whether other taxpayers have greater ability to reduce their burden, legally or not, and as a second factor, taxpayers' reactions to the political and personal activities of the government, either on a broad level or in the relations between taxpayers and tax authorities, suggesting that taxpayers are more likely to report honestly if they feel they are treated with courtesy and respect (ERARD; FEINSTEIN, 1994).

## 2.2 VATs

Since the 1980s, the Value Added Tax (VAT) has been the most significant consumption tax in terms of revenue and geographical coverage. The tax was designed to be neutral in relation to the production process and favorable to growth, leading many developing countries to adopt it in the past two decades. Today, approximately 170 countries operate VAT systems, including all OECD countries except the United States. VAT has the capacity to generate about one-fifth of total tax revenues in OECD member countries and worldwide (OECD, 2020). Fifty years ago, VAT was rarely mentioned, but now it is widely adopted and has been a key element in tax reform in many developing countries, signaling tax modernization and facilitating tax administration and compliance as well. The expansion of VAT has been the most significant development in tax policy and administration in recent decades (KEEN; LOCKWOOD, 2010).

The proliferation of VAT began after World War II when France and its allies created a primitive VAT that, along with other revenues, was partially allocated to finance the European Economic Community, the precursor to the European Union, where a treaty required its members to convert their turnover taxes into a harmonized VAT. Subsequently, all newly admitted members were required to adopt this harmonized VAT. Additionally, the IMF also promoted VAT implementation by providing technical assistance to its member countries, especially developing countries and emerging economies in Eastern Europe, to convert their turnover taxes and other indirect taxes into VAT (SCHENK; OLDMAN, 2001).

Regarding the revenue gain associated with VAT implementation, there is a positive relationship with an increase in per capita GDP and a negative relationship with the share of agriculture in GDP. While the former does not have a clear relationship, the latter is due to the typical exemptions associated with the agricultural sector. However, records show that the revenue gain from adopting VAT is lower in less developed countries. Nonetheless, the taxes replaced by VAT were generally complex in their attempts to avoid the cascading effect, which is a natural characteristic of VATs. Thus, the adoption of a simple VAT is cheaper to collect than more complex ones and, in many cases, will still be simpler than the tax it replaced (EBRILL et al., 2001).

A good VAT has three main characteristics: it is levied on a consumption base, collected incrementally at each stage of the production chain, and distributed through invoice credits and taxed based on destination. In accordance with the traditional public finance norms used to

assess fiscal instruments, such instruments are better when they interfere less with market operations, i.e., they are neutral, and their efficiency outweighs the efficiency-equity trade-off of the designed tax (JAMES, 2015).

Pomeranz (2015) conducted studies on the effectiveness of VATs regarding their ease of implementation and the importance of information and paper trails of third-party relationships for taxation in Chile, a country where VAT accounts for a significant portion of its revenue. VATs leave a stronger paper trail, providing more information to tax authorities for tax collection than retail sales (which only tax at the end of the chain), and other tools that provide information on online sales, as implemented in Brazil, can have high returns. The study, considering that VAT is only effective for formal sector companies and high dependence on VAT may increase distortions between formal and informal sectors, suggests that formalizing the final stage of production can potentially contribute to formalizing entire production chains.

Bahl and Bird (2008) analyzed whether the fiscal policy of developed countries has changed in recent decades and if this potential change is reflected in the way the country is taxed. Citing Bahl (2006), the authors note that there is considerable variation among developing countries, but existing analysis of the determinants of this variation assumed that developing countries that increased taxes did so largely in response to an increase in per capita GDP. They found that an increase in reliance on indirect taxes does not seem to drive the increase in variation, and that emphasizing social service spending tends to dampen it, while spending more on economic services does not seem to matter. There is also some support for the argument that corruption and taxation are substitutes.

In analyzing the tax structure of countries, Bahl and Bird highlight the continuous increase in the share of VAT in emerging economies in the late 20th century and the stability of the importance of income taxes, contrasting with industrialized countries where there has been a significant increase in the share of income taxes and a decrease in the share of VAT. The authors note that empirical studies on the impact of increasing tax burdens in developing countries have not been conclusive, as well as the effect of the tax structure on economic growth.

On the other hand, Keen and Lockwood (2006) studied the classification of VAT as a "money machine" due to its ability to increase revenue and state financing. They used information from non-US OECD countries, examining VAT implementation from its inception in France in 1968 to Australia in 2000.

The results of the analysis indeed showed VAT as a "money machine," either by increasing the revenue of countries that implemented it compared to those that did not, while keeping everything else equal, or by compensating VAT revenue with a reduction in other taxes, suggesting that its implementation was driven by its effectiveness rather than financing government expansion.

However, VAT may reduce efficiency due to potential weaknesses, such as when the supply chain is interrupted by production inefficiencies, criminal attacks like the "carousel fraud" in the European Union, flaws in the refund system or excessive legal exemptions, and informality. Nevertheless, VAT adoption is associated with an increase in the revenue-to-GDP ratio by about 4.5% and tends to be higher in economies with higher revenue due to the ability to administer and enforce taxes and in open economies due to the relative ease of collecting it on imports. The impression left by VAT is that its adoption increases revenue and effectiveness in most countries that have implemented it (KEEN; LOCKWOOD, 2010).

Factors contributing to the strong performance of VAT revenues include a relatively high proportion of trade to GDP, ease of collection on imports, and evidence that VAT performance appears to improve over time. However, it is highlighted that the revenue gain from adopting VAT is less pronounced in less developed countries, and there is limited evidence on administrative costs and tax compliance in developing countries, although there are signs of revenue gain. Therefore, simple VAT models are cheaper to collect than complex ones and should be implemented in such cases, and they will still be simpler than the taxes they replace (EBRILL et al., 2001).

## 3. METODOLOGY

For estimation, monitoring, and, most importantly, to enable the comparison of the ICMS VAT gap among Brazilian states and its evolution over time, standardization of indicators was conducted using one of the calculation models available in the literature or used by tax agencies. Among these existing models for estimating the tax gap, only the methodology developed by the OECD proved to be adaptable to the information provided by Brazilian public administrations. The other existing methodologies require information that is not available at the state level, such as final consumption, making their application unfeasible.

The estimation model of the VAT Revenue Ratio (VRR), used by the OECD, was developed based on the "C-efficiency ratio" measurement concept of VAT tax gaps used by the

IMF. This concept is based on the relationship between the tax revenue collected on its taxable base multiplied by the standard tax rate and aggregate consumption, providing an indicator that combines revenue losses due to exemptions, rate reductions, fraud, tax evasion, and tax planning. The VRR allows for a comparative measure of the effective capacity of tax revenue potential by tax administrations, in order to analyze possibilities for increasing their revenues (OECD, 2016).

$$VRR = \frac{VR}{B \,.\, r} \qquad (1)$$

In equation (1), "VR" represents the VAT revenue collected, "B" refers to the tax base, and "r" is the standard tax rate applied. In the case of ICMS, the revenue collected from the tax is obtained from the "collection bulletin" published by CONFAZ (BRASIL, 2019), which provides monthly ICMS revenue data in current values by state starting from 1996.

Regarding the tax base of ICMS, the values were obtained from the publication by IBGE titled "Gross Value Added, Constant and Current, by Activity" (BRASIL, 2019b), with data available from 2006. Only activities subject to ICMS taxation were considered. The use of gross value added is based on the fact that ICMS taxation occurs only on the value added by the taxpayer at each stage of the supply chain since VATs allow for the offsetting of credits for the tax paid previously in the chain. Therefore, ICMS is levied on the difference between the selling price of the goods and the value at which the goods or inputs were acquired, which is known as value added.

However, ICMS does not apply solely to value added. When considering the tax base established by the relevant legislation, an adaptation needs to be made to the model used by the OECD regarding international trade operations. Article 155, §2, X, "a" of the Brazilian Federal Constitution (BRASIL, 2019) states that exports are immune from ICMS taxation, but imports are regularly included in its tax base. Such adaptation was also proposed by Paes (2009) in his analyses of the tax gap in Brazilian states.

$$VRR = \frac{VR}{(B + \text{imports} - \text{exports}) \,.\, r} \qquad (2)$$

The values of foreign trade are available on the website of the Ministry of Economy, in the publications on "Foreign Trade Operations" (BRASIL, 2021). As for the standard ICMS tax rates, they can be found in the ICMS regulations published by each state.

The interpretation of the results of this indicator should consider that the closer the VRR is to "1," the closer it will be to the pure VAT regime. However, it should also be noted that there are various situations that deviate the VRR indicators from this optimal result. Examples include the use of rates lower than the standard rate for certain products or services, transactions of small businesses that fall below the threshold for the application of the standard rate (such as in the case of Simples Nacional), exemptions, VAT treatment for public sector activities, taxation rules based on the location of the recipient, the tax administration's ability to efficiently manage the tax system, shortcomings of the tax administration in offsetting tax credits, changes in consumption patterns, and differences between measures of final consumption in national accounts and the potential tax base of VATs (OCDE, 2016).

The OECD further states that the level of VRR rarely depends on a single factor but on the interaction between multiple factors, which can be divided into two major categories:

a) Results derived from policy decisions, primarily those affecting the tax base or the standard rate, and

b) Those related to the efficiency of tax collection and levels of compliance.

To measure the impact of fiscal policies on VAT revenues, the OECD aimed to standardize the calculation through the so-called "Policy Efficiency Ratio" in order to facilitate comparisons among member countries.

$$Policy\ Efficiency\ Ratio = \frac{Theoretical\ revenue\ of\ VAT\ in\ current\ legislation}{(\text{Final consuption x Standard VAT rate})} \qquad (3)$$

For application in Brazil, as discussed, the formula used by the OECD requires adjustment since there is no available data for final consumption by state. In order to enable the comparison using the data provided by the federative units, it was necessary to use the values related to tax exemptions themselves.

$$Policy\ Efficiency\ Ratio = \frac{\text{State Tax Waiver}}{(\text{B} + \text{imports} - \text{exports})\,.\,\text{r}} \qquad (4)$$

The values related to tax exemptions are obtained through the annual publications of the Budget Guidelines Law (LDO) of each state, which legally present the estimate of tax

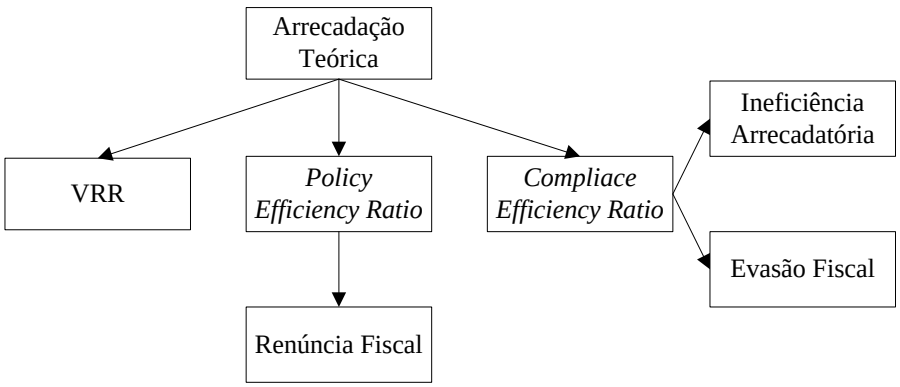
exemptions by type of tax for the following year and how this granted exemption will be compensated in the budget. This formula, although different from the one proposed by the OECD, ensures the necessary comparability for the analysis intended in this study. The calculation methodologies for tax exemptions are not presented by the states in their LDOs in a way that allows their analysis, regularity of calculation over time, or even their comparison.

Lastly, to measure the other major category that affects the level of VRR, it was necessary to estimate compliance. This measurement estimates values for state inefficiency in revenue collection and tax evasion, and it is not possible to segregate these. For this calculation, the OECD proposes the following formula:

$$Compliance\ Efficiency\ Rati = \frac{\text{VAT Revenue}}{Theoretical\ revenue\ of\ VAT\ in\ current\ legislation} \qquad (5)$$

To better illustrate the contribution of the Compliance Efficiency Ratio, it is necessary to present the composition of revenue collection. Considering that these are indicators and that theoretical revenue is the total sum of its constituent elements (VRR, Policy Efficiency Ratio, and Compliance Efficiency Ratio), this theoretical revenue, under regular conditions, should be represented by a total value index of "1". However, certain situations can generate extraordinary tax revenues that disrupt the regularity of this indicator, such as tax installment plans, pro-taxpayer judicial decisions, untimely tax payments, and other situations that result in tax collection outside their original scope.

**Figure 2** - Composition of Theoretical Revenue




Source: OCDE (2016)

In this way, the following formula is proposed:

$$Compliance\ Efficiency\ Ratio = 1 - (VRR\ /(1 - \ PG)) \quad (6)$$

Based on the models presented, it is possible to calculate comparable indicators, enabling the analysis of the potential influence of fiscal SPED on the VAT gap over the period.

## 4. RESULTS

### 4.1 VRR – VAT Revenue Ratio

The VRR, as mentioned, is an indicator of the proportion of the total collected value to the theoretical tax base of operations subject to taxation, multiplied by the standard tax rate. The analysis of this indicator over a time period has the ability to demonstrate whether the implementation of fiscal monitoring has influenced, ceteris paribus, the VAT revenue, specifically in the case of ICMS. Table 6, grouped into the periods from 2006 to 2008 (pre-SPED implementation), 2009 to 2011 (period of adjustment of digital reporting), and 2012 to 2019 (period of mature digital reporting submissions), shows the evolution of the ICMS VRR over time.

**Table 6** - ICMS VRR by State

| State/Region | 2006 a 2008 | Δ% | 2009 a 2011 | Δ% | 2012 a 2019 | Δ% Total |
|---|---|---|---|---|---|---|
| **NORTH** | **0,498** | **-7%** | **0,461** | **7%** | **0,494** | **-0,8%** |
| Acre | 0,461 | -10% | 0,415 | 15% | 0,477 | 3,5% |
| Amapá | 0,324 | 12% | 0,362 | 1% | 0,366 | 13,0% |
| Amazonas | 0,445 | -1% | 0,439 | 5% | 0,462 | 3,8% |
| Pará | 0,672 | -13% | 0,586 | 7% | 0,626 | -6,8% |
| Rondônia | 0,683 | -11% | 0,606 | -9% | 0,549 | -19,6% |
| Roraima | 0,397 | -2% | 0,388 | 7% | 0,416 | 4,8% |
| Tocantins | 0,506 | -15% | 0,432 | 14% | 0,493 | -2,6% |
| **NORTHEAST** | **0,499** | **-3%** | **0,484** | **0%** | **0,485** | **-2,8%** |
| Alagoas | 0,502 | 0% | 0,504 | -5% | 0,480 | -4,4% |
| Bahia | 0,612 | -14% | 0,524 | 1% | 0,529 | -13,6% |
| Ceará | 0,497 | -4% | 0,479 | 1% | 0,482 | -3,0% |
| Maranhão | 0,404 | -2% | 0,394 | 10% | 0,434 | 7,4% |
| Paraíba | 0,449 | -1% | 0,445 | 14% | 0,506 | 12,7% |
| Pernambuco | 0,557 | -3% | 0,543 | -8% | 0,499 | -10,4% |
| Piauí | 0,561 | -1% | 0,555 | -1% | 0,550 | -2,0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Rio Grande do Norte | 0,505 | -3% | 0,489 | 2% | 0,501 | -0,8% |
| Sergipe | 0,407 | 3% | 0,419 | 12% | 0,468 | 15,0% |
| **SOUTHEAST** | **0,531** | **-5%** | **0,502** | **-3%** | **0,489** | **-7,9%** |
| Espírito Santo | 0,760 | -11% | 0,678 | -11% | 0,603 | -20,7% |
| Minas Gerais | 0,591 | -7% | 0,550 | -9% | 0,502 | -15,1% |
| Rio de Janeiro | 0,255 | 5% | 0,267 | 6% | 0,282 | 10,6% |
| São Paulo | 0,518 | -1% | 0,511 | -9% | 0,466 | -10,0% |
| **SOUTH** | **0,486** | **-6%** | **0,455** | **0%** | **0,457** | **-6,0%** |
| Paraná | 0,428 | -6% | 0,403 | 10% | 0,444 | 3,7% |
| Rio Grande do Sul | 0,557 | -8% | 0,510 | -2% | 0,498 | -10,6% |
| Santa Catarina | 0,474 | -5% | 0,452 | 3% | 0,464 | -2,1% |
| **MID-WEST** | **0,622** | **-10%** | **0,56** | **-7%** | **0,523** | **-15,9%** |
| Distrito Federal | 0,235 | -11% | 0,209 | 21% | 0,252 | 7,2% |
| Goiás | 0,518 | 0% | 0,519 | 23% | 0,638 | 23,2% |
| Mato Grosso | 0,994 | -14% | 0,851 | 1% | 0,857 | -13,8% |
| Mato Grosso do Sul | 0,741 | -11% | 0,663 | -6% | 0,624 | -15,8% |
| **BRAZIL** | **0,520** | **-6%** | **0,489** | **1%** | **0,492** | **-5,4%** |

Source: research data

Considering that the VRR index reflects how much of the revenue prescribed by legislation has actually been collected, a value of "1" represents the maximum possible collection, and therefore, the closer the index is to this value, the more efficient the collection. The average VRR value for Brazil in the analyzed period decreased from 0.52 in the pre-implementation period to 0.492 (-5%) after implementation.

Mathematically, this decrease in the indicator can be explained by the fact that there was a variation in the value added proportionally greater than the variation in the collected ICMS value during the same period, indicating an increase in the tax gap. The reverse is also true, meaning that states with an improvement in the indicator experienced a proportionally greater variation in the collected ICMS value compared to the value added during the same period, indicating a reduction in the tax gap. From 2008 onwards, potential influences of the subprime crisis cannot be disregarded, as it affected business operations globally, including the availability of financial credits and reduced commercial activities.

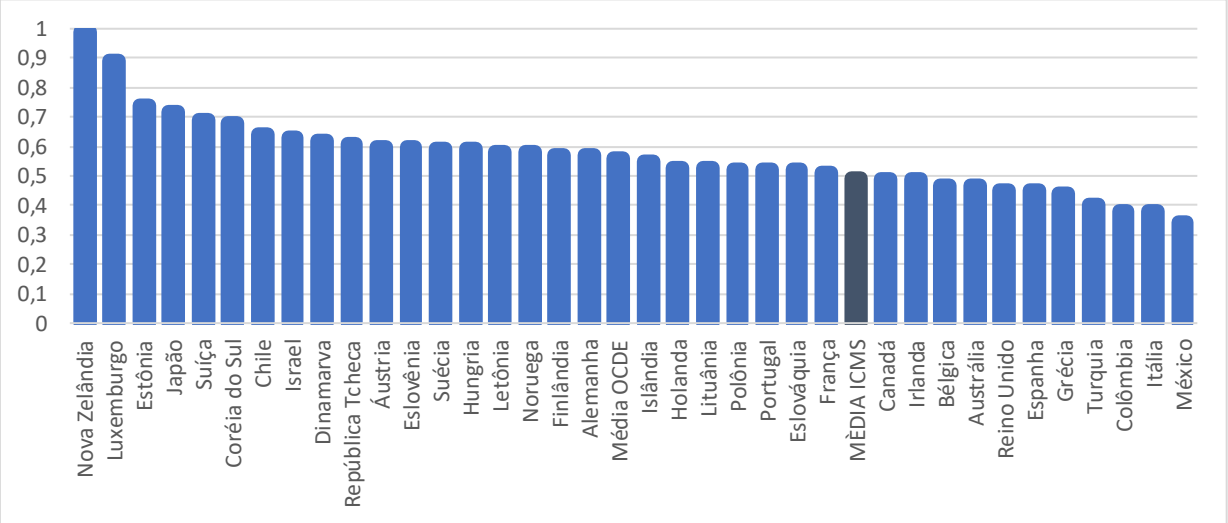
The individual analysis of states shows that Rio de Janeiro, the Federal District, and Amapá strongly contribute to the decrease in the indicator, indicating these states as having poor revenue systems, while the revenue systems of Mato Grosso, Mato Grosso do Sul, and Pará are more efficient.

Regarding the variation of the index over the period, it is noteworthy that all regions experienced a reduction in revenue efficiency, with the Midwest region standing out with a 15.9% decrease in its indicator. One possible explanation for the efficiency of the region is the concentration of revenue in a few products, primarily derived from agribusiness, or, as in the case of Mato Grosso do Sul, having exclusive rights to ICMS on imports from the Brazilian-Bolivian Gas Pipeline.

The analysis of states reveals that ten of them had an increase in VRR during the period, with Goiás (23%), Sergipe (15%), and Amapá (13%) standing out. As negative highlights in this analysis, we mention the states of Espírito Santo (-21%), Rondônia (-20%), and Mato Grosso do Sul (-16%). In general, the predominance of VRR reduction in states indicates that policies to reduce the ICMS tax gap have not been effective, including the adoption of SPED.

In an analysis of ICMS revenue performance, it is possible to compare the ICMS VRR with the VRR of OECD member countries in Figure 3.

**Figure 3** - Comparison of ICMS VRR with OECD member countries' average VRR




Source: OCDE (2020) and research data

The graphical presentation allows us to observe that the average performance of ICMS revenue collection in Brazilian states is lower than the average of OECD countries. This analysis requires further investigation as this low collection efficiency can be explained by concessions made by the government itself, as will be discussed later when addressing the policy gap indicators. Nevertheless, a collection that is less than 50% of what is prescribed in the tax legislation reflects a permissive fiscal policy that does not align with the commercial practices of taxpayers. Contributing to this poor performance are policies such as granting

incentives to small and medium-sized enterprises, exemptions, reductions in tax bases, and preferential tax rates, among other incentives that deviate from regular standard taxation.

In this context, it is necessary to analyze the composition of the VRR in order to identify the sources of revenue inefficiency, which can be attributed to fiscal policies as well as tax evasion and inefficiency in tax administration.

To strengthen the results, the VRR for other applied VATs in the country was also analyzed, namely the social contributions for PIS/PASEP and COFINS. These taxes are administered by the federal tax authority, the Federal Revenue of Brazil, and are also subject to SPED. The VRR values for PIS/PASEP and COFINS are presented in Table 7.

**Table 7** - VRR for PIS/PASEP and COFINS

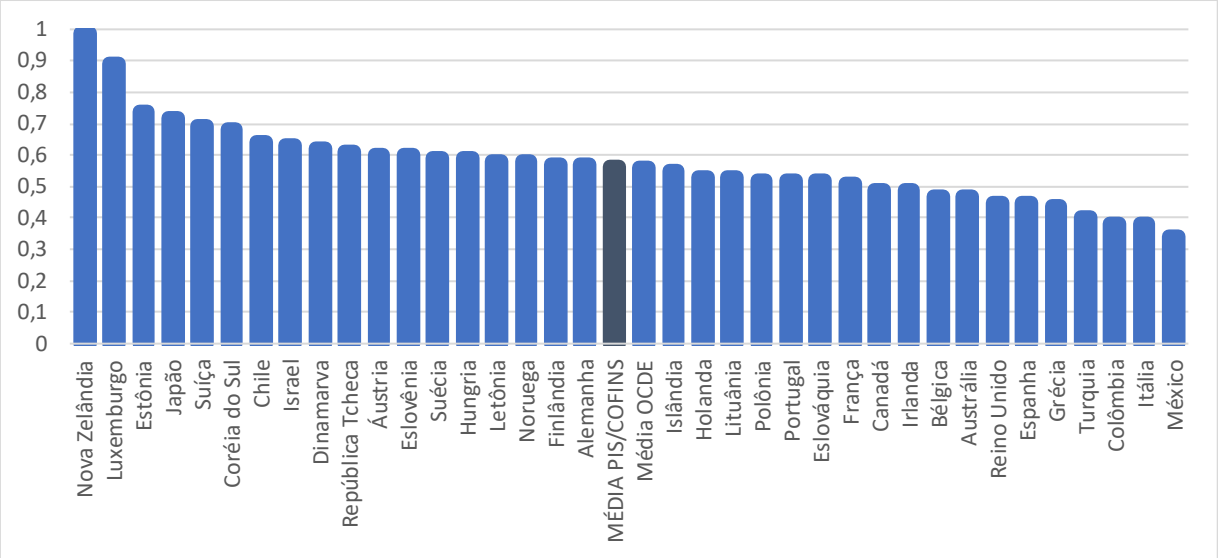
| **Contribution** | **2006 a 2008** | **Δ%** | **2009 a 2011** | **Δ%** | **2012 a 2019** | **Δ% Total** |
|---|---|---|---|---|---|---|
| PIS/PASEP | 0,708 | -4% | 0,681 | -8% | 0,629 | -12% |
| COFINS | 0,578 | -9% | 0,527 | -6% | 0,498 | -11% |
| **TOTAL** | **0,643** | **-6%** | **0,604** | **-7%** | **0,564** | -14% |

Source: research data.

The table indicates that PIS/PASEP has a higher VRR compared to the average presented for ICMS in the states. One possible explanation is the lower tax rate for PIS/PASEP, which is 1.65%, while the standard ICMS rate ranges from 17% to 18%. This difference in tax rates can incentivize tax evasion, as suggested by Allingham and Sandmo (1972). On the other hand, COFINS shows a VRR average closer to ICMS, reinforcing the results presented for this tax. However, despite the contributions having practically the same tax base, there is a decrease in the average VRR after the implementation of SPED, indicating that it was not sufficient to increase the collection of these taxes.

Similar to ICMS, it is necessary to analyze the performance of PIS/PASEP and COFINS revenue collection using the average VRR indicators of these taxes compared to the VRR of OECD member countries. This comparison is presented in Figure 4.

**Figure 4** - Comparison of PIS/PASEP and COFINS VRR with OECD member countries




Source: OCDE (2020) e research data

The average VRR indicators for PIS/PASEP and COFINS, federal taxes administered by the Brazilian Federal Revenue Service, demonstrate higher revenue collection performance compared to the average presented by the states for ICMS. They even show a similar performance to the average VRR of OECD member countries. Only six states have ICMS VRR indicators higher than the average VRR indicator for PIS/PASEP and COFINS.

### 4.2 Policy Efficiency Ratio

The analysis of fiscal policy is limited to the indicator resulting from the proportion of tax incentives granted by the government in relation to the expected revenue according to legislation. This indicates that the higher the index, the more incentives are offered, whether they are exemptions, reductions in the tax base, or any other benefit resulting in a lower payment than what is established by the legislation as the general rule for the tax.

Although the Federal Constitution requires the disclosure of tax incentives granted by each state, along with the requirement to present alternative revenue sources to compensate for the waived revenue, many states have not complied with this disclosure requirement, as demonstrated below. This non-compliance symbolizes the lack of transparency in the planning and public policies of the states, which is one of the possible reasons for the increase in the tax gap.

The states that have not disclosed their tax incentives are as follows: in the North region, Amapá (2006 to 2012), Amazonas (2006 and 2007), Roraima, and Tocantins (2006); in the Northeast region, Alagoas (2006 and 2007), Ceará (2006 to 2014), Paraíba (2006 to 2011), and Sergipe (never disclosed); in the Southeast region, Espírito Santo (2006 to 2010); in the South region, Paraná (2006 to 2015), Rio Grande do Sul (2006, 2007, and 2018), and Santa Catarina (2006 and 2007); and in the Central-West region, Distrito Federal (2006) and Mato Grosso do Sul (2012 to 2018).

With the exceptions of disclosed tax incentives, the Policy Efficiency Ratio by state is presented in Table 8.

**Table 1** - *Policy Efficiency Ratio* for each State

| State/Region | 2006 a 2008 | Δ% | 2009 a 2011 | Δ% | 2012 a 2019 | Δ% Total |
|---|---|---|---|---|---|---|
| **NORTH** | **0,079** | **42%** | **0,112** | **-9%** | **0,102** | **29%** |
| Acre | 0,015 | -13% | 0,013 | 192% | 0,038 | 153% |
| Amapá | N/D | - | N/D | - | 0,041 | - |
| Amazonas | 0,355 | -5% | 0,336 | 0% | 0,336 | -5% |
| Pará | 0,072 | 13% | 0,081 | -40% | 0,049 | -32% |
| Rondônia | 0,058 | 34% | 0,078 | -17% | 0,065 | 12% |
| Roraima | 0,052 | -21% | 0,041 | -12% | 0,036 | -31% |
| Tocantins | 0,077 | 23% | 0,095 | 28% | 0,122 | 58% |
| **NORTHEAST** | **0,033** | **36%** | **0,045** | **51%** | **0,068** | **113%** |
| Alagoas | 0,048 | 2% | 0,049 | 63% | 0,080 | 67% |
| Bahia | 0,039 | 110% | 0,082 | 5% | 0,086 | 121% |
| Ceará | N/D | - | N/D | - | 0,044 | - |
| Maranhão | 0,060 | -13% | 0,052 | -2% | 0,051 | -15% |
| Paraíba | N/D | - | N/D | - | 0,148 | - |
| Pernambuco | 0,006 | -17% | 0,005 | 500% | 0,030 | 400% |
| Piauí | 0,025 | 80% | 0,045 | 31% | 0,059 | 136% |
| Rio Grande do Norte | 0,033 | 9% | 0,036 | 6% | 0,038 | 15% |
| Sergipe | N/D | - | N/D | - | N/D | - |
| **SOUTHEAST** | **0,031** | **23%** | **0,038** | **50%** | **0,057** | **84%** |
| Espírito Santo | N/D | - | 0,061 | 8% | 0,066 | - |
| Minas Gerais | 0,047 | 2% | 0,048 | 21% | 0,058 | 23% |
| Rio de Janeiro | 0,017 | 94% | 0,033 | 55% | 0,051 | 200% |
| São Paulo | 0,029 | 0% | 0,029 | 79% | 0,052 | 79% |
| **SOUTH** | **0,188** | **5%** | **0,198** | **-28%** | **0,142** | **-24%** |
| Paraná | N/D | - | N/D | - | 0,036 | - |
| Rio Grande do Sul | 0,247 | 2% | 0,253 | -17% | 0,210 | -15% |
| Santa Catarina | 0,129 | 11% | 0,143 | -5% | 0,136 | 5% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **MID-WEST** | **0,172** | **7%** | **0,184** | **-7%** | **0,172** | **0%** |
| Distrito Federal | 0,025 | 44% | 0,036 | 100% | 0,072 | 188% |
| Goiás | 0,357 | -15% | 0,305 | -8% | 0,282 | -21% |
| Mato Grosso | 0,124 | 31% | 0,162 | -1% | 0,161 | 30% |
| Mato Grosso do Sul | 0,261 | -11% | 0,231 | - | N/D | - |
| **BRAZIL** | **0,080** | **29%** | **0,103** | **-7%** | **0,096** | **23%** |

Source: research data

N/D: Not disclosed

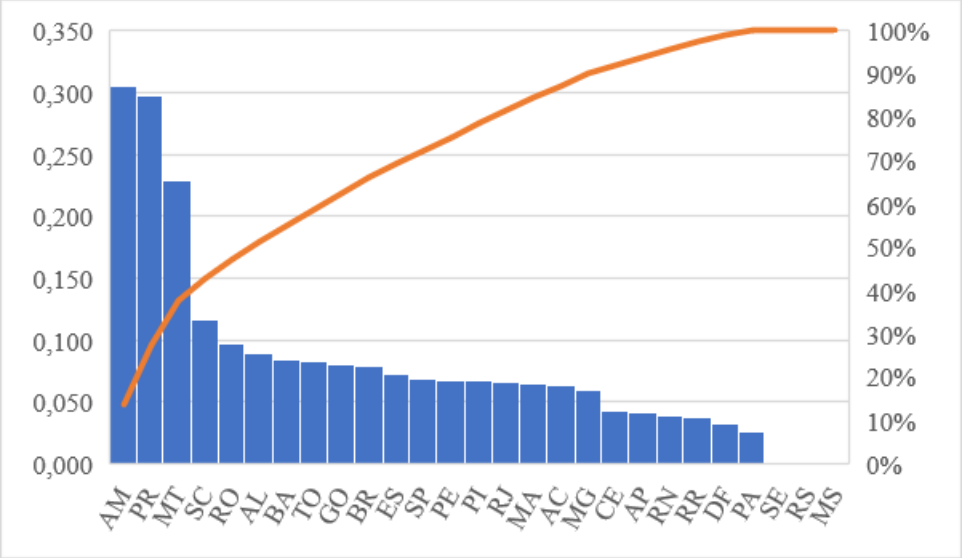
The analysis of the numbers demonstrates that tax incentives in Brazil, according to the average index, have increased by 23%, starting from 0.08 on average between 2006 and 2008 to 0.096 on average between 2012 and 2019, highlighting the fiscal policy of increasing the granting of tax benefits. The index shows that 9.6% of the potential state revenues are waived by the governments themselves without presenting, with rare exceptions, any compensatory counterpart for the waiver.

The region with the highest index of tax incentives is the Central-West region (17.2%), followed by the South region (14.2%). In terms of variation in the index, the Northeast region had the highest growth rate during the period (113%).

The states with the highest indices of tax incentives are Amazonas (0.306 in 2019), due to its constitutionally established Free Trade Zone; Mato Grosso (0.229 in 2019), which has a strong policy of tax benefits for ICMS through the granting of granted credits and incentive programs such as PRODEIC - Industrial and Commercial Development Program and PRODER - Rural Development Program, among others; and Paraíba (0.162 in 2019), which grants incentives through various programs, such as the "FAIN," which allows for presumed ICMS credits of up to 74.25%. In terms of the variation for each state, Pernambuco shows the highest variation, starting from 0.006 on average between 2006 and 2008 to 0.024 on average between 2012 and 2019, indicating a nominal variation of 400%.

The analysis of the indicator by state becomes more evident when observed with the Pareto line. Figure 5 presents this comparison with the numbers of the Policy Efficiency Ratio calculated for the fiscal year 2019.

**Figure 1** - *Policy Efficiency Ratio* for each state in 2019




Source: research data

* SE, RS e MS did not disclose their estimates

The figure 5 demonstrates that the states of Mato Grosso and Amazonas have a strong policy of tax incentives, appearing to be quite different from the policies of other states. In the case of Amazonas, as mentioned, it is important to consider the existence of a constitutionally established free trade area, which means that this is a federal government-driven policy of incentives, unlike what occurs in Mato Grosso. The latter, despite being the state with the highest granting of benefits, is also the state with the highest Policy Efficiency Ratio, meaning it has a higher proportional revenue collection in relation to what is established by legislation. It should be noted that the states without indicators are those that did not publish the values of tax incentives for the year 2019.

Regarding PIS and COFINS, which are administered and, consequently, have their benefits determined by the federal government, their Policy Efficiency Ratio is presented in table 9.

**Table 2** - *Policy Efficiency Ratio* of PIS/PASEP and COFINS

| **Contribution** | **2006 to 2008** | **Δ%** | **2009 to 2011** | **Δ%** | **2012 to 2019** | **Δ% Total** |
|---|---|---|---|---|---|---|
| PIS | 0,076 | 58% | 0,120 | 15% | 0,138 | 82% |
| COFINS | 0,082 | 61% | 0,132 | 14% | 0,151 | 84% |
| **TOTAL** | **0,079** | **59%** | **0,126** | **15%** | **0,145** | **84%** |

Source: research data

It is evident that both social contributions (PIS/PASEP and COFINS) have experienced significant increases in the benefits granted by governments, which may be related to the expansion of the possibility to utilize credits, especially regarding the broadening of the concept of inputs. This also includes the understanding that credits can be claimed when there are zero-rated sales; acquisition of parts, components, and maintenance of vehicles, machinery, and equipment used in production; fuels and lubricants consumed in the process; presumed credits granted to agricultural products used as inputs for human or animal consumption; rental of real estate, machinery, and equipment used in the activity, among other possibilities that have had their credit utilization confirmed by tax or judicial authorities over the years.

It should be noted that among the policy of granting benefits, there is a significant fiscal incentive provided to micro and small businesses, known as Simples Nacional (Simplified Tax Regime). This tax regime, in addition to simplified calculation and collection, allows eligible taxpayers to pay taxes at lower rates compared to the general rules, depending on their revenue, with a limit of R$4.8 million. The corporate numbers based on the tax regime are presented in Table 10.

**Table 10** - PIS/PASEP and COFINS Collection from Companies under Lucro Real and Simples Nacional in 2018 (in million R$)

| Tax Regime | Total CNPJs | Gross Revenue | PIS/PASEP collected | Collected COFINS | Effective tax rate PIS/PASEP | Effective rate COFINS |
|---|---|---|---|---|---|---|
| Lucro Real | 169.160 | 13.640.691 | 33.448 | 158.446 | 0,25% | 1,16% |
| Simples Nacional | 4.211.315 | 1.138.595 | 120 | 550 | 0,01% | 0,05% |
| Simples - MEI | 5.057.763 | 119.702 | 1 | 4 | 0,001% | 0,004% |

Source: BRAZIL (2021)

The benefits granted to opt-outs of Simples Nacional are just some of the various types of incentives available. As a basis for analysis, it can be observed that companies opting for Lucro Real represent a smaller number of companies compared to those opting for Simples Nacional and individual micro-entrepreneurs (MEI). However, the gross revenue values are inversely proportional, meaning that the revenue of companies opting for Lucro Real is much more significant.

The analysis reveals the magnitude of the concessions made by the government. Using data from the Brazilian Federal Revenue (BRASIL, 2021), if the effective PIS/PASEP rate, calculated by dividing the collection by gross revenue, were applied to companies opting for

Simples Nacional, these companies would have collected R$2.8 billion instead of R$120 million. In the case of MEIs, they would have collected R$294 million instead of R$1 million. For COFINS, taxpayers opting for Simples Nacional would have collected R$13.3 billion instead of just R$550 million, and MEIs would have collected R$1.4 billion instead of only R$4 million.

The presentation of this example is not intended to question the incentive policies implemented by the government for economic or social stimulation, but rather to demonstrate the impacts on revenue caused by the granting of benefits.

### 4.3 Compliance Efficiency Ratio

The compliance efficiency ratio is an indicator that, among other measurements, estimates tax evasion and tax avoidance, or in other words, the difference between the revenue prescribed by legislation, minus the concessions established in the policy gap, and the actual timely collection. Based on this definition, it can be observed that this indicator is responsible for indicating the revenue efficiency of the tax administration. The estimation of the compliance efficiency ratio by state is presented in Table 11.

**Table 3** - *Compliance Efficiency Ratio* for each State

| State/Region | 2006 to 2008 | Δ% | 2009 to 2011 | Δ% | 2012 to 2019 | Δ% Total |
|---|---|---|---|---|---|---|
| **NORTH** | **0,469** | **3%** | **0,482** | **-6%** | **0,455** | **-3%** |
| Acre | 0,537 | 8% | 0,579 | -19% | 0,468 | -13% |
| Amapá | 0,676 | -6% | 0,638 | -1% | 0,633 | -6% |
| Amazonas | 0,470 | -29% | 0,336 | 7% | 0,359 | -24% |
| Pará | 0,271 | 34% | 0,362 | -12% | 0,318 | 17% |
| Rondônia | 0,275 | 24% | 0,342 | 19% | 0,408 | 48% |
| Roraima | 0,588 | 1% | 0,595 | -5% | 0,568 | -3% |
| Tocantins | 0,467 | 12% | 0,523 | -17% | 0,434 | -7% |
| **NORTHEAST** | **0,490** | **2%** | **0,501** | **-5%** | **0,474** | **-3%** |
| Alagoas | 0,490 | -4% | 0,470 | 5% | 0,495 | 1% |
| Bahia | 0,364 | 18% | 0,429 | -4% | 0,412 | 13% |
| Ceará | 0,503 | 4% | 0,521 | -2% | 0,510 | 1% |
| Maranhão | 0,570 | 2% | 0,584 | -8% | 0,539 | -5% |
| Paraíba | 0,551 | 1% | 0,555 | -26% | 0,408 | -26% |
| Pernambuco | 0,440 | 3% | 0,454 | 7% | 0,488 | 11% |
| Piauí | 0,425 | -1% | 0,419 | -3% | 0,406 | -4% |
| Rio Grande do Norte | 0,478 | 3% | 0,492 | -4% | 0,474 | -1% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sergipe | 0,593 | -2% | 0,581 | -8% | 0,534 | -10% |
| **SOUTHEAST** | **0,457** | **5%** | **0,482** | **4%** | **0,502** | **10%** |
| Espírito Santo | 0,240 | 28% | 0,308 | 12% | 0,344 | 43% |
| Minas Gerais | 0,380 | 11% | 0,422 | 1% | 0,426 | 12% |
| Rio de Janeiro | 0,741 | -2% | 0,724 | 0% | 0,727 | -2% |
| São Paulo | 0,466 | 2% | 0,473 | 8% | 0,512 | 10% |
| **SOUTH** | **0,486** | **-5%** | **0,461** | **4%** | **0,481** | **-1%** |
| Paraná | 0,572 | 4% | 0,597 | -7% | 0,556 | -3% |
| Rio Grande do Sul | 0,382 | -17% | 0,316 | 25% | 0,395 | 3% |
| Santa Catarina | 0,504 | -6% | 0,472 | 4% | 0,492 | -2% |
| **MID-WEST** | **0,229** | **25%** | **0,286** | **8%** | **0,310** | **35%** |
| Distrito Federal | 0,759 | 3% | 0,783 | -1% | 0,773 | 2% |
| Goiás | 0,292 | -13% | 0,253 | -15% | 0,214 | -27% |
| Mato Grosso | -0,132 | -85% | -0,020 | 410% | -0,102 | -23% |
| Mato Grosso do Sul | -0,004 | * | 0,128 | 177% | 0,355 | * |
| **BRAZIL** | **0,441** | **4%** | **0,457** | **-2%** | **0,450** | **2%** |

Source: research data.

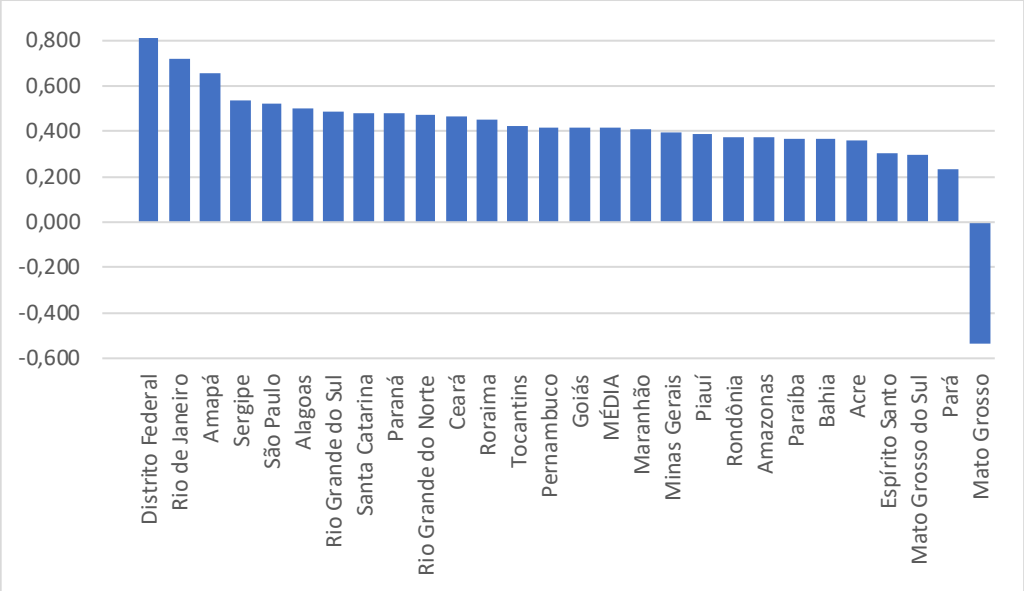
* Mathematical representation not suitable for analysis.

During the analyzed period, there was a slight deterioration of 0.009 in the indicator. However, an analysis of the regions shows that the North, Northeast, and South regions of the country experienced slight reductions in their indicators, although in the case of the North region, the state of Amazonas had a significant negative variation (a 24% decrease during the period), as well as the state of Paraíba in the Northeast region (a 26% decrease). The states with the highest percentage variations, indicating progress in revenue efficiency, were Rondônia, with a variation of 48% (from 0.275 to 0.408), Espírito Santo, with a variation of 43% (from 0.24 to 0.334), and Mato Grosso do Sul (from -0.004 to 0.355).

The negative indicators are essentially related to the efficiency of the tax authority, associated with the possibility of receiving tax revenues from previous periods, which can occur through tax debt installments or significant unfavorable judicial decisions for taxpayers.

The analysis in Figure 6 reflects the volume of the compliance efficiency ratio across states in 2019.

**Figure 2** - *Compliance Efficiency Ratio* for each State in 2019




Source: research data.

The figure 6 efficiently demonstrates the significant contribution of the compliance gap indicator in estimating the tax gap, that is, it indicates how representative tax evasion and inefficiency of tax authorities are in this indicator.

Regarding PIS/PASEP and COFINS, the comparison is even more relevant in this indicator as it analyzes the efficiency of a tax authority with a different scope of responsibility compared to the states. Table 12 shows the Compliance Efficiency Ratio for these taxes.

**Tabela 4** - *Compliance Efficiency Ratio* of PIS and COFINS

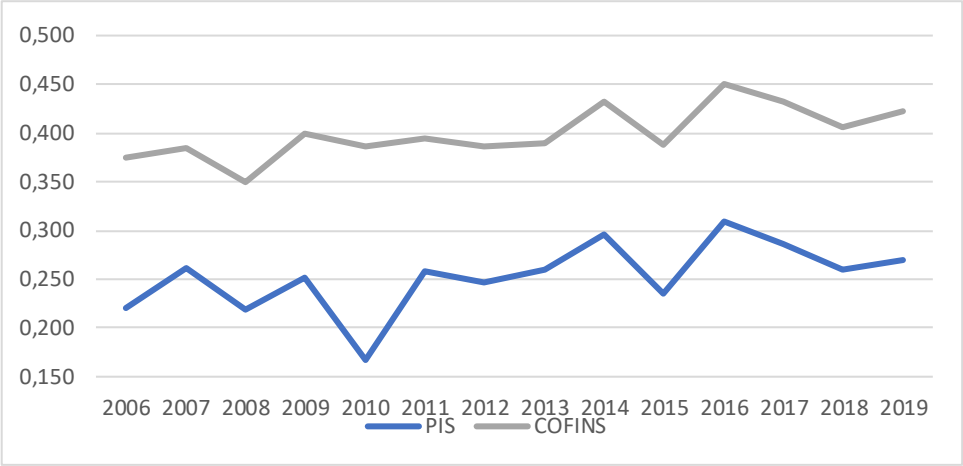
| Contribution | 2006 to 2008 | Δ% | 2009 to 2011 | Δ% | 2012 to 2019 | Δ% Total |
|---|---|---|---|---|---|---|
| PIS/PASEP | 0,234 | -3% | 0,226 | 19% | 0,270 | 15% |
| COFINS | 0,370 | 6% | 0,393 | 5% | 0,413 | 12% |
| **TOTAL** | **0,302** | **2%** | **0,309** | **11%** | **0,342** | **13%** |

Source: research data

Unlike the overall average for ICMS, the compliance efficiency ratios for the social contributions administered by the Federal Revenue have been increasing, indicating a worsening efficiency in the administration of these taxes. PIS/PASEP and COFINS are subject to numerous disputes regarding their calculation bases for debits, such as the recent exclusion of ICMS from the calculation base, and particularly regarding the calculation bases for credits. Several questions have been taken to court, as exemplified by the mentioned case of the concept

of inputs. Graph 1 demonstrates the evolution of the compliance efficiency ratio for COFINS and PIS/PASEP over time.

**Graph 1** - Evolution of the Compliance Gap Ratio of COFINS and PIS/PASEP over time




Source: research data.

In a preliminary analysis, it can be observed that the evolution exhibits a relative symmetry, with the exception of the fiscal year 2010, due to the fact that the calculation bases of the social contributions in question have significant similarities. A more detailed analysis reveals a certain balance in their evolution, except for the years 2008, during the subprime crisis, and 2015, during the national political crisis that led to periods of recession in Brazil.

### 4.3.1 *Compliance with reduced fiscal effort*

The numbers of revenue inefficiency by the states are even more alarming when considering the contribution of sectors with minimal fiscal effort in ICMS revenue. These sectors are characterized by being controlled by a small number of taxpayers, which results in limited fiscal administration. Examples of such sectors include electricity, petroleum, fuel and lubricants, and communication. Table 13 presents the participation of these sectors in each state's ICMS revenue between 2006 and 2019.

**Table 13** - Participation of low fiscal effort sectors in ICMS revenue

| STATE/REGION | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NORTH** | **40%** | **41%** | **39%** | **39%** | **39%** | **34%** | **33%** | **31%** | **31%** | **32%** | **34%** | **36%** | **39%** | **38%** |
| Acre | 0% | 0% | 0% | 0% | 18% | 22% | 20% | 18% | 20% | 21% | 20% | 24% | 45% | 46% |
| Amapá | 55% | 56% | 50% | 52% | 48% | 50% | 47% | 49% | 49% | 49% | 48% | 45% | 47% | 47% |
| Amazonas | 21% | 32% | 27% | 27% | 20% | 17% | 17% | 19% | 19% | 22% | 30% | 33% | 35% | 34% |
| Pará | 50% | 50% | 46% | 44% | 45% | 44% | 42% | 41% | 44% | 46% | 47% | 48% | 45% | 46% |
| Rondônia | 48% | 45% | 45% | 46% | 40% | 37% | 33% | 19% | 18% | 20% | 23% | 41% | 39% | 35% |
| Roraima | 45% | 52% | 47% | 47% | 47% | 19% | 18% | 17% | 13% | 10% | 12% | 9% | 7% | 10% |
| Tocantins | 58% | 56% | 55% | 54% | 52% | 51% | 52% | 51% | 52% | 56% | 55% | 53% | 52% | 51% |
| **NORTHEAST** | **41%** | **41%** | **42%** | **41%** | **38%** | **37%** | **37%** | **36%** | **37%** | **40%** | **40%** | **39%** | **41%** | **40%** |
| Alagoas | 21% | 30% | 37% | 35% | 33% | 32% | 30% | 29% | 27% | 29% | 31% | 27% | 27% | 26% |
| Bahia | 50% | 49% | 48% | 44% | 41% | 41% | 40% | 38% | 40% | 42% | 41% | 41% | 40% | 39% |
| Ceará | 49% | 44% | 45% | 41% | 41% | 40% | 40% | 39% | 39% | 43% | 44% | 43% | 43% | 43% |
| Maranhão | 52% | 51% | 49% | 50% | 49% | 48% | 47% | 46% | 52% | 50% | 36% | 40% | 50% | 49% |
| Paraíba | 47% | 47% | 44% | 44% | 41% | 41% | 41% | 42% | 41% | 43% | 42% | 42% | 42% | 40% |
| Pernambuco | 46% | 41% | 42% | 39% | 35% | 34% | 34% | 34% | 35% | 36% | 37% | 36% | 36% | 36% |
| Piauí | 50% | 49% | 50% | 49% | 47% | 48% | 48% | 47% | 45% | 51% | 50% | 50% | 53% | 52% |
| Rio Grande do Norte | 22% | 22% | 24% | 28% | 24% | 20% | 19% | 17% | 17% | 29% | 40% | 39% | 40% | 39% |
| Sergipe | 33% | 37% | 39% | 38% | 33% | 33% | 34% | 34% | 34% | 37% | 38% | 34% | 35% | 34% |
| **SOUTHEAST** | **40%** | **39%** | **36%** | **36%** | **34%** | **35%** | **34%** | **33%** | **33%** | **36%** | **37%** | **36%** | **36%** | **35%** |
| Espírito Santo | 31% | 29% | 29% | 30% | 32% | 29% | 29% | 32% | 31% | 36% | 36% | 35% | 36% | 34% |
| Minas Gerais | 47% | 45% | 40% | 41% | 38% | 39% | 40% | 37% | 38% | 41% | 43% | 43% | 42% | 40% |
| Rio de Janeiro | 48% | 46% | 43% | 41% | 38% | 40% | 40% | 38% | 36% | 39% | 41% | 40% | 38% | 41% |
| São Paulo | 35% | 35% | 32% | 31% | 28% | 33% | 28% | 26% | 26% | 29% | 30% | 28% | 26% | 26% |
| **SOUTH** | **50%** | **48%** | **44%** | **44%** | **41%** | **40%** | **38%** | **36%** | **37%** | **40%** | **40%** | **37%** | **35%** | **34%** |
| Paraná | 56% | 54% | 50% | 50% | 49% | 48% | 43% | 42% | 41% | 45% | 43% | 36% | 36% | 35% |
| Rio Grande do Sul | 46% | 43% | 40% | 38% | 36% | 36% | 36% | 33% | 33% | 36% | 38% | 36% | 34% | 33% |
| Santa Catarina | 49% | 47% | 43% | 42% | 39% | 35% | 35% | 34% | 37% | 38% | 39% | 38% | 34% | 34% |
| **MID-WEST** | **48%** | **48%** | **46%** | **41%** | **39%** | **39%** | **42%** | **41%** | **42%** | **45%** | **45%** | **42%** | **42%** | **39%** |
| Distrito Federal | 51% | 49% | 49% | 48% | 46% | 46% | 46% | 45% | 41% | 46% | 50% | 46% | 42% | 37% |
| Goiás | 46% | 49% | 46% | 36% | 31% | 32% | 43% | 44% | 46% | 48% | 48% | 45% | 44% | 47% |
| Mato Grosso | 43% | 42% | 37% | 34% | 33% | 32% | 32% | 30% | 33% | 36% | 38% | 35% | 40% | 34% |
| Mato Grosso do Sul | 53% | 50% | 51% | 47% | 46% | 47% | 47% | 46% | 48% | 49% | 46% | 43% | 43% | 39% |
| **BRAZIL** | **43%** | **43%** | **41%** | **40%** | **38%** | **37%** | **36%** | **35%** | **35%** | **38%** | **39%** | **38%** | **39%** | **38%** |

Source: research data

The numbers show that in Brazil, approximately 38% of ICMS revenue in 2019 comes from these sectors, while the remainder is the result of regular fiscal efforts. However, the decrease in the participation of these sectors from 43% in 2006 to 35% in 2014 could reflect an increase in revenue from regular fiscal efforts, possibly influenced by the implementation of

SPED (Digital Accounting System). However, with a subsequent increase in the participation of the mentioned sectors in 2015 and 2018, this proposition is questioned, despite the fact that the country experienced an economic crisis starting in 2014.

## 5. FINAL CONSIDERATION

This study assessed whether the VAT gap of Brazil's main state tax was affected by the implementation of fiscal monitoring, specifically SPED, which was implemented without complementary policies. The presented numbers are robust in demonstrating that VAT gap indicators are significant in revenue collection and show a growing trend. The analysis of VRR (Voluntary Revenue Ratio) for Brazil, both for the state VAT (ICMS) and federal VATs (PIS/PASEP and COFINS), indicated a reduction in this index during the analyzed period, indicating that the implementation of fiscal monitoring did not result in a proportional increase in revenue. In other words, the implementation did not achieve the planned results by the government, at least in terms of the participation of timely collected tax amounts compared to the total tax amounts due according to the current legislation.

It is important to note that the decrease in the proportion of revenue compared to the total amount due, represented by the VRR indicator, was caused by the increase in its two components: compliance gap and policy gap. This trend was observed in both the state VAT (ICMS) and federal VATs (PIS/PASEP and COFINS), with the latter experiencing more pronounced effects. This indicates that during the analyzed period, there was a decline in tax revenue efficiency, stemming from both a potential increase in tax evasion not identified by authorities and a potential increase in the granting of tax benefits by governments.

Thus, the hypothesis developed for this research, which suggests that the isolated implementation of fiscal monitoring does not reduce the VAT tax gap, has been confirmed. This result is consistent with the study by Johnson, Masclet, and Montmarquette (2010), which emphasizes the need for complementary policies to enhance revenue collection efficiency. These policies could include increased penalties, higher probability of audits, adoption of measures for tax system equity, or better perception of governance quality by citizens.

As a recommendation for further studies, a more in-depth analysis could be conducted regarding the increase in the policy gap by discussing tax incentive policies, beneficiaries of these incentives, and their connections to political issues. Additionally, analyzing the economic and social return of such incentives would be valuable.

Furthermore, additional studies are recommended to analyze the effects, specifically for ICMS, of the existence, prior to SPED, of requirements for issuing fiscal documents for every transaction, keeping individualized records of operations, and implementing control systems such as SINTEGRA, which unified all information on the input and output of goods and provision of services by ICMS taxpayers. These studies would shed light on the inefficiency of SPED implementation in increasing tax revenue, as indicated by this study.

## 6. LIMITATIONS

The numbers presented in the Fiscal Responsibility Law (LDO) for tax incentives are estimates, which can lead to distortions in calculations when actual values are used. There is also a limitation in that some states have not published the values related to their tax incentives.

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