

# Brazilian Evidence on Tax Evasion and Enforcement: A Case Study of Global North–South Comparison

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## Abstract

This study investigates the differences observed in the rate of tax evasion between the Global North and South countries, with special focus on Brazil, by comparing key parameters of their tax systems, namely, tax burden, audit cost, and fines. This is achieved by extending and applying Graetz, Reinganun, and Wilde's model using data from tax authorities from European and Latin American countries, which produced parameters that are used for Bayesian games. The results show that tax evasion is directly associated with tax burden and audit cost, but the effect of fines is unclear. Overall, findings pointed to shortcomings in the tax system of Latin American countries that create the avenue for high tax evasion.

## Keywords

tax evasion, global north–south comparison, Brazil

The problem of tax evasion is a priority to many governments, given that it shorts the public budget that could be allocated to providing vital services (e.g., health, education, safety), yet, it is notoriously difficult to detect and measure it. Tax evasion can be succinctly defined as the illegal and intentional actions taken by individuals and firms to reduce their legally due tax obligations, by underreporting incomes, sales, or wealth; by overstating deductions, exemptions, or credits; or by failing to file appropriate tax returns (Alm & Martinez-Vazquez, 2003).

According to Alm and Martinez-Vazquez (2003), tax evasion poses far more serious consequences in developing and transition countries (henceforth, Global South) than in developed economies such as European and North American countries (henceforth, Global North); however, most of the studies in the literature on the topic are focused on the context of the Global North. Nevertheless,

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some studies have borrowed, adjusted, and compared lessons from the analyses of tax evasion and enforcement in the Global North context for the better understanding and reduction of tax evasion in the Global South (Alm & Martinez-Vazquez, 2003; Bird & Casanegra de Jantscher, 1992; Martinez-Vazquez & McNab, 2000; Schneider & Enste, 2000; Tanzi, 1980). A few other studies specify even further by comparing differences in estimating this phenomenon between the regions of Latin America and Europe that have the highest and lowest tax evasion rates, respectively (Bagnulo et al., 2009; Fernández-Ballesteros et al., 2009; Guseinova et al., 2011; Inostroza et al., 2010; Korol, 2013; Raffo et al., 2008). Additionally, these studies design different comparative strategies, such as the effectiveness of descriptive and statistical analysis, decisional trees, and artificial neural network models for a better understanding of tax evasion in both regions.

In Latin America, Brazil gains the spotlight because of the combination of three risk factors related to tax evasion: (i) the soft legislation, (ii) the high tax burden (besides being complex and not very transparent), and (iii) the low social returns. Estimates from the National Union of National Treasury Attorneys between January 1 and November 23 of the year 2020 show that Brazil lost R\$562 billion due to illicit practices relating to tax evasion (equivalent to 7.6% of the gross domestic product [GDP]; SINPROFAZ, 2020). However, contrary to what occurs in many European nations and even in Latin America, tax evasion in itself is not considered a crime in Brazil. The categorization of tax evasion as a criminal offense in the Brazilian legislation depends on the existence of a fraudulent practice, that is, the deliberate attempt to commit fiscal fraud. Even so, if the tax evasion is identified and the due amount is paid, the investigation procedure is dissolved, that is, once the debt is paid, the practice of tax evasion is disregarded and there is no punishment for the agent who committed the attempted tax fraud, favoring the existence of a sense of impunity.

Regarding tax burden, there are some estimates made by the Brazilian Institute of Planning and Taxation (IBPT) that give a clear illustration of its magnitude. In the year 2006, the average percentage of income paid in tax on consumption, property, income, and others was about 39.72%; this value reached 41.25% in the year 2020 (IBPT, 2020). Using an alternative parameter, this report showed that the number of days that the taxpayer needs to cover the average tax burden increased from 4 months and 25 days in 2006 to 4 months and 30 days in 2020. Such estimates place Brazil in ninth place in terms of tax burden, however, without any similarity in terms of social return or quality of life compared to the other countries at the top of the ranking.

In terms of social returns, IBPT has been calculating and publishing, since 2011, the Index of Return of Welfare to Society to measure the return of taxes levied by countries to the population. The index considers the 30 countries with the highest tax burden in the world, including Brazil, to indicate how these countries perform. In the latest report, published in 2018, Ireland, the United States, Switzerland, South Korea, and Australia are the best placed countries in terms of the quality of the application of the taxes collected, with regard to the impacts on improving the quality of life of their citizens. In all the editions, Brazil was in last place even behind other South American countries, such as Uruguay and Argentina.

The objective of this study is to empirically analyze the phenomenon of Brazilian tax evasion in comparison between Latin American and European countries and, by consequence, identify good practices that can be bridged. In specific, firstly, this study extends the theoretical model of Graetz, Reinganun, and Wilde (GRW, 1986), such that the theoretical links between tax evasion and enforcement variables such as tax burdens, fines, and audit costs become explicit. Subsequently, the directions of these causal links are empirically evidenced using data from the Global North and South regions.

The structure of this article is as follows. In the next section, we present the research background and, in the third section, the underlying theoretical model that guides this study. These last two sections guide the hypotheses of this study presented in the fourth section. In the fifth section, we present the data sources and the case study is framed in the sixth section. The descriptive and

empirical results are presented in the seventh section, discussed in the eighth section, and conclusions and the final section conclude this article with a summary of the case, policy recommendations, and propose new research questions.

## Research Background

Tax evasion by firms or individuals is greatly an economically motivated crime whereby rational decisions are made based on economic gains, costs, and the probability of getting caught, thus making the rational choice economic theory of crime proposed by Becker (1968) a significant reference when investigating tax evasion decisions. Building on the opportunity perspective, criminological approaches such as the situational crime prevention and situational action have also been used to understand tax evasion (Ceccato & Benson, 2016).

The consequences of tax evasion, however, transcend the economic cost that is directly reflected on the government budget shortage to the essential public services and social policies directed to the welfare of the society at large, that is, economic and social costs to the society (Dreher et al., 2009; Dreher & Schneider, 2009; Hassan & Schneider, 2016; Johnson et al., 2000; Medina & Schneider, 2018; Schneider & Williams, 2013; Teobaldelli, 2011; Teobaldelli & Schneider, 2012). Consequently, in tackling tax evasion, indirect costs arise through tax audits and the distribution of tax burdens (Slemrod, 2018).

On the one hand, some theoretical studies explain why individuals evade tax, whereas, on the other hand, others explain the interaction between tax evasion and law enforcement through tax authorities. The scope of this study aligns with the latter approach, although making due reference to the former. According to Karzhassova (2013) and Skatteverket (2013), these approaches represent the internal and external circumstances that motivate tax evasion. The extensive literature review provided by Pereira (2017) indicated a direct association between tax evasion and the individual perception of the egalitarian tax system. This author also reported the vast literature on a citizen's perception of tax burden and the decision to evade tax. The theoretical explanation of tax evasion using the social and psychological model and social norm approach is also extensive in the literature (Gordon, 1989; Minor, 1981; Sour, 2004; Spicer, 1986; Weigel et al., 1987; Wintrobe, 2001).

The interaction between tax evaders and law enforcement, that is, tax authorities, has been commonly addressed using the game model that expresses how enforcement factors such as audits and fines affect tax evasion. In this line, Allingham and Sandmo (1972) developed a game model that shows how the increase in penalties or sanctions increases tax reports by rational taxpayers. Although significant, this contribution considered the taxpayer actions but ignored agents involved in the process of collecting taxes, that is, the tax authorities, making the model impractical for policymakers or empirical studies.

GRW (1986) made a significant advance to the game model by introducing the dynamic games of tax evasion that involve law enforcement, whereby the opportunistic decision to evade taxes is influenced by parameters such as fine or audit costs. The GRW model has been further extended and applied in other studies (Andreoni et al., 1998; Lipatov, 2005, 2006, 2008). In this line, a vast tax enforcement literature emerges to understand the effects of deterrence and compliance on tax evasion (Andreoni et al., 1998; Braithwaite & Braithwaite, 2001). Zaklan et al. (2009) argued that individuals are influenced by the environment in which they live; however, when there is a greater probability of being detected and there are greater penalties, they do not risk breaching the tax obligations. Ayres and Braithwaite (1992) made a great contribution to the literature with an enforcement pyramid model where most regulatory action occurs at the base of the pyramid. In this framework, different kinds of sanctioning are appropriate to different regulatory arenas. Few studies have also incorporated tax morale as an important component of tax enforcement to improve compliance (Antinyan & Asatryan, 2020; Cummings et al., 2001; Luttmer & Singhal, 2014).

Despite the significant contribution of the GRW model and the relevant developments that have been made by previous studies, the association of crime deterrence through fines (and the audit costs involved) and compliance of taxpayers is not explicit in the model. Therefore, to empirically assess the link between tax evasion and fines, audit costs, and tax burden, it is important to make adjustments to the GRW model in such a way that these associations become explicit. The original GRW model and the adjustments are presented in the next section.

Tax burdens are one of the main indicators of tax evasion. This is because the distortion in the overall tax burden has the potential to affect individuals' preferences concerning their time allocation between work and leisure, which may lead to the increase of labor supply in the shadow economy—illegal activities that generate unreported income. In other words, excessively high tax burdens stimulate underreporting of income, making tax burden one of the key determinants of the existence of tax evasion (Johnson et al., 2000; Medina & Schneider, 2018; Schneider, 2004).

Many studies uphold the effect of fines in dissuading tax evasion, that is, the application of high fines increases the cost of evasion and, thus, reduces the rate of evasion (Bayer & Cowell, 2009; Lipatov, 2006). Studies have also found that the effect of the fines depends crucially on the accounting standard adopted by the agents. If the accounting standard chosen is aggressive, an increase in fines may adversely affect enforcement. In political terms, these studies argue that the increase of fines in countries with high tax evasion rates may lead to unexpected results (Bayer & Cowell, 2009; Crocker & Slemrod, 2005; Lipatov, 2006; Sanchez-Villalba, 2006).

Regarding the effect of audit cost on tax evasion, there is consensus in the literature that tax audits are not random. First, the taxpayers are divided into homogenous auditing categories. Second, within each category, the tax authority may receive some signals that a given report is suspicious. The evasion opportunity arises, for instance, when an individual or firm deducts payments made to the other, whereby this other is not taxable. This type of evasion seems simple at glance but requires sophisticated auditing to detect, which means high economic and time cost of auditing. This implies that expressively high auditing costs may render auditing unfeasible, especially in developing countries. In turn, the coordination for auditing may not be obvious (Alm & McKee, 2004; McIntyre, 2005; Sumina, 2006).

## The GRW Model and Extension

In this section, we show the empirical aspect of the GRW (1986) model, as well as the authors' theoretical description of the parameters. Suppose some taxpayers report their income given some interests. Taxpayers are rational and maximize expected utility subject to the likelihood of auditing associated with the income they report.

We assume two types of income—high and low, denoted by  $H$  and  $L$ , respectively, where  $L < H$  and  $L > 0$ ;  $H > 0$ . Taxpayers' income is not directly observable, so they can report high or low income.  $H$  represents real income and  $L$  represents reported income, so that  $H - L$  represents unreported income, that is, the portion of income that is evaded. The tax burden that taxpayers must pay to tax authorities is denoted by  $t$ . According to GRW model, we assume  $t \leq L$  and  $t \leq H$  and  $t \geq 0$ . Taxpayers who do not report real income could be fined in the amount  $s$  ( $s \geq 0$ ). It is assumed that  $t$  and  $s$  are fixed and specified by tax authorities.

We denote  $c$  as audit cost, where  $c \geq 0$  and assume that  $H - L + s > c$ , that is, the sum of the evaded tax and the fine must exceed audit cost, otherwise, whenever tax evader is identified a priori, it would not be advantageous to audit him, thereby benefiting the evader. We also assume that  $t + s \leq L$  and  $t + s \leq H$ , that is, taxes and fines cannot exceed the taxpayer income. The authors of this model assumed complete information throughout the game, thus no representing a real interaction between taxpayers and tax authority where asymmetric information exists.

**Table 1.** Simultaneous Game Between Taxpayer and Tax Authority.

Taxpayer/Tax Authority	Audit ( $p$ )	Not audit ( $1 - p$ )
Evade ( $q$ )	$(1 - t)H - st(H - L); tH + st(H - L) - c$	$H - tL; tL$
Not evade ( $1 - q$ )	$(1 - t)H; tH - c$	$(1 - t)H; tH$

Source. Lipatov (2005) and Graetz et al. (1986).

In order to take incomplete information into account, we adopted Bayesian games to extend the GRW model and incorporated probabilities to players' actions, where  $q$  represents the probability of the taxpayer choosing to evade, where  $0 < q < 1$ . Likewise,  $p$  represents the probability of tax authorities choosing to audit, with  $0 < p < 1$ .

After these assumptions and extensions, we obtain an expected taxpayer utility function and the expected revenue from tax authorities. For a better illustration of the GRW model, we present the model as a simulation game in Table 1.

Here, the taxpayer decides to evade or not at the same time that tax authority decides to audit or not. The probabilities of evasion and audit are  $q$  and  $p$ . For each decision of the taxpayer and tax authorities, there is a payoff or result associated. For example, in a case whereby a taxpayer evades and the tax authority audits, the game implements fine ( $s$ ) and the audit cost ( $c$ ) on the payoff.

Given that the associations between tax evasion and fines, tax burden, and audit cost are not explicit in the original GRW model, we performed an algebraic manipulation of the model in such a way that the links between these tax parameters become clear. The result of this manipulation places the audit cost as a function of the tax burden, fine, and the probability of evasion, which is expressed thusly

$$c = qt(H - L)(1 + s), \quad (1)$$

where audit cost,  $c$ , is the dependent variable explained by independent variables such as fine,  $s$ ; tax burden,  $t$ ; the sum tax evaded,  $H - L$ , and the probability of tax evasion  $q$ . A completed derivation of this equation is available in Appendix A.

## The Hypotheses

The overall hypothesis of this study is that the differences observed in the rate of tax evasion between the Global North and South countries, especially Brazil, can be explained by the differences in the key parameters of their tax systems, namely, tax burden, audit cost, and fines. Regarding the specific objectives, based on the existing research background and the extended GRW theoretical model, it is expected that

- a) A higher tax burden increased the probability of tax evasion.
- b) Higher fines reduce the probability of tax evasion.
- c) Higher audit costs increase the probability of tax evasion.

## The Data

In order to compare Latin America and Europe, we used different sources of data (see <https://bityli.com/dpVVO>). First, we selected the countries that are included in the analysis, choosing those with the highest tax evasion rates into the Latin American countries and the lowest tax evasion into the European countries. Then, following Medina and Schneider (2018), we selected some countries from both regions as the representatives of both groups: G1 (Global North)—Belgium, Denmark,

Finland, France, Germany, the Netherlands, Norway, and Sweden; and G2 (Global South)—Argentina, Bolivia, Brazil, Colombia, Chile, Mexico, Peru, and Uruguay. Thereafter, we collected a *proxy* for tax evasion rates ( $H - L$ ) for all countries from Medina and Schneider (2018). This proxy is calculated using the size of the shadow economy and has been used for many countries by numerous studies such as Tanzi (1980), Frey and Weck (1983), Frey and Pomme-Rehne (1984), Feige (1989), Susan Pozo (1996), Owen Lippert and Michael Walker (1997), Andreoni et al. (1998), Thomas (1992), Hernando de Soto (1989), Ben-Zion Zilberfarb (1986), Schneider and Enste (2000), Schneider (2004), Schneider and Klinglmair (2004), Tsakumis et al. (2007), Feld and Larsen (2011), Slemrod (2007), Richardson (2008), Schneider (2008), Feld and Schneider (2010), Feld et al. (2011), Schneider and Williams (2013), and Medina and Schneider (2018).

Given that the most recent data on tax evasion calculated by Medina and Schneider (2018) are for the year 2015, the empirical analysis of this study is performed for this year. The value of fine or penalty ( $s$ ) imposed on unpaid taxes is defined by national tax laws and can be found in the tax regulation of the respective countries. The European Tax Justice database provides the details of the fines ( $s$ ) and sanctions imposed by European countries. Fines ( $s$ ) from Argentina, Bolivia, Brazil, Colombia, Chile, Mexico, Peru, and Uruguay were collected from national's tax codes, available online. Finally, tax burden ( $t$ ) and probability of tax evasion ( $q$ ) were collected from the Global Competitiveness Report (Schwab, 2015). The probability of tax evasion ( $q$ ) was constructed as an inverse of "efficiency of tax regulations" obtained from the same report.

## The Case Study

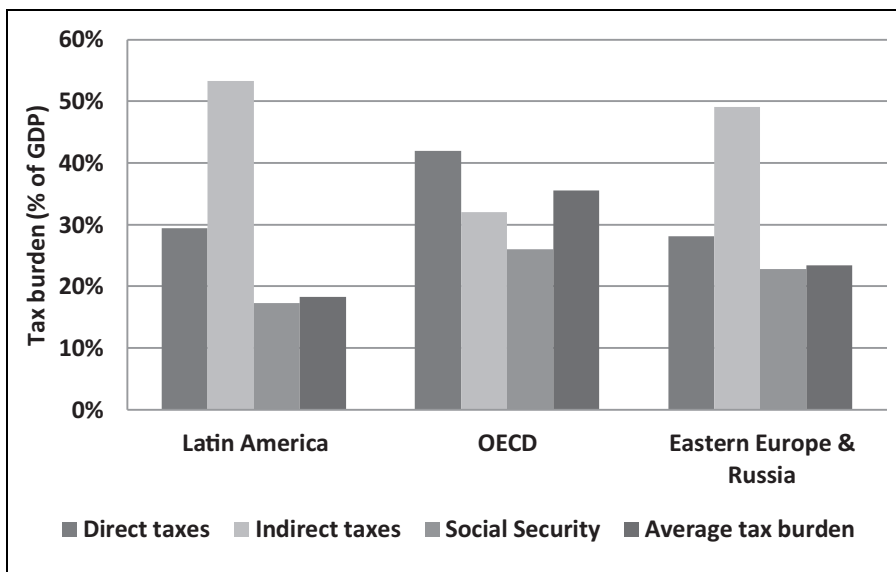
Tax evasion is responsible for global revenue losses at about US\$650 billion per year, of which about one third are from emerging economies (Crivelli et al., 2016). Consequently, over the past few years, the fight against corruption and tax evasion, particularly in emerging economies, has become high on the agenda of various international organizations, such as the World Bank and the International Monetary Fund. This has been motivated by a deepening belief that good quality governance, adopted by developed countries, is essential for sustained economic development. (Rose-Ackerman, 1999). Thus, tax authorities from emerging economies observe global North countries' strategies and make efforts to develop mechanisms that discourage tax evasion in the Global South.

Despite the great efforts expended by the tax authorities of emerging economies, tax evasion is still quite pronounced (Wasilewski, 2001). Recently, Carvalho (2019) reported that the highest rates of tax evasion (percentage of GDP) around the world are found in Latin American economies, such as Chile (11.0), Argentina (21.2), and Brazil (27.6).

According to Jiménez and Sabaini (2012), the individual and regional peculiarities of countries should be taken into account when studying tax issues in Latin America. The tax system of the vast majority of Latin America's countries shares certain key characteristics: the composition of their complex tax structures, current trends in tax policy and administration, and a high estimated level of tax evasion. Given that today's globalized world calls for the need to align tax policies and administrations with those used in developed countries, this section briefly describes the characteristics of the tax system and tax evasion across the 16 countries selected by this study.

Figure 1 showed that, although the average tax burden in Latin America (18% of GDP) has seen an upward trend in the last two decades, most of the countries have lower tax burdens compared to countries in other regions of the world, like Organization for Economic Cooperation and Development economies (36% of GDP) and Eastern Europe and Russia (23% of GDP).

These figures also highlight certain peculiarities of the Latin American tax system. According to Jiménez and Sabaini (2012), the composition of the tax burden has been highly heterogeneous in this region. Specifically, the ratio of direct to indirect taxes in Latin America is 0.55, in line with the values from economies with similar levels of development, like Eastern Europe and Russia (0.57).



**Figure 1.** Tax burden and structure in Latin America as compared with other groups of countries, 2006 (percentages of GDP and of total). Source. Elaborated by authors from Jiménez and Sabaini (2012).

However, these figures are in sharp contrast with developed regions, such as the European countries, where the ratio of direct to indirect taxes is 1.31. This stark imbalance in the tax structure has been a reaction to the high levels of evasion in Latin America (González, 2009).

In recent years, tax policy reforms have led to some changes in tax structures across Latin America's countries. One change successfully implemented in Latin America was the simplification of taxes on small firms. The large size of the informal economy in terms of microenterprises has led Brazil and Argentina to institute tax policies designed to address the difficulty of maintaining control over the taxation of small firms. Examples of this are Brazil's "Simples" system and Argentina's "Monotributo" (single tax; Jiménez & Sabaini, 2012). Regarding Brazil, Clemente (2021) developed a special section entitled "Brazilian studies on tax evasion."

The fact is that the problem of tax evasion, and the nature of the tax structures in most Latin American countries, is strongly biased toward indirect taxation, leading to a dispersed collecting system in the region. In this line, Brazil is a good example since it has one of the most complex tax systems in the world. According to Clemente and Lirio (2017), the current Brazilian taxation system was introduced by the 1988 Constitution, which endorsed the federal, state, and municipal governments to collect taxes. The number and nature of the regulations enacted by each of these governmental instances led to a very complex tax environment, in which taxpayers are required to comply with many obligations, both comprising tax collection and reporting. Federal taxes vary according to their nature. The most important to the upstream industry are those levied on (i) Revenues: Social Contributions on Gross Revenues (Social Integration Program (PIS) and Contribution for Social Security Financing (COFINS)); (ii) Excise Tax: Federal Value-Added Tax (VAT; IPI); (iii) Importation of Goods: Import Duty (II), Federal VAT (IPI), PIS-importation, and COFINS-importation; (iv) Importation of Services: PIS-importation and COFINS-importation; and (v) Profits: Corporate Income Tax (IRPJ) and Social Contribution on Profits (CSLL).

Naritomi (2019) highlighted that states in Brazil have two main tax instruments: a tax on goods and certain services (ICMS) and a property tax on motor vehicles (IPVA). Because the ICMS (VAT) is a state-level tax in Brazil, its legislation and enforcement policies are determined by the states.

**Table 2.** Statistical Analysis for Low Tax Evasion (G1) and High Tax Evasion (G2) Countries.

	Average ( $\mu$ )		St. Deviation ( $\Sigma$ )	
	G1	G2	G1	G2
Probability ( <b>q</b> )	0.142	0.360	0.055	0.216
Fine ( <b>s</b> )	0.900	1.500	0.873	0.707
Tax burden ( <b>t</b> )	0.460	0.605	0.125	0.249
Audit cost ( <b>c</b> )	1.537	16.984	1.075	16.821

Source. Elaborated by the authors.

The tax base includes goods and some services, the most common rate of the ICMS tax is 18% over the value added, which is computed through a credit-invoice method. As observed in the VAT tax adopted across the world, there is a threshold below which firms pay taxes on gross revenue instead of the value added (Keen & Mintz, 2004).

Services supplies, other than those subject to ICMS, are subjected to a cumulative tax called *Imposto Sobre Serviços* (ISS). This is a municipal tax on certain services listed by the federal government as per Supplementary Law 116/2003. The tax base of ISS is the price of the service rendered. In general, the service tax is levied by the municipality in which the company is established, and its rates vary from 2% to 5%.

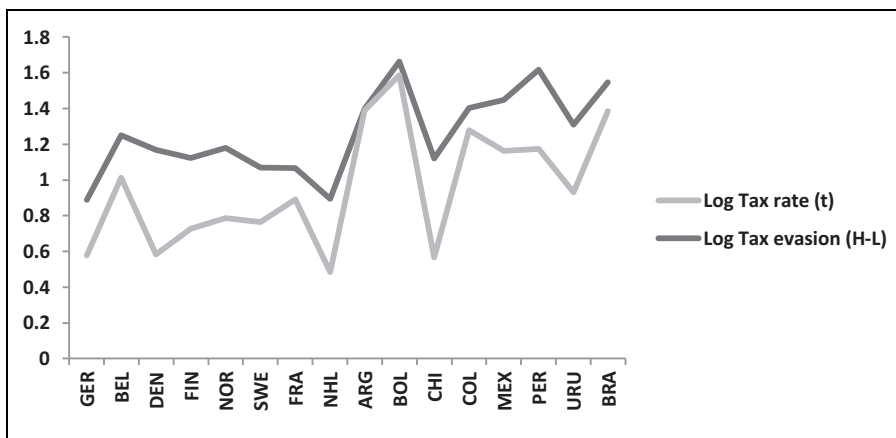
As noticed, the Brazilian tax system is greatly based on indirect taxes such as VAT. In order to increase tax revenue, given the inadequate information of the tax administration, there is a need for many audits. This means that the audit costs are directly related to the type of tax system practiced by the countries. By observing countries with low costs for tax audits, it is possible to observe that they have a tax system with several direct taxes on income. As in Sweden, for example, the employer, banks, and other institutions report the income to the tax administration (Skatteverket, 2013). That means that a large part of the money circulating in the economy is reported to the tax administration and there is no need for regular audits. In summary, the high tax evasion can be partly explained by the structure of the tax system and how taxes are collected. Marrelli (1984) compared direct and indirect tax evasion in the context of a monopolistic firm and showed that the percentage of tax evasion on indirect taxes is higher compared to the direct tax system.

Table 2 shows other differences in the tax structure and characteristics across European and Latin American countries. Fines have an average of 0.9 (approximately 90% of the evaded sum) in European economies and 1.5 (approximately 150%) in Latin American economies. Countries such as Chile, Argentina, and Brazil presented very high values for fines, around 300%, 200%, and 150%, respectively.

The probability of tax evasion (**q**) displayed an average of around 14.2% for G1 (Global North) economies and 36% for G2 economies. That is, people who live in one G2 (Global South) country have a 22% higher probability of evading taxes than people who live in a G1 country. We also observe a discrepancy between the probability of tax evasion (**q**) across European and Latin American countries.

Finally, our preliminary analysis shows that audit costs (**c**) are very discrepant across European and Latin American economies. We observe a high gap variation between both groups (approximately 1.005%). Thus, we expect that audit cost is highly correlated with the probability of tax evasion. Brazil has a 10.744<sup>1</sup> index in audit cost (**c**), which contributed to the high average in Latin American countries. As previously detailed, audit costs are directly linked to the tax system adopted by the country.





**Figure 2.** Tax burden and tax evasion across countries. *Source.* Elaborated by the authors.

To summarize, we find a great difference in the parameters  $s$ ,  $q$ ,  $t$ , and  $c$  between both groups of countries. In addition, we observe that audit cost is lower in low tax evasion countries than high tax evasion countries.

## Main Findings

We found the highest probability of tax evasion in Latin American countries such as Argentina (68%), Uruguay (67%), Bolivia (48%), Peru (28%), and Brazil (18%), whereas countries with the lowest probability of tax evasion are Germany (10%), Denmark (11%), France (11.7%), and Finland (13%).

The average tax burden ( $t$ ) considering all the countries included in this study is around 53.4% of GDP. Denmark has the lowest tax burden (around 26% of GDP) and Bolivia has the highest tax burden (around 83% of GDP), indicating a 57% in the difference between tax burdens on these countries. Figure 2 illustrates the link between tax burden tax evasion, indicating a positive association, that is, that low tax evasion countries ( $G1$ ) have also low tax burden and high tax evasion countries ( $G2$ ) have also high tax burden. Thus, it is possible to interpret, guided by the GRW model, that, *ceteris paribus*, changes in the tax system may reduce tax evasion across countries.

Chile, Belgium, the Netherlands, and Argentina present the highest fines imposed by tax authorities to prevent tax evasion, whereas Germany, Finland, Norway, and Sweden have the lowest fines. Here, we observe that countries from both regions have practiced high fines but have experienced different results since some high tax evasion countries also have high fines. Moreover, the parameters  $s$  and  $q$  are not highly statistically correlated ( $r = 0.29$ ), indicating that fines may not be effective to reduce tax evasion. This weak association is further emphasized in Figure 3. In other words, fines imposed by tax authorities may not be effective to reduce tax evasion.

We found an overall average cost audit costs ( $c$ ) of 9.26,<sup>2</sup> whereby countries with the lowest audit costs are Germany (0.434), Denmark (0.739), and Finland (0.907) and countries with the highest audit costs are Argentina (49.37), Bolivia (36.94), Uruguay (14.31), and Brazil (10.74). Table 3 shows the values of parameter  $c$  for all selected countries.

The graphical illustration of the association between audit cost and probability of tax evasion in Figure 4 shows a positive direction, indicating that audit cost directly increases the probability of tax evasion as theoretically demonstrated in the GRW model. This means that Latin American countries

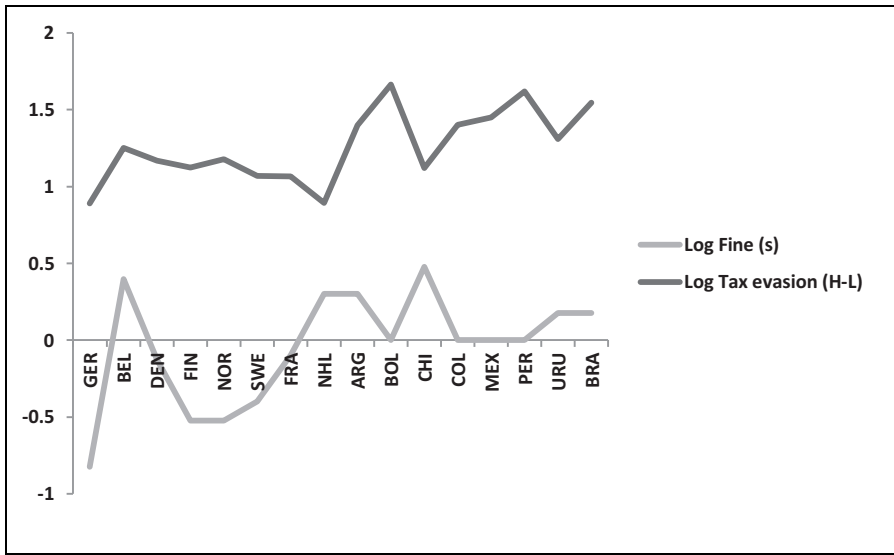


Figure 3. Fine and tax evasion across countries. Source. Elaborated by the authors.

Table 3. Audit Cost—Selected Countries.

Countries	c	Countries	c
<b>Denmark</b>	0.73926	Chile	<b>3.12322</b>
<b>Germany</b>	0.43493	Argentina	<b>49.3722</b>
<b>Belgium</b>	3.85324	Bolivia	<b>36.9458</b>
<b>Finland</b>	0.90773	Colombia	<b>7.18757</b>
<b>Norway</b>	2.12628	Mexico	<b>5.8161</b>
<b>Sweden</b>	1.40624	Peru	<b>8.37245</b>
<b>France</b>	1.61813	Uruguay	<b>14.3117</b>
<b>The Netherlands</b>	<b>1.21186</b>	<b>Brazil</b>	<b>10.744</b>

Source. Elaborated by the authors.

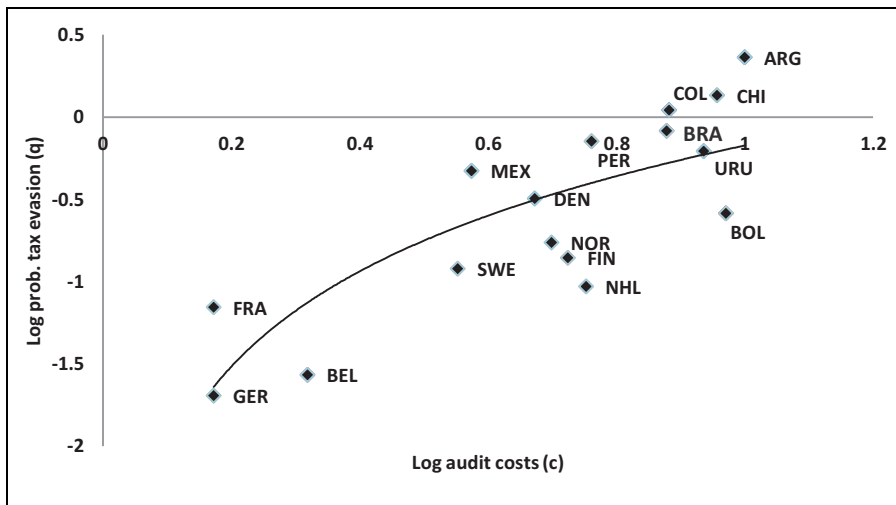
with high audit costs have more chance of high tax evasion compared to European countries with low audit costs.

Regarding the association between tax evasion and audit costs, we found that countries with lower audit costs have low probabilities of tax evasion. This result is corroborated using the Pearson’s correlation, which at the value of  $r = 0.8184$  indicates a high correlation between the audit cost and the probability of tax evasion. Guided by the GRW model and the literature background, this means that high audit costs limit tax enforcement through auditing, thus, giving room for high tax evasion.

### Discussion of the Results

The main findings of this study showed that Brazil and the other Latin American countries have a higher probability of tax evasion than European countries, such as Germany, France, or the Netherlands. There are key characteristics that contribute to this discrepancy.

First, Latin American economies have a complex tax system and high tax burden in comparison with per capita GDP, indicating that high tax evasion can be explained by the tax structure and how



**Figure 4.** Interaction between  $c$  and  $q$  across countries. *Source.* Elaborated by the authors.

tax is collected. According to Clemente et al. (2017), it is expected that countries show levels of tax burden lower than expected based on their level of development, otherwise people are inclined to evade taxes. The composition of the tax system is another issue that needs caution. An unbalanced tax structure biased toward indirect taxes, as observed in Brazil and entire Latin America's region, creates opportunities for tax evasion and warrants tax policy reforms. Several successful tax policy reforms have been implemented in European countries. In this line, Jiménez and Sabaini (2012) suggest some implementations in order to improve the tax system in Latin American countries: (i) reduction of taxes on trade and international transactions, (ii) reduction of the number of selective taxes, (iii) simplification of taxes on small firms, (iv) reduction of the role of wage-based charges in funding social security systems, and (v) reduction of the marginal personal income tax rates. These tax policy reforms, if implemented, will have a mitigating effect on the levels of evasion for various taxes.

Second, the findings showed a noncorrelation between fines and tax evasion rate. As expected, Latin American countries' tax systems have a lot of complex rules and several fines to prevent tax evasion behavior. However, Alexandre (2013) highlighted that more rules lead to more difficulty in monitoring compliance, which has been called the "legislative inflation" by specialists. Brazil, for example, has one of the most complex tax codes in the world, and the difficulty in monitoring and auditing heightens the opportunity of tax evasion.

The prevention of tax evasion goes beyond the increase of fines to the improvement of tax institutions themselves. Figure 4 emphasizes this by indicating that economies with higher audit cost (Latin American countries) experience higher tax evasion compared to those with low audit cost (European countries). In this line, Brazil has the fourth highest audit cost in contrast with other countries analyzed in this study. Pereira (2017) showed that, among many other factors, there is a need for (i) public inspectors in Brazil to monitor individuals and firms, (ii) debureaucratization of the tax system, (iii) police power to tax agents, and (iv) reduction of the use of "social cost" technique, which means that tax authorities calculate "social cost" for every suspicious of fraud and tax evasion before implementing any investigation and investigate only suspicious with high "social cost" to the society. Most of these measures are implemented in most European countries and have presented great results.

## Conclusion and Recommendations

This study investigates the differences observed in the rate of tax evasion between the Global North and South countries by comparing key parameters of their tax systems, namely, tax burden, audit cost, and fines. This is achieved by applying GRW's seminal model using data from European and Latin American countries, whereby the spotlight is given to Brazil.

We found a couple of shortcomings in the tax system of Latin American economies that create the avenue for high tax evasion, which can only be resolved or reduced through auditing rather than reforming the entire tax system. The results showed that tax evasion can be reduced if the tax burden and audit costs were lower. However, the effect of fines on tax evasion remained unclear; evidence that is not unusual in the literature on the topic. Therefore, we suggest further in-depth investigation in this direction, perhaps at the national level. In sum, this study indicates that the improvement of public instruments that promote tax reform is the key to reducing audit costs and mitigating tax evasion in emerging economies. In addition, this study contributes to the international criminological literature on tax evasion by providing a comparative study of a global North–South perspective from an econometric perspective.

Regarding limitations and suggestions for future study, we suggest the expansion of the number of countries included in the analysis. This may provide more robust parameters compared to those found in this study, although tax evasion information is limited. We also recommend the application of the database used in this study in extensions of the GRW model as found in Lipatov (2006, 2008) in order to compare findings with this study where the classic GRW's seminal model is used.

## Appendix A

### *Derivation of the Audit Cost Model*

Expected taxpayer utility function:

$$U(p, q) = pq(H - st(H - L) - t(H - L) - 1) + qtH + (1 - t)H. \quad (\text{A1})$$

Expected revenue from tax authorities:

$$\pi(p, q) = pqt(H - L)(1 + s) - qt(H - L) + tH - pc, \quad (\text{A2})$$

$$U(p, q) = \pi(p, q), \quad (\text{A3})$$

$$q[(tH + st(H - L) - c] + (1 - q)[tH - c] = q(tL) + (1 - q)[tH], \quad (\text{A4})$$

$$c = qt(H - L)(1 + s). \quad (\text{A5})$$

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### Notes

1. The completed database is available: <https://bityli.com/dpVVO>.
2. It is important to mention that the values represent only result from interaction between variables on the model. The parameter value is useful just to compare between countries.

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