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Tax Expenditure and Evasion in the Value Added Tax in Latin America

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1. Introduction

Developing countries often experience low levels of tax collection, limiting their capacity to provide goods and services and promote economic and social development. While member countries of the Organization for Economic Cooperation and Development (OECD) had an average tax revenue of 33.7% of the gross domestic product (GDP) in 2019, this figure was 19.7% in developing countries.[1] The low collection levels in this second group of countries can be explained by various reasons: the characteristics of their economic structures, cultural and sociological factors, the weakness of public institutions, and the design of tax policies (Besley and Persson, 2014).

This study aims to contribute to the literature on the factors influencing low revenue collection by quantifying and examining the factors that diminish revenue from the Value Added Tax (VAT) in Latin American countries. Specifically, it analyzes how the presence of tax expenditures stemming from preferential treatments in VAT legislation and tax evasion diminish revenue. To accomplish this goal, this paper employs a standardized methodology to estimate tax expenditures and evasion, applying it across 16 Latin American countries. This is the first instance that a study utilizes a uniform procedure throughout the entire Latin American region, thereby facilitating comparison and analysis of determinants associated with estimated levels of tax expenditures and evasion—another goal of this paper.

The focus of this study on the Value Added Tax (VAT) is partly because this tax tends to be the primary source of revenue in developing countries, accounting for an average of 28.1% of total tax

[1] Own calculations based on data from Revenue Statistics: Comparative tables (OECD, 2022).

revenue in 2019 for a typical country in this group.[2] It is also the primary tax in Latin America, generating average revenues equivalent to 6.1% of GDP and representing about 28.3% of total tax revenues in the region.[3] Despite its significant role in country financing, the collection of this tax falls short of its potential levels. One reason is that developing countries often have lower standard VAT rates than developed ones (see Figure 1.a). In 2019, the average standard VAT rate for developed countries that had this tax at the central government level was 19%, while for developing countries, it was 14.7%. However, the difference in collection levels is not solely due to lower rates. When controlling for rate differences, lower collection persists in developing countries compared to developed ones. This becomes evident when analyzing a measure of efficiency in VAT collection known as C-efficiency. This measure is obtained by comparing the observed tax collection with potential collection, approximated by multiplying aggregate consumption in the economy by the standard tax rate.[4] In developed countries, the average C-efficiency in VAT collection was 52.9% in 2019, while in developing countries, it was 46.1% (see Figure 1.b).[5]

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[2] In developed countries, the VAT also has high collection levels, but it has a smaller weight on total tax revenues. According to our own calculations based on data from OECD Revenue Statistic database, the average collection of VAT for OECD member countries with this tax at the central government level was 6.7% of GDP, representing approximately 20.3% of their total tax revenues.

[3] Own calculations based on data from Revenue Statistics: Comparative Tables (OECD, 2022).

[4] The approximation of potential VAT collection by multiplying the aggregate consumption in the economy by the general tax rate is justified by the fact that VAT is a general consumption tax levied on the sales of goods and services. In the absence of preferential treatments, it should tax all final consumption. This makes the aggregate consumption of an economy a good simple approximation of the base of the VAT.

[5] Because the values reported in national accounts for aggregate consumption at market prices include taxes paid, the use of these figures would overstate the potential base for VAT. To correct this situation, in the denominator of the efficiency ratio, the VAT actually paid is subtracted from the aggregate consumption presented in national accounts. This correction is also performed by the OECD (2021) and Sarralde (2017).

This document analyzes two factors that diminish Value Added Tax (VAT) collection: tax expenditures and evasion of tax payment. Tax expenditures are standardly defined as revenue losses resulting from preferential treatments existing in tax codes. These include tax exemptions, deductions, tax credits, and payment deferrals, among others (Villela, Lemgruber, and Jorratt, 2011; IMF, 2019). In the case of VAT, common preferential treatments leading to tax expenditures include zero rates and other reduced rates applied to the sale of certain goods and services, tax exemptions for some sectors or goods and services, the non-obligation for small taxpayers to register and invoice the tax, and the fact that certain regions do not charge VAT, among others.

Preferential treatments in VAT are often introduced to stimulate policies that, for example, promote greater equity or develop sectors or areas considered priorities. While these treatments can contribute to reducing tax burdens among lower-income households (Pessino et al., 2023), they generate revenue losses that can be significant in cases where they benefit many economic agents (International Monetary Fund, 2022). Additionally, tax expenditures cause distortions in relative prices, affecting production (Crawford, Keen, and Smith, 2010) and consumption decisions (Mirrlees et al., 2011). These distortions may even alter economic growth rates (Acosta-Ormaechea and Morozumi, 2021).

Another significant source of losses in VAT collection originates from evasion of tax payment. Traditional economic literature argues that there are different determinants of evasion levels related to pecuniary benefits and the perceived risk of detection (Allingham and Sandmo, 1972). The latter is, in turn, linked to the capacity of tax administrations to monitor tax payment compliance. Due to a Latin Americank of comparable values, there are few studies comparing evasion levels and determinants of different taxes among countries.

A first objective of this study is to quantify the size of tax expenditures and evasion in VAT in Latin America. There is little reliable information on evasion amounts because studies are often scarce, and administrations do not systematically make them public.[6] Regarding tax expenditures, although an increasing number of countries in the region estimate these amounts and publish their results, they are difficult to compare because institutions use different methodologies. This study employs a common methodology to estimate tax expenditures and evasion in VAT in 16 Latin American countries. The methodology used is a top-down gap methodology[7] that identifies shortfalls in VAT collection compared to potential collection. The latter is obtained by considering the economic structure of countries and the standard rate of this tax. The methodology also allows breaking down these collection gaps into losses related to tax expenditures and evasion. One of the main advantages of this procedure is that it can be implemented with national accounts data, tax revenue reports, and each country's regulations, information that is standardly public.

After implementing this common methodology in 16 Latin American countries, we found that in those countries the average VAT tax expenditure is equivalent to 2.1% of GDP, or 26.4% of the

[6] Studies like those by Jorratt (2009) and Sabaini and Morán (2016) attempt to provide some insights into the historical behavior of tax evasion in the region, presenting data for some countries where information is available.

[7] There are three groups of methodologies commonly used for estimating tax collection gaps in VAT (Hutton, 2017). The first group employs econometric techniques, such as frontier analysis or time series analysis. The second group uses an approach known as top-down, which begins with a detailed analysis of tax expenditures and evasion for a random sample of taxpayers. The results are then extrapolated to obtain aggregated values for tax expenditures and evasion. These methodologies are not often used due to their high implementation costs, as they require enforcement actions for the taxpayers included in the sample. Finally, the third group of methodologies utilizes a bottom-up approach, as it starts by estimating potential revenues from various administrative data sources, which are then compared with the actual collection to derive estimates of tax expenditures and evasion.

potential VAT collection in 2019. These values are high compared to developed countries.[8] The study also reveals a high level of dispersion in tax expenditure levels: from 0.8% and 0.9% of GDP in Brazil and Chile, to 3.9% and 4% in Colombia and Honduras, respectively. At the sectoral level, the highest tax expenditures are observed in education, health, and manufacturing industries. Regarding products, food and beverages, and goods and services related to education and health top the list. Regarding evasion of VAT payment, the study finds it is also high in Latin America – an average of 2.3% of GDP – and heterogeneous – ranging from 1.2% of GDP in El Salvador to 4.5% in the Dominican Republic. The highest evasion rates are observed in the trade sector and accommodation and restaurant sectors.

A second objective of this work is to explore the factors that could affect the high levels of tax expenditures and evasion in VAT observed in Latin America. To do this, variables are identified from economic literature that could influence decisions to introduce tax expenditures and evade tax payment. Subsequently, it is calculated how these variables correlate with the estimated levels of tax expenditures and evasion using a panel database. The analyses suggest that tax expenditure tends to be higher in countries with higher standard VAT rates, in contexts with higher levels of poverty and inequality, and in countries where education, extractive industries, and trade represent a higher percentage of economies. They also indicate that evasion tends to be higher in contexts with a higher tax burden on the private sector.

This paper contributes to two strands of literature. The first one is that of quantifying VAT shortfalls in Latin American countries. Existing studies that cover a large number of countries

[8] A recent study by the European Commission for its member countries found that the average tax gap for VAT in 2019, including both tax expenditure and evasion, was 1.1% of GDP or 10.3% of potential revenue (European Commission et al., 2021). This study uses a methodology different from that of this work. While it also applies a bottom-up procedure, the focus is on the demand side rather than the supply side.

using a common methodology tend to use simple VAT C-efficiency calculations, comparing actual revenues to an approximation of VAT potential revenues. Some studies that use this methodology include Sarralde (2017) and a report by the Inter-American Development Bank (IDB, 2013). These studies find large revenues gaps but are unable to disentangle the reasons behind those large gaps. We contribute to this literature by measuring how much of the VAT revenue shortfalls are due to tax expenditures and how much to tax evasion. While existing research has touched upon various aspects of tax systems in developing countries (as Jorratt, 2009; Sabaini and Morán, 2016; and Economic Commission for Latin America and the Caribbean, ECLAC, 2020), to the best of our knowledge, none have undertaken a region-wide analysis of VAT-related challenges using a common methodology. By employing a uniform approach across 16 Latin American countries, this study facilitates direct comparison and sheds light on common trends and disparities. Furthermore, the identification of factors influencing tax expenditures and evasion not only enhances academic understanding but also provides practical insights for policymakers striving to enhance revenue collection and fiscal management in the region.

The second strand of literature this paper contributes to is that of determinants of tax expenditures and tax evasion. We document different statistically significant correlations, which are consistent with different theoretical models. We have no knowledge of a study doing this analysis for the VAT in Latin American countries. There are however some studies in other region, mainly Europe. For instance, Zídková (2014) finds that the VAT gap in the European Union was positively correlated with the final consumption as a proportion of GDP, also positively correlated to GDP per capita, and negatively correlated with the ratio of VAT collected to GDP in the period of analysis.

This document is structured into six sections, including the introduction. The second section presents the methodology and data used to measure tax expenditure and evasion of VAT in Latin America. The third and fourth sections discuss, respectively, the results obtained regarding tax expenditures and evasion, characterizing the main findings in terms of levels and differences between countries and sectors. The fifth section analyzes correlations between the estimated levels of tax expenditures and evasion with different relevant variables. The last section presents the main conclusions of the study.

2. Methodology and information sources for the calculation of tax expenditure and evasion

To estimate tax expenditure and evasion in the VAT in Latin American countries, this document employs a methodology based on tax gap measurement, based on that presented in Hutton (2017). This procedure compares the VAT collections reported by tax administrations or finance ministries of the countries to different estimates of potential VAT collection. Evasion is obtained by calculating the gap between the observed and potential collection that could be achieved according to current legislation and the existing tax base. On the other hand, tax expenditure is calculated as the gap between the beforementioned potential VAT collection and a new counterfactual potential VAT collection, which estimates how much VAT could be collected if there were no preferential treatments in the VAT legislation.

To estimate potential collections under different legal frameworks, the methodology replicates the process followed by taxpayers to determine their VAT tax obligations. The amount of VAT a taxpayer must pay is defined by three components: i) the VAT payable on imports, ii) the VAT

payable on domestic sales[9], and iii) the amount of deductible VAT for VAT paid on input purchases. Thus, the total potential VAT collection (VAT^P) can be expressed as:

$$VAT^P = \sum_j (VAT_j^M + VAT_j^S - VAT_j^X) \quad (1)$$

where j represents a particular sector of the economy, VAT_j^M is the potential VAT collection on imports for sector j, VAT_j^S is the potential VAT collection on domestic sales for sector j, and VAT_j^X is the potential amount of deductions in VAT payment related to the VAT amounts paid on input purchases for sector j. As can be noticed in the equation above, the model estimates potential VAT by sector, which then are aggregated up to obtain economywide figures.

To obtain the potential VAT collection described by equation (1), it is necessary to define each of its three components. Regarding the potential collection on imports for sector j (VAT_j^M) it is given by:

$$VAT_j^M = \sum_i (M_i^j * \tau_i) \quad (2)$$

where i denotes an imported good, M_i^j is the value of sector j's imports of good i, and τ_i is the statutory VAT rate applicable to good i.

Regarding the potential collection from domestic sales for sector j (VAT_j^S), it is calculated as:

$$VAT_j^S = \sum_i \left(Y_i^j - X_i^j\right) * \tau_i \quad (3)$$

[9] Only domestic sales are considered since the VAT legislations of the countries under consideration stipulate that exports are taxed at a zero rate.

where Y_i^j is the value of the total production of good i in sector j, and X_i^j is the value of the exports of good i from sector j.[10] The reason why the exports of good i from sector j are subtracted from the total production of the same good in that sector is that it allows determining taxable domestic sales.

Finally, the potential number of deductions in VAT payment related to the VAT amounts paid on input purchases for sector j (IVA_j^X) is determined by:

$$IVA_j^X = \sum_i \left(N_i^j + K_i^j\right) * \tau_i * \eta_i^j \quad (4)$$

where N_i^j is the intermediate consumption of good i in sector j, and K_i^j is the use of good i for gross capital formation in sector j. On the other hand, the parameter η_i^j seeks to reflect VAT exemptions related to the purchase of intermediate goods and capital formation.[11] η_i^j allows

[10] Hutton (2017) presents a different version of equation (3) where the right-hand side expression is multiplied by the proportion of value added in sector j, which is produced by entities registered for VAT, a variable denoted as r^j. In many countries, this value is less than 1, as small businesses are not required to pay VAT if their total sales are below certain thresholds established in the VAT legislation. If these provisions did not exist, the value of r^jwould be 1. Since obtaining the values of r^j requires having information that generally is not publicly available, for this study we assume that r^j equals one for all sectors. This assumption should not introduce significant distortions at the aggregate level, as most domestic sales tend to be made by companies with total sales exceeding the non-obligation thresholds established in the VAT legislation. However, in some sectors, it could be the case that small non-VAT-reporting companies generate significant levels of total sales in that sector. This situation would lead to overestimating evasion estimates in these sectors.

[11] Hutton (2017) presents a different version of equation (4), where the right-hand side expression is multiplied by the proportion of value added in sector j, which is produced by entities registered for VAT (r^j). Hutton's (2017) proposal is a simplification based on different assumptions, as the values of r^j apply similarly to $N_i^j * \tau_i * \left(1 - e^j\right) * \eta_i^j$ and $K_i^j * \tau_i * \left(1 - e^j\right) * \eta_i^j$, when in practice the coefficients for both terms could differ.

capturing whether a total, partial, or no deduction of VAT paid on the purchase of good i by sector j is allowed. For example, if a sector j is completely exempt from VAT, $\eta_i^j = 0$.

Considering all equations (1) to (4), the potential VAT collection in sector j (VAT_j^P) can be expressed as:

$$VAT_j^P = \sum_i (M_i^j * \tau_i) + \sum_i \left(Y_i^j - X_i^j\right) * \tau_i - \sum_i \left(N_i^j + K_i^j\right) * \tau_i * \eta_i^j \quad (5)$$

and the total potential VAT collection (VAT^P) is:

$$VAT^P = \sum_j VAT_j^P \quad (6)$$

With the definition of total potential collection, tax expenditure is obtained as the gap between the potential VAT collection under current legislation and the potential collection in a counterfactual scenario, with VAT tax legislation without preferential treatments for goods and services. To obtain the potential VAT collection in sector j under current legislation ($VAT_j^{P,A}$), equation (5) must be applied, using a vector of rates τ_i that captures the current statutory rates of this tax for different goods and services in the economy. On the other hand, to obtain the potential collection in sector j under a counterfactual scenario ($VAT_j^{P,C}$), a different vector of rates τ_i is required, where all goods and services, or at least those feasible to be taxed,[12] are taxed at the standard VAT rate. Thus, the tax expenditure due to the preferential treatment of sector j in the current VAT legislation (TE_j) can be expressed as:

[12] There are certain services produced in the economy that, by their nature, are considered difficult to tax, and for this reason, most countries with a VAT do not impose this tax on them. A significant portion of the methodologies for calculating VAT tax expenditure excludes tax expenditures related to not taxing these sectors.

$$TE_j = VAT_j^{P,C} - VAT_j^{P,A} \quad (7)$$

Given equation (8), the total tax expenditure in VAT (TE) is[13]:

$$TE = \sum_j TE_j \quad (8)$$

An important decision when identifying the total tax expenditure in VAT is to determine whether the elimination of preferential treatments is considered for all sectors of the economy or if sectors difficult to tax with this tax are excluded from this consideration. In this document, sectors difficult to tax are not included in the tax expenditure estimates. The sectors defined as difficult to tax and not included are public administration services, life insurance, and financial services.[14]

To obtain estimates of tax evasion in sector j (E_j), it is necessary to compare the tax collection in that sector (R_j) with the potential collection in that sector, given the current legislation ($VAT_j^{P,A}$). Thus, VAT evasion in sector j is:

$$E_j = VAT_j^{P,A} - R_j \quad (10)$$

Given these sector estimates, total evasion (E) is obtained as:

$$E = \sum_j E_j \quad (11)$$

An important point is that in this methodology, evasion is obtained as a residual, which can lead to an overestimation of its measurement. For example, the procedure includes in the measurement

[13] A similar methodology can be used to estimate tax expenditure by product instead of by sectors, identifying for each product the imports, domestic sales, and goods used as inputs for its production.

[14] Public health and education services could be considered challenging sectors to tax, especially when provided free of charge by the public sector. However, the national accounts of most analyzed countries do not allow differentiation between public and private provision. Therefore, these sectors are not considered in this study as difficult-to-tax sectors.

of evasion the revenue losses due to the closure and bankruptcy of companies, the non-obligation to pay VAT for small businesses, and reductions in tax burdens due to simplified taxation regimes, among other cases.

The described methodology is applied to the years between 2010 and 2019 for which there is sufficient national accounts information. However, not all analyzed countries have sufficient information to estimate tax expenditures and evasion for all the mentioned years. To have a greater number of observations contributing to correlation analyses, the values of tax expenditures and evasion were imputed to complete the missing years. This was done assuming that the sectorial tax expenditure as a percentage of sectorial GDP remains constant relative to the last available observation. Then, these sectorial values are summed to obtain aggregated values for the entire economy. This methodology leads to imputed total tax expenditure values varying from previous years because of changes in the sectorial composition of GDP.

The presented methodology has several advantages, such as credibly modeling the taxable base of VAT and allowing for calculations of tax expenditures and evasion by economic sectors, but it does not consider responses to behaviors of economic agents (Gemmell and Hasseldine, 2014). Specifically, the methodology assumes that taxable bases are fixed and do not vary in response to changes in VAT tax statutes. This lack of modeling changes in taxable bases due to modifications in the behavior of economic agents is a weakness of the procedure, as it leads to an overestimation of tax expenditures.

2.2. Information Sources and Methodology Implementation

The implementation of the described methodology requires various sources of information. To calculate tax expenditures, data on the production of goods and services across different economic sectors, the inputs used in such production, and information on imports and exports of goods and

services in an economy are needed. Additionally, it requires information on VAT rates applicable to these different goods and services, as well as on any special treatments outlined in the VAT legislation. Finally, to calculate evasion, data on the actual tax collection is necessary.

Information on production, inputs, and foreign trade. It comes from supply and use accounts (SUA) or input-output matrices (IOM), which are part of the national accounts system of countries. Table 1 presents the databases used for the 16 countries analyzed in this study. These countries were selected because they have recent information and sufficient disaggregation to perform the required calculations.[15]

Information on tax codes. Regarding the VAT rates applicable to different goods and services, a thorough review of the tax codes of the countries was carried out to obtain the statutory rates and collect all preferential treatments and exemptions. The review was done for all the years included in the sample, to capture changes in the legislation. Table 2 summarizes the different VAT rates applied in the region. Annex 1 presents a detailed structure of goods and services with preferential treatment, including zero-rated and exempt goods (see Table A.1.1).

Information on VAT collection. Information from tax administrations or ministries of finance of the countries was used (see Appendix 2). In the case of some countries, collection information is disaggregated by sector, which allowed for sectoral evasion estimates. However, most of the countries considered in the study only provide public information at an aggregate level. In these cases, it was not possible to obtain sectoral evasion estimates.

[15] The low sectoral disaggregation in some countries in occasions makes it difficult to assign VAT rates to the different sectors or goods and services. When faced with this challenge, we assign the most economic relevant tax rate for specific sector being considered. It is worth mentioning that the countries in our sample with the fewest sectors do not exhibit much variation in tax rates within a given sector, so the beforementioned problem is not acute and should not bias the results presented.

3. Tax Expenditure in Latin American Countries

This section presents the tax expenditures obtained for the 16 Latin American countries, using the methodology described in the previous section. The average expenditure in 2019 average 2.1% of GDP, with significant heterogeneity across countries (see Figure 2).[16] While in Colombia, Honduras, and the Dominican Republic, VAT tax expenditures exceeded 3% of GDP, in Brazil and Chile, they did not reach 1%.

By sectors, the highest tax expenditures are observed in manufacturing industries, education, and health, with averages of 0.45%, 0.42%, and 0.30% of GDP, respectively (see Figure 3). In the case of manufacturing industries, the highest tax expenditures occur in food and beverage processing, wood and wood products, and chemicals and chemical products, including medicines (see Figure A.3.1 in Appendix 3). These three subsectors present tax expenditures of 0.28%, 0.15%, and 0.09% of GDP, respectively.

While tax expenditures in manufacturing, education, and health are high in most countries, there is significant heterogeneity in the region (see Table A.3.2 in Appendix 3). For example, in manufacturing industries, countries like Colombia, Peru, and the Dominican Republic have tax expenditures of over 1%, while in Brazil, Bolivia, Chile, and Mexico, this figure is close to 0%. In this case, the dispersion is mainly explained by differences in treatment in tax statutes. There are also significant differences in sectors such as education and health. In education, tax expenditure values range from 0.07% to 1.1% of GDP, and in health, between 0.10% and 0.78%. This is due

[16] The average of 2.1% of GDP, as well as the values in figure 2 through 6, include figures obtained through the imputation method discussed in the section 2.

to differences in treatment in tax statutes,[17] methodological issues in national accounts that make it difficult to identify the sector,[18] and the composition of the economy,[19] among other factors.

Regarding the type of rate, the highest tax expenditures observed in Latin American countries are related to zero-rated products, followed by exempt goods (see Figure 4). Zero-rated goods generate an average tax expenditure equivalent to 1.68% of GDP, representing 76.7% of tax expenditures. Exempt goods, on the other hand, generate an equivalent of 0.39% of GDP, which accounts for 18.1% of the total. Finally, the lowest tax expenditure is observed in differential rates, which is zero in several countries that do not have this type of rate. Tax expenditure for differential rates is equivalent to 0.11% of GDP and represents 5.18% of tax expenditures.[20]

For goods and services,[21] the highest levels of tax expenditure are observed in education, food and beverages, and health (see Figure 5 and Table A.3.3), which is consistent with the results obtained at the sectoral level. In these three sectors, tax expenditures reach on average 0.47%, 0.43%, and 0.37% of GDP, respectively. Significant expenditures are also observed in transportation, averaging 0.18% of GDP. Following these are other sectors such as commerce; electricity, gas, and steam; leather and leather products; and accommodation and restaurants.

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[17] In Argentina, the low tax expenditure in the health sector is because only a portion of the service is taxed, whereas other countries tax the entire sector at zero rate.

[18] In Bolivia, the health sector is not included separately in the input-output matrix; instead, it is included within the public administration sector.

[19] In El Salvador and Panama, the health sector has very low values in the national accounts, around 2% of GDP.

[20] The Latin American countries that only have a general rate, zero rates, and exempt from VAT, without having other differential rates, are Chile, Ecuador, El Salvador, Guatemala, Honduras, Panama, Peru, and the Dominican Republic.

[21] For this classification, we use the categories contained in the Central Product Classification (CPC).

The average tax expenditure on VAT in Latin American has remained stable between 2010 and 2019, around 2.14% of GDP (see Figure 6). In the countries, it also remained relatively stable, except for Colombia, where it increased by approximately 0.45% of GDP between 2010 and 2019 (see Figure A.3.2 and Table A.3.4 in Appendix 3).[22]

4. Evasion in Latin American countries

The average VAT evasion across the 16 countries in Latin America analyzed with the methodology described in the second section of this document amounts to 2.3% of GDP or 27.6% of potential revenue (see Figure 7). [23] There is a high level of heterogeneity: the Dominican Republic stands out for high levels of evasion, where it represents 4.5% of GDP and 36.7% of potential revenue. At the other extreme is El Salvador, where VAT evasion represents 1.2% of GDP and 18.9% of potential revenue.[24]

Six countries[25] have publicly available information on VAT collection with some level of sectoral disaggregation, allowing for the calculation of evasion levels for certain sectors.[26] In these countries, the highest absolute levels of evasion are observed in the accommodation and food services sector with an average of 1.36% of the sector's GDP (see Figure 8). This is followed by trade with 1.34%, and manufacturing with 0.78%.

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[22] Appendix 3 develops a discussion about the tax reforms that have occurred in these countries, where significant changes are observed.

[23] The average of 2.3% of GDP, as well as the values in figure 7 through 9, include figures obtained through the imputation method discussed in the section 2.

[24] The lowest evasion rate is detected in Uruguay, where it represents 17.7% of potential revenue.

[25] The six countries are Argentina, Chile, Colombia, Ecuador, Peru, and the Dominican Republic.

[26] The sectors presented in the revenue reports often do not coincide with those used in national accounts, which prevents computations of evasion for all sectors.

The evolution over time of average VAT evasion in LATIN AMERICA has remained relatively stable: it has increased from 2.25% of GDP in 2011 to 2.29% in 2019 (see Figure 9). Meanwhile, the evasion rate showed a slightly upward trend: it has increased from 26.1% to 27.6% over the same period. The evolution by country shows differences with significant increases in Chile and Honduras, and a significant decrease in Uruguay. In the rest of the countries, evasion remained relatively stable (see Figure A.4.1 and Table A.4.1 in Appendix 4).

5. Correlations with tax expenditures and evasion

This section delves into factors correlated with estimated tax expenditures and evasion levels, utilizing a common methodology for calculations. To do this, we estimate linear regressions using the calculated values of tax expenditure and evasion as dependent variables. This analysis uses a balanced panel for the 16 countries considered with annual data from 2011 to 2019. The study is based on fixed effects estimations; therefore, it includes an intercept for each country and each year. The equation estimated to analyze the correlations is:

$$Y_{i,t} = \propto_i + \propto_t + \beta * X_{i,t} + \varepsilon_{i,t}$$

where $Y_{i,t}$ corresponds to the outcome variable (e.g., level of tax expenditure and level or rate of evasion) for country i in year t. $\propto$ captures country and year effects. β is a vector of coefficients corresponding to variables contained in matrix $X_{i,t}$, which captures the correlations of interest. Finally, $\varepsilon_{i,t}$ is the error term, with robust errors used in the estimations. The European Commission et al. (2021) uses a similar equation to analyze VAT tax gaps in European Union countries.

To define the variables included in the regressions, we primarily use considerations from theoretical models, as the empirical literature on this topic using cross-country data is reality small. The variables we consider fall into four groups. The first one is tax burdens. Allingham and Sandmo (1972) argue that incentives to evade a tax are higher when tax rates are high. High tax

rates might also generate pressure to introduce preferential tax treatments, to reduce the tax burden on the population (Bird and Gendron, 2007). The second group of variables we consider relates to social/income variables, such as GDP per capita, poverty rates and inequality levels. These variables could be relevant, as the VAT is known for being a regressive tax, which is also true in Latin America countries (Pessino et al., 2023). Regarding tax expenditure, having lower incomes and high poverty rates could create pressures to reduce taxation on goods and services that represent a high share of poor household spending. This is case the case of food, which present lower VAT rates in most countries considered. Higher poverty levels can also lead to higher evasion rates, as poor household tend to buy more than richer households in informal businesses (Bachas, Gadenne and Jensen, 2023).

The third group of variables relates economic activity, mostly sectoral composition and trade. In the case of tax expenditure, sectoral composition is as many preferential treatments tend to emerge from lower rates or no taxation on sectors producing merit goods (e.g education and health). Similar, some sectors are hard to tax with an VAT (e.g. finance), reason why government decide not to tax them or only tax a few of their activities. For evasion, certain sectors are easier to monitor for tax administration, and therefore sector composition can affect the economywide evasion level. The four and last group of variables considered institutional variables, such as institutional capacity or regulatory quality.[27]

The variables of the different groups were considered one at a time, given the high correlations between them. All regressions control for the standard VAT rate to isolate the effect on the decision to introduce tax benefits. This is necessary, as several control variables may also affect the decision

[27]These variables do not appear in Tables 3 and 4 as they did not produce statistically significant correlations.

on the level of the standard rate. The correlations of various economic variables with estimated tax expenditures are shown in Table 3. [28]

An important correlation observed is between the level of tax expenditures and the standard VAT rate. The results indicate that, on average in the sample, an additional percentage point of VAT rate is associated with increases in tax expenditures equivalent to around 0.2% of GDP. This correlation is partly mechanical, as any preferential treatment introduced becomes more costly in contexts with higher standard VAT rates. On the other hand, there may be political economy factors leading to this positive correlation. In particular, higher standard VAT rates increase the tax burden on the population, which may pressure governments to introduce preferential treatments to reduce rates on certain goods and services, leading to higher tax expenditures.

Tax expenditure levels also appear to be positively correlated with levels of corporate income tax rates, although the coefficient value is relatively low.[29] This positive correlation would indicate that in contexts of higher tax burdens on corporate income, there are greater pressures to reduce the VAT burdens they face.

Other significant correlations observed are the results between variables related to poverty and inequality, and levels of tax expenditures. Higher levels of poverty, lower levels of per capita GDP, and higher levels of income inequality are correlated with higher levels of tax expenditure. This result may be linked to arguments such as VAT often being considered a regressive tax, with a high burden on lower-income households. This regressivity of the tax may generate greater

[28]To reduce the number of regressions being shown, those with statistically significant results were prioritized for reported.

[29] The result in the table is statistically significant at a significance level of 12%. When not controlling for the VAT rate, the coefficient takes a value of 0.029 and is statistically significant at a significance level of 1%.

pressures for governments to introduce tax expenditures, particularly in food and medicine, in contexts where poverty and inequality are higher.

Regarding the composition of economic activity, correlations between levels of tax expenditures and the relative sizes of different sectors in the economy were analyzed. The highest positive correlations were found regarding the education and health sectors, although in the case of health, the relationship is not statistically significant. These higher correlation values are not surprising given the discussions in previous sections. Positive correlations are also found in contexts with a greater emphasis on trade and extractive industries.[30] There are negative correlations, although not significant, in agriculture and construction.[31]

With the remaining variables, no significant correlation is found, except for the level of imports relative to GDP. There are no correlations observed with the level of public expenditure, which was considered a variable related to the need for resources.

Similar analyses were also conducted to characterize the correlations of various economic variables with the levels and rates of estimated evasion. The regressions did not yield statistically significant correlations in most of the cases considered, suggesting that it would be desirable to have more disaggregated information. In some specific analyses, significant results emerged at commonly used significance levels or not too high significance levels (see Table 4).

The main significant correlations with evasion were observed when considering the sectoral composition of economies. In contexts where the construction sector represents a larger proportion

[30] The positive correlation with extractive industries could be due to countries with larger mining sectors having higher royalty revenues, which creates fiscal space for them to have higher tax expenditures on VAT.

[31] In the case of construction, the correlation is statistically significant at a significance level of 10%.

of the economies, the level and rate of evasion are higher.[32] A higher relative weight of the health sector in the economy is also positively correlated with higher evasion rates, although there is no significant effect on evasion levels instead of evasion rates.[33] On the other hand, a greater participation of the extractive industries sector is correlated with lower levels and rates of evasion. This may be linked to the fact that much of these productions are for export, which are taxed at zero rate.

Another variable that has a negative correlation with evasion is the ease of paying taxes index developed by the World Bank and Price Waterhouse Cooper (PwC). This composite index captures both the tax burden faced by companies and the ease of tax payment by them. Higher values of this index reflect more favorable tax payment contexts for companies. The correlation found indicates that evasion is lower in contexts with more favorable tax payment conditions.[34] This result is consistent, moreover, with the one found for the VAT rate and evasion level, where it is observed that, in contexts with higher standard VAT rates, evasion levels are higher.

6. Conclusions

This study used a common tax gap methodology to estimate levels of tax expenditures and VAT evasion in 16 countries in Latin America. The results indicate that revenue losses from these two factors would be 4.4% of GDP for an average country, of which 2.3% corresponds to evasion and

[32] The correlation of the percentage of construction in GDP with the level of evasion is statistically significant at a significance level of 12%.

[33] The correlation of the percentage of extractive industries in GDP with the evasion rate is statistically significant at a significance level of 16%.

[34] The correlation of the index with the level of evasion is statistically significant at a significance level of 14%.

the rest to tax expenditures. These figures are high, considering that VAT revenues in the region are, on average, around 6% of GDP.

The study also revealed that there is a great heterogeneity of tax expenditures and evasion both among countries and sectors. Despite this, the results show certain common patterns. Tax expenditures are mainly explained by preferential treatments in education, food, and health, sectors that tend to account for more than half of tax expenditures. The results of the correlation analysis also indicate that levels of tax expenditures tend to be positively correlated with standard VAT rates, in contexts with higher levels of poverty and inequality, and in countries where education, extractive industries, and trade represent a higher percentage of the economies. Regarding evasion, it is observed that higher relative levels tend to be observed in countries where the tax burden for the private sector is higher.

Another important aspect that emerges from the analysis is that levels of tax expenditures and evasion have remained relatively constant over the last decade in most countries in the region. Reducing them should be a priority for most countries, as they face demand to increase spending in critical areas. To reduce VAT expenditures, countries must eliminate existing preferential tax treatments. Previous effort to eliminate preferential tax treatments in LAC have proven difficult, given their effects on the poor and the middle class. Our results show that VAT expenditures tend to be higher in context of high poverty and inequality, which is the case in most Latina American countries. Therefore, efforts to reduce tax expenditure should consider mitigating measures to lower income households. Some countries in Latin American have implemented in recent years policies that reimburse the VAT to poor households (Rasteletti, 2021). These *personalized*-VAT policies could be implemented alongside the elimination of preferential treatments. Such

combination of policies would reduce tax expenditures, at the same time that lower income households are protected from higher VAT burdens.

Regarding tax evasion, tax administrations in the Latin America should continue their modernization efforts, particularly regarding their digital transformation. Several countries in the region have introduced e-invoicing over the last two decades and e-invoicing is mandatory for most firms and service providers in the economy. The data provided by e-invoicing could be critical to detect and combat evasion. Tax administration should therefore increase their data analytics capabilities to strengthen their capacity regarding tax compliance.

Bibliographical References

Acosta-Ormaechea, S., and Morozumi, A. (2021), "The value-added tax and growth: design matters", International Tax and Public Finance, 28: 1211–1241.

Allingham, M. and Sandmo, A. (1972), "Income Tax Evasion: A Theoretical Analysis", Journal of Public Economics, 1(3–4): 323–38.

Bachas, P., Gadenne, L., and Jensen, A. (2023), "Informality, Consumption Taxes, and Redistribution", The Review of Economic Studies, (21 September 2023): 1-31.

Besley, T. and Persson, T. (2014), "Why Do Developing Countries Tax So Little?", Journal of Economic Perspectives, 28 (4): 99-120.

Bird, R. and Gendron. P. (2007). The VAT in Developing and Transitional Countries. Cambridge University Press.

Crawford, I., M. Keen and Smith, S. (2010), "Value Added Taxes and Excises", pp. 275-362 in James Mirrlees and others (eds), Dimensions of Tax Design: The Mirrlees Review, Oxford: Oxford University Press for Institute for Fiscal Studies.

Economic Commission for Latin America and the Caribbean (ECLAC), Fiscal Panorama of Latin America and the Caribbean 2020 (LC/PUB.2020/6-P), Santiago, 2020.

European Commission, CASE, Poniatowski, G., M. Bonch-Osmolovskiy and Śmietanka, A. (2021), "VAT Gap in the EU Report 2021", Publications Office of the European Union, Luxembourg.

Gemmell, N. and Hasseldine, J. (2014), "Taxpayers' behavioural responses and measures of tax compliance 'gaps': A critique and a new measure", Fiscal Studies, Vol. 35(3), 275-296.

Hutton, M. (2017), "The Revenue Administration–Gap Analysis Program: Model and Methodology for Value-Added Tax Gap Estimation", IMF Technical Notes and Manual 17/04.

Inter-American Development Bank. (2013), More Than Revenues. Taxation as a Development Tool, A. Corbacho, V. Fretes Cibils, E. Lora (editors). Palgrave Macmillan New York.

International Monetary Fund (2019), "Tax Expenditure Reporting and Its Use in Fiscal Management A Guide for Developing Economies", IMF Fiscal Affairs Department. How to notes 19/01.

International Monetary Fund (2022), "How to Evaluate Tax Expenditures", IMF Fiscal Affairs Department. How to notes 22/05.

Jorrat, M. (2009), "Estimación del impacto redistributivo de un IVA standardizado y transferencia a los deciles más pobres en Chile", Mimeo.

Mirrlees, J., S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles and Poterba, J. (2011). Tax by Design: The Mirrlees Review, Oxford: Oxford University Press for Institute for Fiscal Studies.

OECD (2021), "Consumption Tax Trends 2020: VAT/GST and Excise Rates, Trends and Policy Issues.

OECD (2022), "Revenue Statistics: Comparative tables, OECD Tax Statistics (database). Disponible en: https://doi.org/10.1787/data-00262-en.

Pessino, C., A. Rasteletti, D. Artana and Lustig, N. (2023), "Distributional Effects of Taxation in Latin America", Inter-American Development Bank. IDB Working Paper Series # IDB-WP-01534.

Rasteletti, A. (2021), "IVA personalizado: Experiencia de 5 países y su importancia estratégica para la política y la administración tributaria", Web blog post. *Recaudando Bienestar*. January, 25 2021.

Sabaini, J. C. and Morán, D. (2016), "Evasión tributaria en América Latina: Nuevos y antiguos desafíos en la cuantificación del fenómeno en los países de la región", Cepal. Serie Macroeconomía del Desarrollo #172.

Sarralde, S. (2017), "El impuesto sobre el valor agregado: Recaudación, eficiencia, gastos tributarios e ineficiencias en América Latina", Documento de Trabajo CIAT #5.

Villela, L., A. Lemgruber and Jorratt, M. (2011), "Los presupuestos de gastos tributarios. Conceptos y desafíos de implementación", Documento de trabajo del BID # IDB-WP-131.

Zídková, H. (2014), "Determinants of VAT Gap in EU", Prague Economic Papers, 23(4): 514–530.

Tables and Figures

Table 1. Data Sources by Country

Country	Economic Sector Data	Years	Sectors	Source
Argentina	SUA	2018	223	Instituto Nacional de Estadística y Censos
Bolivia	IOM	2010 - 2014	35	Instituto Nacional de Estadística
Brazil	IOM	2018	128	Instituto Brasileño de Geografía y estadística
Chile	SUA	2008 - 2018	181	Banco Central de Chile
Colombia	SUA	2005 - 2020	394	Departamento Administrativo Nacional de Estadística
Costa Rica	SUA	2012 - 2017	183	Banco Central de Costa Rica
Dominican Republic	SUA	2010 - 2016	69	Banco Central de la República Dominicana
Ecuador	SUA	2007 - 2019	279	Banco Central del Ecuador
Salvador	SUA	2014 - 2018	69	Banco Central de Reserva de El Salvador
Guatemala	IOM	2013	152	Banco de Guatemala
Honduras	SUA	2008 - 2018	55	Banco Central de Honduras
Mexico	SUA	2003 - 2019	265	Instituto Nacional de Estadística y Geografía
Panama	SUA	2007 - 2012	60	Instituto Nacional de Estadística y Censo
Paraguay	SUA	2008 - 2019	33	Banco Central del Paraguay
Peru	SUA	2010 - 2019	14	Instituto Nacional de Estadística e Informática
Uruguay	SUA	2012 y 2016	21	Banco Central de Uruguay

Source: Own elaboration

Table 2. Statutory VAT Rates by Country

Country	TARIFF		
	Standard	Reduced	Increased
Argentina	21	2,5 and 10,5	27
Bolivia	13	-	-
Brazil	17	4, 7 and 12	25
Chile	19	-	-
Colombia	19	5	-
Costa Rica	13	5 and 10	-
Dominican Republic	18	16	-
Ecuador	12	-	-
Salvador	13	-	-
Guatemala	12	-	-
Honduras	15	-	18
Mexico	16	-	-
Panama	7	-	10 and 15
Paraguay	10	5	-
Peru	18	-	-
Uruguay	22	10	-

Source: Own elaboration.

Note: The tax rates presented reflect the most common tax rates in the period considered. Different rates can applied to years when the statuary code had different rates.

Table 3. Correlations with tax expenditure to GDP ratio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Standard VAT rate	0.2181***	0.1875***	0.2319***	0.2295***	0.2289***	0.1992***	0.2182***	0.2217**	0.2106***
	(0.006)	(0.018)	(0.006)	(0.006)	(0.006)	(0.014)	(0.006)	(0.000)	(0.006)
Corporate income tax rate		0.0162							
		(0.009)							
GDP per capita (in logs)			-0.6482**						
			(0.301)						
Poverty rate (at US$3.20)				0.0145*					
				(0.007)					
Gini coefficient					0.0193*				
					(0.011)				
Agriculture						-0.0157			
						(0.020)			
Extractives industries						0.0225*			
						(0.011)			
Manufacturing						0.0290			
						(0.022)			
Construction						-0.0207			
						(0.013)			
Retail						0.0038*			
						(0.002)			
Education						0.0523***			
						(0.017)			
Health						0.0513			
						(0.042)			
Imports /GDP							0.0087*		
							(0.004)		
Exports /GDP								0.0069	
								(0.0051)	
Public Expenditure /GDP									0.0114
									(0.009)
Number of countries	16	16	16	14	14	16	16	16	16
Observations	146	146	146	126	126	144	144	144	144

Note: The dependent variable is the ratio of total tax expenditure to GDP. The estimations include fixed effects by country and by year. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10, 5, and 1% levels, respectively.

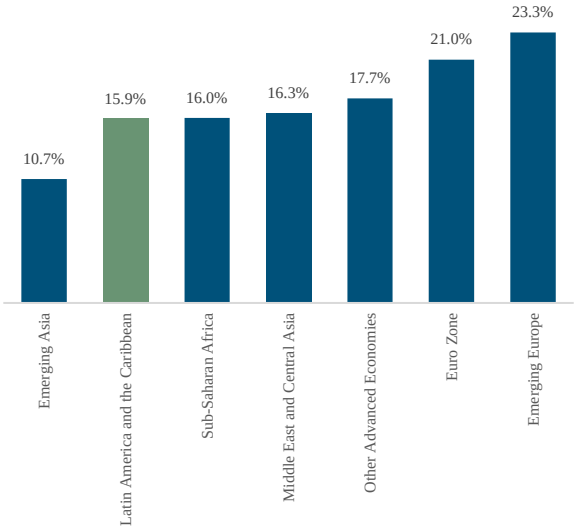
Table 4. Correlations with tax evasion to GDP ratio

Dependent Variable	Evasion / GDP			Evasion / Potential VAT revenue	
	(1)	(3)	(4)	(6)	(7)
Standard VAT rate	0.0028***				
	(0.000)				
Ease of paying taxes		-0.0089		-0.0832*	
		(0.006)		(0.046)	
Agriculture			-0.0097		-0.8872**
			(0.071)		(0.360)
Extractive industries			-0.0742*		-0.4345
			(0.036)		(0.290)
Manufacturing			-0.0303		-0.2508
			(0.042)		(0.521)
Construction			0.0485		0.5735*
			(0.029)		(0.316)
Retail			0.0017		0.0777
			(0.002)		(0.048)
Education			-0.0065		1.149
			(0.095)		(0.949)
Health			0.0356		2.674**
			(0.085)		(1.256)
# of countries	16	16	16	16	16
Observations	144	144	144	144	144

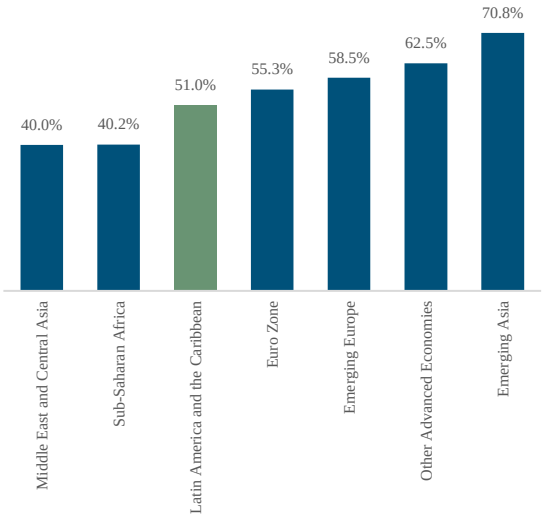
Note: Estimates include country and year fixed effects. Robust standard errors in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Figure 1. VAT Rates and Efficiency in VAT Collection Levels in 2019

a. Rates

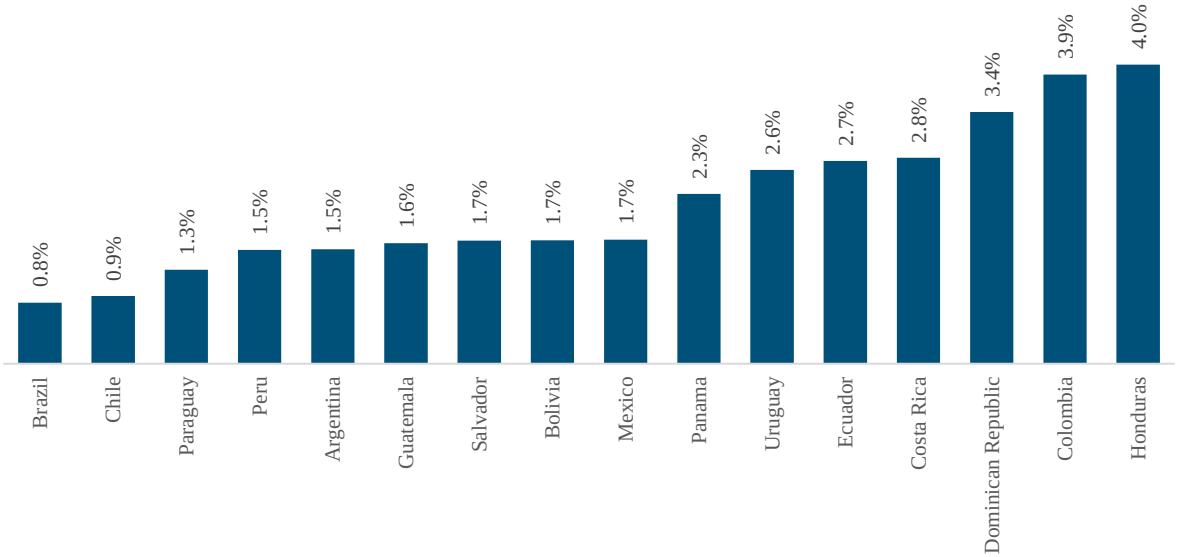


b. Collection efficiency



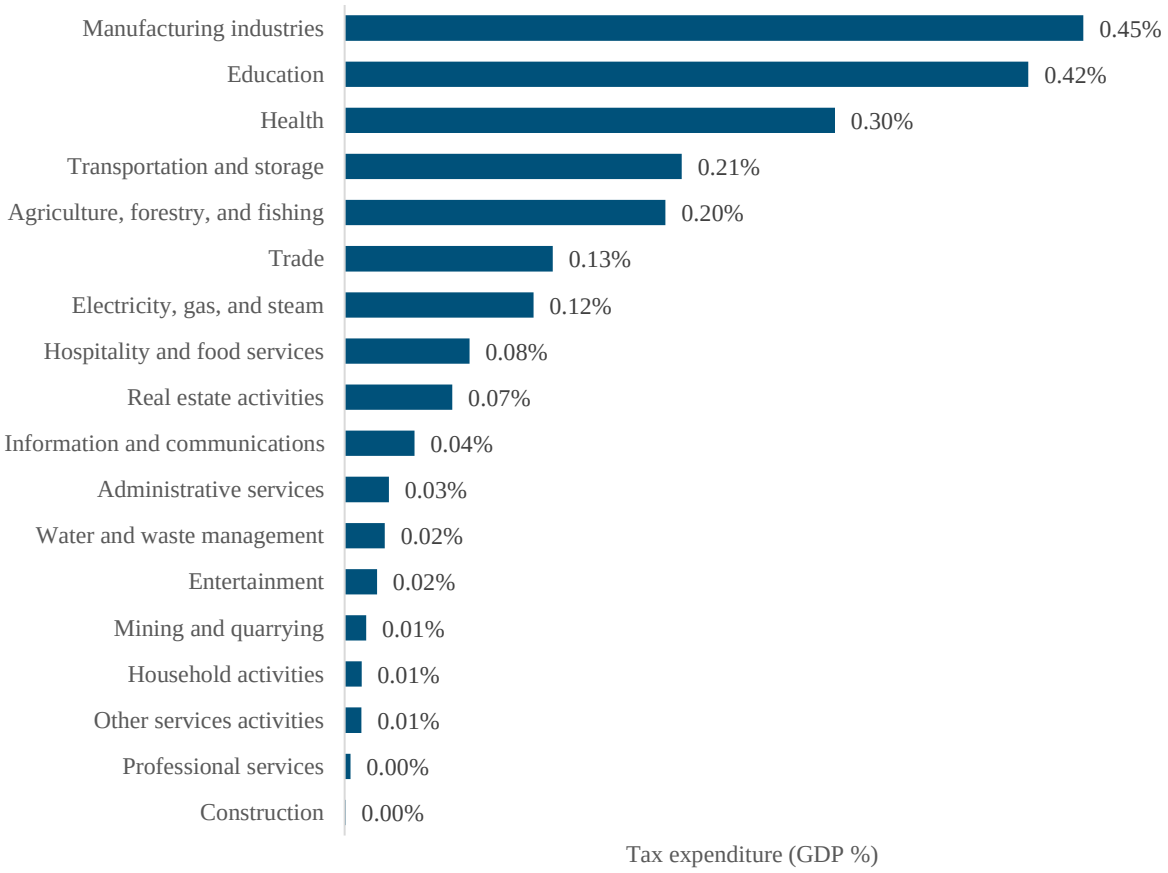
Source: Own calculations based on data from the OECD, the Inter-American Center of Tax Administrations (CIAT), and the World Bank. Note: The charts present simple averages of country values. The grouping of countries follows the classification of the International Monetary Fund (IMF) available at: https://www.imf.org/external/pubs/ft/weo/2022/01/weodata/groups.htm.

Figure 2. Tax expenditure as % of GDP, 2019



Source: Own elaboration.

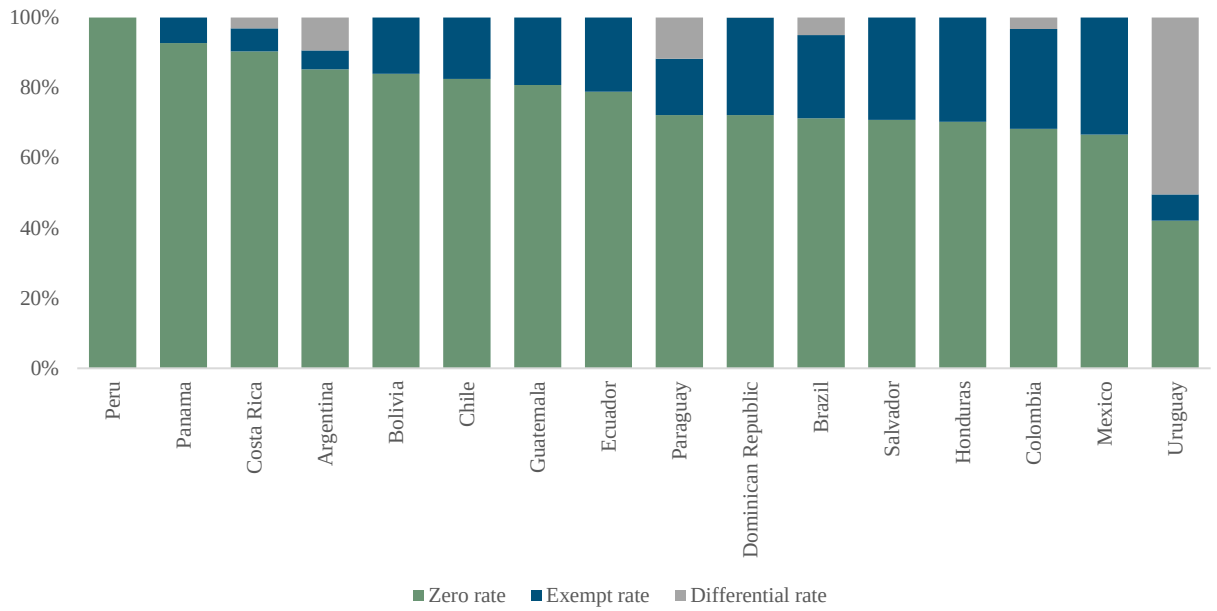
Figure 3. Average Tax Expenditure by Sector, 2019



Source: Own elaboration.

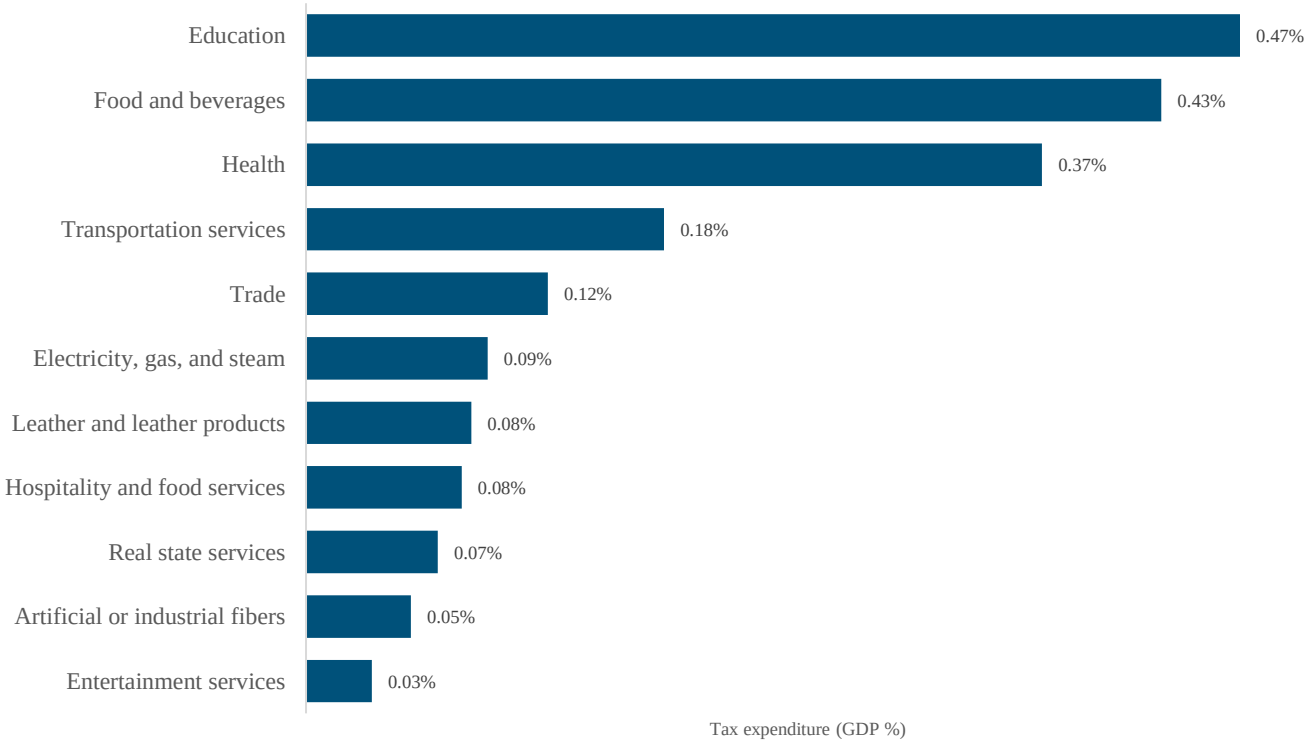
Note: Average across countries.

Figure 4. Participation of preferential treatments in total tax expenditure, 2019



Source: Own elaboration.

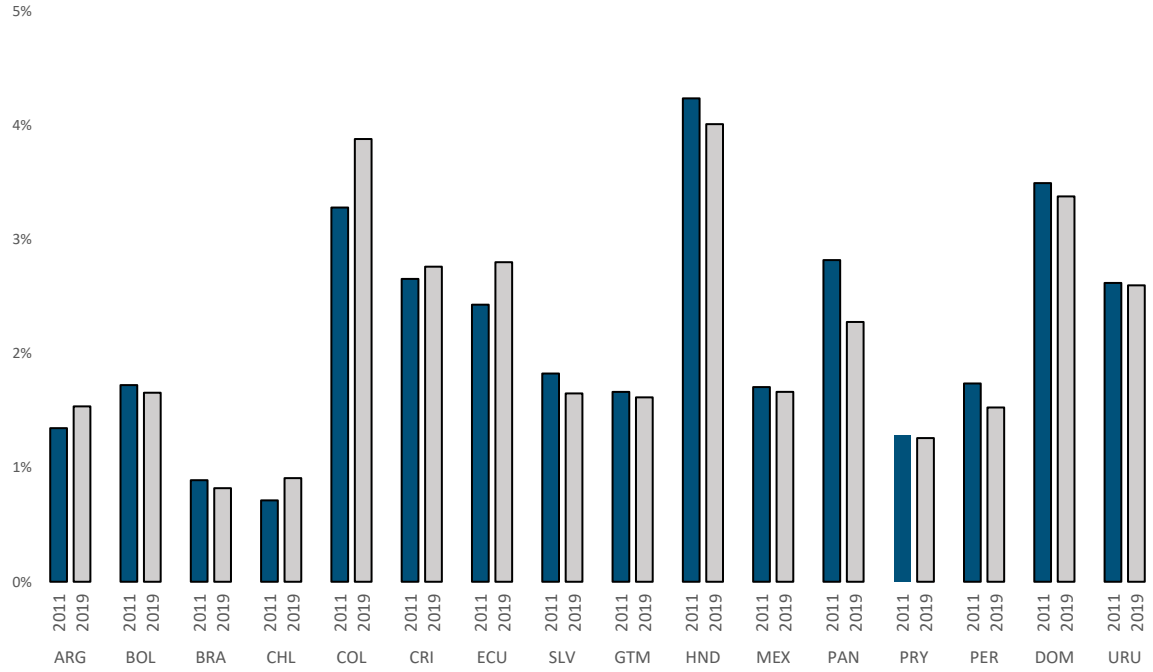
Figure 5. Average tax expenditure per goods and services, 2019



Source: Own elaboration.

Note: Average across countries.

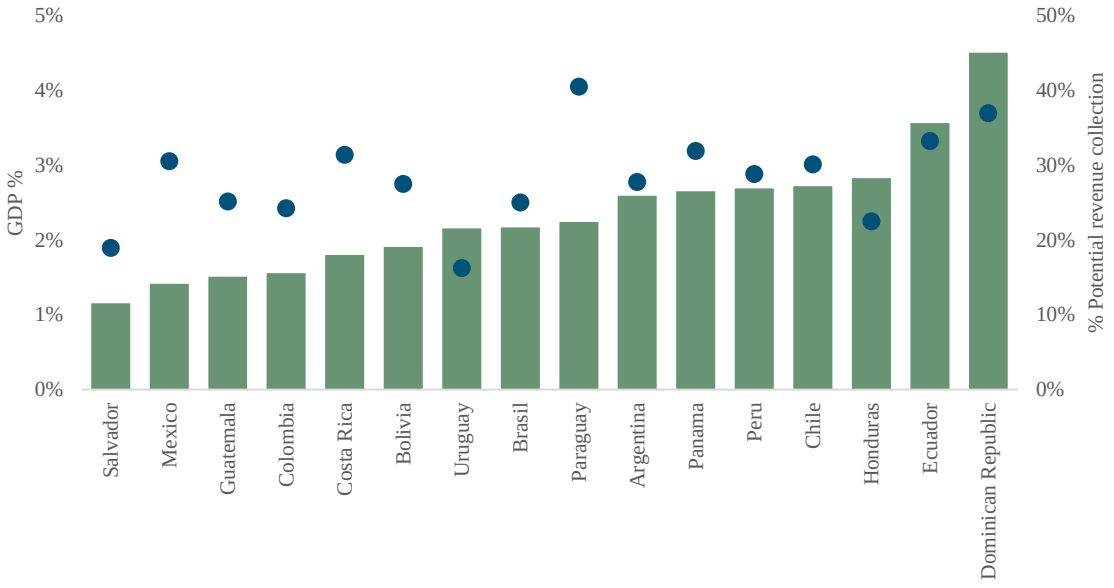
Figure 6. Evolution of tax expenditure



Source: Own elaboration.

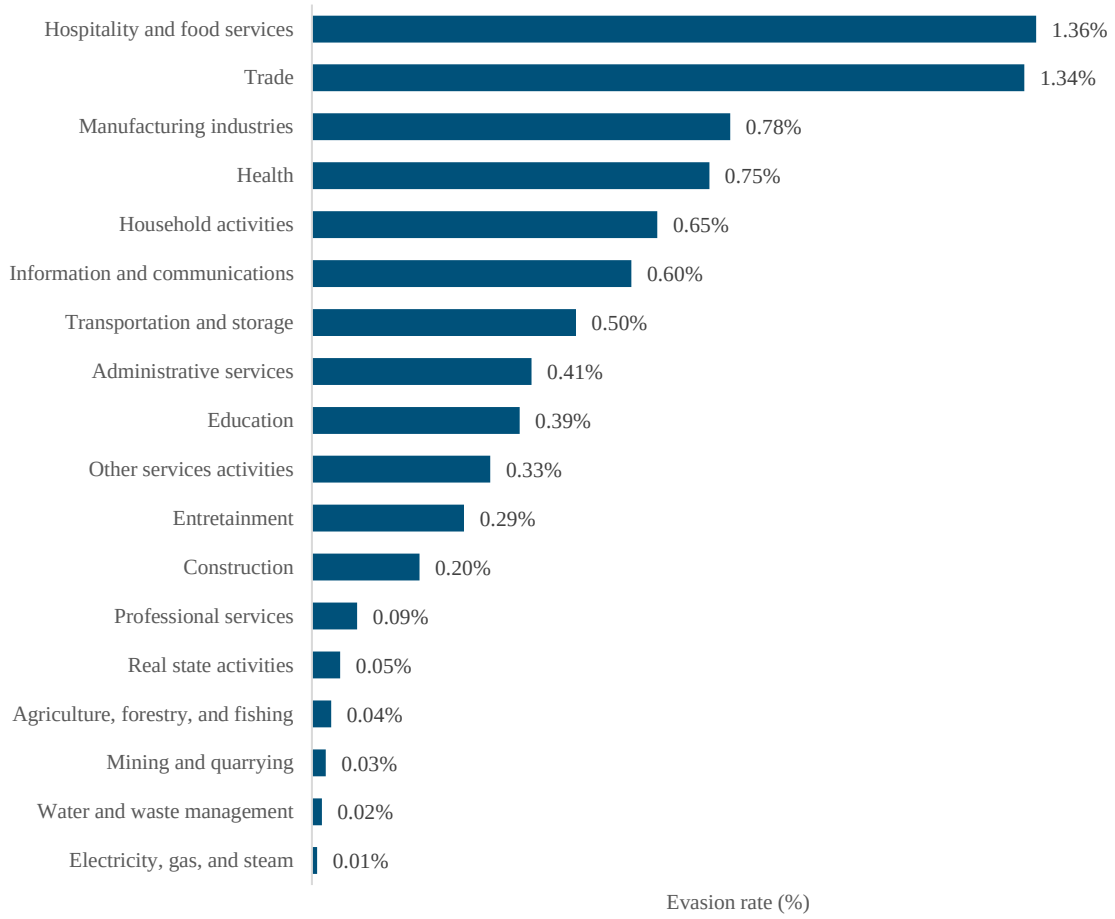
Note: Average across countries.

Figure 7. VAT evasion as % of sector GDP, 2019



Source: Own elaboration.

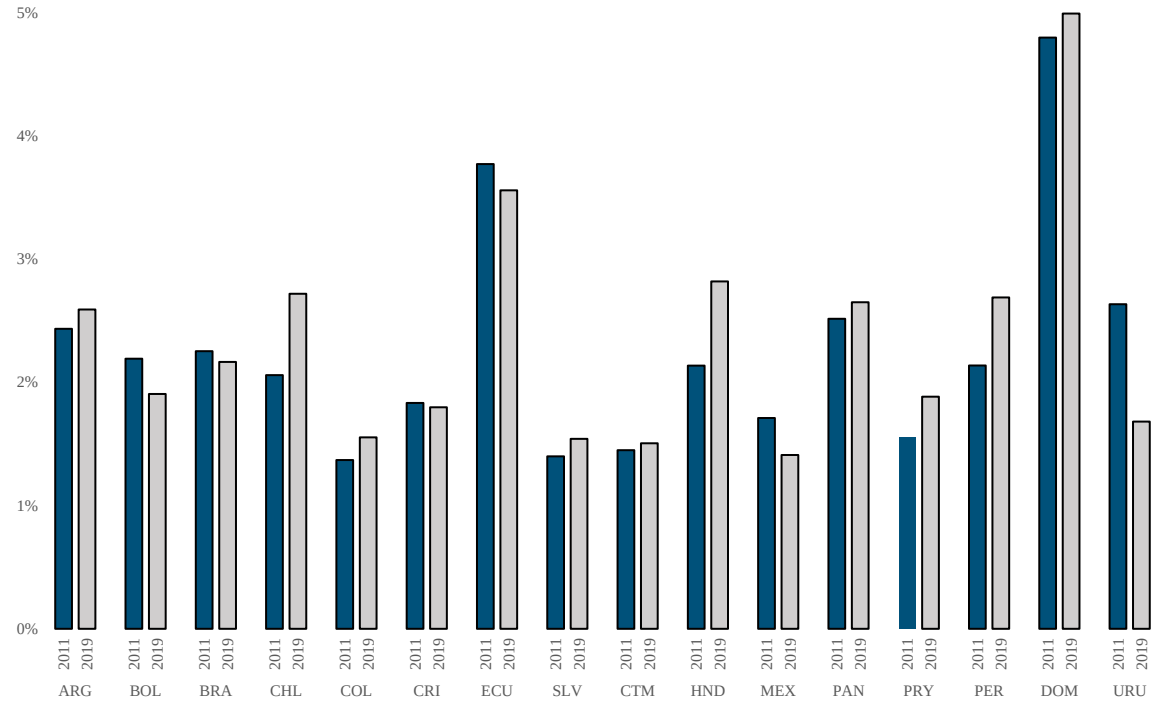
Figure 8. VAT evasion as % of sector GDP, 2019



Source: Own elaboration

Note: The countries included in the average calculation are Argentina, Chile, Colombia, Ecuador, Peru, and the Dominican Republic.

Figure 9. Evolution of average evasion as % of GDP



Source: Own elaboration.

Note: Average across countries.