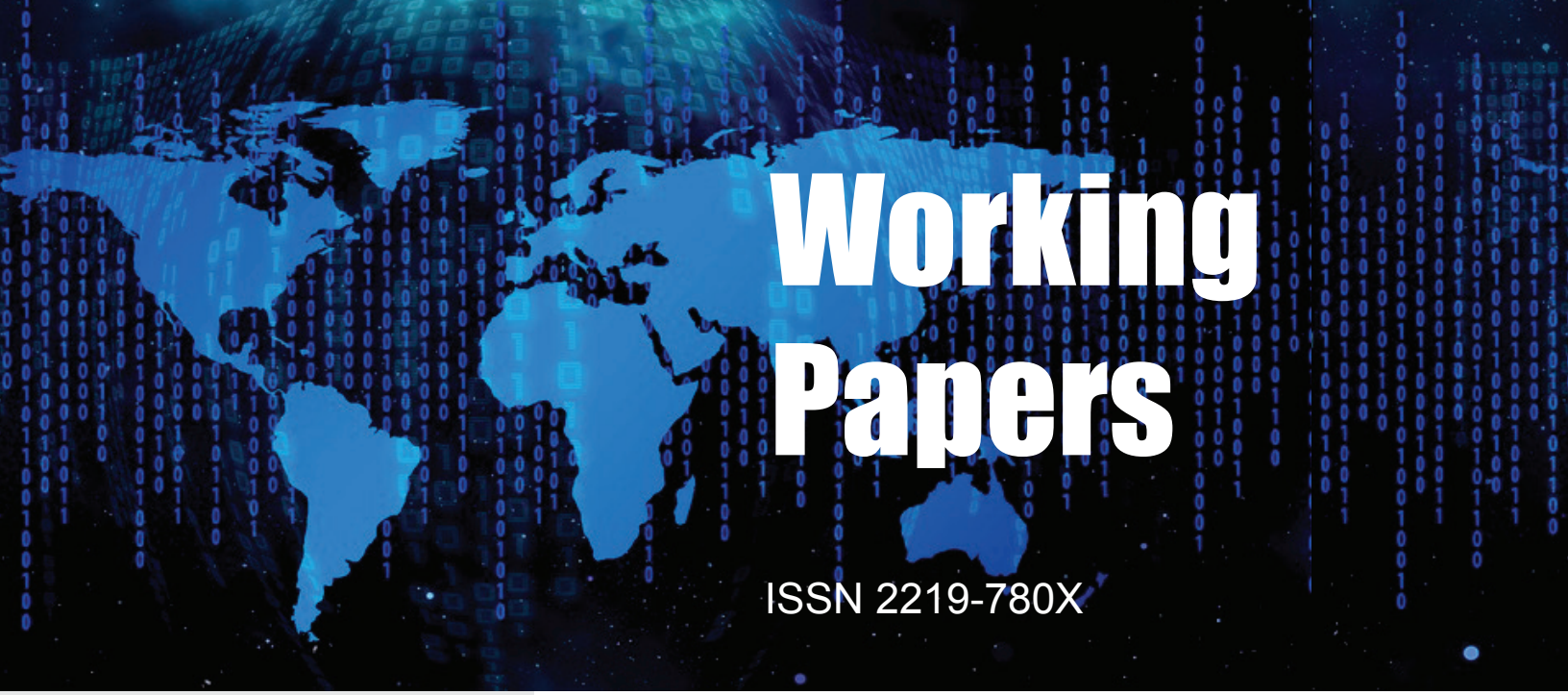

Working Papers

ISSN 2219-780X

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FEBRUARY
2022

Efficiency and tax gap in Latin America and the Caribbean: Value Added Tax and Corporate Income Tax

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CIAT

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Serie: *Working Papers*
ISSN 2219-780X

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WP-01-2022

Diagramming: CIAT Communication and Publications Coordination

Content

Acknowledgments

I wish to express my gratitude to the Inter-American Center of Tax Administrations for its support in the execution of this project. I extend the same to the operational areas of editing and translation and to the Directorate of Tax Studies and Research, Julio López and Gaspar Maldonado, for their support in the bibliographic compilation and in the preparation of certain data that support the analysis. I am especially grateful to the Director of Studies, Santiago Díaz de Sarralde, for entrusting me with this new challenge, and for his comments and observations that enriched the work.

1 Summary

The objective of this paper is to analyze the collection performance of the two main components of tax revenues in the countries of our region, the Value Added Tax and the Corporate Income Tax over a long period of time, up to the last few years. Revenue Collection efficiency indicators are obtained, and an attempt is made to decompose theoretical collection into its main elements, effective collection, tax expenditures and tax non-compliance.

The analysis indicates that the revenue collection efficiency of both taxes increased throughout the analysis period. Although the efficiency of the CIT is lower than that of the VAT, it was observed that the evolution of the former performed better, especially in the most recent periods, where the revenue collection efficiency of the VAT remained flat.

A reading of the results shows that there is still room for action, with efficiency levels at the end of the series of 0.55 and 0.46 for VAT and CIT, respectively. Contrasting the series of results found with the results of the same indicator for OECD countries shows that both sets of countries present comparable levels of efficiency.

The decomposition of the components of the theoretical collection shows that while in the VAT the inefficiency is distributed in similar parts between the policy gap (tax expenditures) and inefficiency attributable to non-compliance, in the CIT the latter is predominant, with a lower weight of tax expenditures.

2 Introduction

The objective of this paper is to analyze the revenue collection efficiency of the two main components of the tax revenues of the countries of our region, the Value Added Tax and the Corporate Income Tax over a long period of time, up to the last few years, and to have an approach to the decomposition of the theoretical collection of these taxes into their main elements, effective collection, tax expenditures and non-compliance.

The revenue-raising capacity of a tax or tax system depends on a variety of factors. Broadly speaking, in the design stage of a new tax or of reforms to a pre-existing instrument, the scope of the taxable economic event, knowledge of the dimension of its determining variable/s and the type of levy or level of tax rates to be applied to it, among other technical aspects, will allow us to primarily assess its potential collection.

In a second stage, in a more precise delimitation of the scope, with the introduction of certain exceptions of applicability, for example, we will be able to obtain a more accurate approximation of its real revenue-raising capacity.

Once implemented and put into operation, we will observe the effective collection produced, which may differ from previous estimates, mainly due to discrepancies between the a priori determinant variable and the effective determinant variable, to the greater or lesser incidence of the exceptions introduced and to the level of tax compliance.

The tax collection gap is the difference between the potential revenue that would be collected under a theoretical design, and the revenue that is actually collected. The gap will be an indicator of potential revenue losses and is usually decomposed in the literature into two broad categories: the policy gap and the non-compliance gap.

In 2011 - 2012 CIAT presented the study *Estimating Tax Noncompliance in Latin America*. This work was developed within the framework of the ITC/GIZ/CIAT Program for the development of Tax Administrations in Latin America and the Caribbean. The objective of the study was to put on the table the discussion on the importance of measuring the economic dimension of the phenomenon of tax noncompliance, in light of the little development that existed until then of tax evasion measurements, especially in corporate income taxes.

The paper compiled pre-existing estimates of VAT and CIT evasion, showing the scarcity of published estimates for the latter. On the other hand, the paper presented a specific methodology and applied it, estimating tax non-compliance for a set of LA countries and for a 10-year period. The estimated series included 14 countries and covered the period 2000 - 2010. At the same time, the paper made a theoretical review of the various methodologies that address the study of the phenomenon.

In this opportunity, the paperwork will focus on two taxes, which are pillars of tax collection in the countries of the region and in the world. On the one hand, general sales taxes, typically Value Added Tax (VAT), and on the other hand, Corporate Income Taxes (CIT).

The quantitative analysis that will be presented will take advantage of various pre-existing statistics on these taxes and, through an indirect approach, will present an estimate of the composition of the potential collection of them, for a set of Latin American countries and for a period of time, discriminating within the potential collection, the proportion represented by the effective collection, the collection gap attributable to tax expenditure and the collection gap attributable to tax non-compliance.

The tax expenditure estimations make it possible to quantify at the level of each instrument and with the identification of the origin, the non-collection attributable to the existence of exceptions in the tax system, such as exemptions, reduced rates, extraordinary deductions, simplified regimes, etc., i.e.

exceptions to the theoretical design of the tax that imply a reduction in tax collection. This is the policy gap. The non-compliance or tax evasion gap is the second component of the difference between the theoretical collection and the effective[1] collection.

Knowing the size of the total gap and its components allows us to better understand the lost collection capacity of the tax, what its origin is and what kind of measures to take to manage one or the other. With respect to the non-compliance gap, as we will see, it is the least certain portion of the quantitative decomposition of the theoretical collection. This paper will present an approach to its dimension and evolution. It is essential to dimension the phenomenon, *its distribution in space, its evolution over time, as well as to be able to characterize in greater detail its components and try to understand the subjectivity implicit in the different forms in which it manifests itself, in order to direct the necessary actions to confront it. Especially for the Tax Administrations. It is a matter of measuring in order to know and thus be able to act appropriately*. CIAT (2012)[2].

1 Keen (2013) uses the term Policy Gap to refer to revenue losses resulting from tax expenditures and uses the term Compliance Gap, to refer to non-compliance in VAT. See The Anatomy of the VAT. IMF Working paper WP/13/111. Barreix et al (2012) use the terms Inefficiency - G to refer to the value of the gap attributable to policy and Inefficiency - X to refer to the value of the difference between the unit and the sum of the revenue collection efficiency indicator plus Inefficiency - G. See Collecting Is Not Enough, Taxes as Instruments of Development. Chapter 9: VAT, let it be what it is. Inter-American Development Bank (2012). While both documents refer to Value Added Tax, here we will extend this terminology to Corporate Income Tax as well.

2 Inter-American Center of Tax Administrations. Pecho, Miguel; Sánchez, Jorge; Peláez, Fernando: Estimating Tax Noncompliance in Latin America.

3 Common characteristics of the two main instruments of tax collection

Although from an economic point of view, in their design, in the nature of each tax and in the understanding we have of them, they are different figures, they have certain elements in common that for the purposes of this work merit their joint study.

From the point of view of tax incidence analysis, a perspective that seeks to determine who effectively bears the tax burden, the effects of one or the other tax on the distribution of income are different. From this perspective, it is understood that although the legal incidence of these two taxes usually falls on the same subject (the company as taxpayer), the VAT is transferable forward in the marketing production process, while the same does not happen with the CIT, which is internalized by the taxpayer himself. The legal incidence refers to who is the subject nominated by the Law as the taxpayer.

Tax shifting is the process by which the taxpayer tries to recover the loss that the payment of the tax has entailed, trying to reestablish his situation prior to the imposition of the tax.

From the point of view of individual accounting, VAT is a periodic obligation of the company to the Tax Administration, which is originated as the net value of the liabilities generated with each sales transaction burdened with the tax, minus the assets generated with each purchase transaction when the VAT included in the same is deductible, so the tax does not alter the economic result of the company[3]. CIT is also a periodic obligation, but unlike VAT, it does alter the economic result of the company, since it originates after the realization of the income, the accounting profit of the company, the result after direct taxes. According to the translation process mentioned above, VAT, an indirect tax, is transferred *out* of the company, while CIT, a *direct* tax, is absorbed or internalized by the company.

The first common characteristic that we identify is that both taxes share the same legal subject, the same taxpayer, the companies. In other words, it is the companies, or more generally and depending

3 Without disregarding the portion of VAT included in acquisitions that for legal reasons is not deductible and is integrated as an economic loss for the company, for example, VAT on purchases associated with tax-exempt sales.

on the scope established in the tax law of each country, the productive units that combine factors of production, their own and those of others, to obtain an economic result, that are obliged to document, determine, declare, pay and other obligations related to both taxes.

The second common factor to both figures is related to the taxable base, or rather to the way in which the taxable base is determined.

The tax base can be defined as the magnitude that allows determining or quantifying the tax liability. From this definition we can state that both taxes partially share the main variables determining the calculation base. While the VAT tax base is determined as the difference between the inputs minus the outputs burdened with the tax, with some specific determination rules, the CIT tax base is determined as the inputs minus the total inputs, with some specific determination rules.

Invoicing, sales, or income are, to a large extent, the main input factor for the determination of the taxable base for both VAT and CIT, while taxable purchases or expenditures are part of the outputs for VAT, and may be part of the outputs for CIT, to the extent that, in the fiscal year, these purchases are intended to be part of the income. In turn, other expenditures, not subject to VAT, are part of the outputs for the determination of the CIT taxable income.

This high connection in the form and calculation of the tax base of both taxes determines that certain changes in inputs or outputs generate effects on both tax bases at the same time. For example, a drop in turnover in a given economic period has a downward impact on the taxable base of both VAT and CIT, reducing them. Similarly, an increase in turnover, even if accompanied by an increase in outputs, will probably produce an increase in the nominal tax base of both taxes, thus increasing tax revenue.

4 Tax Gap Estimation Methodologies

The two major perspectives for estimating the tax gap, or tax evasion, the top-down and bottom-up methods, also called indirect methods and direct methods, have advantages, disadvantages and different uses.

While indirect methods rely on macroeconomic indicators, national accounts data or national survey data to estimate the theoretical basis and potential collection, direct methods work mainly on administrative data only and are intensive in their use.

Some direct estimation methodologies can provide a global result of the tax gap, although they usually have a more precise focus, providing results for groups or sub/segments of taxpayers. In turn, these methodologies tend to have greater application for specific actions that the administration can execute a posteriori, towards compliance.

Other methodologies have been developed for the study of the phenomenon that do not necessarily fall into any of the methods mentioned above. Hutton (2017)[4], mentions econometric techniques. Certain econometric tools are often used to provide estimates of efficiency or revenue losses. According to this work, the results are quite sensitive to the selection of determinants and assumptions used in the model. It emphasizes that the results can be difficult to interpret from a compliance perspective. Therefore, their use is not recommended for studies whose main objective is to estimate the tax gap itself, although they can still be useful for more general studies of tax efficiency and others.

Rubin (2011)[5], points out that while both the direct and indirect methods provide an uncertain estimate of the total tax gap, the former has the important advantage of providing operationally useful information for the tax administration. The detailed breakdown of the tax gap required for a bottom-up approach allows for better prioritization of the administration's resources to maximize tax collection.

4 International Monetary Fund. Fiscal Affairs Department. The Revenue Administration —Gap Analysis Program: Model and Methodology for Value-Added Tax Gap Estimation. Eric Hutton. 2017.

5 The practicality of a top down approach to the direct tax gap. Marcus Rubin. Her Majesty's Revenue and Customs, United Kingdom (2011).

The most representative direct methods, with wide bibliographic dissemination, although less empirical practice and diffusion, are those based on audits. If we had the capacity to audit exhaustively all taxpayers in the registry while being able to identify and audit, quantifying the equivalent tax bases in the informal economy, we could know for certain the magnitude of evasion and characterize it completely. If so, the administration would take advantage of this to quantify the tax debt and proceed to enforce it. But this is not possible.

Auditing is the most labor-intensive activity of tax administrations. The *audit* rate (ratio between the number of taxpayers audited in a fiscal year and the number of taxpayers included in the registry), usually indicates that, a priori, the probability of any taxpayer being audited in the tax prescription time is low.

Audit samples can be useful for making inferences about the behavior of the noncompliance phenomenon from the results obtained in a selected subset. The objectives and characteristics of the sampling process may or may not allow us to extend the results to the entire population.

Random audit programs are applied on taxpayers randomly selected to be representative of the broader population that the sample is intended to represent, an economic sector, a geographic area, or the entire population. A random sample will allow us to infer the results for the represented population with a known level of error, allowing us to quantify and characterize the phenomenon. This methodology can be enriched by incorporating standardized surveys to the sampled, in order to know also subjective aspects of evasion.

In practice, these methodologies are not often applied in their most general form. The audits must be developed by the tax administration itself and it will have to derive a significant part of its auditing force towards this service. Given the heterogeneity of taxpayers, it is likely that the size of the sample to be representative of the entire population will be comparable to the number of audits ordinarily performed. At the same time, the average performance of an audit of a randomly selected taxpayer will be lower than that usually[6] obtained.

6 This is to the extent that management has selection processes that identify the highest non-compliance.

These obstacles mean that this methodology receives scarce resources and must be applied to represent not the entire population but subsets of it, a sector only, or a sectoral chain, a geographic area, etc., with smaller samples.

A more commonly used direct method is the exploitation of the results of ordinary audits. This analysis does not interfere with the audit work and allows, by systematizing the results of ordinary audits, to estimate the *evasion found by the administration*. Knowing the *found evasion* is useful to evaluate the results of the audit strategy and allows us, using the results of *general evasion*, from indirect methods, for example, to infer the capacity of selection and recognition of the tax debt by the administration. If the relation or ratio between the *found evasion rate* and the general evasion rate is greater than 1, we will say that the administration is capable of selecting taxpayers with higher levels of relative noncompliance; the further away from 1, the greater this capacity will be. A ratio lower than a unity will indicate that the results of the audits are lower than the average evasion rate, which would suggest that the administration's capacity to select and recognize tax debt is weak.

It is advisable to implement more than one perspective of evasion analysis. The contrast between the results of the indirect methodologies and the evasion found by the administration is an interesting and low-cost combination that provides results that may be useful to review the enforcement strategy.

There is a variety of other techniques based on tax information. An interesting reference, especially for the CIT is the report by HRMC (2008)[7], and the Tax Gap Project Group - TGPG (2018)[8]. The latter identifies a number of econometric techniques based on tax information, such as matching techniques to compare companies, specifically income transfers between countries by multinational[9] companies.

For TGPG, direct methods have some important advantages in addition to the certainty of the results. First, this perspective can provide a guide to identify the causes of evasion since it focuses on a

7 HMRC Working Paper No. 12. The Practicality of a Top-Down Approach to the Direct Tax Gap.

8 The Concept of Tax Gaps Report II: Corporate Income Tax Gap Estimation Methodologies. FISCALIS Tax Gap Project Group (FPG/041). European Commission. Directorate-General Taxation and Customs Union.

9 See: Federico Sallust. UNCTAD Research Paper No. 64. Measuring profit shifting in Italy with propensity score matching and receiver operating characteristics analysis (PS-ROC) method

specific component, with uniform and well-defined characteristics among its components. Second, they provide greater certainty and precision of estimations due to the greater granularity required by these approaches. In particular, random audits allow us to identify sectors or regions with larger gaps, and the most vulnerable areas of the tax, allowing us to incorporate adjustments to mitigate evasion.

As a major disadvantage, they also point out that the approach is resource intensive, in case it is based on random audits. They add that the matching method is also data-intensive, as well as requiring complex and time-consuming pre-calculations of variable data. HRMC (2008) raises this same limitation, but understands that top-down methods can potentially support the estimation of some elements of the direct tax gap.

Indirect methods, on the other hand, tend to provide a more global overview of the tax gap, as they are generally measurements of the total gap of a tax. This allows an approach to the dimension of the phenomenon and its evolution over time, being their main empirical limitation the difficulty to introduce them as an indicator to support concrete actions of the administration. These estimates will not give us an answer to the question of what are the reasons for non-compliance, why certain areas or sectors are not taxing adequately.

Among the most widely used and recognized indirect methodologies are those based on National Accounts. Although they are methods with lower data requirements, in order to develop the estimation it will be necessary to have the appropriate set of data and that these are explanatory of the tax base to be estimated, or, in their absence, that the necessary adjustments can be introduced to bring the macroeconomic variables closer to the tax bases of the taxes to be analyzed.

In order to apply this methodology, it would be ideal if National Accounts data were produced independently from tax information. Although the Tax Administration is not responsible for producing the National Accounts information, there are usually exchanges of information with the entities responsible for producing them. UN (2008)[10] considers it desirable that the macroeconomic accounts of the sectors or of the total economy could be obtained directly by aggregating the data of the individual units, information that the Tax Administration largely possesses. According to the document, the use of this

10 System of National Accounts 2008. United Nations Statistical Commission. Translation Economic Commission for Latin America and the Caribbean (ECLAC)

information would bring analytical advantages by providing microeconomic databases compatible with the corresponding macroeconomic accounts of the sectors or the total economy. In any case, the document states that even when accounts or records of individual institutional units are available, the concepts necessary or appropriate at the microeconomic level may not be appropriate at the macroeconomic level.

Even when the National Accounts do not make use of administrative data, tax collection and the collection of each tax, in each period, is a macroeconomic variable itself, real, accounted, verifiable and usually available in advance of the availability of the National Accounts for the same period. This characteristic of the macro tax data transforms it into a source of at least verification of consistency with the National Accounts and their evolution. This interdependence between the explained variable and the register of the explanatory variable can generate interferences in the estimation of the tax gap using indirect methods.

These weaknesses do not prevent us from carrying out these estimates using the aforementioned methodologies but keeping this possible interdependence in mind will allow us to better evaluate the results of the estimation.

The practice of Tax Gap Estimation by CIAT countries

ISORA survey (2020)[11], presents information from the tax administrations of 159 countries representing 90.37% of world GDP and 88.5% of the world population in 2017 (more than 6. 600 million people). These include 37 CIAT member countries, which account for 39% of GDP and 37.1% of the population[12].

The survey contains questions regarding the practice of estimating and publishing tax evasion estimations of VAT, CIT, PIT and other by tax administrations. The following chart summarizes the results of the responses from the countries in the region.

11 International Survey on Revenue Administration (FMI, IOTA, OECD, BAD y CIAT).

12 CIAT (2021).

Chart 1: **Estimations and Publications of Tax Evasion Studies**

Countries / Tax Gap estimations	VAT		CIT	
	Periodic tax gap estimations	Tax gap publications	Periodic tax gap estimations	Tax gap publications
Argentina	Yes	No	Yes	No
Bolivia	Yes	Yes	No	No
Brazil	No	No	No	No
Chile	Yes	Yes	Yes	No
Colombia	Yes	Yes	Yes	Yes
Costa Rica	Yes	Yes	Yes	Yes
Dominican Republic	Yes	No	Yes	No
Ecuador	Yes	No	Yes	No
El Salvador	Yes	No	Yes	No
Guatemala	Yes	Yes	Yes	Yes
Honduras	Yes	No	No	No
Jamaica	No	No	No	No
Mexico	Yes	Yes	Yes	Yes
Nicaragua	No	No	No	No
Panama	No	No	No	No
Paraguay	Yes	Yes	No	No
Peru	Yes	Yes	Yes	No
Uruguay	Yes	Yes	No	No
Estimations & publications	**14**	**9**	**10**	**4**

Source: Based on ISORA 2020

The table shows that out of a total of 18 countries analyzed, 14 claim to estimate VAT evasion, while 9 of them published the reports and results. On the CIT side, 10 of the countries under analysis claim to estimate CIT evasion, and only 4 of them mention that they published the results of their CIT evasion studies. These results allow us to appreciate that the practice of estimating evasion is not yet fully extended, and especially in the CIT, the situation is similar to that highlighted in our previous work. There is a lower number of estimates in the corporate tax.

Tax Gap Approach based on Revenue Collection Efficiency

One way to approach the tax gap, using indirect methods, is through revenue collection efficiency indicators. A revenue collection efficiency indicator contrasts the observed collection of a tax with its theoretical potential.

In chapter 6 we will present our own estimations based on VAT and CIT revenue collection efficiency indicators, and we will use the information on tax expenditures of the countries under analysis to decompose the efficiency gap into two components: the *policy gap* and the *non-compliance gap*. Next, we will present the approach for calculating this indicator for each tax.

VAT Revenue Collection Efficiency

In the case of VAT, *C-Efficiency* or the VAT Revenue Ratio (VRR) are widely used tools for the analysis of the development and evolution of the tax collection and allow the policy evaluator to understand the ability of the tax to increase its capacity to provide revenue. According to Keen (2013)[13], this indicator has become a widely used tool to evaluate VAT, implicitly comparing the revenue actually collected by some VAT with the revenue that would be obtained if the tax were perfectly applied at a uniform rate, equal to the standard rate, on all consumption, with no exceptions.

OECD (2010)[14], states that the objective is to provide comparative measures of the capacity of countries to effectively guarantee the potential VAT tax base and proposes the VRR ratio. The ratio found will be between 0 and 1 given that the tax collection will be lower than the potential collection, given the existence of exceptions and evasion. The value of the indicator will tell us how efficiently the tax is collected. The closer the value is to 1, the higher the efficiency of the VAT under analysis (low tax expenditures, low levels of evasion). The key will be to accurately identify and quantify the Tax Base.

13 The Anatomy of the VAT. Fiscal Affairs Department. IMF Working Paper. WP/13/111. Michael Keen.

14 Consumption Tax Trends 2010: VAT/GST and Excise Rates, Trends and Administration Issues. Measuring Performance of VAT. The VAT Revenue Ratio. OECD.

The approach of the indicator is as follows:

$$VRR_{VAT} = \frac{VR_{VAT}}{B_{VAT} \cdot r_{VAT}}$$

Thus:

VR = VAT Revenue

B = Potential Taxable Base

r = Standard VAT rate

In the numerator we find VAT Collection. Although collection records for a period of time (annual records, for example) are usually available, for the purposes of the timely estimation of a fiscal year, it is ideal to have the tax accrued in the same time period in which we have the Potential Taxable Base record.

The Potential Bases that we will use for our analysis are expressed in calendar year. In tax assessment practice, tax liabilities must be paid at a date subsequent to the realization of the taxable event. This practice implies that the collection records have a time lag with respect to the tax base. This shift could result in changes in revenue collection efficiency in one fiscal year being imputed in the following fiscal year. If we want to arrive at a long-term view of revenue collection efficiency, we can contrast the potential collection and the effective cash collection, prioritizing the evolution of the ratio rather than the specific values found.

In the denominator we find two elements:

The standard VAT rate, for the purposes of this indicator, refers to the rate provided for the legal VAT regulation in the country under analysis. The objective is to apply the standard rate to the entire tax base in order to calculate the potential revenue that would be obtained if the tax were perfectly applied at a uniform rate, on all consumption, with no exceptions. The practice of these taxes shows that they apply a uniform rate to the generality of goods and services covered, with certain lists of exceptions for certain transactions, depending on the objects, the subjects, the territorial space where the transactions are carried out, among others. The standard rate, then, is obtained from the tax Law.

The second element that we find in the denominator is the Taxable Base. For the indicator we are analyzing, this variable will be the one provided by the System of National Accounts.

Value Added Taxes, or general taxes on sales of goods and services, and in particular the figures we are analyzing for this group of countries, generally take the form of taxes levied on the circulation of goods and services, at all stages of production and marketing, up to the last stage, not applying to exports. Although formally the selling companies are nominated as taxpayers, in practice the tax is shifted forward. It is an indirect tax whose ultimate taxpayer is the final consumer, or more generally any buyer who is not entitled to a tax credit (final consumers, non-profit institutions, the central government).

Given the available statistical data set of the countries[15], we will resort to some items of the Use of Income Account of the System of National Accounts of each country as an approximation of the final tax base. The Use of Income Account shows how households (CH), government units (CG) and non-profit institutions serving households (NPISHs) allocate their disposable income between final consumption and savings (UN 2008)[16].

Household final consumption expenditure of households is the expenditure of resident households on consumer goods or services. It includes, among others, the direct purchase of goods and services, and goods and services produced and consumed within the same household.

The use of income account also includes spending on individual and collective goods or services by the government as well as by NPISHs.

As stated in the System of National Accounts Manual, the value of the effective final consumption of the general government is equal to the value of its total final consumption expenditure minus its expenditures on individual goods or services provided to households as social transfers in kind. The

15 The macroeconomic statistics used for the estimation of the potential tax come from countries' Systems of National Accounts, or from statistics available from UNdata, a United Nations database service that provides official country data and statistics, or from statistics available from DataBank, a World Bank analysis and visualization tool that contains data sets on a variety of topics

16 System of National Accounts. 2008. European Commission. International Monetary Fund. Organization for Economic Cooperation and Development. United Nations. World Bank. ECLAC edition

value of the effective final consumption of government units is therefore equal to the value of the expenditures they incur in providing collective services or certain individual goods or services. Similar criteria should be adopted to account for the consumption of NPISHs. The value of NPISHs' actual final consumption should be equal to the value of their total final consumption expenditure minus their expenditures on individual goods or services provided to households as social transfers in kind.

This approximation to the theoretical tax base that we will construct will be determined by the sum of the three aforementioned factors, from which we will subtract the effective tax collection record, to the extent that the valuation rules of these accounts indicate that the expense is recorded for the total consideration paid or valued, which includes, among others, the sales tax or VAT.

$$VRR_{VAT} = \frac{VR_{VAT}}{[CH + CG + NPISH - VR_{VAT}] \cdot r_{VAT}}$$

Based on this approximation, in the denominator we estimate the Theoretical VAT Collection (RT_{VAT}) by applying the standard legal rate of the tax to the above-mentioned amount. As we know, VAT is a tax that applies to the general circulation of goods and services, there being a general legal rate and a set of exceptions: exempt goods and services, goods taxed at the minimum rate, etc. Theoretical collection will then try to show the potential collection of a tax that applies to all goods and services at a single rate without exceptions.

$$RT_{VAT} = [CH + CG + NPISH - VR_{VAT}] \cdot r_{VAT}$$

As mentioned above, the result of the ratio should be between 0 and 1. The difference between the unit and the VRR found, we will call the revenue collection *inefficiency*[17]. The revenue collection inefficiency will be the total gap between the theoretical tax and the effective tax.

17 To the extent that we correctly identify the tax base of the tax and the System of National Accounts captures the totality of the base that is proposed to be exposed. If the tax base is underestimated, for example, we could arrive at an efficiency indicator higher than 1. On the contrary, if the variables are overestimated we would determine an index lower than the real one, so we would have the perception that the tax is less efficient than it really is

At this point we ask ourselves what are the components of the total gap? As mentioned above, there are exceptions to the application of the statutory rate to the tax base: exempt goods and services, goods taxed at the minimum rate, certain credits or deductions for tax purposes only, etc.

All tax exceptions are identified and valued in the tax expenditure reports of the countries. CIAT follows these reports and has a systematic record of tax expenditures by country[18], tax, fiscal year, type of tax expenditure, among other variables. With this information we will determine what is called the *policy gap*.

Regarding the policy gap, Keen (op. cit.) and several authors recognize this component and attribute it essentially to tax expenditures, calculated under the assumption of total compliance. The policy gap can be presented in gaps attributable to different characteristics of the exceptions included in the tax. Diaz de Sarralde (2017)[19], designates this concept as "G-inefficiency".

As the difference between the unit (equivalent to total revenue collection efficiency, given the theoretical basis), the revenue collection efficiency index and the portion of inefficiency attributable to the policy gap, we will residually obtain a value. Barreix et al (2012)[20], call this difference as "X-inefficiency", as an analogy to the concept that is applied to name explanatory components of internal efficiency losses in a firm not explicitly defined.

Under the assumption that the variables selected accurately express the tax base, and the identification and estimation of tax expenditures is complete and consistent with these variables, we could attribute this differential entirely to noncompliance. Keen (op.cit) calls it a *noncompliance gap*. In practice, even the best selection of macroeconomic variables will not perfectly explain the tax base of the tax we want to analyze. For their part, tax expenditure studies have some weaknesses in their construction, while

18 See TEDLAC. Tax Expenditure DataBase. https://www.ciat.org/tax-expenditures/?lang=en

19 Value Added Tax: Revenue, Efficiency, Tax Expenditures and Inefficiencies in Latin America. Santiago Díaz de Sarralde Miguez. Inter-American Center of Tax Administrations (CIAT). 2017

20 Value Added Tax: let it be what it is. In Recaudar no Basta: Taxes as an instrument of development. Chapter 6 . Alberto Barreix y Fernando Velayos, in colaboration with Luis Cremades, Fernando Díaz Yubero, Miguel Pecho, Óscar Vázquez, Manuel Alarcón, Domingo Carbajo, Horacio Castagnola, Patricio Castro, Santiago Díaz de Sarralde, Rocío Ingelmo, Raúl Junquera, Gaspar Maldonado, Manuel Márquez, Enrique Rojas y Marcio Verdi

many times the basis for their estimation is not the macroeconomic accounts, but tax microdata, so that the last gap, the differential found, will be attributable to several concepts, including tax noncompliance.

CIT Revenue Collection Efficiency

We previously commented that, in the case of VAT, the *C-Efficiency* or the VAT Revenue Ratio (VRR) are widely used tools for the analysis of the development and evolution of the tax collection, implicitly comparing the revenue collected by VAT with the revenue that would be obtained if the tax were perfectly applied at a uniform rate, equal to the standard rate, on all consumption, with no exceptions.

This estimation of the gap based on revenue collection efficiency is not as widespread in the case of CIT, nor are estimates (or publications of estimates) of the tax gap in this tax by other variants of indirect methods or through some of the methodologies based entirely on tax data discussed above, as can be seen in the summary table of the ISORA survey.

Rubin (2011)[21], presents a detailed list and characterization of these estimates, and suggests that one of the reasons for the lower progress in these estimates is the degree of dependence of macroeconomic variables on Tax Administration data. This endogeneity, already discussed previously in our work, is, according to this author, more accentuated in macroeconomic variables related to income than to consumption, which explains the greater extension of VAT gap estimates through indirect methods.

This author raises another obstacle and refers to the difficulty of converting the Gross Operating Surplus into the corporate tax base, since the Gross Operating Surplus and the tax base are *quite different* concepts for the author.

In practice, corporate income taxes, taxes on company income or general corporate income taxes, generically referred here as CIT, generally arise from the application of a proportional tax rate on the economic results (accounting results) of companies, adjusted for tax purposes. The economic results are subject to certain tax adjustments, thus determining the taxable income, also called, in this tax, taxable income.

21 The practicality of a top-down approach to the direct tax gap. Marcus Rubin. Her Majesty's Revenue and Customs, United Kingdom (2011)

Given this form, this basis for calculation and the statistical data set available for the countries, we will resort to some items of the Generation of Income Account, which reflect the portion of value added distributed to capital. The Generation of Income Account is a sub-account of the Primary Income Distribution Account (UN - 2008). In this sub-account, value added is distributed among labor (remunerations), capital and government (taxes less subsidies). The portion corresponding to capital is reflected in the balance of this account, the Operating Surplus and/or Mixed Income.

The accounting balance of the generation of income account, the portion of value added distributed to capital, is the result of deducting from Gross Value Added the remuneration of employees and taxes minus subsidies on production. This balance measures the surplus or deficit generated from production. The accounting balance is called Operating Surplus, or Mixed Income in the case of unincorporated enterprises owned by households in which the owner contributes labor, the remuneration of which cannot be distinguished from his performance as an entrepreneur. The balance of the generation of income account will conceptually differ from the consolidation of the accounting results of the enterprises, to the extent that the former is usually expressed in the national accounts in gross terms, without considering the consumption of fixed capital, nor the consideration for financial services received or granted.

Consumption of fixed capital is the decrease, during the accounting period, in the current value of the stock of fixed assets owned and used by a producer, resulting from physical deterioration and normal obsolescence. The equivalent term from the accounting point of view is depreciation or amortization of fixed assets. Operating surplus does not take into account interest either, rent payable on financial assets or natural resources borrowed or leased by the company, or any interest, rent or similar income receivable on financial assets or natural resources owned by the company (UN - 2008).

Most of the statistics available for this estimation present the balances of the generation of income accounts in gross terms. As a way of approximating the net accounting result of the companies, we deduct from this balance an estimate of the consumption of fixed capital. It is linked to the Gross Fixed Capital Formation account, in the Use of Income Account. Gross fixed capital formation comprises acquisitions of new and existing fixed assets through purchase, barter or own-account capital formation, minus the disposal of existing assets through sale or barter. (UN 2008).

The contrast between the theoretical revenue obtained by applying the rate in force in each country/year on the theoretical tax base, and the effective revenue collection will be the CIT revenue collection efficiency. The difference between the unit and the revenue collection efficiency found will be called *revenue collection inefficiency*. With the information on Tax Expenditures on this tax, we will be able to determine the portion of the gap associated with the policy gap or *G-inefficiency*, while the *X-inefficiency*, which would contain tax evasion, will be the difference between the unit, the revenue collection efficiency and the *G-inefficiency*, in the same way as expressed for the VAT in the previous subsection.

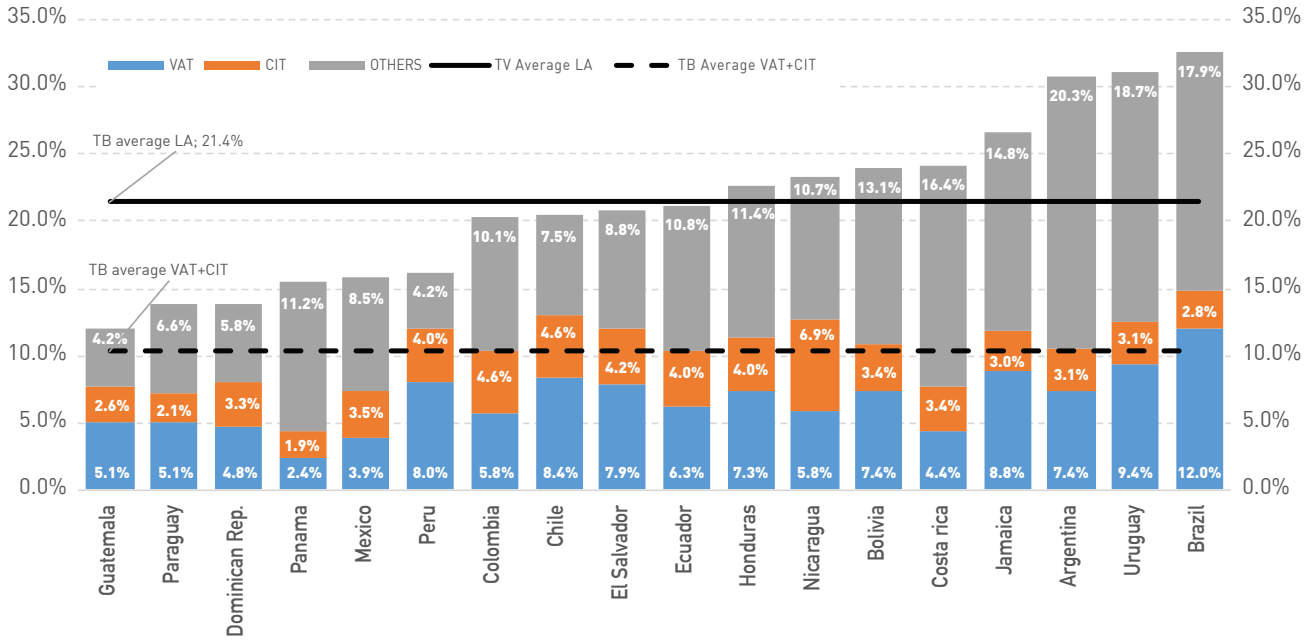
In the following section we will present some relevant statistics on these two taxes for Latin American countries, followed by the development and results of estimates of revenue collection efficiency and the components of the tax gap.

5 Presence in the collection of VAT and CIT

As mentioned before, this paper will focus on two taxes, which are two essential pillars of tax collection in the countries of the region and the world. On the one hand, general sales taxes, typically Value Added Tax (VAT), and on the other hand, corporate income taxes, which we will call here Corporate Income Taxes (CIT).

Using the collection series (IDB-CIAT 2020)[22], identifying in particular value added taxes, or sales taxes and corporate income taxes, in relation to the Gross Domestic Product series of the countries, we can estimate the total tax burden, and the incidence specifically of VAT and CIT collections and the rest of the components.

Figure 1. **Tax Burden: Total, VAT and CIT. Latin America and the Caribbean**
Average 2016 - 2018



Source: Prepared by the authors, based on IDB&CIAT statistics and national accounts series of the countries.

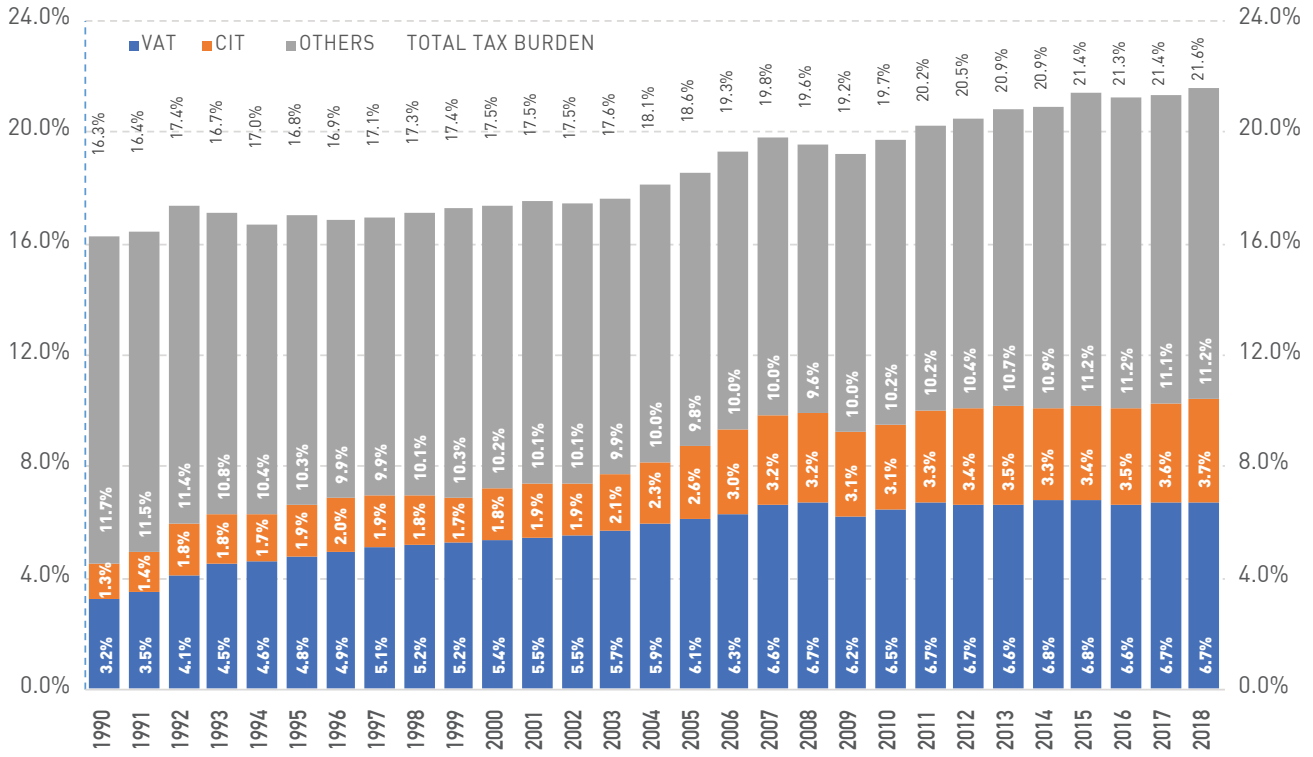
22 Equivalent Fiscal Pressure in Latin America and the Caribbean / CIAT & IDB. 2020. IDB- Revenue Collection database | Inter-American Center of Tax Administrations (ciat.org)

In the last recorded period (2016 to 2018), we can appreciate that the pressure of the countries considered was equivalent to 21.4% of GDP, on average. And the tax burden specifically of VAT and CIT represented practically 50% of the total pressure, with greater or lesser presence of each of these figures in the different countries.

Regarding VAT-type taxes, we observe the lowest tax burden records, in the analyzed period, in Panama - 2.4% - (Tax on the Transfer of Movable Tangible Goods and the Provision of Services -ITBMS, general rate 7%); Mexico - 3.9% - (Value Added Tax - VAT, general rate 16%); Costa Rica - 4.4% - (General Sales Tax - IGV, general rate 13%). At the other extreme, we find higher VAT tax pressures in the region in Jamaica - 8.8%- (General Consumption Tax - GCT, general rate 16.5% *17.0% in 2018); Uruguay - 9.4% -(Value Added Tax - VAT, general rate 22%) and Brazil - 12. 0% - (We identified more than one type of VAT in Brazil, *the Imposto sobre Circulação de Mercadorias, Bens e Serviços- ICMS, the Imposto sobre produtos Industrializados - IPI, the Programa de Integração Social & Contribuição para o Financiamento da Seguridade Social* PIS/COFINS).

The figure shows that CITs have a relatively minor presence in the tax burden, in relation to the VAT burden itself. In any case, the weight of this tax is relevant, constituting more than half of the weight of VAT and, as mentioned, both represent about 50% of the average tax burden of LA and Caribbean countries. Nicaragua is positioned as the country with the highest tax burden of CIT (Corporate Income and Profits Taxes, and Income and Profits Taxes, 6.9% average tax burden 2016 - 2018). On the other hand, Chile presents a 4.6% pressure of CIT over GDP (the series of this statistic includes First Category Tax, Additional Tax of 40% on Public Companies Rate 8% Transitory Art. 6 Law 18985 and Specific Tax on Mining Activity). Among those with the lowest figures are Panama 1.9% (Corporate Income Tax - CIT, legal rate 25%), Paraguay 2.1% (Tax on Income from Commercial and Industrial Activities - IRACIS, and Tax on Agricultural Income - IRAGRO, legal rates 10%).

Figure 2. **VAT Tax Burden, CIT Tax Burden, Others Tax Burden, long term. Average of Latin American and Caribbean countries. 1990 - 2018**



Source: Prepared by the authors, based on IDB&CIAT statistics and national accounts series of the countries.

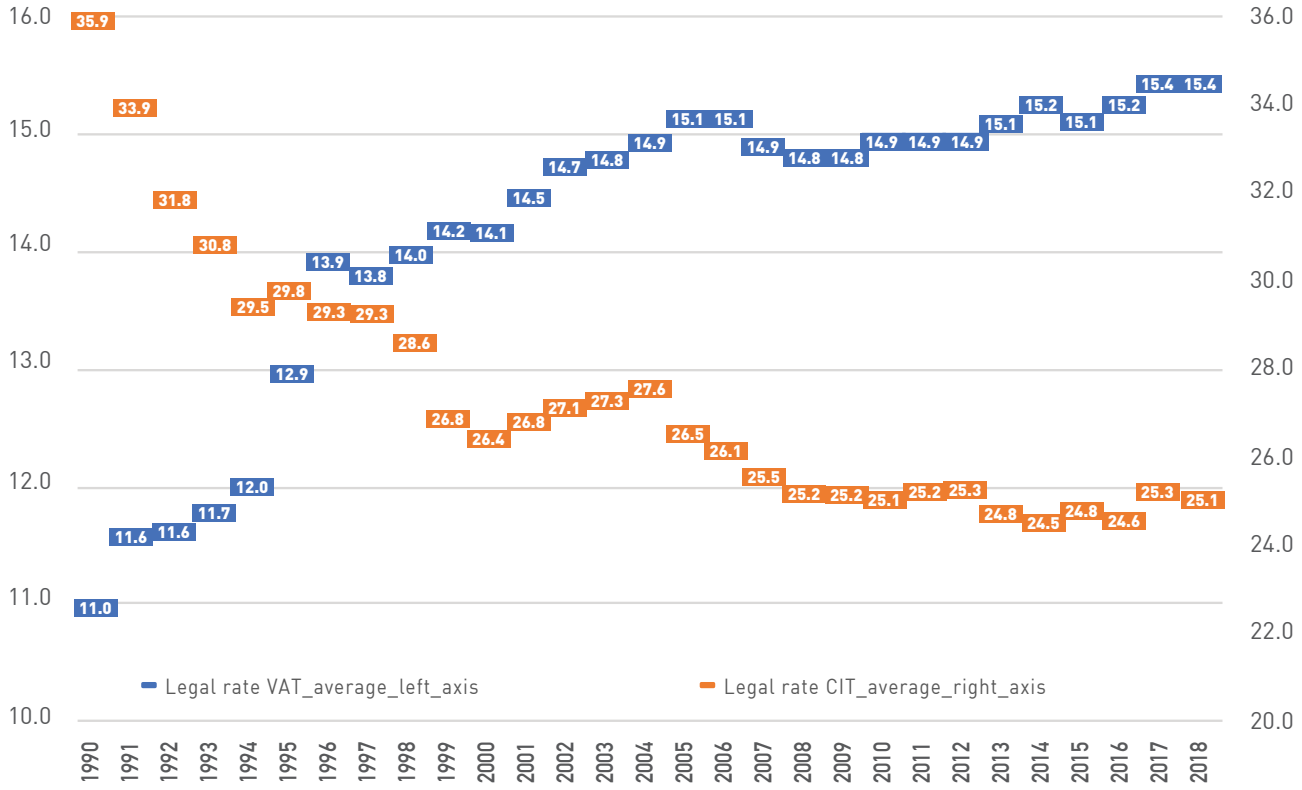
In a long-term view, we can appreciate how the average tax burden in LAC has been consistently increasing year after year (with the exception of 2008 and 2009). While in 1990 the collection represented 16.3% of GDP, in 2018 the tax burden was 21.6%. The figure shows that the two components we are analyzing, VAT and CIT, are the ones that explain this growth, since the "Other" bracket remained at levels of 10 to 11% throughout the series[23]. The VAT and CIT currently represent almost 50% of the average tax burden of LAC, while at the beginning of the series both had a 30% share in the average tax burden.

23 Within "Other", although the series remains stable over time, there is no homogeneous behavior among its components, since some items, such as PIT, have shown a greater participation in the tax burden, as a result of reforms to strengthen this type of tax imposed by several countries in the region, while others have had a reduction in their presence in the tax burden, such as selective or foreign trade taxes.

This higher share of both figures can be explained by successive reforms concentrated on these taxes, which have been applied by the countries of the region, expanding the tax bases, reducing exceptions and increasing the concentration of the Tax Administrations in the management of these taxes.

The remaining components of the countries' tax burden include numerous varieties of taxes, where the collection of social security contributions, excise taxes, and personal income taxes stand out.

Figure 3. **VAT and CIT Legal Rates. Average of LAC. 1990 - 2018**



Source: Prepared by the authors, based on Tax rate CIAT series and country legislation.

With regard to rates, and being mainly taxes that apply a proportional rate to the taxable base, there was a gradual increase in VAT rates in the countries, while maintaining a certain heterogeneity and a reduction towards convergence in CIT rates.

At the beginning of the series, the VAT had an average legal rate of 11.0%[24], which grew steadily (with some exceptions over time) to reach an average value of 15.4% at the end of the series. Although the reforms in this tax parameter have had an upward bias, there is no trend towards convergence in terms of the rate to be applied in each of these countries[25].

On the CIT side, the evolution of the average legal CIT rate shows a decrease from an average value of 31.6 in 1990 to an average value of 25.1 in 2018. While the average value of the rate decreased, the analysis of the data allows inferring that in this tax there were reforms that took into account the regional context, observing a greater convergence of the levies towards a rate centered on, in this case, 25%[26].

We must bear in mind that the automatic border adjustment provided for in practically all VAT designs minimizes the distortions produced by the tax in the competition between domestic and imported products, so that the jurisdictions of the region may be freer to set the VAT rate, without considering the direct geographical context or the destination/origin of the products they market. On the contrary, the CIT can become an attraction or a detractor to receive investments, so this tax parameter (among others) is usually established by observing the impact it can have on investment decisions, taking into consideration the direct regional context.

Finally, it is worth stating that, although we are working with a group of countries in the same broad geographic region, the data tell us that they have very different tax collection capacities (Figure 1). The tax burden of the three countries with the highest tax collection levels is 2.4 times higher than that of the third group of countries with the lowest tax collection. With respect to the taxes under analysis, the data show that the countries with the lowest tax burden tend to be more dependent on VAT and CIT.

24 We refer to the average of the general VAT rates applied in each country in each year. In this visualization, particular rates, reduced rates, increased rates, etc., were not considered

25 This statement is supported by the analysis of the range of the interquartile range of the aliquot series of the countries. While in 1990 the central 50% of the aliquot distribution was 6 points (7.0:13.0), in 2018 the central 50% of the distribution was 5 points (13.0:18.0)

26 In the case of the CIT the 1990 interquartile range (32.0: 40.0), had a spread of 8 points, while that range was reduced to 4.5 points in 2018 (25.0: 29.5).

With the exception of Panama and Mexico, in the 9 countries with the lowest tax burden (the bottom half), VAT + CIT represent more than 50% of the total tax burden, while in the 9 countries with the highest tax burden, with the exception of Nicaragua, the presence of these two taxes is below 50% of the total tax burden. These different proportions, associated with different collection capacities, give us the indication that the countries with the highest tax burden have a more diversified collection base, compared to the countries that collect the least, which are especially dependent on VAT and CIT.

6 The Gap between Theoretical Collections and Effective Collections

As can be seen in the previous points (Figure 1, Figure 2), the revenue-raising capacity of the countries analyzed, measured by the evolution of the tax burden, has been increasing, driven by the two taxes under analysis, VAT and CIT.

In this section of the paperwork we will focus on estimating the theoretical collections of each of these taxes, based on certain macroeconomic aggregates. From there, we will measure the weight of the effective collection in relation to the theoretical collection, the revenue collection efficiency. We will determine the economic gap of the tax, as the difference between the theoretical collection and the effective collection and then we will try to discriminate the portion of the gap attributable to the existing exceptions in the tax system, for which we will take advantage of the CIAT Tax Expenditure Database (TEDLAC).

Finally, and residually, we will estimate the proportion of potential collection attributable, among other components, to tax noncompliance. The knowledge of effective tax collection and tax expenditures will lead us to estimate the portion of the potential revenue estimate that is not explained, and that will be attributable to the non-compliance gap.

This is an estimate of the potential tax collection based on an adaptation of the macroeconomic aggregates that best explain the tax base of each tax under analysis, recognizing the limitations of this indicator, which were expressed in the previous section.

Estimation of the Theoretical VAT Collection, the Collection Gap and disaggregation of its components

Value Added Taxes, or general taxes on sales of goods and services, and in particular the figures we are analyzing for this group of countries, generally take the form of taxes levied on the circulation of goods and services, at all stages of production and marketing, up to the last stage, not applying to

exports of goods and services. Although formally the selling companies are nominated as taxpayers, in practice the tax can be carried forward. It is an indirect tax whose ultimate taxpayer is the final consumer, or more generally, any buyer who is not entitled to a tax credit (final consumers, non-profit institutions and the central government).

Given this characteristic and the available statistical data set of the countries[27], we will resort to some items of the Use of Income Account of the System of National Accounts of each country as an approximation of the final tax base. The use of income account shows how households, government units and non-profit institutions serving households (NPISHs) allocate their disposable income between final consumption and savings (UN 2008).

Household final consumption expenditure is the expenditure of resident households on consumer goods or services. It includes, among others, the direct purchase of goods and services, and goods and services produced and consumed within the same household.

The use of income account also includes spending on individual and collective goods and services by the government and NPISHs.

As stated in the System of National Accounts Manual, the value of the effective general government final consumption is equal to the value of its total final consumption expenditure minus its expenditures on individual goods or services provided to households as social transfers in kind. The value of the effective final government units consumption is therefore equal to the value of the expenditures they incur in providing collective services or certain individual goods or services. Similar criteria should be adopted to account for the consumption of NPISHs. The value of NPISHs' actual final consumption should be equal to the value of their total final consumption expenditure minus their expenditures on individual goods or services provided to households as social transfers in kind.

27 The macroeconomic statistics used to estimate the potential tax come from countries' Systems of National Accounts, or from statistics available from UNdata, a United Nations database service that provides official country data and statistics, or from statistics available from DataBank, a World Bank analysis and visualization tool that contains collections of time series data on a variety of topics.

This approximation to the theoretical tax base that we will construct will be determined by the sum of the three aforementioned factors, from which we will subtract the effective tax collection record, to the extent that the valuation rules of these accounts indicate that the expense is recorded for the total consideration paid or valued, which includes, among others, the sales tax or VAT.

Based on this approximation, we estimate the theoretical VAT collection by applying the general legal rate of the tax to this amount. As we know, VAT is a tax that applies to the general circulation of goods and services, with a standard legal rate and a set of exceptions: exempt goods and services or goods taxed at the minimum rate. The theoretical collection will then seek to show the theoretical collection of a tax that applies to all goods and services at a single rate without exceptions.

Chart 2. **Estimation of Potential Collection, Tax Gap and Components. VAT**

ORD	Variable	Source
(a)	(+) Household Final Consumption	System of National Accounts of the Country & The World Bank Data (https://data.worldbank.org/indicator/) & UNdata (https://data.un.org/)
(b)	(+) Government consumption and NPISH	System of National Accounts of the Country & The World Bank Data (https://data.worldbank.org/indicator/) & UNdata (https://data.un.org/)
(c)	(-) Effective VAT collection	IDB-CIAT Collection Database (https://www.ciat.org/base-de-datos-de-recaudacion-bid-ciat/) & Collection Reports countries
(d)	(=) Final Consumption excluding VAT	Estimation
(e)	(*) Legal Tax Rate	Tax Rates History - CIAT (https://www.ciat.org/alicuotas-en-america-latina/) & Country Legislation
(f)	{(d)*(e)} (=) Potential VAT Collection	Estimation
(g)	(-) Effective VAT collection	IDB-CIAT Collection Database (https://www.ciat.org/base-de-datos-de-recaudacion-bid-ciat/) & Collection Reports countries.
(h)	{(f) – (g)} (=) VAT Tax Gap	Estimation
(i)	{(g)/(f)} (=) VAT Revenue Collection Efficiency	Estimation

ORD	Variable	Source
(j)	{1-(i) (=) (h)/(f)} (=) VAT Revenue Collection Inefficiency	Estimation
(k)	(+)VAT Tax Expenditures	Tax Expenditure Data Basedel CIAT (https://www.ciat.org/gastos-tributarios/) & Tax Expenditures Reports countries.
(l)	{(k)/(f)} (=) Inefficiency_gt	Estimation
(m)	{1 - (i) - (l)} (=) Inefficiency_x	Estimation

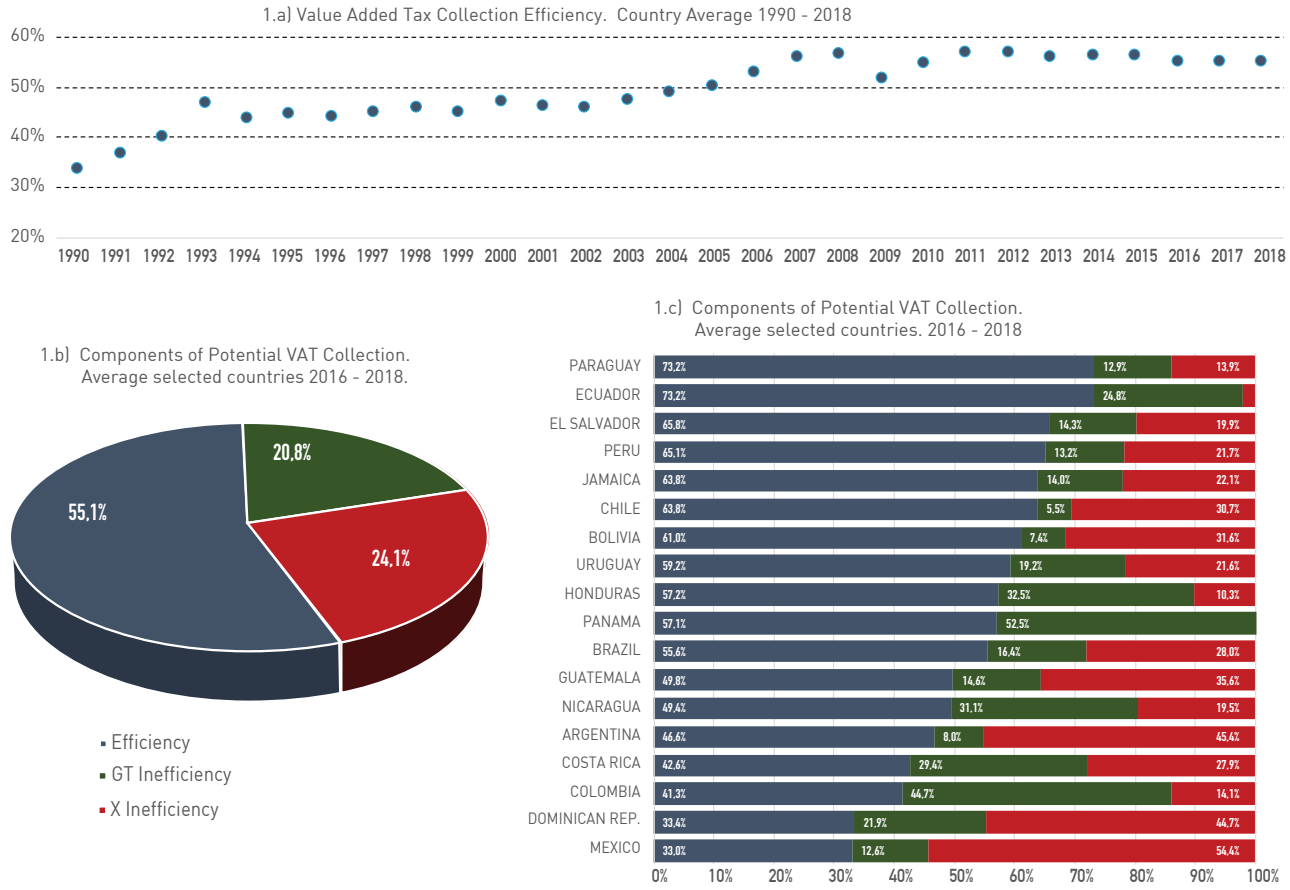
Exceptions to this tax are valued in the tax expenditure studies, so that part of the tax gap found may be attributable to the existence of these exceptions.

Once the theoretical collection has been achieved, the contrast of the effective collection with the theoretical collection will show us the *revenue collection efficiency* of the tax. With the available data we will be able to construct a long series of revenue collection efficiency and infer whether the improvement observed in tax collection is attributable only to nominal changes in rate increases (as shown in the figure) or also to an improvement in revenue collection efficiency, which, as its calculation showed, but not necessarily its origin, is independent of the level of the legal rate.

If the effective collection were to reach the same magnitude as the theoretical collection, we would be faced with a tax that collects its full potential, a theoretical case in which there would be no policy gap (tax expenditures) and no non-compliance gap (evasion). The empirical evidence will show that the revenue collection efficiency is less than 1 since the effective collection is less than the potential collection. The overall gap will be determined as the difference between 1 minus the quotient between the effective collection and the theoretical collection.

With the value of the gap and based on the amounts of VAT tax expenditures reported by the countries, we are able to estimate the portion of the economic gap attributable to this concept. The policy gap.

Figure 4. **VAT Revenue Collection Efficiency 1990 – 2018 (1.a)**
Components of Theoretical Collection 2016 – 2018 (1.b; 1.c)



Finally, the remainder between unity, revenue collection efficiency and the portion of inefficiency attributable to tax expenditures will determine the portion of *inefficiency* not attributable to policy, which to some extent is explained by tax noncompliance. We must keep in mind that, from the initial estimation, when we choose the most representative variables of the tax base, we are approximating the potential collection, both the revenue collection efficiency and the difference attributable to non-compliance are estimates, so this final result does not necessarily show the VAT evasion rate. In any case, to the extent that the macroeconomic variables considered have systematically applied accounting criteria, and since we have a long series, we will be able to appreciate the trend of the indicator as a better measure to evaluate whether the tax revenue collection efficiency has increased, or how the trajectory of the other components of the tax gap has been.

The figure above summarizes the results found.

First (figure 1.a) we show the average VAT revenue collection efficiency for the period 1990 - 2018. It was calculated as the annual average of the revenue collection efficiency found in each country. Following a long series allows us to appreciate the sustained improvement that this indicator has experienced over time. From values below 0.4 at the beginning of the series, the ratio between effective collection and theoretical collection has shown improvements until reaching a maximum in 2007. From there, it immediately showed a drop, and then stabilized at a level slightly below 0.6%.

This result explains why this tax plays such an important role in tax collection and why it explains the sustained growth of the tax burden during the period analyzed. In addition to the fact that the tax's collection capacity grew, measured in this indicator through the increase in legal rates (see Figure 3), revenue collection efficiency did not neutralize this effect, but on the contrary strengthened it, since increases in revenue collection efficiency in scenarios of increased collection capacity of the instrument will result in improvements in collection levels.

Figure (1.b), statically shows the composition of the theoretical VAT revenue calculated as the average of the composition of the theoretical revenue of the countries included in the analysis. The period considered is the last three-year period available, and there we can see that, in addition to the estimated revenue collection efficiency of .551, the tax gap is divided into a portion equivalent to 0.208 attributable to the policy gap and 0.241 to the non-compliance gap.

Sub-figure (1.c) shows statically the composition of the theoretical VAT collection at country level.

Chart 3. **Components of Potential VAT Collection. Selected countries 2016 - 2018.**

Country	Efficiency	GT Inefficiency	X Inefficiency
Argentina	0.47	0.08	0.45
Bolivia	0.61	0.07	0.32
Brazil	0.56	0.16	0.28
Chile	0.64	0.06	0.31
Colombia	0.41	0.45	0.14
Costa Rica	0.43	0.29	0.28
Dominican R.	0.33	0.22	0.45
Ecuador	0.73	0.25	0.02
El Salvador	0.66	0.14	0.20
Guatemala	0.50	0.15	0.36
Honduras	0.57	0.33	0.10
Jamaica	0.64	0.14	0.22
Mexico	0.33	0.13	0.54
Nicaragua	0.49	0.31	0.20
Panama	0.57	0.52	-0.10
Paraguay	0.73	0.13	0.14
Peru	0.65	0.13	0.22
Uruguay	0.59	0.19	0.22
Country Average	**0.55**	**0.21**	**0.24**

The revenue collection efficiency ratio at the country level is between 0.33 and 0.77, with a mean of 0.55.

As mentioned in this document, tax revenue collection *inefficiency* can be broken down into two main components: on the one hand, non-collection due to the existence of exceptions to the general taxation rule, and on the other hand, non-collection attributable to non-compliance, among other factors. The first of these components is estimated using tax expenditure reports, while the second is determined by the difference between the theoretical level of efficiency (1), minus the sum of the two components determined above.

We can see that although the average inefficiency attributable to one or the other factor is 0.21 and 0.24 for tax expenditures and noncompliance, respectively, when analyzing the data we can see that

there is a greater dispersion in the results at the country level than those observed for efficiency[28]. To some extent, this may be attributable to different levels of tax expenditures, but also to different methodological criteria applied by the countries to recognize and estimate them. On the non-compliance inefficiency side, being a residual estimate, its result is dependent on the levels of revenue collection efficiency and tax expenditures.

In Appendix IV of this document we contrast revenue collection efficiency with the ratios estimated for OECD countries for the same period[29]. This analysis allows us to appreciate that, from the point of view of this indicator, both sets of nations are achieving similar levels of revenue collection efficiency with this same instrument.

We must keep in mind that the estimation of the theoretical tax base through the combination of macroeconomic variables chosen does not fully represent the tax base, but it is an approximation to it. Therefore, the Inefficiency_x found as a residual value, after deducting the effective collection and tax expenditures from the potential collection, has a component of discrepancy between the estimate of the tax base and the true tax base and a component of effective inefficiency, the latter to a certain extent attributable to tax non-compliance or evasion. To the extent that the preparation of the National Accounts maintains and updates its estimates based on a systematic and consistent methodology, changes in the value of the indicator or the trend of this index throughout the series may be an indicator of changes in the levels of non-compliance.

Estimation of the Theoretical CIT Collection, the Collection Gap and disaggregation of its components

Taxes on corporate profits, company income, or corporate income tax which we have generically referred to here as CIT, generally arises from the application of a proportional tax rate on the economic results (accounting results) of companies. These accounting results are subject to certain tax adjustments,

28 The total efficiency rank is 0.40, inefficiency attributable to TE is 0.47 and inefficiency attributable to non-compliance is 0.64.

29 Consumption Tax Trends 2020: VAT/GST and Excise Rates, Trends and Policy Issues. 2021.

thus determining the taxable base, also called, in this tax, taxable result. At the same time, simplified regimes usually coexist with this tax which, knowing the greater complexity for the determination of the taxable base, which requires the existence of complete accounting, appeal to only some of the variables of activity, for the determination of the tax profit, or of the tax itself.

Given this form, this basis for calculation and the statistical data set available for the countries, we will resort to some items of the Generation of Income Account, which reflect the portion of value added distributed to capital. The Generation of Income Account is a sub-account of the Primary Income Distribution Account (UN - 2008). In this sub-account, value added is distributed among labor (remunerations), capital and government (taxes less subsidies). The portion corresponding to capital is reflected in the balance of this account, the Operating Surplus or Mixed Income.

The accounting balance of the generation of income account, the portion of value added distributed to capital, is the result of deducting from Gross Value Added the remuneration of employees and taxes minus subsidies on production. This balance measures the surplus or deficit generated from production.

The accounting balance is called Operating Surplus, or mixed income in the case of unincorporated enterprises owned by households in which the owner contributes labor, the remuneration of which cannot be distinguished from his or her performance as an entrepreneur. The balance of the generation of income account will conceptually differ from the consolidation of the accounting results of the companies, to the extent that the former is usually expressed in the national accounts in gross terms, without considering the consumption of fixed capital, nor the consideration for financial services received or granted.

Consumption of fixed capital is the decrease, during the accounting period, in the current value of the stock of fixed assets owned and used by a producer, resulting from physical deterioration and normal obsolescence. The equivalent term from the accounting point of view is depreciation or amortization of fixed assets. Operating surplus also does not take into account interest, rent payable on financial assets or natural resources borrowed or leased by the company, or any interest, rent or similar income receivable on financial assets or natural resources owned by the company (UN - 2008).

Most of the statistics available for this estimation present the balances of the generation of income accounts in gross terms. As a way of approximating the net accounting result of the companies, we deduct from this balance an estimate of the consumption of fixed capital. It is linked to the Gross Fixed Capital Formation account, in the Use of Income Account. Gross fixed capital formation comprises acquisitions of new and existing fixed assets through purchase, barter or own-account capital formation, less the disposal of existing assets through sale or barter. (UN 2008).

Chart 2. **Estimation of Potential Collection, Tax Gap and Components. CIT**

ORD	Variable	Source
(a)	(+) Gross Operating Surplus	System of National Accounts of the Country & The World Bank Data (https://data.worldbank.org/indicator/) & UNdata (https://data.un.org/)
(b)	(+) Gross Mixed Income	System of National Accounts of the Country & The World Bank Data (https://data.worldbank.org/indicator/) & UNdata (https://data.un.org/)
(c)	(-) Consumption of Fixed Capital	System of National Accounts of the Country & The World Bank Data (https://data.worldbank.org/indicator/) & UNdata (https://data.un.org/). Cuenta de Referencia, CKF (t-1)
(d)	(=) Net income of companies	Estimation
(e)	(*) Legal tax rate	Tax Rates History - CIAT (https://www.ciat.org/alicuotas-en-america-latina/) & Country Legislation
(f)	(=) Potential CIT Collection	Estimation
(g)	(-) Effective CIT collection	IDB-CIAT Collection Database (https://www.ciat.org/base-de-datos-de-recaudacion-bid-ciat/) & Collection Reports countries
(h)	(=) CIT Tax Gap	Estimation
(i)	{(g)/(f)} (=) CIT Revenue Collection Efficiency	Estimation
(j)	{1-(i) (=) (h)/(f)} (=) CIT Revenue Collection Inefficiency	Estimation

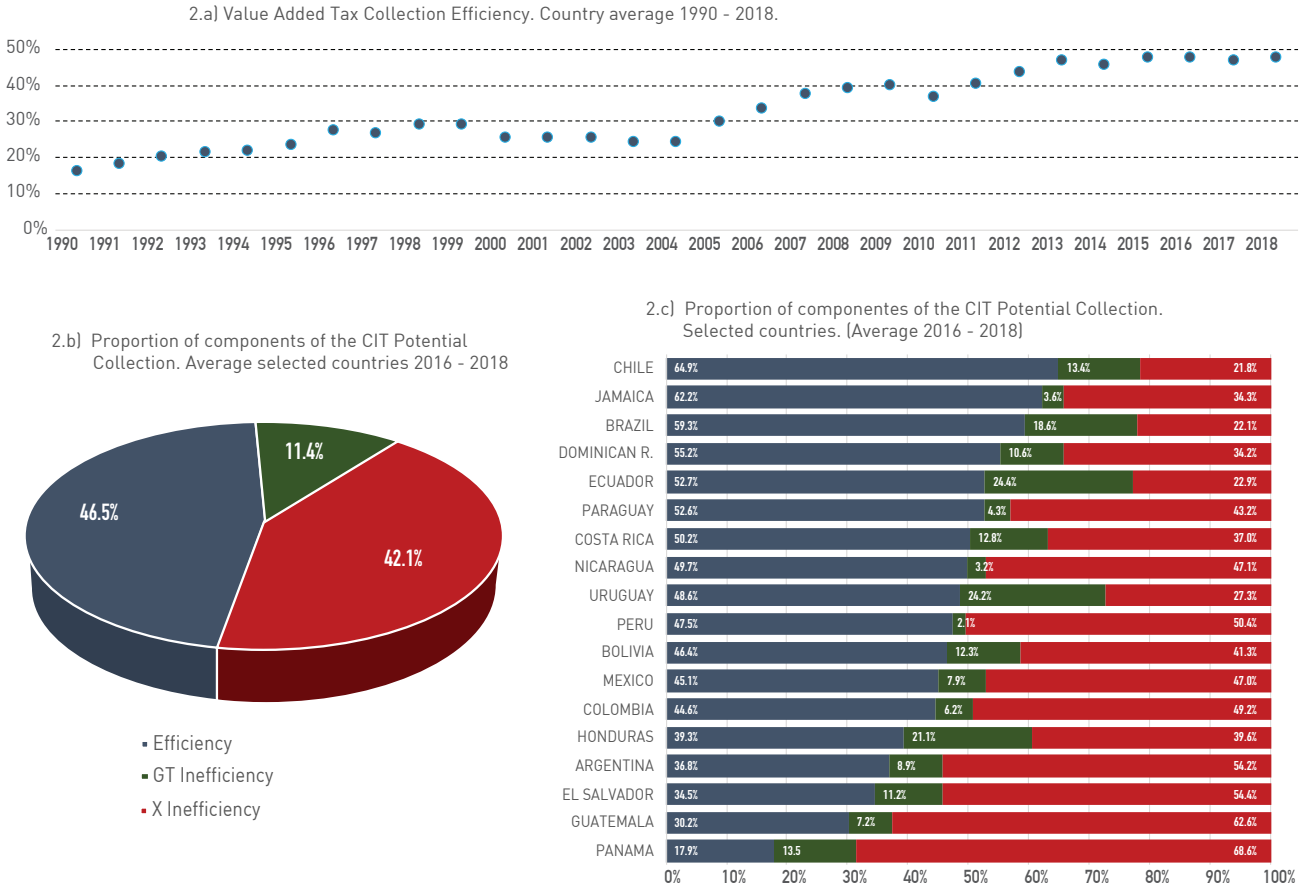
ORD	Variable	Source
(k)	(+) CIT Tax Expenditures	Tax Expenditure Data Based - CIAT (https://www.ciat.org/gastos-tributarios/) & Tax Expenditures Reports - Countries.
(l)	{(k)/(f)} (=) Inefficiency_gt CIT	Estimation
(m)	{1 - (i) - (l)} (=) Inefficiency_x CIT	Estimation

The macroeconomic statistics used for the estimation of the theoretical tax come from countries' Systems of National Accounts, or from statistics available from *UNdata*, a United Nations database service that provides official country data and statistics, or from statistics available from *DataBank*, a World Bank analysis and visualization tool that contains sets of data series on a variety of topics.

The estimate of the theoretical tax base will then be the sum of the balances of the generation of income account, less an estimate of the consumption of fixed capital. The potential tax is estimated for each country and each fiscal year as the application of the current tax rate on the base thus estimated.

Exceptions in the CIT are valued in tax expenditure studies, so part of the tax gap found may be attributable to the existence of these exceptions. Once the theoretical collection has been obtained, the contrast of the effective collection with the theoretical collection will show us the *revenue collection efficiency* of the tax. With the available information we will be able to construct a long series of revenue collection efficiency, and infer whether the observed improvement in tax collection is attributable to an improvement in revenue collection efficiency.

Figure 5. **Revenue Collection Efficiency of CIT. 1990 – 2018 (2.a)**
Components of Theoretical Collection 2016 – 2018 (2.b; 2.c)



The figure above summarizes the results found.

First (figure 2.a) we show the average CIT revenue collection efficiency for the period 1990 - 2018. It was calculated as the annual average of the revenue collection efficiency found in each country in each year. Following a long series allows us to appreciate the sustained improvement that this indicator has experienced over time. From values around 0.2 at the beginning of the series, the ratio between effective collection and theoretical collection has shown sustained improvements (with the exception of 2004, 2010 and 2013) until reaching a maximum at the end of the series (around 0.5).

Although the value of this efficiency indicator throughout the series is lower than the CIT efficiency indicator (Figure 1.a), the CIT indicator has shown a higher growth rate than the VAT, more than doubling its efficiency from the beginning to the end of the series. In the following section we will analyze the relationship between both indicators in more detail.

The evolution of the revenue collection efficiency of this tax explains its greater presence in the long-term tax burden (Figure 2).

Sub-figure (2.b), shows statically the composition of the theoretical CIT revenue calculated as the average of the composition of the theoretical revenue of the countries included in the analysis. The period considered is the last available three-year period, and there we can see that, in addition to the estimated revenue collection efficiency of .465, the tax gap is constituted with a portion of 0.114 attributable to the policy gap and 0.421 to inefficiency_x, which includes the non-compliance gap.

Sub-figure (3.a), shows statically the composition of the estimated theoretical CIT collection at the country level. It corresponds to the average result of the last three years of the data series.

Chart 4. **Components of the CIT Potential Collection.**
Selected countries 2016 - 2018

Country	Efficiency	GT Inefficiency	X Inefficiency
Argentina	0.37	0.09	0.54
Bolivia	0.46	0.12	0.41
Brazil	0.59	0.19	0.22
Chile	0.65	0.13	0.22
Colombia	0.45	0.06	0.49
Costa Rica	0.50	0.13	0.37
Dominican Republic	0.55	0.11	0.34
Ecuador	0.53	0.24	0.23
El Salvador	0.34	0.11	0.54
Guatemala	0.30	0.07	0.63
Honduras	0.39	0.21	0.40
Jamaica	0.62	0.04	0.34
Mexico	0.45	0.08	0.47
Nicaragua	0.50	0.03	0.47
Panama	0.18	0.14	0.69
Paraguay	0.53	0.04	0.43
Peru	0.47	0.02	0.50
Uruguay	0.49	0.24	0.27
Average	**0.47**	**0.11**	**0.42**

The revenue collection efficiency ratio at the country level is between 0.18 and 0.65, with an average of 0.47.

As mentioned in this document, revenue collection inefficiency can be broken down into two main components: on the one hand, non-collection due to the existence of exceptions to the general taxation rule, and on the other hand, non-collection attributable to non-compliance, among other factors. The first of these components is estimated using tax expenditure reports, while the second is determined by the difference between the theoretical level of efficiency (1), minus the sum of the two components determined above.

We can see that although the average inefficiency attributable to one or the other factor is 0.11 and 0.42 for tax expenditures and non-compliance respectively, when analyzing the data we can see that there is a greater dispersion in the results at the country level than those observed for efficiency[30]. This is to some extent attributable to different levels of tax expenditures, but also to different methodological criteria applied by the countries to recognize and estimate them. On the non-compliance inefficiency side, being a residual estimate, its result is dependent on the levels of revenue collection efficiency and tax expenditures.

We must keep in mind that the estimate of the theoretical tax base through the combination of macroeconomic variables chosen does not fully represent the tax base of the tax but is an approximation to it. Therefore, the inefficiency_x found as a residual value, after deducting the effective tax collection and tax expenditures from the potential collection, has a component of discrepancy between the estimate of the tax base and the true tax base and a component of effective inefficiency, the latter to some extent attributable to tax non-compliance or evasion.

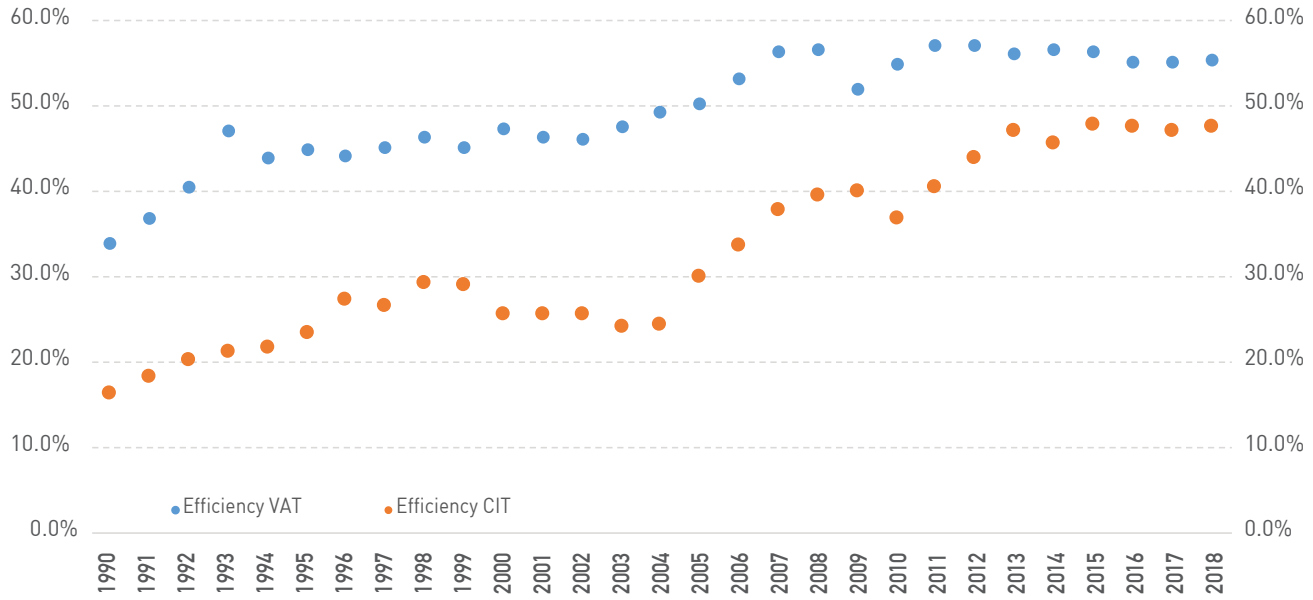
At the same time, CITs usually contain certain tax adjustments, which produce alterations between the accounting result and the taxable result of the tax year, which are not necessarily included in the result of the tax expenditure. Some actual expenses are not admitted for tax purposes, and some legal deductions, such as the adjustment of losses from previous years, are not considered tax expenditures. To the extent that the preparation of the National Accounts maintains and updates its estimates based on a systematic and consistent methodology, changes in the value of the indicator or the trend of this index throughout the series may be an indicator of changes in the levels of non-compliance.

30 The coefficient of variation (CV = standard deviation / mean) is 0.25 for the efficiency ratio, 0.61 for inefficiency attributable to tax expenditures and 0.32 for residual inefficiency, attributable to non-compliance

7 Revenue Collection Efficiency and Tax Burden

When contrasting the results of VAT and CIT revenue collection efficiency in the period analyzed, there is some evidence of parallel trends in both series. And beyond the harmonization and coordination of the national accounts, the basis for estimating the theoretical collection, the estimation of the revenue collection efficiency of each tax was carried out independently and with a different set of variables, so this similarity in the trend of the series may be attributable to the endogeneity of the tax bases between the two taxes. An improvement in tax returns, a reduction of the under-reporting of income, for example, translates into greater revenue collection efficiency in both VAT and CIT.

Figure 6. **VAT & CIT revenue collection efficiency 1990 – 2018**



Throughout the entire time period, we can see that VAT revenue collection efficiency is higher than the CIT indicator, although the gap narrows at the end of the series.

At the beginning of this paper we commented that a common factor of both figures is related to the taxable base, or rather to the way in which the taxable base is determined. Both taxes partially share

the same tax base. While the VAT tax base is determined as the difference between the inputs minus the outputs taxed with the tax, with some specific determination rules, the CIT tax base is determined as the inputs minus the total outputs, with some specific determination rules.

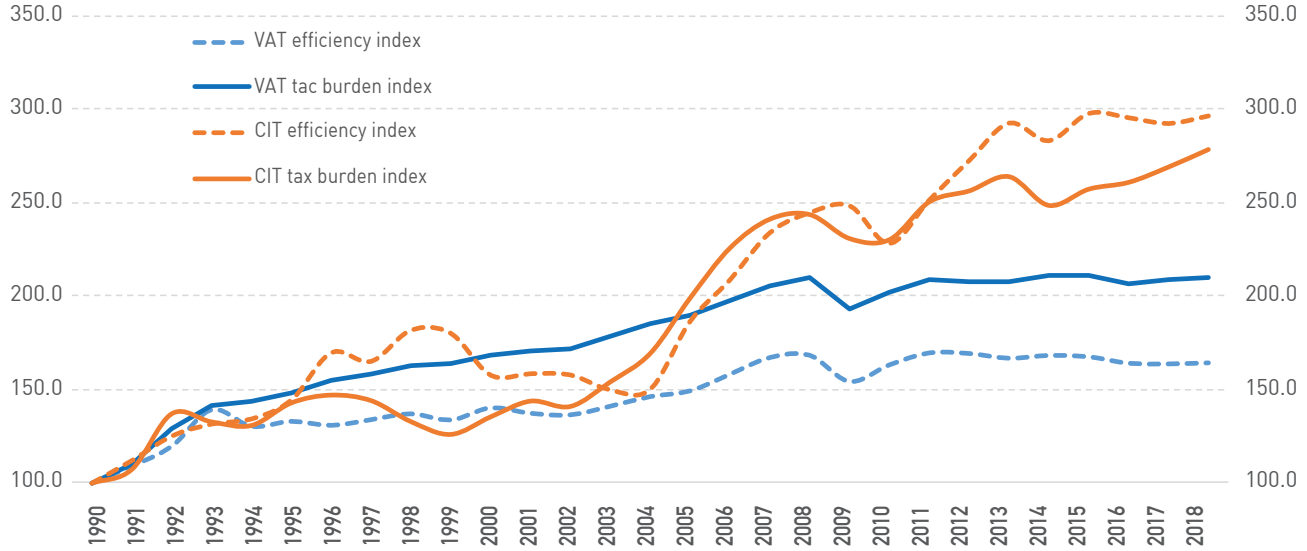
This high connection in the form and calculation of the taxable base of both taxes determines that certain changes in inputs or outputs generate effects on both tax bases at the same time. For example, a drop in turnover in a fiscal year has a downward impact on the taxable base of both VAT and CIT, reducing them. Similarly, an increase in turnover, even if accompanied by an increase in outputs, will probably produce an increase in the nominal taxable base of both taxes, thereby increasing tax revenue.

The VAT taxable base is higher in proportion to income or invoicing than the CIT taxable base, so the latter is more sensitive to changes in invoicing, for example, under-billing. And, in fact, although at the end of the series the efficiencies are closer, the CIT Inefficiency_X component is higher than the VAT Inefficiency_X (Sub-figures 1-(a) and 2-(a)).

We have previously shown that the tax burden of the countries included in this analysis has grown throughout the period analyzed. At the same time, we noted that the evolution of the tax collection of the taxes we are working with explained to a large extent this performance of the main indicator. We then observed that the reforms carried out in the countries had resulted in an increase in the standard VAT rate, while, in the CIT, the changes pointed towards a convergence of the rates, which had had an impact on a reduction in the average legal tax rate in the countries.

In order to contrast the incidence of revenue collection efficiency on the evolution of the tax burden of each tax, we constructed base 1990=100 indexes for the efficiency indicators, as well as for the tax burden indicators.

Figure 7. **VAT and CIT revenue collection efficiency index & Tax burden index 1990 – 2018 (base 1990 = 100)**[31]



The figure above is useful to contrast pairs of variables. First, we see the VAT efficiency index (dotted blue line) and the VAT tax burden index (solid blue line). At the same time we see the CIT efficiency index (dotted orange line) and the CIT tax burden index (solid orange line).

It is to be expected that each pair of indices has a similar[32] trajectory, but the position of each indicator within the pairs is eloquent. While the VAT tax burden index showed a trajectory above the tax efficiency index, the opposite is true for the CIT, where revenue collection efficiency performed better than tax burden. This phenomenon may be partially attributable to the reforms that followed, seen at the rate level. While the changes in the VAT rate a priori boosted its collection capacity, its efficiency was not as fast. On the CIT side, where rate reductions predominated, the tax improved its revenue collection efficiency, probably generating extra collection gains than those that would have been observed if efficiency had remained at the same levels prior to the reforms.

31 Appendix VI shows the point values of each of the index series expressed in the figure.

32 Since the tax burden is the effective tax collection over GDP, and revenue collection efficiency is the ratio of effective tax collection over theoretical tax collection, both indicators share the same numerator.

8 Final Considerations

In the previous section we presented the results of an approximation of the measurement of the VAT and CIT tax gap in the countries of the region based on estimates of the theoretical collection of each tax and revenue collection efficiency, using information from the system of national accounts, national accounts statistics from international organizations, tax collection series, the main parameters of the taxes and the results of available tax expenditures studies.

The results obtained indicate that the revenue collection efficiency of both taxes increased throughout the period under analysis, mainly due to reductions in tax non-compliance. Although the efficiency of the CIT is lower than that of the VAT, it was observed that the collection of the former had a better performance in narrowing the gap than that of the VAT, where the gap remained stable in the most recent period.

In any case, there is still room for action, with inefficiency levels of 0.449 and 0.535 for the VAT and CIT respectively. At the same time, while in the VAT inefficiency is distributed in similar parts between the policy gap (tax expenditures) and inefficiency attributable to evasion, in the CIT the latter is predominant, with a lower presence of policy inefficiency. It is necessary to consider, as mentioned above, that in the CIT, there are exceptions to the tax base, which move it away from the real base (business profits) and are not included as tax expenditures, which affects the result of the non-compliance gap.

We point out some of the limitations of this approach to the tax gap.

Since this is an indirect method, it is based on an estimate of the tax base of each tax using the most appropriate set of available macroeconomic statistics.

The set of statistics does not necessarily fully reflect the tax base.

Some of the statistics were available in the countries' own presentations, while others were obtained from databases of international organizations that compile and report them. Linear interpolation was used for missing cells.

Macroeconomic statistics are presented on an accrual basis, while the collection series have a time lag in relation to this accrual, which in turn is usually different depending on whether VAT or PIT is involved. This decoupling can lead to a delay in the evolution of the calculated index.

There are no long series of tax expenditures, especially for the older periods covered by this estimate.

The work addressed the revenue collection efficiency of the set of countries for which the tax expenditure database has accounted for records, and new country reports were added to the estimation in order to extend the series.

Bibliographical References

Barbone, L. et al. (2013). *Study to quantify and analyse the VAT gap in the EU-27 member states*. Center for Social and Economic Research (CASE).

Barreix, A., Bès, M. Díaz de Sarralde, S. y Velayos, F. (2012). El IVA: que sea lo que es. En A. Corbacho, V. Fretes Cibils y E. Lora (eds.) *Recaudar no basta: los Impuestos como instrumentos de desarrollo* (pp. 239-270). Banco Interamericano de Desarrollo.

Burke, A. (2019). *Measuring tax gaps 2019 edition: Tax gap estimates for 2017-18*. HM Revenue and Customs.

Center for Social and Economic Research. (2020). *Study and reports on the VAT Gap in the EU-28 Member States. – Final Report*. European Commission.

Díaz de Sarralde, S. (2017). El Impuesto sobre el Valor Agregado: Recaudación, Eficiencia, Gastos Tributarios e Ineficiencias en América Latina. *Documento de Trabajo 05/2017*. CIAT.

Díaz de Sarralde, S., Moran, D. (2001). *Panorama de las administraciones tributarias en los países miembros del CIAT: Ingresos, recursos, funcionamiento y estado de la transformación digital en la antesala previa a la pandemia de COVID-19*. CIAT.

Díaz de Sarralde, S., Moran, D., López, J., Maldonado G. (2020). *Revenue Report COVID-19 (RRC)*. CIAT.

Dirección Nacional de Investigaciones y Análisis Fiscal (2020). *Estimación de los Gastos Tributarios para los años 2018 a 2020*. Argentina.

Ebrill, L., Keen, M., Bodin, J-P., Summers, V. (2001). *The Modern VAT*. International Monetary Fund.

Gomez-Sabaini, J. C., Morán, D. (2016). *Evasión tributaria en América Latina Nuevos y antiguos desafíos en la cuantificación del fenómeno en los países de la región*. CEPAL.

Hutton, E. (2017). *The Revenue Administration—Gap Analysis Program: Model and Methodology for Value-Added Tax Gap Estimation*. International Monetary Fund.

ISORA. *International Survey on Revenue Administration* (FMI, IOTA, OECD, BAD y CIAT).

IRS (2012). *Tax Year 2006 Tax Gap Estimate* – Summary of Estimation Methods.

Keen, M. (2013). *The Anatomy of the VAT*. International Monetary Fund.

Keen, M., Perry, V., de Mooij, R., Matheson, T., Schatan, R., Mullins, P., Crivelli, E., and Gupta, S. (2014). Spillovers in International Corporate Taxation. *IMF Policy Paper*. International Monetary Fund.

Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., Grammie M., Johnson, P., Myles, G. and Poterba, J. (2013). *Tax by Design*. Institute of Fiscal Studies.

Naciones Unidas, Comisión Europea, Organización de Cooperación y el Desarrollo Económico, Fondo Monetario Internacional, Banco Mundial y Comisión Económica para América Latina y el Caribe. *Sistema de Cuentas Nacionales* 2008. Manual.

OECD (2011). *Consumption Tax Trends 2010: VAT/GST and Excise Rates, Trends and Administration Issues Measuring Performance of VAT*. The VAT Revenue Ratio.

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

OECD (2020). *Revenue Statistics. 1965 – 2019*. Consumption tax revenues under covid-19: Lessons from the 2008 global financial crisis.

OECD (2021). *Estadísticas tributarias en América Latina y el Caribe 2021*. Reportes de países.
Peláez, F. (2018). Panorama de los Gastos Tributarios de América Latina. *Documento de Trabajo 05-2018*. Centro Interamericano de Administraciones Tributarias - CIAT.

Pecho, M., Peláez, F. y Sánchez, J. (2012). Estimación del Incumplimiento Tributario en América Latina: 2000 -2010. *Documento de Trabajo 03-2012*. Centro Interamericano de Administraciones Tributarias -CIAT.

Rojas, A.; Moran, D. (2019). La presión fiscal equivalente en América Latina y el Caribe: Un análisis de los hechos estilizados durante la última década. *Documento de Trabajo 05/2019*. CIAT-BID.

Rubin, M. (s.f). *The Practicality of the Top-Down Approach to Estimating the Direct Tax Gap*. Her Majesty's Revenue and Customs, United Kingdom.

Sallusti, F. (2021). Measuring profit shifting in Italy with propensity score matching and receiver operating characteristics analysis (PS-ROC) method. *UNCTAD Research Paper No. 64* UNCTAD/SER.RP/2021/7.

Ueda, J. (2018). *Estimating the Corporate Income Tax Gap: The RA-GAP Methodology*. International Monetary Fund.

Appendix

Appendix I. Sources of information for each country

Argentina	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data Base CIAT 2018
Tax Expenditures Reports	Dirección Nacional de Investigaciones y Análisis Fiscal
National Accounts Series	INDEC, Dirección Nacional de Cuentas Nacionales.
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Bolivia	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Estadísticas Económicas - Instituto Nacional de Estadística.
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Brazil	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
	https://www.confaz.fazenda.gov.br/boletim-de-arrecadacao-dos-tributos-estaduais
	https://receita.economia.gov.br/dados/receitadata/arrecadacao/relatorios-do-resultado-da-arrecadacao
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Instituto Brasileiro de Geografia e Estatística
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Chile	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central Chile - Cuentas Nacionales de Chile 2013-2020
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Colombia	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
Tax Expenditures Reports	DIAN. Coordinación de Estudios Económicos - Gasto Tributario en el IVA e Impuesto sobre la Renta 2017 - 2018.
National Accounts Series	DANE - Departamento Administrativo Nacional de Estadística
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Costa Rica	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central de Costa Rica - Cuentas Nacionales Base 2017
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Ecuador	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central del Ecuador - Cuentas Nacionales
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

El Salvador	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central de Reserva - Sistema de Cuentas Nacionales
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Guatemala	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco de Guatemala - Cuentas Nacionales
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Honduras	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	Informe de Gasto Tributario - Secretaría de Finanzas
National Accounts Series	Departamento de Estadísticas Macroeconómicas, BCH
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Jamaica	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Statistical Institute of Jamaica
Tax rate series	CIAT - DATA. Tax Rates in Latin America
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	General Consumption Tax Act.

Mexico	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Instituto Nacional de Estadística y Geografía **** INCOMPLETA LA INFORMACIÓN SOLO TRIMESTRES.
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Nicaragua	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central de Nicaragua - Series de CCNN 2006
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Panama	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
Tax Expenditure Reports	Estimación del Gasto Tributario del ITBMS de la República de Panamá. Marvín Cardoza
Tax Expenditure Reports	Estimación del Gasto Tributario del ISR de la República de Panamá. Marvín Cardoza
National Accounts Series	Instituto Nacional de Estadística y Censo Panamá - Principales cuentas y cuadros complementarios de la serie 1996-2006 - SCN Panamá
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Paraguay	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central del Paraguay - Sistema_de_Cuentas_Nacionales_ Paraguay_Serie_2008_2018
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Peru	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Instituto Nacional de Estadística e Informática - Cuentas Nacionales
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Dominican Republic	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central República Dominicana
National Accounts Series	UN/ DATA + DATABANK
Tax rate series	CIAT - DATA. Tax Rates in Latin America

Uruguay	
Collection Series	Equivalent Fiscal Pressure. Serie 1990 - 2018 BID - CIAT
Tax Expenditures Series	TEDLAC - Tax Expenditure Data BaseCIAT 2018
National Accounts Series	Banco Central del Uruguay & Instituto Nacional de Estadística
National Accounts Series	UN/ DATA + DATABANK
Tax ate series	CIAT - DATA. Tax Rates in Latin America

Appendix II. VAT efficiency series 1990 - 2018 by country. CIAT

COUNTRYY	ARG	BOL	BRA	CHI	COL	CRI	ECU	ELS	GUA	HON	JAM	MEX	NIC	PAN	PAR	PER	RDO	URU	PROM
1990	0.22	0.24	0.60	0.63	0.30	0.54	sd	sd	0.39	sd	0.06	0.29	sd	0.35	sd	0.12	0.25	0.40	0.34
1991	0.26	0.27	0.48	0.66	0.28	0.48	sd	sd	0.39	sd	0.17	0.40	0.49	0.36	sd	0.24	0.23	0.42	0.37
1992	0.40	0.30	0.49	0.71	0.31	0.42	sd	sd	0.47	sd	0.31	0.31	0.53	0.43	sd	0.28	0.24	0.44	0.40
1993	0.48	0.31	0.44	0.75	0.34	0.42	0.32	0.49	0.49	sd	0.57	0.28	0.60	0.45	0.91	0.36	0.30	0.43	0.47
1994	0.48	0.34	0.55	0.71	0.34	0.46	0.31	0.53	0.45	sd	0.52	0.28	0.29	0.47	0.53	0.46	0.29	0.43	0.44
1995	0.45	0.34	0.54	0.68	0.34	0.50	0.31	0.60	0.51	sd	0.57	0.21	0.20	0.48	0.63	0.50	0.30	0.44	0.45
1996	0.44	0.38	0.53	0.70	0.33	0.57	0.32	0.55	0.47	sd	0.49	0.21	0.22	0.46	0.57	0.47	0.31	0.45	0.44
1997	0.45	0.41	0.51	0.69	0.32	0.42	0.34	0.56	0.53	sd	0.48	0.23	0.27	0.48	0.61	0.51	0.36	0.47	0.45
1998	0.44	0.42	0.49	0.68	0.31	0.49	0.36	0.56	0.55	sd	0.47	0.23	0.34	0.47	0.63	0.51	0.37	0.49	0.46
1999	0.42	0.36	0.51	0.66	0.30	0.48	0.35	0.56	0.60	sd	0.45	0.24	0.36	0.44	0.55	0.49	0.41	0.48	0.45
2000	0.41	0.38	0.56	0.67	0.34	0.49	0.60	0.60	0.62	0.51	0.42	0.25	0.34	0.40	0.53	0.49	0.42	0.45	0.47
2001	0.36	0.39	0.59	0.66	0.36	0.52	0.68	0.62	0.54	0.45	0.40	0.26	0.32	0.35	0.50	0.47	0.38	0.45	0.46
2002	0.38	0.42	0.57	0.67	0.36	0.50	0.67	0.61	0.53	0.46	0.44	0.25	0.32	0.33	0.49	0.48	0.39	0.38	0.46
2003	0.43	0.43	0.57	0.67	0.41	0.47	0.62	0.61	0.52	0.50	0.50	0.28	0.34	0.40	0.54	0.50	0.33	0.41	0.47
2004	0.48	0.46	0.58	0.67	0.43	0.49	0.61	0.64	0.55	0.51	0.50	0.28	0.36	0.42	0.55	0.52	0.33	0.46	0.49
2005	0.47	0.50	0.58	0.67	0.45	0.50	0.64	0.66	0.53	0.51	0.46	0.29	0.38	0.45	0.57	0.57	0.31	0.49	0.50
2006	0.49	0.53	0.58	0.64	0.49	0.54	0.66	0.70	0.54	0.54	0.51	0.32	0.42	0.53	0.58	0.62	0.35	0.50	0.53
2007	0.52	0.59	0.56	0.68	0.51	0.58	0.70	0.70	0.60	0.57	0.50	0.32	0.44	0.57	0.58	0.66	0.38	0.63	0.56
2008	0.52	0.65	0.59	0.71	0.51	0.57	0.69	0.70	0.54	0.58	0.43	0.33	0.41	0.63	0.58	0.73	0.35	0.65	0.57
2009	0.49	0.55	0.56	0.60	0.47	0.47	0.65	0.65	0.50	0.47	0.43	0.30	0.39	0.62	0.55	0.64	0.31	0.68	0.52
2010	0.48	0.62	0.57	0.63	0.49	0.46	0.71	0.69	0.53	0.49	0.45	0.32	0.41	0.64	0.68	0.70	0.32	0.67	0.55
2011	0.48	0.69	0.56	0.64	0.53	0.46	0.77	0.72	0.56	0.54	0.43	0.31	0.46	0.67	0.71	0.76	0.31	0.66	0.57
2012	0.47	0.74	0.55	0.65	0.51	0.46	0.77	0.71	0.55	0.52	0.46	0.31	0.49	0.69	0.67	0.75	0.30	0.63	0.57
2013	0.48	0.74	0.56	0.64	0.44	0.45	0.80	0.69	0.53	0.49	0.49	0.28	0.49	0.66	0.68	0.74	0.30	0.62	0.56
2014	0.47	0.74	0.54	0.64	0.46	0.44	0.80	0.69	0.52	0.50	0.51	0.32	0.51	0.63	0.74	0.72	0.32	0.62	0.56
2015	0.46	0.71	0.54	0.64	0.45	0.44	0.79	0.68	0.50	0.55	0.57	0.32	0.51	0.59	0.73	0.68	0.37	0.60	0.56
2016	0.45	0.65	0.54	0.63	0.42	0.44	0.69	0.64	0.49	0.59	0.60	0.33	0.51	0.62	0.74	0.65	0.33	0.59	0.55
2017	0.46	0.60	0.55	0.64	0.40	0.42	0.74	0.65	0.50	0.58	0.65	0.32	0.53	0.56	0.74	0.64	0.33	0.59	0.55
2018	0.50	0.58	0.58	0.64	0.41	0.41	0.77	0.68	0.50	0.55	0.66	0.34	0.44	0.53	0.72	0.67	0.34	0.59	0.55

Appendix III. CIT efficiency series 1990 - 2018 by country. CIAT

COUNTRY	ARG	BOL	BRA	CHI	COL	CRI	ECU	ELS	GUA	HON	JAM	MEX	NIC	PAN	PAR	PER	RDO	URU	PROM
1990	0.03	0.03	0.29	0.09	sd	sd	sd	sd	0.12	0.15	0.41	0.01	0.16	0.06	0.10	-	0.54	0.08	0.15
1991	0.00	0.04	0.17	0.42	sd	sd	sd	sd	0.33	0.18	0.28	0.01	0.16	0.08	0.10	-	0.54	0.11	0.17
1992	0.10	0.05	0.30	0.40	sd	sd	sd	sd	0.22	0.22	0.33	0.01	0.25	0.12	0.10	0.00	0.54	0.17	0.20
1993	0.12	0.06	0.26	0.43	sd	sd	sd	sd	0.32	0.23	0.33	0.01	0.22	0.12	0.10	0.00	0.54	0.22	0.21
1994	0.14	0.05	0.43	0.40	sd	sd	0.11	sd	0.21	0.24	0.34	0.01	0.08	0.14	0.10	0.14	0.54	0.22	0.21
1995	0.16	0.06	0.46	0.39	sd	sd	0.13	sd	0.23	0.31	0.36	0.01	0.11	0.16	0.10	0.19	0.54	0.23	0.23
1996	0.13	0.14	0.59	0.84	sd	sd	0.13	sd	0.30	0.28	0.31	0.01	0.13	0.12	0.10	0.29	0.54	0.26	0.28
1997	0.14	0.16	0.51	0.84	sd	sd	0.12	sd	0.29	0.25	0.27	0.01	0.14	0.17	0.10	0.26	0.54	0.22	0.27
1998	0.17	0.18	0.54	1.14	sd	sd	0.12	sd	0.34	0.31	0.25	0.01	0.14	0.10	0.10	0.26	0.54	0.32	0.30
1999	0.21	0.24	0.53	0.89	sd	sd	0.06	sd	0.41	0.33	0.28	0.01	0.15	0.15	0.10	0.18	0.54	0.37	0.30
2000	0.20	0.16	0.39	0.59	0.18	sd	0.12	sd	0.45	0.19	0.29	0.01	0.14	0.13	0.10	0.16	0.54	0.35	0.25
2001	0.20	0.18	0.38	0.76	0.24	sd	0.19	sd	0.23	0.25	0.24	0.01	0.14	0.10	0.09	0.18	0.54	0.31	0.25
2002	0.10	0.16	0.52	0.79	0.24	0.38	0.20	0.17	0.22	0.24	0.25	0.01	0.17	0.09	0.08	0.17	0.54	0.21	0.25
2003	0.17	0.17	0.47	0.45	0.23	0.38	0.21	0.22	0.22	0.25	0.30	0.00	0.25	0.09	0.08	0.23	0.45	0.15	0.24
2004	0.26	0.18	0.48	0.38	0.28	0.36	0.22	0.23	0.20	0.26	0.25	0.00	0.23	0.11	0.11	0.23	0.33	0.23	0.24
2005	0.29	0.24	0.61	0.51	0.29	0.39	0.27	0.27	0.20	0.29	0.29	0.08	0.24	0.12	0.15	0.32	0.46	0.36	0.30
2006	0.30	0.27	0.60	0.50	0.33	0.47	0.31	0.29	0.23	0.30	0.40	0.08	0.25	0.16	0.29	0.46	0.41	0.36	0.33
2007	0.33	0.29	0.67	0.63	0.39	0.51	0.30	0.36	0.24	0.34	0.39	0.10	0.26	0.16	0.30	0.56	0.60	0.29	0.37
2008	0.21	0.33	0.76	0.61	0.40	0.69	0.31	0.32	0.23	0.37	0.43	0.11	0.28	0.18	0.29	0.54	0.55	0.43	0.39
2009	0.23	0.39	0.82	0.31	0.44	0.64	0.41	0.37	0.21	0.36	0.37	0.11	0.36	0.23	0.43	0.46	0.57	0.45	0.40
2010	0.23	0.36	0.67	0.56	0.37	0.53	0.32	0.24	0.19	0.29	0.44	0.11	0.36	0.21	0.34	0.50	0.42	0.43	0.37
2011	0.27	0.35	0.80	0.66	0.39	0.53	0.38	0.31	0.21	0.33	0.40	0.12	0.37	0.17	0.43	0.74	0.42	0.39	0.40
2012	0.34	0.39	0.71	0.76	0.51	0.48	0.44	0.27	0.21	0.31	0.39	0.25	0.39	0.29	0.49	0.67	0.58	0.38	0.44
2013	0.35	0.42	0.75	0.73	0.46	0.57	0.53	0.38	0.27	0.35	0.54	0.37	0.45	0.24	0.42	0.54	0.61	0.47	0.47
2014	0.33	0.48	0.70	0.63	0.45	0.52	0.55	0.34	0.28	0.35	0.47	0.31	0.51	0.20	0.48	0.54	0.63	0.38	0.45
2015	0.36	0.63	0.68	0.74	0.45	0.57	0.71	0.28	0.27	0.35	0.52	0.42	0.52	0.18	0.51	0.46	0.54	0.41	0.48
2016	0.36	0.51	0.62	0.67	0.45	0.51	0.53	0.33	0.30	0.39	0.60	0.46	0.54	0.20	0.51	0.47	0.57	0.49	0.47
2017	0.36	0.43	0.60	0.63	0.42	0.49	0.49	0.34	0.31	0.38	0.77	0.44	0.58	0.17	0.53	0.41	0.58	0.48	0.47
2018	0.38	0.45	0.56	0.65	0.47	0.50	0.56	0.36	0.30	0.41	0.74	0.44	0.60	0.16	0.54	0.43	0.51	0.48	0.47

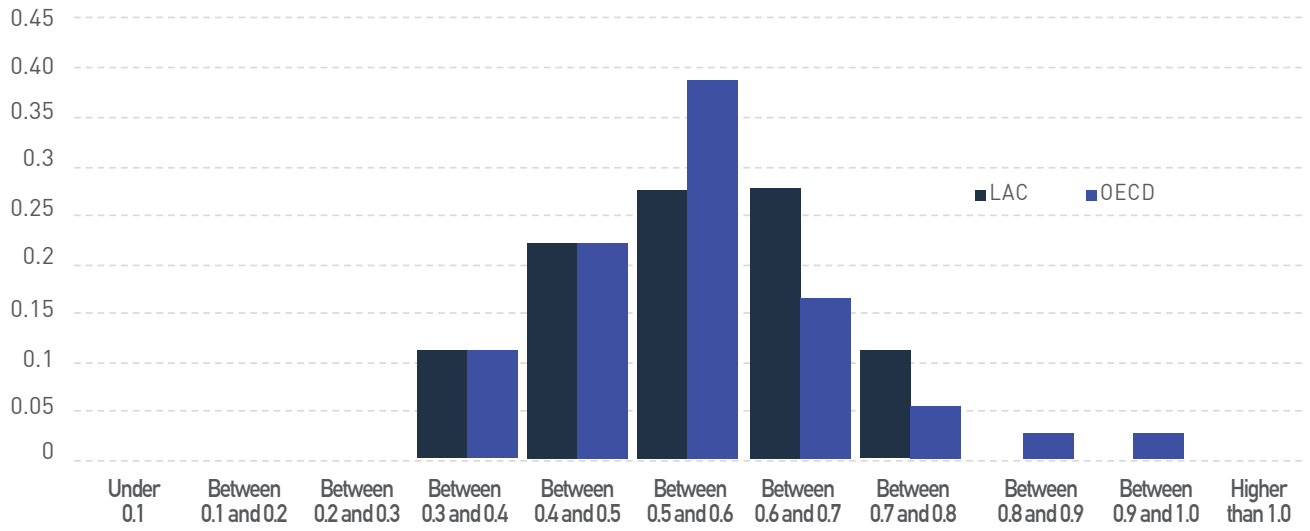
Appendix IV. Efficiency_C VAT Latin America and Caribbean VRR OECD Countries.

OECD (2021)[33], in the thirteenth update of its publication of consumption tax trends, calculates and renews the VRR for all its member countries. According to this publication, the objective is to provide comparative measures of countries' ability to effectively secure the potential VAT tax base.

As mentioned in the previous sections, the VRR and the Efficiency_C are directly comparable indicators insofar as they are based on the same set of statistics which operate in the same positions in the calculation of the ratio.

The recent OECD publication estimates for a set of 36 countries, members of that organization, the VRR indicator for the period from 1992 to 2018. Our ratio was calculated for the same period, for a set of 18 countries. The OECD publication and the Latin American and Caribbean countries selected in our sample have three countries in common: Chile, Mexico and Colombia. The estimates for these three countries coincide in both studies.

Figure 8. Relative Frequency Distribution Histograms. $OECD_{VRR}$ & LAC_{EF_C} Average 2016 – 2018.



It is very interesting to appreciate the similarities in the distribution of the results for both indicators. The figure above does so for the average values of the country index for the last three-year period available in each of the papers. 2016 to 2018, i.e., the most recent results. In none of the 53 countries analyzed (36 OECD, 18 LAC and 3 in common), the Efficiency_C (or the VRR) are below 0.3. In fact, the lowest value corresponds to the same country for both studies.

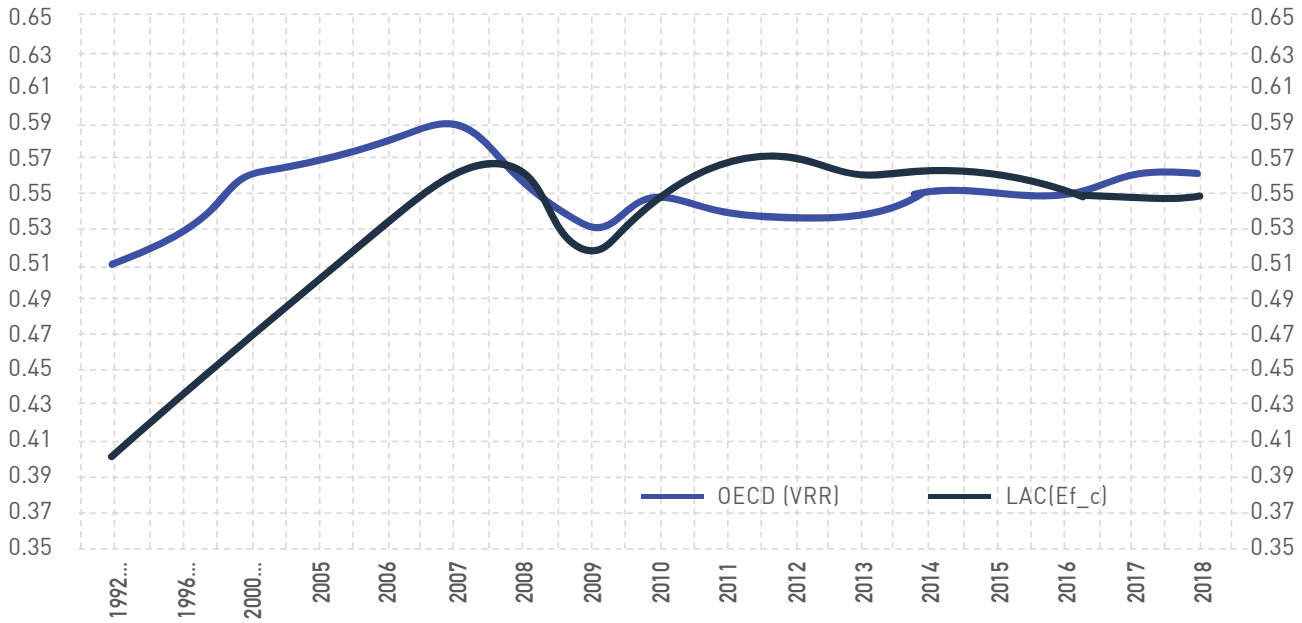
On the right side of the figure we observe that only in OECD VRR ratios above 0.8 are observed. In particular, 2 OECD observations are above 0.8, one of them is located between 0.9 and 1.0. The highest values of Efficiency_C in Latin America and the Caribbean are in the 0.7 to 0.8 range.

33 Consumption Tax Trends 2020: VAT/GST and Excise Rates, Trends and Policy Issues. 2021

We note that the OECD has a mode in the VRR observations located between 0.5 and 0.6 (14 of 36 observations are located in this range), while Latin America and the Caribbean have a mode in the double range: between 0.5 and 0.6 and 0.6 and 0.7 (10 observations of 18 are located in this range). The average indicator for both sets of countries is between 0.55 and 0.56[34] in the last three years.

From the point of view of this indicator, it would give the impression that both sets of nations are achieving equivalent levels of revenue collection efficiency with the same instrument. Since both studies analyze these indicators over a long period of time, we are able to contrast the historical average value for both sets of nations. In the figure below we can appreciate these sequences.

Figure 9. **Evolution of revenue collection efficiency indicators. Annual averages $OECD_{VRR}$ & LAC_{EF_C} 1992 – 2018.**



In the period analyzed, we observe that both indicators show a similar trajectory. First, a period of growth (from approximately 0.50 to 0.60 in OECD countries between 1992 and 2007 and from approximately 0.40 to 0.55 in LAC countries between 1992 and 2008). This was followed by a drop in the OECD countries between 2008 and 2009 and in Latin America in 2009, followed by an immediate recovery in the following year, until stable levels of around 0.55 to 0.57 were maintained until the end of the series. The main difference is the better dynamics of the indicator in Latin America and the Caribbean at the beginning of the series.

34 Average ((OECD = 0.559, LAC = 0.551), Median (OECD = 0.552, LAC = 0.570), Standard Deviation (OECD = 0.132, LAC = 0.121)

VAT is a fundamental pillar of revenue collection in Latin American and Caribbean countries, as it is in OECD countries. The slowdown in the improvement of revenue collection efficiency observed up to 2007 (2008) can be explained by the components of the tax gap. The countries of our region have made progress in the fight against non-compliance, which can be inferred from scattered studies of VAT evasion, while the policy component, tax expenditures, seems to be more rigidly downward. There is still room for growth in the collection capacity of this instrument.

Appendix V. VRR Ratio Series. OECD countries.

Country	1992	1996	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australia				0.56	0.54	0.54	0.49	0.51	0.49	0.47	0.47	0.49	0.48	0.50	0.50	0.48	0.47
Austria	0.61	0.60	0.61	0.58	0.57	0.58	0.59	0.58	0.58	0.58	0.59	0.58	0.58	0.59	0.59	0.60	0.60
Belgium	0.50	0.46	0.51	0.50	0.51	0.51	0.49	0.47	0.49	0.48	0.48	0.47	0.47	0.46	0.47	0.47	0.47
Canada	0.43	0.47	0.49	0.50	0.47	0.51	0.49	0.49	0.49	0.48	0.47	0.47	0.47	0.48	0.48	0.49	0.49
Chile	0.63	0.67	0.64	0.67	0.64	0.68	0.71	0.60	0.63	0.64	0.65	0.64	0.64	0.64	0.63	0.64	0.64
Colombia			0.35	0.42	0.47	0.45	0.48	0.43	0.44	0.49	0.46	0.41	0.42	0.41	0.38	0.37	0.38
Czech Republic		0.43	0.42	0.56	0.52	0.54	0.56	0.55	0.52	0.55	0.57	0.56	0.58	0.58	0.60	0.62	0.61
Denmark	0.56	0.57	0.59	0.62	0.64	0.65	0.61	0.58	0.57	0.58	0.59	0.57	0.57	0.58	0.60	0.61	0.62
Estonia		0.72	0.71	0.70	0.82	0.81	0.67	0.73	0.66	0.67	0.69	0.66	0.69	0.72	0.72	0.74	0.74
Finland		0.54	0.61	0.61	0.61	0.60	0.58	0.56	0.55	0.56	0.56	0.55	0.55	0.54	0.55	0.56	0.57
France	0.54	0.53	0.51	0.52	0.52	0.51	0.50	0.47	0.48	0.48	0.48	0.48	0.48	0.49	0.49	0.50	0.51
Germany	0.61	0.60	0.61	0.55	0.57	0.55	0.56	0.55	0.55	0.56	0.56	0.55	0.55	0.56	0.56	0.56	0.57
Greece	0.47	0.41	0.45	0.47	0.46	0.48	0.46	0.39	0.44	0.37	0.37	0.36	0.37	0.38	0.44	0.43	0.44
Hungary	0.30	0.43	0.52	0.48	0.54	0.58	0.56	0.61	0.52	0.51	0.52	0.52	0.56	0.59	0.55	0.56	0.59
Iceland	0.63	0.54	0.58	0.61	0.64	0.59	0.52	0.44	0.42	0.42	0.43	0.43	0.44	0.51	0.53	0.57	0.55
Ireland	0.45	0.52	0.61	0.66	0.67	0.63	0.55	0.46	0.47	0.46	0.44	0.45	0.48	0.48	0.49	0.48	0.49
Israel		0.66	0.62	0.61	0.62	0.66	0.65	0.65	0.65	0.66	0.64	0.65	0.63	0.63	0.63	0.63	0.63
Italy	0.37	0.39	0.43	0.39	0.41	0.41	0.39	0.36	0.40	0.40	0.37	0.37	0.37	0.37	0.37	0.39	0.38
Japan	0.68	0.71	0.68	0.70	0.70	0.68	0.66	0.66	0.68	0.68	0.68	0.69	0.69	0.73	0.72	0.72	0.72
Korea	0.62	0.57	0.58	0.61	0.60	0.60	0.60	0.62	0.64	0.64	0.66	0.64	0.66	0.60	0.66	0.69	0.68
Latvia		0.53	0.51	0.57	0.61	0.61	0.49	0.38	0.42	0.42	0.46	0.49	0.51	0.52	0.54	0.54	0.58
Lithuania		0.46	0.52	0.52	0.56	0.61	0.58	0.47	0.49	0.51	0.50	0.50	0.51	0.51	0.51	0.53	0.53
Luxembourg	0.45	0.54	0.68	0.85	0.82	0.96	0.96	0.97	0.99	1.06	1.11	1.16	1.23	0.95	0.92	0.86	0.89

Country	1992	1996	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Mexico	0.30	0.21	0.25	0.29	0.32	0.32	0.33	0.30	0.32	0.31	0.31	0.28	0.32	0.32	0.33	0.32	0.34
Netherlands	0.55	0.54	0.57	0.55	0.57	0.58	0.56	0.52	0.54	0.52	0.52	0.47	0.47	0.49	0.51	0.52	0.53
New Zealand	0.96	0.99	0.99	1.03	1.03	0.96	0.96	0.97	1.10	0.93	0.94	0.94	0.96	0.97	0.96	0.99	0.99
Norway	0.58	0.61	0.67	0.57	0.61	0.63	0.57	0.55	0.56	0.56	0.57	0.57	0.56	0.56	0.57	0.57	0.58
Poland	0.00	0.42	0.42	0.47	0.51	0.53	0.50	0.45	0.47	0.47	0.43	0.42	0.44	0.44	0.45	0.50	0.52
Portugal	0.46	0.55	0.60	0.56	0.51	0.51	0.49	0.43	0.48	0.45	0.47	0.46	0.49	0.50	0.49	0.51	0.52
Slovak Republic	0.00	0.45	0.43	0.61	0.58	0.53	0.53	0.47	0.46	0.49	0.43	0.47	0.49	0.52	0.50	0.52	0.52
Slovenia	0.00	0.00	0.68	0.67	0.68	0.69	0.68	0.59	0.59	0.59	0.57	0.59	0.58	0.58	0.58	0.59	0.60
Spain	0.59	0.44	0.52	0.56	0.56	0.52	0.41	0.29	0.44	0.38	0.40	0.39	0.41	0.43	0.43	0.44	0.45
Sweden	0.40	0.49	0.51	0.54	0.55	0.56	0.57	0.55	0.57	0.57	0.55	0.55	0.55	0.57	0.58	0.59	0.59
Switzerland		0.67	0.73	0.72	0.74	0.73	0.74	0.70	0.72	0.71	0.71	0.71	0.70	0.69	0.68	0.69	0.69
Turkey	0.37	0.43	0.46	0.40	0.42	0.38	0.37	0.36	0.41	0.44	0.40	0.44	0.40	0.42	0.40	0.41	0.40
United Kingdom	0.42	0.43	0.44	0.44	0.44	0.44	0.43	0.43	0.44	0.44	0.43	0.44	0.44	0.45	0.45	0.45	0.45
Unweighted average	**0.51**	**0.53**	**0.56**	**0.57**	**0.58**	**0.59**	**0.56**	**0.53**	**0.55**	**0.54**	**0.54**	**0.54**	**0.55**	**0.55**	**0.55**	**0.56**	**0.56**

Source: Consumption Tax Trends 2020: VAT/GST and excise tax rates, trends and policy issues. 2021

Appendix VI. Series of Efficiency Rate and Tax Burden Index VAT and CIT 2000 - 2018.

Currency / Year	VAT efficiency rate	CIT efficiency rate	VAT Tax burden index	CIT Tax burden index
1990	100.0	100.0	100.0	100.0
1991	109.1	112.1	109.5	107.4
1992	119.6	125.1	129.0	137.1
1993	139.1	131.6	140.9	132.8
1994	130.2	134.3	143.2	130.9
1995	132.9	144.3	148.4	142.9
1996	130.7	169.7	154.6	147.1
1997	133.7	165.0	158.2	144.1
1998	136.9	181.7	162.3	132.9
1999	133.6	180.1	163.6	126.1
2000	140.0	157.7	167.9	135.5
2001	137.1	158.5	171.1	143.9
2002	136.3	157.8	172.0	141.0
2003	140.9	149.8	178.0	154.1
2004	146.0	150.1	185.2	169.3
2005	149.0	186.4	190.2	198.9
2006	157.9	208.5	197.1	225.7
2007	166.7	233.7	206.0	241.2
2008	168.0	244.4	209.9	243.6
2009	154.0	248.2	192.8	230.8
2010	162.9	228.0	202.3	230.2
2011	169.2	251.2	208.3	250.4
2012	168.9	272.3	207.9	256.3
2013	166.4	292.3	207.3	263.9
2014	167.9	282.9	210.9	248.5
2015	167.2	297.5	211.2	257.2
2016	163.7	295.2	206.7	260.9
2017	163.4	292.1	208.4	269.1
2018	163.9	296.1	209.5	278.4

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