CHALLENGES AND **OPPORTUNITIES**

FOR **TAX ADMINISTRATIONS** AFTER THE COVID-19 CRISIS

Presentations
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of CIAT Network of Tax Studies
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CHALLENGES AND **OPPORTUNITIES** FOR **TAX ADMINISTRATIONS** AFTER THE COVID-19 CRISIS

Challenges and opportunities for tax administrations after the COVID-19 crisis

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Content

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Firstly, special thanks are due to the Norwegian Agency for Development Cooperation (NORAD), which has sponsored and promoted the Eighth Meeting of the CIAT Network of Tax Studies and Research Areas. Its vital support in the production of this publication as an instrument for disseminating the ideas and concepts discussed at the event is also acknowledged.

Moreover, we would like to express our gratitude to each of the participants in this meeting. In this sense, special recognition is given to those experts and tax officials who contributed with each of the articles that make up this document and that, undoubtedly, have enriched its content.

Introduction

Santiago Díaz de Sarralde
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The **CIAT Network of Tax Studies and Research Areas** is an initiative launched in 2010 in Panama, with the purpose of supporting the exchange of experiences, cooperation, and training of tax officials responsible for the analysis and evaluation of tax policies in CIAT member countries.

Since its creation, the Network has received the support of the tax administrations co-organizers of the seven meetings already held before: *Dirección General de Ingresos* (DGI) of Panama at the first meeting in 2010; *Dirección de Impuestos y Aduanas Nacionales* (DIAN) of Colombia in 2011; the *Dirección General de Impuestos Internos* (DGII) of Dominican Republic in 2012; *Dirección General Impositiva* (DGI) of Uruguay in 2014; *Servicio de Impuestos Internos* (SII) of Chile in 2015; *Superintendencia Nacional de Aduanas y de Administración Tributaria* (SUNAT) of Peru in 2016; *Receita Federal of Brazil* (RFB) in 2018. In addition, these events have had the advice, support or sponsorship of various international organizations such as the Inter-American Development Bank (IDB), the World Bank, the Economic Commission for Latin America and the Caribbean (ECLAC), the European Commission, the International Monetary Fund (IMF), the German Society for International Cooperation (GIZ), the Central American Institute for Fiscal Studies (ICEFI), the Abdul Latif Jameel Poverty Action Lab (J-PAL), the Spanish Ministry of Finance and Civil Service and its Institute of Fiscal Studies (IEF), the Organization for Economic Cooperation and Development (OECD), among others.

After a prolonged period of COVID-19 pandemic, which had multiple negative economic impacts on a global scale, it was an appropriate time to resume these fruitful meetings promoted by CIAT, especially under the premise of fostering and enriching the debate on the challenges that tax administrations will face in the coming years. Considering the encouraging progress made by several of the countries in recent years -particularly in Latin America and the Caribbean-, the need to identify the opportunities in this area posed by this new regional and international context has also become more evident.

Indeed, on March 27 and 28, 2023, and with the sponsorship of the Norwegian Agency for Development Cooperation (NORAD), the **Eighth Meeting of the CIAT Network of Tax Studies and Research Areas** was held. This event brought together a large group of specialists and officials in Panama City, where a series of presentations were made to illustrate different current issues related to tax administration at the international level[1]. As a way of generating a final product that would allow for the subsequent mass dissemination of the ideas and concepts discussed at this meeting, the organizers (CIAT and NORAD) also decided to promote the preparation of a document that would bring together the work carried out by the Network members.

This publication consists of 19 articles made by international experts and official representatives of CIAT member countries. They were organized into four sections or thematic areas, which coincide with some of the main lines of work that the Tax Studies and Research CIAT Directorate has been developing and promoting in recent years.

The first section contains five articles on **"Tax Reforms in CIAT member countries, updated tax legislation and analysis of tax collection, with emphasis on the impact of the COVID-19 pandemic and the subsequent recovery"**. There, two general analyses can be found: on the one hand, Dalmiro Morán summarizes the main trends in tax collection and administration that emerge from a series of recent studies, while on the other hand, Luis A. Peragón Lorenzo systematizes the latest changes in tax legislation in CIAT countries. Following this, three particular analyses are presented regarding the evolution of tax revenues in some member countries in times of pandemic. Specifically, Diego D. Domínguez Verón analyzes the case of Paraguay in connection with a recent major tax reform; Jorge L. Sánchez Vecorena does the same for the case of Peru, where a significant recovery was observed after the pandemic crisis; José M. Pereira de la Puente also focuses on this period in the case of Uruguay, showing a strong rebound in tax revenues during the 2021-22 biennium.

The second section contains four articles and refers to **"Tax expenditures and evasion: methodologies for the measurement and the evaluation of their effects"**. First, Fernando Peláez Longinotti introduces a general quantitative analysis with two lines of research -driven by CIAT- to quantify and compare both the tax gap (and collection efficiency) and tax expenditures in Latin America and the Caribbean. Cristina García-Herrera Blanco presents Spain's novel experience in the evaluation of tax benefits, which can serve as a reference model for other countries. Then, Nicolás Sassano makes a methodological description of the first experience, on the part of the Tax Administration, in estimating the compliance gap in Argentina's income tax. Finally, David Pineda Pinto discusses the potential of the exploitation of administrative data for the analysis and rationalization of tax expenditure in Honduras.

1 The press release, the agenda and the meeting presentations may be downloaded at the following link: https://www.ciat.org/viii-meeting-of-the-network-of-tax-studies-and-research-areas/?lang=en.

The third section is also composed of four articles and deals with the **"Responses of the Tax Administrations and development of specific services in the face of the digitalization of the economy, with emphasis on the formalization of taxpayers"**. First, Juan P. Jiménez and Andrea Podestá highlight the need to rethink intergovernmental finances (taxation and allocation of taxing powers) in the new context for Latin American countries. Next, Arelys Pérez García presents the case of Cuba, highlighting the central role of the Tax Administration in the current process of digital transformation of State services towards the citizens. Similarly, Tammy Branch points out the challenges and opportunities posed by the COVID-19 pandemic crisis for the Canadian Tax Administration, especially in terms of interaction with taxpayers and joint work with other agents to minimize the risks of tax fraud. Finally, Marvin Cardoza focuses on a typical problem for Tax Administrations throughout Latin America: the specific treatment of small taxpayers and the dissemination of simplified regimes as a tax inclusion strategy to fight informality.

The last and fourth section of this document consists of six articles and revolves around **"Advances in the implementation and use of electronic invoicing, especially in relation to improving tax compliance"**. In a diverse range of national cases, the recent experience of the *Servicio de Rentas Internas* of Ecuador - presented by Juan C. Campuzano Sotomayor - in the exploitation of Big Data and the use of analytical tools as inputs for the development of a tax risk model initially stands out. Following this, two examples of massive implementation of electronic tax documents in different stages of development can be found: on the one hand, Luis H. Valero Vásquez describes the latest advances for the case of Colombia; on the other hand, Fany K. Mejía Dueñas does the same for El Salvador with respect to electronic invoicing. The Caribbean countries have also joined these cutting-edge trends, as Hank Williams explains in relation to the technological tools incorporated in recent years by the Tax Administration of Jamaica, which have favored a restructuring of the fundamental work processes to strengthen tax compliance. As an example of the evolution and potential of electronic invoicing for CIAT member countries, Víctor H. Vargas Apaza presents an application for the case of Bolivia, aimed at identifying simulated transactions through advanced analytical techniques. Finally, Erick E. Echeverría Mazariegos provides details on the development of an innovative model, based on the use of a vast amount of statistical information, for the segmentation of the determinants of tax revenues from foreign trade in Guatemala.

In summary, this publication aims to record the latest developments observed by the CIAT Network of Tax Studies and Research Areas, reinforcing its relevance as a space for debate and exchange of experiences among a

group of leading specialists in tax matters. With this, it is expected to contribute to the dissemination of the most innovative studies that the different member countries have been promoting and developing in recent years, especially oriented towards the improvement of tax management and administration based on the use of modern information and communication technologies at the service of taxpayers.

I. Tax Reforms

in CIAT member countries, updated tax legislation and analysis of tax collection, with emphasis on the impact of the COVID-19 pandemic and the subsequent recovery

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I.1. Analysis of tax collection and trends in tax administration: CIAT's recent contributions

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Introduction

Since its creation, the Inter-American Center of Tax Administrations (CIAT) has been a fervent promoter of generating statistics, studies, and research in the tax area. Indeed, within its current Strategic Plan (2021-2026), one of the strategic initiatives consists of the development and dissemination of information, studies, research, innovative practices, and other products to improve tax policy and administration (CIAT, 2021). Among other issues, this encompasses collecting and making available data from and to member countries related to tax legislation, organizational and management systems, tax statistics, trends, and technological changes. It also includes conducting comparative studies and analyses in these thematic areas as well as establishing benchmarks and indicators for the tax administrations of member countries.

The main purpose of this article is to summarize four lines of work that CIAT, from its Tax Studies and Research Directorate, has been developing in recent years, all of which have resulted in a set of documents and statistical databases that, in addition to complying with the aforementioned premises, have been highly valued by tax administrations of the member countries themselves.

Following this introduction, the first section will focus on two projects related to the collection of tax statistics and the analysis of tax collection with short- and medium-term approaches. The second section will focus on two other projects that, based on an international database (ISORA), provide lessons on recent international trends in tax administration, with special emphasis on technological innovation and operational digitalization. Finally, a series of lessons learned, and final perspectives are included.

1. Systematization of tax statistics and tax collection analysis (short and medium term)

1.1. Equivalent Fiscal Pressure: 1990-2021 Update (PFE, 2023)

In the framework of a joint work project between the Inter-American Development Bank (IDB) and the Inter-American Center of Tax Administrations (CIAT) and with more than a decade of validity, the Equivalent Fiscal Pressure (EFP) Database has become a statistical reference for tax revenues in Latin American and Caribbean (LAC) countries. Its most recent update covers the 1990-2021 period and includes systematized official figures for 27 countries throughout the region (Morán and Solera, 2023).

It is well known that Latin America and the Caribbean is a very heterogeneous region in terms of level and composition of tax revenues mobilized in each country and used for public financing. The different instruments that countries of the region have adopted to reach these resources often make it difficult to classify them and, therefore, to compare cases in quantitative terms. In this sense, the EFP represents an alternative methodology for calculating the tax burden in LAC and seeks to measure more accurately the total resources collected by countries of the region, which under traditional methodologies would be underestimated. Thus, the EFP is composed of four components: (i) general government tax revenues, including subnational governments, (ii) contributions to public social security systems, (iii) mandatory contributions to private social security systems, and (iv) non-tax revenues associated with the exploitation of natural resources.

Based on the available data, the global results make it possible to identify medium-term trends in levels and structures of fiscal revenues, also comparing between subregions and countries in the region. The overall average EFP for 25 countries in the region (excluding Cuba and Venezuela) maintained an upward trend since the 1990s, increasing by more than six percentage points (p.p.) of Gross Domestic Product (GDP), from 17.3% to 23.6% of GDP between 1990 and 2021 (figure 1). Having peaked in 2019 (23.9% of GDP), the impact of the COVID-19 pandemic caused average EFP to contract 1.0 p.p. in 2020, partially recovering in 2021 (+0.7 p.p. of GDP).

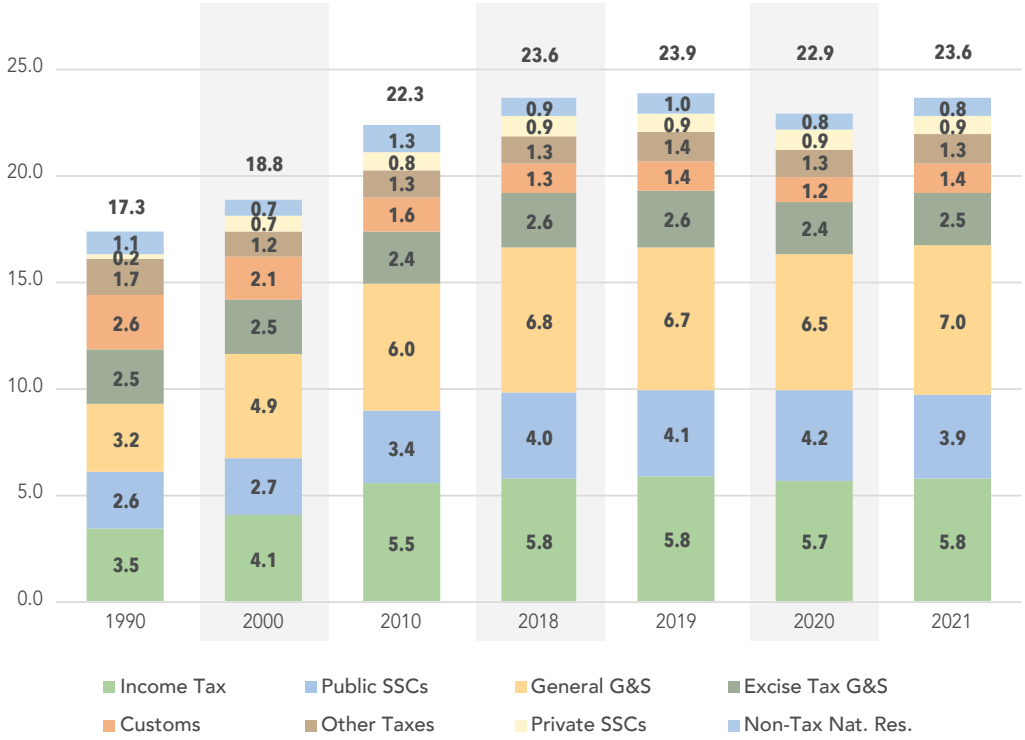
The evolution of the EFP in the last three decades was based on three pillars: (i) general taxes on goods and services; (ii) income tax and complementary taxes; and (iii) public and private social security contributions (SSCs). In the first case, its average collection increased from 3.2% of GDP in 1990 to 7.0% in 2021, reaching a percentage share of 29.7% of the total. As for the second pillar, it went from 3.5% to 5.8% of GDP and from 18.3% to 24.4% of the average EFP between those years. As for the third pillar, average revenues for public SSCs increased from 2.6% to 3.9% of GDP, and for private SSCs from 0.2% to 0.9% of GDP in the same period.

1 In the first case, a recent monetary reform has resulted in tax figures for 2021 no longer being comparable with those of previous years. In the second, no official information has been available since 2016.

FIGURE 1

Evolution of the level and structure of the Equivalent Fiscal Pressure - Latin America and the Caribbean

Simple (unweighted) average for 25 countries, 1990-2021 (selected years), as percentages of GDP



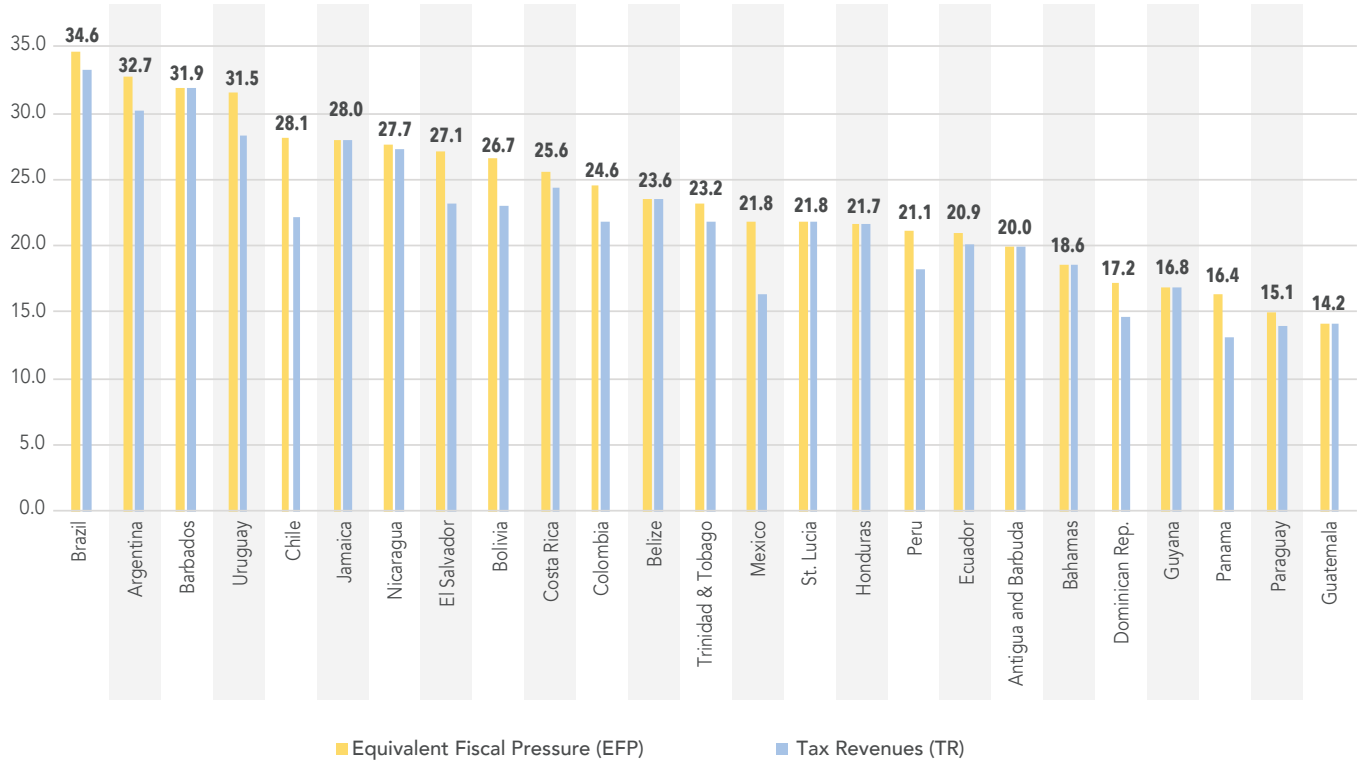
Source: CIAT-IDB Database of Equivalent Fiscal Pressure for Latin America and the Caribbean 1990-2021 (IDB-CIAT, 2023).

At the individual level, there is a high heterogeneity of cases in terms of evolution and level of EFP. All countries, with the exception of Panama and Trinidad and Tobago, showed growth in EFP between 1990 and 2021. There is currently a large gap between the country with the highest level of EFP in 2021 (Brazil; 34.6% of GDP) and the one with the lowest level (Guatemala; 14.2% of GDP). Furthermore, although Figure 2 shows the ordering of countries according to EFP in 2021, the heterogeneous regional picture would be different if they were ordered according to the level of total tax revenues including public SSCs (TR). This particularity is due to the significant gap between both concepts (due to the specific weight of revenues from private SSCs and/or non-tax resources linked to the natural resources sectors) for some cases in particular, such as Chile (with a difference of 5.9 p.p. of GDP), Mexico (5.5 p.p.), El Salvador (3.8 p.p.) and Bolivia (3.7 p.p.).

FIGURE 2

Tax Revenues and Equivalent Fiscal Pressure by Latin American and Caribbean countries

Individual data, 2021, as percentages of GDP



Source: CIAT-IDB Database of Equivalent Fiscal Pressure for Latin America and the Caribbean 1990-2021 (IDB-CIAT, 2023).

Note: The labels refer to the level of total EFP of each country at the end of 2021. The cases of Cuba (according to official figures, in 1990 the EFP stood at 29.1% of GDP and in 2021 it was 17.7%) and Venezuela (due to lack of official information since 2016) are not presented.

In addition, in order to weight the evolution of tax revenues over the last three decades, relative convergence indicators were calculated as a percentage of the average tax collection of the 38 member countries of the Organization for Economic Cooperation and Development (OECD). In terms of total resources, the average EFP of LAC went from 56.2% in 1990 to 69.0% in 2021 of the average calculated for the OECD. As for the differences in the respective tax structures, some gaps persist that are difficult to close in the short term, including i) social security contributions, ii) property taxes, and iii) income taxation, particularly that levied on individuals.

1.2. Revenue Report COVID-19/CIAT (RRC, 2020-22)

The COVID-19 pandemic, in addition to its serious health consequences, rise to one of the deepest economic crises in recent decades. From the multiple impacts, one of the most evident was an accelerated drop in tax revenues in the vast majority of countries, as a result of the sharp contraction in the level of economic activity and the families and businesses income in general. In a context of extreme uncertainty, it became essential to have as much information as possible in order to know the relative situation of each

country and facilitate the design of policy responses to contain and mitigate the negative effects of this crisis.

Since July 2020, with the support of the tax administrations of the member countries, CIAT began publishing the so-called "Revenue Report COVID-19 (RRC)". These documents have been supported by another important statistical project promoted by CIAT, which consisted in the construction of a database of international scope, which has made it possible to monitor and analyze the monthly evolution of the global collection of the administrations and its main components (Income Tax - IT, Value Added Tax - VAT or similar, Excise taxes, and Other taxes), with their monthly variations, both in current and constant values, with respect to the same month of the preceding year and cumulatively throughout each year[2].

Throughout the successive editions of this Report (eight so far), several CIAT member countries have been incorporated (reaching a total number of 23 cases), which has provided considerable robustness to the general trends identified based on the averages calculated[3]. In all of them, the most important developments by country have been addressed, including information on the structure of tax collection, its monthly distribution and the evolution of economic activity in the different territories, supported by the mobility reports provided by the major mobile telephone technology companies. An analysis by region or group of countries was also added in order to delve deeper into the common aspects as well as the most notable differences between the diverse countries where information was available.

For illustrative purposes, the sixth edition of the RRC provided the possibility of verifying, early on, the strong recovery of total revenue, +17.2% on average and in constant values, during the year 2021 and with respect to the deep falls recorded in the previous year (Díaz de Sarralde et al., 2022). This trend was also verified for all major tax categories. However, when comparing with the 2019 figures, the average annual improvement was maintained although limited (+6.7% for the total). At the country level, the recovery in real terms was unanimous when compared to 2020 figures in a wide range of increases, which were reduced when weighted against 2019 values, including some cases with percentage drops in real terms.

Throughout 2021, a trend of gradual improvement in mobility indicators in all their dimensions began to consolidate. In turn, average monthly collection data by type of tax showed a behavior correlated with mobility indicators, with a slow recovery as of June 2020 (figure 3). The general upturn in tax collection in the second half of that year was supported, especially, by the evolution of income tax (IT) which, as a fiscal cushion, contributed to offset the more considerable falls observed in taxes linked to economic activity such as VAT -which in 2021 would become one of the drivers of the recovery- or excise taxes , whose collection remained in negative territory for a large part of the last year as well.

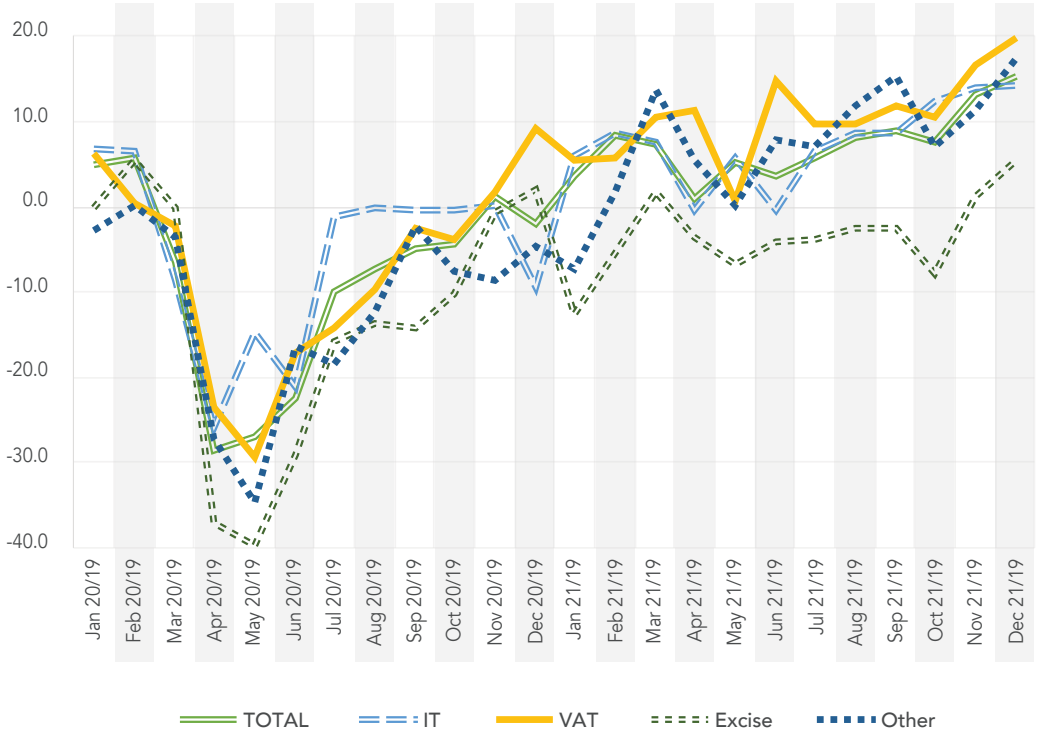
2 See link: https://www.ciat.org/recaudacion/, "Revenue Report Covid-19 CIAT (Annex)".

3 Updates to the RRC are published in the CIAT Book and Working Paper series. See: https://www.ciat.org/reporte-de-recaudacion-covid-19-ciat/.

FIGURE 3

Evolution of monthly tax collection by tax administrations by tax type

Simple average for 23 CIAT member countries, constant values, January 2020 to December 2021, in percentage changes with respect to the same month of 2019



Source: Díaz de Sarralde, López, Maldonado and Morán (2022), "Revenue Report COVID-19 - Year 2021", CIAT.

The most recent update of the RRC, which refers to 2022 figures, has ratified the recovery of tax revenues with respect to the pre-pandemic scenario, with an average annual growth in constant values of 8.6% with respect to 2021 and 16.8% with respect to 2019 (Díaz de Sarralde et al., 2023). Due to its great usefulness, this CIAT statistical project is expected to continue under the name of Revenue Report CIAT (RRC), focusing on the monitoring of total collection -and its main components- as a tool for comparative diagnosis and evaluation of the effective impact of different tax measures.

2. Trends in international tax administration, with emphasis on CIAT countries

2.1. Overview of Tax Administrations in CIAT countries 2021 (ISORA)

The dynamic nature in which they operate and develop means that Tax Administrations (TAs) around the world are in a constant process of transformation. However, the

diversity of realities generally makes it difficult to carry out international comparisons regarding their structure and operation, limiting the possibility of weighing and evaluating the different changes observed in each particular case. To account for this, and also to identify general trends and stylized facts, CIAT has promoted another line of tax research whose final product is the Overview of Tax Administrations in CIAT countries.

Since its first edition (Díaz de Sarralde, 2019), this document has been based on updated information from the International Survey on Revenue Administration[4] (ISORA) and has sought to provide a detailed and systemic picture of the state of tax collection agencies for CIAT member countries in the international context. The different dimensions analyzed include the revenues administered and financial resources of TAs, the basic characteristics of the staff employed, the central aspects of their operational functioning -with special emphasis on digitalization and risk management processes-, and the degree of implementation of technological innovations aimed at improving tax compliance and tax management.

The most recent release of this document (Díaz de Sarralde and Morán, 2021) took advantage of information from the ISORA survey collected during 2020, for a universe of national TAs from 156 countries (35 of which are CIAT members), with data available for fiscal years 2018 and 2019. While recognizing the impossibility of summarizing the contents of the latest Overview in this article (it contains 41 tables and 27 figures with various results), here will be presented an example of the specific information provided by it in terms of international comparative analyses for CIAT countries in the prelude of the COVID-19 pandemic.

In the area of organization and operational functioning, one of the numerous indicators that ISORA allows to analyze is related to main taxpayer segmentation strategies. On the one hand, special offices, or programs for large taxpayers (LTO) stand out, which, at the end of 2019, were present in almost 90% of the countries participating in ISORA (97.1% in CIAT and 87.1% in LAC), contributing, on average globally, 54.2% of the collection, a share that decreases with the income level of countries (Table 1). In addition, the LTOs consumed a limited portion of personnel: 8.3% in ISORA and 7.3% in CIAT, while the number of corporate income taxpayers (CIT) administered by the LTOs (out of the total number of taxpayers) was, on average, 8.5% for ISORA and 1.8% for CIAT, showing an inverse relationship with the average income level of the analyzed countries.

Simplified IT regimes for small taxpayers were identified in 63.5% of ISORA countries, 71.4% of CIAT and 61.3% of LAC. This percentage was considerably higher for low-income countries (88.9%), gradually decreasing as the income level increases (Table 1). Something similar can be observed for special programs and specific services for SMEs, which in 2019 existed in 59.6% of ISORA countries (65.7% of CIAT), with a higher relative presence in low-income countries (72.2%).

4 The International Survey on Revenue Administration (ISORA) is a standardized tax administration information collection tool in the framework of a project conducted by five different organizations: the International Monetary Fund (IMF), the Intra-European Organization of Tax Administrations (IOTA), the Organization for Economic Cooperation and Development (OECD), the Inter-American Center of Tax Administrations (CIAT) and, since 2018, the Asian Development Bank (ADB).

TABLE 1

Indicators of the main taxpayer segmentation programs

Proportion of countries and simple averages for selected groups of countries, 2019, in percentages

Country Groups	Large Taxpayers Office (LTO)				Specific service initiatives aimed at SMEs (% of countries)	Simplified income tax regime for small taxpayers (% of countries)
	Countries (in % of total group)	Revenue Contribution (In % of Total Net Revenue)	Assigned staff (in %)	CIT Taxpayers (in % of total)		
ISORA	**89.7**	**54.2**	**8.3**	**8.5**	**59.6**	**63.5**
CIAT Members	97.1	54.1	7.3	1.8	65.7	71.4
Latin America and the Caribbean	87.1	60.4	11.1	6.8	61.3	61.3
Low Income	100.0	69.8	7.7	21.5	72.2	88.9
Lower Middle Income	92.7	59.8	9.3	11.1	63.4	68.3
Uper Middle Income	95.7	52.7	10.5	5.3	58.7	60.9
High Income	78.4	41.9	5.6	3.7	52.9	52.9

Source: Morán and Díaz de Sarralde (2021), "Overview of Tax Administrations in CIAT Countries: Revenue, Resources, Performance, Digital Transformation in the prelude to the COVID-19 pandemic. Results from the ISORA 2020 survey (Data 2018-2019)", CIAT.

One of the main conclusions of this document highlights the performance of CIAT member countries, which, with limited budgets and staffs subject to a high workload, manage to operate with a relatively low average collection cost. Most of these countries have shown a) a growing degree of digitization of their TAs in multiple dimensions, b) a special emphasis on taxpayer segmentation strategies, c) some leadership in the introduction of technologies to improve tax compliance (electronic invoicing), and d) encouraging progress in the incorporation of innovative technological solutions.

2.2. Innovation, Digitalization and Technology Index (INDITEC, 2022)

Taking advantage of the large amount of valuable statistical information gathered through the International Survey on Tax Administration (ISORA), the latest CIAT-driven project to be highlighted here is the one that has risen to the so-called "Innovation, Digitalization and Technology Index in Tax Administration (INDITEC)" (Díaz de Sarralde and Morán, 2022). This novel tool, which seeks to facilitate the comparative evaluation of Tax Administrations (TAs), provides a detailed and systemic picture of the relative status of TAs around the world in terms of incorporation of technological innovations to improve tax compliance and

statistical information management, digital transformation of operational processes and strategic orientation of financial and human resources available in this regard.

For the development of the INDITEC index it was necessary, firstly, defining a series of methodological issues regarding the determination of the dimensions of analysis (4), the selection of the most representative variables (29), the statistical treatment of the components of each index and the strategy for aggregating all the elements into a global synthetic indicator. Afterwards, calculations were made at the individual level and by groups of countries according to different criteria.

The overall results for the entire universe of the 156 countries participating in ISORA 2020 (with data available for fiscal years 2018 and 2019) suggest lower average indexes in the area of technological innovation (0.37), somewhat higher for tools aimed at improving tax compliance (0.46) and digital transformation of TAs' internal operations (0.46), with better relative performance on resources and budget (0.61). The INDITEC index for the "ISORA universe" stands at 0.48 (Table 2).

The analysis by different country groupings shows some interesting results. For example, Latin America and the Caribbean appears one step below the global average in the dimensions of technological innovation and improved compliance, although at a similar level for INDITEC. Following the World Bank's classification criteria, a clear positive association is detected where the average values of all the indexes calculated grow with the level of income and reach their maximum in the group of high-income countries. The conglomerate of CIAT member countries shows, on average, a better relative performance in the four dimensions with respect to the global figures, but not with respect to the averages calculated for OECD countries, which achieve better results than the rest of the groups considered.

TABLE 2

Digital transformation indexes by dimension and overall (INDITEC)

Simple averages for selected groups of countries (156 jurisdictions), 2019, in percentages

Country Group	Technological Innovation	Compliance Improvement	Operational Digitalization	Resources and Budget	INDITEC (Total)
By region or group of countries					
ISORA	0.37	0.46	0.46	0.61	**0.48**
Latin America and the Caribbean	0.31	0.39	0.49	0.68	**0.47**
CIAT Members	0.46	0.53	0.64	0.66	**0.57**
OECD Members	0.63	0.63	0.71	0.72	**0.67**
By income level					
Low Income	0.25	0.34	0.15	0.47	**0.30**
Lower-Middle Income	0.29	0.46	0.38	0.54	**0.42**
Upper-Middle Income	0.32	0.42	0.50	0.64	**0.47**
High Income	0.53	0.54	0.60	0.69	**0.59**

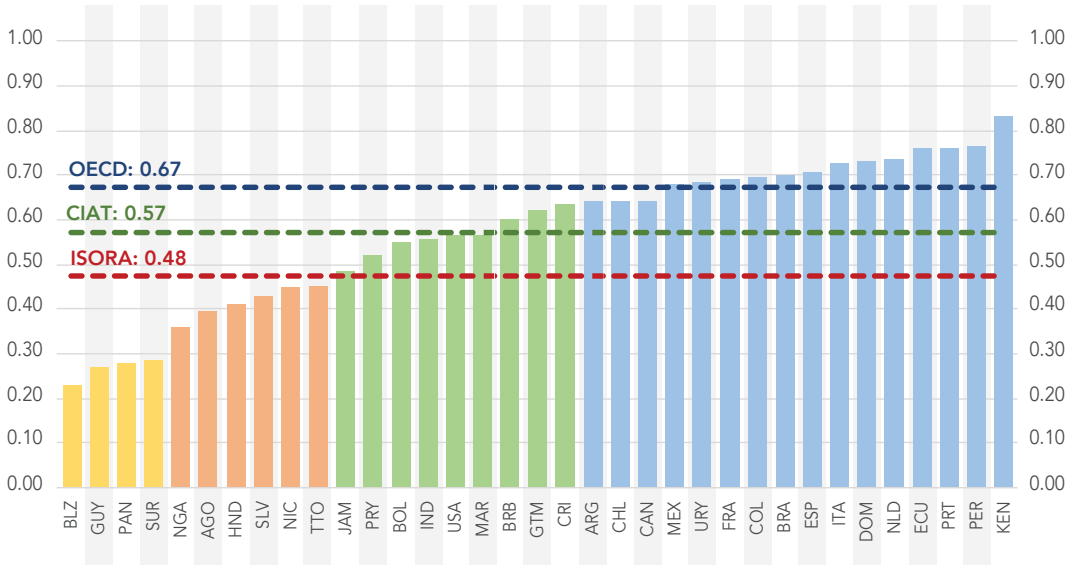
Source: Díaz de Sarralde and Morán (2022), "Innovation, Digitalization and Technology Index (INDITEC). A tool for benchmarking Tax Administrations at the international level (based on ISORA 2020)", CIAT.

To focus the analysis on CIAT member countries that participated in the ISORA survey in 2020, an individual ranking of the INDITEC index was obtained and the total sample was distributed into four quartiles of 39 countries each. It was found that more than 70% (25 out of 35) of the CIAT member countries are located in the top two quartiles, above the global average and with some of them even exceeding the estimated average for developed OECD countries, which can be considered at the forefront of tax administration at the international level. The cases of Kenya, Peru, Portugal, Ecuador, the Netherlands, the Dominican Republic and Italy stand out (figure 4). This outstanding performance has also been verified in the different dimensions that make up INDITEC, especially in the aspects of technological innovation and compliance improvement.

FIGURE 4

INDITEC index for CIAT countries (differentiated by quartiles) and reference average

Individual data (CIAT members) and simple averages for selected groups, 2019, in percentages



Source: Díaz de Sarralde and Morán (2022), "Innovation, Digitalization and Technology Index (INDITEC) A tool for benchmarking Tax Administrations at the international level (based on ISORA 2020)", CIAT.

In conclusion, the INDITEC index has the potential to synthesize the relative degree of progress of the different TAs in terms of technological innovation, operational digitalization, and strategic orientation of the resources available for this purpose. While recognizing certain relative advantages and disadvantages compared to other alternatives, this new instrument aims to strengthen the role of benchmarking as a technical diagnostic tool. Since the data used refer to fiscal year 2019, it is expected that a future update of INDITEC may reflect the impact of countries' forced responses, in terms of tax administration, to the new opportunities and challenges arising from the COVID-19 pandemic.

3. Lessons learned and perspectives for the future

Assuming the commitments set forth in its current Strategic Plan (2021-2026), in recent years CIAT has multiplied its efforts to increase and strengthen its multiple statistical, analytical, and practical contributions to improve tax administration in its member countries. This article has attempted to summarize some of the most recent main lines of work conducted through its Tax Studies and Research Directorate, pointing out their most outstanding results and their potential as reference tools for tax agencies.

Regarding the compilation of tax statistics and analysis of tax collection, the database for measuring the Equivalent Fiscal Pressure (EFP) in 27 Latin American and Caribbean countries has become a statistical reference at the regional level. Its cumulative updates have resulted in a repository of very detailed fiscal figures for an extensive period of time, the analysis of which has made it possible to identify certain medium-term trends and key areas for reform, as well as providing additional elements for making comparisons between countries. On the other hand, the statistical project around the Revenue Report COVID-19 (RRC) provided the possibility of monitoring the short-term evolution of tax collection since the beginning of 2020, with the primary objective of verifying the magnitude of the negative impacts produced by the pandemic and the subsequent recovery. In addition, various indicators of mobility of people were used to analyze their correlation with the collection performance of main taxes applied in 23 CIAT member countries of different latitudes and levels of development.

Regarding the benchmarking of Tax Administrations, CIAT's active participation in the joint project of the International Survey on Tax Administration (ISORA) has provided it with an extensive database which has allowed the development of two new complementary lines of work. Firstly, the Overview of Tax Administration has contributed to illustrating the progress, differences, and relative situation of CIAT member countries in the international context. Precisely, the performance of these countries is highlighted for the set of variables analyzed, especially those related to the introduction of innovative technologies for improving tax compliance and facilitating tax management. Secondly, to deepen the previous analysis, progress was also made in the construction of the INDITEC index, which aimed to concentrate in a synthetic indicator a large amount of quantitative and qualitative information from the ISORA survey and related to the degree of digital transformation. CIAT countries showed very encouraging results in the different dimensions considered, which constitute a good benchmark prior to the pandemic.

Looking to the future, the tax statistics databases and the valuable documents produced so far underpin CIAT's prospects in this area. Cooperation with other organizations, as reflected in relation to the ISORA survey for example, appears as an important source of possibilities at the time of developing and improving different methodologies and strengthening the quality of the statistical figures

collected in each project. Within the framework of the CIAT Network of Tax Studies and Research Areas, the lines of tax analysis presented here may serve as a basis and reference framework to promote specific developments in CIAT member countries, whose role of assistance and statistical validation will be increasingly relevant in future projects.

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I.2. Recent changes in Latin American Tax Legislation in 2022

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Introduction

At the Eighth Meeting of the CIAT Tax Studies and Research Areas Network, held at the end of March 2023 in Panama, one of the topics on the agenda was dedicated to recent changes in the tax legislation of Latin American CIAT member countries for the year 2022.

For this purpose, a presentation was given showing the legal tax changes made by Latin American countries in 2022, derived from the update of the first edition of the Summary of Latin American Tax Legislation for 2021, published by CIAT last year (CIAT, 2022).

Before commenting the amendments, it should be noted that this new publication covers:

- Taxes in force in **19 Latin American countries**.
- The publication is composed of **3 main sections**:
  - A first section dedicated to the analysis of taxes under the authority of the central government.
  - A second section covers those taxes whose authority depends, in some way, on the territorial levels of government (state and municipal) in the decentralized countries of the region.
  - Finally, the third section includes social security contributions.

It should also be noted that:

- The taxes analyzed are classified according to the base on which the tax is levied (income, property, consumption, excise, foreign trade, and other taxes).
- The analysis is carried out systematically based on its main elements (tax base, exemptions, deductions, tax rates, etc).
- The review also pays attention to the so-called Simplified Regimes, which are of great importance in the tax structure of Latin American countries.

1. Update on the new edition of the Tax Legislation Summary for 2022

In mid-April 2023, CIAT published the second edition of the Summary of Latin American Tax Legislation 2022, which updates the previous version and includes the legal[1] modifications made by countries in their national and subnational tax systems (CIAT, 2023). The main modifications made in the most recent edition of the Summary correspond to the following two types:

- **Normative references:** as many legal references as possible (laws, regulations, other rules) are included in the description of each of the taxes under analysis, with the aim of making it easier for the reader to follow the evolution of the levies over time, with a view to their future updates.

- **Regulatory changes or updates:** an exhaustive review of the modifications made to the legal texts of each and every one of the taxes included in the Summary updated to 2022, based on the legislative reforms carried out by countries. In this context, the current publication includes an analysis of a **total of 435 taxes**.

2. Final remarks

As the reader can note, the presentation made at the Eighth Meeting[2] focused on countries that had made some modification to their tax regulations up to June 30, 2022, in relation to the content of the 2021 edition of the Summary. In this way, the reader was able to note the changes produced in 2022, for each tax by country[3].

In preparing this article, it was considered appropriate to modify this analysis methodology. To this end, a ***transposition of the data matrix*** *used as the basis for this publication has been carried out, using now as central pivot for the analysis the tax itself (or group of taxes) levied on a given economic base or activity*, with respect to the countries that have carried out some type of legal modification in the period.

In this way, it is believed that the reader can now more easily observe (at first glance) which countries have introduced changes in their taxes (or group of taxes, in aggregate) and, more importantly, in which of the elements of the tax (tax base, tax rate, deductions, etc.) and, finally, what significance such a change might have for the purpose of evaluating countries' tax policies.

1 These amendments will be effective until June 30, 2022..

2 Available at: https://ciatorg.sharepoint.com/sites/cds/Conocimientos/Redes/RedEstudios/OctavoEncuentro/Presentaciones/PDF/4-1%20Consultor-%20L%20Perag%c3%b3n-Cambios%20en%20la%20Legislaci%c3%b3n%20Tributaria%20en%20Am%c3%a9rica%20Latina.pdf?ga=1.

3 In 2022, the number of countries that have made changes compared to 2021 is 17.

The primary results of the analysis of tax changes in 2022 are shown in the tables below. For reasons of space, the analysis is only carried out for taxes levied by central government, including information on the following taxes:

- Income Taxes, establishing a breakdown between the changes affecting individuals and legal entities (tables 1.a and 1.b);
- Property Taxes (table 2);
- General Consumption Taxes (table 3);
- Excise Taxes (table 4);
- Taxes on Financial Transactions (table 5);
- Simplified Regimes (table 6);
- Other taxes (table 7);
- Social Security Contributions (table 8).

TABLE 1.A

Main regulatory changes in Income Taxes - Corporate Income Taxes

Countries, modified items, and measures adopted, 2022

Country	Item	Measure
Brazil	Type of levy	**CSLL rates** update for 2022 (financial institutions).
Colombia	Exempt income	Different **incentives** for **exemption** of certain incomes are reformulated up to **2022**.
	Deductible expenses	Updating of some **deductible expenses** up to **2022**.
	Type of levy	**Rates** are updated to the year **2022**.
Costa Rica	Type of levy	The **thresholds** and the scale of **rates** are updated for year **2022**.
	Non-resident withholding taxes - Interest:	Update of **rates** applicable to a variety of **interest** paid to foreign banks.
Ecuador	Exempt income	Some **exemptions** are updated to **2022**.
	Deductible expenses	Certain **deductible expenses** are updated to **2022**.
	Depreciation	**Amortization** is updated to **2022**.
	Capital gains	The content of this section is reformulated and updated to **2022**.
	Type of levy	The tax rates for new companies and **capital gains** are updated to **2022**.
Mexico	Tax base	**New taxable income** is added from **2022**.
	Deductions	**New requirements** are added for **2022**.
	Deductible expenses	Some **expenditure** components are updated to year **2022**.
	Depreciation and amortization	The **rate** table is updated, and some assets are added for **2022**.
	Reserves and provisions	Some contents are updated to **2022**.
	Losses	Some reforms are introduced for **2022**.
	Withholdings - internal payments	Interest **withholding tax exemptions** are reformulated and the **withholding** tax rate is updated to the year 2022.
	Withholding taxes - non-residents - Interest	**Rates** are realigned and updated for **2022**.
Peru	Exempt income	The **exemption** of various incomes is extended until **12-31-2023**.
	Depreciation and amortization	Certain non-depreciable **assets** are added.
Dominican Rep.	Reserves and provisions	Certain amounts are updated to **2022**. Uncollectibility of accounts.
Uruguay	Taxable event	Amounts of **incomes assimilated** to **2022** are updated.
	Depreciation and amortization	**Amortization** possibility for road infrastructure contractors from February **2022**.

Source: Updated legislation of the countries included in CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 1.B

Main regulatory changes in Income Taxes – Personal Income Tax

Countries, modified items, and measures adopted, 2022

Country	Item	Measure
Argentina	Exempt income	Several exempt annuities are **added** and **updated** to **2022**.
	Interests	Several **exemptions** are added in **2022**.
	Deductions	The amounts of various **deductions** are updated to **2022**.
	Personal and family deductions in the base	New **deductions** are introduced, and the amounts are updated to **2022**.
	Type of levy	The **rate** scale is updated to **2022**.
	Internal withholdings - Dependent employed individual	Certain amounts are updated to **2022**.
Chile	Deductions	**Deductions** for **donations** to non-profit entities are updated (**as of 5-1-22**).
		New Tax Benefits Law 21.440.
	Internal withholdings - Professionals	Rates are updated to **2022** and further to **2028**.
Colombia	Personal deductions	Some **deductions** of this type are added.
	Internal withholdings	The **withholding** rates are adjusted to **2022**.
Costa Rica	Deductions in the quota	The amounts are updated for **2022**.
	Type of levy	Update of the **rate** scale applicable in **2022**.
	Internal withholdings - labor	Update of the **rate** scale applicable in **2022**.
Cuba	Personal deductions	The **deduction** for property lease payments is added.
	Type of levy	New scale of rates **applicable to dividends** received by micro, small and medium-sized companies, effective from September 2021. However, an exemption applies to dividends received in the first year of operations.
	Withholding internal payments	New **withholding** applicable to micro, small and medium-sized companies that distribute dividends.
Ecuador	Exempt income	Some exemptions and amounts are updated to **2022**.
	Income from economic activities	New Simplified Regime (RIMPE) by **2022**.
	Capital gains	The content of this section is reformulated and updated to **2022**.
	Deductions	The content of this section is reformulated and updated to **2022**.
	Deductions in the quota (tax credits)	The content of this section is updated to **2022**.
	Type of levy	The content of this section is updated to **2022**.
Honduras	Type of levy	The **rate** scale is updated for the year **2022**.

Country	Item	Measure
Mexico	Employment income	The taxation of certain **professional and business income** is updated to **2022**.
	Capital income - Interest	The **withholding** rate in effect for **2022** is updated.
	Deductions	Some update to **2022**.
	Type of levy	The income derived from the Tax Incorporation Regime, which will be eliminated as of **2022**, is excluded from the taxable income.
	Withholding internal payments - Interest	The withholding rate applicable in **2022** is updated.
	Non-resident withholding taxes - Interest	The **rates** applicable in **2022** for various interests are updated.
Peru	Exempted income	The **exemption** of several incomes is extended until **12/31/2023**.
Dominican Rep.	Exempted income	Certain amounts are updated to **2022**.
	Capital income - Interest	Certain amounts are updated to **2022**.
	Capital gains	New **taxable event**. Sale of shares on the stock exchange from **2021** at **15%**.

Source: Updated legislation of the countries included in CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 2

Main regulatory changes in Property Taxes

Countries, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Argentina	B. Personal Property Tax	Introduction	The validity of the tax is **extended** until **12/31/22**.
		Minimum exempt	The **amounts** are updated to **2022**.
		Type of levy	**Rate** scales updated to **2022**.
	E. Solidarity and Extraordinary Contribution to Help Mitigate the Effects of the Pandemic		Repealed.
Costa Rica	A. Solidarity Tax for the Strengthening of Housing Programs	Type of levy	Update of the **rate** scale and **minimum exemption** for the year **2022**.
	B. Property Tax on Motor Vehicles, Aircrafts and Boats		Reform in the Assembly.
Cuba	C. Idleness Tax on Agricultural and Forestry Lands (IOTAF)	Taxable event	This tax is applied in **2022**, as of the Budget Law for **2022**.
	F. Property Transfer and Inheritance Tax (ITBH)	Taxable event	New determination of the **taxable base** of **donations**, in the case of transfers of housing and the sale and purchase and donation of vehicles between individuals and non-agricultural cooperatives, starting in **2022**.
Ecuador	A. Inheritance Tax	Type of levy	Some **exemptions** are reformulated, and the **rate scale** is updated to the year **2022**.
	B. Property Tax on Motor Vehicles	Exemptions	The **amounts** of the **reductions** are updated to **2022**.
	E. Tax on Rural Lands		**Repealed.**
	F. Environmental Tax on Vehicle Pollution		**Repealed.**
	G. Temporary Contribution on Companies' Wealth		**New** temporary **tax.**
	H. Temporary Contribution on Individuals' Wealth		**New** temporary **tax.**

Country	Tax	Item	Measure
Dominican Rep.	A. Tax on Real Estate Property, Sumptuary Housing and Unbuilt Urban Lots	Tax base and Type of levy	Various **amounts** are updated to **2022**.
	B. Wealth Transfer Tax		The **exempt amount** is updated in the year **2022**.
	C. Inheritance and Gift Tax - 1. Inheritance	Exemptions	New **exemption** from **2022**. Pension funds to heirs from **10-30-21**.
	E. Additional Tax on Real Estate Transactions		The **exempt amount** is updated in **2022**.
Uruguay	A. Wealth Tax	Taxable person	The **non-taxable minimums** are updated to year **2022**.
		Type of levy	The **rate scales** applicable to year **2022** tax return are updated.
	C. Annual Elementary Education Tax		Certain **amounts** and the **scale of rates** applicable in **2022** are updated.

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 3

Main regulatory changes in General Consumption Taxes

Countries, taxes, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Colombia	C. National Tax on Plastic Bags Consumption	Type of levy	**Rate** updates for the years **2021** and **2022.**
Costa Rica	A. VAT	Taxable event	New assumptions are included for sales of goods and services on credit, starting March 2022.
		Exemptions	**New exemptions** from 2022 are included
Cuba	A. Sales Tax	Taxable event	New taxable event, for sales made through digital channels and platforms, starting in **2022**.
		Taxable person	As from **2022**, micro, small and medium-sized companies are **taxable persons** for the retail commercialization of goods and for the rendering of services.
		Exemptions	New reformulation of non-taxable activities and exemptions, as of **2022**
Ecuador	A. VAT	Taxable event	The content of this section is reformulated and updated to year **2022**.
		Tax base	Certain components of the **taxable income** are reformulated and updated to **2022**.
		Exemptions	Certain **exemptions** are reformulated and updated to **2022**
Mexico	A. VAT	Type of levy	**New** sales **operations** will be added as of **2022**
Panama	A. Tax on the Transfer of Movable Property and the Rendering of Services (ITBMS)	Exemptions	**New exemption** on sales of musical instruments and their spare parts starting in **2022**.
Peru	A. General Sales Tax	Exemptions	The **exemptions** in Appendices I and II (tables in the text) are extended until **12/31/2022.**
Uruguay	A. VAT	Exemptions	**New exemptions** on services rendered are added as of **2022**.

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 4

Main regulatory changes in Excise Taxes

Countries, taxes, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Argentina	A. Domestic Taxes	Type of levy - taxed goods	**Rate** amounts are updated up to **8/31/22**
	B. Taxes on Liquid Fuels and Carbon Dioxide	Exemptions	Various amounts of the ICL are updated to **2022**
		Type of levy	**Rates** for both taxes are updated to **2022**
Bolivia	A. Excise Tax (ICE)	Type of levy	**Rates** are updated to **2022**
	C. Tax on Departures Abroad	Type of levy	**Amount** is updated to **2022**
Chile	B. Tax on fuels	Type of levy	Amounts and **rates** in effect as of 6-30-22 are updated.
Colombia	A. National Tax on Gasoline and Motor Fuel Oil	Taxable Base and Type of levy	Updating the **rates** of both taxes to **2022**
	B. National Tax on Carbon		
Costa Rica	A. Excise Tax	Exemptions	New **non-taxable** assumptions for **2022** (seniors)
	B. Single Tax on Fuels	Type of levy	**Rates** are updated for year **2022**
	C. Excise Tax on Alcoholic Beverages		
	E. Excise Tax on Tobacco Products		
	F. Excise Tax on Non-Alcoholic Bottled Beverages and Toilet Soaps		
Cuba	A. Special Tax on Products and Services - IEPS	Taxable event	The tax also applies to retail marketing of motor vehicles and possibly other products or services later in the year in **2022**
		Taxable person	Authorized vehicle marketing entities, as of **2022**
Ecuador	A. Special Excise Tax	Taxable Base	Some **components** and amounts of the **base** are updated to **2022**
		Type of levy	Certain **taxable items** and tax **rates** are updated as of **2022**
		Exemptions	Certain **exemptions** are introduced and updated to 2022.

Country	Tax	Item	Measure
Honduras	A. Single Excise Tax on Cigarettes	Type of levy	**Amounts** are updated to **2022**
	B. Tax on Domestic and Imported Production of Soft Drinks, Alcoholic Beverages and Other Prepared or Fermented Beverages		
	D. Contribution for the Attention to Social Programs and Conservation of Road Heritage (ACPV)	Type of levy	The contribution **amounts** are updated to year **2022**
Mexico	A. Excise Tax on Production and Services	Taxable event and Type of levy	The applicable **rates** are updated for year **2022**
	B. Federal Tax on New Automobiles	Taxable Base	The determination of the **basis** in new car sales is updated to **2022**
		Type of levy	**Rates** applicable in **2022** are updated
		Exemptions	The **exempt** amounts are updated for **2022**
Nicaragua	A. Excise taxes (ISC)	Type of levy	Update of the **specific rate** applied to beverages in **2022**
Panama	C. Excise taxes	Exemptions	New **exemption** for certain foods
		Type of levy – Other goods	Rates applicable to electric and hybrid vehicles updated in **2022**
Paraguay	A. Excise taxes (ISC)	Type of levy	Taxable property **rates** updated to **2022**
Peru	A. Excise taxes	Type of levy	Certain **specific rates** of Appendices III and IV are updated to **2022**, with some exclusions in their application until July **2022**
Dominican Rep.	A. Excise taxes	Type of levy	Certain **amounts** of excise taxes are updated to **2022**
Uruguay	A. Internal Excise Tax	Taxable event	**New** subject **operations** are added as of **2022**
		Type of levy	Extensive reformulation and updating of tax **rates** in **2022**

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 5

Main regulatory changes in Financial Transaction Taxes

Countries, taxes, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Argentina	A. Tax on Current Bank Account Credits and Debits	Exemptions	The content of this section is expanded, reordered, and updated (if necessary).
Brazil	A. Tax on Credit, Exchange, and Insurance Transactions, or related to Securities: Foreign Currency Exchange Transactions	Base and Type of levy	**Rate** change in **2022** - gradual reduction to **0%** in **2029** - Possible OECD accession.
Ecuador	A. Tax on Foreign Exchange Outflows	Exemptions	Certain **exemptions** and **amounts** are updated to **2022**.
		Type of levy	In **2022** the rate is progressively reduced to **4%** (from **5%**).
Venezuela	A. Tax on Large Financial Transactions (IGTF)	Exemptions	New exempted transactions and **exemption** (for one year) of Venezuelan public debt transactions, as well as the **exemption** (for one year) of certain foreign exchange transactions, payments in foreign currency or crypto-assets and remittances from abroad, as of **2/25/2022**.
		Type of levy	**Rate** updated as of **4/27/2022**.

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 6

Main regulatory changes in Simplified Regimes

Countries, tax regimes, modified items and measures adopted, 2022

Country	Tax	Item	Measure
Argentina	Monotax	Taxable base and type of levy	The **thresholds**, **amounts** and **contributions** of the Monotaxes are updated to 2022.
Bolivia	B. Unified Agricultural Regime (RAU)	Type of levy	The **fixed fees** applicable in 2022 are updated.
Brazil	B. Regime for Individual Microentrepreneurs	Type of levy	The **contributions** of the Regime are updated to **2022**.
Chile	A-1. Presumptive Income Tax Regime	Taxable base	Mining activity **rate** scales updated for **2022**.
Colombia	A. Unified Tax under the Simple Taxation Regime (SIMPLE)	Taxable person	The **amounts** for membership in the Regime in **2022** are updated.
		Type of levy	**Rate** update to **2022**.
Cuba	A. Simplified Taxation Regime (RST)		A reform of this Regime is introduced, which is described in this section of Summary **2022**.
Ecuador	A. Ecuadorian Simplified Tax Regime		**Repealed.**
	B. Tax Regime for Micro-enterprises		**Repealed.**
	A. Simplified Regime for Entrepreneurs and Popular Businesses		New **RIMPE** for **2022**, described in this section of the **2022** Summary.
Mexico	A. Tax Incorporation Regime		**Repealed**. This text is maintained, since there are some taxpayers who are still included.
	B. Simplified Trust Regime		For individuals and corporations, described in this section of the Summary **2022**.
Dominican Rep.	Simplified Tax Regime		Various **amounts** are updated to the year **2022**.
Uruguay	A. Monotax	Taxable base and type of levy	All Monotax **thresholds**, **amounts** and **contributions** are updated to **2022**.

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 7

Main regulatory changes in Other Taxes

Countries, taxes, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Chile	A. Stamp Tax (Tax on Legal Acts)	Type of levy	Several **rates** are updated to **2022**.
Colombia	D. National Stamp Tax	Type of levy	Several actions carried out outside Colombia by consular officers are repealed, starting in **2022**.
Cuba	A. Tax on Documents (ID)	Taxable Base and Type of levy	New tax **payment method** through electronic channels.
Ecuador	A. Single and Temporary Tax for the Regularization of Assets Abroad		**New tax** from **2022** onwards, described in this section of the **2022** Summary.
Nicaragua	A. Stamp Tax (ITF)	Type of levy	The table of tax **rates** for **2022** is updated.
Dominican Rep.	A. Tax on Motor Vehicle Circulation	Type of levy	**Amounts** are updated to **2022**.
	B. Tax on Casinos		
	C. Single Tax on Lottery and Sports Betting Banks		
Uruguay	A. Tax on Control of Corporations	Type of levy	**Rates** to be applied in **2022** are updated.

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

TABLE 8

Main regulatory changes in Social Security Contributions

Countries, contributions, modified items, and measures adopted, 2022

Country	Tax	Item	Measure
Argentina	A. Argentine Integrated Pension System	Taxable Base	Updating of the contribution **bases** to **2022**
Bolivia	A. Contributions to the Comprehensive Pension System	Taxable Base	Updating of the contribution **bases** to **2022**
Brazil	A. Social Security and Self-Employment Contributions	Taxable Base and Type of levy	Updating of the contribution **bases** and **rates** to **2022**
Chile	A. Social Security Contributions	Taxable Base and Type of levy	Updating of the contribution **bases** and **rates** to **2022**
Colombia	A. Contributions to the Comprehensive Social Security System	Taxable Base	Updating of the contribution bases to **2022**
Costa Rica	A. Social Security Contributions	Taxable Base	**Minimum Tax Bases** are updated to **2022**
Cuba	A. Social Security Contributions (CSS and CESS)	Taxable Base and Type of levy	Reformulation of all the elements of this section, and they are adapted to the 2022 Budget Law.
	B. Labor Force Utilization Tax - IUFT	Taxable Base	The method for determining the **taxable base** of this tax is updated, effective as of **9/18/2021**
Ecuador	Social Security Contributions	Taxable Base	Updating of the contribution **bases** to **2022**
Honduras	A. Contributions under the General Regime	Taxable Base and Type of levy	Updating of the contribution **bases** and rates to **2022**
Mexico	A. General Regime	Taxable Base	Updating of the contribution **bases** to **2022**
Peru	Social Security Contributions	Taxable Base	Updating of the contribution **bases** to **2022**
Dominican Rep.	Social Security Contributions	Taxable Base	The contribution **bases** and **salary ceilings** are updated to **2022**
Uruguay	A. Social Security Contributions	Taxable Base	Updating of the contribution **bases** to **2022**
Venezuela	A. Social Security Contributions	Taxable Base	The amount of the contribution **base** is updated as of **3/15/2022**

Source: Updated legislation of the countries included in the CIAT Tax Legislation Summary 2022 (Peragón, 2023).

3. Final comments

Along the lines of the discussions following the presentation, derived from the opinions of some of the members of the Network and CIAT's Directorate of Studies, the following objectives are proposed for further development:

- The text of the Summary should continue providing information on legal tax regulations in force during the year, the same as in the past.

- For the Summary, to the extent possible, the economic objective pursued by certain (substantive) reforms of the main taxes in the countries of the region should be indicated, using certain metrics or indicators on the tax measures involved:
  - a broadening or reduction of the tax bases
  - an increase or decrease in types of levies.
  - neutral measures with other objectives
  - measures that deserve to be included in the summary, in the opinion of the members of the Network.

Undoubtedly, the regulatory compilation process, as well as the improvement of its systematization and presentation for dissemination represents a task in which the collaboration and interaction with the members of the CIAT Network of Tax Studies and Research Areas is and will continue to be fundamental and necessary.

References

Peragón Lorenzo, L. A. -coordinador- (2022); "Sumario de Legislación Tributaria en América Latina 2021", Centro Interamericano de Administraciones Tributarias (CIAT), Panamá. https://www.ciat.org/Biblioteca/DocumentosTecnicos/Espanol/Sumario-legislacion-tributaria/2022-Sumario-Legislacion-Tributaria-CIAT.pdf.

_____ (2023); "Sumario de Legislación Tributaria en América Latina 2022", Centro Interamericano de Administraciones Tributarias (CIAT), Panamá. https://www.ciat.org/Biblioteca/DocumentosTecnicos/Espanol/Sumario-legislacion-tributaria/2023-Sumario-Legislacion-Tributaria-CIAT.pdf.

I.3. Tax reform in Paraguay and its impact on revenue collection

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Introduction

Paraguay's Tax Reform Law 6380 was enacted in December 2019 and became effective as of January 1, 2020. For the beginning of the Reform, an Economic-Tax Technical Commission (CETET) was formed, through which the basic principles were established for the start of the work they were undertaking to achieve:

- Increased efficiency, reduced distortion, and reduced evasion
- More equity, with greater collection of direct taxes
- Modernizing, adopting best practices and maintaining competitiveness.

The main objective of this reform has been to improve the efficiency and equity of the Paraguayan tax system, on the other hand, to increase tax collection and promote the formalization of the economy. Among the main measures of the Tax Reform are the elimination of tax exemptions and benefits, some important points regarding the establishment of the personal income tax rate for individuals, the introduction of a tax on dividends and profits, the simplification of registration and tax payment procedures for taxpayers and the improvement in the supervision and control of economic activities. In addition, the Tax Reform generated important mechanisms to create conditions to increase the participation of direct taxes in tax collection and reduce dependence on indirect taxes.

Following this introduction, this article provides an overview of the structure of the Paraguayan tax system before and after the Reform. A second section deals with the context and evolution of tax collection in recent years, discriminating by type of instrument, and then continues with a third section in which the specific impact of the Reform is quantified. Finally, some concluding remarks are included.

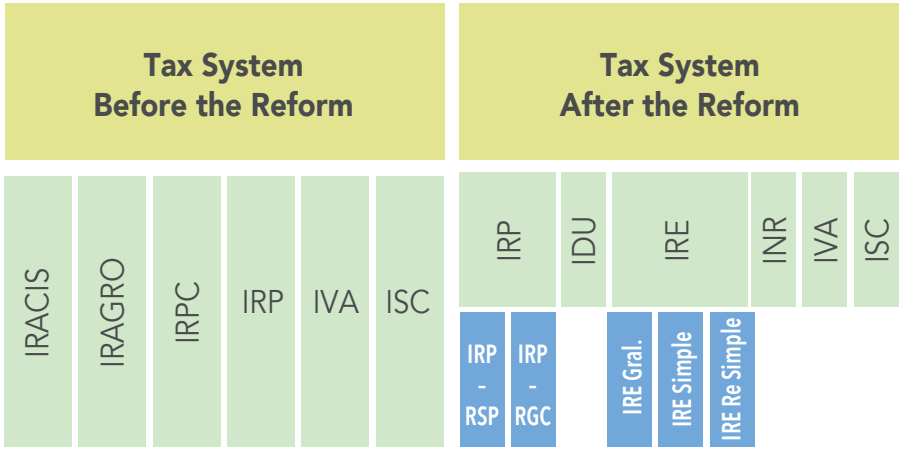
1. Tax Structure in Paraguay before and after the Reform

Before the Reform, Paraguay had differentiated taxes on income: on the one hand, there was the Tax on Income from Commercial, Industrial and Service Activities (IRACIS) and, on the other hand, the tax on Agricultural Income (IRAGRO). In addition, the IRACIS indirectly included the taxation of income from dividends and profits, while personal income was taxed at a rate applicable regardless of the source of income.

In this context, the reform resulted in the Corporate Income Tax (IRE), which integrated the IRACIS and the IRAGRO, unifying the application of the tax on income from all business activities, regardless of whether they are commercial, industrial, service, or agricultural activities.

Additionally, simplified regimes were created within the IRE in order to facilitate the process of formalization and tax inclusion for the smallest taxpayers. Likewise, as regards Personal Income Tax, it was divided considering the source of income, on the one hand, income from personal services (IRP-RSP) and, on the other hand, income from capital gains (IRP-RGC), in addition to isolating the component referring to taxation on the income of non-residents (INR), as shown in Diagram 1.

DIAGRAM 1 **Overall structure of the tax system in Paraguay, before and after the Tax Reform (Law 6380)**



Source: Subsecretaría de Estado de Tributación, Ministerio de Hacienda of Paraguay, based on tax legislation.

For your information, the main adjustments incorporated into the Reform are summarized below:

- ***Personal Income Tax (IRP)***
  - Progressive tax rate of 8%, 9% and 10% on net income.
  - 8% tax rate on income and capital gains.

- ***Tax on Dividends and Profits (IDU)***
  - An 8% withholding tax was established on the distributable income of resident individuals and corporations, which had a significant impact, especially in the first year.

- ***Tax on Non-Residents (INR)***
  - The application of the 15% tax rate to non-resident taxpayers (INR), generated withholdings for the provision of digital services, among others.

- ***Corporate Income Tax (IRE)***
  - The tax base was broadened considering the simplified regimes (Simple and Re Simple).
  - By not including the revaluation, the impact was also generated within the companies' profits.
  - The deduction of the residual value of fixed assets was limited (100% of the acquisition value).
  - Exemptions for cooperative entities were limited.
  - A loss carryforward of up to 20% was allowed, a factor that resulted in a negative impact, since this benefit was not previously available.

- ***Value Added Tax (IVA)***
  - Significant positive impacts were generated with the application of the tax on digital services and the non-refund or limitation on the refund of VAT on exports.

- ***Excise Taxes (ISC)***
  - The maximum rates established in such regulations were increased, with which the taxation on certain goods generated a considerable contribution to the collection, even considering that during the COVID-19 pandemic, administrative measures were applied to support certain sectors that had a direct effect on the yield of this tax.

2. Context of tax collection in Paraguay

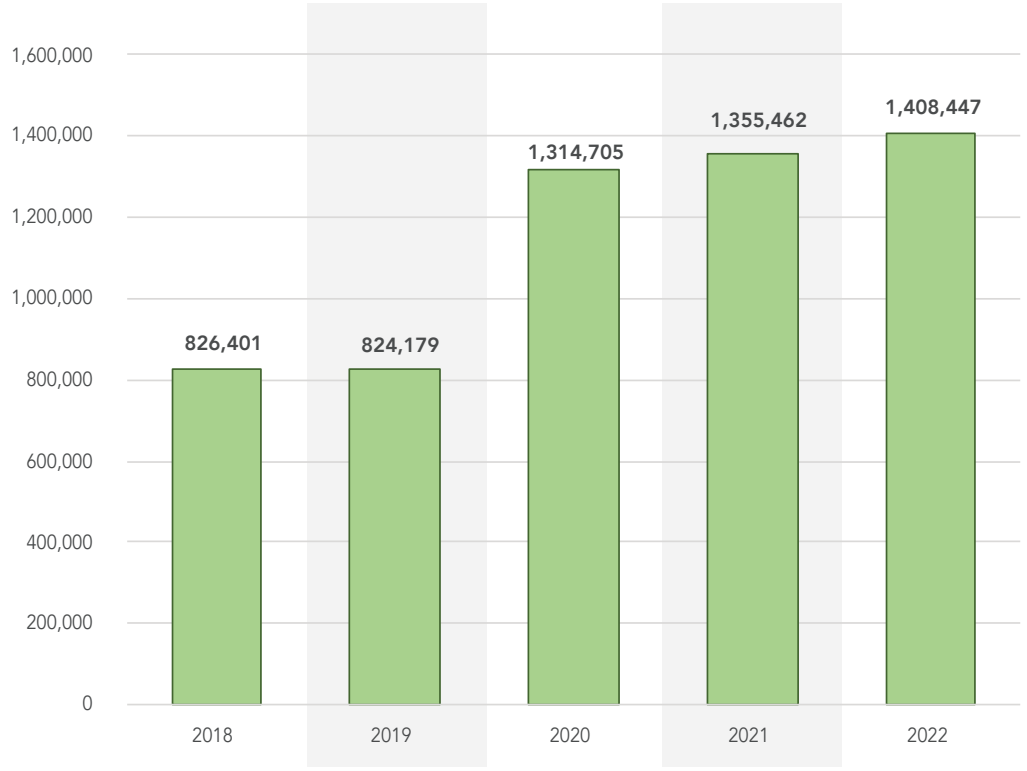
One of the main objectives of the Tax Reform has been to promote the formalization of the economy and, therefore, to increase the number of taxpayers registered in the *Subsecretaría de Estado de Tributación* (*SET*). In fact, since its entry into force, significant progress has been made in this regard.

Between 2019 and 2020 there was a 60% increase in the number of registered taxpayers compared to the same period of the previous year. This was due to two specific factors: the greater ease of formalization processes and the registration of taxpayers to access certain types of benefits provided by the Tax Administration for reasons of the COVID-19 pandemic. Subsequently, the tax registration growth rate remained at around 3.5% on average per year.

FIGURE 1

Evolution of the number of taxpayers registered in the SET-Paraguay

Annual balance at the end of each year, 2018-2022 (selected years), in units.



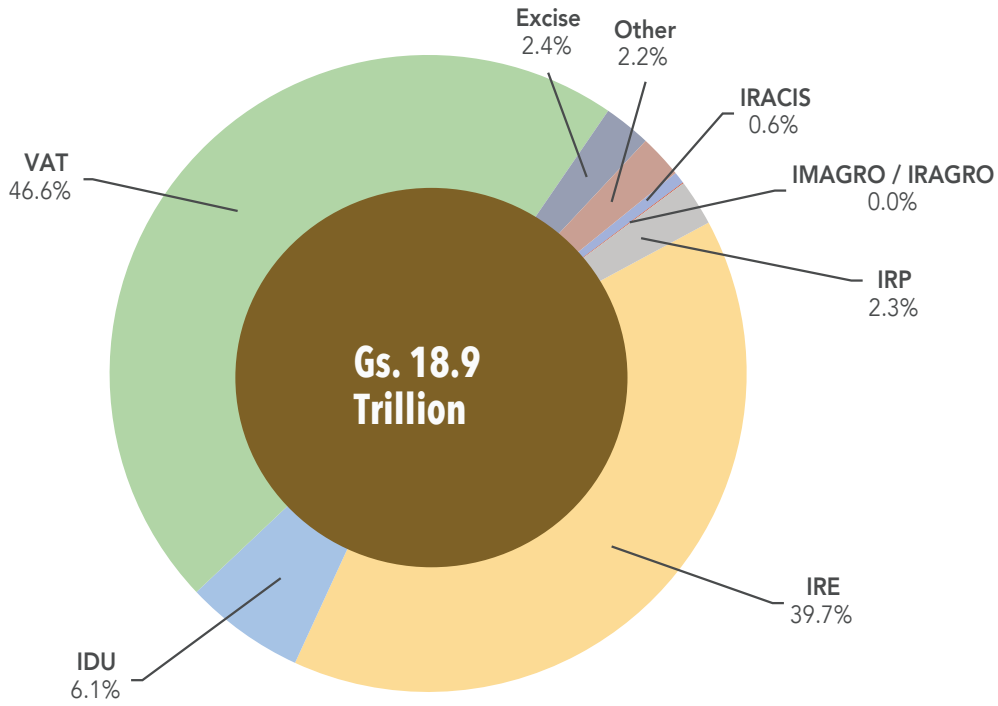
Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

The total gross tax collection (cash + tax credits) at the end of December 2022 reached Gs. (guaraníes) 18.9 trillion, which implies a difference of Gs. 2.3 trillion (+14.1%) at current prices with respect to the same period of 2021. On the other hand, it is important to point out that the composition of the accumulated collection as of the cut-off date presents VAT as the tax that generates the highest collection with a 46.6% share, followed by the share of IRE with 39.7%, IDU with 6.1% and then the rest of the taxes (figure 2). However, it is important to mention that, as will be insisted below, the sum of direct taxes (IRE, IRP, IDU, plus the remainder of the repealed IRACIS and IMAGRO/IRAGRO) exceeds the sum of indirect taxes (VAT, Excise and Others) considering the total collection (effective plus tax credits).

FIGURE 2

Composition of tax revenues by main tax (cash + tax credits)

Annual cumulative amount, 2022, in percentages of total



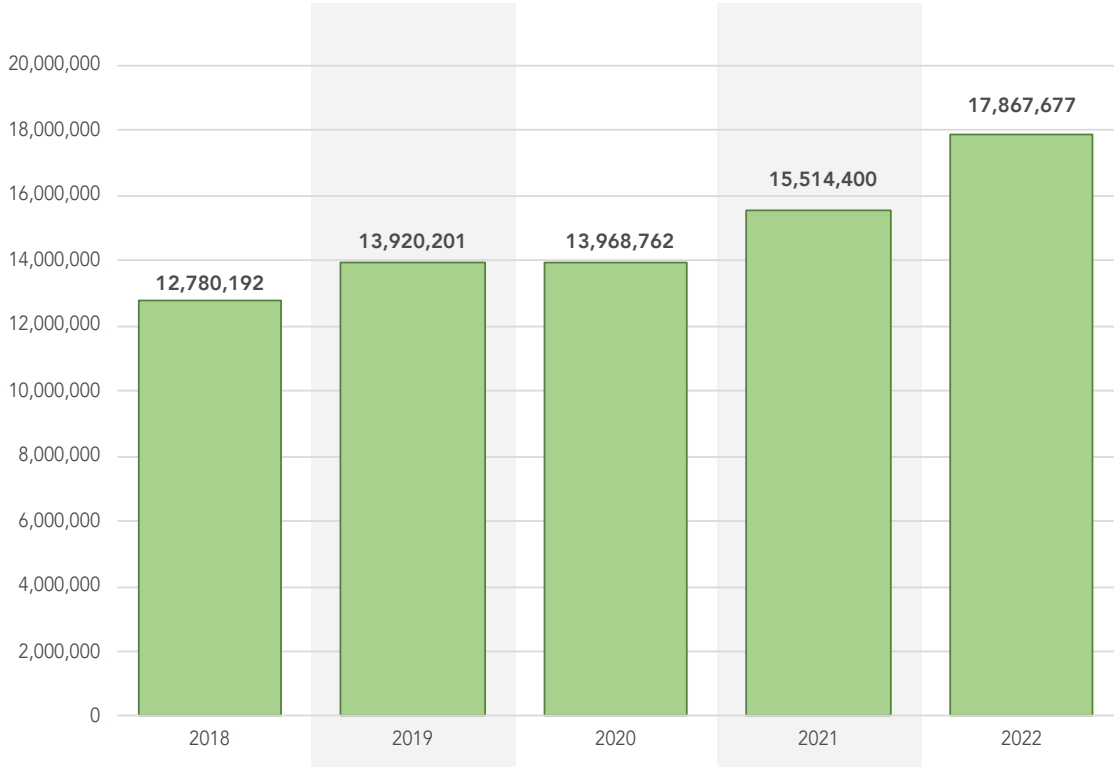
Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

Another important aspect to point out is that tax collection at the end of the year 2022 presented favorable aspects that are especially valued at the time of estimating tax revenues for fiscal year 2023. Regarding its levels, cash tax collection (without considering revenues collected with tax credits) amounted to Gs. 17,867,677 million, which means an improvement of 15.2% with respect to year 2021 (figure 3).

FIGURE 3

Total Tax Collection (cash)

Annual cumulative amount, 2018-2022 (selected years), in millions of guaraníes



Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

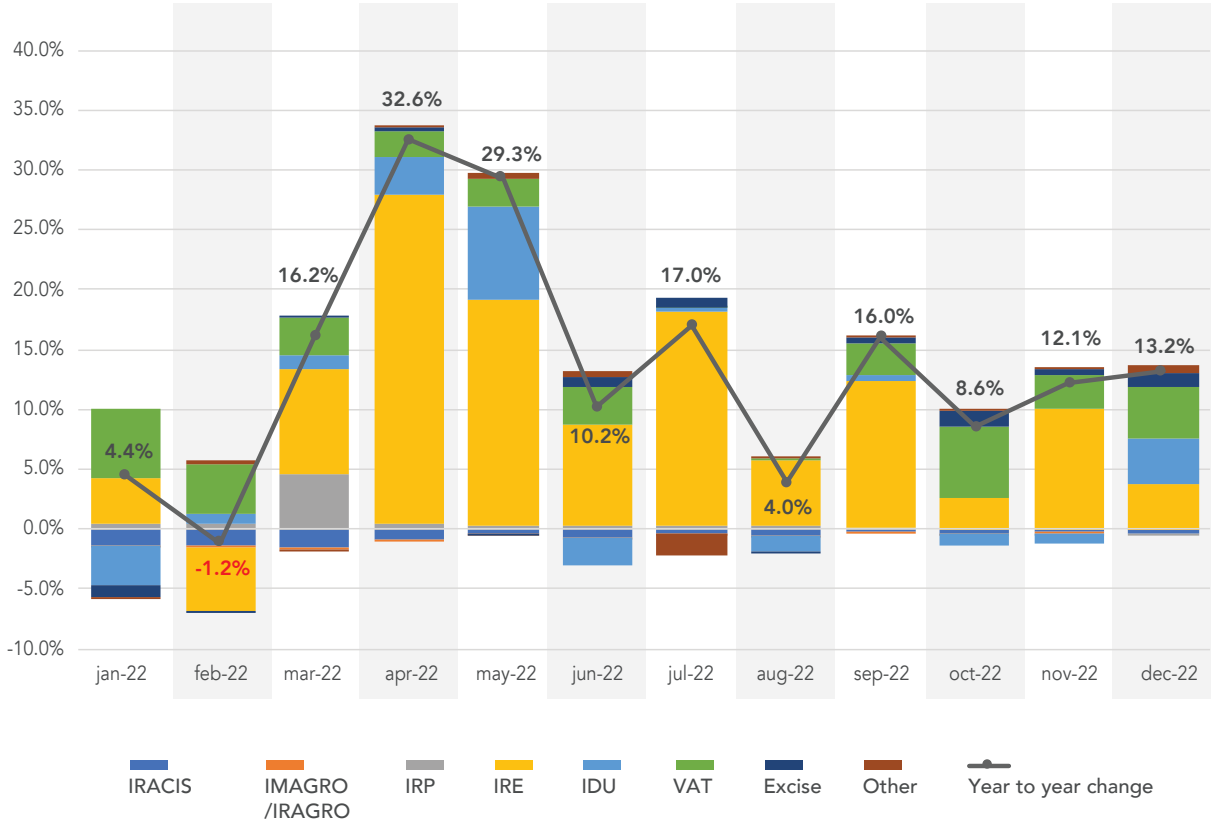
With the support of the private sector to the measures implemented by the State, there was a more accelerated recovery of the collection after the COVID-19 pandemic than initially expected, consolidating an upward trend in the year-on-year monthly variations of the total collection (in cash, excluding tax credits). During 2022, year-on-year monthly growth averaged 13.5%, with peaks in April (+32.6%) and May (+29.3%) and a single slight overall drop of 1.2% in the month of February (figure 4).

Regarding the contribution to revenue growth, the monthly analysis for 2022 shows that the favorable evolution was mainly explained by the behavior of the Corporate Income Tax, the Tax on Dividends and Profits and, finally, the Value Added Tax, showing a relatively greater strengthening of resources from direct taxes over indirect taxes.

FIGURE 4

Contribution to the monthly growth of total (effective) tax collection by taxes

Monthly changes, January-December 2022, in percentages



Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

3. Tax Reform Impact

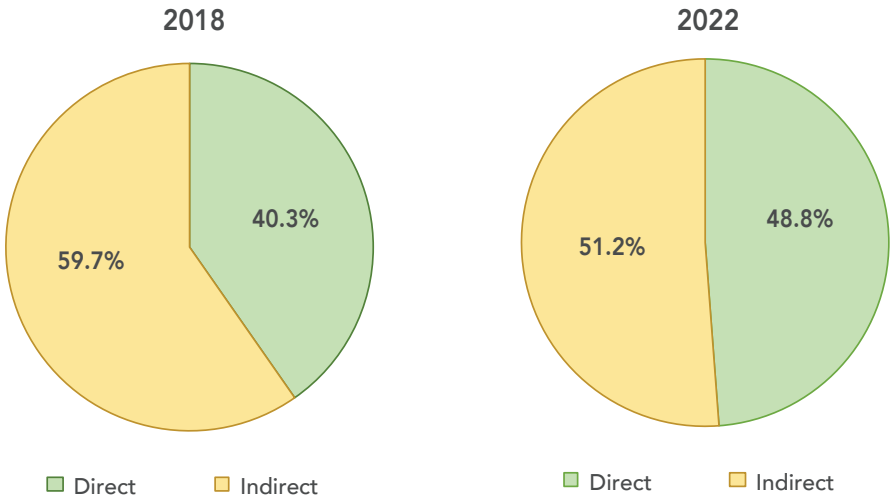
The final impact of the Tax Reform can be visualized from three different perspectives. The first one is related to the change in the proportional relationship between direct and indirect taxes in the tax system. The second one is related to the generation of additional revenue measured as a percentage of GDP. The third is derived from the share of SET revenues as a percentage of Gross Domestic Product and its estimation for the coming periods.

Firstly, regarding the relative composition between direct and indirect taxes, it can be noticed in Figure 5 that the composition has undergone a change after the enactment of Law 6380 in Fiscal Year 2019, since the weight of indirect taxes was 59.7% at the end of 2018 and was reduced to 51.2% at the close of Fiscal Year 2022; while direct taxes increased their share from 40.3% to 48.8%.

FIGURE 5

Collection Structure (direct/indirect taxes) before and after the Tax Reform

Annual cumulative, years 2018 and 2022, in percentages of total



Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

Secondly, regarding the incidence of the Tax Reform as a percentage of GDP, the additional revenue reached 0.25% in Fiscal Year 2020, 0.31% in Fiscal Year 2021 and 0.17% by the end of Fiscal Year 2022 (Table 1). This shows the relevance of the additional collections resulting from the implementation of the reform within the tax system. In millions of *guaraníes* and by type of instrument, while in 2020 the additional collection came mainly from the IDU, in 2021 and 2022 it is shown that the IRE has been the main driver of this collection gain, with the complementary contribution of VAT revenues.

TABLE 1

Impact of the additional tax collection associated with the Tax Reform, by tax and global

Cumulative annual, 2020-2022 (selected years), in millions of guaraníes and as percentages of GDP

Taxes	2020	2021	2022
IRP	54,975	27,607	21,396
IDU	485,215	129,299	129,299
IRE	60,014	560,327	266,336
VAT	-	129,457	78,583
Excise	-	-	-
Total (Gs.MM)	**600,204**	**846,690**	**495,614**
Total (GDP %)	**0.25%**	**0.31%**	**0.17%**

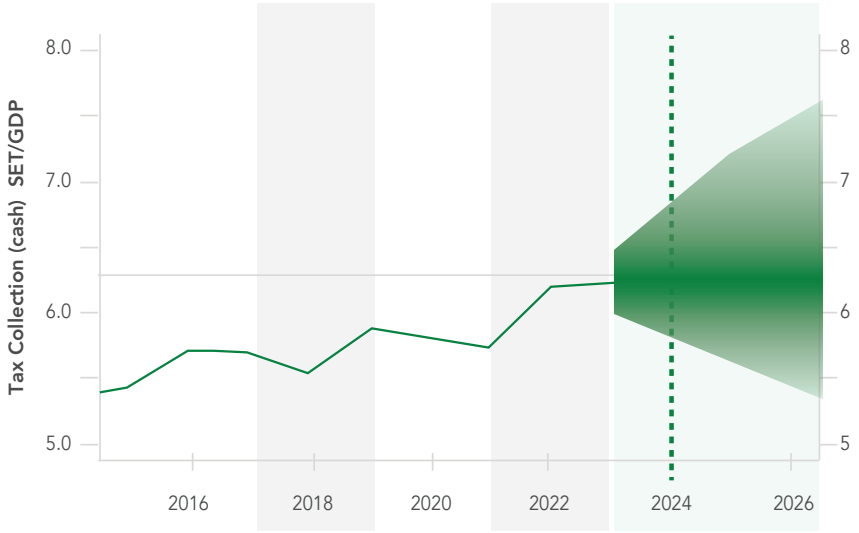
Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

Lastly, an estimate for the end of Fiscal Year 2023 - based on the expected growth of the economy - suggests that SET's total collection (in cash) would grow by 8.1% annually at the end of the current year and, in addition, would show an increasing behavior over the next few years (figure 6).

FIGURE 6

Tax collection of SET and its projection for the next few years

Aligned with the growth of the economy, 2016-2026 (selected years), as a percentage of GDP



Source: Own elaboration based on data provided by SET - Ministerio de Hacienda of Paraguay.

4. Conclusions

With this it can be pointed out that the Tax Reform implemented in Paraguay in 2019, is generating the favorable conditions that were defined at the time of the drafting of the norm where the aim was to increase the number of taxpayers through formalization, increase collection, increase tax equity and simplify the processes within the Administration.

On the other hand, it is no less important that all these regulatory provisions and tax decisions have been supported by the necessary technologies to ensure the existence of mechanisms to help taxpayers and to strengthen the Tax Administration in all areas, be they collection, control or formalization.

Finally, it can be pointed out that the support of the private sector for the measures, the strengthening of human capital, in addition to the regulatory provisions that helped certain sectors of the economy, contributed to the successful implementation of the Tax Reform, even in spite of the adverse shock that the COVID-19 pandemic represented for the Paraguayan economy.

I.4. The impact of the COVID-19 pandemic on Peru's tax collection and its post-pandemic recovery

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Introduction

The COVID-19 pandemic formally began in Peru on March 16, 2020, when Supreme Decree N°044-2020-PCM went into effect, declaring a State of Emergency and providing for mandatory confinement, the suspension of constitutional rights, including free transit, and the shutdown of economic activities with very few exceptions limited to those offering basic services. This measure was extended until mid-2020, when the gradual resumption of activities began in phases, culminating at the end of the year and consolidating during 2021.

From the outset, the pandemic had devastating effects globally and locally, not only because of the high cost in human lives, but also because of the major negative impact it had on the economy and, in particular, on tax collection and compliance levels. Peru was no exception, with GDP falling by 11% in real terms during 2020 and tax pressure falling by 1.4 percentage points, while poverty rose sharply to 30.1%.

Fortunately, in the post-pandemic period, the Peruvian economy, as well as tax collection levels, consolidated a fast recovery since 2021, even surpassing pre-pandemic levels (2019). In this encouraging upturn and its sustainability, in addition to the more favorable international and local context, the permanent work of the *Superintendencia Nacional de Aduanas y Administración Tributaria* (SUNAT) through its four work axes to promote tax compliance also had an influence: Massive Risk Management, Digital Transformation of Processes, International Taxation and Collaborative Compliance.

Following this introduction, the first section will describe the main economic and revenue impacts of the crisis associated to COVID-19 pandemic. A second section will delve into the main indicators that made it possible to visualize the fast and solid recovery during 2021 and 2022, closing with some brief reflections and final conclusions for the future.

1. Impacts of the pandemic on the economy and on tax revenues

The year 2020 has been marked in world history by the negative effects generated by the COVID-19 pandemic worldwide. In the Peruvian case, the social balance has been painful and showed 4.5 million positive cases, with 219,344 compatriots dead and a lethality rate that reached 4.9% in a development of up to five waves of contagion. The first two were the most critical since, after them, lethality decreased in a context in which vaccination of the population gained in coverage with the application of at least one and even multiple doses.

In the economic field, the negative impact was also devastating through supply shocks, demand shocks and the volatility of financial markets as a result of the confinements and the paralysis of activities; this generated a deterioration in consumption, loss of jobs, disruption in the supply chain, stress in the health systems, a drop in tourism, and a drop in the price of raw materials. This situation severely affected companies in the tourism sector (hotels, restaurants, entertainment companies), transportation, exporters, financial institutions, health, and services, among others.

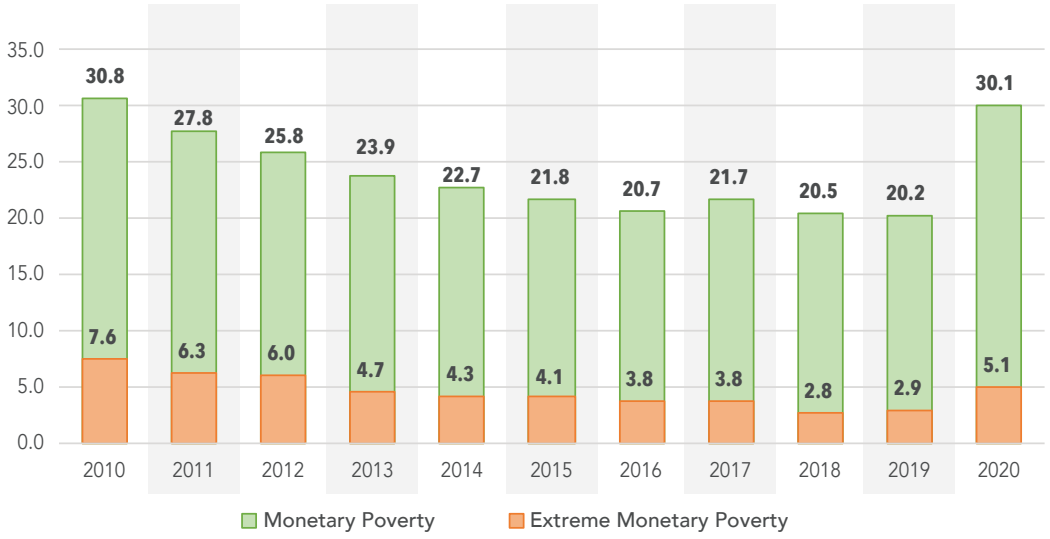
Thus, in year 2020, the economy registered negative results that translated into a real fall in GDP of 11%, a Domestic Demand that fell 9.9%, imports that fell 15.6% and exports that fell 10.6% (see Annex at the end of the article). This negative result was observed in all economic sectors apart from those linked to basic services and which were not subject to paralysis.

These negative results of the national macroeconomy were also reflected at the microeconomic level since, with the aggravating factor of the context of job losses, poverty increased by 10 percentage points from 20.2% in 2019 to 30.1% in 2020, the same as extreme poverty increased from 2.9% in 2019 to 5.1% in 2020, results that meant a 10-year setback sacrificing all the ground gained in this dimension at the expense of a responsible management of economic activity (figure 1). Along the same lines, the estimated levels of tax non-compliance for the General Sales Tax (IGV) and the Corporate Income Tax (IRE) increased by 4 points and 5 points, respectively, in a context in which individuals prioritized compliance with other obligations over tax obligations.

FIGURE 1

Evolution of monetary poverty in Peru

Annual data, period 2010-2020, in percentages of total population



Source: Own elaboration based on data from the *Instituto Nacional de Estadística e Informática* (INEI), www.inei.gob.pe.

Facing this critical scenario, the Peruvian government deployed the greatest efforts to help families and companies through a set of policy instruments that made up an economic plan to contain the crisis and reactivate the economy, including public spending measures, tax measures and other measures to generate liquidity.

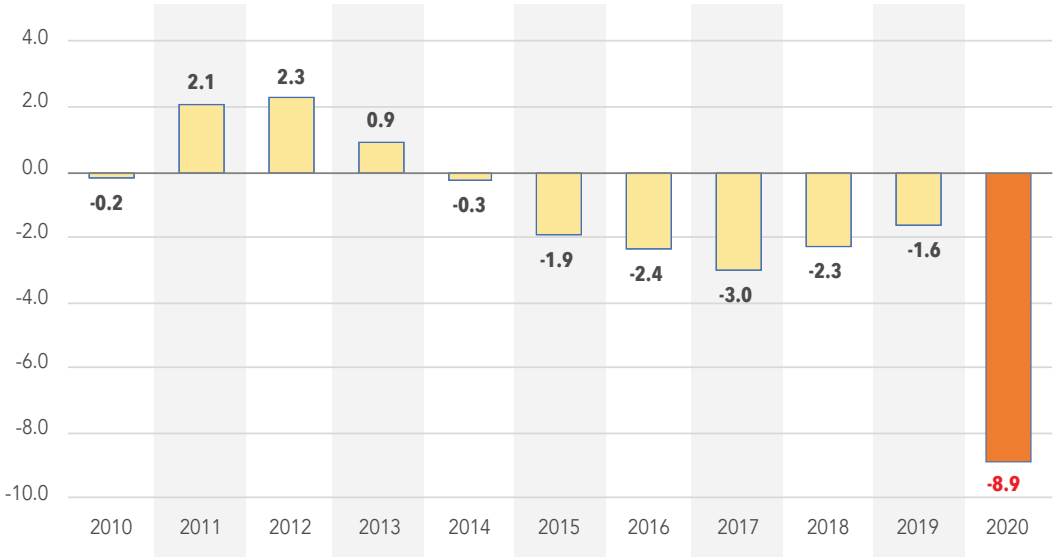
Public spending measures represented 4.6% of GDP and included the delivery of economic aid through monetary bonds, as well as the promotion of investment and current spending. Tax measures accounted for 2.3% of GDP and consisted of tax relief to provide both families and companies with sufficient monetary liquidity through, for example, the deferral of payment of obligations, the temporary reduction of taxes, as well as administrative facilities such as the reduction of interest on arrears and the relaxation of certain procedures. Other measures of the economic plan accounted for 13% of the GDP and included the temporary release of workers' Compensation for Time of Service (*Compensación por Tiempo de Servicios* CTS) resources, as well as a program of loans to companies guaranteed by the State.

Therefore, the fiscal measures of the Peruvian government's plan totaled nearly 20% of GDP, making Peru one of the countries in the world with the largest investment of resources to address the effects generated by the pandemic. As a result of the plan implemented, it was possible to close 2020 with a fiscal deficit of 8.9% of GDP, compared to 2019, which was only 1.6% (figure 2), which was financed mainly with fiscal savings and debt, and by temporarily postponing the fiscal consolidation plans that sought to gradually bring the deficit to levels of 1% of GDP.

FIGURE 2

Non-Financial Public Sector Economic Results

Annual data, period 2010-2020, in percentages of GDP



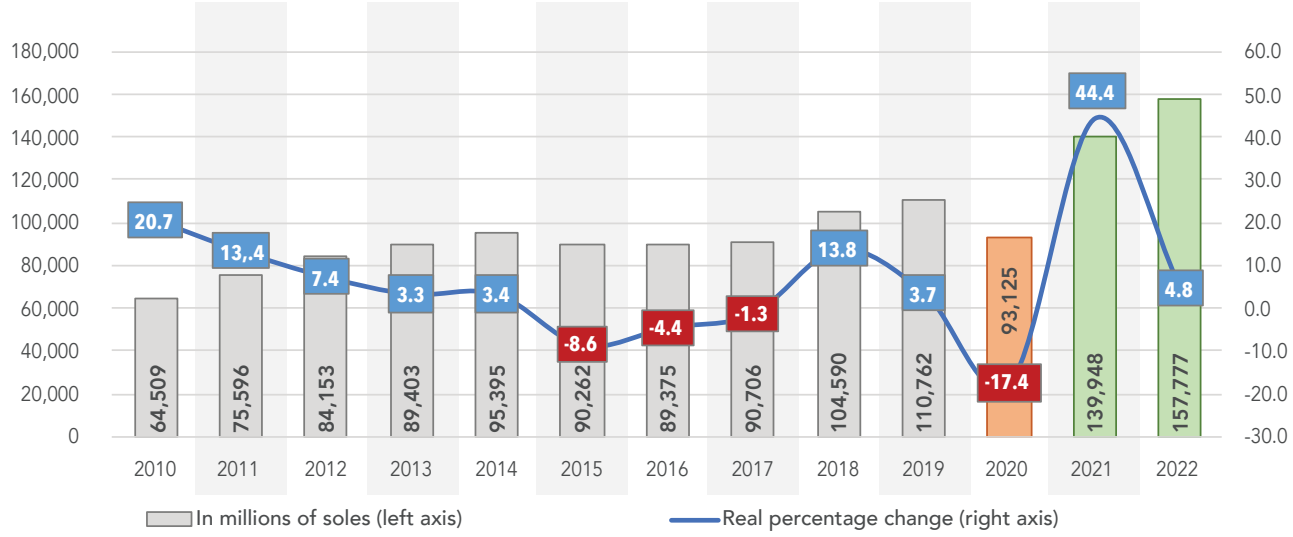
Source: Own elaboration based on data from *Ministerio de Economía y Finanzas* (MEF).

The high deficit recorded in 2020 had its origin not only in the higher levels of public spending to address the effects of the pandemic, but also in the effect it had on tax revenues, which fell by 17.4% in 2020 (Figure 3). This was also reflected in the collection of the two main taxes of the Peruvian tax system, such as the General Sales Tax, which fell by 14.4% in that year (figure 4), and the Income Tax, which showed an annual decrease of 14.8% (figure 5). Thus, the central government's tax pressure (without considering social security contributions or resources captured by subnational governments) for 2020 fell to 12.9% of GDP, losing 1.4 percentage points with respect to what was gained in 2019 when this indicator was 14.3% of the Gross Domestic Product.

FIGURE 3

Central Government Total Tax Revenues

Annual data, period 2010-2022, amounts in millions of soles and real percentage change

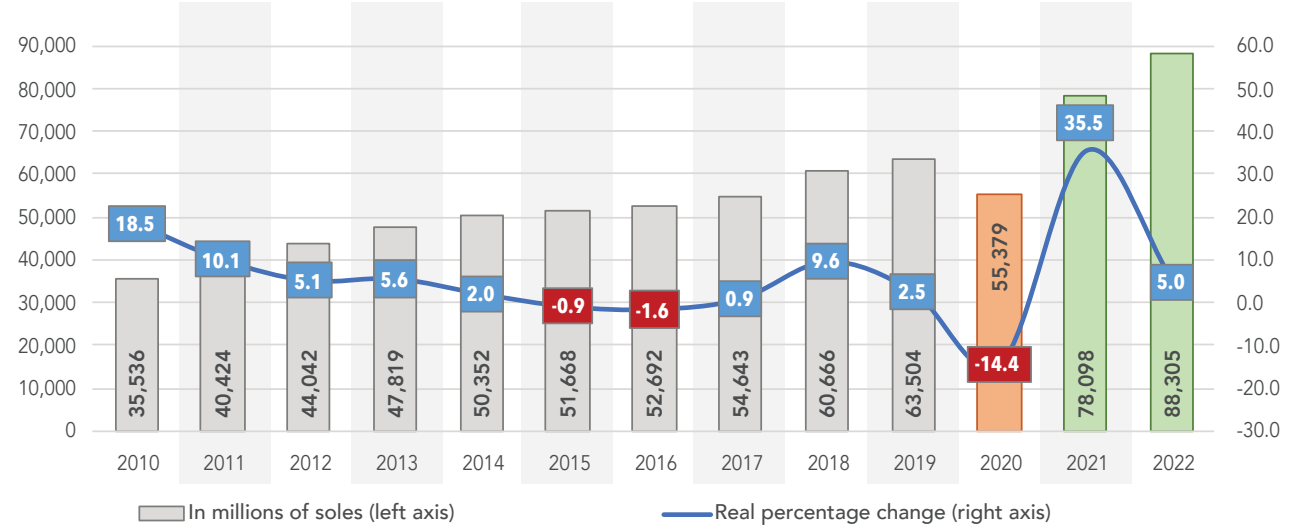


Source: Own elaboration based on data from SUNAT.

FIGURE 4

Central Government Tax Revenues from General Sales Tax (IGV)

Annual data, period 2010-2022, amounts in millions of soles and real percentage change.

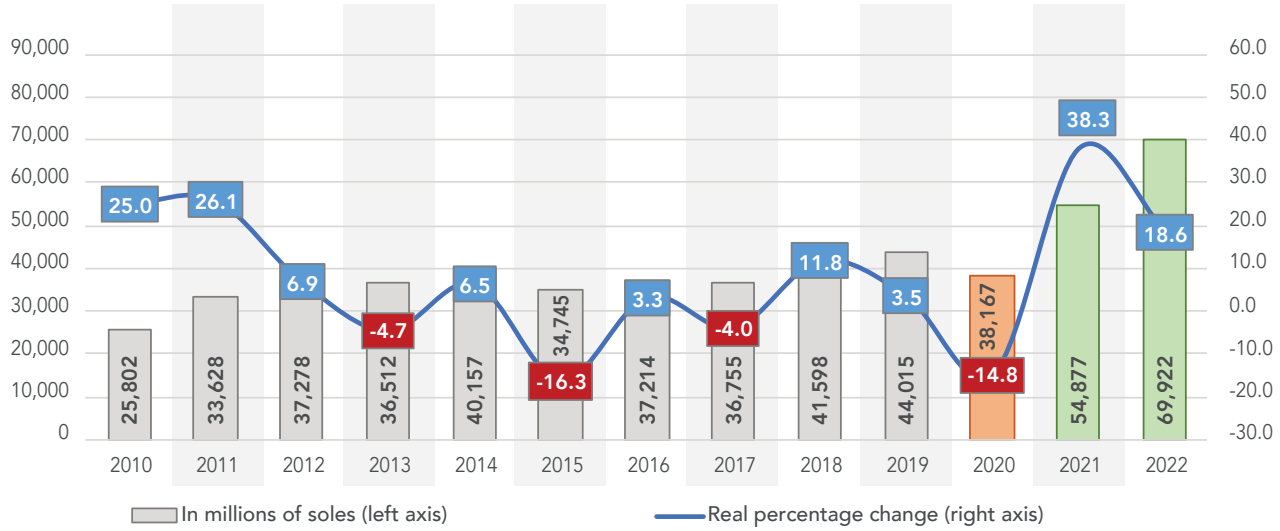


Source: Own elaboration based on data from SUNAT.

FIGURE 5

Central Government Tax Revenues from Income Tax

Annual data, period 2010-2022, amounts in millions of soles and real percentage change



Source: Own elaboration based on data from SUNAT.

2. The Post COVID-19 Situation

Thanks to a plan for the gradual resumption of economic activities in phases, initiated in mid-2020, and the aid programs provided by the government, the Peruvian economy began to show gradual signs of recovery in 2021 (year of rebound effect), which was consolidated in 2022 by reaching growth rates of 13.6% and 2.7% respectively, despite facing a complex international context due to geopolitical problems caused by the Russia-Ukraine war, as well as internal conflicts due to the rejection of the new government and the permanent struggle between the executive and legislative powers. Likewise, in a context of reactivation of activities, Domestic Demand 2021 grew by 14.7% and in 2022 it grew by 2.3%. Exports also recovered, growing 47.2% in 2021 and 4.3% in 2022; and imports grew by 38.9% and 16.7% in 2021 and 2022, respectively (see Annex).

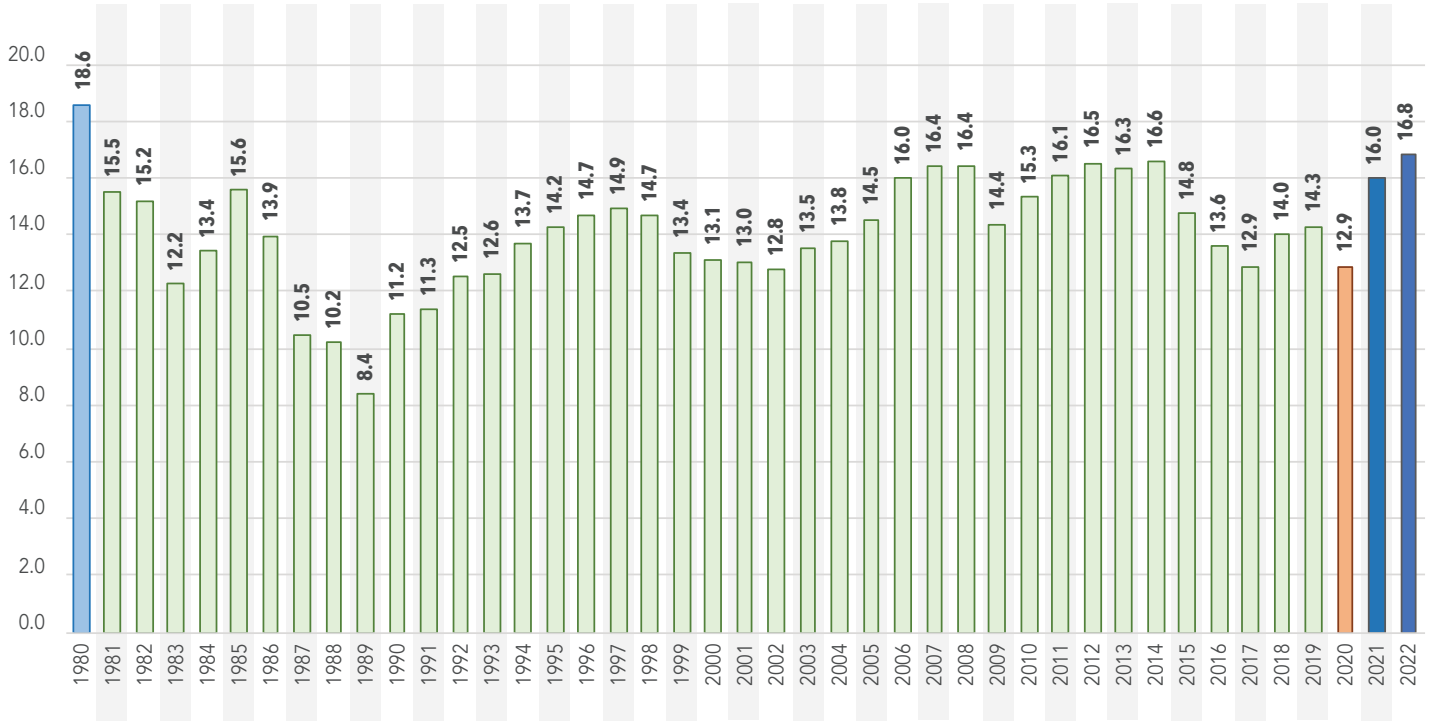
The prompt post-COVID recovery was also registered in tax collection, since during 2021 it registered a 44.4% growth with respect to 2020 and even surpassed pre-pandemic levels by growing 19.2% with respect to 2019. Likewise, during 2022 this growth was consolidated by registering a positive rate of 4.8% with respect to 2021 in a favorable context for domestic economic activity (figure 3). This recovery in revenue collection was supported by the growth of the two main taxes: the IGV, whose collection grew 35.5% and 5.0% in 2021 and 2022, respectively (figure 4); and the Income Tax, where the year-on-year increase was 38.3% and 18.6% in the same years (figure 5).

The recovery in tax collection also translated into a significant improvement in the central government's tax burden, since in 2021 this indicator more than recovered what was lost in 2020 and reached 16.0% of GDP, while in 2022 it even stood at 16.8% of GDP, a figure that was a historical record not reached since 1980 (figure 6).

FIGURE 6

Central Government Tax Burden

Annual data, period 1980-2022, as a percentage of GDP



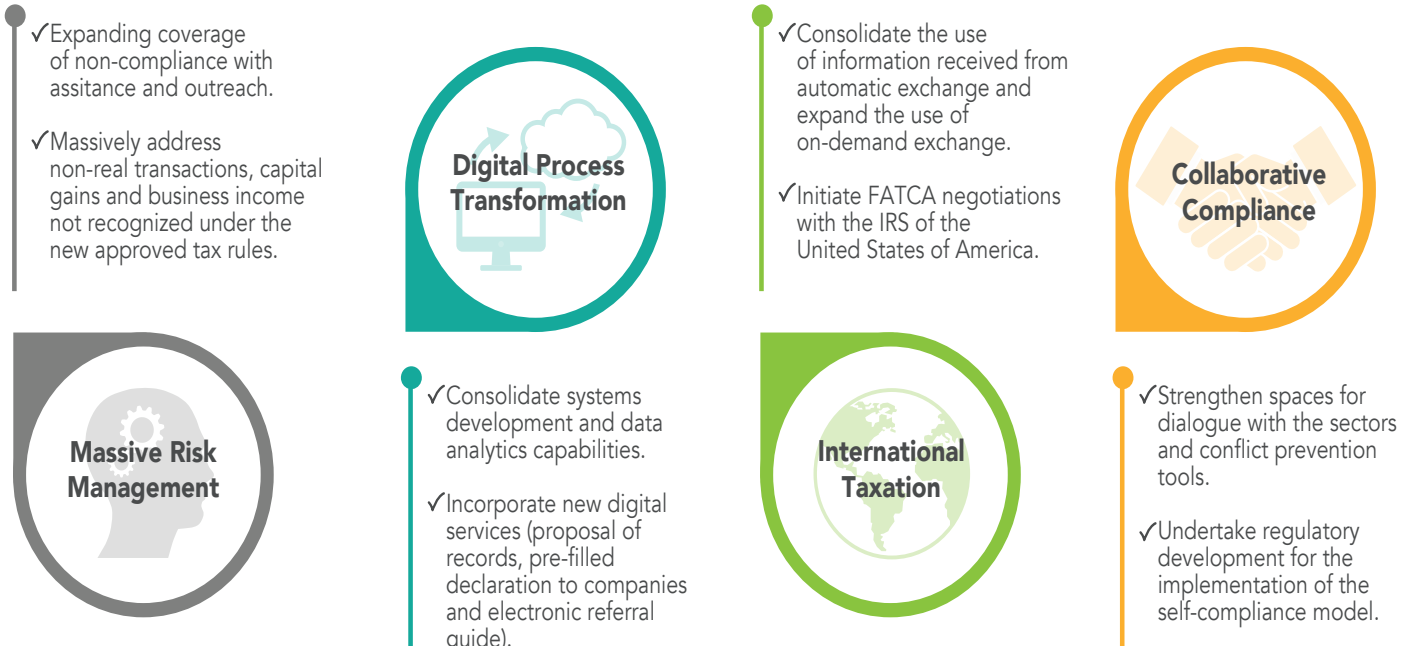
Source: Own elaboration based on data from SUNAT and INEI.

The favorable result achieved in the collection 2021 and 2022 reflected not only the resumption of economic activities after the pandemic but also the favorable international context in terms of metal prices, especially copper, which is the main Peruvian mining export product, with cUS$420 per pound in 2021 and cUS$400 per pound in 2022, which generated important payments in the Corporate Income Tax for those years. Likewise, the influence of the management carried out by the *Superintendencia Nacional de Aduanas y Administración Tributaria* (SUNAT) must be considered in these results, with permanent actions aimed at facilitation and control, seeking to broaden the tax base, reduce non-

compliance and encourage voluntary compliance of obligations by taxpayers.

This work of SUNAT was carried out by strengthening its processes of Collection, Recovery, Auditing and Taxpayer Service through the application of the following four main axes for promoting tax compliance (diagram 1): i) Massive Risk Management, ii) Digital Transformation of Processes; iii) International Taxation and iv) Collaborative Compliance.

DIAGRAM 1 **Main lines of action to promote voluntary compliance**



Source: Superintendencia Nacional de Aduanas y de Administración Tributaria (SUNAT).

The management results of SUNAT have been favorable and have resulted in significant amounts of collection obtained from the collection of obligations, induced payments, favorable rulings in processes that were in litigation, determination and collection in audit actions, reduction of delinquency, among others. Evidence of the good results of institutional management has been the reduction observed in the estimated tax non-compliance of the IGV and the IRE in the post-pandemic, with decreases of close to 10 and 22 percentage points, respectively, going from 38.4% to 28.0% and from 54.7% to 33.1% between 2020 and 2021. The tax delinquency rate fell from 4.3% in 2020, a high rate because of the pandemic, to levels of only 1.8% in 2021 and 1.3% in 2022.

Definitely, this improvement in post-COVID-19 tax collection meant achieving better fiscal results that translated into a deficit of only 2.5% of GDP in 2021 and 1.6% of GDP in 2022, making it possible to resume plans to achieve the desired fiscal consolidation and thus bring it to levels of 1.0% in the coming years. Likewise, important ground was regained in terms of reducing poverty levels since in 2021 total poverty fell by more than 4 points from 30.1% in 2020 to 25.9%, while extreme poverty fell from 5.1% to 4.1%. It is expected that in 2022, whose figures were not yet available at the time of writing this article, the pre-pandemic levels of 20.2% and 2.9% for total poverty and extreme poverty, respectively, will have already been reached.

Finally, year 2023 calls for new challenges for SUNAT, as it must maintain the sustained growth of revenue collection while consolidating and even strengthening the work of the Administration and the measures adopted in the four aforementioned areas that add to this increased collection. All this must be developed in a complex international context that represents risks for revenue projections due to the continuity of the Russia-Ukraine conflict, the weakening of China and the United States (Peru's main trading partners), the problem of inflation and the withdrawal of monetary stimulus, in addition to the volatility of financial and commodities markets, among others; to which is added a domestic context also unfavorable due to the weather phenomena and natural disasters, political uncertainty and the social conflict that has been occurring in the country.

Conclusions and final thoughts

The COVID-19 pandemic generated a lot of damage with a negative impact on the world economy and Peru has been no exception, breaking an expansive cycle of several years with positive GDP growth rates. The contraction observed in tax revenues set the country back 10 years in terms of both central government tax pressure and poverty levels.

The post-pandemic period in Peru has been characterized by a rapid recovery of tax collection levels, in a context of gradual resumption of activities, starting from mid-2020 and consolidated with full operation in 2021 and 2022. This has made it possible to reduce poverty levels that had increased and to recover the country's tax burden, even reaching historic record levels in 2022 that had not been reached since 1980.

The recovery of tax revenues was not only a consequence of the resumption of economic activities and favorable international situation in terms of commodity prices, but it was also due to the work developed by the Peruvian Tax Administration, through its four basic axes for promoting tax compliance. In particular, the Digital Transformation is a very important tool as it is like a coin with two sides, helping to enhance both the control and the facilitation of tax compliance carried out by SUNAT. The challenge for the future is to keep tax revenues growing, supported by the exploitation of technological advances, in spite of the existence of multiple internal and external risks.

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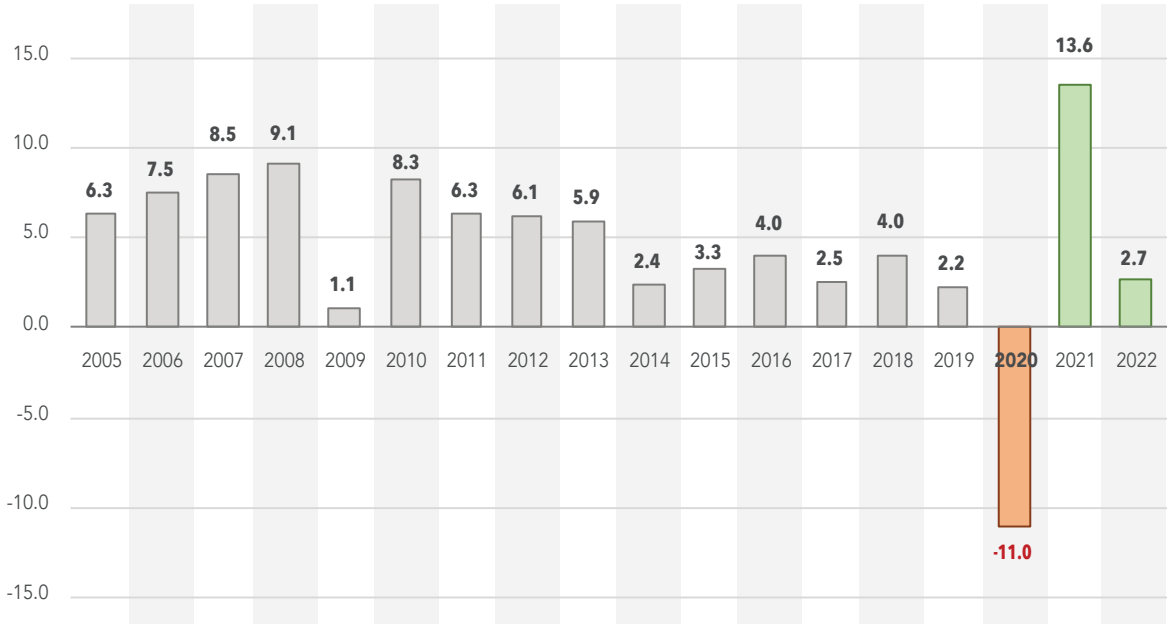
Statistical Annex

FIGURE A.1

Gross Domestic Product Evolution

Annual data, period 2005-2022, real percentage changes

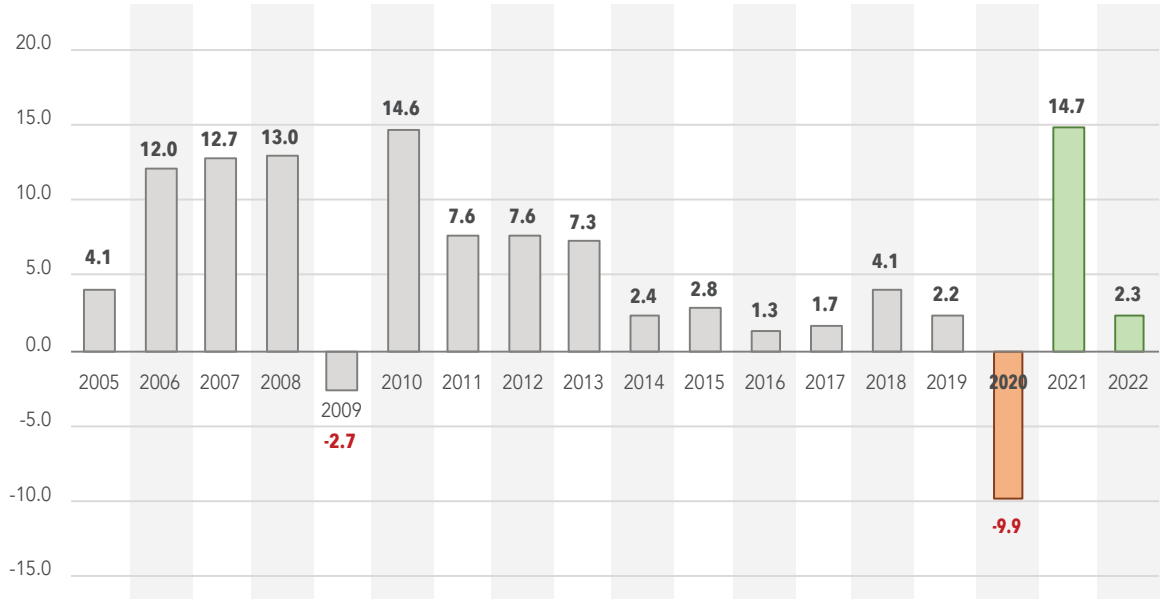


Source: Own elaboration based on the statistical bulletin *Nota Semanal del Banco Central de Reserva del Perú* (BCRP) and *Marco Macroeconómico Multianual, Ministerio de Economía y Finanzas* (MEF).

FIGURE A.2

Domestic Demand Evolution

Annual data, period 2005-2022, real percentage changes

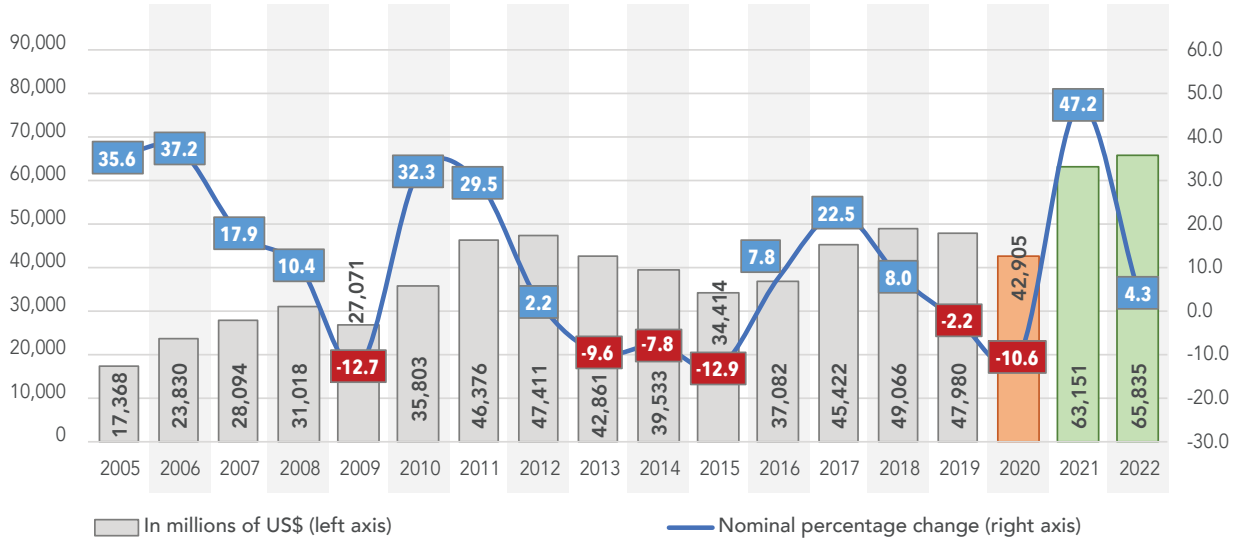


Source: Own elaboration based on the statistical bulletin *Nota Semanal del Banco Central de Reserva del Perú* (BCRP) and *Marco Macroeconómico Multianual, Ministerio de Economía y Finanzas* (MEF).

FIGURE A.3

Total Exports Evolution

Annual data, period 2005-2022, in millions of dollars and in nominal percentage changes

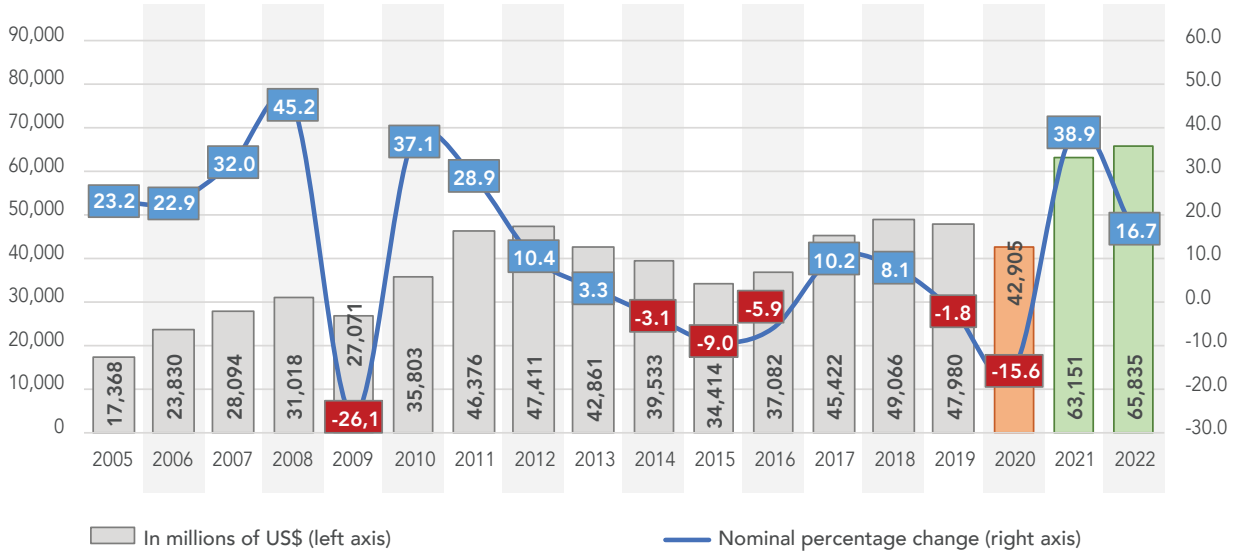


Source: Own elaboration based on the statistical bulletin *Nota Semanal del Banco Central de Reserva del Perú* (BCRP) and *Marco Macroeconómico Multianual, Ministerio de Economía y Finanzas* (MEF).

FIGURE A.4

Total Imports Evolution

Annual data, period 2005-2022, in millions of dollars and in nominal percentage changes



Source: Own elaboration based on the statistical bulletin *Nota Semanal del Banco Central de Reserva del Perú* (BCRP) and *Marco Macroeconómico Multianual, Ministerio de Economía y Finanzas* (MEF).

I.5. Evolution of tax revenues in Uruguay after the COVID-19 crisis

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Introduction

The following article summarizes the presentation made at the Eighth Meeting of the CIAT Network of Tax Studies and Research Areas, where the evolution of the revenue collection of the Dirección General Impositiva de Uruguay (hereinafter, DGI) over a period that covers the entire COVID-19 crisis was discussed. It is presented in terms of total gross tax collection as well as by different groups of taxes.

It should be clarified that the collection presented includes only internal taxes, excluding revenues from special social security contributions and customs duties. In this case, the collection of the DGI represents 85% of the revenues of the Central Administration[1].

The health emergency began in Uruguay on March 13, 2020, and lasted for more than two years until April 5, 2022. From the beginning of the emergency, the Tax Administration undertook a series of actions, mainly to facilitate the taxpayer's services, including the online processing of many procedures that until then had been carried out on site. At the same time, short-term changes were introduced in tax obligations, such as the establishment of extensions for small and medium-sized companies. Meanwhile, the central government introduced a transitory tax, which was levied on the income of government employees and on pensions and retirement benefits.

1 Own elaboration based on data for year 2022 published on the web of: Ministerio de Economía y Finanzas. (2023). Accessed on February 24, 2023, from https://www.gub.uy/ministerio-economia-finanzas/datos-y-estadisticas/estadisticas.

Within the Tax Administration, the Department of Economic-Tax Studies (a member of the aforementioned Network) is the area in charge of, among other tasks, the projection and follow-up of tax collection. The abrupt change in the economic context experienced by the country implied the revision of the collection projection tools, highlighting the use of electronic[2] invoicing information to reinforce short-term estimates, especially in VAT, as well as the production of indicators that allowed a just-in-time follow-up of the activity at the level of all economic activity sectors.

1. Evolution of the amount of tax revenues before, during and after the COVID-19 pandemic

1.1. Total gross tax collection

Firstly, the evolution of the DGI's total gross[3] tax collection for a four-year period, from January 2019[4] to December 2022, is presented below (figure 1). The solid line represents the cumulative total collection in each year (moving) expressed at constant[5] December 2022 prices. In turn, the bars represent the real year-on-year changes by calendar[6] month.

2 In 2020, the use of electronic invoicing reached a set of taxpayers whose payments accounted for more than 75% of the collection.

3 In Uruguay, tax revenues are shown in gross terms, that is, the collection figures regardless of the means of payment used to cancel the tax obligation. For example, payments made with tax credit certificates are included in the gross collection (this applies to all figures).

4 The analysis is initiated from year 2019 for the purpose of observing the collection performance prior to the beginning of the crisis by COVID-19.

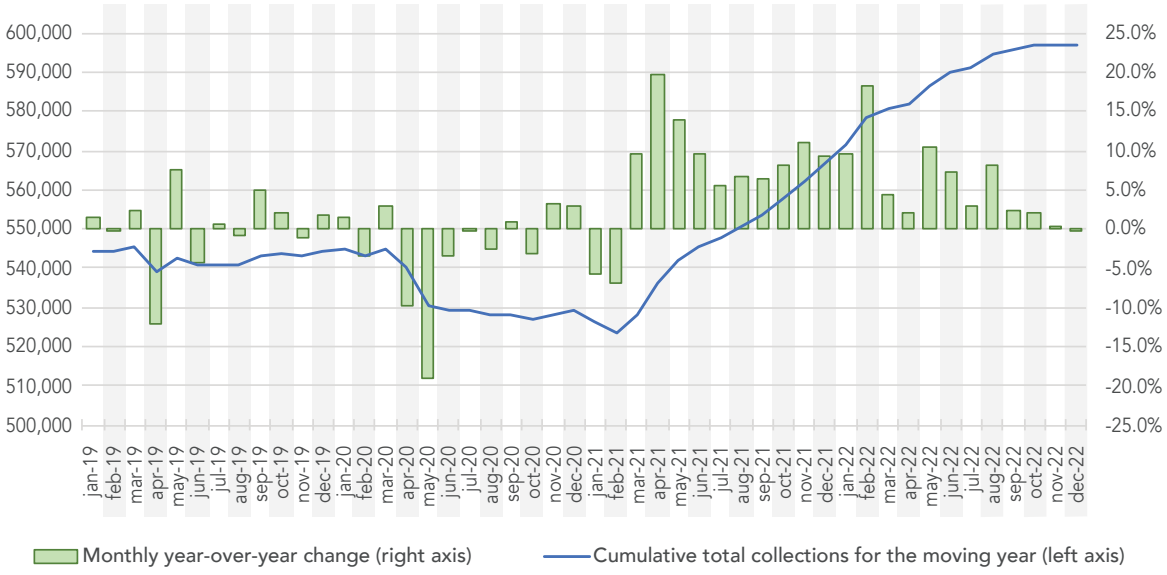
5 *Instituto Nacional de Estadística* (2023), "CPI time series Base October 2022=100", accessed February 24, 2023. https://www.gub.uy/instituto-nacional-estadistica/datos-y-estadisticas/estadisticas/series-historicas-ipc-base-octubre-2022100

6 Detailed information can be found on the *Dirección General Impositiva website*, "Tax collection - Monthly series". https://www.dgi.gub.uy/wdgi/page?2,principal,ampliacion-DatosSeresEstadisticas,O,es,0,PAG;CONC;865;3;D;recaudacion-por-impuesto-series-mensuales;5;PAG

FIGURE 1

Evolution of total gross tax collection administered by DGI in Uruguay

Monthly values in constant prices, January 2019 to December 2022, in millions of Pesos and percentages



Source: Own elaboration based on data published by the DGI (www.dgi.gub.uy – statistical data and series).

Figure 1 shows a certain stability in the collection level during 2019, showing a drop in the level with the arrival of the pandemic in Uruguay, which was maintained during the first year of the pandemic. From that moment on, a period of sustained growth of the accumulated collection begins, being observed in 2021 a collection level higher than the one observed in 2019. At the end of the period under analysis (end of 2022), the beginning of a certain stabilization and stagnation of the annual accumulated amount is observed.

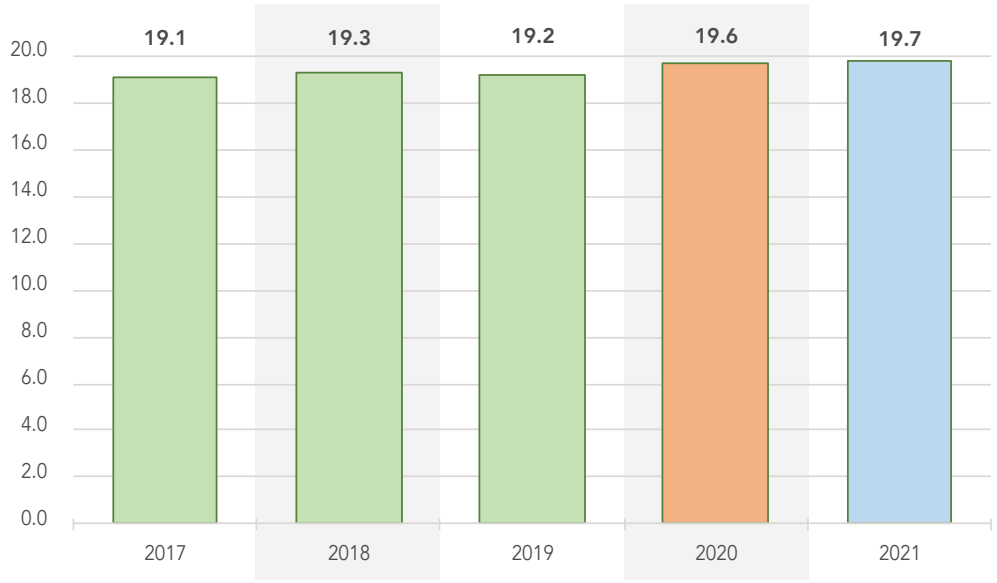
As regards real monthly year-on-year variations, the largest drop is observed in May 2020, close to -20%. This drop occurs because the collection of that month mainly reflects the generating events accrued during April 2020, a month of greater paralysis of mobility as well as economic activity due to the forced confinement and isolation measures to prevent the spread of COVID-19 contagions. Subsequently, the aforementioned variations show decreases of lesser magnitude and as of March 2021 they show positive variations, initially as an effect of the statistical rebound and then consolidating towards the end of that year.

1.2. Tax Burden of DGI

Regarding the DGI tax burden evolution of the last years (figure 2), an increase in this indicator could be observed with respect to previous years and in spite of 2020 tax collection drop with respect to 2019. Precisely, in 2020, although a real fall in collection was noticed, it was at a lower level than the fall recorded by GDP, which had an impact on an increase in the total gross tax burden of around half a percentage point, reaching 19.6% of GDP at the end of that year. Then, in 2021, the consolidation of the recovery of tax revenues contributed that DGI's tax burden remained at higher levels than in previous years, close to a maximum equivalent to 19.7% of GDP.

FIGURE 2 **Gross Tax Burden of DGI**

Annual data, 2017-2021, as a percentage of GDP



Source: Own elaboration based on Statistical Bulletin 2021 - DGI (www.dgi.gub.uy)

2. Tax revenue structure of DGI

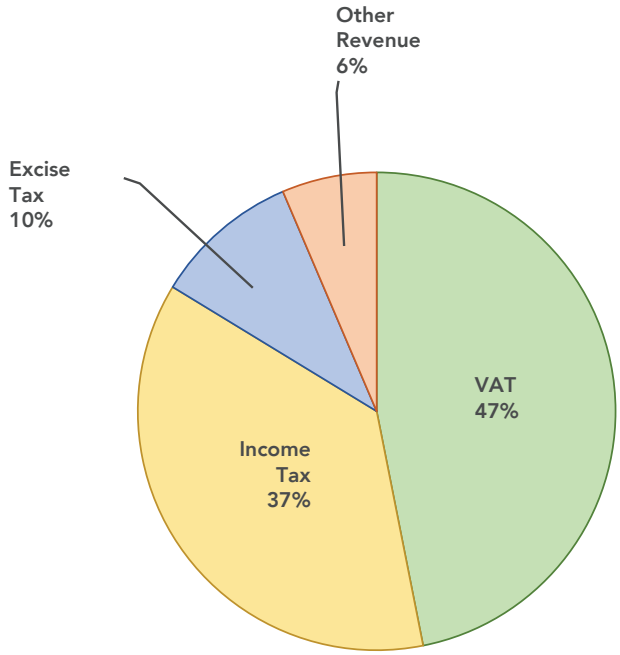
2.1. Current status

Before addressing the analysis of the recent evolution of revenue collection by main tax group, the structure or relative weight of these taxes at the end of fiscal year 2022 is presented below (figure 3). It can then be observed that, at present, almost half of the revenues (47%) comes from VAT, a little more than a third is explained by Income taxes (37%) and a tenth of the total originates from excise taxes, while the rest of the revenues represent 6% of the cumulative collection as of December 2022.

FIGURE 3

Relative participation of main taxes in Uruguay

Data corresponding to year 2022, as a percentage of total gross revenues of DGI



Source: Own elaboration based on data published by DGI (www.dgi.gub.uy – data and statistical series).

Despite the high concentration of the gross tax collection of the DGI in three main types of taxes (which together contribute more than 90% of the total), the evolution of each of them has been quite different over the last four years, not so much in terms of the heading or direction of the fluctuations (they all accused the negative impact of the COVID-19 pandemic, for example) but in terms of intensity and magnitude of the decreases and increases observed during the period from January 2019 to December 2022. Next, a discriminate analysis by instrument type will be presented to test for certain trends.

2.2. Recent development of Value Added Tax (VAT)

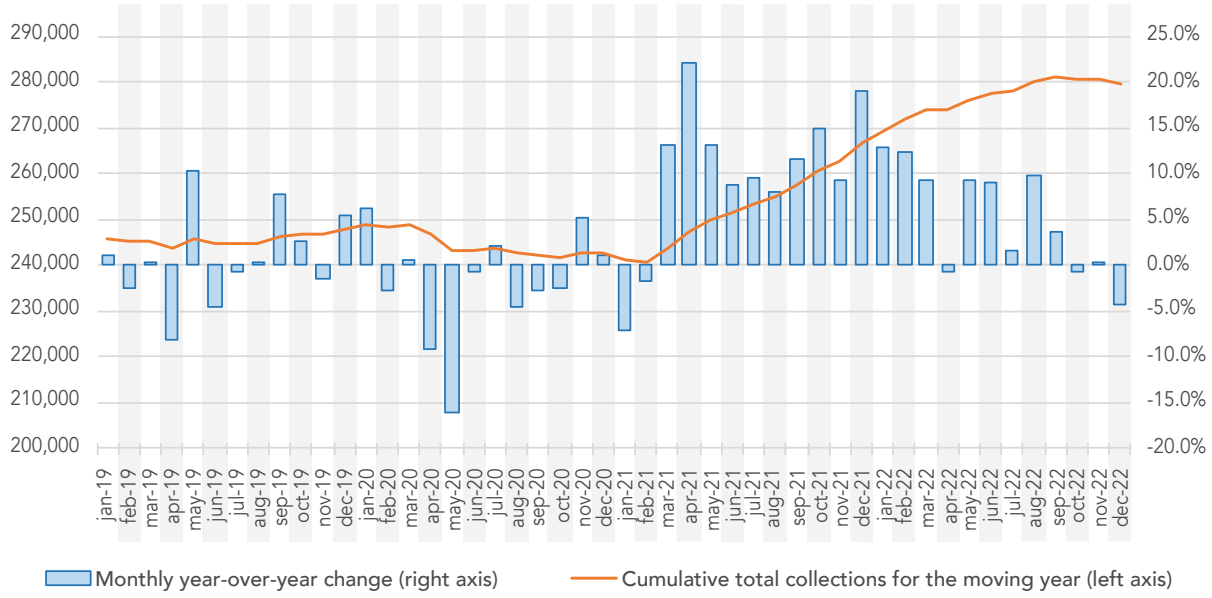
On the one hand, VAT revenues (cumulative collection per moving year) showed during 2019 a certain level of stability, which remained in the range of 240,000-250,000 million Uruguayan pesos even once the COVID-19 pandemic was declared (figure 4). That is to say that, beyond the impact of this extraordinary event, the collection in real terms (at December 2022 prices) showed a remarkable resilience throughout 2020, which cushioned the fall in the overall DGI collection.

However, as of March 2021, a dynamic of growth in the tax collection began to be observed, which reached the end of 2022, when the beginning of a stabilization period at a level higher than that observed during 2019, at values close to 280,000 million of Pesos.

FIGURE 4

Evolution of total gross tax collection of Value Added Tax (VAT)

Monthly values in constant prices, January 2019 to December 2022, in millions of pesos and percentages



Source: Own elaboration based on data published by DGI (www.dgi.gub.uy – data and statistical series).

In terms of year-on-year real monthly variations, April and May 2020 saw the largest declines as a result of the pandemic. During the same year, some other milder declines were recorded, although explained by the high monthly comparison base of 2019 (Figure 4). However, as of March 2021, a clear recovery trend was consolidated, which continued with positive variations until mid-2022, at which point the upturn lost its initial strength and tax collection stabilized at higher values than those of 2019.

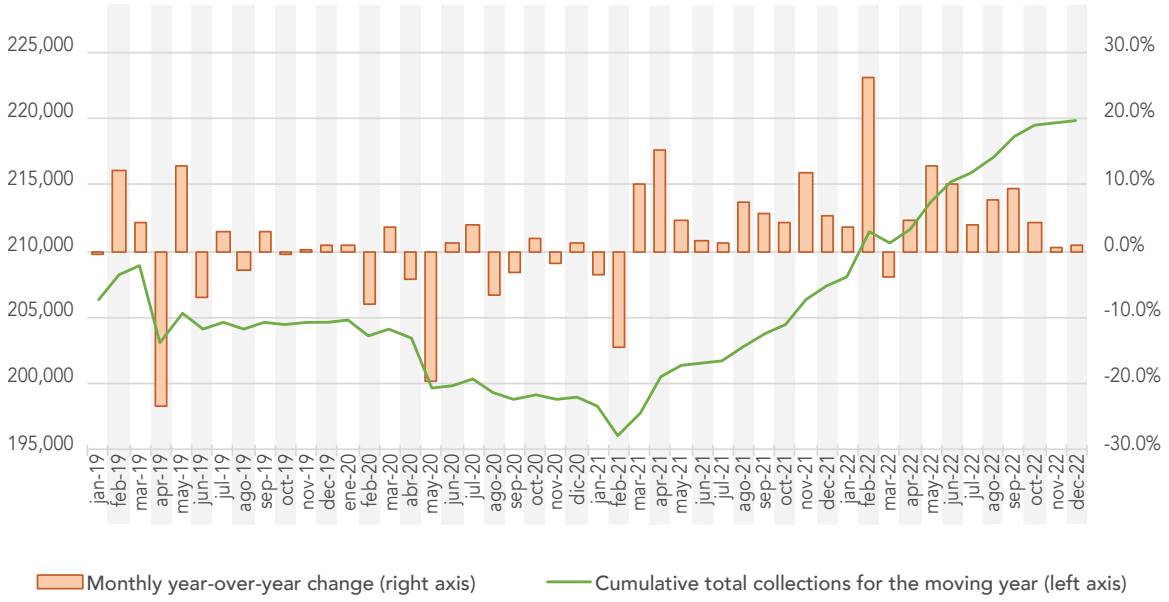
2.3. Recent development of Income Taxes (IT)

Hereafter, figure 5 below shows the evolution of the mobile annual cumulative collection of income taxes[7]. In terms of level, excluding the high level observed at the beginning of 2019 and the subsequent drop, all that year maintained a stable level, around 205,000 million of Pesos (at constant prices), until the beginning of the pandemic. From then on, there was a deep drop in level that lasted until March 2021. Then, with a strong rebound, a period of sustained growth began to appear, which first reached the initial values of 2019 towards the end of 2021 and then continued until the end of 2022, when a period of stability began at a level higher than that observed during 2019, close to 220,000 million of Pesos.

FIGURE 5

Evolution of total gross tax collection of Income Tax

Monthly values in constant prices, January 2019 to December 2022, in millions of pesos and percentages



Source: Own elaboration based on data published by DGI (www.dgi.gub.uy – data and statistical series).

7 This group of taxes includes taxes levied on the income of individuals as well as legal entities. In Uruguay, this includes the Income Tax on Economic Activities (IRAE), Personal Income Tax (PIT), Tax on the Disposal of Agricultural and Livestock Goods (IMEBA), Tax on the Income of Non-Residents (IRNR), and Social Security Assistance Tax (IASS).

Unlike what was commented with respect to total gross and VAT collections, the largest drop in real monthly year-on-year variation was observed in April 2019 for reasons unrelated to COVID-19. However, May 2020 also registered a strong negative variation, close to -20%, which is associated with the effect of the pandemic on the regular flow of income tax collection revenue. From March 2021 onwards, there were repeated year-on-year monthly increases in real terms, including a large jump of +26.3% in February 2022, which became less pronounced towards the end of the period analyzed (figure 5).

2.4. Recent development of Excise Taxes

Next, figure 6 below shows the evolution of excise[8] tax revenues. This group of taxes is characterized by greater volatility in the evolution of the revenues they produce, compared to the other taxes. Despite this, it can be observed that at the beginning of the period analyzed there was a certain stability in the annual cumulative level of collection and later a sharp drop (from 56,000 to 50,000 million of constant Pesos) due to the beginning of the pandemic (figure 6). This was due to the strong reduction in mobility that occurred in Uruguay during the first months of the pandemic, which impacted fuel and automotive sales, items that represent a significant part of the group of taxes under analysis. After the first months of the pandemic, the collection performance of this group of taxes improved and continued, even with strong oscillations, until the end of 2022, reaching a higher level than that obtained in 2019, above 58,000 millions of Pesos.

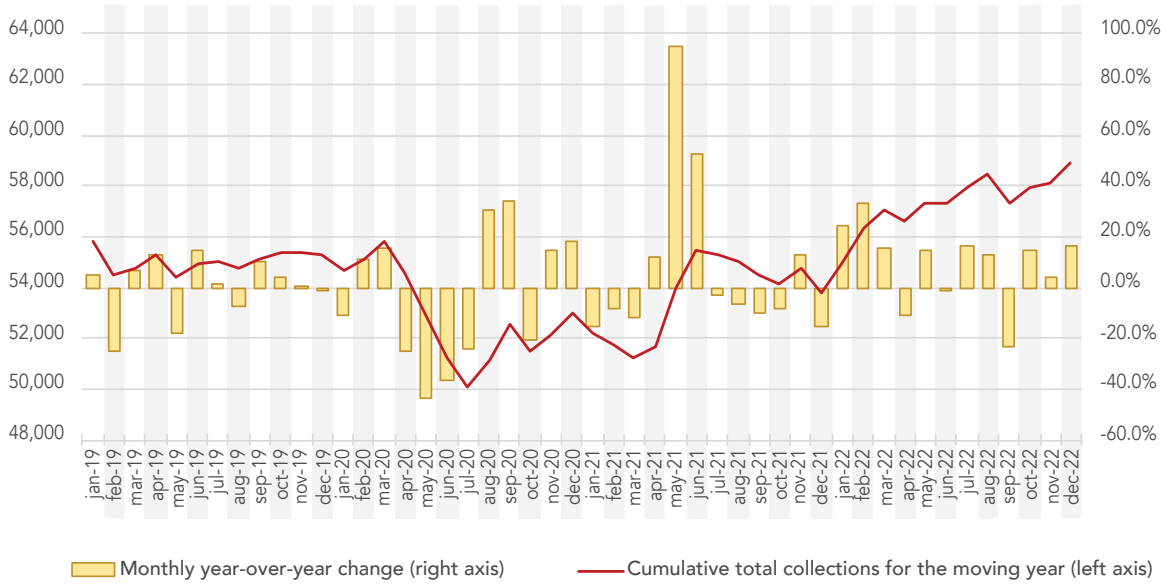
Regarding monthly year-on-year variations, the repeated drops recorded since the pandemic stand out, which were reversed in the second half of 2020 and at the beginning of 2021 (although the large jumps in May and June are linked to a base effect, they contributed to the recovery of collection levels). Already in 2022, the increases were also somewhat more limited but recurrent, which allowed the collection of these taxes to consolidate towards the end of that year (figure 6).

8 This group includes the following taxes: Internal Specific Tax (IMESI), additional to the Tax on the Disposal of Agricultural Goods (IMEBA), Insurance Tax, and Tax for the Sanitary Inspection Fund (FIS).

FIGURE 6

Evolution of total gross tax collection of Excise taxes

Monthly values in constant prices, January 2019 to December 2022, in millions of pesos and percentages



Source: Own elaboration based on data published by DGI (www.dgi.gub.uy– data and statistical series).

3. Final comments

This article has briefly analyzed the impact of the COVID-19 pandemic and the associated crisis on tax collection in Uruguay.

To summarize, it was observed that at the beginning of the pandemic there was a very pronounced drop in tax revenues of the DGI, which continued during the first half of 2020. Once this short period was over, a prompt recovery of tax collection levels began, surpassing in 2021 the levels reached in 2019, consolidating during 2022 and which could stabilize in 2023.

In turn, in general terms, none of the main groups of taxes evolved very differently from the evolution of total tax collection. However, VAT showed greater resilience -in terms of constant price levels- to the effects of the crisis, income taxes showed a relatively strong and accelerated recovery in the post-pandemic period, while excise taxes were the most affected in their medium-term evolution, with deeper falls and a more volatile recovery in the last two years.

II. Tax expenditures

and tax evasion: methodologies for the measurement and the evaluation of their effects

Norad

II.1. Revenue collection efficiency, tax gap and tax expenditure outlook in Latin America and the Caribbean: synthesis of the main results

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Introduction

The purpose of this article is to summarize two lines of the extensive work that CIAT, from its Tax Studies and Research Directorate, has recently promoted. These have arisen to two comparative documents -with statistical bases- of great relevance for the tax administrations (TA) of the member countries.

Firstly, and following this introduction, reference will be made to a quantitative analysis that provides estimates of the revenue collection efficiency of two main instruments, such as the Value Added Tax (VAT) and the Corporate Income Tax (CIT), including the measurement of the tax gap between the theoretical revenue and that actually collected by TAs in Latin American and Caribbean countries. Secondly, the main methodological aspects of a recent edition of the tax expenditure outlook for the countries of the region will be presented, in addition to summarizing the most important results from the latest update of CIAT's Tax Expenditure Database. Finally, a series of conclusions and general reflections are presented jointly for both studies.

1. Tax Efficiency of VAT and CIT in Latin America and the Caribbean 2022[1]

1.1. Relevance of both taxes in terms of tax collection

Value Added Taxes (VAT) and Corporate Income Taxes (CIT) are usually two of the instruments, individually considered, that contribute the most to the countries' tax revenues.

In the last recorded period (2016 to 2018), the total tax burden (TB) of the countries considered was equivalent to 21.4% of GDP, on average (figure 1). And the tax burden

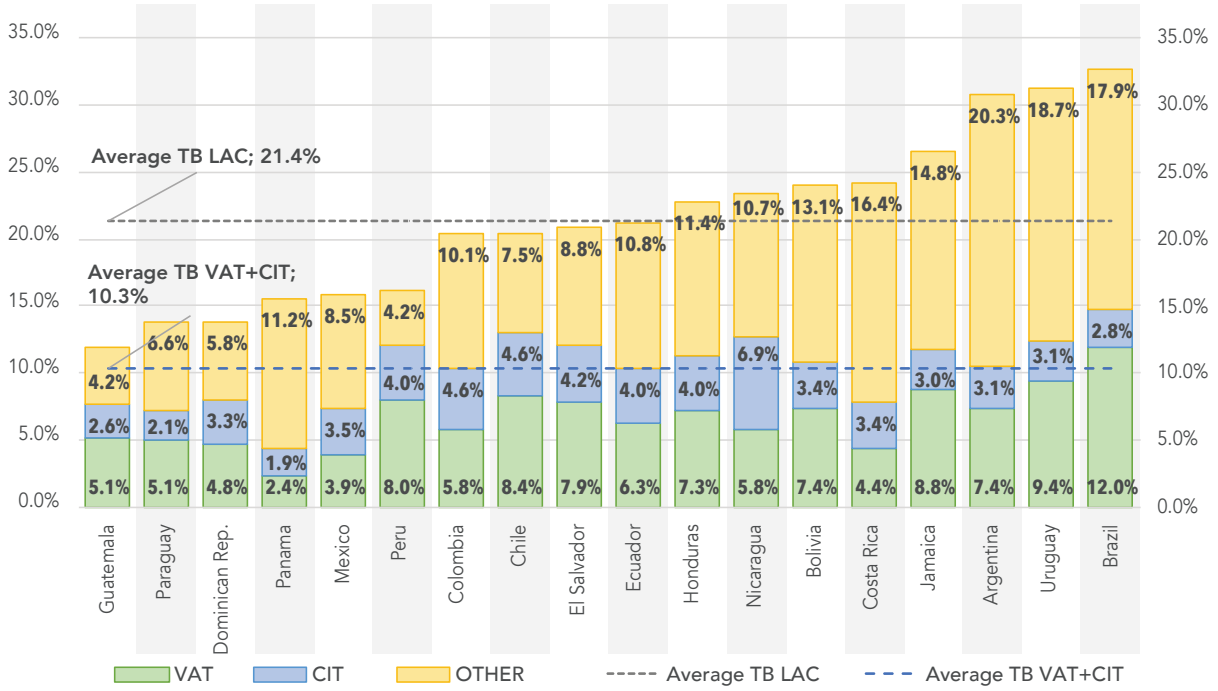
1 The complete document with details on the methodological development of these indicators, as well as the detailed results for both taxes and by country, can be found in CIAT's digital library: https://biblioteca.ciat.org/opac/book/5797 (Spanish) or https://biblioteca.ciat.org/opac/book/5802 (English).

specifically of VAT and CIT represented practically 50% of that, with a greater or lesser presence of each of these figures in the different countries of Latin America and the Caribbean (LAC).

FIGURE 1

Total Tax Burden (TB), VAT and CIT in Latin American and Caribbean countries

Individual data and simple average for 18 countries, average 2016-2018, in percentages of GDP



Source: Peláez Longinotti (2022), "Efficiency and tax gap in Latin America and the Caribbean: Value Added Tax and Corporate Income Tax", CIAT. Prepared based on statistics from the CIAT-IDB Database of Equivalent Fiscal Pressure for Latin America and the Caribbean 1990-2018 (IDB-CIAT, 2019) and National Accounts series of the analyzed countries.

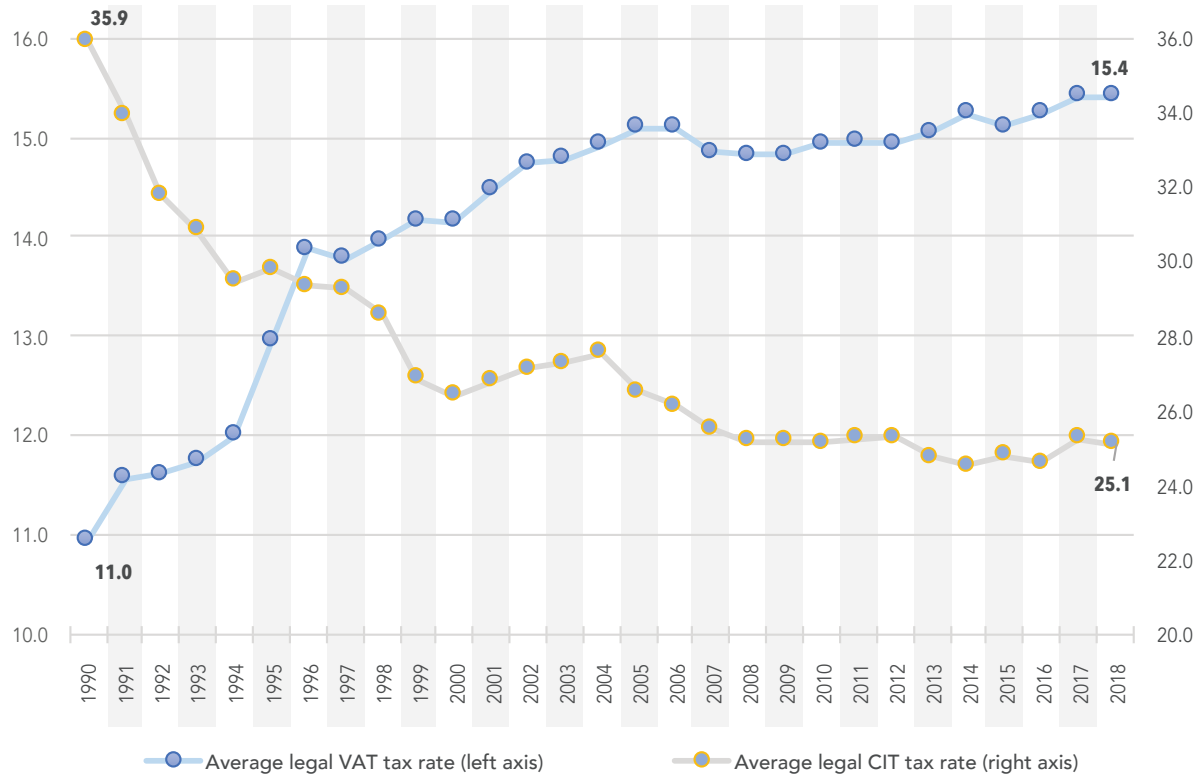
In a long-term view, the average tax burden in LAC has been consistently increasing year after year (except for 2008 and 2009). While in 1990 the average tax collection represented 16.3% of GDP, in 2018 the average tax burden was 21.6%. In this period, VAT and CIT accounted for a large part of the cumulative growth. VAT and CIT, which currently represent 50% of the average tax burden in LAC, had an incidence of only 30% of the total at the beginning of the series.

This greater participation of both figures, in turn, can be explained by the successive reforms focused in these taxes in most of the countries of the region, either through the broadening of the tax bases, the reduction of exceptions and the greater concentration of the Tax Administrations in the management of these taxes.

With regard to the rates and being mainly taxes that apply a proportional rate to the tax base, a gradual medium-term increase in the general VAT rates in the countries has been observed in the 1990-2018 period of analysis (reaching an average of 15.4% in 2018), but maintaining certain heterogeneity and a reduction towards a convergence towards values around 25% in the general CIT rates (figure 2).

FIGURE 2

General VAT and CIT rates in Latin America and the Caribbean
Simple average for 18 countries, 1990-2018, in percentages



Source: Peláez Longinotti (2022), "Efficiency and tax gap in Latin America and the Caribbean: Value Added Tax and Corporate Income Tax", CIAT. Based on CIAT tax rate series and updated legislation of the countries.

1.2. VAT and CIT revenue collection efficiency indicators in LAC

The paper presented here (Peláez Longinotti, 2022) analyzes the collection performance of VAT and CIT over a long period of time, up to recent years, with a quantitative development based on estimations of revenue collection efficiency indicators for each tax[2].

According to the results obtained, in first place, revenue collection efficiency has been increasing throughout the period of analysis. Although the efficiency of the CIT is lower than the one of the VAT, it was observed that the evolution of this indicator for the former performed better, especially in the most recent periods, whereas the collection efficiency for the VAT remained stable with no growth.

From the estimation of the theoretical collection, the contrast of the effective collection with the theoretical collection allows obtaining the tax collection efficiency. With the available data, it has been possible to construct a long series of collection efficiency, and to infer whether the improvement observed in tax collection is attributable only to nominal changes in the increase in rates or also to an improvement in the intrinsic collection capacity of each tax.

If effective collection were to reach the same magnitude as theoretical collection, we would be facing a tax that collects its full potential, a theoretical case in which there would be neither a policy gap (tax expenditures) nor a non-compliance gap (evasion). Empirical evidence shows that collection efficiency is less than 1 in all cases, given that effective collection is lower than potential collection. The overall gap is determined as the difference between 1 minus the ratio of effective collection over theoretical collection.

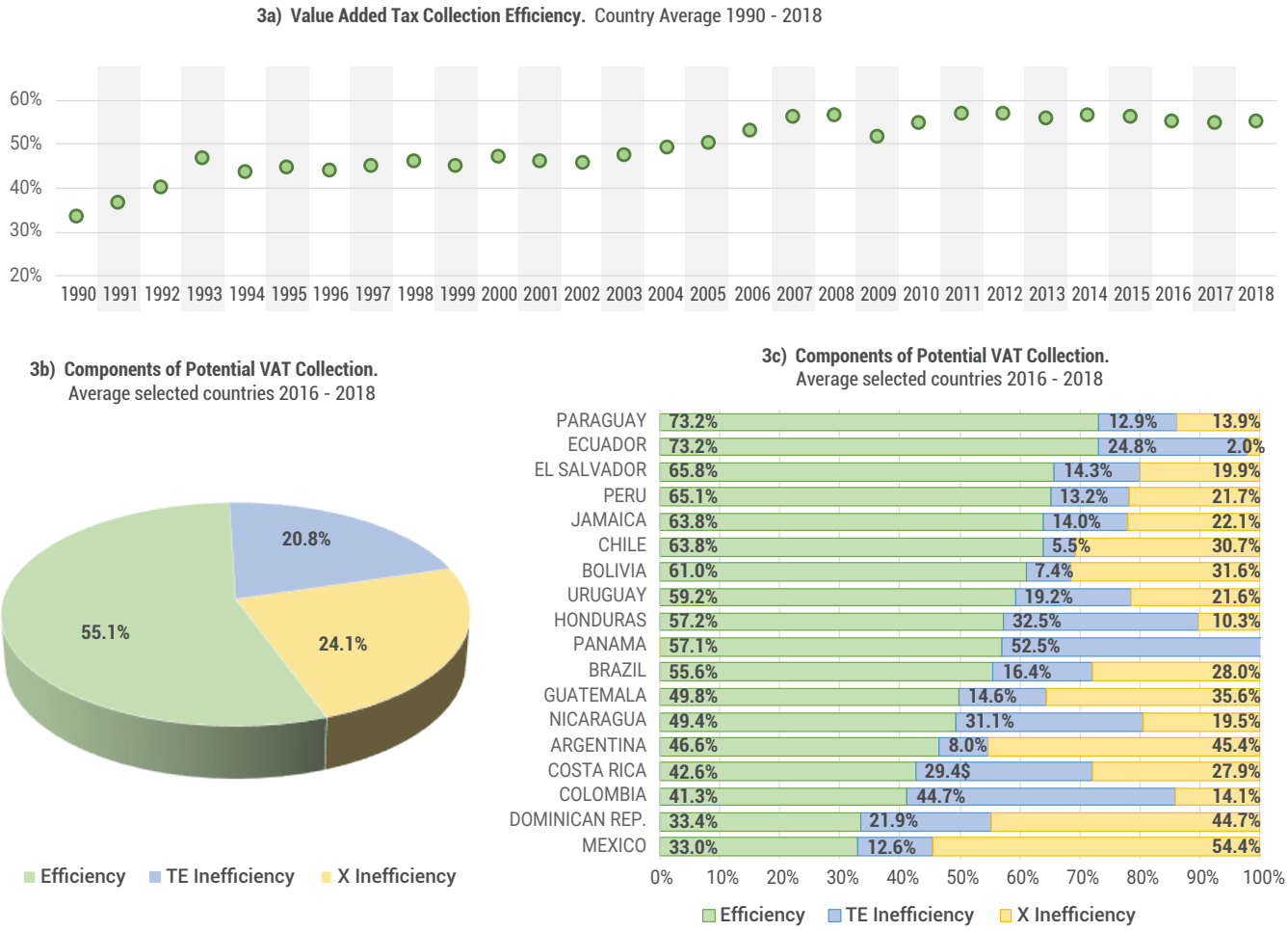
The average VAT collection efficiency for the period 1990-2018 was calculated as the annual average of the collection efficiency found in each country (figure 3.a). This result explains why this tax plays such an important role in tax collection and why it explains the sustained growth of the tax burden in 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, collection efficiency did not neutralize this effect, but on the contrary strengthened it, since increases in collection efficiency in scenarios of increased collection capacity of the instrument result in improvements in the levels of effective collection. Figure 3.b shows statically the composition of the theoretical VAT revenue calculated as the average of the composition of the theoretical revenue of the countries in the region included in the analysis. Figure 3.c shows statically the composition of the theoretical VAT collection at the country level.

2 It should be noted that the most recent document represents the continuation of a line of work that has important antecedents from previous years also promoted from CIAT (Díaz de Sarralde, 2017).

FIGURE 3

VAT collection efficiency 1990-2018 (3.a) and components of theoretical collection 2016-2018 (3.b; 3.c)

Individual data and regional averages for selected countries, in percentages



Source: Peláez Longinotti (2022), "Efficiency and tax gap in Latin America and the Caribbean: Value Added Tax and Corporate Income Tax", CIAT.

Note: TE inefficiency refers to the theoretical revenue not collected due to the existence of tax expenditures, while X-inefficiency is given by the loss of revenue associated with evasion, management failures and errors in the measurement of the variables used as input in the calculation of TE inefficiency and X-inefficiency.

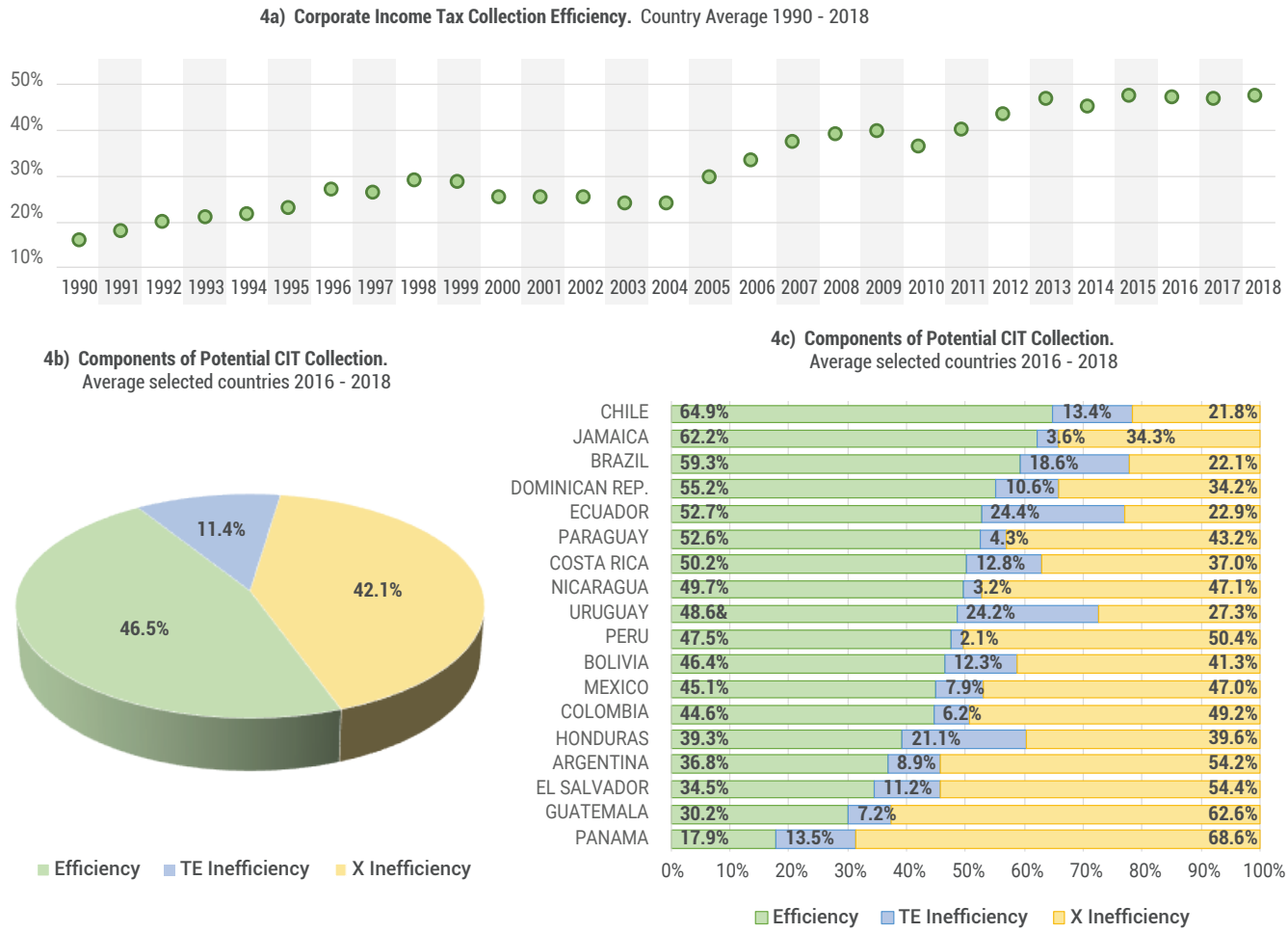
Regarding the average CIT collection efficiency for the period 1990-2018 (figure 4.a), following the same methodology, it was possible to verify the sustained improvement experienced by this indicator over time. From values in the vicinity of 20% at the beginning of the series, the ratio between effective collection and theoretical collection has shown sustained improvements (except for 2004, 2010 and 2013) until reaching a maximum at the end of the series (in the vicinity of 50% of potential collection).

Although the value of this efficiency indicator throughout the series is lower than the VAT efficiency indicator (figure 3.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. The evolution of the average collection efficiency of this tax explains the greater presence it has gradually shown in the long-term tax burden (as shown in figure 1).

FIGURE 4

CIT collection efficiency 1990-2018 (4.a) and components of theoretical collection 2016-2018 (4.b; 4.c)

Individual data and regional averages for selected countries, in percentages



Source: Peláez Longinotti (2022), "Efficiency and tax gap in Latin America and the Caribbean: Value Added Tax and Corporate Income Tax", CIAT.

Figure 4.b shows statically the composition of the theoretical CIT collection calculated as the average of the composition of the theoretical collection of the countries included in the analysis. The period considered is the last three-year period available (2016-2018), and there it can be seen, in addition to the fact that the estimated collection efficiency is 46.5%, the tax gap is constituted with a portion attributable to the policy gap of 11.4% of the potential and 42.1% to the so-called X-inefficiency, which includes the non-compliance gap and any remaining error in the measurement of the previous components. Figure 3.a shows statically the composition of the estimated theoretical CIT collection at the country level, corresponding to the average result of the last three years of the data series.

2. Overview of Tax Expenditures in Latin America and the Caribbean 2023[3]

2.1. The CIAT Tax Expenditure Database

As a way of implementing their government programs or in response to circumstantial situations in which they believe they must intervene, the States resort to various instruments to make economic transfers to individuals, sectors or regions in order to assist them. Usually, these transfers are executed through budgetary items defined in the budget laws. However, they -or their desired effects- can also be achieved through an alternative channel. To favor a group of individuals through a reduction in the tax burden can be economically equivalent to granting a transfer through a public budget expenditure item, hence the name Tax Expenditure (TE).

Although several countries have implemented TE reporting, the gap between the level of scrutiny and transparency of these instruments compared to direct expenditures is notorious. Unless TE are subject to a level of debate equivalent to direct expenditures, they can lead to fiscal opportunism on the part of governments. Some sectors of economic activity are aware of this fact and prefer to receive benefits through tax incentives rather than direct subsidies.

Based on the official reports prepared by the countries of the region, the Tax Studies, and Research Directorate of CIAT maintains and updates the Tax Expenditure Database for Latin America and the Caribbean (TEDLAC). It is compiled by systematically recording the information contained in the reports, with openness to the highest level of disaggregation allowed in each report.

From the most recent comparative reviews of these reports[4], it has been concluded that there is no overall consistency with respect to the elements that they should include, neither in countries that have experience in their preparation nor in countries that have more recently adopted this practice. Likewise, it has been possible to identify some aspects commonly found in these documents: a general definition of tax expenditure; the description of the reference framework for each of the taxes under analysis; the description of each of the items identified as TE; the compilation of the tax regulations that originate each benefit; the results found; and the projection of the TE for the coming periods. This last component is mainly included in those reports that are integrated in the budget and accountability laws.

CIAT (2011) has defined Tax Expenditures as the resources that the State ceases to collect due to the existence of incentives or benefits that reduce the tax burden faced by certain taxpayers in relation to a reference tax system. The term "expenditures" emphasizes the fact that the resources that are no longer collected could have financed explicit public spending programs in favor of those whose tax burden is reduced, and even in favor of other taxpayers.

Tax Expenditures are the economic result of exceptions to a reference tax or a reference tax system. The reference tax system, usually, includes the constituent elements of the nature of the tax: the determination of the taxable amount, the rate structure, the accepted accounting practices, the form and conditions of the deduction of expenses incurred, specific rules to facilitate the administration of taxes, among others.

3 The complete document supporting the update of the Tax Expenditure Database for Latin America and the Caribbean (TEDLAC) can be found in CIAT's digital library: https://biblioteca.ciat.org/opac/book/5837 (Spanish) or https://biblioteca.ciat.org/opac/book/5846 (English).

4 The cumulative nature of the processing of the data collected has allowed the TEDLAC database to be nourished by documents and updates in previous years. See: Peláez Longinotti (2018; 2021).

The CIAT Tax Expenditure Database (TEDLAC) contains the following variables (Table 1):

TABLE 1

Variables contained in the Tax Expenditure Data Base TEDLAC

Denomination and description of its meaning

Variable	Description
Country	Name of the country being analyzed
Tax Category	Categorical variable that identifies the tax (see glossary).
Name of the tax	Name of the tax in the country of analysis.
Type of Tax Expenditure	Categorical variable that identifies the type of exception (see glossary).
Tax incentive	Identifies whether it is a Tax Incentive or Tax Benefit (see CiAT Manual).
Regulatory Source	Type of rule and numbering creating the exception.
Name of the measure	Name by which the analyzed measure is identified.
Description of the measure	Broader description of the analuzed measure.
Effective since	Start of application
Effective until	Expiration or repeal of the exception.
Associated budget sector	It is associated by type of exception to certain budget sector categories (see glossary).
Specific geographic area	When the measure applies in a specific geographic area.
Fiscal year	Fiscal year in which this tax expense is recorded.
Measurement method	Details the method of measurement (when the TE report provides that information).
Sources for estimation	Details the sources for the estimate (when the TE report provides that information).
Currency	Currency in which tax expenditures are expressed (and other variables).
Tax Expenditure Amount	Currency in which tax expenditures are expressed (and other variables).
Tax Collection	Collection of the tax under analysis for that fiscal year.
Total Collection	Total collection for the year.
GDP in that fiscal year	Amount of current GDP for that year.
Sources of information	Country Tax Expenditure Reports consulted for registration in TEDLAC.
Update	Year in which this entry was updated in TEDLAC.

Source: Peláez Longinotti (2023), "Overview of Tax Expenditures in Latin America and the Caribbean", CIAT.

Qualitative variables describe in more detail some characteristics of the record such as: name of the measure, description, legal and regulatory source, the measurement method, the sources of information for the estimation, the report that originated each record, etc. This allows to go to the individual detail and to know at the retail level the measure being analyzed. In addition, the accounting and characterization of the various items follows the recommendations included in the CIAT Handbook of Best Practices for Tax Expenditure Measurements (CIAT, 2011).

The recording rules provide for the existence of several types of classification variables: categorical, qualitative, in addition to the quantitative variable itself, which is the amount of Tax Expenditure for that particular measure.

The categorical variables include: a general classification of incentives into 2 types, 9 types of taxes, 7 types of tax expenditures, 16 associated budgetary sectors and an openness according to the fiscal year under analysis. These codifications allow for a multiplicity of analyses and for describing the information at the level of hundreds of sub-categories formed by certain combinations of such variables.

2.2. Updated figures for tax expenditures in countries of the region[5]

The exploration of TEDLAC makes it possible to know the weight of Tax Expenditures in relation to the Gross Domestic Product of each country, its evolution throughout the periods included in the analysis, as well as its distribution according to the most relevant tax categories where exceptions were found (value added taxes, personal and corporate income taxes, excise taxes, foreign trade taxes, property taxes, etc.). It is also possible to know the number and accumulated amounts of revenue losses attributable to each of the types of tax expenditures (exemptions, reduced rates, deductions, credits, etc.).

With respect to the reading and interpretation of the results between countries, it should be kept in mind that, as mentioned above, the tax expenditure studies analyzed, although they seek to identify and quantify the fiscal cost of similar instruments, present conceptual differences, which translate into different reference frameworks and, therefore, into a greater or lesser set of exceptions, where methodological differences are also observed, as well as differences in scope according to the specific taxes that are included in the analysis. The studies are not harmonized and this lack of coordination produces results that are not directly comparable without further study of the differences in the country reports.

Table 2 presents the results of Tax Expenditure as a percentage of GDP and tax revenue for the countries included in TEDLAC for the last three fiscal years available[6]. The average tax expenditure for the 17 countries analyzed was 3.6% of GDP in the last year of the analysis, while the average for the countries two years earlier was 3.9%. The table shows, vertically, a certain disparity between the countries' results. A significant portion of this disparity is attributable to the lack of harmonized criteria in the different tax expenditure studies. These differences are also attributable to the different designs of the tax systems adopted by the countries, which lead to more or less room for exceptions.

5 The data are available in a consolidated version and by country at: https://www.ciat.org/gastos-tributarios/.

6 All official tax expenditure reports of the countries were utilized, up to the latest available fiscal year. Data collection ended in October 2022. As of that date, the last available fiscal years corresponded to 1 to 2022, 7 to 2021, 4 to 2020 and 5 to 2019 and prior years.

TABLE 2

Level of tax expenditures in Latin American and Caribbean countries

Individual and average data for 17 countries, last three years available, as a percentage of GDP and as a percentage of the potential revenue of each country

Countries	Last Fiscal Year (t)	Tax Expenditure / GDP (last three fiscal years) (1)			Tax Expenditure / Potential Collection (last three fiscal year) (2)		
		t	t-1	t-2	t	t-1	t-2
Argentina	2021	2.5%	2.7%	2.8%	8.8%	9.1%	10.0%
Bolivia	2013	1.3%	1.2%	1.0%	3.9%	3.7%	3.1%
Brazil	2022	3.3%	3.2%	4.2%	14.3%	13.7%	18.4%
Chile	2021	2.3%	2.2%	2.4%	10.8%	12.1%	11.9%
Colombia	2019	8.6%	8.2%	7.9%	36.6%	35.8%	34.7%
Costa Rica	2020	4.2%	4.7%	5.6%	15.5%	16.3%	18.8%
Dominican Rep.	2021	4.0%	5.3%	4.9%	26.4%	34.9%	31.4%
Ecuador	2020	4.9%	5.2%	5.4%	28.2%	27.3%	28.5%
El Salvador	2017	3.5%	3.8%	3.8%	16.3%	17.5%	17.5%
Guatemala	2021	2.8%	2.7%	2.5%	18.6%	20.6%	18.9%
Jamaica	2020	2.4%	3.2%	4.7%	8.0%	10.2%	14.4%
Mexico	2021	3.3%	3.8%	3.2%	19.3%	21.2%	19.7%
Nicaragua	2013	5.4%	5.0%	4.6%	20.4%	18.9%	18.1%
Panama	2019	3.1%	3.4%	3.7%	27.9%	27.9%	29.1%
Paraguay	2021	1.3%	1.4%	1.5%	11.7%	13.0%	13.2%
Peru	2020	2.4%	2.3%	2.3%	11.7%	10.6%	10.7%
Uruguay	2021	6.0%	5.9%	5.8%	23.3%	23.1%	23.1%
LAC Average (3)	**--**	**3.6%**	**3.8%**	**3.9%**	**17.7%**	**18.6%**	**18.9%**

Source: Peláez Longinotti (2023), "Overview of Tax Expenditures in Latin America and the Caribbean", CIAT.

Notes: (1) Refers to the quotient of Tax Expenditures over the nominal value of the Country's Gross Domestic Product. (2) Potential Collection is considered the sum of Effective Collection (only of taxes for which tax expenditures are measured) plus the respective tax expenditures. (3) Simple average of the ratios of each country in each period.

At the horizontal level, within each country, there is a certain stability in the results, with a slight downward trend in the TE ratios, resulting in a drop in the average for the last fiscal year. A growing revision of the exceptions included in the tax system, as well as the greater presence of new rules that include a specific date of expiration of the benefit, contribute to a greater control of the exceptions and may be pushing towards a decrease in the weight of these, knowing that the reading of only 3 fiscal years does not enable to categorically conclude this hypothesis. The stability of the results can also be attributed to the fact that, although the reports are not harmonious among countries, a systematic methodological practice of measuring the phenomenon is maintained within each country, which in most cases allows us to interpret a result through the evolution of the values observed over time.

3. Concluding remarks

This article summarizes two studies recently published by CIAT, which constitute an important part of the multiple lines of work developed by its Tax Studies and Research Directorate. The main objective is to present their main results and encourage their use and dissemination as statistical reference frameworks for the countries of the region.

On the one hand, the results of an approximation of the measurement of the VAT and CIT tax gap in the countries of the region were presented, based on estimates of the theoretical collection of each tax and the collection efficiency of these taxes. It was found that the latter indicator has been increasing throughout the period of analysis, mainly as a result of reductions in tax non-compliance. Although the efficiency of the CIT is lower than that of the VAT, the collection of the former performed better in narrowing the gap than that of the VAT, where the gap in the most recent period remained stable.

There is still room for action, with inefficiency levels of 44.9% for the CIT and 53.5% for the VAT. At the same time, while in the VAT inefficiency is equally divided 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. This is linked to the fact 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.

On the other hand, the Tax Expenditure Database for Latin America and the Caribbean (TEDLAC) was updated based on the official reports of the countries of the region. This database is the result of recording the information contained in the country reports, with openness to the highest level of disaggregation allowed by each report. The identification, quantification and publication of the tax expenditure reports is of enormous importance, insofar as it makes it possible to know the dimension of the phenomenon, the subjects, sectors, regions or activities benefited; and it is one of the components of the cost-benefit equation that the policymaker should analyze to know whether the benefit granted through this mechanism had the desired effect and whether the latter justifies the associated fiscal sacrifice.

A total of 13,900 tax expenditure items included in the latest reports of 17 countries analyzed were identified and recorded. Their processing and analysis led to a new edition of the Overview of Tax Expenditures in Latin America and the Caribbean, where the different degree of development of these studies among the countries analyzed was observed and areas for improvement were identified for the process of identifying exceptions, estimation practices and reporting the results. The lack of harmonization of criteria among the countries is probably one of the determinants of the disparities observed in the results.

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II.2. The evaluation of tax benefits: the Spanish experience

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Introduction

Tax benefits are a generalized element in the tax systems of all countries. In most of them the loss of tax revenue they imply is quantified. The comparison between countries is not simple, since there are differences both in what is considered a tax benefit and in the methodologies that are used for its measurement.

Beyond this provision, an evaluation of the final effects of tax benefits is rare. Of course, there are evaluations carried out by academics, experiences of evaluation by independent agencies or internal evaluations carried out for decision-making purposes, but only in exceptional cases countries have institutionalized the evaluation in such a way that it is carried out in a comprehensive and systematic manner.

In Spain, this work has been carried out since 2019, when the Government commissioned the Independent Authority for Fiscal Responsibility (AIReF) to evaluate thirteen tax benefits, as part of the review of public spending. The Ministry of Finance and Civil Service has continued with this activity, including in the Transformation and Resilience Recovery Plan the analysis of fifteen tax benefits, the results of which have been published in 2022 and 2023.

The purpose of this article is to describe the Spanish experience in tax benefit assessment, an area in which substantial progress has been made as of 2019. This article is structured in three parts. Firstly, and after this brief introduction, it begins with a reference to tax benefits in Spain, describing the concept used and its quantification. Secondly, it justifies the need to evaluate tax benefits. Thirdly, the Spanish experience is developed, explaining the reports of both the AIReF and the Ministry of Finance and Civil Service. Finally, some brief conclusions and recommendations are made.

1. Tax benefits in Spain

1.1. Concept

There is no internationally accepted standard defining what should be considered as a tax benefit. Nor is there a legal definition of tax benefits in Spain, despite the fact that the need to quantify their amount appears in the Constitution itself (Article 134.2). The General Tax Law limits itself to establishing that the following are subject to the principle of reservation of the law.

Because of the need established in the Constitution to include in the General State Budget, together with the total expenditure and income, the tax benefits that affect State taxes, the Tax Benefits Report (MBF) that accompanies the draft Budget indicates the features or conditions that a certain tax incentive must have in order to be considered as generating a tax benefit. Specifically, the following are indicated:

a) Intentional deviation from the basic structure of the tax, understood as the stable configuration that responds to the taxable event that is intended to be taxed.

b) An incentive that, for reasons of fiscal, economic, or social policy, is integrated into the tax system and is aimed at a specific group of taxpayers or at promoting the development of a specific economic activity.

c) There is a legal possibility of altering the tax system to eliminate the tax benefit or change its definition.

d) No offsetting of any tax benefit against any other figure in the tax system is presented.

e) Not due to technical, accounting, administrative or international tax conventions.

f) Not intended to simplify or facilitate the fulfillment of tax obligations.

These conditions are the result of experience, both international and accumulated in the preparation of these tax benefit reports. They do not provide an unequivocal or unquestionable definition of what a tax benefit is, among other things because they include concepts (such as the basic structure of the tax) that do not have a clear definition either, but at least they serve as a guide when deciding whether or not a certain measure is a tax benefit.

Nevertheless, it is acceptable to define tax benefits as tax policy instruments that allow reducing the tax burden on taxpayers through the introduction of exemptions, reductions or adjustments in the tax base, reduced tax rates or rates, allowances, deductions in the quota or refunds, in order to create incentives to achieve certain economic and social policy objectives.

2.2. Quantification

At present, it is a generalized practice for countries to quantify, by way of a forecast, the loss of tax revenues resulting from the tax benefits of their tax system. As pointed out before, in the case of Spain there is a constitutional mandate that makes it compulsory to record the amount of the tax benefits affecting State taxes. Thus, since 1979 the Tax Benefits Budget has been prepared and, since 1996, the Tax Benefits Budget (PBF) has been complemented with a MBF in which the PBF figures are detailed, compared with those of the previous budget, classified by expenditure policy and the sources of information used and the calculation methodologies employed are explained.

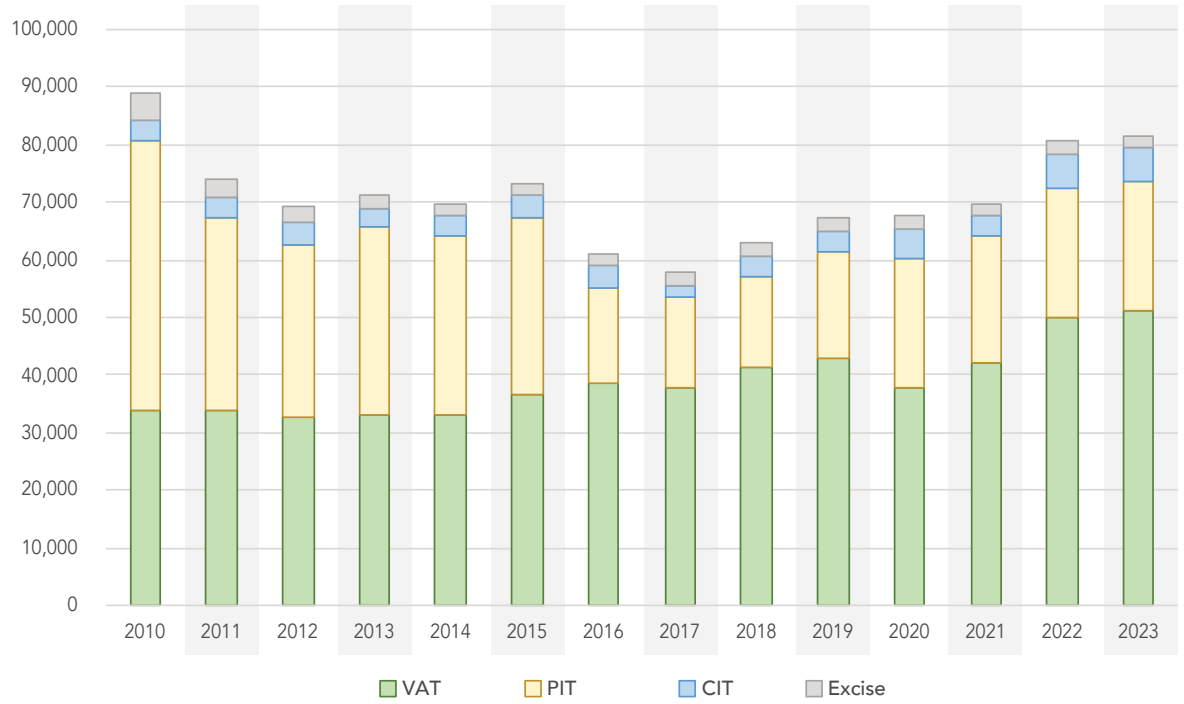
On the other hand, in a decentralized State, the regions must also carry out such quantification. In Spain, the Autonomous Communities prepare their own tax benefit budgets, which

are published regularly[1]. According to the information available, by 2023 the expected revenue loss due to the existence of total tax benefits (State and Autonomous Communities) is 89,100 million euros (figure 1). More than half of these foregone resources (63%) are associated with Value Added Tax (VAT), followed by Personal Income Tax (PIT) with 27%, Corporate Income Tax (CIT) with 7%, and Excise Duties (IIEE) with the remaining 3% of the total.

FIGURE 1

Budgeted fiscal cost of tax benefits in Spain, by main taxes

Total amount for National State and Autonomous Communities, 2010-2023, in millions of euros



Source: Own elaboration based on the respective Tax Benefit Budgets.

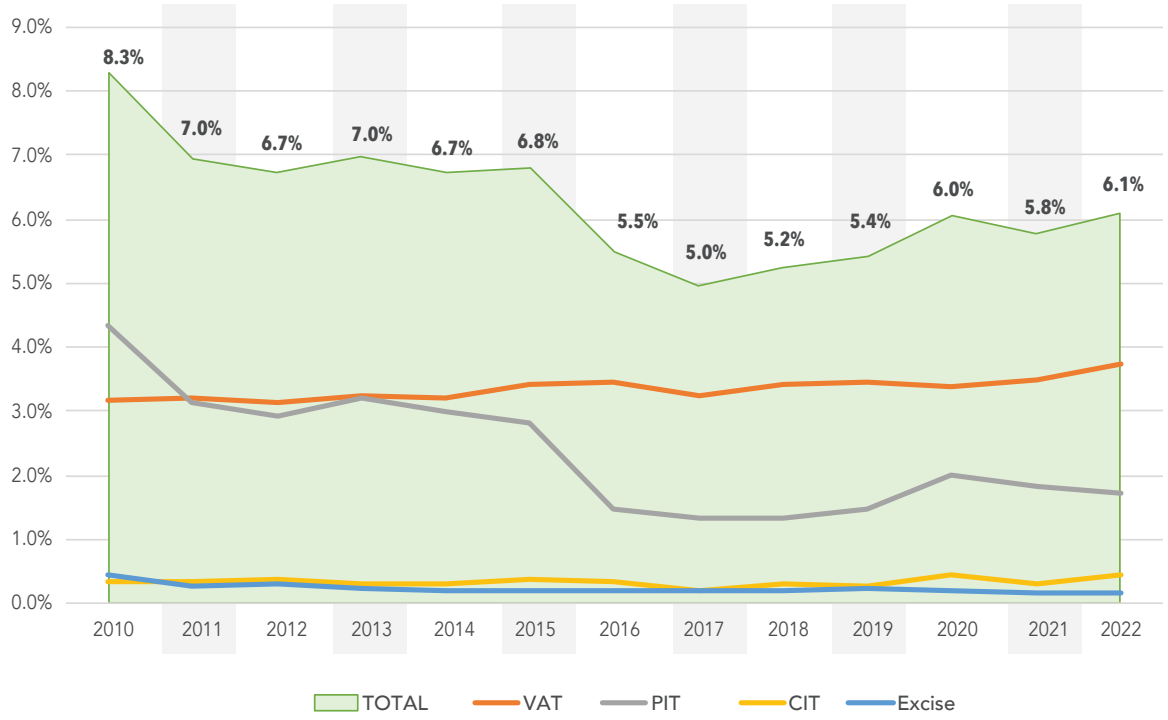
As a percentage of GDP, for 2022 as the last reference year, tax benefits account for 6.1% (figure 2). Looking at the evolution, since 2010 there has been a reduction of two points of GDP, being the Personal Income Tax (PIT) the one that has experienced the largest drop, after its reform in 2015. However, from the total minimum reached in 2017 (5.0% of GDP), a slight but sustained upturn is verified during the most recent years. This has been supported by the tax benefits linked to VAT, which have remained at around 3.5% of GDP throughout the period (3.7% in 2022), consolidating as the main component of the fiscal cost associated.

1 These can be consulted at the following link: https://www.hacienda.gob.es/es-ES/CDI/Paginas/InformacionPresupuestaria/InformacionBeneficiosFiscales/Presupuestosdebeneficiosfiscales.aspx

FIGURE 2

Budgeted fiscal cost of tax benefits in Spain, by main taxes

Total amount for National State and Autonomous Communities, 2010-2022, in percentages of GDP



Source: Own elaboration based on the respective Tax Benefit Budgets.

2. The need for evaluation beyond the Tax Benefit Budget

The quantification of tax expenditures is an activity of enormous importance, since it makes it possible to know the loss of revenue that is occurring each year through the tax system itself. As in other countries, in Spain this task is carried out by the Ministry of Finance and Civil Service which devotes significant efforts and means to this end. Thus, there is a working group made up of civil servants, coordinated by the General Directorate of Taxes, which also includes the State Agency of Tax Administration, the Institute of Fiscal Studies, the Directorate-General for Budgets, and the Office of the Secretary of State for Finance.

Despite its importance, this exercise is insufficient to adequately assess the expenditure policies developed through this mechanism of the tax system. Firstly, the quantification of tax benefits only provides information on how much revenue is not being collected but does not allow us to know the efficiency and effectiveness of the measures that have been adopted. The motivations behind the design of any tax benefit are the achievement of equity or the interest in redirecting the actions of agents towards certain behaviors that are to be encouraged for various reasons.

When equity is pursued, it is the specific characteristics of taxpayers that are considered to allow tax reductions for the most disadvantaged. In the second case, the aim is to redirect taxpayers' behavior towards more efficient

scenarios. As is well known, the simultaneous achievement of efficiency and equity objectives represents an inevitable trade-off that is also present in the design of tax benefit and incentive schemes. Apart from this, behind the existence of any tax benefit there must be a justification in one sense or the other for its existence, since it is a measure that implies a monetary cost through the loss of potential tax revenue.

Finally, the evaluation can help in making decisions about tax benefits that are already part of the tax system. This is important because the modification or elimination of a tax benefit is complex and has a political cost that is not easy to assume. But additionally, it encounters other difficulties from both the economic and legal perspectives.

From a legal perspective, the constitutional principle of legal certainty protects taxpayers who adapted their conduct to the legislation in force. It is true that the constitutional doctrine has pointed out that this principle does not imply the existence of a consolidated right or the maintenance of a certain tax regime, since this would imply a petrification of the tax system. However, in the face of legal doubts as to the scope of this principle, when tax benefits are modified or eliminated, it is common for transitory regimes to be created which, de facto, allow the tax reduction to subsist practically indefinitely. In this way, possible legal obstacles are avoided, but a privileged regime is maintained only for some taxpayers, which implies a violation of the principle of horizontal equity.

Spain has a very illustrative example of this in the form of the deduction for the purchase of a primary residence in the PIT. International organizations and the European Union recommended its elimination, since it induced the indebtedness of families, slowed down the rental market and had been responsible for the country's real estate bubble. In 2013, in the midst of the economic crisis, the deduction was abolished, but a transitional regime was established for those who had acquired a home before that date. In the PBF of 2023, it is still applied by 2,663,223 taxpayers, with a fiscal cost equivalent to 753.51 million euros, creating a situation of inequality between taxpayers who have lost the right to the deduction and those who still have it.

Furthermore, from an economic perspective, eliminating a tax benefit may also give rise to other challenges. Thus, the elimination of this type of measure may imply the need to approve other measures, such as compensation for those affected by the elimination. The White Paper for the Reform of the Tax System (2022) proposes the reform of environmental taxation, as well as the elimination of reduced VAT rates, but in both cases, it is recommended that compensation be established for those affected. These compensations are not easy to establish and require information and an adequate design.

In short, tax benefits are an alternative to expenditure policies (subsidies or direct aid). Evaluation can help to determine which alternative is the most effective and efficient, and that no additional distortions are produced by their application.

3. The Spanish experience in the evaluation of tax benefits

3.1. The evaluation of the AIReF

In 2017, Spain began a process of reviewing the public spending of all public administrations with the aim of detecting inefficiencies and improving the quality of public spending in the country. This work was entrusted to the Independent Authority for Fiscal Responsibility (AIReF). The second phase of the public spending review included, in addition to the evaluation of the National Health System's hospital spending, hiring incentives and transport infrastructures, the review of tax benefits.

With regard to the latter, the study evaluated thirteen tax benefits, with a total cost of approximately 35,000 million of euros, which represented approximately 60% of the total tax cost of all existing tax benefits in Spain. The tax benefits selected corresponded to four main taxes:

- ***Personal Income Tax:*** Personal income tax: reduction for contributions to social welfare systems; reduction for work income; reduction for rental of housing; deduction for donations; social deductions, such as for maternity, disability, and large families.

- ***Corporate Income Tax:*** reduced tax rates for listed real estate investment companies (SOCIMIS) and for open-end investment companies (SICAV); deduction for incentives for technological-industrial research and development (I+D+i); deduction for donations.

- ***Value Added Tax:*** reduced rates of 4% and 10%; exemption of health and education; exemption of financial services.

- ***Tax on Hydrocarbons:*** reduced and differentiated rates by type of fuel (diesel/gasoline).

It is important to point out that the purpose of the report was to evaluate whether the tax benefits met the objective for which they had been created and whether they generated any distortion that would determine the need for their reformulation. However, the economic policy objectives pursued by these measures were in no way discussed. This evaluation was carried out with the collaboration of other public institutions such as the State Agency of Tax Administration, the National Statistics Institute and the Institute of Fiscal Studies.

The structure of the study consists of a first part of definition, historical evolution and international comparison, a second part of quantification, a third part of evaluation and, finally, the results, conclusions and proposals[2]. The study carried out by the Ministry of Finance and Civil Service, which is described in the following section, is very similar, and will be explained below in order to avoid repetition.

The recommendations of this report led to the modification of two tax benefits: the one related to pension plans in the PIT, and the reduced VAT rate for soft drinks, juices and sodas with added sugars or sweeteners. Given the situation derived from the pandemic in which the economy found itself and the serious crisis that certain sectors were going through, it was considered that it was not the right time to modify the rest of the tax benefits.

3.2. The Evaluation of the Ministry of Finance and Civil Service

Following AIReF's evaluation, the Ministry of Finance and Civil Service decided to continue with this exercise. Thus, this task was included in reform 2 of component 28 of the Recovery, Transformation and Resilience Plan (PRTR). For this purpose, a working group was created, formed by the State Agency of Tax Administration, the General Directorate of Taxes, and the Institute of Fiscal Studies, which selected a set of fifteen tax benefits. The criteria considered were the

2 The report published by AIReF can be consulted at the following link: https://www.airef.es/wp-content/uploads/2020/10/Docus_Varios_SR/Estudio_Beneficios_Fiscales_Spending_Review.pdf.

quantitative and qualitative importance of the benefit, as well as the recommendations of the aforementioned White Paper. It is important to point out that the tax benefits that entail a higher collection cost had already been analyzed by AIReF.

Following the PRTR schedule, the work was carried out in two installments: the report with the review of the first five tax benefits was published in March 2022 and, in March 2023, the report on the remaining[3] ten benefits.

The structure of all the evaluations is similar and follows the same scheme as the evaluation carried out by AIReF. Firstly, a description of the tax benefit is given, indicating its current regulation, its definition, and the objectives it pursues. This section also presents the regulatory evolution and its quantification for the last few years for which data are available. The institutional framework and the economic context are described in the second section, and, in the third section, an analysis of comparative law is carried out in order to frame the situation of the tax benefit within the international framework. This is followed by a descriptive analysis in the fourth section and the databases used for the analysis in section five, which contains the quantitative evaluation of the impact of the tax credit. Finally, the main conclusions of the study are summarized.

Within this scheme, two elements should be highlighted. On the one hand, the usefulness of comparative law in the analysis of tax systems. In this regard, the report is accompanied by a study of the regulations of other countries in order to be able to compare our regulations. The major European countries have been selected, together with others developed outside Europe (Australia, Canada and the United States). All of them have a similar social, economic, and cultural context and are a reference in the elaboration and analysis of tax benefit budgets.

However, this analysis has important limitations. Firstly, it is a normative study when it would be desirable to be able to carry out a quantitative comparative study that would allow us to know the real weight that a tax benefit of usual application has in other countries with respect to Spain. However, in many cases this is not possible due to methodological differences in quantification. Secondly, in the cases in which this quantification can be carried out, the information on the cost of tax benefits for comparison between countries may not be very informative (AIReF, 2020:6). For example, Spain has had a maternity deduction since 2003 that is paradigmatic in the international context; however, this information is insufficient because, even if another country lacks this measure, it may encourage this policy or pursue similar objectives through large and generous direct transfers.

The second element to highlight concerns the methodologies to be used for the assessment. There is no single method and each has strengths and weaknesses, as well as specific costs or data requirements. This last aspect is crucial: access to various data sources varies and can have a major impact on how assessments can be carried out. In this sense, the data available for an assessment will significantly influence the methods used and the quality and relevance of the results.

3 The reports have been published and can be found at the following links: https://www.hacienda.gob.es/Documentacion/Publico/GabineteMinistro/Varios/31-03-22-Informe-Revision-Beneficios-Fiscales-2021.pdf (Revisión de Beneficios Fiscales 2021), and https://www.hacienda.gob.es/Documentacion/Publico/GabineteMinistro/Varios/Informe-revision-beneficios-fiscales-2022.pdf (Revisión de Beneficios Fiscales 2022).

4. Conclusions and recommendations

Tax benefits have an opportunity cost in terms of tax collection, which determines the need to ensure that these instruments fulfill the purpose for which they were created. Their evaluation is an essential task to ensure that the use of public resources is appropriate. In this sense, the path followed by Spain over the last few years represents the beginning of a good practice in the management of these public resources.

However, the evaluations carried out are necessary, but not sufficient. The analysis of public policies requires an integrated vision of public revenues and expenditures, so that tax benefits must be interpreted within the logic of the system, not as isolated pieces. In other words, tax benefits cannot be assessed in isolation from the rest of the aid received by the sector or by the taxpayers who benefit from them via expenditure, which means that the conclusions must be integrated into the overall framework of the public policy in question. In the words of AIReF (2020:261), it is necessary that "the creation or any modification of tax benefits should be framed within the strategic planning of the public policies to which it is related, so that the effectiveness of the different instruments as a whole can be assessed and the efficiency of the different alternatives for achieving the proposed objective can be compared".

Ex post evaluation is essential, but it does not obviate the need for ex ante evaluations of each measure to be incorporated into the tax system. This prior evaluation, as AIReF (2020:262) also calls for, makes it possible to know the potential effects of the measures before their incorporation.

In addition, the evaluation requires the provision of the necessary material and human resources. Furthermore, to ensure the success of the evaluation, it is important that it be scheduled in advance, as soon as the measure is adopted, in order to have the relevant information available from the outset.

Beyond these ideas on evaluation, the existing difficulties in modifying tax benefits require additional precautions. Thus, a good practice would be to condition the introduction of any measure of this type to a certain period of time, linking its maintenance to the completion of the corresponding evaluations.

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II.3. Compliance Gap in the Income Tax: First experience of its estimation in the Argentinean Tax Administration

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Introduction

Tax non-compliance can be explained by three factors: 1) errors attributable to ignorance of the regulations or involuntary omissions linked to the complexity of the tax system; 2) financial insolvency associated with economic cycles or the inadequacy of the tax system to the purchasing power of the different sectors and actors; and 3) the most relevant for the purposes of this study, the deliberate actions of taxpayers with the aim of reducing the tax burden by failing to comply with the regulations.

In the latter case, a distinction is usually made between tax evasion and tax avoidance, the difference between the two being that the former is an open transgression of tax legislation, while the latter refers to the different actions taken to avoid tax liability, such as, for example, the transfer of profits to countries with low or no taxation or the use of transfer pricing to deliberately distort the tax burden. In this regard, the very design of the tax system can influence tax evasion and avoidance by providing arbitrage opportunities to reduce the tax burden.

In view of the different dimensions of tax non-compliance, and more specifically in relation to income tax, this paper proposes to explore the application of an estimation methodology, in order to begin the path towards a quantitative assessment of the situation of compliance with this tax in Argentina.

The methodology applied in this case is inspired by that developed jointly by the United States and Australian tax administrations, whose implementation, both in its original form and with modifications, has been extended to other tax agencies around the world.

The importance of this study lies in the need to strengthen this tax, taking advantage of its advantages in terms of efficiency and distributive equity. Argentina has never succeeded in making income tax significant for the treasury, especially in comparison with the more regressive indirect taxes. Therefore, knowledge of tax non-compliance, particularly in relation to income tax, is essential for progress in meeting the criteria of equity and progressivity of the tax structure.

1. Definition and methods for estimating the tax compliance gap

The tax gap for any tax can be defined as the *difference between the potential revenue of the underlying economic tax base and the actual revenue collected*. This concept allows the gap to be broken down into two main components: the impact of noncompliance or compliance gap, on the one hand, and the impact of regulatory and tax policy choices or regulatory gap, on the other.

The *regulatory gap* is composed of the resources that the government fails to collect due to tax policy decisions: it is the difference between the total amount of potential collection under the general rules of the tax law and the theoretical amount of resources if all taxpayers would duly comply with their tax obligations under the current legislation (i.e., considering concessions, special treatments and deviations from the general rule).

The *compliance gap*, on the other hand, is the difference between the amount collected if there were no non-compliance (according to current legislation), and the amount actually collected by the tax administration.

There are two widely accepted methods for measuring tax noncompliance: *the top-down, global or indirect method and the bottom-up, partial or direct method*. Both methodologies are complementary to the extent that their inputs, scopes, and dimensions are different, so they can be applied together to achieve the best possible result. Likewise, the best method to use will depend on the quality of the information available and the objective of the analysis.

1.1. Top-down methods

Top-down methods estimate theoretical tax revenues based on the construction of a hypothetical tax base defined from aggregate data provided externally by the National Accounts and Permanent Household Surveys, among others.

Applying a series of technical adjustments to the aggregate information and using the legal rates, the theoretical collection is calculated. The difference between the actual collection and the theoretical collection is the tax noncompliance gap. This method is generally used to estimate the noncompliance gap in indirect taxes such as VAT (Hutton, 2017).

The advantage of applying this method is that it requires less time and resources and offers comparable overall results and the possibility of constructing annual series of non-compliance. However, it has several limitations: on the one hand, it depends on the quality and frequency of the statistical sources and their independence from the tax administration, and on the other hand, it does not provide information on the motivations of taxpayers who fail to comply with their tax obligations.

For the estimation of the corporate income tax default there is fairly widespread agreement on the estimation of the theoretical tax base starting from the operating surplus from the national accounts, subject to a number of adjustments (Ueda, 2018).

The problem that this method usually faces is that the operating surplus is also affected by evasion and avoidance, since the information provided by the tax administration is used to determine it. This lack of statistical independence between the information that serves as the basis for estimating macroeconomic aggregates and that which arises from tax collection violates one of the fundamental requirements of the methodology.

Another element to consider is the difficulty generated by the excessive number of differential treatments and deductions in the tax, which further complicates the estimation of the tax base using macroeconomic aggregates, and therefore, the estimation of income tax non-compliance in a global manner, given the large number of methodological assumptions to be applied.

1.2. Bottom-up methods

Bottom-up methods estimate the tax noncompliance gap based on a detailed examination of the information available to the Tax Administration, such as tax returns, moratorium and whitening information, audit results, risk registers or information provided by third parties, among others. Basically, the non-compliance gap is estimated by extrapolating point or sample data to the entire corresponding population. This approach is generally used for direct[1] taxes.

Unlike the top-down method, this methodology does provide information about the motivations for tax noncompliance, which allows obtaining inputs for defining and adjusting tax policies. However, it encounters difficulties in reaching a global result of the non-compliance gap, which does not prevent obtaining information on different parts or components of the gap and, above all, requires more time and resources. Within the audit-based methods, there are two main variants:

Random Audits

Of the different methodologies to estimate the income tax collection gap, random auditing shows in international experience the most robust results (European Commission, 2018). They allow estimating the extent of under-declaration of obligations as a consequence of the submission of incomplete or incorrect affidavits. Each affidavit selected for a random audit is subject to a full review, including full inspection of the supporting records and using third-party information where available.

In addition to their benefits for gap measurement, they can be a source of revenue by increasing risk perception and can improve risk management through new information provided to management as a result of the audit.

However, given the importance of the resources required for its implementation, it is normally reserved for the estimation of non-compliance for the segment of individuals and small companies. For medium and large companies, the estimation of population noncompliance can be carried out based on the results of operational audits, as developed later in this report.

In relation to the results obtained, there are two main sources of error associated with random audits that may result in real values of the tax gap that differ from the estimates that are prepared, and they are as follows:

Sample variations: not the entire population is audited, so that, although the sample may be representative, its characteristics may differ from those of the population due to random factors or extreme cases.

Systematic inaccuracy: when the results tend to underestimate the compliance gap values, either due to:

- Lack of registration and informal economy that are not captured by the method and require the application of multipliers to the results found to take these factors into account.

- Inspection shortcomings where inspection results are not accurate and should be adjusted to capture the probability of errors or omissions not detected by the inspectors involved in the random inspection.

For sampling errors, it is possible to determine statistical error margins and report them along with the estimates. For systemic errors, multipliers of the sample estimates can be developed to incorporate the gap not detectable by this method and attributable to informality or non-detection. Multipliers for informality are similar to those used in the

1 The same methodological discussion developed in this article is also applicable to the case of personal income tax (Thackray, Jennings and Knudsen, 2021).

preparation of macroeconomic aggregates, and although their determination may be difficult, working in coordination with the statistical authority may reduce the time required for their implementation. Multipliers that adjust for non-detection require a specific elaboration process and imply a work to be developed, linked to the effectiveness of the tax administration's auditing. As long as these multipliers are not available, the estimated gap should be considered as a lower limit of the real gap.

However, as long as the methodology is applied systematically, the scale and direction of the errors should remain relatively constant, so that, despite the margin of error in the point data, the estimation would allow the analysis of the evolution of the gap over time.

Operational audits

Naturally, it is possible to use the information provided by the normal and usual audits carried out by the tax administration to estimate the compliance gap.

In this way, the cost is reduced compared to the development of random audits. However, the estimate may not be representative of the population, since taxpayers with a higher probability of noncompliance are selected for operational audits, as a consequence of the risk management applied by the administration (selection bias).

It is this inability to obtain useful results from direct extrapolation of the results of operational audits that has led to the development of alternative methodologies. For example, statistically based approaches extrapolate the data obtained in operational audits with methodologies that seek to correct or reduce the selection bias that emerges from risk management. Their main advantage is that they require less data and resources, but the errors may be greater, and the estimated gaps will be partial, not reflecting the totality of non-compliance.

One of the main statistical methods for estimating the tax compliance gap from operational audits is the so-called *Extreme Value Method* (EV), which will be discussed in more detail in this section . This methodology was originally developed by Bloomquist, Hamilton and Pope (2014) for the Internal Revenue Service (IRS) of the United States and is currently used to estimate the collection gap of medium and large companies not only in that country but also in Canada, Australia, and the United Kingdom, among other countries.

The estimation technique is based on the assumption that audit adjustments among medium and large companies follow a distribution in which most of the tax noncompliance is concentrated in a relatively small number of taxpayers. Based on the adjustments to the assessed tax arising from the operational audit of this group of companies, an analysis is carried out to extrapolate the non-compliance to the non-audited portion of the taxpayer's taxable income.

Since risk-based audits rely on the search for tax-relevant cases, audited companies are expected to be substantially more noncompliant than those that are not audited. The EV methodology takes this bias into account by assuming that all companies with relatively extreme values of noncompliance have been subject to review under a tax risk management-based audit process. Consequently, it is assumed that non-compliance among non-audited companies is lower than in those that were audited by the Tax Administration (in this case, the AFIP), except for some cases that may have escaped risk management. Non-compliance of non-audited companies would also show a distribution with extreme values.

However, the methodology has certain limitations. On the one hand, since the selection of cases based on fiscal risk may be imperfect, it is possible that some of the unaudited companies may have relatively extreme values of non-compliance. If so, the methodology will tend to underestimate noncompliance in the unaudited population. Therefore, the gap estimated with this methodology should be considered as a lower or minimum limit of noncompliance for medium and large companies.

Another limitation of the methodology lies in the need for the audits for a given fiscal period to be completed. This can lead to estimates of noncompliance being delayed (sometimes significantly) with respect to the year to which they are imputed.

To obtain the estimate of the non-compliance gap, the methodology is based on a Pareto-Zipf distribution. Under this distribution, the amount of audit adjustments is inversely proportional to the ranking of a company's noncompliance in the population. This implies that the magnitude of non-compliance tends to decrease exponentially as one moves down the ranking of companies, ordered from the most non-compliant to the least non-compliant.

The estimation procedure has several stages:

1) For all medium and large companies with completed audits for a given fiscal period S, those with favorable tax adjustments N are identified $p=N/S$ is then defined as the proportion of taxpayers with favorable tax adjustments out of the total number of taxpayers audited;

2) The N taxpayers with a positive adjustment are ranked in descending order by the amount adjusted. In this step, the default ranking is determined by the amount of the adjustment. The firm with the largest adjustment is assigned the ranking $r=1$, the firm with the second largest adjustment is assigned the ranking $r=2$, and so forth;

3) The ranking and adjustment data are transformed to a logarithmic scale. Under the assumption of a Pareto-Zipf distribution, the relationship between the logarithm of the ranking and the logarithm of the fiscal adjustment should approximate a straight line;

4) A least squares regression, in which the dependent variable is the logarithm of the adjustment and the independent variable is the logarithm of the ranking, is carried out to estimate the adjustments of the medium and large non-audited companies. This allows us to estimate the slope a and the ordinate to the origin c of the line;

2 There is another alternative given by the Cluster Analysis, which will not be developed here because it exceeds the objective and scope of this article. However, it is worth noting that it consists of grouping taxpayers into groups or clusters that share similar characteristics, then analyzing the non-compliance of those elements of the group that were audited and assuming that the non-audited members of the cluster have the same level of non-compliance as the former, extrapolating the results to the whole set under analysis. The advantages of this method are that it incorporates the selection bias of the operational audits and requires fewer assumptions than the Extreme Value method, although the disadvantage is that the estimated gaps will be partial, not reflecting the totality of noncompliance, and will require greater quality and capacity for statistical data analysis.

5) It is assumed that, if all medium and large companies had been audited and the above procedure was followed, the total number of companies with positive adjustment M would be equal to p times the number of medium and large companies F;

6) To estimate the total default for a period U_t, we use the slope a and the ordinate to the origin c estimated above, in the equation:

$$U_t = 10^c \sum_{r=1}^{M} r^a$$

The information needed to estimate the non-compliance of medium and large companies for a given fiscal period includes the following elements:

i) Number of companies in the segment for that fiscal year (***F***).

ii) Number of companies audited for that fiscal year (***S***).

iii) Number of companies with positive income tax adjustments in that fiscal year (***N***).

iv) Amount of the adjustment to the tax for that tax year for the companies in the previous item.

2. Practical application: estimation of income tax non-compliance in Argentina

After analyzing the framework of the EV method within the framework of the methodologies available for the estimation of compliance gaps, a first exploration of its application was carried out with the information available at the AFIP for Income Tax.

2.1. Determination of the taxpayer focus segment

As indicated above, the selected methodology is applicable to medium and large companies, since it is there where it is more likely to find that the audit adjustments follow the required distribution, and that is the subset of taxpayers with the largest number of operational audits in relation to income tax[3].

In order to identify the set of taxpayers to be analyzed, it was decided to use the information available in relation to those companies that, for each fiscal year in the period from 2015 to 2020 inclusive, had declared joint revenues equivalent to 80% of the total revenues declared by the corporations registered as taxpayers of the tax. This group of companies with the highest declared income represented, in number, an average of 5.7% of the total for the period analyzed (table 1).

3 It must be noticed that the complexity of the Income Tax design in Argentina and the diversity of taxpayers would require the application of different methodologies at the same time. On the one hand, the estimation of the compliance gap for companies in the highest part of the distribution of declared income (Medium and Large Companies), could be developed by applying the EV methodology at first, complemented later with a cluster analysis approach to adjust the preliminary results obtained. On the other hand, the reduced availability of operational audits among Small Businesses would make it necessary to use random audits to estimate non-compliance. AFIP plans to move forward in a coordinated manner applying these approaches in the future.

TABLE 1

Number of taxpayers (corporates) selected as focus segment for estimating the income tax compliance gap

Cases with declarations filed, 2015-2020, in number and percentages

Fiscal Year	Number of Corporations with Corporate Income Tax Return Affidavit submitted	Number of corporations explaining 80% of reported income	Selected Segment (in %)
2015	224,911	13, 995	6.2%
2016	234,764	14,147	6.0%
2017	238,212	14,785	6.2%
2018	237,837	11,790	5.0%
2019	227,817	11,332	5.0%
2020	199,802	11,214	5.6%
Average 2015-2020	**227,224**	**12,877**	**5.7%**

Source: Own elaboration based on AFIP Statistical Yearbook (2015-2020).

2.2. Definition of noncompliance

The estimation of the income tax compliance gap based on the EV methodology involves the extrapolation, to all taxpayers in the segment of large and medium-sized companies, of the non-compliance observed in the part of this segment that was audited.

The AFIP's operational auditing work involves different types of actions, ranging from desk investigations and massive electronic audits to in-depth and comprehensive face-to-face inspections of taxpayers, for many taxes and obligations. In turn, these actions have different results, depending on the taxpayer's reaction to the administration's findings, ranging from adjusting their returns and regularizing their payments to taking the dispute to court in order to reverse the inspectors' actions. This variety of possible actions and results makes it necessary to operationally define the scope of the non-compliance to be extrapolated, in order to have a better understanding of the results to be obtained.

In relation to AFIP's actions, the information from ordinary audits is used since they are those whose depth would allow identifying noncompliance due to under-declaration more effectively. Furthermore, it is to be expected that the highest adjustments will come from this type of actions. Preventive audits and electronic verifications were not considered since, due to their characteristics, they involve smaller companies and individuals, and have a much greater risk of error due to non-detection than ordinary audits.

As regards the results, the adjustments determined by the inspectors become an obligation for taxpayers when they accept the tax claim or when the ex officio assessment is ratified in court. The latter definition may be delayed in time, and its amount may be affected by errors in the assessment procedure or by the judicial process itself, modifying the under-declaration determined by the inspector. For this paper we will use the adjustment determined in the inspection, both because of its temporal proximity to the tax period analyzed and because it is understood that it reflects more closely the non-compliance that we are seeking to extrapolate, even at the risk that some adjustment may later be considered excessive in a court of law.

Unfinished audit cases present a major problem for the application of the methodology, since the audits that are completed first are generally the simplest and smallest audits, while the more complex audits tend to take longer to complete and are expected to result in larger adjustments.

This situation means that the information available for recent years contains fewer extreme cases and proportionally many more cases with minor adjustments, which distances the observations from the power distribution necessary for the methodology to be applicable. In order to solve this problem, adjustments were imputed to the pending cases. This was done in two stages: firstly, we randomly selected which of the pending cases would have an adjustment, based on the percentage of cases with an adjustment for each year. Secondly, the randomly selected cases were imputed an adjustment proportional to the declared income, using the average "adjustment/income" ratio of the closed audits with adjustment for each year.

2.3. Preparation of available data and estimation

In order to apply the methodology, data must be prepared for the identification of the adjustments determined in favor of the tax authorities, and the variables to be used in the calculation for each tax year. For this purpose, taxpayers with adjustments were ordered from highest to lowest, and adjustments without tax interest or with adjustments in favor of the taxpayer were eliminated, preserving the total net tax adjustment. Taxpayers with adjustments not eliminated represent the total number of cases to be used for the extrapolation, corresponding to parameter N of the methodology, allowing estimating the percentage p for each tax year.

As noted above, the analysis uses imputed adjustments for cases in process, so subsequent revisions may result in changes to the amounts, percentages and amounts as imputations are replaced by actual adjustments.

With the adjustments N ordered from highest to lowest for each fiscal period, the least squares regressions should be carried out using, for each year, the logarithm of the adjustment as the dependent variable, and the logarithm of the ranking as the independent variable, estimating the parameters a and c of the methodology, with the corresponding R^2 coefficient.

The data analysis, within the framework of international experiences in the application of the methodology, showed that the large number of small adjustments in the cases used for the calculation significantly distorts the estimation of the distribution of extreme values.

Therefore, it was considered appropriate to apply a cut to the amount of data used for the estimation, in line with the experience of other tax administrations, including that of the United Kingdom. A new regression was carried out but using only the 20% of the audited cases with the best fit. Thus, the estimated lines were better adjusted to the distributions of the extreme values of the audits, constituting a more appropriate basis for the application of the methodology.

2.4. Calculation of the compliance gap

Applying the coefficient p determined in the previous section, to the subset of companies under analysis F, the parameter M is obtained for each fiscal period. With all the information it is

possible to use the results of the regressions to calculate the amount of noncompliance for the segment of medium and large companies for each year, using the following formula: $U_t = 10^c \sum_{r=1}^{M} r^a$

The amounts to be obtained will underestimate the actual non-compliance, as a consequence of the systematic inaccuracy described above. Although in this segment of taxpayers the incidence of error due to lack of registration is presumed to be lower, this risk exists and must be taken into account in the analysis of the results. As for non-detection error, related to the probability that the audit work does not identify all sources of underreporting, it is possible to adjust the results obtained by applying the correction factor developed by the IRS in the United States and also applied by other tax administrations. This provisional decision allows the estimation until a multiplier that adjusts to the particularities of AFIP's audits is developed.

The EV methodology allows extrapolating the results of operational audits, taking into account the selection bias implicit in the tax administration's risk management. If the most non-compliant taxpayers had been effectively audited in each tax period, the estimation of the gap through this technique would be very accurate to represent the total non-compliance in the segment.

To the extent that risk management moves away from this ideal scenario, the possibility that some non-compliant companies have not been audited increases, causing the EV estimation to underestimate the true non-compliance in the segment.

At the other extreme, if the operational audit were not guided by risk management, then the bias would not exist and the result of the audits could be extrapolated to the total population. Estimation by direct extrapolation, in the presence of some form of risk management, will tend to overestimate the true noncompliance, since the sample should generally give more adjustments than the population.

It can then be observed that, to the extent that the selection of cases for operational audit is carried out within the framework of imperfect risk management, the actual default of the segment under analysis will be located at a value between the estimate using EV, which would be the lower limit, and the direct extrapolation of the adjustments, which would determine the upper limit.

Some tax administrations, in the presence of this situation, report the bands within which the actual noncompliance lies. Others present the average of both values as a more approximate measure of noncompliance.

3. Conclusions

The main focus of this paper is the estimation of the non-compliance of corporations with corporate income tax returns in the tax periods 2015 to 2020 that reported 80% of the total income declared for each year. The analysis proposed seeks to approximate noncompliance due to under-declaration, not considering whether the tax determined was actually paid or not. Preliminary results were also not adjusted for underreporting so, although informality is not frequent in the analyzed segment, the gap could be underestimated by this error.

This proposal is a first step towards estimating income tax non-compliance using bottom-up methodologies in the case of AFIP, using available information related to operational audit adjustments.

Its results should, however, be considered provisional and subject to revision. In fact, AFIP plans to conduct semi-annual reviews of the estimates made. The replacement of imputed adjustments by those resulting from the audits that are closed will result in changes in the estimated gaps. Similarly, the design and development of AFIP-specific non-detection multipliers may result in changes in the estimated gap magnitudes for the entire estimated series. Finally, methodological improvements under development may introduce changes in the results before they can be considered as definitive.

The methodology will make it possible to improve the previous results and build a series that facilitates the monitoring of the evolution of the gap over time, constituting a potentially valuable indicator for the evaluation of the administration's management.

The analysis can also be complemented by using the same base information, in combination with other taxpayer characteristic variables available to the administration, in order to apply other bottom-up techniques that allow improving the estimates (cluster analysis, post-stratification, among others), resolving the selection bias.

The estimation of the total gap will require the use of other methodologies, both bottom-up and top-down, in order to reflect the non-compliance of individuals and companies not included in the analyzed segment. In this regard, AFIP is currently working on an estimate using cluster analysis for medium and large companies (as a complement to the methodology explained here) as well as on a project of random audits for the small companies' segment.

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II.4. Tax expenditure in Honduras: experience in the exploitation of administrative data for its analysis and rationalization

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Introduction

A country's tax system performs several important purposes. It provides the necessary resources to design budgetary policy through tax collection and, therefore, determines the relative weight of the State. It also plays a redistributive role by reallocating resources from those economic agents who have the most to those exposed to the most disadvantaged social conditions, thus contributing to the functioning of the democratic system. These elements lead to a discussion on the proper functioning of the tax system based on a series of principles of sufficiency, equity, and efficiency. Moreover, it is ideal that such discussion be guided by the intensive use of empirical evidence, as it allows to contrast certain premises that are of interest when designing tax measures.

After the (last) tax reform of 2013[1], tax revenues between 2014 and 2021 have represented, on average, 17.3% of Gross Domestic Product (GDP). Additionally, tax collection in Honduras is made up of 31.5% direct taxes (on income, profits, and property) and 68.5% indirect taxes (on production, consumption, sales, services and special activities, imports, and eventual benefits). This tax structure coincides with the view that developing countries face important economic (such as frictions in the labor market) and administrative (limited audit capacity, reduced sources of primary and/or third-party information) constraints to design more complex tax burdens, which is why it falls on sales taxes or taxes on the profits of large companies (Gordon and Li, 2009).

Increasing Honduras' tax collection performance depends on multiple factors. Aspects such as the level of tax non-compliance (or in a broader sense, evasion), the size of informality, the dynamics of the economic cycle or the perception of risk generated by the tax authority can affect tax collection. However, recent evidence suggests that one

1 Decree No. 278-2013. Law for the Ordering of Public Finances, Control of Exonerations and Anti-Evasion Measures published in the Official Gazette La Gaceta on December 30, 2013.

of the main elements that has limited tax collections in Honduras is the large number of tax exceptions and the long tradition of granting tax benefits.

Preferential tax treatments predominate in the country. Multiple authors state that the main characteristic of the Honduran tax system is its high level of tax expenditure (Roca, 2010; Fenochietto et al., 2016; Fenochietto and Pérez Trejo, 2017; Fenochietto et al., 2018; Artana, 2021). Tax expenditure is defined as the resources foregone by the State, due to the existence of incentives or benefits that reduce the direct or indirect tax burden of certain taxpayers in relation to a reference tax system, in order to achieve certain economic and social policy objectives (CIAT, 2011). According to estimates by the Ministry of Finance (*Secretaría de Estado en el Despacho Finanzas - SEFIN*) and the Servicio de Administración de Rentas (SAR), tax expenditure for 2021 stood at 6.8% of GDP, the highest in the Central American region (simple average of 3.9% of GDP for El Salvador, Costa Rica, Guatemala, Nicaragua and Panama).

In this context, it is appropriate to review, from a holistic approach, the vast dimensions associated with preferential tax treatments in Honduras. Precisely, in 2023, a tax reform project has been presented, aimed at two central axes. Firstly, it seeks to rationalize the current scheme of tax benefit regimes, since behind the high level of tax expenditure there are other systemic problems such as the denaturalization of benefits, the harmfulness they produce in terms of equity and efficiency, as well as problems of administrative control. Secondly, the reform proposal seeks to move towards a tax system that guarantees the sufficiency of resources needed to undertake the agenda of programs necessary for the social and economic development of Honduras, while complying with the constitutional principles of legality, proportionality, generality, and equity according to the economic capacity of the taxpayer[2].

The general objective of this document is to rely on the experience in the exploitation of administrative data and the best tax administrative information available in Honduras to document a diagnosis of the tax benefits that has led to the proposal of a tax reform aimed towards their rationalization[3].

1. Use of administrative data in Honduras

In order to improve the design of tax policy, the analytical capacity of the institutions must be developed for the correct exploitation of the available information, leading to evidence-based decision making.

Among the factors motivating the use of tax data are that they offer valuable insights for making accurate and, above all, timely decisions. For example, the recent health and economic crisis begs the question, what was the impact of the pandemic at the microeconomic level? And, to address this impact, experience provides the possibility of using different sources of information such as mobile data, credit cards, satellite images, surveys, etc. However, there is one potentially valuable source of data at the corporate level: tax data.

Among the benefits in the use of administrative data are the following:

- High frequency (real-time availability).
- Low collection cost.
- Surveys and censuses are expensive.

2 Article 351 of the Constitution of the Republic of Honduras.

3 This paper also follows an important trend of documenting, publishing, and socializing the background of tax reform design. Recent examples include the case of Chile (***Ministerio de Hacienda***, 2022) and Colombia (***Ministerio de Hacienda y Crédito Público***, 2022).

- Performance can be evaluated at the level of size, sector, geographic area, and others.
- Allows the construction of data panels (time and individuals).
- Can be merged with other data sources: customs, social security, financial data, etc.

And some disadvantages may be:

- Only captures performance of formal companies.
- May be under-reported or contain omissions.
- In some countries only a few variables are available.

Since the creation of the Department of Fiscal and Economic Studies (Departamento de Estudios Fiscales y Económicos DEFE) in 2019, the SAR has made progress in this direction with the objective of building institutional capacity for tax policy analysis within the Tax Administration and producing rigorous policy analysis using administrative data complemented by macroeconomic variables.

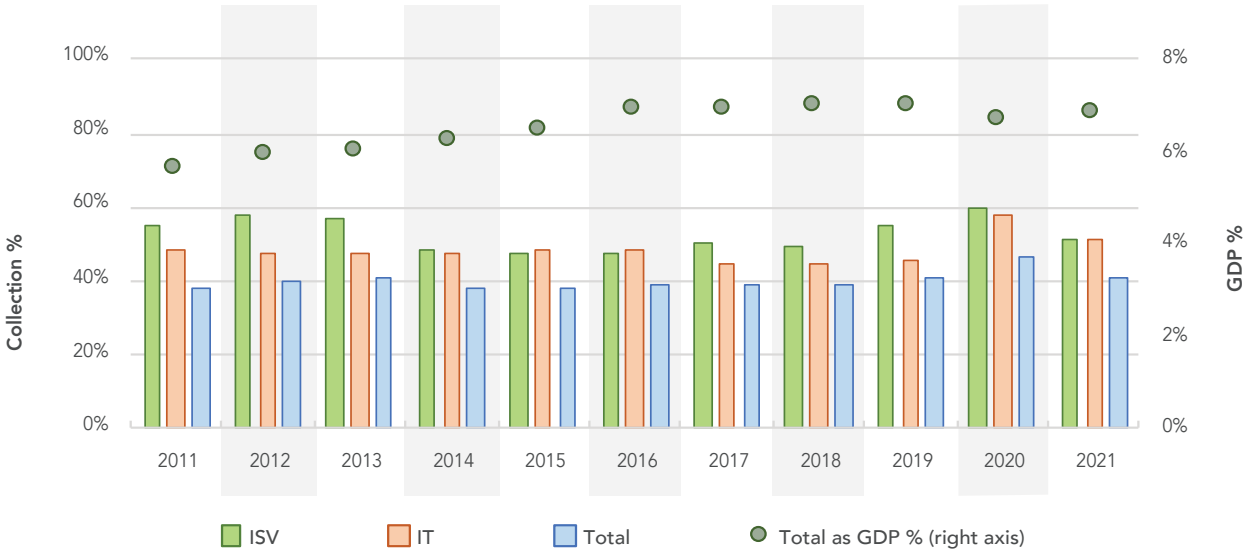
2. Experience in tax expenditure calculation

Tax benefits have a long history in Honduras. Since the entry into force of the Sales Tax exemptions (ISV) with the creation of this tax in 1963 (Decree 24-1963), as well as the entry into force of the first special free zone regime in 1976 (Decree 356-1976) that exempted the payment of Income Tax (IT), the country has been increasing the granting of preferential tax treatments.

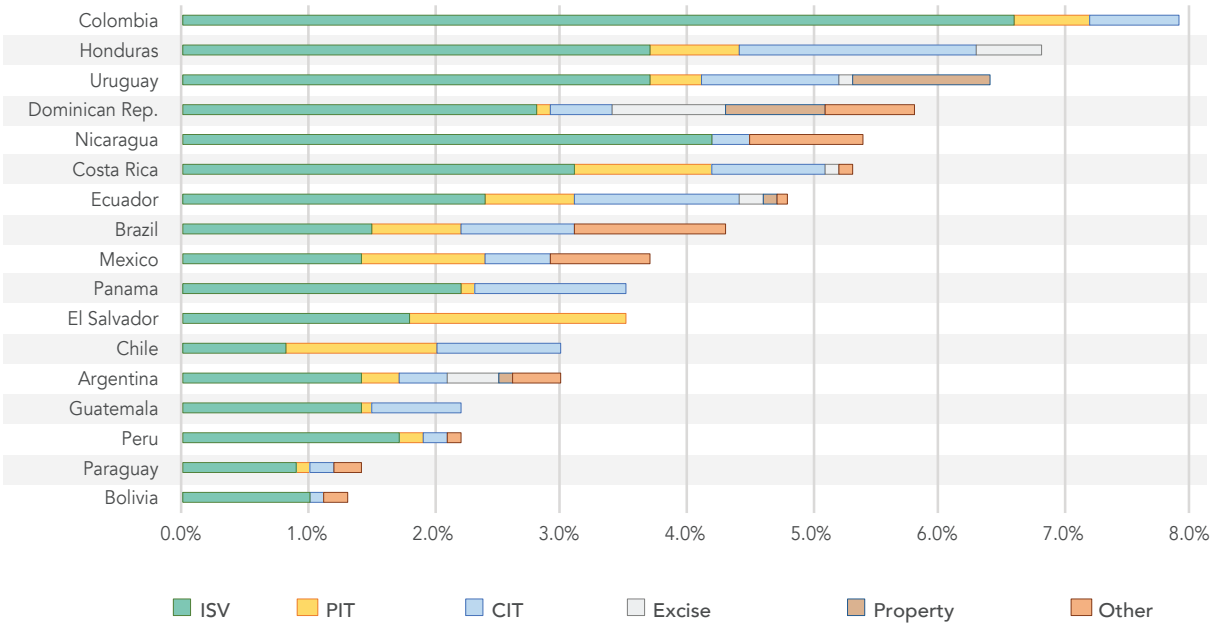
Over the years, the Honduran tax system has been characterized by a high level of tax expenditure. Estimations by SEFIN and SAR warn that between 2011 and 2021 the average tax expenditure could have been around 6.5% of GDP, representing close to 40% of total tax revenue collection, and just over 50% for IT and ISV collection respectively (figure 1.a). In turn, Honduras is the second country in Latin America with the second highest tax expenditure, only behind Colombia (figure 1.b). An additional stylized fact is that the tax sacrifice from ISV exemptions accounts for more than half of the tax expenditure in Honduras, although this is also the case in most countries in the region.

FIGURE 1 **Honduran Tax Expenditure and regional comparison**

1.a) Tax expenditure in Honduras, 2011-2021, as a percentage of revenue and as a GDP percentage



1.b) Tax expenditure in Latin American countries by tax, latest year available, as a GDP percentage



Source: Own elaboration based on data from SEFIN and SAR (figure 1.a) and from Peláez Longinotti (2019) (figure 1.b).
Notes: For figure 1.a) the IT expenditure corresponds to the sum of the tax expenditure on CIT (IT, IT, AS, AN, credits for job creation and untaxed income) plus the tax expenditure on PIT (untaxed income, medical expenses, exempt income, exemption credit, credit for job creation and tax expense for teachers). The ISV tax expenditure corresponds to the sum of the tax expenditure on sales plus the tax expenditure for the 8% refund on sales with credit or debit cards. The total tax expenditure is the sum of the IT tax expenditure, plus the ISV tax expenditure, plus the ACPV (Excise tax on fuel) tax expenditure. The blue bars relate tax expenditure to specific tax revenue, whereby "Total" is the ratio of total tax expenditure with respect to total tax revenue (domestic plus customs).

The background in the estimation indicates that until 2016 tax expenditure in Honduras was estimated because of technical assistance: IMF (Fenochietto, Pecho), IDB (Gómez Sabaini, Morán, Roca), and that as of 2017 it is calculated by Honduran institutions: Finance Secretariat (SEFIN) and Tax Administration (SAR). The methodology used since then has been based on the work of these technical assistance agencies.

To date, it can be said that Honduras has made progress in estimating tax expenditures, although the amount may be underestimated due to limitations in the statistical information, where many institutions manage tax benefits, local sales by companies in regime, use of exempt or taxed purchases in exempt and taxed sales, exempt purchase orders, etc., and there has not been much progress in cost-benefit analyses.

2.1. Sales Tax Exemptions (Impuesto sobre las Ventas ISV)

The Sales Tax (ISV) has a number of attractive theoretical characteristics. According to Almunia et al. (2022), the ISV - similar to the value added tax (VAT) present in other countries - does not distort firms' production decisions since it does not affect input prices, it is difficult to evade since the incentive structure within the ISV helps tax compliance, and it is a tax that generates a substantial amount of revenue for the treasury. However, in many countries there are discrepancies between the textbook model of a general goods and services tax -such as the Honduran ISV- and its practical application.

The desirable properties of the ISV may be affected in reality. One factor that can move ISV away from its ideal characteristics is exemptions. These imply that a basket of goods and services are excluded, by law, from paying ISV in any instance of intermediate production or final consumption. Mirrlees et al. (2011) indicate that exemptions violate the logic of a broad-based ISV, as they result in cascading and excessive taxation (tax on tax) if applied to pre-retail (intermediate) stages. They also create a bias against outsourcing, as the tax burden can be reduced by producing inputs internally (self-consumption) rather than purchasing taxable inputs from third parties. Exemptions, once granted, tend to proliferate as exempt sectors want their suppliers to be exempt as well, and other sectors push for equal treatment.

In general, ISV exemptions, in addition to causing revenue losses, are usually designed under the justification of promoting equity. According to CIAT (2011), in the case of necessary goods or services, what is generally sought is to improve the welfare of a certain segment of society -the most disadvantaged- on the assumption that they allocate a greater proportion of their income to consumption. The objective pursued by the State is clearer when the requirement to enjoy the benefit is, for example, that the points of sale are those generally visited by the most disadvantaged, such as neighborhood markets.

Contrary to expectations, evidence suggests that exempting ISV is difficult to justify on equity grounds in low-income countries. One of the most frequently used compensatory measures are reduced rates and/or exemptions on popular consumer goods in order to shift tax burdens away from lower-income individuals. However, a recent study by Bachas et al. (2020), using household expenditure surveys for 32 developing[4] countries, shows robust evidence indicating that a large part of household consumption is made in informal sales outlets (since they are not subject to the tax system) or that they are exempt from paying ISV because they are part of a simplified regime. This fact is even more attenuated when it comes to lower-middle or low-income

countries, since in these countries lower-income households spend close to 90% of their consumption in informal places, while this behavior decreases as households in the highest income distribution are analyzed, with close to 70% of their consumption in informal places. The authors state that these results suggest that the ISV would be a progressive tax as long as informality is taken into account.

However, other literature analyzing the distributional incidence of ISV exemptions states that the largest share of ISV tax expenditures would be enjoyed by individuals in the highest income deciles since they consume the most in absolute terms (Barreix et al., 2011 and 2012; Barreix et al., 2022; Rasteletti, 2021), which is referred to as the "VAT exemption inclusion error". Thus, the evidence indicates that the ISV is a progressive tax if informality is included within the measure of distributional incidence, but ISV exemptions tend to be pro-rich.

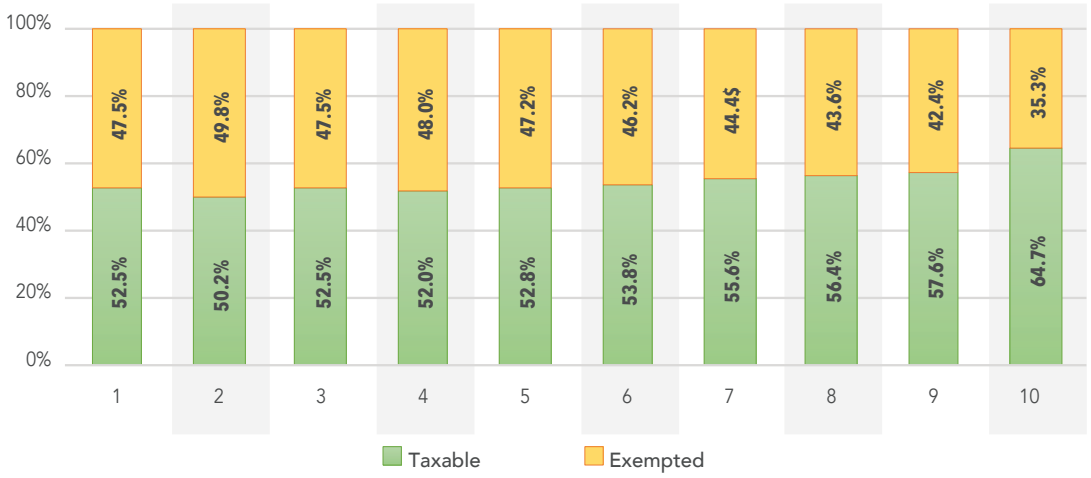
In Honduras, even though almost half of the consumption of lower-income people is exempt from the tax, the tax expenditure on ISV is regressive. The ISV is usually interpreted as regressive as it is a tax whose generating fact does not discriminate proportionally the income level of the consumer, so that the compensations via exemption from ISV payment or reduced rates on specific baskets of goods are very tempting and, in fact, applied in practice by many countries.

The evidence for Honduras would seem to justify ISV exemptions since people in the lowest income decile spend up to 48% of their consumption exempt, while people in the highest decile spend only 35% of their consumption on exempt goods (figure 2.a). However, when decomposing the distributional incidence of exemptions, in Honduras 40% of ISV tax expenditure is enjoyed by the richest quintile of the population, while only 9% is enjoyed by people in the poorest quintile (figure 2.b). This regressive pattern of ISV exemptions is also observed, in different magnitudes, in other countries of the region.

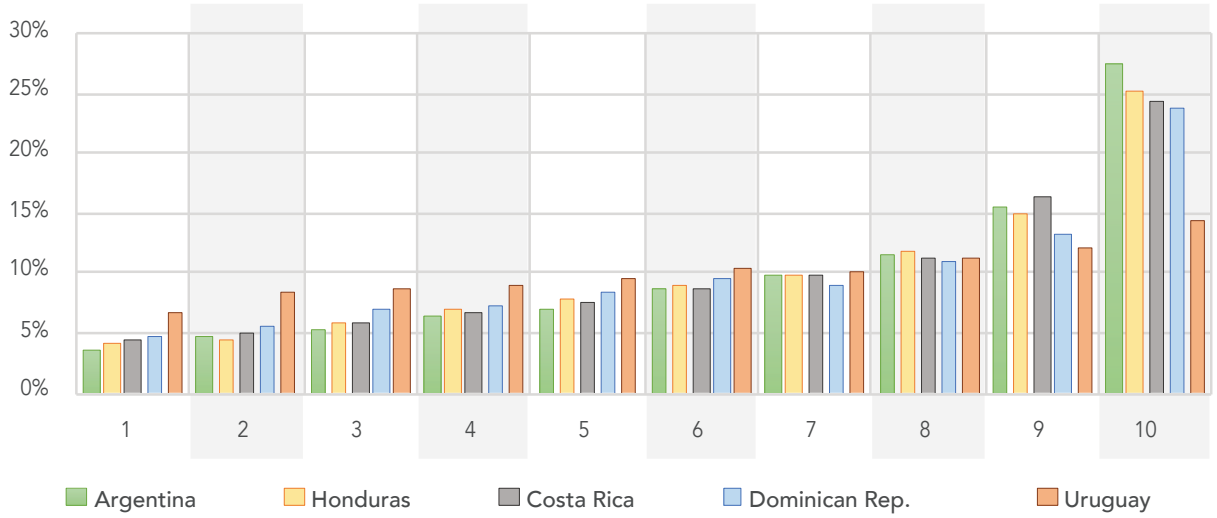
4 Honduras is not part of the study sample. However, it includes countries in the region such as Costa Rica and Mexico that have consumption baskets similar to those of Honduras. Likewise, are included countries with GDP per capita levels around that of Honduras.

FIGURE 2 **Distributive aspects of sales tax exemptions**

2.a) Type of consumption (taxable/exempted) by population deciles (consumption), as a percentage of the total



2.b) Distribution of tax expenditure by population deciles (*), as a percentage of the total



Source: Own elaboration based on data from ENIGH 1998 and Artana (2021) for the case of Honduras in both figures, and from Barreix et al. (2022) for figures corresponding to other countries (figure 2.b). (*) The deciles for Honduras are constructed at the consumption level, while for the rest of the countries they are determined by income level.

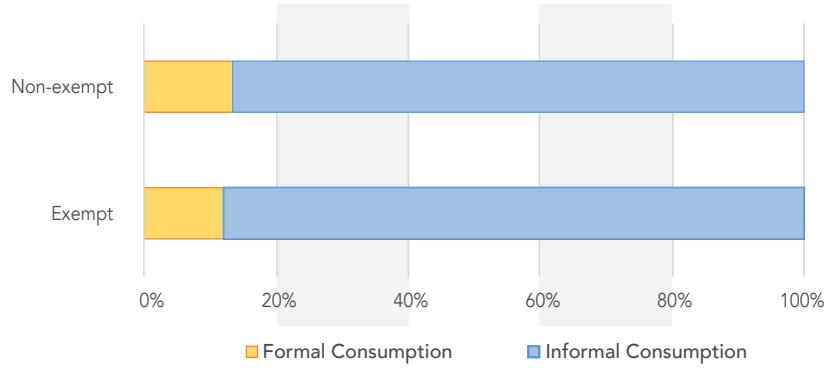
Lower-income people buy more than 90% of their food in informal places that do not tax the ISV. Following the strategy of Bachas et al. (2020), an Engel Curve of informality was estimated for food. Unlike the rest of the items that make up the 1998[5] National Household Income and Expenditure Survey (ENIGH), at the time of writing only place of purchase data was available for the food item. Each place of purchase is classified as either informal or formal. The pattern of food consumption is strongly located in shopping places classified as informal (figure 3.a). In addition, figure 3.b shows the existence, in line with the results of Bachas et al. (2020), of a negative relationship between income and informal consumption. People in the first decile buy more than 97% of their food in places classified as informal, which is attenuated until the last income decile, with 71.4% of food consumption in informal places, with a slight predominance of exempt food (73.1%) overtaxed food (68.9%) in these outlets.

5 As the only information available at this level of detail, it is recognized as an important limitation.

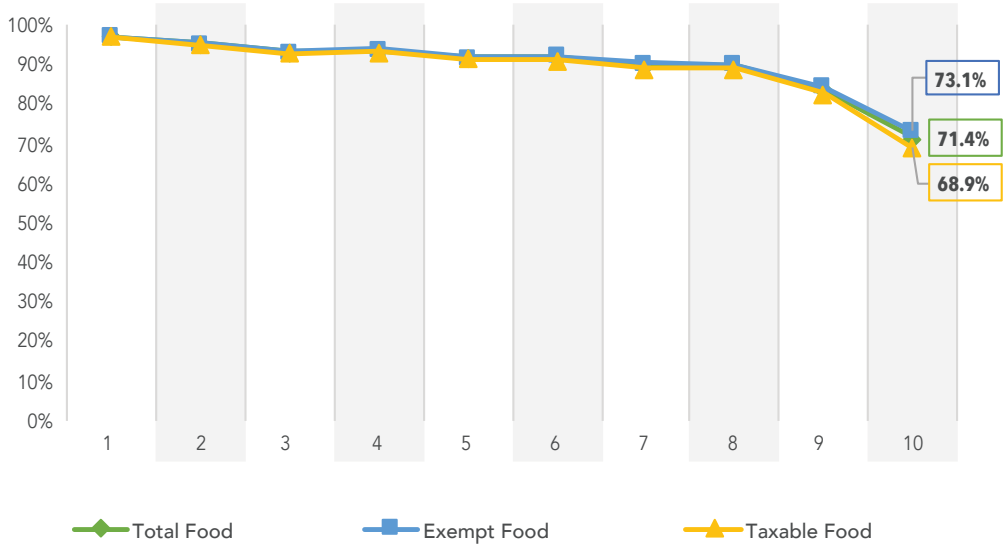
FIGURE 3

Characterization of informality in food consumption and distribution by income level

3.a) Type of food consumption by exemption and place of purchase, as a percentage of the total



3.b) Engel Curves by Informality, in percentages of the total



Source: Own elaboration based on 1998 ENIGH data. In figure 3.b the Engel curve corresponds to the total informal food consumption per decile with respect to total food consumption (formal consumption + informal consumption). In the case of the Engel curves for taxed and exempt food, we first take a ratio of how much taxed and exempt consumption represents for each place of purchase (formal or informal) and then impute the proportion of food consumption of each decile.

2.2. Income Tax Exemptions

Taxes levied on businesses are an important source of revenue, although with significant heterogeneities worldwide. Taxes on corporate income in low-income countries have increased and tend to be higher than taxes on labor income (Bachas et al., 2022). Collections from this tax represent between 3% and 4% of GDP on average worldwide. In Honduras, at the end of fiscal year 2021, Corporate Income Tax (CIT) represented around 3.5% of GDP.

The empirical evidence on the impact of tax incentives on investment attraction is mixed and not entirely conclusive. The underlying idea is that exempting profit tax is synonymous with a lower cost of capital, so this should attract greater investment flows to a country. However, studies show that this premise holds true in some countries and not in others, depending on certain initial conditions. While some studies confirm that there is a positive causal effect between exemptions and the attraction of foreign direct investment (Van Parys and James 2010a; Klemm and Van Parys, 2012), others show that tax incentives have neutral or null effects in attracting new capital flows (Van Parys and James, 2010b).

Honduran tax regulations offer extensive preferential tax treatments. Since the establishment of the first special regime in 1976 through the Free Zones, there is a long tradition of granting exemptions to companies engaged in specific industries. The main characteristic is that contrary to an appropriate tax benefit (partial, temporary and degressive), exonerations in Honduras are granted on taxes additional to IT for prolonged periods of time that contradict the infant industry principle. Table 1 shows the tax benefits per tax for the main special regimes in force.

TABLE 1

Tax Benefits by Special Regime and by type of taxation in Honduras, 2022

Regime	IT	AN	GC	AS	ISV	ISV Imp.	ACPV	DAI
Export Regimes								
ZOLI (Free Zones)	x	x	x	x	x	x	x	x
RIT (Temporary Import Regime)		x		x	x	x	x	x
ZADE (Agricultural Export Zones)	x	x	x	x	x	x	x	x
Tourism Regimes								
ZOLITUR (Bay Islands Tourist Free Zones)	x		x	x	x	x	x	x
Tourism Development	x	x	x	x	x	x	x	x
LIT (Tourism Incentives Law)	x	x	x	x	x	x	x	x
ZOLT (Tourist Free Zones)	x	x	x	x	x	x	x	x
Other Special Regimes								
Renewable Energy	x		x	x	x	x		x
Thermal Energy					x	x	x	x
Biofuels	x		x	x	x	x	x	x
APP (Public-Private Partnerships)	x		x	x	x	x	x	x
Trusts			x	x	x	x	x	x
Call Centers	x					x		
Agroindustrials					x	x		x
Transport	x				x	x		
SMES	x	x		x				
Social Sector or the Economy (*)	x	x		x				
Cooperatives (*)	x	x		x				
NGOs, Foundations and churches	x		x	x	x	x	x	x

Source: Own elaboration based on updated legislation. IT: Income Tax; AN: Net Assets; GC: Capital Gains; AS: Solidarity Contribution; ISV: Sales Tax; ISV Imp.: Imports ISV; ACPV: Attention to Social Programs and Conservation of Road Patrimony (fuels); DAI: Import Duties.

(*) In lieu of income tax, they are taxed at a differential rate of 10%.

Exemption credits are concentrated to a greater extent in export regimes. As shown in Table 2, for fiscal year 2021, 40.4% of the tax expenditure of exemption credits was concentrated in the free zone regime (ZOLI). It is followed by the State exemption credits and renewable energy with 19.5% and 13.3%, respectively. Thus, the total tax expenditure

for these exonerations amounts to 1.7% of GDP. This amount reaches 2% of GDP when including other tax expenditure items in the CIT such as, for example and among others, credits for job creation and untaxed income (which are not reported in Table 2). Since ZOLI and RIT account for almost 45% of the total tax expenditure in CIT, the document goes on to offer a series of elements that characterize the incidence of the companies involved in such specific regimes.

TABLE 2

Credits for Exemption by Exempt Regime, 2021

Annual approved amount, fiscal year 2021, in millions of Lempiras and in percentages of total and GDP

Special Regime	Millions of Lempiras	Percentage of total	Percentage of GDP
ZOLI	4,659.7	40.4	0.7
RIT	519.2	4.5	0.1
ZADE	131.9	1.1	0.0
ZOLITUR	213.1	1.8	0.0
Tourism Incentives	154.2	1.3	0.0
LIT	24.5	0.2	0.0
ZOLT	11.9	0.1	0.0
The State	2,248.2	19.5	0.3
Renewable Energy	1,534.4	13.3	0.2
APP	487.0	4.2	0.1
Cooperatives	320.9	2.8	0.0
Churches	252.6	2.2	0.0
NGO	204.4	1.8	0.0
Social Sector of Economy	165.2	1.4	0.0
SMES	56.0	0.5	0.0
OPDF	48.8	0.4	0.0
Professional Associations	32.0	0.3	0.0
Biofuels	19.7	0.2	0.0
Call Center	5.9	0.1	0.0
Employer Associations	3.2	0.0	0.0
International Organizations	0.5	0.0	0.0
Labor Unions	0.2	0.0	0.0
Other Regimes	437.7	3.8	0.1
Total	**11,531.1**	**100.0**	**1.7**

Source: Own elaboration based on IT returns. Does not include special periods, generated as of June 2022. Some taxpayers without a specific special regime were reclassified according to their corporate name.

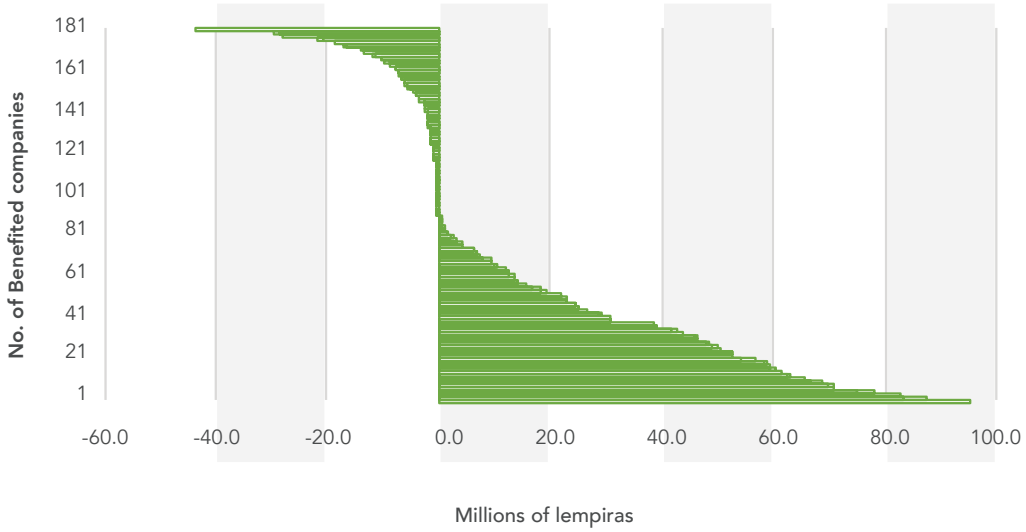
Finally, it can be noted that the relationship between tax sacrifice and some economic variables of interest reflect an indication of the economic implications of the regimes. Figure 4 shows an analysis for the ZOLI regime in terms of employment generation and its exports. Figure 4.a shows that, in the fiscal 2019 period, 26.4% (92 out of 348) of the companies that indicated belonging to the regime[6] registered exports lower than the IT tax benefit received. In other words, they exported less than what they received as tax benefit.

Figure 4.b, also with data from 2019, shows that, at least for 193 companies, the cost per job generated for the State (in relation to the tax benefits granted) is higher than the average annualized minimum wage of the manufacturing industry (118,271.40 Lempiras), and in some cases reaches values above US$ 98,000 (excluding jobs under the minimum taxable threshold of the PIT). It should be noted that companies within the ZOLI regime enjoy broad tax benefits that extend beyond IT, being exempted from the payment of tariffs, ISV and other import taxes. Recently, by means of Decree 08-2020, new benefits were added such as the exemption in the payment of capital gains, dividends, and extending the term for 15 years, extendable for 10 more years.

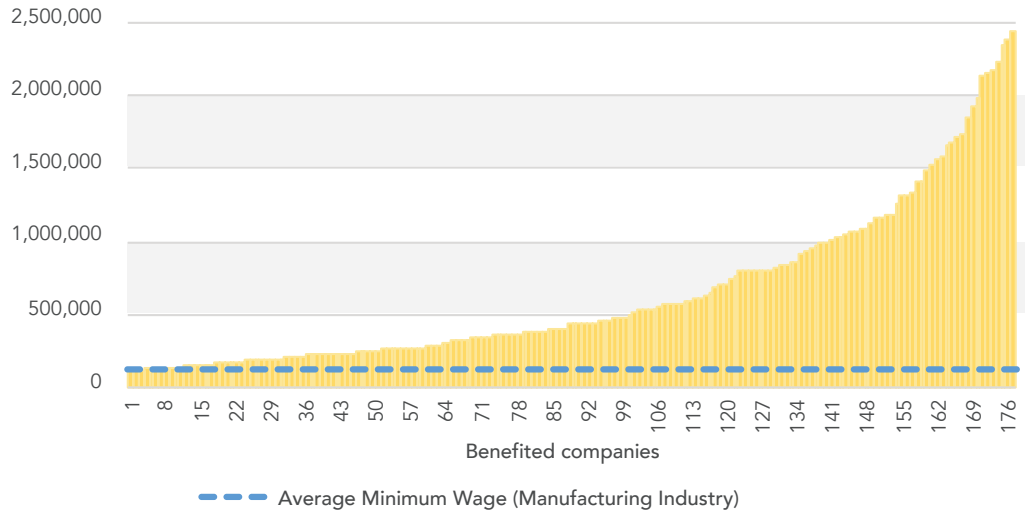
6 Considering taxpayers whose balance (exports-profit) would be in the range of -50 to 100 million lempiras, excluding extreme values.

FIGURE 4 **Relationship between tax expenditure under the ZOLI regime, exports, and employment generation, 2019**

4.a) Difference between exports and the IT benefit received, in millions of Lempiras



4.b) Tax expense per taxpayer withheld in PIT, in Lempiras



Source: Own elaboration based on data from IT and ISV returns, and the Monthly Withholding Tax Return (DMR), following Fenochietto et al. (2016).
Note: Only Taxpayers with a tax expense ratio greater than the reference Minimum Wage (annualized) are included. Extreme values are excluded for the purpose of a better figure presentation.

3. Tax Reform Proposal

With the arrival to power of the new government at the beginning of 2022 and after a diagnosis of the country's tax system, it has been identified the need to advance in a tax reform that reverses the situation of excessive and misused tax benefits in order to rationalize them and eliminate those that do not comply and tie the new ones to specific objectives such as employment, investment, added value, incorporation of technologies, research, which can be monitored and evaluated. In addition, there is a need to increase the levels of transparency and effective control.

The reform proposal is available at: www.sar.gob.hn. It contains as main elements: i) the creation and elimination of regimes; ii) the ability to cancel benefits through administrative channels; iii) the return to the standard refund system; iv) the elimination of the amnesty figure; v) the transition to a worldwide income system; vi) the ratification of the Mutual Administrative Assistance Convention in Tax Matters (MAAC); vii) the proposal of the Final Beneficiary Law; among other measures.

4. Final comment

The main characteristic of the Honduran tax system is its high level of tax expenditures. Honduras has used tax benefits to promote exports and some sectors for more than 40 years, but despite the long-standing use of tax benefits in the country, the experience has not been positive. The objective of these instruments has been denatured and control has been null. This development model has clearly not been successful.

The exploitation of administrative data has made it possible to carry out analyses that provide a diagnosis of the tax system with evidence of the need for a tax reform.

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III. Tax Administrations'

responses and development of specific services facing the digitalization of the economy, with emphasis on the formalization of taxpayers

Norad

III.1. Rethinking intergovernmental finance in the digital era: Taxation, allocation and new challenges for Latin American and Caribbean countries

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Introduction

The digital economy is expanding at a rapid pace, changing consumption habits, production and marketing of goods and services.

New forms of business have created new challenges for taxation and intergovernmental fiscal relations.

The significant growth of digital activities has not been reflected in a consistent increase in tax collection in these sectors, which raises suspicions about the design of tax instruments and/or the existence of large pockets of tax avoidance/evasion.

On the side of subnational finances and intergovernmental fiscal relations, there is a need for more local funding due to the increased demand for the growth of digital activities: organization of cities, urban changes for the operation of logistics centers, spaces in cities, externalities in terms of traffic, costs of digitization of subnational administrations to provide services to their citizens, etc.

New challenges arise, since both the tax systems and the basis for their allocation between levels of government have been designed for another time and another set of circumstances.

This is the reason why many countries, with the support of international organizations and regional institutions, have been making progress in designing mechanisms to face the new fiscal challenges posed by the digital revolution.

However, it is striking that among the abundant literature that has been developed on the ways and instruments for taxing the digital sector, there is very little on how these tax responsibilities should be allocated and coordinated between levels of government and the role of subnational taxation. Therefore, it is necessary to strengthen the debate to support intergovernmental allocation and coordination decisions and avoid incipient disputes in a sector that is already facing potential conflicts and new challenges.

Thus, the objective of this paper is to contribute to the debate about the effective taxation of the digital sector, its intergovernmental allocation and to document the progress and challenges of taxation of digital activities in some countries of Latin America and the Caribbean (LAC) and the Organization for Economic Cooperation and Development (OECD), with special emphasis on intermediate and local governments.

1. The expansion of the digital economy in LAC and the developed world

Measuring the digital economy and the value creation and capture associated with it is fraught with difficulties, as there is no generally accepted definition of what the digital economy is, nor are reliable statistics available, especially in developing countries. Depending on the definition adopted, estimates of the size of the digital economy range widely, from 4.5% to 15.5% of global GDP (UNCTAD, 2019).

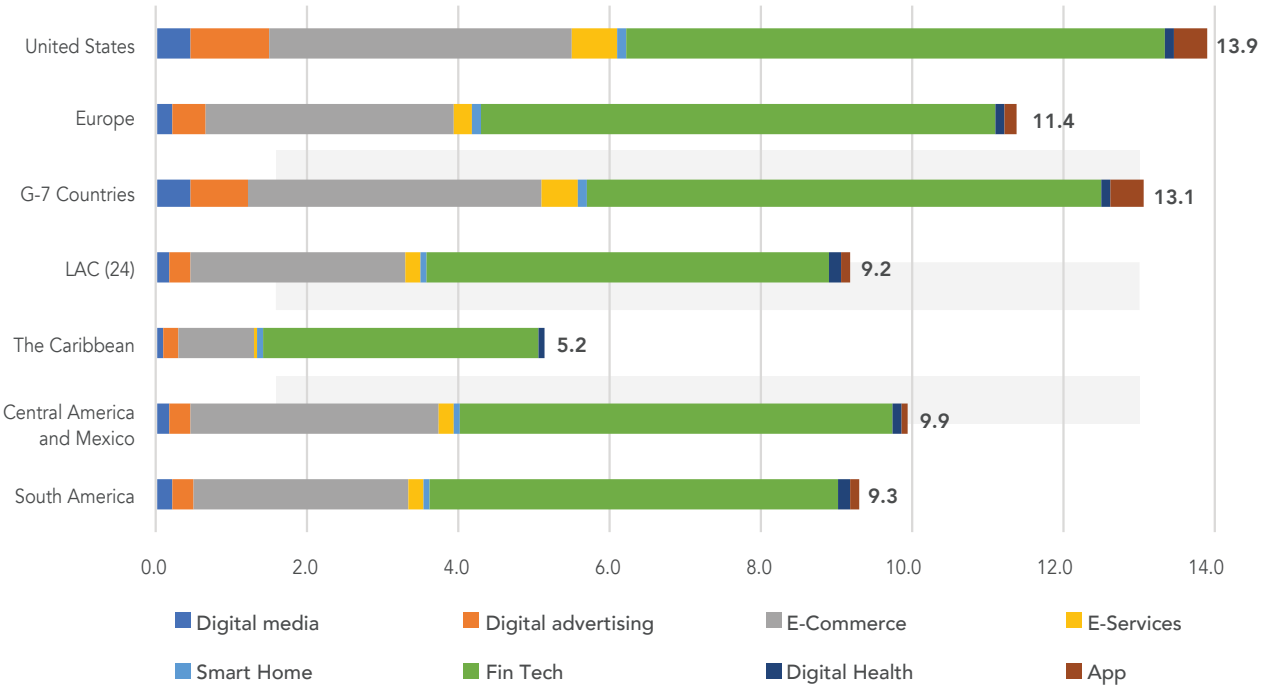
One way of estimating the digital economy is through sales revenue from the following sectors: eCommerce; eServices market; digital advertising; digital media (digital video content, digital music, digital games, e-books, print, etc.); Smart Home; FinTech (financial technology); Digital Health (fitness, nutrition and health devices and apps, telemedicine, etc.) and apps (those that can be downloaded from major app stores, such as App Store and Google Play).

According to information available as of October 2022, it is estimated that revenues from the digital economy in the Latin American and Caribbean region will grow by about 28% per year in 2022, reaching USD 509 billion, equivalent to 9.2% of regional GDP. This indicator is lower compared to 13.1% of GDP in the group of the seven most advanced economies (Canada, France, Germany, Italy, Japan, United Kingdom, and United States), 11.4% of GDP in European countries or 13.9% of GDP in the United States (figure 1). The Latin American and Caribbean region will account for approximately 3.4% of global revenues from digital economy in 2022.

FIGURE 1

Digital economy revenues by subregions and segments - Latin America and the Caribbean and others

Year-end estimates with figures through October 2022, as a percentage of GDP



Source: Own elaboration based on Statista (https://www.statista.com/outlook/digital-markets), IMF and ECLAC.

2. New business models of the digital economy and their elusive taxation

Six relevant characteristics distinguish the digital economy from a tax perspective (OECD, 2015 and ECLAC, 2019):

- **mobility** of both intangible assets, users and business functions;
- **usage** of customer and supplier **data** by companies in the sector;
- network effects or **externalities**, to the extent that the participation of an additional user changes the value of that network to existing users;
- **multilateral** business models, where different groups interact through an intermediary or platform that coordinates the demand and where the parties may be located in different jurisdictions;
- tendency to **monopoly** or oligopoly, based on network effects and economies of scale;
- **volatility,** due to the progressive reduction of both data processing costs and entry barriers.

These characteristics make it difficult to answer the typical general questions of taxation: who to tax (taxable persons); what to tax (taxable events); and how to quantify those events (tax bases). Questions related to which level of government

should decide on their amounts, their management and their general administration must also be addressed.

Table 1 presents a non-exhaustive summary of what could be the scope of the issue being addressed, which can give a first idea of the heterogeneous problem to be faced and the need for a disaggregated analysis, differentiating between activities and business models, ranging from different types of e-commerce, online application stores, online advertising, cloud computing, participatory network platforms, high-speed transactions, and online payment services.

TABLE 1

Synthesis of business models in the digital economy
Main features

Business models	Main characteristics
E-commerce	Purchase and sale of goods or services carried out through computer networks. These operations may be:
	Business-to-Business (B2B): sales from one company to another. Examples: purchase of goods for resale and various services (logistics, computing, e-commerce support, e-auction, content management, etc.)
	Business-to-Consumer (B2C): online sale of goods (tangible or intangible) or services from a business to end consumers. Advantages: digital delivery of a greater number of goods and services to remote customers; shortens the supply chan and eliminates intermediaries; reduces transaction costs and market entry barriers..
	Consumer-to-consumer (C2C): operates through a multi-sided platform of a company that acts as an intermediary between consumers. It is financed by charging consumers or though advertising.
Payment services	There is a payment service provider that acts as an intermediary between online buyers and sellers; it accepts payments from buyers through various payment methods (credit card, debit card, bank transfer, virtual wallets, etc.) processes them and deposits them into the seller's account, charging a fee..
App stores	Software digital distribution platform; they include applications developed by the company that manages it or by another developer and their download can be free (and financed by advertising) or have an associated cost.
Online advertising	It uses the internet as a means of targeting customers and delivering advertising messages. It has several modalities, although billboard (paid for a link or ad related to the user's habits) and search engine ads (paid to appear in the results of a search engine) predominate.

Cloud computing	Provisions of standardized, configurable, on-demand online computing services, such as data processing, storage, software and management, using shared physical and virtual resources (networks, servers and applications). It may be free to consumers, earning revenue from advertising, sale of users habit data or charges for extended services; or it may be sold on a monthly subscription or pay-per-use basis.
High frequency transactions	It consist of high-speed order execution using state-of-the-art-technologies and complex computer algorithms. Huge volumes of market data are analyzed and small price variations or arbitrage opportunities in a market that can be verified within milliseconds are exploited.
Participatory networking platform	It is an intermediary that allows users to collaborate and contribute to the development, expansion, evaluation, critique and distribution of user-generated content (such as text, audio, images, videos) such as blogs, social media, etc.) The platform can monetize this content in a variety of ways: voluntary contributions, payment for content viewed, subscription, advertising, licensing, sale of goods and services to the community sale of user data, etc.

Source: Own elaboration based on OECD (2015).

3. Intergovernmental allocation of digital taxation: a conceptual approach

The theories of fiscal decentralization, both traditional and second generation, tend to establish limits to the taxing powers of subnational governments.

In traditional theory (Oates, 1972; Musgrave, 1959), the basic reasons are operational and are based on the fact that the mobility of tax bases and the appearance of incentives for relocation tend to restrict the use of taxes with essentially redistributive objectives, as well as the intensive use of indirect taxes by local governments. In practice, it suggests limiting local taxation to the implementation of direct user charges (benefit principle) and to taxation on bases with little or no capacity for interjurisdictional mobility (real estate taxation) and making very moderate use of other taxable events with income, property, or consumption bases.

The second generation theories (Brennan and Buchanan, 1980), which emphasize more institutional and accountability aspects, advise giving local governments greater autonomy in managing their (limited) fiscal spaces. It is based on the fact that the freedom to establish rates, tax bases and administrative responsibilities in the area of local taxes would tend to strengthen the fiscal co-responsibility of these governments, improve their accountability and their efficiency.

Therefore, an effective way to address the problem of intergovernmental tax allocation could be to try establishing the links between the different taxable events and territories on the basis (separately) of the efficiency and equity considerations that are considered relevant (Jiménez, Muñoz, Podestá and Suarez Pandiello, 2023). In the first case, it would be a matter of linking the possible taxable sources with the market failures to be corrected, while in the

second, distributive considerations should be considered, without losing sight of the trade-off between efficiency and equity.

If we review the usual catalog of market failures that generate inefficiencies, we could associate episodes linked to digitalization to most of them: monopolistic or restrictive practices of competition, externalities, public (bad) goods, asymmetries in information or "abusive" exploitation of common goods.

From these associations, one could conclude that there is a need for corrective interventions by governments, not all of them necessarily of a tax nature, although there is room for them in order to improve economic efficiency. The public response may range from regulatory measures to ad valorem taxes on data, taxes on data mining or taxes on personalized advertising. However, the introduction of any of these figures is not free of technical difficulties, both in terms of the reasonable configuration of taxable bases and the assessment and management of compliance.

4. Digital taxation at different levels of government: practices in Latin American countries

In the federal or more decentralized countries of Latin America, taxation of digital activities at the intermediate and/or local level has mainly consisted of including these sectors as taxable under existing general consumption taxes, such as the gross income tax in Argentina, the ICMS and ISS in Brazil, or the ICA in Colombia.

In this regard, most Argentine provinces have broadened the scope of the gross income tax to include digital economy activities in the taxable base. The general rate of the gross income tax on digital services averages 3.5%, although the general rates vary among provinces (in a range between 1% and 6%) and, in some cases, according to the type of digital good or service and the status of the registered taxpayer. For example, some jurisdictions apply higher rates to gambling and video games (up to 13.2%) or a lower rate to those digital service providers registered as taxpayers[1].

In Brazil, as of April 2018, states may charge ICMS on transactions with digital[2], goods and merchandise , such as software, programs, electronic games, applications, electronic files and similar, which are standardized; where it has been agreed that the taxable base for the calculation of ICMS on transactions with standardized software, programs, applications and electronic files is reduced so that the tax burden results in 5% of the value of the transaction. In the case of ISS, the regulation sets a minimum rate of 2% and a maximum rate of 5% to be determined by each municipality and prohibits the granting of tax benefits that result in a tax burden lower than the minimum rate. However, some areas of overlapping tax powers between these levels of government and intergovernmental conflicts have been observed.

In Colombia, at the local government level, the industry and commerce tax (ICA) is paid on income generated in a municipality from industrial, commercial, and service activities, and the rate for digital transactions is determined by each local government (Bogota: 1.063% and Medellin: 0.3%).

1 Although each province has autonomy to establish the scope and rates of the tax, in December 2021, the provinces and the national Executive Branch signed a new Fiscal Consensus in which provisions on subnational taxation of the digital economy are included. For more details, see Jiménez and Podestá (2022).

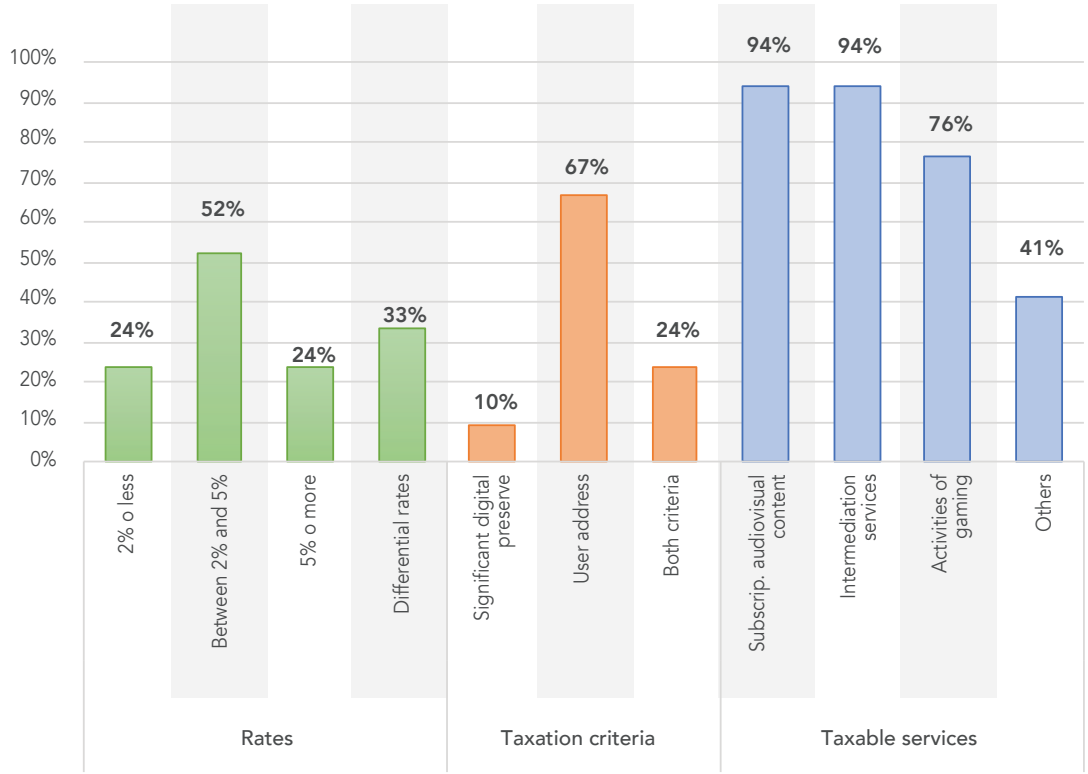
2 See for more detail ICMS Agreement 106/2017 of the National Council for Fiscal Policy (CONFAZ) published in September 2017.

From the review of subnational taxation on the digital economy in these three countries, it appears that more than half of the subnational governments analyzed have established rates ranging between 2% and 5%, although there is some variability in rates between jurisdictions and, in some cases, within the same jurisdiction, depending mainly on the type of digital good or service. In addition, in order to determine the indirect taxation of digital services in a given jurisdiction, the subnational governments of Brazil, Colombia and most Argentine provinces use one or more indicators to identify whether the domicile of the user of the digital good or service is in their territory, although some Argentine provinces apply the concept of significant digital presence. Regarding the scope of these taxes, almost all of the subnational governments examined levy indirect taxes on the commercialization of online subscription services for access to audiovisual content and intermediation services. In addition, most jurisdictions include gambling activities in the tax base, and some also tax other digital services or goods, such as data processing and storage services, online advertising, databases, remote system administration, online technical support, etc. (figure 2).

FIGURE 2

Characteristics of subnational indirect taxes on the digital economy - Latin America

Selected countries (Argentina, Brazil and Colombia), 2022, as a percentage of total jurisdictions



Source: Jiménez and Podestá (2022), "Subnational finance and digital economy: Indirect taxation on digital activities in subnational governments", CIAT.

On the other hand, in Mexico City, the creation in 2022 of a tax, called "*aprovechamiento por uso de infraestructura*", for companies that carry out intermediation, promotion or digital facilitation activities through computer platforms dedicated to the delivery of food and other products within its territory, with the argument that they make use of the city's infrastructure, stands out. This tax is 2%, before taxes, on the total commissions or fees charged for intermediation, promotion and/or facilitation, and according to the regulations, its collection may be used preferentially for the maintenance of Mexico City's infrastructure.

5. Options for subnational taxation of the digital economy

As analyzed above, the digital revolution poses challenges in the tax sphere at the local level, generating conflicts and overlapping competencies between different levels of government. Although there are international efforts to coordinate the taxation of the digital economy and close tax gaps, progress has been limited and the characteristics of digitalization make it difficult to implement taxes on the income and revenues of companies in the digital economy.

This generates important challenges in terms of tax revenues for subnational governments since the growth of the digital sector does not necessarily translate into higher revenues due to the difficulty of adjusting their tax systems to this new reality. In addition, traditional companies may migrate to the digital sector and operate from abroad in order to avoid taxation or pay less taxes. On the other hand, the expansion of the digital economy increases the demand for goods, services, and infrastructure at the local level, which requires greater financing from subnational governments.

This raises some key questions:

a) How much of the digital sector tax bases can be reallocated at the subnational level?

b) How much revenue is raised from digital economy at the central government level?

In general, the answer to both questions is that, at least for now, experience shows that the size is small.

Regarding the first question, if the principle of benefit is considered, there are criteria that could justify the subnational allocation of those charges on end users (for example, for tourist accommodation services provided through Airbnb-type IT platforms); last mile charges for digital activities that use existing infrastructure and public space, such as roads and public access routes, to connect or access the digital good or service (for example, delivery companies, Uber, logistics platforms, PedidosYa, Glovo, etc.). In this regard, certain examples can be observed in some European jurisdictions and cities in the United States (Committee of Expert Persons - IEF, 2022).

On the other hand, regarding the second question, the amount of revenues obtained by central governments from the activities of digital companies is currently quite small (Jiménez and Podestá, 2021) and basically corresponds to indirect taxation, given that the appropriate mechanism for extracting revenues from these activities and distributing them among the different countries participating in their generation is still under discussion at the global level. Consequently, the number of resources to be distributed between the central government and the intermediate and local levels is, for the time being, quite limited.

6. Recommendations and challenges

In short, it can be noted that there are options of tax bases and indirect taxation to be exploited at different levels of government. As for direct taxation (income/profit), it can be very difficult for subnational governments to control avoidance, so it is more efficient for this function to be exercised by the central levels in coordination with other countries.

In addition, the allocation and design of subnational taxes on the digital sector should be accompanied by the redesign of intergovernmental transfer systems so that they are in line with the new reality and allow subnational governments to appropriate a portion of the resources generated. To this end, it would be advisable to incorporate into the distributive formulas components of: need (especially those linked to the expansion of digitization in public administrations and the fight against the digital divide); capacity (associated with the economic activities of the sector); and the efforts of subnational levels of government in the development of digitization.

In this context, a reform agenda should consider that given that the bulk of taxation will probably remain the responsibility of higher levels of government (national or even supranational), it is important to define the form of intergovernmental distribution of these resources, depending on the new needs generated by the expansion of digital activities, which may be different depending on the level of government.

The region is facing a series of intergovernmental conflicts, which although not exclusively originated in the digital sector, warn about the need but also the difficulty of modifying the intergovernmental transfer and subnational financing regimes.

It is crucial to lay the foundations of this debate in the link between the new resources expected to be captured from the digital sector and the new needs that these changes in the productive spaces and in the economy will generate for the subnational levels of government.

Central, intermediate, and local governments face the imperative of adapting their tax systems to this new reality, ensuring sufficient tax revenues to provide the necessary goods, services, and infrastructure. At the same time, it is necessary to rethink transfer systems, which requires a careful and coordinated approach among the various levels of government.

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III.2. Digital transformation of the Tax Administration in Cuba

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Introduction

Digital transformation is a key objective of the Cuban Tax Administration, not only to achieve greater efficiency in revenue collection and tax control, functions inherent to the institution itself, but also to provide better services to taxpayers and citizens, facilitating compliance with their tax obligations in the voluntary term, which, in turn, lead to achieving the estimated collection levels.

The digital transformation process is a strategic and urgent issue that emphasizes processes and places the citizen at the center. The digital transformation is transversal to all economic, political, and social factors, and involves the government at different levels, public institutions, all economic actors and citizens.

The Cuban Tax Administration, within the Public Administration, is the leader in the computerization of processes and services, encouraging other sectors to achieve the necessary synergy in the completion of the processes in which they are involved, since the possibility of transmitting, storing, and processing large amounts of data through information and communication technologies has transformed the way in which the Tax Administrations carry out their functions.

The work of the Cuban Tax Administration, within the process of digital transformation, is aimed at promoting tax culture, to achieve revenue collection through proactive work with taxpayers to encourage the voluntary payment of their tax obligations, providing them with facilities and services that may be available in the digital era, all this with a constant improvement of the internal processes of the organization, based on the development of computerization and communication.

1. Characterization of the Cuban Tax Administration

The Cuban Tax Administration *Oficina Nacional de Administración Tributaria*, ONAT, has three levels of organization in the country: 1 Central Office; 16 Provincial Offices and 168 Municipal Offices.

The year 2021 saw the updating of the economic actors in Cuba, where an opening was made for the private sector, authorizing the creation of MSMEs (micro, small and medium-sized enterprises), which are an economic actor that emerged in a digital environment and caused an increase in the number of registered taxpayers.

The total number of registered taxpayers exceeds one million, 1,105,187 taxpayers, of which 1,074,441 (97.2%) are individuals and 30,746 (2.8%) are corporations, of which more than 5,000 are MSMEs.

In Cuba, with a population that does not exceed 11 million Cubans, there are more than 7 million cell phone lines and more than 5 million of them have access to digital payment channels, which has facilitated digital interaction with this sector of the population. The extension of the COVID-19 pandemic forced the country to make decisions to limit the movement and concentration of people, among which was approved in 2020 the payment of taxes through electronic channels with a benefit of 3% of the amount to be paid, for the taxpayer who used these channels.

The ONAT receives a daily average of approximately 4,000 formalities and requests, so that, in times of pandemic, it was necessary to enhance digital services and procedures. Thus, as a first step, the existence of an e-mail for consultations and a direct telephone line was guaranteed in each office of the country in order to achieve a correct attention and assistance to taxpayers. It was also necessary to update ONAT's digital portals, with emphasis on improving communication with taxpayers, so in December 2020 the tax portal www.onat.gob.cu was launched, which included services for taxpayers and public information on tax matters for the general public.

The use of the digital signature for corporates made it possible for ONAT officials who issue tax documents to do so in digital format with the use of the Digital Identity Certificate, which was established by ONAT for all signing officials of the institution. Likewise, the payment of the tax on documents through electronic payment channels was approved in 2021, which until now was only done through stamp stamps.

2. Development of the ONAT's digital transformation program

In accordance with the country's policy and international trends, the ONAT developed a program for the digital transformation of the tax administration that included internal technological development projects which, in turn, translated into external services and facilities for taxpayers, some of which will be referred to in this article.

2.1. Integrated Tax Management Technology Platform (Gesti)

ONAT has its own technological platform for Integrated Tax Management known as "Gesti", which has been developed, linking the existing databases, for internal use at all three organizational levels of the institution. This platform has different modules all interrelated, linked to the work processes of the organization, namely:

- Taxpayer Registration
- Collection Control
- Management of Obligations
- Legal Services

• Auditing

• Taxpayer Services

• Tax Intelligence

• Analysis and Investigation

The deployment and consolidation of these integrated modules allows for efficiency in the use of the technological infrastructure, increasing connectivity, security, and data protection, as well as its use in internal and external services. The main feature of this system is that all modules intercommunicate with each other through the taxpayer's current account.

Internal Impact:

- Control, information and reports on daily collection, tax debt, payment obligations, payments made, procedures, audits, control actions and all the institution's processes.

- Enabled the creation of a single digital file that integrates all modules and eliminates all paper forms used by ONAT.

- Accuracy and speed in registration, deregistration, suspension, modification, and other procedures related to taxpayers.

External Impact:

- Enables interconnection with other platforms of the governing bodies to carry out registration procedures digitally.

- The information is provided in reports as services and procedures to taxpayers.

- Provides fiscal information for ONAT and government decision making.

Among the results that have allowed the benefits offered by Gesti is the generation of the tax vector for both individuals and corporates, which is a document containing the obligations and payment periods of taxpayers, which has enabled the effective fulfillment of tax obligations through electronic channels, for both taxpayers, minimizing errors and facilitating the payment of taxes, fees and contributions. The tax vector is the first and most important direct assistance action received by taxpayers in Cuba since, in addition to the information for the payment of obligations, it has a text explaining how and when to pay, as well as information on duties and rights as a taxpayer.

2.2. Data intelligence platform (Big data)

We are working together with software development institutions and a scientific-university team to create a data intelligence platform, in which ONAT participates as data client/provider, aiming to achieve the integration of large volumes of heterogeneous data from different sources, with a high processing capacity, high data security, anonymity of sensitive information and the availability of web services (API) and dashboards, which will allow the use of statistical information to improve government decision making and also to be useful for national agencies and entities.

To this end, algorithms, methods, and analysis models are implemented in tax administration processes throughout the country to facilitate the detection of anomalies, the identification of at-risk taxpayers and other aspects that will favorably enable proactive management and differentiated assistance by taxpayer sector, reducing non-compliance and, therefore, the fines and surcharges for these concepts.

Internal Impact:

- Automatic detection of potential under-declarants and non-compliers.

- Prediction of delinquencies or possible non-payments based on historical performance.

- Organization of an action recommendation system, based on artificial intelligence, in case of possible future non-compliance (generation of proactive alerts, warnings to contributors, etc.).

- Selection of taxpayers to be audited based on tax fraud risk levels.

- Evaluation of known fraud scenarios using rule engines.

External Impact:

- The analysis and results achieved in the tax administration scenario become an organizational and technological reference for accelerated scaling towards the incorporation of other data sources and analysis scenarios.

2.3. Digital signature

The National Tax Administration Office (ONAT) achieved digital taxpayer registration through inter-institutional electronic platforms with the Ministry of Labor and Social Security, the governing body for self-employment, and with the Ministry of Economy and Planning, which is the governing body for authorization in the process of updating economic actors, using the possibilities offered by the digital signature and payment of stamp stamps electronically.

The ONAT was the first institution in the country to deliver the digital signature or certificate to individuals, as it was previously only available to corporates. Currently, the digital signature is an everyday reality for ONAT taxpayers, who can request their electronic certificate at the municipal offices where they are registered, and thus proceed to sign documents from their cell phone, tablet, or personal computer, anywhere and at any time.

Despite wide dissemination, the number of taxpayers with electronic certificates is still insufficient, and they can make use of the procedures and services involving digital signature, mainly because taxpayers can only make use of this certificate in procedures with ONAT.

Internal Impact:

- This translates into significant savings in time and resources for ONAT, which can deliver the tax documentation in digital format.

- Allows inter-institutional connectivity to carry out digital processes avoiding the need to go to offices.

- Ability to provide digital services to taxpayers in an expeditious and secure manner.

External Impact:

- Access to digital services in an agile and secure operation.

- Reduces process execution time, avoiding queues.

- Avoids displacements and transfers.

- Greater security and integrity of documents.

2.4. Tax Portal (www.onat.gob.cu)

As part of the development of the Tax Administration's digital transformation program, the office has a Tax Portal, which provides information of interest to all publics and interactive services for taxpayers authenticated in it, increasing the exchange between taxpayers and the Administration, through the provision of new tax services and the possibility of carrying out online procedures. So far, a total of 82,461 taxpayers have registered in the Portal, who can make use of the digital services it offers.

The services that can be accessed from the Portal include the following:

a) Tax vector download: 251,909 tax vectors have been downloaded to date,

b) Specialized queries: 9,631 queries have been answered,

c) Consultation of payments made: 53,757 payments have been made,

d) Tax Return with digital signature: started in January 2023 (78 tax returns received).

As part of the facilities provided by the ONAT, all municipal offices in Havana and in the main municipalities have a self-service station where taxpayers can access, using the office's intranet, the tax portal and access its services. This is mainly used by customers who do not have access to mobile networks or by bookkeepers, a self-employed figure in charge of taxpayers' payments and accounting. For these subjects, who seek to facilitate the payment of their clients, the services of the Portal were adapted, with the established security and transparency, so that they can access to download the documentation of the clients who declare before the ONAT

Internal Impact:

- The Tax Portal provides tangible results in the creation and consolidation of a positive public image of ONAT, the facilitation of compliance with tax obligations, the increase of tax culture and the formation of a collective tax awareness.

External Impact:

- Provides facilities and services to taxpayers and the population in general.

- Enables digital access to previously face-to-face procedures and services.

- All the benefits of the computerization of procedures and services.

2.5. Electronic Tax Invoice

The ONAT, together with other institutions, is working on the proposal for the Electronic Tax Invoicing System. So far, the following achievements have been reached.

Firstly, seven electronic models were validated with the criteria of CIAT experts: Electronic Invoice, Electronic Final Consumer Invoice, Electronic Debit Note, Electronic Credit Note, Electronic Waybill, Electronic Invoice with Withholding to the Buyer and Electronic Invoice with Withholding to the Seller. In addition, the Ministry of Finance and Prices has drafted a proposal for a legal norm to regulate the use of these electronic receipts. In addition, work is being done on an IT solution to process electronic invoices in the cloud, independently of the applications used at the invoicing/vendor level, with the incorporation of the tax component. Finally, the infrastructure has been implemented and the country is in the phase of adapting and certifying the accounting systems.

Internal Impact:

- It will make it possible to increase tax control, reducing under-declaration of income and tax evasion.

- Reduction of administrative costs for ONAT.

External Impact:

- It will allow taxpayers to simplify and reduce costs in the tax filing process by eliminating the filing of reports and associated schedules.

- Streamline the tax refund process.

2.6. Institutional Communication: Social Networks

Digital transformation in an organization works in coordination with three main pillars: processes, technology and the most important, people, who are the main receiver and operator of this change. The interaction between the Tax Administration and citizens during the COVID-19

pandemic demonstrated the importance of institutional communication and within it, that which is made possible by social networks. For this reason, ONAT has maintained an important positioning of contents through this channel.

- The ONAT's institutional Facebook page is kept updated with the generation of its own content, based on information and proactive alerts for compliance with voluntary tax obligations. With respect to the previous year, the reach doubled, and user visits increased three times.

- In addition, there is an ONAT channel on picta.cu (Cuban audiovisual content platform developed by the University of Computer Sciences of Cuba), which is also present on YouTube, where content and videos that have achieved high visualization and whose materials have been massively downloaded are made available to the public.

- In the Telegram channel OnatdeCuba, more than 5 thousand subscribers were reached, 3,582 more than the previous year. More than 25 thousand queries have been received in the OnatdeCuba group, mostly doubts and comments that have been answered on the same day. The average number of views of Telegram news is approximately 3,809.

- On Twitter @OnatdeCuba there was an increase in the number of followers with respect to the previous year.

In addition to the above, all the digital services offered by the Cuban Tax Administration, in addition to the authorized procedures, can be found in the catalog of digital services published in the institution's Tax Portal.

3. Results obtained by the Cuban tax administration

In recent years, the Cuban Tax Administration has been guided by the country's policy of promoting an integral culture for the intelligent, critical, and responsible use of digital technologies, which stimulates the production of computer applications and services, with innovative thinking and the use of scientific research. This has made possible the improvement of the institution's work, ensuring the fulfillment of its own mission to achieve the promotion of tax culture and social responsibility, providing facilities and services that contribute to the voluntary compliance with tax obligations, supported by the computerization strategy carried out by the country. In this regard, the most outstanding results of the ONAT are highlighted as follows:

a) In 2022, the number of procedures increased due to the updating of the economic actors, which led to new registrations; 45% of the total number of procedures carried out was done digitally.

b) 43.3% of payments made by individuals were made through electronic channels and represent 66.2% of the amount paid, growing by 15% and 9%, respectively, compared to 2021 (Table 1).

TABLE 1

Number and amount of tax liability payments by payment channel and type of taxpayers, 2022

In number of payments, as a percentage of total payments per taxpayer and in Cuban Pesos

Type of taxpayer	Type of channel	Quantity		Amount	
		Number of Payments	%	Payments Amount	%
Individuals	Electronic	2,868,519	43.3	5,269,501,430	66.2
Individuals	On-site	3,760,396	56.7	2,686,424,598	33.8
Total individuals		**6,628,915**		**7,955,926,028**	
Corporates	Electronic	1,438,302	61.9	75,706,868,281	52.1
Corporates	On-site	884,097	38.1	69,672,671,451	47.9
Total Corporates		**2,322,399**		**145,379,539,732**	
Total		**8,951,314**		**153,335,465,760**	

Source: Oficina Nacional de Administración Tributaria de Cuba.

c) For 2023, work began on the implementation of the online payment of the tax vector for individuals using QR codes.

d) With the use of the digital signature and electronic seal, new services were consolidated by 2023 in the tax portal (tax certification with digital stamp seal and consultation/update of registry data).

e) Taxpayers with digital signature are able to receive their personal income tax returns digitally through the Tax Portal.

f) With the launching of the Affidavit Tax Return service with digital signature on the Portal, in the first month of 2023, the number of taxpayers accessing the digital signature increased by 24.8%.

g) The digital gap was reduced: in 2022, taxpayers in the agricultural sector were the ones who most accessed payment through electronic channels, almost 70% of them paid their additional liquidation through digital channels. The percentages of electronic payment were also high for personal income taxpayers in the sugarcane sector and in the general regime, where the percentage was even higher considering the accumulated amount of tax collection (Table 2).

TABLE 2

Number and amount of personal income tax payments by payment channel and specific sector, 2022

In number of payments, as a percentage of total payments by sector/regime and in Cuban Pesos

Type of individual	Type of channel	Quantity		Amount	
		Number of Payments	%	Payments Amount	%
Sugarcane sector	Electronic	139	62.9	375,088	72.3
	On-site	82	37.1	143,851	27.7
Total sugarcane sector		**221**		**518,938**	
Agricultural sector	Electronic	16,071	69.4	24,521,537	67.8
	On-site	7,079	30.6	11,644,609	32.2
Total agricultural sector		**23,150**		**36,166,145**	
General Regime	Electronic	16,465	66.6	1,563,883,433	86.3
	On-site	8,270	33.4	249,102,034	13.7
Total general regime		**24,735**		**1,812,985,467**	

Source: Oficina Nacional de Administración Tributaria de Cuba.

h) Among the tax returns received with digital signature, 86% are from taxpayers born before 1990, and 52% are from taxpayers over 50 years old.

i) In the first quarter of 2023, the number of contributors registered in the Portal grew by 20.6%.

j) 38.1% of taxpayers as corporate entities are registered in the Tax Portal.

k) The ONAT has managed to maintain in the national media materials to encourage and facilitate the access of taxpayers and citizens to our digital services with the vision of educating by communicating. .

4. ONAT projects for the future

In the continuity of this digital transformation process, the main forward project (ONAT-Finanzas en La Habana Technological Innovation Project) aims to have a direct impact on the promotion of tax culture in the population and the improvement of tax control. This project focuses on the creation of a fully digital tax office, with the following functions:

- ***Creation of a facilitation office in a digital environment*** (*Centro de Atención al Contribuyente - CentAC*), which will provide excellent service to taxpayers electronically. It will have windows for specialized attention to older taxpayers, with relatively lower technologies skills and with constant advice through facilitators. Additionally, it will have a Call Center for receiving and answering calls 24 hours a day, 7 days a week (24*7). The aim is to encourage voluntary compliance, with an attitude oriented to serve taxpayers, ensuring that the offices streamline administrative procedures, avoid travel to the offices and provide effective information services.

- ***The Fiscal Observatory*** aims to achieve higher levels of effectiveness and efficiency in revenue collection and public spending. It is a space where the general population and public institutions have at their disposal daily information related to: i) revenue plans and their daily compliance, by municipality and province; ii) expenditure behavior by territory and budgeted units; iii) revenue and expenditure by taxpayer and by geographic location (mapped); iv) tax and contravention debts; v) tax studies, investigations, tax control news; vi) characteristics of municipalities and daily revenue management; vii) tax collection and expenditure by territory and budgeted units; viii) revenue and expenditure by taxpayer and by geographic location (mapped); viii) tax and contravention debts; viii) tax studies, investigations, tax control news; viii) characteristics of municipalities and daily revenue management.

This tool is intended to serve as a vehicle for obtaining information that contributes to transparency, equity, and territorial balance, as well as to ensure that fiscal policy decisions are well-founded and coordinated, thus promoting public confidence in the institutions of the three levels of government, as well as constituting a control tool. Thus, the adequate analysis of the information obtained from the Fiscal Observatory allows for the following:

- Greater Fiscal Transparency based on knowledge of the administration of contributions to the State Budget and their destination.
- Improved tax administration and better selection of taxpayers to be audited.
- Improved management of tax and violation collections.
- More efficient capture of resources and their effective application.
- Evaluation of government management based on the management of increased revenues and the proper and orderly use of expenditures.
- Produce and disseminate high quality and high impact reports for decision making and analysis of the economic development of the province or a particular municipality.
- Provide simple and user-friendly applications and tools for its use as a public good by the public sector and citizens in general, as well as relevant stakeholders in the territory.

• Creation of a ***Delegation of Large Taxpayers***, for the virtual service and attention of the largest taxpayers in Havana, using digital media, video chat rooms and providing a group of incentives or inputs such as shortening terms for specific procedures, personalized assistance, prior reviews of affidavits tax returns, among others.

5. Conclusions

In short, the Cuban Tax Administration has as a strength to advance in the digital transformation, the computerization of its internal processes associated with a robust platform, Gesti. This is linked to the fact that digital transformation is, in fact, a strategy of the Cuban government and the country has the legal regulations that ensure its use.

To this end, ONAT is working on computerization projects that establish an architecture to improve its processes, and achieve specialization in data analysis, information cross-checking, risk classification, gap maps, all of them to carry out proactive work aimed at voluntary compliance. In a difficult economic environment, with external restrictions, ONAT has enhanced digital services and facilities for taxpayers, taking advantage of the benefits of the digital era.

In this regard, technical training on issues related to digital transformation is an imperative need of the Tax Administrations. The integration of the ONAT in projects and advisory services will allow it to continue to move closer to its priority objective of achieving digital transformation, which is both strategic and urgent, and which places the citizen at center stage.

III.3. Challenges and opportunities for tax administrations after the COVID-19 crisis: The Canada Revenue Agency's experience

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Introduction

In early 2020, the pandemic took the world by surprise, and it presented new challenges for tax administrations. The following report will focus on the Canada Revenue Agency's experience following the COVID-19 crisis.

The Canada Revenue Agency (CRA) was able to overcome several of these new challenges with the assistance of digital and remote services that were already available to Canadian taxpayers prior to the pandemic, including electronic filing and free tax clinics. This report will cover the history of these services, as well as how they have continued to aid both the CRA and Canadian taxpayers since their inception.

This report will also detail the introduction of various COVID-19 benefits, offered by the Canadian Government to assist Canadians and support Canada's more vulnerable populations.

Lastly, the report will look at the challenges the CRA faced, as well as its opportunities for change and growth.

1. Electronic Filing

The CRA began offering secure electronic services to Canadians in the early 90's. The first program was called EFILE and gave tax preparers the ability to file their clients' personal income tax returns electronically. In 2000, the NETFILE program was introduced to enable individual Canadians to electronically file their returns. By 2002, electronic filing for GST/HST (VAT) returns and for Corporation Income Tax (T2) returns were implemented.

From 2003 to 2006, online services for individual taxpayers/benefit recipients, business owners and authorized representatives were developed: My Account, Represent a Client, and My Business Account. The My Account service

provides individuals convenient and easy to use services related to their personal income tax and benefit information. These include the ability to track the status of a return, to view or make changes to a return, and to check benefit and credit payments. The Represent a Client service meets the needs of authorized representatives to manage the tax affairs of other individual and business taxpayers. Finally, the My Business Account allows business owners to manage their various business accounts with the CRA through various services.

Given the CRA's secure, fast and easy e-filing service, the percentage of Canadians using this method to file their taxes has continued to increase over the years, with a significant increase seen during the pandemic. The growth in the percentage of returns filed electronically is due to an ongoing commitment towards continual improvement in the suite of CRA e-services offered.

Over the years, the CRA has steadily added new services such as:

- Electronic payment options, which reduces the cost of cheque processing.
- The ability to submit documents electronically, which facilitates compliance.
- The option to receive email notifications from CRA informing clients that they can view their Notice of Assessment, or other correspondence, online, reducing postage costs for outgoing correspondence.
- The Progress Tracker service to allow Canadians to track the status of certain files they have sent to the CRA.

Despite the high rate of e-filing in Canada, the CRA works daily to ensure its digital services continue to evolve to meet the needs of Canadians. The CRA works closely with stakeholders, including the software developer community, to certify tax preparation software packages. The Agency will continue building communication products, infographics and videos, as well as engaging in social media and attending relevant public speaking engagements. The continued provision of more digital services ensures the CRA is meeting the expectations of taxpayers and benefit recipients while also contributing to the government's ongoing goal of fiscal responsibility.

2. Free Tax Clinics

The CRA's Community Volunteer Income Tax Program works in collaboration with community organizations in supporting free, volunteer-based tax preparation clinics for individuals with a modest income and simple tax situation. These clinics help eligible individuals in filing their tax returns in order to access the benefits and credits designed to support them. This program works to reduce the barriers that dissuade individuals from filing a return, including the cost of engaging tax preparation assistance, limited financial and technological literacy, the perception that filing is complicated, and not wanting to make an error on a tax return.

Due to COVID-19 mitigation measures, the CRA introduced virtual tax clinics to provide assistance to individuals who may not otherwise have access to in-person free tax preparation services. This service is offered by videoconference, telephone, or via document drop-off arrangement. Virtual clinics will remain a part of the program even now that the restrictions have been lifted, as they provide organizations flexibility and the opportunity to extend their reach beyond their immediate region.

3. COVID-19 Benefits

During the COVID-19 crisis, the Government of Canada committed to support Canadian workers, business and service providers through several COVID-19 benefits programs that were available between March 15, 2020, and May 7, 2022.

As the CRA is a leader in the administration of benefits and taxes, the Agency was responsible for managing the COVID-19 benefits listed, on behalf of the Government of Canada. In order to make these benefits available to everyone, the CRA used existing electronic filing systems.

The following subsidies, benefits and programs were available:

- Canada Emergency Response Benefits (CERB)
- Canada Recovery Sickness Benefit (CRSB)
- Canada Recovery Benefit (CRB)
- Canada Worker Lockdown Benefit (CWLB)
- Canada Recovery Caregiving Benefit (CRCB)
- Canada Emergency Student Benefit (CESB)
- Canada Emergency Business Account (CEBA)
- Canada Emergency Wage Subsidy (CEWS)
- Canada Emergency Rent Subsidy (CERS)
- Canada Recovery Hiring Program (CRHP)
- Hardest Hit Business Relief Program (HHBRP)
- Tourism and Hospitality Relief Program (THRP)

4. Challenges during COVID-19

The CRA's top priority when managing the administration of the COVID-19 benefits was to ensure that access was simple and clear, and that benefit payments got into the hands of those who needed it, as quickly as possible. However, this also presented a new avenue for scammers to try to take advantage of taxpayers seeking these benefits, through fraudulent emails, texts, and phone calls.

Due to an increase of frauds and scams during COVID-19, the CRA had to enhance its security measures. The Agency monitored for fraud and suspicious activity and implemented necessary controls to protect the integrity of the programs and helped ensure that only eligible Canadians were receiving benefit payments.

Other security enhancements include:

- **Multi-factor authentication.** This was implemented throughout the CRA sign-in services and requires users to enter a one-time passcode when they sign in.
- **CRA scam alert.** This allows Canadians to stay up to date about the latest scam and fraudulent communications.
- **Two-way authentication captcha.** During COVID-19, the CRA website had a password breach. The Agency responded with a captcha to reinforce their security system. The captcha helps protect taxpayers as well as the Agency, by asking users to complete a simple test to prove that they are not a computer trying to break into a password protected account.

5. Opportunities during COVID-19

One of the greatest positive outcomes of the pandemic was the new relationships that were built during the early part of the federal government roll-out of COVID-19 related benefits. The CRA worked with a number of stakeholders to identify and mitigate risk of benefits fraud. These partners included police at the federal, provincial and municipal levels, financial institutions, and other federal departments such as the Department of Justice. All stakeholders have very different and specific mandates, but all had information that could contribute to minimizing fraud against the public purse and compromise of important programs to Canadians.

These partnerships assisted in identifying CRA system vulnerabilities, fraudulent schemes, and links between schemes and criminal groups. It also assisted in initiating criminal investigations or audits, where applicable. The increased cooperation translated into a robust response by the CRA to counter benefits fraud. This increased coordination also assisted in the drafting of the new pieces of legislation providing the government authority to issue the different benefits.

Finally, the Agency expanded its insights into tax compliance through the Results Framework Indicators. The CRA also had the opportunity to hear directly from Canadians through online consultations and seven face-to-face sessions throughout Canada. These public consultations confirmed that the CRA is heading in the right direction, as Canadians are noticing significant improvements with how the Agency serves them.

III.4. Simplified regimes for small taxpayers: A path to tax inclusion

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Introduction

Informality is a widespread phenomenon in Latin America, with multiple causes and a series of negative effects that are reflected in various socioeconomic indicators. Several studies on the subject have presented evidence that the tax system influences the size of the informal economy. High levels of informality, in turn, undermine taxpayers' tax compliance, eroding available resources and distorting the effects of taxation on efficiency and distributive equity. In response to this problem, since the mid-1990s, the countries of the region have been exploring and implementing a series of simplified regimes for small taxpayers. The aim has been to reduce the workload of the tax administrations and thus improve their auditing capacities, favoring the formalization of a large sector of taxpayers (Gómez Sabaini and Morán, 2012).

The objective of this article is to present the context and the main trends regarding the dissemination and implementation of simplified tax regimes in the countries of the region. To this end, a set of their characteristics will be described, pointing out their potential as a tool for tax inclusion but also their possible limitations and weaknesses in terms of design, which require due attention in each specific case. Finally, the paper closes with some brief final comments on this topic.

1. Economic informality and its linkages with the tax system in Latin America

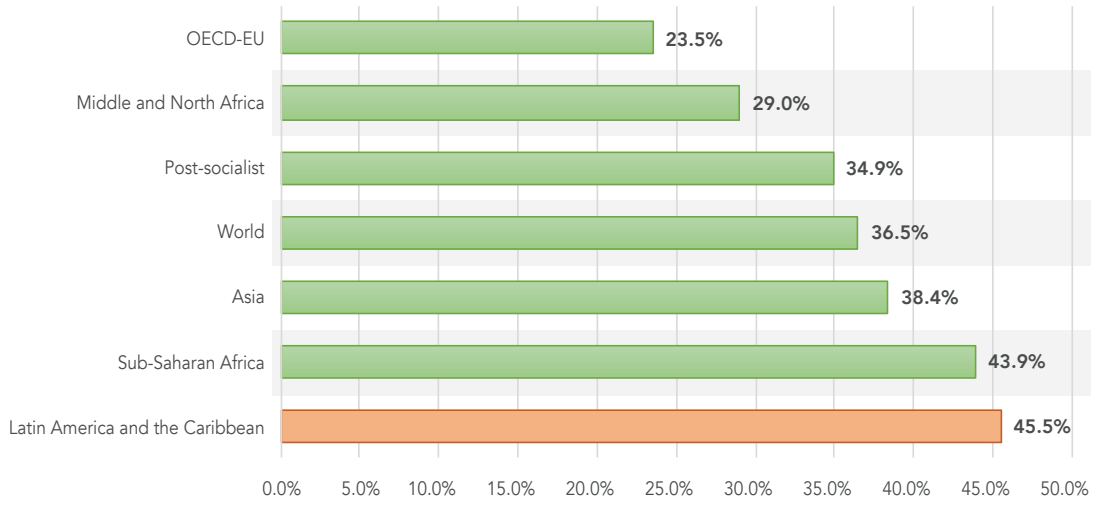
Across the globe, informality persists as an unresolved challenge for countries, in part because of the lack of a single definition in the economic sphere and because data indicate that its impact on the economy is significant. Despite this, there is some consensus on a broad definition of informality: the Non-Observed Economy (NOE), which encompasses subway, illegal, informal production, and self-consumption. In this regard, studies such as that of Elgin and Oztunali (2012) suggest that the NOE represents 36.5% of GDP worldwide, 23.5% of GDP in the developed

countries of the OECD and the European Union, and 45.5% if only Latin American countries are considered, figures that are by no means negligible. In addition, labor informality in the countries exceeds 50% of the employed, according to the ILO (Salazar-Xirinachs and Chacaltana, 2018).

FIGURE 1

Global Estimates Non-Observed Economy Size (NOE)

Unweighted regional averages for 161 countries, around 2009, as a percentage of GDP

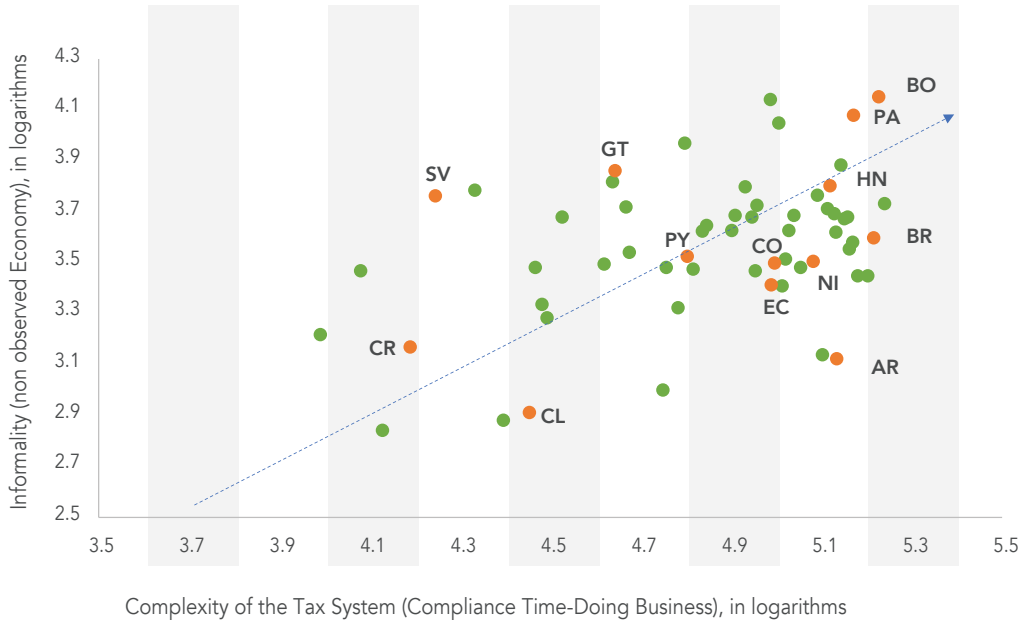


Source: Own elaboration based on Elgin and Oztunali (2012), "Shadow Economies around the World: Model Based Estimates", Working Papers 2012/05, Bogazici University, Department of Economics.

Although the causes of informality may be diverse, the complexity of the tax system stands out as one of them. Evidence suggests the existence of a positive relationship between the level of informality (or the size of the non-observed economy) and the degree of tax complexity (whose level can be approximated from the time it takes to comply with regular tax obligations in each country, according to the World Bank's Doing Business ranking (figure 2). Against this backdrop, countries have implemented simplified regimes to facilitate tax compliance by small taxpayers, which, according to the United Nations, represent 90% of companies. However, the design of these regimes is not homogeneous among countries. This article will analyze this interesting topic and its potential benefits for the economy.

FIGURE 2 **Informality and complexity of the tax system**

Individual country data, year 2009 (NOE) and 2019-20 (Compliance time), in natural logarithms



Source: Own elaboration based on Elgin and Oztunali (2012), op. cit., and Doing Business Archive (Banco Mundial, 2020).

2. Stylized facts on existing simplified regimes in the countries of the region

Simplified Regimes (SR) are strategies implemented by various countries with the objective of addressing fiscal challenges in the economy. Among their goals are:

- **Compliance Costs:** Reduce the administrative burden and compliance costs for small taxpayers, facilitating their inclusion in the tax system.
- **Formalization:** Increasing tax revenues by promoting the formalization of small businesses that might otherwise remain in the informal economy.
- **Tax Equity:** Establishes special plans that guarantee fairness criteria in the distribution of the tax burden.
- **Growth:** Stimulate economic growth and job creation by providing a more favorable tax framework for small business development.
- **Sustainability:** Promote the sustainability and development of micro, small and medium-sized enterprises (MSMEs).
- **Liquidity:** Support the liquidity or cash flow of microentrepreneurs.
- **Efficiency:** Strengthen the collection efficiency of tax administrations.

According to a survey for Latin American countries (CIAT members), the objective of "simplifying the process of complying with tax obligations" is the most prevalent, present

in almost 90% of the existing SRs, followed by "facilitating access to formality" with 78%, and then "reducing the tax burden for micro and small businesses" in 22% of the cases.

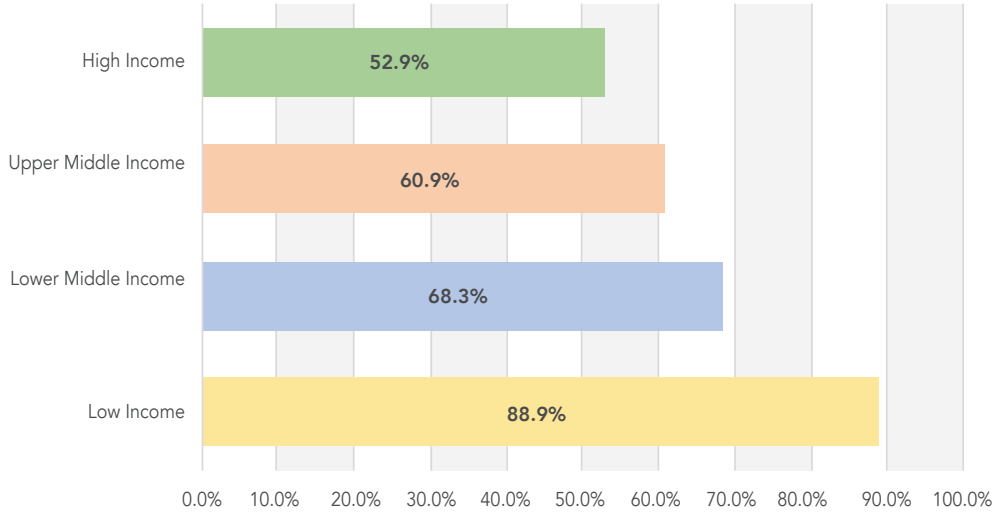
A global trend, according to data from the International Survey on Tax Administrations (ISORA), is that simplified regimes for small taxpayers are more common in low- and lower-middle-income economies. For example, SRs are present in 52.9% of high-income countries; however, in lower-middle-income countries this percentage rises to 68.3%, even more so among low-income countries where diverse examples are recorded in 88.9% of cases (figure 3). There are several reasons why simplified regimes for small taxpayers are more prevalent in low- or middle-income economies than in high-income ones:

- **Economic informality:** In low- and middle-income economies, informality is more prevalent.
- **Productive structure and employment:** In low- and middle-income economies, a larger proportion of the population works in small enterprises and informal activities.
- **Administrative capacities:** High-income countries generally have more sophisticated tax systems that are better equipped to deal with tax complexity. In contrast, low- and middle-income economies may face limitations in terms of human and technological resources, making simplified regimes a more appropriate and efficient option for these countries.

FIGURE 3

Relative presence of Simplified Regimes in countries by income level

Data for 156 countries (ISORA), years 2018-19, in percentages



Source: Own elaboration based on ISORA 2020 (Morán and Díaz de Sarralde, 2021).

Among the countries in the region, where SRs are widespread, most of the small taxpayers registered tend to be concentrated in certain economic activities such as the commerce and services sector, and among self-employed or independent professionals. This may be due to the following reasons:

- **Prevalence:** Small businesses and self-employed professionals constitute a significant proportion of the informal economy and more so in low- and middle-income countries.
- **Income structure:** Self-employed and independent professionals tend to have several and difficult to track incomes.
- **Low complexity:** Activities in the commerce and independent professional sector are usually less complex than in other sectors, such as industry or mining. This facilitates the implementation of a simplified regime for these taxpayers, as it is easier to establish simplified tax rates and criteria.

On the mandatory side, only 15% of the SRs require mandatory registration, while the majority are voluntary. One option for these cases would be to register taxpayers in the SRs by default upon registration unless they express their desire to be in the normal regime. This is in line with the statistical evidence that most of the companies that are incorporated are small.

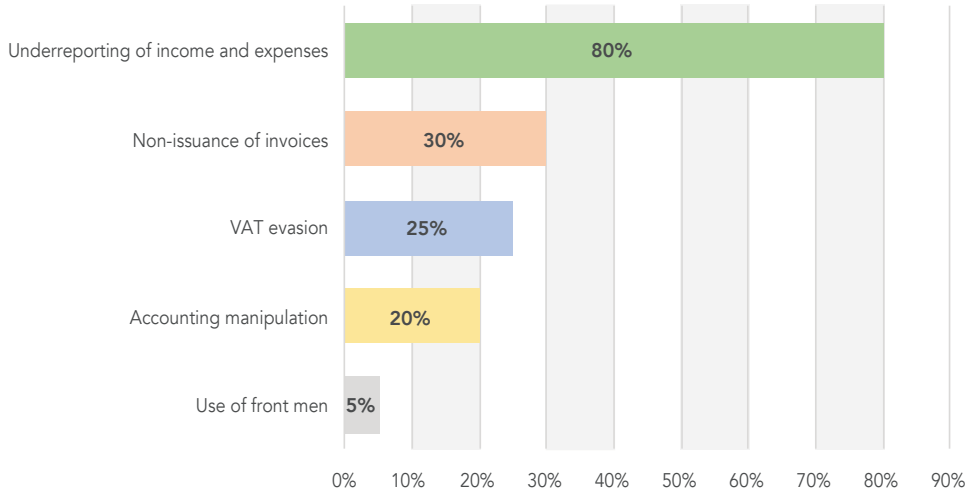
It is observed that only 15% of Latin American countries with SRs include social security contributions, in addition to VAT and IT, among the formal obligations substituted. This is more common in tax administrations that unify customs, internal taxes, and social security, suggesting that transaction costs may be higher when these institutions are separated. It should be noted that the more comprehensive the design of the SRs, the more attractive it is to taxpayers, increasing the likelihood of its use. Therefore, it is recommended to adopt this integration, which can also include other taxes such as permits and fees.

According to a survey for 20 Latin American countries, the most frequent tax risks of SRs are linked to the under-declaration of income or "fiscal dwarfism" (figure 4). For this, the Tax Administrations (TA) most frequently employ mechanisms such as audits, electronic invoicing, and review of tax returns to control SRs. Although this indicates that corrective treatments are still common, it is recommended to adopt a risk-based tax compliance management approach. Depending on the taxpayer's risk level, preventive or corrective actions could be applied.

FIGURE 4

Relative importance of the main tax risks in SRs according to Latin American Tax Administrations

Data compiled for 20 countries, year 2023, in percentages



Source: Own calculations, with data obtained from the official web pages of the Tax Administrations and CIAT.

Despite the widespread adoption of simplified regimes in most tax administrations, informality continues to be a problem in several countries. According to recent studies, very few taxpayers manage to formalize their businesses. Among the reasons behind this phenomenon are the number and complexity of requirements needed to access the SR or to create a company.

In addition, those taxpayers who are already part of the normal regime and wish to change to the SR face significant barriers due to the requirements demanded. Another possible cause is the lack of comprehensiveness in the SR, since it has been observed that they are more attractive when they include, in addition to internal taxes, benefits such as social security.

In this sense, Salazar-Xirinachs and Chacaltana (2018) warn of the challenges faced by Simplified Regimes in their implementation and sustainability. Among the main obstacles are the balance between simplification and efficiency in collection and control, and the difficulty of establishing fair tax rates for small taxpayers without discouraging their formalization. In addition, specialists highlight the importance of guaranteeing the long-term financial sustainability of the system, especially in the case of those taxpayers with low contributions. Another key aspect is to ensure that small taxpayers understand their tax obligations and comply with them properly. Finally, they stress the need for efficient and secure IT systems that facilitate the registration and payment of taxes by small taxpayers, thus ensuring the proper functioning of the tax system.

Good news is that data from ISORA (corresponding to the year 2019) indicate that SR countries show better indicators in the timely filing of tax returns, which suggests improvements in the evaluation indicators of TADAT (Tax Administration Diagnostic Assessment Tool) platform.

As taxpayers opt for the SR, the Tax Administration can gain in efficiency by reducing the administrative burden, for example, instead of managing the omission of 12 VAT periods with the SR, this is reduced to a single return per year. Therefore, the SRs allow to focus on taxpayers with greater economic capacity and free up personnel that can be used for more complex risk analysis tasks such as transfer pricing, mining, among others.

3. Final comments

In summary, simplified regimes for small taxpayers have a significant impact on the economy by facilitating the inclusion of smaller businesses in complying with their tax obligations and contributing to economic growth. Even more so in an environment with complex tax systems, which are conducive to informality. Therefore, despite some disadvantages such as the risk of abuse and tax evasion, these regimes represent a valuable tool to improve tax equity and promote the formalization of the economy.

To ensure the continued success of SRs, TAs must implement best practices, such as risk-based compliance management and the integration of social security into their design. This benefits both taxpayers and TAs by freeing up resources to focus on other priorities. Undoubtedly, the adoption of these regimes can be a key step towards fairer and more inclusive tax systems globally, creating a win-win situation for both taxpayers and TAs.

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IV. Progress

in the implementation and use of electronic invoicing, especially in the relation to improving tax compliance

Norad

IV.1. Exploitation of Big Data and use of Analytics tools as inputs for a Tax Risk model: the recent experience at the Servicio de Rentas Internas of Ecuador

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Introduction

In an increasingly changing and challenging context for tax control tasks, risk management appears as a fundamental strategy for any tax collection agency. To ensure its success, it is essential to rely on technological innovation and digital transformation, since they have the potential to make it possible to obtain better diagnoses as well as, simultaneously, more robust results in the efficient use of available resources.

In that sense, this article aims to present very briefly the recent experience of the Tax Administration of Ecuador the *Servicio de Rentas Internas* (SRI) in the exploitation of Big Data and the use of tax data analytics tools aimed at improving the operational tasks of the agency and tax management in general.

Therefore, following this introduction, the main background to the development of data mining as a strategic input for the tax administration is presented first. Then, the design of a comprehensive tax risk model based on taxpayer data analytics is described. It also presents the executive viewer -developed with innovative computer tools-, which represents a breakthrough in the management and instant availability of a large amount of statistical information for monitoring and decision making. Finally, the paper closes with some brief concluding remarks.

1. Background

Within its institutional philosophy, SRI recognizes the risk management approach as a fundamental guiding element in its mission and long-term vision. The institution understands that risk management is essential to ensure the effectiveness of its operations and the fulfillment of its responsibilities.

In addition, the SRI considers innovation and digital transformation as key tools to strengthen and improve internal controls. Through the adoption of advanced technologies

and the implementation of innovative processes, the SRI seeks to optimize its functions and achieve institutional objectives more efficiently.

Innovation and digital transformation provide the SRI with the opportunity to automate processes, streamline information exchange, improve data quality, and strengthen transparency in its operations. These tools contribute to better tax compliance, risk reduction and a greater capacity to provide efficient and quality services to taxpayers.

In this context, the Institutional Planning Model based on a management intelligence strategy recognizes the importance of the Collection Cycle as a key element in the definition, analysis, and evaluation of tax risk.

The Collection Cycle (see diagram 1 below) covers all stages of the tax collection process, from the identification of taxpayers to the examination and collection of tax obligations. The main objective of this cycle is to ensure the correct collection of tax revenues and minimize the risks associated with tax evasion and fraud.

The use of management intelligence allows the SRI to have a more complete and updated view of tax risks, which facilitates informed decision making and efficient resource allocation. Through the application of analytical techniques and advanced technologies, the SRI can identify patterns, trends and behaviors that help to detect possible non-compliance and design effective control strategies.

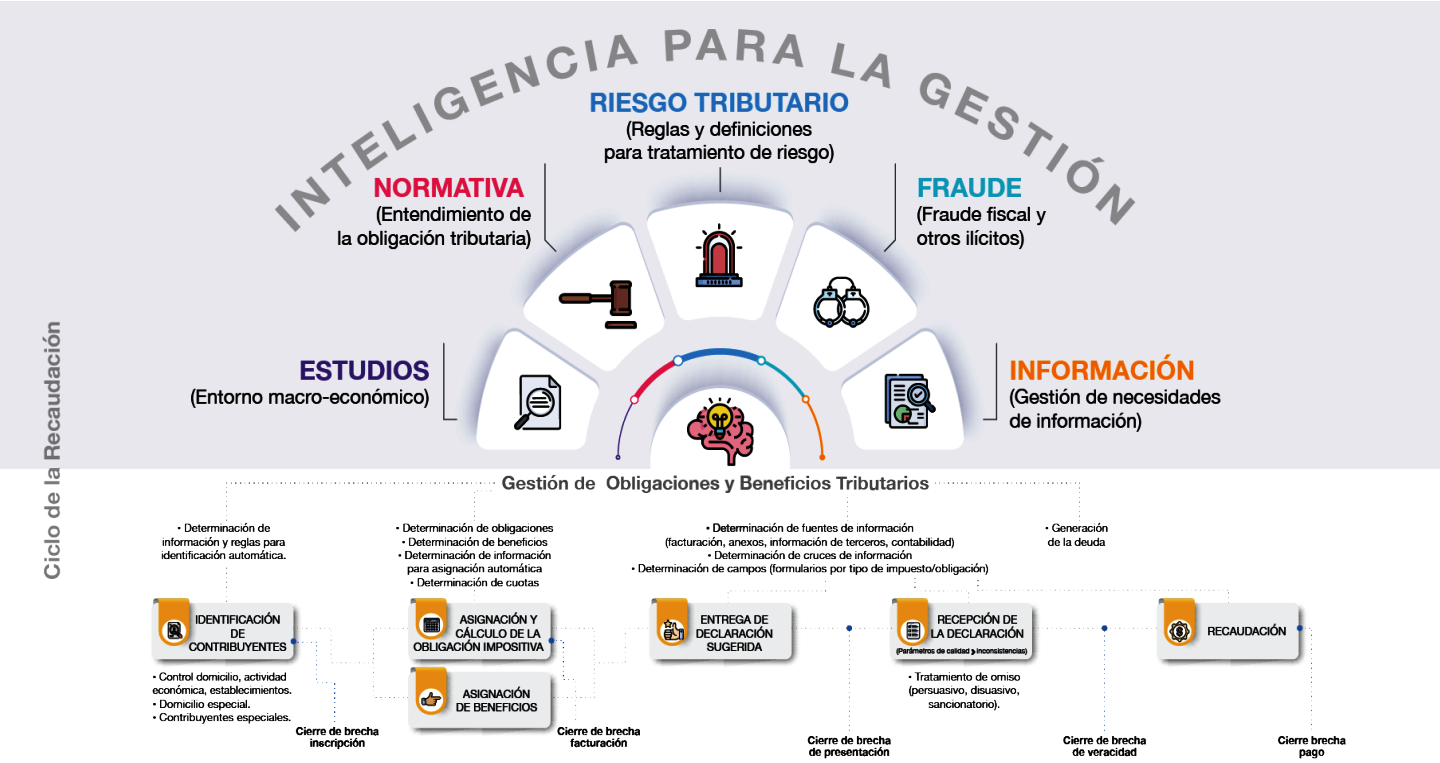
However, even though the SRI has clearly defined guidelines and concepts in its institutional framework, the current administration has identified limited application and underutilization of the available information.

This means that, despite having clear guidelines on how to address tax challenges and risks, there is a gap between theory and practice in the implementation of these measures. The current administration has observed that the available information is not being used to its full potential, which limits the SRI ‘s ability to make informed and efficient decisions.

Within the diagnosis carried out, it was detected that the underutilization of information was related to several factors, such as the lack of adequate training, the lack of technological resources or the lack of an organizational culture that promotes the effective use of information. These obstacles hinder data-driven decision making and limit the SRI ‘s ability to optimally manage tax risks.

In view of this situation, it was necessary for the SRI to make efforts to promote greater application of the guidelines and better use of the available information by implementing appropriate technological tools and fostering an organizational culture oriented to data-based management.

DIAGRAM 1 **Schematic description of the Collection Cycle for the SRI**



Source: Servicio de Rentas Internas (SRI).
Note: The diagram provided by the tax administration is presented in its original language.

2. Design of a comprehensive tax risk model based on data analytics

The little or no use by the control units of the tax risk model in force until October 2022 was a trigger for the design of a new model based on data analytics. The existing model was considered impractical and generated partial results due to the lack of adequate database integration.

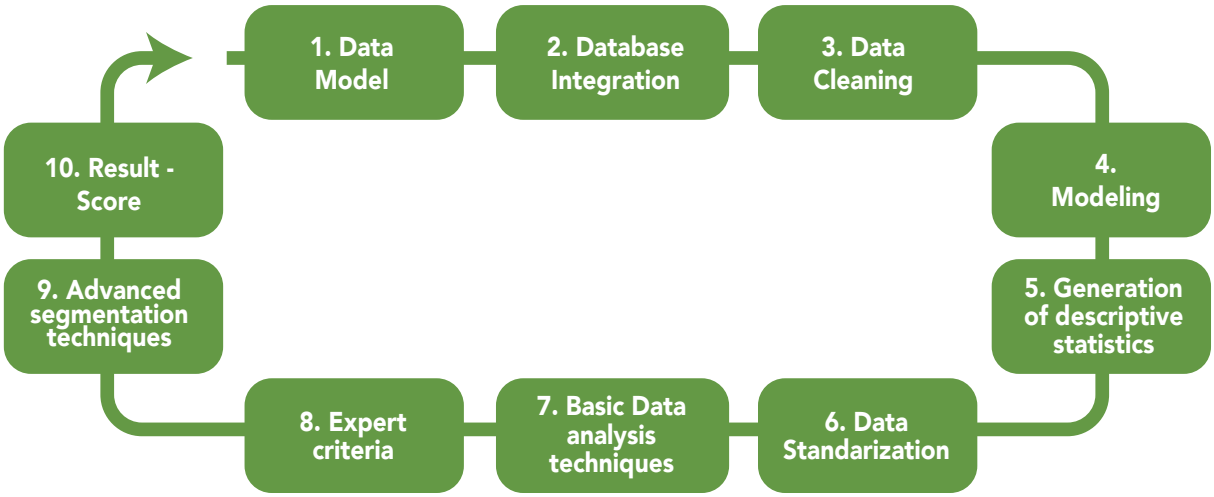
The lack of appropriate database integration meant that the units in charge of using the information in their control processes did not have confidence in the results obtained. This generated doubts about the effectiveness and validity of the tax risk model, which in turn limited its usefulness and its ability to identify tax risks accurately and in a timely manner.

To address this problem, the need was recognized to design a new model that would take advantage of data analytics to improve the quality and integrity of the information used in the control processes. Data analytics allowed the integration and analysis of large volumes of information available to the SRI in an efficient manner, which would lead to more reliable and complete results.

By designing a tax risk model based on data analytics (diagram 2), we sought to overcome the limitations of the previous model and increase confidence in the results obtained. The proper integration of databases and the use of advanced analytical techniques made it possible to identify patterns, trends and relationships that are currently helping to predict and mitigate tax risks more effectively.

In addition, this model includes an individual tax score system for each taxpayer, allowing the probability of risk associated with tax compliance to be summarized in a synthetic number.

DIAGRAM 2 **Comprehensive tax risk model based on data analytics**



Source: Servicio de Rentas Internas (SRI).

Currently, the new tax risk model is in the implementation and production phase, addressing four main tax compliance gaps: registration, filing, invoicing, and veracity. The objective is to improve tax compliance and strengthen risk detection capabilities in these critical areas.

The implementation and entry into production of the model represents an important step in strengthening the control and risk management capacity of the Servicio de Rentas Internas. Through the application of advanced analytical techniques and the effective use of data, we seek to improve the efficiency and effectiveness of tax control and compliance processes.

In terms of coverage, the scope of the model is broad and includes different segments of taxpayers. It contemplates the inclusion of 500 companies considered large taxpayers, 4 thousand companies belonging to strategic sectors, 209 thousand companies and more than one million individuals.

The selection of these companies and taxpayers is based on specific criteria, such as their size, economic relevance, and sector of activity. By covering a broad spectrum of taxpayers, the model aims to provide a comprehensive view of tax compliance and to detect possible non-compliance or risks at different levels.

3. Executive viewer for monitoring and decision making

The update of the tax risk model is reinforced by the development of Power BI viewers, which offer a comprehensive and strategic view of the different components of the risk model. These viewers provide senior management with the ability to make informed, real-time decisions by providing them with a clear and accessible visualization of the relevant data.

Thanks to these viewers, it is possible to have a panoramic view of the organization's tax situation, quickly and accurately identifying potential risks and areas for improvement, both for corporations and individuals (diagram 3). These viewers allow the generation of interactive and customized reports, with figures, tables and metrics that facilitate the understanding and analysis of the information.

This tool can closely monitor the tax performance of stakeholders, evaluate the effectiveness of the strategies implemented and make adjustments as needed. In addition, real-time visualization of data promotes agile decision making based on up-to-date information.

DIAGRAM 3 **Executive viewer based on Big Data for monitoring and decision making**

a) Corporates

b) Obligated Individuals

Source: Servicio de Rentas Internas (SRI).

Note: The diagram provided by the tax administration is presented in its original language.

4. Final comments

The design and implementation of a new tax risk model based on data analytics is a significant step towards more efficient and effective tax management. By addressing key tax compliance gaps such as registration, filing, invoicing and accuracy, the model aims to improve the ability to detect potential non-compliance and strengthen enforcement. With its broad coverage, which includes both large taxpayers and individuals, it seeks to ensure a comprehensive view of tax compliance and promote greater equity in tax collection. However, it is crucial that the implementation of the model goes beyond theory and is accompanied by adequate resources, such as staff training and the necessary technological infrastructure for effective data integration and analysis. This is the only way to ensure that the tax risk model really fulfills its purpose and contributes to the strengthening of the tax administration.

IV.2. Colombia: 100% electronic tax administration, beyond the technological challenge

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Introduction

In recent years, tax agencies around the world have understood that technological modernization and the management of large amounts of statistical information are fundamental to their operational functions, especially regarding the tasks of tax audit, tax control and risk management of the different taxpayers. In this context, the adoption of electronic tax documents -in particular, the electronic invoice for sales- has become a generalized strategy at international level, and the progress made by Latin American countries -such as Colombia- in this regard is noteworthy.

The Colombian Tax Administration *Dirección de Impuestos y Aduanas Nacionales* (DIAN) is materializing a vision with respect to the electronic invoice system where it is expected that the fiscal supports will be 100% electronic and will be transmitted for validation to the entity, with which it will be able to offer more and better services, as well as have inputs for the fight against evasion, smuggling and delinquency.

The purpose of this article is to provide a quick overview of the state of progress of these technological adaptation processes in Colombia.

After this introduction, some concrete data will be provided to illustrate the growth and consolidation of electronic invoicing in the country. The second section describes the scope of the expansion process of electronic tax documents promoted by DIAN, concluding with some brief final comments.

1. The growth of e-invoicing: some illustrative data

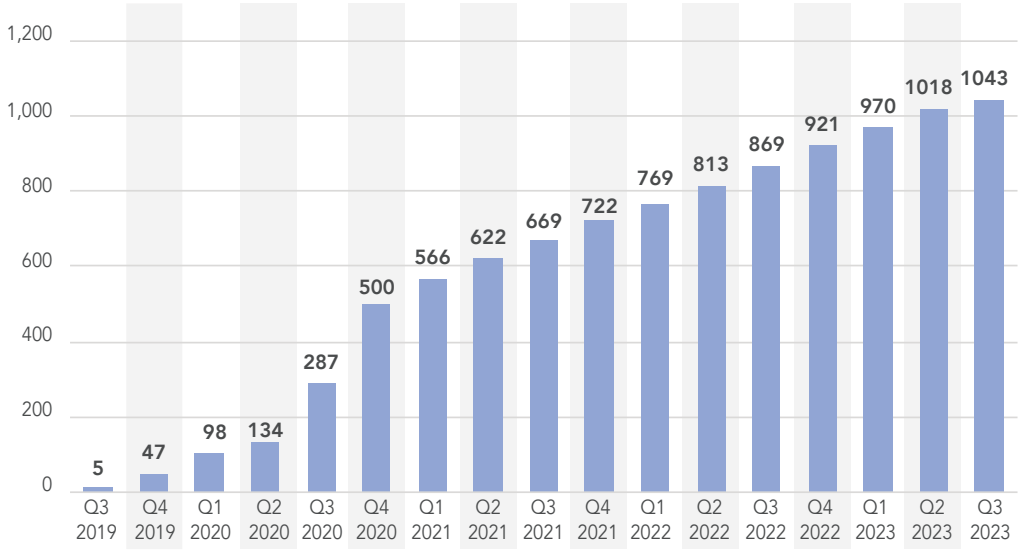
Since 2019, Colombia has had an evolution in the implementation of non-physical tax documents starting with the electronic sales invoice which, despite various situations presented, achieved its goal of substitution and consolidation in traditional economic transactions. In just 7 months, nearly 450,000 taxpayers opted for the electronic

invoicing model with prior validation during 2020. And they have continued to increase, reaching more than 720,000 in 2021; more than 921,000 in 2022; and in the last year -until the end of August- their number exceeds 1,043,000 taxpayers authorized to issue this document. (Figure 1).

FIGURE 1

Evolution of the number of taxpayers authorized to operate with electronic invoicing in Colombia

Quarterly data, third quarter 2019 - third quarter 2023, in thousands of taxpayers



Source: Dirección de Impuestos y Aduanas Nacionales (DIAN), Colombia.

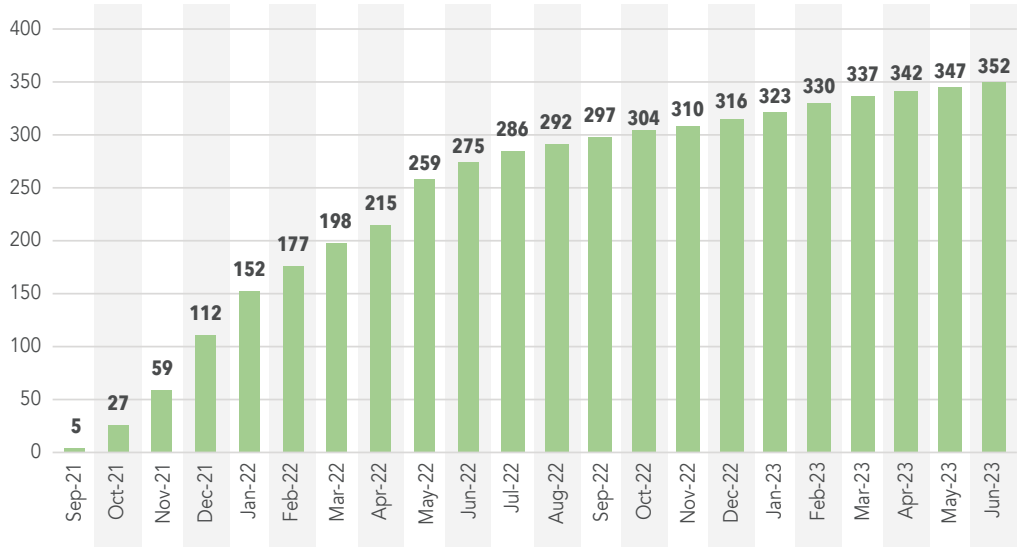
On the other hand, the Electronic Payroll Payment Support Document and the Support Document in acquisitions with parties not obliged to invoice electronically, as well as the RADIAN service (Registration of Electronic Invoices of Sale as a Value Title), are the additional electronic documents to the electronic invoice, which are currently operating in the invoicing system and have had the same acceptance by taxpayers.

Data up to June 2023 show that more than 351,000 employers are authorized to generate electronic payroll documents (figure 2), with more than 136 million documents validated and 8.7 million employees included up to the second quarter of this year. In turn, more than 28,000 subjects are registered in the RADIAN to register, consult, and view the traceability of their electronic invoices as a security (figure 3), involving more than 1,411,000 transactions for an amount of more than 6,114 million dollars.

FIGURE 2

Evolution of the number of taxpayers authorized to operate with Electronic Payroll

Monthly data, September 2021 - April 2023, in thousands of taxpayers

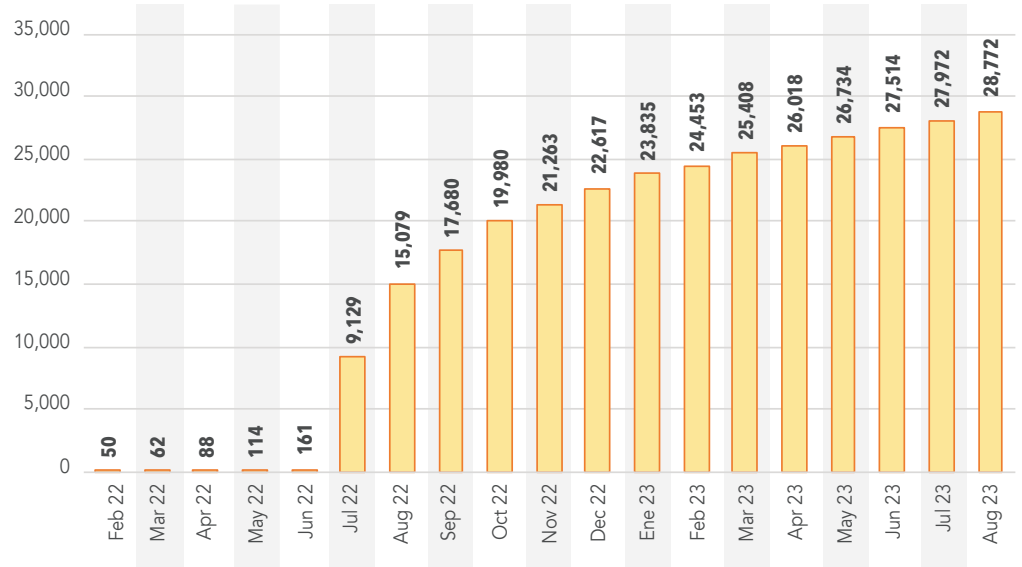


Source: Dirección de Impuestos y Aduanas Nacionales (DIAN), Colombia.

FIGURE 3

Evolution of the number of taxpayers registered in the RADIAN service

Monthly data, February 2022 - April 2023, in number of unique taxpayers



Source: Dirección de Impuestos y Aduanas Nacionales (DIAN), Colombia.

It should be noted that, in order to facilitate the implementation of the electronic invoice and supporting documents, the DIAN made available a free software which can be accessed by all taxpayers and has no limit for the issuance and receipt of electronic documents. This service has more than 280,000 users, which is equivalent to 26% of the total number of taxpayers obliged to invoice electronically (the rest do so through a regulated technology provider or by using a duly validated proprietary solution). Since the implementation of the electronic invoice with prior validation, the DIAN has received and processed close to 5,507 million electronic documents for an approximate value of 14,232 trillion Pesos.

2. The expansion in the use of electronic tax documents

With the success achieved in the implementation and massification of the invoice and electronic supporting documents, Law 2155 of 2021 brought with it a more comprehensive vision regarding the electronic invoicing system, which involves other tax documents such as those that support tax and customs declarations and the entity's procedures, with the power for the DIAN to directly determine the equivalent documents. This is intended to dematerialize and digitize the largest possible number of tax documents, such as:

- POS cash register machine tickets
- Cinema ticket
- Passenger transport ticket (land, water, air, etc.)
- Statement issued by financial companies and funds
- Document in localized games
- Ballot, fraction or form in games of chance different from localized games
- Document issued for the collection of tolls
- Stock Exchange Operating Document
- Agricultural and other commodities exchange trading document
- Household utility bill
- Admission ticket for public shows

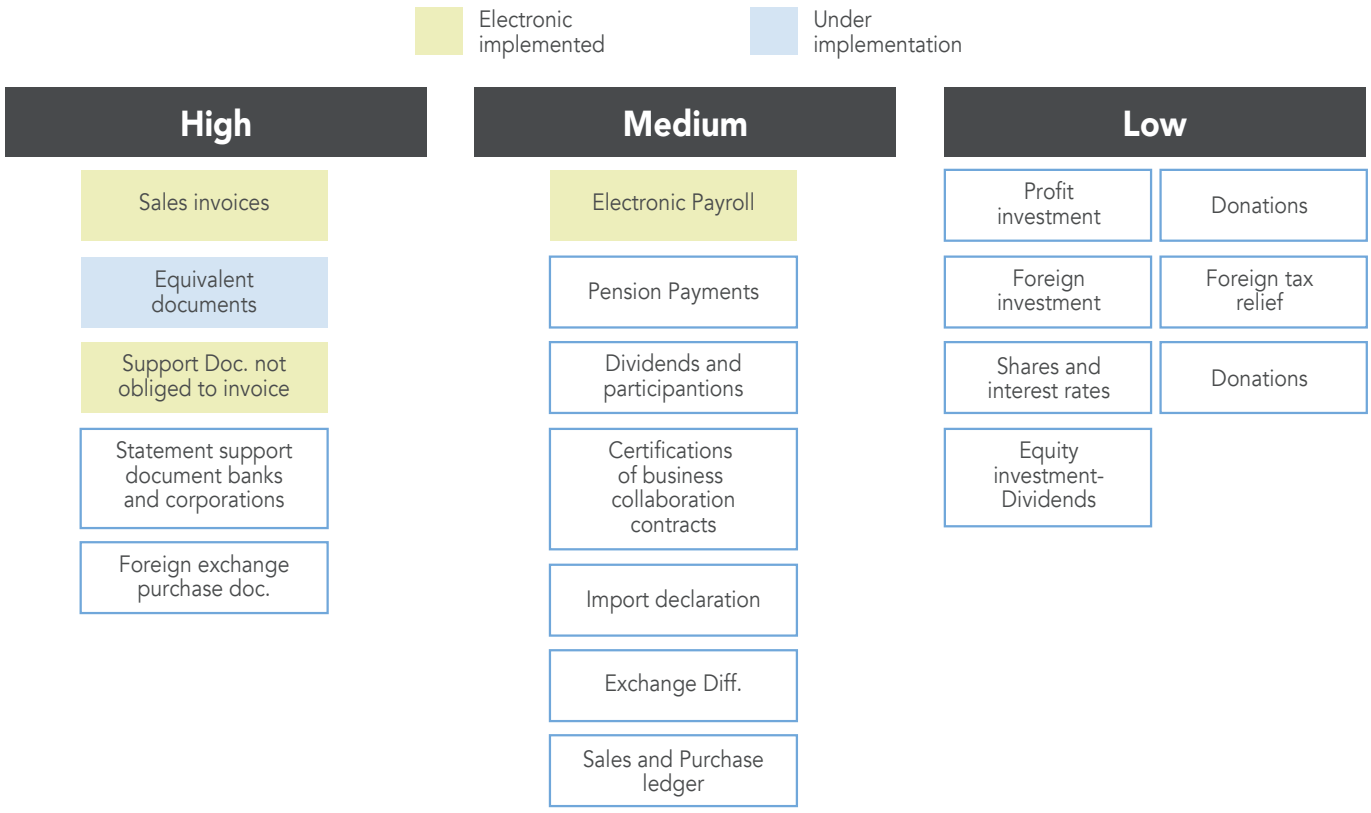
After the implementation of the documents listed above, it will be necessary to continue with others, such as: sales tax and income tax withholdings, purchase of foreign currency; dividends and participations; business collaboration contracts (consortiums and temporary unions, joint venture and mandate contracts); import and export declarations; financial sector support documents (bank statements); fiscal book of purchases and sales and exchange difference.

With all these electronic tax documents, the tax administration is complemented with the use of data to improve tax control based on artificial intelligence technology, automated control of taxpayer transactions, analysis of information based on metadata, early warnings, analysis of commercial behavior, identification of evaders, identification of fraudulent operations, among others, facilitating tax control by the Entity's officials.

The strategy to continue dematerializing/digitizing documents involves a differentiation between documents that represent high transactionality and those of low transactionality, since the solutions to implement them are more cost-efficient in the case of documents of the first type, in which billers and solution providers achieve economies of scale and thus efficiencies that are difficult to achieve in documents of low transactionality, where the emphasis should be on free services provided by the entity, so as not to increase compliance costs for those responsible for tax obligations.

DIAGRAM 1

Classification of DIAN Tax Documents according to degree of transactionality



Source: Dirección de Impuestos y Aduanas Nacionales (DIAN), Colombia.

In Colombia there are technology providers that supply services to those responsible for generating electronic invoices; these providers are regulated by DIAN, but only for the aforementioned document, the payroll and the payroll support document, they can be provided by any third party, which does not necessarily need to be regulated by DIAN.

Regarding medium and low-transaction documents, the discussion arises as to whether all providers of electronic document solutions should be obliged to extend their services to all decision-makers who require them, or whether they should be left free, so that only those interested parties who find promising niches can do so:

- If freedom is chosen, then the free solution provided by DIAN should have the capacity to serve the segments that are not attractive to third party providers, or when the solutions provided by third parties would be too costly for the taxpayer.

- If third parties were to be obliged to have solutions for all documents to be dematerialized, there would be the possibility that costs would be passed directly to users, generating significant increases in the case of documents with few copies and/or low periodicity.

In general, all documents are based on prior validation schemes by DIAN. For documents of low transactionality, it is necessary to advance in the analysis of whether it is the same scheme that should operate or whether, since they are documents that are generated with low frequencies, deferred schemes can be chosen, with which the information can be obtained at different times than the real time.

3. Final comments

The challenges of materializing the vision that has been outlined for the Colombian tax administration are not only technical, technological and regulatory, but also manifest themselves in the challenge of using information for the purpose of reducing tax evasion and tax avoidance, offering auditors in the areas of auditing, returns and other services the possibility of processing a large amount of data and answering questions that are asked when evaluating the consistency of the returns, with respect to the electronic information generated. To this end, it is essential to advance in the digitalization of all tax documents used in the country for different operations, speeding up both the collection and the strategic processing of available tax information.

Taxpayers and responsible parties begin to use different services from the tax administration to permanently reconcile the transactions existing in their corporate billing, accounting, and financial systems with respect to the records available to the entity, to find the differences and adjust in their processes and those of their suppliers to minimize the differences.

This will result in a modern tax administration, providing efficient services with effective controls and wide coverage, which will continue to significantly combat tax evasion, avoidance, and smuggling.

IV.3. The process of massification of Electronic Invoicing in El Salvador

Fany Karol Mejía Dueñas
Electronic Invoicing Coordinator, Dirección General de Impuestos Internos, Ministerio de Hacienda, El Salvador

Introduction

The implementation of electronic invoicing in El Salvador is part of the commitments assumed by the administration of the President of the Republic, Nayib Bukele, in 3 of the 12 strategic sectors of the *Cuscatlán* Plan.

The first sector is "Innovation and Technology", where Electronic Invoicing is determined as a mechanism that generates transparency in commercial transactions and makes the management of the State more efficient using technology. The Government is established as the key catalyst that must generate the legal, fiscal and technical conditions that facilitate the transition to this model through investment and the definition of regulations and logistics for its implementation, where legal security and the authenticity and integrity of the documents generated with Electronic Invoicing are guaranteed by applying the electronic signature.

For the strategic sector of "Modernization of the State", Electronic Invoicing is an axis to achieve a digital government and connected citizens, visualized as an automatic technological mechanism that provides information for real-time control over companies, applicable to issues such as tax payments, commercial activity, compliance with regulations, state audits, and even in saving time and expenses of internal processes of receipt and issuance of tax documents. This allows the Salvadoran State to strengthen its fight against tax evasion, achieve greater tax collection, generate more efficient responses in public procurement and reduce payment times to its suppliers.

In the "Fiscal" strategic sector, Electronic Invoicing appears as an important action to solve the problem of State finances, increasing tax collection, facilitating the invoicing process with a minimum tax burden on companies and providing reliable information for the fulfillment of State functions.

With Electronic Invoicing, El Salvador aims to overcome the barriers of bureaucratization of procedures, streamline services, make the management and use of taxes transparent, in addition to benefiting users, reducing costs, and facilitating compliance with tax obligations. In that sense, this article aims to describe the distinct stages of implementation of Electronic Invoicing that has been implemented in the country since the end of 2019. In addition, some satisfactory results already proven will be presented as well as the prospects in this area for the coming years. Finally, some brief conclusions will be drawn in this regard.

1. Stages of Electronic Invoicing Implementation

Electronic Invoicing in El Salvador began with the impetus of the Government of President Nayib Bukele at the end of 2019, going through the following stages:

1.1. Development

In October 2019, with the support and guidance of subject matter experts from the Inter-American Center of Tax Administrations (CIAT) and with loan funds from the Inter-American Development Bank (IDB), the Ministry of Finance created a multidisciplinary team with 100% Salvadoran personnel, taken from vital areas of its Tax Administration (Dirección General de Impuestos Internos DGII) such as: tax intelligence, auditing, citizen assistance, customs, legal and technology. This made it possible to establish an adequate solution for the country, taking the best international practices to make a fast, solid, robust, and safe development feasible, without operational and technological drawbacks.

Some of the best practices used included:

- **In the operational area:** prior transmission and validation scheme, direct management between the taxpayer and the State without the obligation of third party intermediaries, use of electronic signature, availability of web option that allows the user to issue electronic invoices, promotion of a robust and easily updated legislation, establishment of a comprehensive assistance for issuers, related services for the electronic invoicing solution, design of two platforms, one for taxpayers to generate their electronic invoicing solution ad hoc to their needs in compliance with the regulatory requirements and another platform provided by the Ministry of Finance oriented to taxpayers with a low level of document issuance -services that are totally free of charge-, among others.

- **In the technological area:** a scalable infrastructure with high performance and production in the processes of reception, validation, response, and security was provided, using microservices that run their own process and communicate with lightweight mechanisms. In addition, cloud services were used as a paradigm of this platform for a second phase. The database uses the NoSQL schema with Mongo DB for functionality, scalability, performance, and the use of Docker containers that allow easy management and autonomy of execution. Likewise, the JSON (JavaScript Object Notation) format was adopted as the data exchange language, as it is a lightweight format that facilitates its transmission and safekeeping.

1.2. Pilot Plan

In January 2020, taxpayers were invited to accompany the State in this stage. The companies that accepted the challenge worked together and even remotely during the months of confinement due to the COVID-19 pandemic, achieving that the Ministry of Finance initially developed four types of tax documents: Tax Credit Voucher (CCF), Credit Note (NC), Debit Note (ND) and Remittance Note (NR). All these documents are necessary for transactions with Value Added Tax (VAT) taxpayers. In addition, the tool for the electronic signature of Electronic Tax Documents (DTE) and the electronic signature certificate were developed and delivered free of charge for issuers.

In April 2021, the first company was authorized as a DTE issuer through a resolution in accordance with Article 113 of the Tax Code. During the rest of the year and with feedback from the companies, the Electronic Invoicing System was improved and stabilized. Five other types of tax documents were also implemented, including the one used for transactions with end consumers: Invoice (F), Export Invoice (FEX), Settlement Accounting Document (DCL), Withholding Voucher (CR) and Settlement Voucher (DL). At this stage, we worked using an On-Premise infrastructure, but adapting what was necessary for the transfer to cloud services.

1.3. Voluntariness

The stability, efficiency and confidence of the companies that used the Electronic Invoicing System, together with the popularity of the use of technological applications as a result of the new reality originated by the COVID-19 pandemic, provided the necessary conditions for the Ministry of Finance to initiate the voluntary stage. Since November 2021, access to Electronic Invoicing was made available to all VAT taxpayers who opted to issue DTEs voluntarily, ending 2021 with five authorized issuers in the year and more than 81,230 DTEs received. At the beginning of 2022, another six issuers were authorized and more than 300 applicants joined the implementation program. In addition, the development of all remaining types of tax documents was completed: Excluded Subject Invoice (FSE) and Donation Voucher (CD).

In parallel, work was carried out on the legislation related to the DTE, presented by the Minister of Finance, Alejandro Zelaya, to the Legislative Assembly in August 2022, as a reform to the Tax Code, and three exclusive assistance channels were established for Electronic Invoicing.

At the technological level, the development, test and production environments were configured and the migration to the cloud was carried out, guaranteeing quality, scalability, flexibility and adequate performance.

1.4. Mandatory

The Tax Code reform regarding Electronic Invoicing was approved by the Legislative Assembly through Decree No. 487 dated August 30, 2022, beginning the stage of obligatory nature, since it determines that Electronic Tax Documents are Law of the Republic; in addition to granting sufficient powers to start with the massification of the same.

a) Massification: in December 2022, the Ministry of Finance officially launched Electronic Invoicing in the country, initiating a publicity and dissemination campaign. The Electronic Invoicing Integral Assistance Center was created with a trained team, serving the population through call-center channels, WhatsApp, e-mail and automated chatbots.

In January 2023, the "Regulations for Compliance with Electronic Tax Documents" were issued, which contains the operational and technological specifications for the operation of Electronic Invoicing and determines that the Tax Administration will establish the groups of taxpayers and the starting dates of the obligation to issue DTEs.

The target universe of DTE issuers in El Salvador includes: all VAT taxpayers, designated VAT withholding agents and issuers of Donation Vouchers. Based on this, in January of this year, the first group of more than 300 taxpayers was notified regarding the date of obligation to start issuing DTE in July 2023. These taxpayers were selected based on parameters such as: high levels of tax document issuance, high reported sales and with locations that include all departments of the national territory.

Outreach events have been held for public entities and future issuers of DTE, as part of the Government's commitment to support notified taxpayers, with priority being given to the creation of the appropriate conditions to facilitate the integration of issuers, creating a completely virtual process on the Electronic Invoicing website (https://factura.gob.sv/)[1], through the following steps:

- **Step 1:** complete the online application to enter the Issuer DTE site.
- **Step 2:** Obtain the Electronic Signature Certificate for testing purposes.
- **Step 3:** Execute the minimum tests required for each type of document to be issued.
- **Step 4:** Obtain the Authorization to be a DTE Issuer.
- **Step 5:** Obtain Electronic Signature Certificate in productive.
- **Step 6:** Start operations by issuing the DTEs.

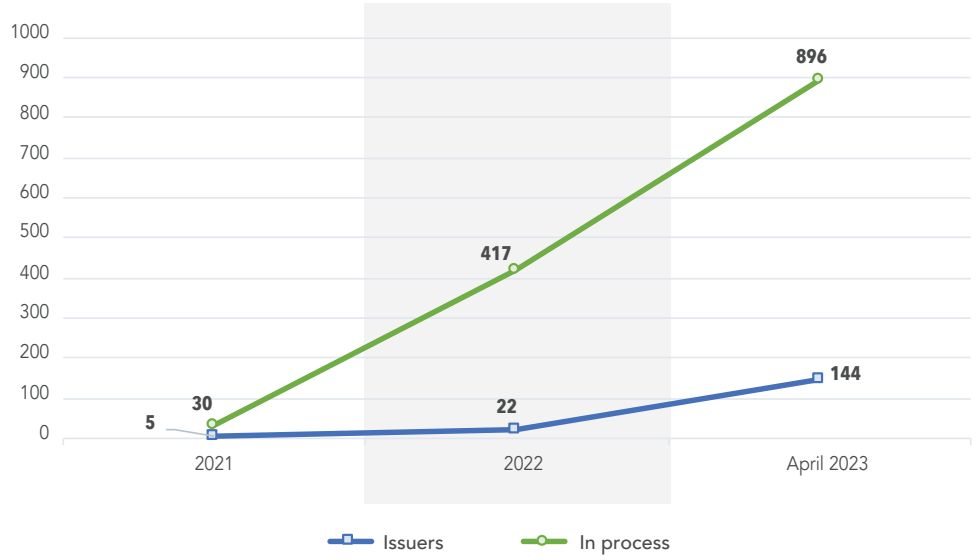
All the progress achieved has been reflected in concrete results, evidencing a significant growth in the implementation and massive use of Electronic Invoicing in the country. On the one hand, the number of taxpayers authorized as issuers of DTE went from only 5 at the end of 2021 to 22 issuers at the end of 2022 and continued to increase during 2023 reaching a total of 144 taxpayers only up to April (figure 1).

1 On the Electronic Invoicing web page, you can find statistical information, the DTE Compliance Regulations, manuals, guides, videos, tutorials, frequently asked questions, and contacts for related queries.

The potential for growth in the number of TED issuers going forward is very encouraging as taxpayers in the process of being authorized to legally issue these documents increased from 30 at the end of 2021, to 417 at the end of 2022 and almost 900 as of April of this year.

FIGURE 1

Evolution of the number of Electronic Tax Document (DTE) issuers in El Salvador
Taxpayers authorized and in the process of authorization, 2021-2023 (as of April)



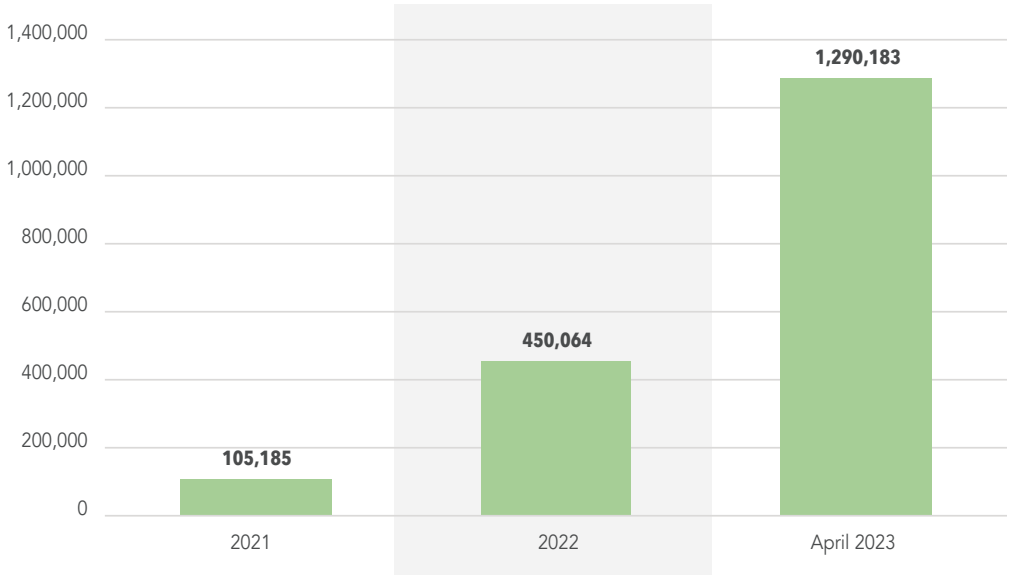
Source: Dirección General de Impuestos Internos (DGII), Ministerio de Hacienda de El Salvador.

On the other hand, the success of the massive implementation of Electronic Invoicing is also reflected in the amount of DTEs received by the tax authority (figure 2). From an initial balance of more than 105 thousand DTE during 2021, the amount accumulated in the following year exceeded 450 thousand documents and, only up to April, in 2023 it reached more than 1,290,183 DTEs received.

FIGURE 2

Evolution of the number of Electronic Tax Documents (DTE) received in El Salvador

2021, 2022 and 2023 (until April)



Source: Dirección General de Impuestos Internos (DGII), Ministerio de Hacienda de El Salvador.

In recent months, the Ministry of Finance has continued to develop various services for both issuers of DTE and the general population, such as public consultations, validators, reports, mobile applications, among others. The objective is to achieve the massification of Electronic Invoicing in El Salvador within the next two years. With its implementation it is intended to reduce the tax burden of taxpayers, eliminating tax obligations such as reports used as control measures, which will be replaced with the timely transmission of information obtained through the DTE.

b) Use of the information obtained from Electronic Invoicing: as a logical stage in the development of this tool, the use of the information obtained from the DTEs seeks to meet the objectives of the State, specifically those of the Tax Administration. The internal system has been created to enable the Ministry's personnel to consult and manage the information of the DTEs and the respective taxpayers, their customers, suppliers and business chains, and alerts will soon be generated to identify tax risks.

In the future, work will continue to ensure that, through the DTE information, declarations, and reports on the different tax obligations of taxpayers are generated, in addition to the integration of customs services and state purchases.

Subsequently, electronic audits will be implemented, using information from the DTE and appropriate third parties. In its development, tax intelligence will be applied as a control tool to obtain greater and more efficient tax collection. As a first objective, the Ministry of Finance is working to achieve in the short term a smooth massification of the Electronic Invoicing solution in the country, thus ensuring that the results generated from the DTE information are valuable, adequate, and more accurate.

3. Conclusions

Under the administration of President Nayib Bukele, El Salvador joins the Latin American vanguard, with the implementation of Electronic Invoicing. This is part of a broader strategy, through which it seeks to enhance investment opportunities and growth through comprehensive policies, applying important laws such as Electronic Signature, Bitcoin Law and technological, environmental and social incentives.

With the support of strategic development partners, El Salvador has managed to implement electronic invoicing, using international best practices and advanced technology. At all times, all the difficulties that arose and could arise throughout the massive implementation project were taken as opportunities for development. We are committed to eliminating the digital divide, combating the attachment to the known and the resistance to change, promoting the advantages of investment, encouraging adaptation to changes, among others.

In short, with the implementation of Electronic Invoicing, a better control of the Ministry of Finance is established, and its services are streamlined, reflecting an achievement in the area of national tax management; in addition to benefiting the environment and users with the reduction of costs and tax burden.

IV.4. Digital Innovations to support tax compliance in Tax Administration of Jamaica

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Introduction[1]

The future of Tax Administrations has been greatly impacted by the advancement of technology on a global scale. These agencies have had to give considerable focus to the fast and ongoing developments in digital technology (OECD, 2015). It is worth noting that countries have had to modify their tax plans to account for technological progress and quick changes in addressing global tax issues (ACCA, 2018; OECD, 2018). This has caused a major disruption and transformation in the usual way of doing things in order to improve compliance with taxpayer risk activities. There is now a greater need for the implementation of modern technologies to strengthen the capabilities of Tax Administrations in using a risk-based strategy for managing compliance.

According to the Organization for Economic Co-operation and Development (OECD) and the United Nations (UN), the effective use of technology will enhance the ability of revenue bodies to manage compliance risks and also meet service expectations in the future (OECD, 2009; United Nations, 2019). This enables greater focus on efficiently allocating limited resources to achieve maximum tax compliance. Consequently, various measures are being taken to prioritize the collection of taxes and duties in accordance with the law, functioning in a way that will maintain trust in the tax system and its overall administration (OECD, 2004).

Jamaica has adopted a risk-based approach utilizing modern information technology systems to deal with compliance-related activities. This approach has not only changed the way the Tax Administration of Jamaica (TAJ) conducts business but also introduced a new method of managing compliance and taxpayer risks.

1 The author would like to give special thanks to Andrea Gregory, Nigel Wilks and Marsha Samuels for their contributions to this paper.

As an expansion of the presentation made at the 8th Meeting of the CIAT Network of Tax Studies and Research Areas in Panama City on last March 27 (2023), the objective of this paper is to outline the role of technology in taxpayer compliance risk management and also to address the major tax issues within the Jamaican taxpayer population. Following this introduction, the first section of this article describes the rationale for the development of the Revenue Administration Information System (RAIS) tool, based on investment in technology to improve tax compliance. A second section refers to the data sources and the specific structure of the RAIS as a tax compliance risk management environment. The third section provides some relevant results achieved since the implementation of the RAIS. Finally, the paper closes with some general conclusions.

1. Investment in technology to improve tax compliance

In September 2016, Tax Administration Jamaica (TAJ) effectively executed all three phases of its new Revenue Administration Information System (RAIS). RAIS is a significant investment and a web-based tool designed specifically with advanced risk models in accordance with global standards. The system also involves the restructuring of workflow management and fundamental business processes.

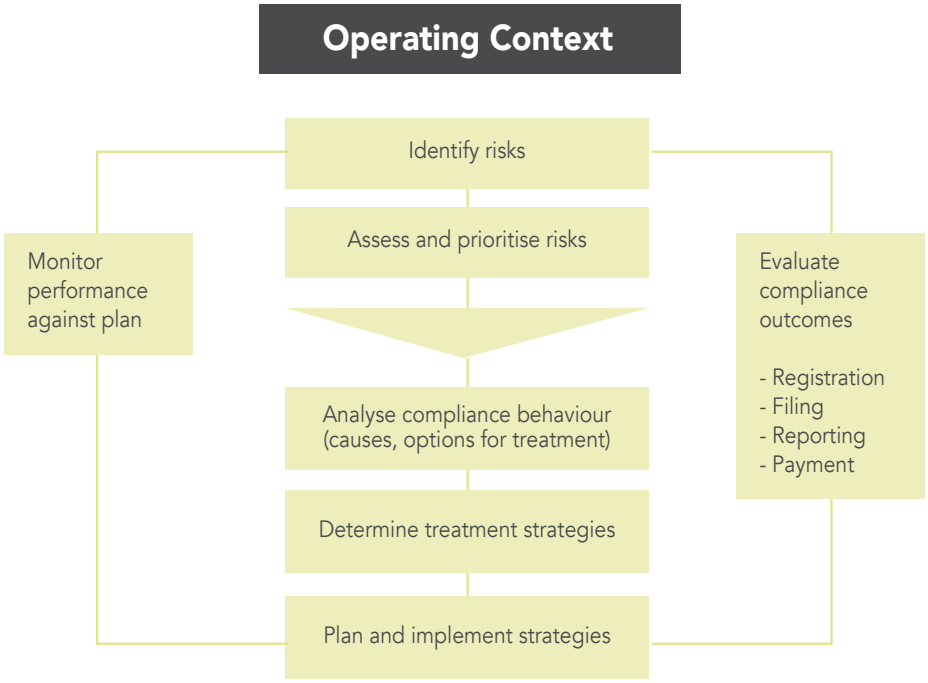
It is crucial to focus on the system's capacity to provide a wide range of predictive modeling and risk assessment abilities as the organization deals with a large amount of data from different sources. This system can process and utilize this data to better understand compliance risks, which was not possible in previous years. This foundation can offer a structured path to improve decision-making by providing insights. Many Caribbean nations are in urgent need of innovative ways to address the digital economy's rapid developments, and improving their tax administration is a key priority.

Despite investments in automation and upgrading information technology, many tax administrations still face difficulties beyond infrastructure. COVID-19 pandemic has caused a significant economic challenge for the nation, resulting in an 18% decline in government revenue, impacting the tax administration's ability to respond as the major revenue collection agency. To ensure the continuity of essential services while prioritizing health and safety, significant transformation in tax compliance activities is necessary. The RAIS in Jamaica aims to foster voluntary compliance and build partnerships with taxpayers while maintaining the security of sensitive information.

The TAJ has the ability to use a structured and methodical approach to allocate its limited resources and prioritize risks that require immediate attention. The system includes various steps for identifying, assessing, ranking, and managing tax compliance risks, along with monitoring and evaluating taxpayer activities to support informed decision-making. The process for managing taxpayer compliance risks implemented by the TAJ is crucially aligned with that derived from the OECD recommendations (as shown in Figure 1).

FIGURE 1

Taxpayer Compliance Risk Management Process taken as model by the TAJ



Source: OECD (2004), "Compliance Risk Management: Managing and Improving Tax Compliance", OECD, Paris.

The enhancements made to tax administration have expanded the range of online services available to taxpayers through the new platform. These modifications aim to enhance the taxpayer's overall experience while increasing the efficiency and effectiveness of customer service delivery.

2. Data Sources and Management Structure

The process of managing taxpayer compliance risks involves utilizing data from various sources, including economic and financial data, information provided by taxpayers on their tax returns, data obtained from third-party entities, and relevant information available on the internet. Notably, TAJ receives data from 245 third-party entities each year, which includes information on payments made to independent contractors providing goods and services, purchases made by corresponding entities, payments to private medical practitioners for medical services, and payments made by non-resident customers for various services.

The TAJ has categorized risk treatment into several general categories, including:

- Bauxite and Mining
- Customs
- Betting and Gaming
- Public bodies
- Tourism

- Medical and Pharmaceutical
- Petroleum
- Utilities

Tax Compliance Risk Management Environment

a) Overview

RAIS is created to maximize the utilization of the expertise and familiarity of users in the fields of data analytics and predictive modeling. The system is composed of a set of repeating stages: data cleaning, data integration, data selection, data transformation, data mining, pattern evaluation, and knowledge presentation. The essential feature of RAIS is that it makes it easy and efficient to turn raw data from multiple sources into insights that will direct the creation of various initiatives that aim to enhance voluntary compliance.

b) Data Cleaning and Integration

The process of data cleaning involves identifying and correcting any errors or missing information in the data received from various sources. This is important because it enhances data quality, leading to increased efficiency in the revenue authority's operations. TAJ follows a rigorous process of removing outdated or incorrect data and ensuring that all information is properly formatted and relevant. Additionally, the data is linked to a unique identifier, the Taxpayer Registration Number (TRN), to facilitate further analysis.

RAIS uses a data warehouse to integrate data from various sources and create a comprehensive profile of each taxpayer. This profile includes details such as the business location, age, sector, income, and payment history, which can help predict the taxpayer's future behavior. Furthermore, entities can submit third-party data to TAJ as needed. The repository of data facilitates further analysis and risk management efforts.

c) Data Mining

The process of data mining involves finding valuable patterns and knowledge from large datasets. RAIS allows for analytical techniques to be used, such as summarization, consolidation, and aggregation, to view data from different angles and gain knowledge that can benefit the organization.

RAIS has enabled the identification of significant tax risks within the overall taxpayer population based on their tax obligations. This process considers factors such as legislation, government policies, public opinion, international agreements, and economic conditions. TAJ uses segmentation to analyze taxpayer behavior based on the Jamaica Industrial Classification. The Discovery module within RAIS identifies leads and suggests corrective measures in response to risks, taking into account compliance principles such as registration, filing, payment, and reporting.

For example, if a taxpayer has a history of missed general consumption tax payments but reports high income, the Discovery module may suggest that certain assets be reviewed for compliance action. It is essential to note that the Discovery module provides possible treatment options based on compliance principles.

d) Data Analytics

RAIS includes analytical models that allow TAJ to evaluate taxpayers' risk levels by ranking and prioritizing risk factors based on appropriate statistical and macroeconomic analyses. These models assign overall scores to taxpayers based on their tax history, profile, tax revenue at risk, and other relevant information.

Data Analytics in revenue administration involves using data to learn from past and present experiences, increase revenue collections, reduce costs, and understand and predict patterns of non-compliance. Within TAJ, analytics

models have been used to improve compliance rates and operational efficiency. RAIS includes a risk scoring system that produces a probabilistic distribution to maximize revenue collection, minimize shortfalls, and anticipate changes in taxpayer behavior.

For instance, TAJ has employed the Analytics Score Model in RAIS to determine collection cases to be prioritized based on the likelihood of generating J$D 6.000 per day. Scores range from 0 to 100, with 100 indicating the highest probability of collection, and are automatically generated by the system.

3. Impacts of the RAIS on tax compliance

RAIS has been a major strategic investment by TAJ, as it not only impacts customer service delivery, but also greatly improves compliance rates in registration, filing, payment and accurate reporting. The analytical models in RAIS have underpinned the development and design of targeted strategies to promote voluntary compliance. Furthermore, such models have placed TAJ in a position to aggressively pursue tax avoiders and evaders through intelligence and enforcement actions. RAIS has significantly improved the time taken for taxpayers to comply with tax obligations since its implementation and facilitates greater ease of doing business and ease of paying taxes – as evidenced by growing taxpayer testimonials and growth in the use of the electronic services platform.

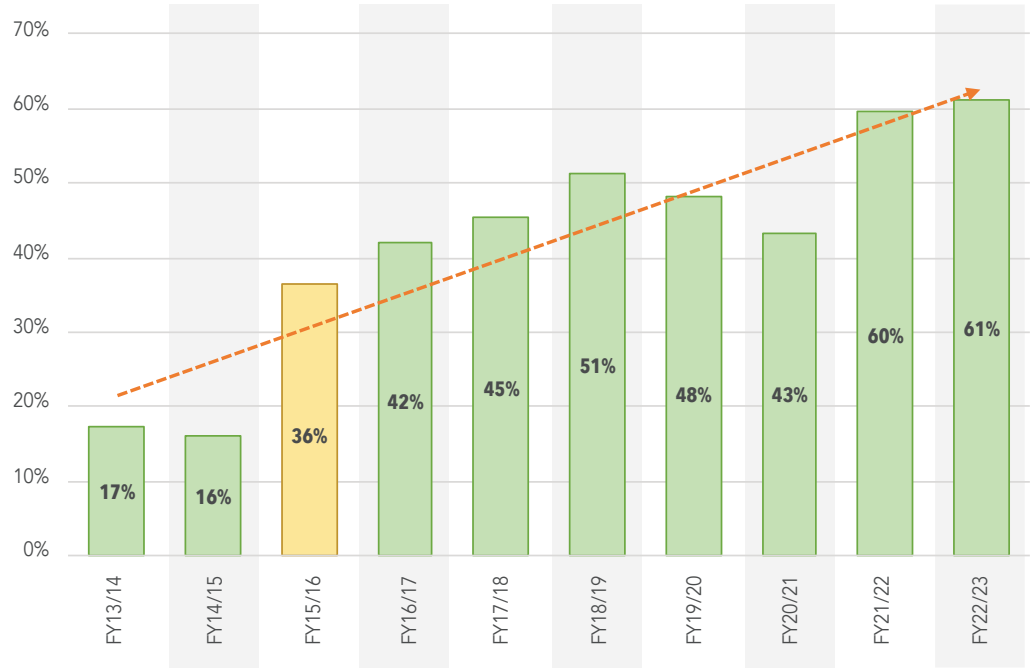
With the introduction of RAIS, there has been an explosion in the number of e-Payments and e-filing transactions. This was largely expected as the legacy system (ICTAS) was not only outdated but was also not very user-friendly. The impact of RAIS on the delivery of TAJ's services and operations, overall, has been positive. This is borne-out by the continual improvements in the filing compliance rate over the years as shown in figure 2 below. It should be noted, however, that these results are also a result of TAJ making it mandatory for taxpayers to file specific return types[2] online, a policy that would not have been possible before the implementation of RAIS.

2 This relates mainly to tax returns for the core tax types, i.e., taxes on income (CIT, PIT, PAYE) and taxes on goods and services (SCT, GCT).

FIGURE 2

Filing Compliance trend in Jamaica

Annual average (fiscal years), FY 2013/14 to FY 2022/23, in percentages of total received tax returns



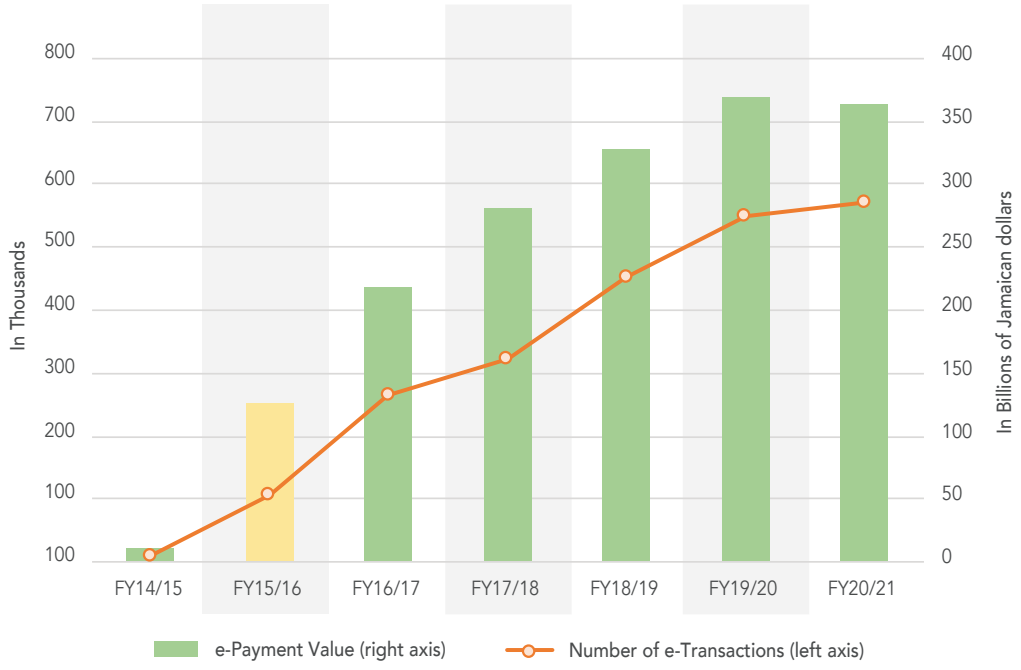
Source: Tax Administration of Jamaica (TAJ).

Another area positively impacted by improvements in TAJ's digital products is collections/payments. As mentioned before, the introduction of RAIS created a platform that allowed TAJ to mandate e-Filing of specific returns. For a seamless user experience, this policy needed to be supported by various e-Payment tools that would allow users to file and pay within the same environment.

FIGURE 3

Trend in e-Payments Monetary Value vs. Number of e-Transactions

Annual data (fiscal years), FY 2014/15 to 2020/21, in billions of Jamaican dollars and in thousands



Source: Tax Administration of Jamaica (TAJ).

Note: Billions refers to thousands of millions in national currency unit.

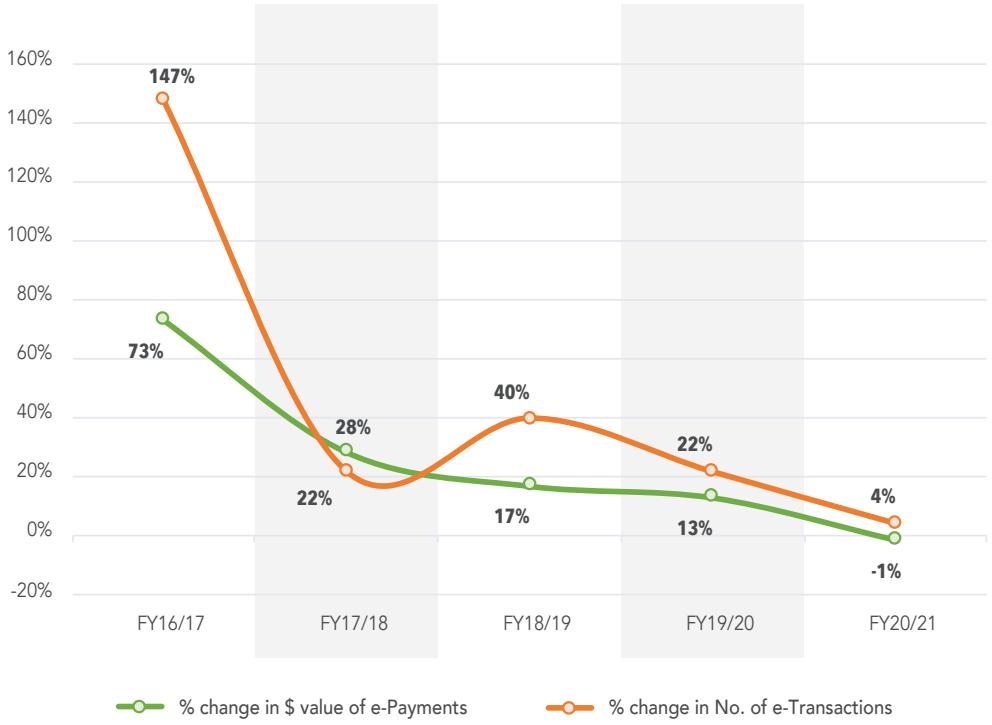
Figure 3 above shows the increase in the number of e-transactions as against the increase in the value of e-payments over the same period FY14/15 to FY20/21. Over the period, at FY15/16 there is a large bump in both the value of e-payments as well as the amount of e-transactions coinciding with the implementation of RAIS. While there has been a positive increase over the years for both e-payments and e-transactions, the percentage increase has continually been reducing as shown in Figure 4 below[3].

3 The data for FY15/16 is not shown on the chart so as not to distort the chart. The percentage change in $ value of e-Payments for FY15/16 is 1093% and the percentage change in No. of e-Transactions is 943%.

FIGURE 4

Changes in e-Payments Monetary Value vs. Number of e-Transactions since the implementation of RAIS

Annual data (fiscal years), FY 2016/17 to FY 2020/21, in percentages



Source: Tax Administration of Jamaica (TAJ).

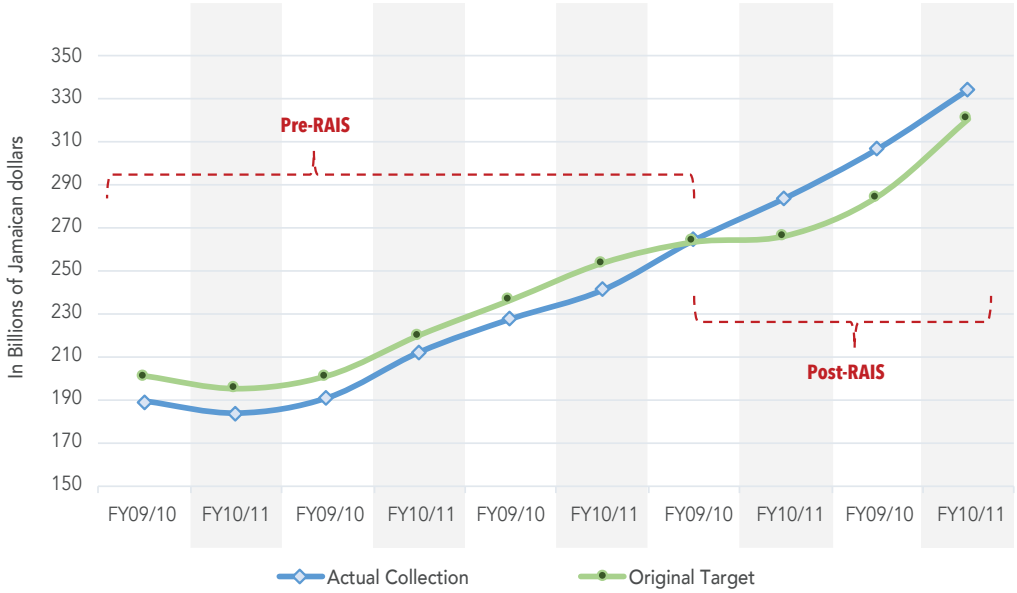
This pattern is, more than likely, due to the diminishing impact of RAIS implementation coupled with the launching of other e-payment services as well as the continued effort to transition taxpayer and clients to these digital tools.

One of the most positive impacts that RAIS has had is attributable to the increased usage of digital services to maximize the collection of tax revenue. Indeed, since the implementation of RAIS, TAJ has been able to meet its collections target consistently (Figure 5).

FIGURE 5

Domestic Revenue Collection vs. Original Target set by the TAJ

Annual data (fiscal years), FY 2009/10 to FY 2018/19, in billions of Jamaican dollars



Source: Tax Administration of Jamaica (TAJ).
Note: Billions refers to thousands of millions in national currency unit.

The change in business processes through the introduction of RAIS has improved the efficiency of the TAJ (and the Ministry of Finance & Public Service – MoF) mainly through the accessibility of data used to inform the setting of targets. This has allowed TAJ/MoF to better analyse and predict taxpayer behaviour, thus, resulting in more reliable revenue forecasts upon which MoF can inform the budget of GoJ (Government of Jamaica). Similarly, the collection of data has helped TAJ to develop more targeted compliance strategies with respect to tax registration, tax filing, tax payment, and tax reporting, guided by the application of this new technology.

Since the inception of RAIS, TAJ has focused on providing various avenues for clients to address not only their tax needs, but also, other various transactions required by other agencies of the government. This has created the need to constantly enhance digital products and services provided by TAJ to ensure that these can also be accessed through user-friendly digital tools. As more users made the transition to TAJ's online and mobile services, the number of e-transactions as a percentage of all client transactions will continue to grow. As such, the need to increase and/or improve on the front end, the Authority's information, and education programmes around these tools, and on the back end, the necessary support services will also become more demanding.

Another benefit of RAIS has been the capability that the platform allows, to communicate with partner systems. The ability to enhance and modify RAIS has given TAJ the capability to better fulfil GoJ's exchange of information obligations under the Convention on Mutual Administrative Assistance in Tax Matters (MAAC) as well as to communicate and share specific information much easier with other partner organizations.

Over the past few years, TAJ has rolled out additional payment options for registered taxpayers as well as; "e-solutions" for tax registration, Taxpayer Compliance Certificate (TCC) applications, and e-payment solutions for traffic tickets, property tax, and motor vehicle Fitness and Registration certificate payments. Although TAJ has expanded and enhanced its digital tools, there is still much to be done. On the "Tax Authority" side; the registration process is not seamless between registration for taxes and registration to have an online account.

Also, weaknesses in the tax laws prevent TAJ from legally serving tax notices on taxpayers. While on the "GoJ Collection Agency" side, although some positive strides have been made, so far, the digital tools, in general, have made little more than a dent in providing the type of customer service that is required to keep clients at their homes and businesses, and out of the tax offices. A breakdown of TAJ's collections for FY21/22 indicate that, although approximately 85% of the revenue collected was paid by electronic means, this also represented about 25% of the payment transactions.

4. Conclusions

The implementation of the RAIS has signalled not only a change in the way TAJ does business but, most importantly, a transformation of the organization so that it can sustain confidence in the system and its overall administration. TAJ has placed much attention on ensuring that its limited resources are strategically used so as to maximize the impact of its compliance efforts through the development and timely deployment of efficient, effective, and targeted compliance programmes. The technological evolution of TAJ has sought to broaden the holistic profile of taxpayer risk in order to efficiently improve voluntary compliance.

The use of these new technologies, coupled with a renewed thrust to register new taxpayers, encourage "online and on time" filing, improve payments, and ensure correct reporting, has significantly contributed to TAJ's achievements. It is also important to note that in addition to the technological advances outlined, TAJ has embraced a change management programme that has allowed for the smoother and less chaotic introduction of new and/or enhanced tax products and services. It is hoped that with this shift in TAJ's service delivery methodologies, that in time, with accompanying taxpayer education and information initiatives, these will bring about a corresponding shift in taxpayers' perceptions of, and attitudes towards the filing, reporting, and payment of taxes.

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IV.5. Exploitation of the Electronic Invoice: Identification of simulated transactions through advanced analytics in Bolivia

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Introduction

Among the practices used by some taxpayers to illicitly reduce their tax burden is the issuance of invoices that support non-existent operations, which occurs when the former issue invoices without the delivery of the good, service, or equivalent act that supposes the transfer of ownership. In addition to this fact, the issuer does not have the material infrastructure, purchases of inputs or personnel that allow the production or commercialization of goods or services that support such tax documents.

The recipient of the invoices in question declares them for VAT credit or to request a refund of the VAT paid, while the issuers, in general, disappear with declarations with underpayments or unsupported VAT accreditations and with a considerable number of non-compliances of their formal duties. These types of transactions will be referred to in this study as possible simulated operations (POS).

The purpose of the application presented here is to show the use of logistic and normal (probit) regression methodology to detect possible simulated operations. Based on a sample of Value Added Tax (VAT) taxpayers, we will try to estimate the above mentioned models that allow us to assign a probability that a taxpayer has a behavior similar to those who simulate operations based on the data submitted to the Bolivian Tax Administration (Servicio de Impuestos Nacionales- SIN), in order to determine proportional treatments that mitigate the issuance of apocryphal invoices that support non-existent operations.

In addition to this introduction, the structure of this article is described below. Firstly, a characterization of the simulated operators by type of taxpayers, activities, age group and sex is made. Then, the specific research design and methodology used are described. Subsequently, the main results are summarized. Finally, the main conclusions of this novel line of research developed by the SIN are presented.

1. Characterization of simulated operators

The characterization of the POS is based on a descriptive analysis of the verified cases considering the following variables: a) type of taxpayer (individual, sole proprietorship, corporation), economic activity and tax obligations, b) tax domicile and non-existent address, c) links by legal representation, attorneys-in-fact, partners and family (presumed) and d) sociodemographic variables as additional indicators, which are evaluated in combination with the previous ones.

The 96% of the POS are sole proprietorships which, together with the remaining 3% registered as Corporates, obtained a Tax Identification Number (NIT) to carry out business activities that are subject to VAT, the Transaction Tax (IT) and the Corporate Income Tax (IUE). This suggests that they have been able to camouflage themselves very well within the general regime that is subject to the greatest number of tax obligations (formal and informative), in addition to the presentation of tax returns with the possibility of generating losses in the management, involving the presentation of the Report of Purchases and Sales and Financial Statements.

TABLE 1

Number of POS by type of taxpayer and sector of economic activity

As of March 2023, in percentages

Business activity	Composition
Sole Propiertorships	**96%**
Wholesale trade	53%
Retail trade	22%
Services	16%
Construction	3%
Industrial enterprise	2%
Agriculture and/or livestock	0%
Corporations	**3%**
Services	1%
Wholesale trade	1%
Construction	0%
Agriculture and/or livestock	0%
Retail trade	0%
Individuals	**1%**
Services	1%
Total	**100%**
Sector	
Wholesale trade	55%
Retail trade	22%
Services	18%
Construction	3%
Industrial enterprise	2%
Agriculture and/or livestock	1%
Total	100%

Source: Servicio de Impuestos Nacionales (SIN).

The sectors most "contaminated" by these practices are Trading (Wholesale, Retail), Services and Construction, finding links between activities within the groups of taxpayers (Table 1). For example, with respect to the links through individuals within the POS taxpayers, it has been identified that there are individuals who are linked to more than one NIT, either as legal representative, partner, or attorney-in-fact.

Considering sociodemographic variables, it is observed that there is a greater tendency for men to carry out POS activities, since 64% of the taxpayers registered as Individuals and Sole Proprietorships correspond to this sex, while the remaining 36% correspond to women (Table 2). On the other hand, it can be observed that age could be an element of risk analysis when registering taxpayers aged over 50 years, including the life expectancy established for the country (70 years for men and 77 years for women), as can be seen in Table 2.

TABLE 2

Number of POS by age group and taxpayer gender

Individuals and Sole proprietorships, March 2023, in percentages

Age group (age range)	Gender		Total	Relative Weight (%)
	Male	Female		
21-25	15	7	22	4.2%
26-30	31	17	48	9.2%
31-35	39	36	75	14.4%
36-40	48	25	73	14.0%
41-45	44	32	76	14.6%
46-50	45	27	72	13.8%
More than 50	**111**	**44**	**155**	**29.8%**
Over life expectancy	12	2	14	2.7%
Total	**333**	**188**	**521**	**100.0%**
Participation (in %)	63.9%	36.1%	100.0%	---

Source: Servicio de Impuestos Nacionales (SIN).

2. Research design and methodology

In the present study, a part of the subject to Value Added Tax (VAT) was considered as universe. From these taxpayers the following data were processed: a) NIT; b) Company name; c) Tax returns the F-200, F-210 and F-400; d) Sales and Purchase Books; e) third party reports, specifically those of suppliers, clients and the National Customs; f) number of payments in default and g) collection by type of tax. The processing was conducted by the Information Management team of the Information and Communication Technologies Management of the SIN. The volume of information amounted to 28 million records.

With the aim of achieving non-explicit knowledge from these data, we planned to identify a pattern, law or regularity based on inductive learning. To this end, we proceeded according to the following steps:

a) Two samples were taken, foreseeing they contain significant information in relation to the size of the universe. The first one for evaluating the model (test set) and the second one for finding the pattern or regularity, i.e., the training data (training set).

b) The data were analyzed searching for anticipated relationships, unexpected trends, outliers, and missing values. It is worth mentioning that the processed data have considerable levels of missing data that could be explained by faulty records of the information and natural absence of the information sought.

c) There were seven risk indicators calculated with the data referred above.

d) The analytical tools selected to model the data were the Logit and Probit models because it was possible to define a discrete label or dependent variable.

e) The fifth stage was evaluated according to statistical consistency criteria.

The models mentioned in paragraph d) are based on a sample of taxpayers, of which information is available on whether or not they have simulated transactions. A variable Yi is defined that takes the value of 1 if the $i\text{-}ésimo$ taxpayer simulated operations and 0 otherwise. In addition, a series of factors related to Yi were collected, for example, the declarations and/or payments of certain taxes, the proportions between taxed sales and purchases, the relationship between debit and credit, among other elements. Mathematically, the expression is as follows:

$$P(Y = 1) = F(x, \beta)$$

Where P expresses the probability that a subject simulates transactions given certain characteristics of the taxpayer (vector x), with β being the vector of parameters reflecting the impact of the characteristics on this probability. The βi components of β are the coefficients of each regressor, the marginal effect is formulated by:

$$\frac{\partial F(\beta' x)}{\partial x} = \frac{dF(\beta' x)}{d(\beta' x)} \beta = f(\beta' x)\beta$$

where f(.) is the density function associated with the distribution function F(.).

In the model ***Logit***, F(.) is:

$$F(\beta'x) = \frac{e^{\beta'x}}{1+e^{\beta'x}} = \Lambda(\beta'x)$$

Where Λ(β'x) is the logistic distribution function:

$$\frac{d\Lambda(\beta'x)}{d(\beta'x)} = \frac{e^{\beta'x}}{\left(1+e^{\beta'x}\right)^2} = \frac{e^{\beta'x}+e^{\beta'x}-e^{\beta'x}}{\left(1+e^{\beta'x}\right)^2} = \frac{e^{\beta'x}}{1+e^{\beta'x}} * \left[\frac{1+e^{\beta'x}}{1+e^{\beta'x}} - \frac{e^{\beta'x}}{1+e^{\beta'x}}\right] = \Lambda(\beta'x)[1-\Lambda(\beta'x)]$$

The marginal effects of taxpayer characteristics on the probability of making POS are as follows:

$$\frac{\partial\Lambda(\beta'x)}{\partial x} = \Lambda(\beta'x)[1-\Lambda(\beta'x)]\beta$$

The expression Λ(β'x)(1-Λ(β'x)) is called the scale factor.

In the Probit model, F(.) is the cumulative distribution function of the standard normal distribution:

$$F(\beta'x) = \int_{-\infty}^{\beta'x} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(v)^2} dv = \Phi(\beta'x)$$

The estimation of these expressions provides the power and direction of the explanatory variables of the probability of a taxpayer making POS or not.

3. Results

The results of the estimation of the models using the standard errors robust to heteroscedasticity are listed in Table 3.

TABLE 3 **Estimation of Logit and Probit models for determining POS taxpayers**

Models	Logistic		Probit	
Variables	Coefficients	P>|z|	Coefficients	P>|z|
l2lcc	-3.96295	0.000	-1.94740	0.000
i3lqlvlqlc	-1270.19500	0.002	-615.33570	0.006
i5NoPD	0.48350	0.033	0.23087	0.032
_cons	5..26123	0.000	2.70302	0.000
Wald[2] (3)		33.670		30.250
Prob> chi2		0.000		0.000
Log pseudolikelihood		-10.554		-10.552
Pseudo R^2		0.973		0.973

Source: Dirección de Estudios y Gestión de Riesgos, Servicio de Impuestos Nacionales (SIN).

The logit and probit equations are respectively as follows:

$$P[Y=y]=E[Y=1|X]=\frac{1}{1+e^{-(5.26123-3.96295*l2lcc-1270.19500*i3lqlvlalc+0.48350*i5NoPD)}}$$

$$P[Y=y]=E[Y=1|X]=\frac{1}{\sqrt{2\pi}}e^{\frac{1}{2}(2.70302-1.94710*l2lcc-615.33570*i3lqlvlqlc+0.23087*i5NoPD)^2}$$

These estimates are consistent because in each model the signs of the coefficients are the same and the same variables are statistically significant (see p-value magnitudes in Table 3). The above table also details the goodness of prediction.

As is well known, the interpretation of the partial effects is not straightforward because the scale factor depends on all the explanatory variables, so the emphasis has been placed on the directions of these effects. The signs of indicators 1 (*l2lcc*) and 2 (*i3lqlvlvlalc*) indicate decreasing partial effects, i.e., the smaller these indicators are, the greater the probability that the subject is a POS performer. With respect to indicator 3 (*i5NoPD*), the direction of the estimated coefficient implies that the greater the number of default payments, the greater the probability that the subject is a POS subject.

From the calculation of probabilities, 156 observed subjects were identified, including subjects with some form of electronic invoicing, for which it was proposed to conduct a pilot operation to verify the economic activity and tax domicile in order to have elements of greater certainty.

The results of these actions are detailed in the Minutes of Actions and Omissions where, mainly, it is mentioned that they find the address according to the data of the census and then interview the owner or owner of the house, who sometimes have many years of permanence in the place and who refer that they do not know the taxpayer and that there was no economic activity in the place.

Likewise, there are cases where the homeowners indicate that they know the taxpayer but did not see the development of any economic activity, the verification documents also refer that the taxpayers at the time of registration indicate as tax domicile spaces that are not habitable, others that show characteristics of precarious housing and others that are properties of institutions.

To mitigate this risk, according to the established treatment, the strategy consisted of verifying the clients of the observed taxpayers and implementing mechanisms for the recovery of the Tax Credit misappropriated by them, resulting in a total of 4,000 verifications.

4. Conclusions

The analytical models used in this article allowed us to find the most relevant variables that explain the atypical behavior related to the simulated operations, as well as a better understanding of the relationships or associations between them. The estimations conducted reveal a consistent history, since the signs of the coefficients in both models are the same and the same variables are statistically significant.

The ratio of inputs purchased in the domestic market to sales, either those declared by taxpayers themselves or those reported by their customers or suppliers, together with the number of default payments, are the main variables that differentiate the behavior of a transaction simulator from those that are not.

The estimation of the models shows an inverse relationship between indicators 1 and 2, and the probability that it is a simulated operation, i.e., the smaller these indicators are, the greater the probability that it is a subject that performs POS, regarding indicator 3, a direct relationship is revealed between the number of payments in default and the probability that it is POS.

In line with the above, the importance of controlling or mitigating the timely payment gap was determined, since noncompliance with the aforementioned dimension is a source or behavior that subjects use to incur or conceal frauds.

The Logit and Probit equations were used to estimate the probability of a taxpayer trading invoices through data from taxpayers themselves and third parties. From this process, 156 taxpayers were identified with indications of such operations, and these findings were corroborated by on-site verifications of the economic activity and tax domicile of the taxpayers observed.

The preventive strategy in the registration dimension consisted of establishing greater controls on the registration of new taxpayers requesting registration in economic activities registered as POS subjects, requesting greater evidence of the performance of the activity or on-site verifications of the tax domicile prior to the issuance of the Tax Identification Number.

IV.6. Model for the segmentation of determinants of tax revenues from foreign trade in Guatemala

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Introduction

The main objective of this article is to describe the development of a simple model to explain the year-on-year changes in the collection of foreign trade taxes for a sample of interest. Based on the register of customs declarations, a function was constructed to approximate the year-on-year difference in the collection of foreign trade taxes. In an attempt to identify its main determinants, this function is described as the sum of the effects of the volume of imports, the exchange rate, the tax rate, the price of goods, the price of freight and other expenses, other forms of payment (non-cash) and the complementary collection coming from the banking system. A drawback of the model is that it uses representative values of the determinants for each period and tariff item. The difference between the results provided by the model and those derived from the perceived collection was defined as a statistical effect. All in all, this model aims to produce an information tool in figure format to guide the operational areas of the Tax Administration in the management of change.

1. Model approach

Let I be the set of taxpayers, identified by the Tax Identification Number NIT, that carried out import operations in a monthly period. Let $P \subseteq I$ be a list of interest. The function Rec^t is defined as the collection of the standard in the month. The interest is placed on the calculation of the year-on-year difference:

$$\Delta Rec = Rec^{t} - Rec^{t-12}$$

In addition ΔRec_{NIT} is defined as the year-on-year difference in the collection of each NIT in the taxpayer registry. Then, for n taxpayers registered in the taxpayers' registry:

$$\Delta Rec = \sum_{NIT}^{n} \Delta Rec_{NIT}$$

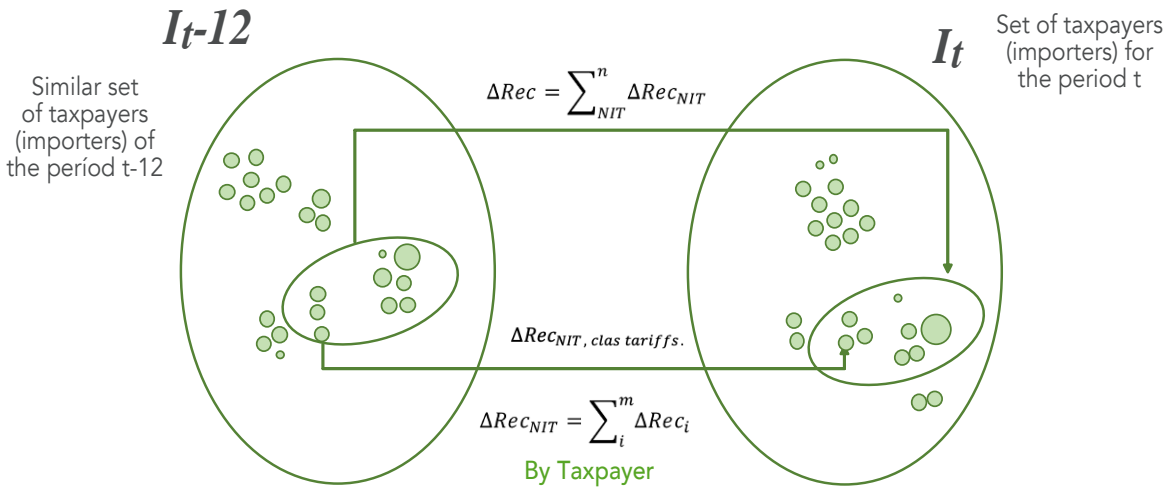
In general, imports of an NIT are heterogeneous. To solve the heterogeneity, it would be better a comparison at the merchandise level to determine ΔRec_{NIT}. However, in the customs register, goods are identified with a description that may present ambiguities. On the other hand, the tariff item is derived from a standardized commodity classification system. Therefore, the tariff item is considered the most appropriate level of comparison for the model.

It is defined ΔRec_i as the year-on-year difference in the collection of a tariff item. If m is the total number of tariff items imported by the NIT, then:

$$\Delta Rec_{NIT} = \sum_{i}^{m} \Delta Rec_i$$

Intuitively, the model can be presented as illustrated in Diagram 1, linking taxable import collections in a particular period and with respect to the same period of the previous year.

DIAGRAM 1 **Intuitive approach to the proposed model**



Source: Own elaboration.

Based on the customs register, the revenue collected for a tariff item can be stated as follows:

$$Rec_i = IVA + DAI - FP$$

where $\mathrm{DAI} = \mathrm{CIF_Q} \cdot \mathrm{T_{DAI}}; IVA = (CIF_Q + DAI) \cdot T_{IVA}$; and FP represents the other (non-cash) payment methods. By substituting:

$$Rec_i = CIF_Q \cdot [T_{IVA} + T_{DAI} \cdot (T_{IVA} + 1)] - FP$$

$$= (FOB_Q + FSO_Q) \cdot TI - FP$$

$$= \left(\frac{FOB_Q}{UM} + \frac{FSO_Q}{UM}\right) \cdot UM \cdot TI - FP$$

$$= TC \cdot \left(\frac{FOB}{UM} + \frac{FSO}{UM}\right) \cdot UM \cdot TI - FP$$

$$= TC \cdot (FOB_u + FSO_u) \cdot UM \cdot TI - FP$$

Where TC refers to the exchange rate (Q/USD), FOB_u to the unit price of goods, FSO_u to the unit price of freight and other expenses, UM to the number of measurement units, TI to the term containing the tax rates of DAI and IVA and FP to the other forms of payment (non-cash). These variables are considered the determinants of foreign trade tax collection in the model.

From the above definition, an algebraic development allows us to define:

$$\Delta Rec_i = Rec_i^t - Rec_i^{t-12} = E_{UM} + E_{TC} + E_{TI} + E_{FOB} + E_{FSO} + E_{FP}$$

Where:

$$E_{UM} = TC^t \cdot (FOB_U^t + FSO_U^t) \cdot \Delta UM \cdot TI^t$$

$$E_{TC} = \Delta TC \cdot (FOB_U^t + FSO_U^t) \cdot UM^{t-12} \cdot TI^t$$

$$E_{TI} = TC^{t-12} \cdot (FOB_U^t + FSO_U^t) \cdot UM^{t-12} \cdot \Delta TI$$

$$E_{FOB} = TC^{t-12} \cdot \Delta FOB_U \cdot UM^{t-12} \cdot TI^{t-12}$$

$$E_{FSO} = TC^{t-12} \cdot \Delta FSO_U \cdot UM^{t-12} \cdot TI^{t-12}$$

$$E_{FP} = -\Delta FP$$

All of the above correspond to the effects on the difference in the collection of the volume of imports, the exchange rate, the tax rate, the price of goods, the price of freight, insurance and other expenses, and the other forms of payment (non-cash) respectively.

2. Determination of representative values

By construction, ΔRec_i is a function only of the determinants and their differences. However, the variation of the exchange rate in the period of analysis and the limitations of the customs register, lead to use representative values of the determinants for each period and tariff item. Based on a series of tests with samples from the customs registry it is considered appropriate to define:

$$UM = \sum UM_f$$

$$TC = \frac{\sum TC_f \cdot CIF_f}{\sum CIF_f}$$

$$TI = \frac{\sum [T_{IVAf} + T_{DAIf} \cdot (T_{IVAf} + 1)]}{\sum f}$$

$$FOB_U = \frac{\sum FOB_f}{\sum UM_f}$$

$$FSO_U = \frac{\sum FSO_f}{\sum UM_f}$$

$$FP = \sum FP_f$$

Where f is a fraction recorded in period t belonging to tariff item i.

3. Adjustment for the effect of import volume

Consider a tariff item, imported by a NIT registered in a specific register. By construction, if:

$$Rec_i^t > 0 \wedge Rec_i^{t-12} = 0 \rightarrow \Delta Rec_i = E_{UM}$$

In other words, if the tariff item only has revenue in the current period, the increase in revenue is a consequence of the volume of imports. In contrast, if:

$$Rec_i^t = 0 \wedge Rec_i^{t-12} > 0 \rightarrow \Delta Rec_i = E_{FOB} + E_{FSO}$$

This implies that when the tariff item only shows collection in the previous period, the decrease in collection is the result of prices. However, conceptually this attribution is incorrect. The difference is due to a decrease in quantity, i.e., the volume of imports. Therefore, for this case, it is established that:

$$\Delta Rec_i = E_{UM} = E_{FOB} + E_{FSO}$$

4. Complementary effect

It is important to consider that the collection of foreign trade taxes has an external component to the customs declarations. This complementary collection C cannot be assigned to a tariff item since there is only a record of the period and NIT that corresponds to it. Therefore, the difference of the complementary collection between the two periods was defined as a complementary effect:

$$E_C = C_{NIT}^t - C_{NIT}^{t-12}$$

When considering this effect, the results of the model are comparable with the differences in closed tax collection.

5. The model as an approximation and the statistical effect

Using representative values of the determinants is a source of errors in the model. Therefore, ΔRec_i is only an approximation of the perceived value. Aggregation for the standard yields the following results:

$$\Delta Rec \simeq \sum_{NIT}^{n}\sum_{i}^{m} \Delta Rec_i = \sum_{NIT}^{n}\left[E_C + \sum_{i}^{m}(E_{UM} + E_{TC} + E_{TI} + E_{FOB} + E_{FSO} + E_{FP})\right]$$

The difference between the results provided by the model and those derived from the perceived collection was defined as the E_E. statistical effect. Finally, the year-on-year difference in the collection of foreign trade taxes is expressed as:

$$\Delta Rec = E_E + \sum_{NIT}^{n}\left[E_C + \sum_{i}^{m}(E_{UM} + E_{TC} + E_{TI} + E_{FOB} + E_{FSO} + E_{FP})\right]$$

6. Outliers treatment

In order to reduce bias in the results, for each year - NIT - subsection, the mean $(\bar{\bar{P}})$ and standard deviation (σ_P) of the unit price (*Pf=CIFf/UMf*). The following fractions were considered:

$$\left|\bar{\bar{P}} - P_f\right| < 2\sigma_P$$

Once the effects have been calculated, we consider those results that satisfy the following criteria:

$$\log 10 \frac{|E_{FOB}|}{|\Delta Rec_i|} < 2$$

That is, results where the order of magnitude of E_{FOB} is at most twice the order of magnitude of ΔRec_i .

7. Concluding remarks

The objective of implementing the above model is to analyze and understand in depth the factors that impact the collection of taxes on foreign trade, considering not only the taxes themselves, but also the different aspects related to the national customs system. By providing a comprehensive analysis, this approach will allow for a more complete understanding of changes in collection, which can lead to more informed decision making and the implementation of more effective strategies to improve tax revenues related to international trade. Some final reflections that can be derived from the practice of the model are:

• ***To demonstrate the quality of the information underlying customs management:***

The quality of information is crucial in customs management, as accurate and reliable data is essential for effective decision making. Segmenting the effects of different variables on customs revenue provides a clear picture of how certain factors influence tax revenues. By analyzing these effects, the quality of the underlying information is tested, leading to improved data collection, recording and storage processes to ensure the accuracy and completeness of customs information.

• ***Generate the opportunity for study units to be enriched through experience in operational processes:***

The segmentation of the effects on customs collection offers a valuable opportunity to enrich the knowledge and experience of the study units involved in the operational processes. By understanding how different variables affect results, these units can identify areas for improvement and optimize their strategies. This involves close collaboration between data analysts, customs specialists and other related professionals to share knowledge and experience, which ultimately strengthens customs management capacity.

• ***Managing information within the framework of Data Governance should enable the application of processes, policies, and technology to ensure the availability, usability, and consistency of institutional data:***

Customs information management must be carried out within the framework of a solid Data Governance. This involves establishing processes, policies and technologies that ensure the availability, usability, and consistency of institutional data. By applying a structured and standardized approach to data management, inconsistencies and errors can be avoided, and the quality of Customs information is promoted. In addition, having appropriate technologies for data collection, storage and analysis facilitates the efficient management of Customs information and improves data-driven decision-making.

• ***Reaping the benefits of change management, generating awareness for better production of customs information:***

The implementation of an effects segmentation model in customs collection requires effective change management. It is essential to raise awareness of the importance of quality information production and foster a data-driven organizational culture. This implies providing adequate training and education to collaborators and employees, clearly communicating the benefits of improving information production and perhaps it could be very timely and useful to establish incentives to promote its adoption. Successful change management in this context will allow for greater efficiency and effectiveness in customs management, aligning operations with tax collection objectives and optimizing the use of available resources.

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