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Topic 2.1:

INSTRUMENTS AND TECHNIQUES FOR THE MEASUREMENT OF TAX EVASION

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Tax evasion measurement: the Uruguayan case

Economic Advisory – General Revenue Office

ABSTRACT: Summary - 1. Introduction. - 2. Method used in Uruguay.- 2.1 The VAT case.- 2.2 The IRAE case.- 2.3 The IRPF case.- 2.4 Method limitations.- 3. Obtained results and dissemination.- 4. Conclusions.- 5. Bibliography.- Annex 1.- Annex 2.

Summary

The purpose of this paper is to present the model used in Uruguay to measure tax evasion.

Firstly, a series of theoretic concepts used herein are defined, such as what we understand by potential collection for the purposes of measuring the subject matter of this work and determining the method used for estimations.

In Uruguay, the General Revenue Office (DGI, in Spanish) has been using a method called “theoretic potential” or “indirect method” to measure the potential collection of certain taxes. Based on such method, such inputs as, mainly, the macroeconomic aggregates of the National Account Systems are used, prepared by the Central Bank of Uruguay (BCU, in Spanish), as well as micro-data provided by the Home Survey prepared by the National Institute of Statistics (INE, in Spanish).

Once the potential collection of a certain tax is obtained, it is then compared against its actual collection, thus arriving at a measurement of tax evasion, whether as a sum or a percentage, over the potential collection.

Currently this method is used to measure the evasion of the value-added tax (VAT), the tax on industry and trade income (IRIC, in Spanish) and/or the tax on economic activity income (IRAE, in Spanish), as per the period considered for measurement. It has also begun to be used to measure the evasion of the tax on individuals’ income (IRPF, in Spanish), although in this case the study is still in its early stages.

Subsequently, the procedures followed in the study of the above mentioned taxes are explained in detail, as well as which are the necessary sources to obtain information.

Lastly, the results obtained in the VAT evasion series are presented for the 2000 - 2008 period.

Introduction

Within the frame of the General Revenue Office's mission of "assuring the collection of the State's resources through the effective application of the regulations on internal taxes that fall within its competence, by promoting the voluntary compliance of taxpayers"[1], the fight against tax fraud and default is among the objectives presented.

To this end it is necessary to know the magnitude of tax default, which is achieved by comparing the potential collection against the actual collection, thus obtaining the tax evasion rate.

By potential collection it is understood the collection that could be actually obtained if all legally bound taxpayers declared the total taxes assessed in their activity. This concept is exclusive of tax deductions or exemptions that certain taxpayers may enjoy, which are considered as components of tax expenditure.

The question remains being how the potential collection of a tax may be measured.

On this regard, the methods mostly used by tax analysts are two: i) direct and ii) indirect.

The direct method consists in measuring evasion through the examinations performed on a random sample of individuals or corporations, to then extrapolate the results to the total population.

The indirect method or theoretic potential consists in the estimation of the potential collection through the use of external data sources.

Both methods present advantages and disadvantages, which should be known before making a choice in order to achieve the most adequate results.

The direct method requires that the sample being used should be statistically representative, and the results will depend on the quality of the conducted audits. Alternatively, in the indirect method the quality of the results will largely depend on the reliability of the estimations provided by the National Account System and, additionally, in the case of the IRPF, the reliability of Home Surveys.

Once the method is defined and the sum or the evasion rate is obtained, this information is of vital importance for tax administrations, for it allows them to better target the resources allocated for examining certain taxes or activity sectors, and thus achieve efficiency in fulfilling their objectives and missions.

[1] Decree 192/006 – Mission, objectives, commitments and organizational structure.

2. The method used in Uruguay

The General Revenue Office (DGI) has estimated the evasion of the value-added tax (VAT), the tax on industry and trade income (IRIC) and the tax on economic activity income (IRAE), and the tax on individuals' income (IRPF), using the indirect method in all cases. The reason for choosing such method is because the direct method demands a greater amount of resources, whether with relation to the design of representative samples or the examination itself. In general, ordinary examinations entail a biased selection that may deviate from what would be desirable to attain from the representative sample.

2.1 The VAT case

The estimations of VAT evasion held by the administration are based on the estimation of the theoretical base of the tax as provided from the National Account System.

The potential collection is determined by estimating the non-deductible VAT, which originates in the final consumption of taxed goods and services, in the purchase of taxed goods and services used as intermediate inputs or investment goods for the production of tax-exempted goods and services.

The main components that originate non-deductible VAT payments are:

- The final consumption of taxed goods and services by homes
- The Government's consumption
- The Government's investment
- The taxed intermediate consumption used to produce tax-exempted and export goods and services
- The investment in taxed goods intended to produce tax-exempted and export goods and services

The potential collection of each component is equal to its taxable base times the average rate:

Potential VAT collection per component $_i$ = Component's base $_i$ x average rate $_i$

The aggregate of each component considered results in the total potential VAT collection:

Potential VAT collection = $\sum$ potential VAT collection per component $_i$

With the resulting tax evasion rate:

Evasion = Potential VAT collection – Gross effective VAT collection

The information requirements necessary to estimate the collection of the above mentioned components are detailed[2].

To quantify the *VAT generated from home consumption*, the following variables were considered:

Variables	Data	Information sources
Final home consumption expenditure	External	Banco Central del Uruguay (BCU)
Composition of taxed and tax-exempted goods and services expenditure	External	National Institute of Statistics (INE)
Expenditure of goods and services purchased from small companies and taxpayers in the self-employed workers scheme	Internal research	General Income Office (DGI)
Uruguayans' consumption expenditure abroad	External	BCU
Foreigners' consumption expenditure in Uruguay	External	BCU
Average VAT rate	Internal research	DGI, INE, Ministry of Tourism and Sports (MINTUR)

Based on the final private consumption expenditure of National Accounts, the potential taxable base was estimated for each year.

This rate required some adjustments as a result of considering tourists' expenditure in the country and a discount of Uruguayan homes' expenditure abroad; and also small-sized companies and self-employed workers' scheme taxpayers who do not generate the VAT from their sales but from their purchases.

Once the components of the home consumption base were defined, the effective average rate of the VAT applicable to each of them in each year of the period was determined, to later estimate the potential collection of this tax.

VAT generated from Government's consumption

The estimation of the VAT generated from the purchase of goods and services for Government consumption was conducted based on the following variables:

Variables	Data	Information sources
Intermediate consumption by Government	External	BCU
Operating expenses of the Central Administration	External	General Government Accountability Office (CGN)
Average VAT rate	Own research	CGN, DGI

[2] For more details on the measurement per component, see Annex 1.

The component considered in the Government's consumption expenditure[3] was the intermediate consumption, because it is representative of the VAT-generated expenditure.
To the extent that the information in National Accounts gives no annual detail of the structure of this intermediate consumption, the VAT average rate applicable each year to the Government's consumption was determined from the composition of the operating expenditure of the Central Administration[4] (with the rate corresponding to each expenditure item).

VAT generated from Government's investment

In the case of the Government's investment, the estimation of potential generated VAT was conducted using the following variables:

Variables	Data	Information sources
Gross formation of Government's fixed capital	External	BCU, public companies
Investment expenditure of the Central Administration	External	CGN
Government's imports of capital goods	External	National Customs office (DNA)
Average VAT rate	Own research	CGN, DGI

To determine the VAT potential base associated with the Government's investment, the value of the gross formation of fixed capital (FBKF, in Spanish) of the Public Sector of National Accounts was used. Since this information includes public companies, the investment performed by the latter[5] was discounted, calculated from the Charts of Property available for Use included in their Balance Sheets.

The VAT average rate applicable to this investment was calculated based on the composition of the investment expenditure of the Central Administration, obtained from the Accountability and Budget Execution Balance report, which presents the investment amounts broken down by program-project and by expenditure item.

VAT generated from the intermediate consumption used to produce tax-exempted and export goods and services

Pursuant to the provisions established in the effective legislation, the VAT included in the purchase of goods and services made by companies constitutes deductible VAT if the goods and services are used for resale or manufacture of taxed products. Where

[3] Includes: the Central Government, Departmental and Social Security Governments (only for the administration services of the pension system). The institutional agent Government is exclusive of public companies, which are considered private agents.
[4] The Central Administration includes the following institutional units: the Executive Branch, the Legislative Branch, the Judicial Branch, the Government Accounting Office, the Court of Elections, the Administrative Litigation Court, the National Administration of Public Education, Universidad de la República and the Child and Adolescent Institute of Uruguay.

[5] The public companies considered were: ANCAP, ANTEL, ANP, OSE and UTE.

produced goods and services are intended for export, the company may opt between discounting the VAT of purchases associated with the payment of other taxes (including the VAT payable for market sales, if the company also produces goods for the local market[6]) and requesting credit certificates[7]. Alternatively, the VAT included in the purchases of goods and services intended to manufacture tax-exempted products cannot be discounted.
To the extent that the collection considered in this paper is gross, the VAT associated with purchases used to produce tax-exempted goods and services as well as the VAT related to export operations were treated as potentially non-deductible VAT.

The estimation of the potential VAT associated with the intermediate consumption used in the production of tax-exempted goods and services or those intended for the external market was performed using the following variables:

Variables	Data	Information sources
Intermediate consumption per economic activity type	Own research	BCU, DGI, DNA
Exports by economic activity type	External	DNA
Percentage of tax-exempted sales by economic activity type	Own research	DGI
Average VAT rate	Own research	BCU, DGI

The determination of the potential base of this non-deductible VAT component required to establish firstly what proportion of the intermediate consumption of the different sectors was used each year in the production of goods and services intended for the local market, and what proportion was allocated to produce export goods. These percentages were applied to the data on intermediate consumption by activity class as obtained from the National Accounts[8], thus determining the amount used in the production of goods and services targeted at the local market and the amount used in manufacturing export products.

Once the intermediate consumption associated with the production targeted at the local market was defined, the percentage used each year in the manufacture of tax-exempted products was established.

[6] In this case, the company may discount the VAT of purchases from the VAT of sales corresponding to the operations performed in the local market and use the excess, if any, to pay other taxes or future year taxes (in the case such credit is not used up within the relevant period).

[7] The credit certificates may be used by the company to pay taxes included in the bills of their goods and service providers, provided that the same are a direct integral part of the cost of the exported goods (in this case, the company pays to its provider the net amount of the bill and delivers the requested credit certificates to the DGI).

[8] Like the other National Account variables, the amounts of intermediate consumption estimated by the BCU include the VAT, so it was necessary to calculate for each year the corresponding non-VAT amounts using the respective sector average rates of this tax.

VAT generated from the investment targeted at producing tax-exempted and export goods and services

The last component that is considered as a potential base of non-deductible VAT was the taxed private investment[9] intended to produce tax-exempted and export goods and services. Its estimation drew on the following variables:

Variables	Data	Information sources
Fixed capital gross formation in the private sector	External	BCU, INE, Ministry of Livestock, Agriculture and Fishery (MGAP)
Fixed capital gross formation of public companies	External	Public companies
Fixed capital gross formation by activity class	Own research	BCU, DGI, INE, MGAP
Imports of capital goods by the private sector	External	DNA
VAT average rate	Own research	BCU, DGI

Since the FBKF data from the National Accounts present a greater aggregation than required, the investment amount contributed by each sector had to be determined by resorting to additional information sources, regrouping activities under new categories[10].

Sector	Source	Available period
Agriculture and livestock	OPYPA - MGAP	2000-2006[11]
Manufacturing industries	INE	2001, 2003-2005
Electricity, gas and water	INE	2001, 2003-2005
Trade, restaurants and hotels	INE	2001, 2003-2005
Transportation, storage and communications	INE	2001, 2003-2005
Others	Own research	-

As it happens with public investment, part of the private investment benefits from tax exemptions[12].

After obtaining the taxed investment of each activity sector, the portion used in producing goods intended for the local market was determined, as well as the portion used in manufacturing export products.

[9] Public companies' investments are included in this category.

[10] The need to regroup the sectors originated in the lack of available information for all activity classes.

[11] The data for 2006 is preliminary, and data for 2007 and 2008 are our own estimation.

[12] The Act 16.906, effective since 1998, contains rules relating to the declaration of interest of some investments performed in the national territory by both national and foreign operators who are engaged in industrial or agriculture and livestock activities. These investments comprise: the acquisition of personal property directly allocated to the production cycle, the purchase of equipment for electronic data processing, fixed improvements intended for industrial and agriculture-livestock activities, and some intangible goods, among others.

Subsequently, from the investment amount allocated by each sector to the production of goods and services for the local market, the portion of such investment used each year in the manufacture of tax-exempted products was determined.

Once the potential collection per component is obtained, it is compared against the effective collection, considering that the local VAT liquidation is carried out in the month following the month in which the originating act takes place; therefore, the effective collection should be considered as accrued.

2.2 The case of the tax on industry and trade income (IRIC) or tax on economic activity income (IRAE).

Using the indirect method for the study of the income tax evasion also implies obtaining the potential collection thereof. To this end, the tax income must be approximated to the relevant macroeconomic aggregate, which in this case is the Gross Operating Surplus (EEB, in Spanish), that is, the balance corresponding to the income generating account resulting from the National Account System (the Gross Added Value minus Remunerations minus taxes net of subsidies).

The taxable amount derives from the legal regulation, the maximum being between the taxable income, if positive, and zero, in the event of loss.

MI = Maximum {RF, 0}

As approximation to the taxable amount, the operating surplus (EEB) is used; this results from the difference or balance in the income generating account of the National Account System. The same is the Gross Added Value (VAB, in Spanish), which is defined as the Gross Production Value (VBP, in Spanish) minus the Intermediate Consumption (CI, in Spanish), after remunerations (RA, in Spanish) are deducted, minus taxes on production net of subsidies (T-S).

EEB = VBP - CI - RA – (T-S)

The taxable amount is determined using the EEB, along with the relevant adjustments[13], which results in:

MI = EE – RE (-/+) AF – GNA + DI

The tax-exempted income (RE, in Spanish) considered is, among others:

- Free-trade zone users
- wood producers
- taxpayers covered in Letter E
- self-employed workers' scheme taxpayers
- taxpayers of other taxes not included in IRIC/IRAE

[13] For a greater detail of equations, see Annex 2.

The Fiscal Adjustments (AF, in Spanish) correspond to the fiscal adjustments that the tax regulation requires to be made in order to determine the taxable income. Likewise, non-admitted expenses (GNA, in Spanish) are actual expenses incurred (which are part of the EEB) but the deduction of which is not allowed to determine the taxable income.

Under the regulation, increased deductions (DI, in Spanish) are defined as certain expenses that may be computed by more than one time their actual amount, and are:

- expenses for training staff in areas considered a priority
- expenses for payment of fees to technicians for their assistance in areas considered a priority
- expenses incurred by companies to obtain the certification under internationally admitted quality standards
- expenses incurred to obtain accreditation of laboratory trials
- expenses incurred in the purchase of labeled seeds by agriculture producers
- expenses for incorporating animal genetic material
- expenses for software services rendered by those who are subject to this tax

Once the taxable amount is obtained, it is multiplied by the tax rate, resulting in the potential collection. To calculate the evasion amount, the potential collection is compared against the effective collection, the latter being that declared by taxpayers.

Effective IRIC/IRAE= declared IRIC/IRAE

The tax evasion rate,

$$Tasa\ de\ evasión_t = \frac{IRICP_t - IRICE_t}{IRICP_t} = \frac{Evasión\ IRIC_t}{IRICP_t}$$

$$Tasa\ de\ evasión_t = \frac{IRAEP_t - IRAEE_t}{IRAEP_t} = \frac{Evasión\ IRAE_t}{IRAEP_t}$$

where IRICP and IRAEP pertain to the *potential* collection of IRIC and IRAE, respectively, while IRICE and IRAEE pertain to the *effective* collection of IRIC and IRAE, respectively.

The information sources required to perform the estimation were both internal of the administration itself and external.

- Internal

- Taxpayers' returns, CEDE and NO CEDE
- Tax returns of agents responsible for withholdings
- Payment of taxes by taxpayers

- External

- EEB obtained from national accounts of the National Account System 1993 (BCU)
- Economic Activity Census, 1998 (INE)
- Economic Activity Survey, 2002, 2003, 2004, 2005, 2007 (INE)

2.3 The case of the tax on individuals' income (IRPF)

The Uruguayan IRPF has been recently created, and its implementation began with the coming into force of the New Tax System in July 2007. As noted in the introductory summary of this document, the process of estimating the IRPF evasion is in its early stages. Firstly, the analysis of the category II of the tax is presented, which comprises work income and, within this category, the study focuses on the income deriving from salaried work relationships.

The consulted sources comprise the DGI's databases (which receive data from collaborative entities and the taxpayers' returns), the Ongoing Home Survey (ECH 2008) published by the INE and the data from the National Accounts published by the BCU.

The purpose of arriving at a potential collection of the tax based on ongoing surveys has the advantage of following up the evasion calculation for the subsequent years, because these surveys are performed continuously and will allow making an adequate calculation of the current design of computable income for the tax, as well as having the possibility of changing parameters resulting in modifications in the design or the mechanics of the tax in the future.

A two-stage calculation proceeding is followed: a first stage for calculating evasion resulting from the informal economy, understatements or tax fraud; and a second stage for calculating evasion from default or omission.

The first stage consists of two alternative mechanisms, the first one concerning the nominalization of personal income comprised in the ECH, the adjustment thereof by way of a coefficient deriving from the existing income gap between the Survey and the National Accounts (as a way to detect any understatements in the Survey), in order to arrive at a calculation of a potential tax from the income declared in the Survey, adjusted as per the National Accounts.

The second mechanism consists in the distribution of the Survey income (without a previous adjustment for National Accounts) in deciles or bands, to then proceed to make an analogous calculation based on the income declared before the DGI, as a way to identify the tax evasion phenomenon by comparing both income distributions.[14]

Once both income structures (that corresponding to the ongoing survey base and that pertaining to DGI's statement base) are obtained, an effective average rate is calculated corresponding to each proposed band or decil. In this way, an effective average IRPF per band or decil is obtained, and by comparing both amounts, the average evasion can be calculated, which allows the later calculation of an evasion rate.[15]

Both mechanisms allow obtaining an estimation of the evasion resulting from the informal economy, understatements or tax fraud. The simultaneous utilization thereof allows making a contrast of the obtained results through one and the other, which results in an evaluation of their robustness.

The second stage is concerned with the estimation of evasion as a result of default or omission, through the comparison between the accrued tax (a calculation made from each person' income as it appears in the DGI's administrative records) and its comparison with the IRPF effectively paid in the relevant period.

By consolidating both facets of evasion (the one obtained through the first and the second stages), what is intended is to arrive at a global amount of IRPF evasion and its corresponding rate.

2.3 Limitations to the Theoretical Potential Method

The main limitation relates to the information sources. In the case of the data provided by the National Accounts, the primary characteristics that constitute limitations are:

- estimations are usually available one year later or more, which implies a great delay. In particular, the EEB is available by activity sector for the period 1997-2005, and the relevant publication for 2006 and 2007 is expected by April 2011.

- the most recently published National Accounts' figures are preliminary, and it should be stated that tax evasion measurement studies are sensitive to changes in these variables.

- if there is any error in the estimation, it is carried over to the tax evasion measurement.

In the case of the data deriving from the Ongoing Home Survey, some aspects could lead to estimation errors. Among the most relevant ones is the fact that the net income

[14] The identification of the "evasion" phenomenon through the detection of a disarrangement in the income declared to the DGI from the uppermost to the lowermost bands.

[15] Evasion rate as a quotient between the average evasion and the potential average IRPF based on the ECH.

is surveyed, but not the gross income. The concept of net income is somewhat malleable in practice (net of social security contributions to the health insurance, but it may also be net of other items, such corporate shares or loans discounted from the salary, etc.), which increases the probability of errors in the estimation of the gross or nominal income, which is the reference for calculating the IRPF.

It should be considered that despite the above stated limitations, the method is useful in that it allows determining the magnitude of the evasion and, most importantly, its evolution.

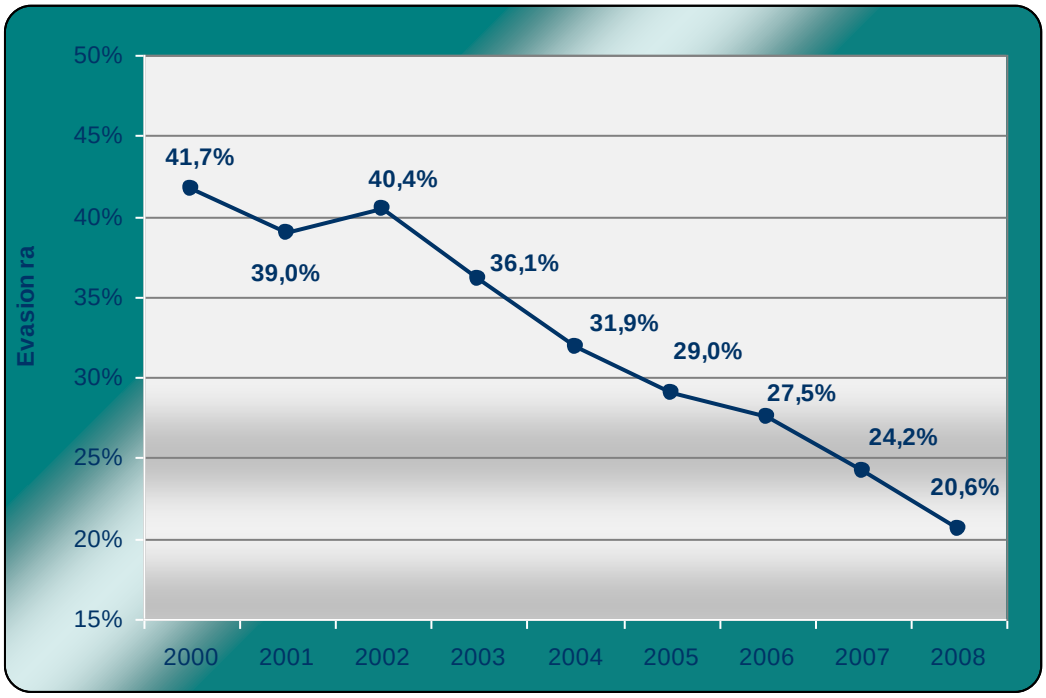
3. Obtained results and dissemination

In the case of the **VAT,** there is a tax evasion rate series covering the period 2000 – 2008.

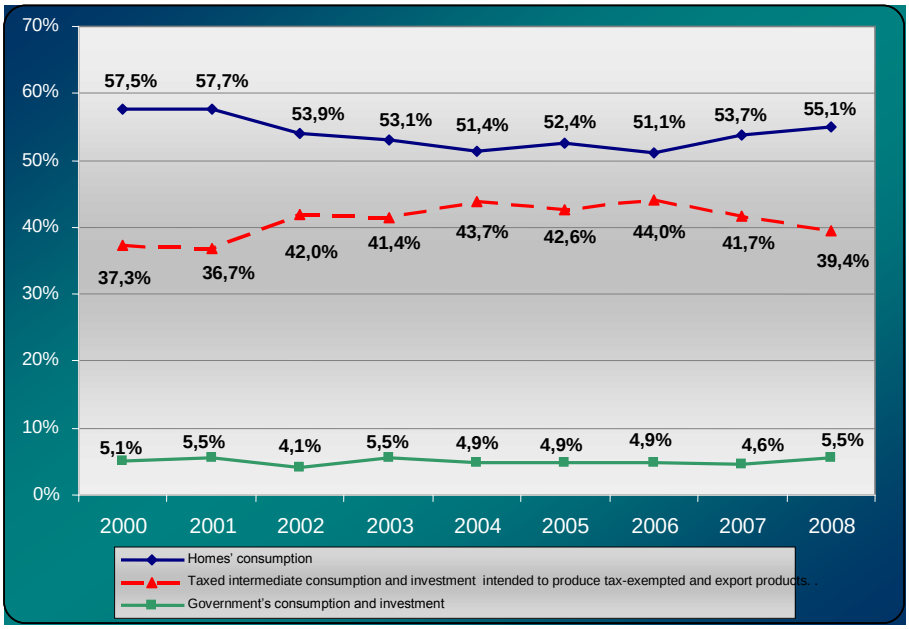
Year	VAT Collection*		Evasion*	Evasion in % PIB	Evasion rate
	Potential	Effective			
2000	33.154	19.335	13.818	5,0%	**41,7%**
2001	33.133	20.222	12.911	4,6%	**39,0%**
2002	35.285	21.023	14.262	4,9%	**40,4%**
2003	43.166	27.577	15.589	4,6%	**36,1%**
2004	52.354	35.658	16.696	4,3%	**31,9%**
2005	56.332	39.968	16.364	3,9%	**29,0%**
2006**	64.807	46.993	17.815	3,7%	**27,5%**
2007**	73.590	55.777	17.813	3,1%	**24,2%**
2008**	86.199	68.418	17.781	2,6%	**20,6%**

* *Figures in millions of current pesos.*
** *Preliminary.*

The indicator's evolution has been downwards since 2003, a trend that has been accentuated in the last two years of the series, recording a reduction of -25.0%. Considering the period as a whole, the evasion rate went down by -50.5%.



Upon analyzing the distribution of the potential VAT among the agents subject to the tax, we observe that during the period, on average, 53.7% of the potential collection corresponded to homes, 41.3% corresponded to companies producing tax-exempted and export goods and services, and the remaining 5.0% to the Government.



The contribution made by the two components having greatest relative weight on the variation of the potential VAT shows that there is no predominance of any one of them: home consumption records the greatest contribution to such variation in four years of the period, whereas the contribution of intermediate consumption and investment taxed on companies intended for the production of tax-exempted and export goods constitutes the most significant in the rest of the years.

The variations observed in the evasion rate would be mainly attributable to the evolution of the *economic activity,* the *Tax Administration's management* and the changes in the *tax regulation* related to the tax.

The considerable increase in the evasion rate recorded in 2002 (3.7%) is mainly the result of the fall in the activity level, which may have been partly counteracted by the improvement in the DGI's management[16]. From 2003, the beginning and the subsequent firming up of the economic recovery, along with a continuous improvement in the TA's management allowed reducing the evasion indicator, which maintained the downward trend during the rest of the period.

In 2007 and 2008, the changes introduced by the New Tax System regarding the VAT regulation (modification of tax rates, as well as its bases, with the inclusion of new goods and services that used to be exempted and the elimination of COFIS), implied a tax sacrifice that accounted respectively for 2.4% and 2.3% of the effective VAT collection. In those same years, the collection attributable to a reduction in the evasion rate accounted respectively for 4.3% and 4.5% of the effective collection, and overcompensated for the fiscal sacrifice associated with the changes in the tax regulation.

This comparison does not purport to indicate that the reduction in the VAT rates (and its consequential tax sacrifice) was the reason for such compensation in tax collection by way of a fall in evasion. Evasion is associated with multiple factors and, under this particular circumstance, the economic activity and the efficiency in the DGI's management may presumably have exercised a greater impact. However, the comparison is useful to size up the economic importance of the reductions observed in evasion, and, additionally, it points out at a virtuous cycle that is frequently highlighted in evasion theories: when the degree of taxpayer compliance is greater, tax collection can be sustained with lower tax rates.

In the case of **IRIC/IRAE,** an estimate was made for 2005, considering thirty-four sectors of the economic activity, which were taken from the opening presented by the Central Bank for the EEB. It should be noted that even though the publication of the

[16] The improvement in DGI's management is measured through an efficiency index created for such purpose. The variation of this index was positive between 2002 and 2001, which would indicate that the Tax Administration contributed positively to the increase in collection, despite the recessionary scenario.

National Account System is for 43 sectors, only those covered by the tax were considered.

These are:

- Mining and quarrying
- Manufacturing industries (23 industries)
- Power, gas, steam supply and water catchment and distribution
- Construction of buildings and other works
- Wholesale and retail trade
- Hotels and restaurants
- Transportation
- Mail and communications
- Financial brokerage
- Real estate activities
- Machinery and equipment rental, research and development activities

By applying the methodology explained in 2.2, the potential collection of the tax is obtained, which is compared against the effective collection. An estimation of tax evasion is contemplated from 2000 to 2008. But the data corresponding to the EEB by sector for the years 2006 through 2008 has not been published yet.

This is the reason that no results are presented until obtaining a series that may allow showing the trend recorded in the evasion rate over the years, and which may be apt to compare the consistency of the results on a sector level.

As for the **IRPF**, the results obtained so far are both preliminary and partial, and require subsequent processes of contrast and validation before considering their public dissemination. However, even under these circumstances, it is possible to clearly verify through these results that the tax evasion in salaried income is highly concentrated in the formal employment. Therefore, evasion in this section of the IRPF could be attributable to understatements in the formal employment payrolls and, to a much less extent, to informal employment[17].The potential collection of the tax resulting from the informal employment (which is, by definition, evaded 100%) would have a minor share in the total of potential collection.

A highly significant salary gap is observed in the Uruguayan labor market between formal and informal employment, in favor of the former. The progressive structure of the IRPF, which implies increasing effective rates along the income gradation, translates this salary gap to even more distant taxation levels. Consequently, the result commented in the previous paragraph is consistent both with the reality of the Uruguayan labor market and the tax's design.

[17] Exclusive of single owner informal jobs. It should be restated that this first study focuses on salaried income, that is, those originating in a contract job.

Lastly, regarding the **dissemination criteria**, the choice has been to disclose publicly the results once they have been duly validated from a technical viewpoint and a series thereof has been construed for a considerable period, which may allow observing the evasion evolution and its consistency with the evolution of its explanatory factors.

Within this frame, the results of VAT evasion have been presented on an annual basis since 2006, by means of press conferences performed with representatives of the Ministry of Economy and Finance and the General Revenue Office. In the case of the IRIC/IRAE and the IRPF, given the above mentioned technical reasons, the results obtained so far are not sufficient to consider their public disclosure.

4. Conclusions

Given the importance of tax resources in the State's fiscal policy, one of the objectives of the General Revenue Office is the fight against fraud and the consequential tax evasion.

In order to know the magnitude of the evaded amount, the same has been estimated for the Value-added Tax, and that of the Economic Activity Income Tax and the Individuals' Income Tax is now also being estimated.

For all the measurements, the method used has been the indirect one, which draws on external data sources. The main input is composed of the macroeconomic aggregates obtained from the National Account Systems. Specifically, in the case of the VAT, the private consumption, the Government's consumption, the Intermediate consumption, the Gross Formation of Fixed Capital are considered; in the case of the IRAE, the Gross Operating Surplus, and in the case of the IRPF, remunerations. By introducing some adjustments to this aggregations, the potential collection of the tax is obtained, which is compared against the effective collection, thus arriving at the evasion rate. In the case of the IRPF, the micro-data from the Ongoing Home Surveys are used as supplementary source.

The results of the VAT evasion rate for the period 2000 – 2008 show a downward trend, except for 2002, reaching a bottom of 20.6% in 2008. These results have been presented at a press conference by the authorities of the Ministry of Economy and Finance and the General Revenue Office.

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Annex 1: Potential collection of VAT by component

The main components that originate non-deductible VAT payments are:

- the final consumption by homes of taxed goods and services
- the Government's consumption
- the Government's investment
- the taxed intermediate consumption used to produce tax-exempt and export goods and services
- the investment in taxed goods intended to produce tax-exempted and export goods and services

Final consumption by homes of taxed goods and services:

$IVACH = (GCFH - GCUE) \times t_{1a} + GCEU \times t_{1b} + IVAPEM$

where:

IVACH	potential collection of VAT originating in home consumption[18]
GCFH	expenditure of final consumption by homes
GCUE	expenditure of Uruguayans' consumption abroad
GCEU	expenditure of foreigners' consumption in Uruguay
IVAPEM	potential collection of VAT originating in purchases made by small companies and self-employed workers' scheme taxpayers
t_{1a}	average VAT rate of GCFH
t_{1b}	average VAT rate of GCEU

Government's consumption:

The amount of potential VAT collection by Government's consumption item was calculated as follows:

$IVACG = GCIG \times t_2$

where:

IVACG	potential VAT collection resulting from Government's consumption[19]

[18] Since the values estimated by the BCU include the VAT, the relevant non-VAT amounts were determined using the respective average rates of this tax. The calculation was as follows:

Consumption without VAT = [VAT consumption inc / (1+t media)], where t_{media} is the VAT applicable in each case.

[19] Like in the case of home consumption, the values of the Government's intermediate consumption estimated by the BCU include the VAT, so the corresponding non-VAT amounts were calculated for each year using the respective average rates of this tax.

GCIG	expenditure of Government's intermediate consumption
t_2	average VAT rate of GCIG

Government's investment:

The potential VAT generated by the Government's investments was estimated as follows:

$$IVAIG = IG \times t_3$$

where:

IVAIG	potential VAT collection deriving from the Government's investment[20]
IG	FBKF of Government net of tax-exempted imports
t_3	average VAT rate of the IG

Taxed intermediate consumption used to produce tax-exempted and export goods and services:

The calculation of the VAT potential base tied to the intermediate consumption used by each sector in the production of tax-exempted goods and services is summarized as follows:

$$CIE_i = CI_i (1 - \alpha_i) \beta_i$$

where:

CIE_i	intermediate consumption of activity class *i* intended for tax-exempted production
CI_i	intermediate consumption of activity class *i*
α_i	percentage of sales of activity class *i* intended for export
β_i	percentage of tax-exempted sales of activity class *i*

Alternatively, the VAT potential base associated in each sector with the intermediate consumption used to manufacture export products was calculated as follows:

$$CIEX_i = CI_i \times \alpha_i$$

where:

[20] Also in this case, the amounts of FBKF of the Public Sector estimated by the BCU include the VAT, so the corresponding non-VAT amounts for each year required calculation, using the respective average rates of this tax.

$CIEX_i$ intermediate consumption of activity class *i* intended for manufacture of export products

The average VAT rates applicable to the potential bases of each sector were determined using the structure of the intermediate consumption of each activity class, as the same appears in the Offer and Utilization Chart prepared by the BCU for 1997 (COU97).

So, drawing on the potential bases and the average rates applicable to the different activity sectors, the collectible amount of VAT was calculated for each intermediate consumption item tied to the production of tax-exempted goods and services, as follows:

$$IVACIE_i = CIE_i \times t_{4i}$$

where:

$IVACIE_i$ potential VAT collection resulting from the intermediate consumption of sector *i* tied to the production of tax-exempted goods and services
t_{4i} average VAT rate of intermediate consumption of sector *i*

In the case of the intermediate consumption tied to the production of export goods and services, the calculation was as follows:

$$IVACIEX_i = CIEX_i \times t_{4i}$$

where:

$IVACIEX_i$ potential VAT collection resulting from the intermediate consumption of sector *i* tied to the production of export goods and services
t_{4i} average VAT rate of the intermediate consumption of sector *i*

Therefore, the total potential non-deductible VAT to be collected each year from the intermediate consumption of the sectors producing such tax-exempted (IVACIE) or export goods (IVACIEX) was obtained as follows:

$$IVACIE = \sum_i IVACIE_i$$

$$IVACIEX = \sum_i IVACIEX_i$$

Finally, the total non-deductible VAT tied to intermediate consumption (IVACI) results from:

$$IVACI = IVACIE + IVACIEX$$

Investment in taxed goods intended to produce tax-exempted and export goods and services

The calculation of the VAT potential base tied to the investment used by each sector in the production of tax-exempted goods and services is summarized as follows:

$$IPE_i = FBKF_i \left(1 - \alpha'_i\right) \beta'_i$$

where:

IPE_i	FBKF net of tax-exempted imports, allocated per activity class *i* for tax-exempted production
$FBKF_i$	FBKF of activity class *i* net of tax-exempted imports
α'_i	percentage of sales of activity class *i* intended for export
β'_i	percentage of tax-exempted sales of activity class *i*

Alternatively, the VAT potential base associated in each sector with the investment targeted at the manufacture of export goods and services was calculated as follows:

$$IPEX_i = FBKF_i \times \alpha'_i$$

where:

$IPEX_i$	FBKF net of tax-exempted imports, targeted by the activity class *i* at the production of export goods and services

The VAT rate applied to this investment was the base rate, to the extent that the goods involved are assessed at this rate.

Using the potential bases of the different activity sectors, the VAT amount collectible for each investment tied to the production of tax-exempted goods and services was computed as follows:

$$IVAIPE_i = IPE_i \times t_5$$

where:

$IVAIPE_i$	VAT potential collection arising from the investment of sector *i* tied to the production of tax-exempted goods and services

t_5 VAT base rate

In the case of the investment intended for the production of export goods and services, the calculation was as follows:

$$IVAIPEX_i = IPEX_i \times t_5$$

where:

$IVAIPEX_i$ potential VAT collection arising from the investment of sector *i* associated with the production of export goods and services

Therefore, the total potential non-deductible VAT to be collected each year from the investment targeted at producing tax-exempted (IVAIPE) and export (IVAIPEX) goods and services was obtained as follows:

$$IVAIPE = \sum_i IVAIPE_i$$

$$IVAIPEX = \sum_i IVAIPEX_i$$

Hence, the total non-deductible VAT tied to the private investment (IVAIP) was determined as:

$$IVAIP = IVAIPE + IVAIPEX$$

Annex 2: Obtaining the taxable amount of IRIC/IRAE through the EEB

According to the effective legal regulations, the taxable amount of the tax should be determined to pay the income tax, which results from the maximum between the taxable rate, if positive, and zero, in the case of loss.

MI = Maximum { RF, 0 }

Below is the taxable income broken down by its main components, which are the Accounting Net Result (RNC, in Spanish), plus the result of the tax adjustments themselves (AF, which may be positive or negative), less the non-admitted expenses (GNA), plus increased deductions.

RF = RNC (+/-) AF – GNA + DI (1)

The RNC originates in the operating income (IO, in Spanish) from sales and other income, minus direct costs (CD, in Spanish), which are the costs associated with the production of goods and services, minus administration and sales expenses (GAV, in Spanish), plus the result of other revenues and expenses (OIE, in Spanish, which may be positive or negative), plus the financial results of the year (RFI, in Spanish, which may also be positive or negative), which relate to earned interest and bank expenses, among others.

RNC = IO – CD – GAV (+/-) OIE (+/-) RFI

The main tax adjustments are: the adjustment for tax inflation (AJI, in Spanish), to reflect losses or gains of the company during the economic year and which are attributable to the holding of assets/liabilities during inflationary periods, the loss generated in previous years (PEA, in Spanish) and investment-based exemptions (EI, in Spanish), whose term and property payroll have been extended under the New Tax System.

AF = AJI + PEA + EI + Others

The **GNA** is the result of applying the “padlock rule”, which states that 100% may be deducted if the person who sells the service or good also pays the IRAE tax; otherwise, in a certain proportion depending on whether such person is an IRPF taxpayer or as per letter E (small-sized company).

The **DI** refers to the expenses incurred in staff training and quality improvement and expenses for scientific innovations.

As approximation to the taxable amount, the operating surplus (EEB) is used, which is the result of the difference or balance in the income-generating account of the National Account System.

EEB = VAB – RA – (T-S) (2)

And it corresponds to the Gross Added Value (VAB, in Spanish), which is the gross production value once the intermediate consumption is deducted, minus remunerations (RA), and after subtracting the taxes applied on production minus subsidies (T-S).

By making (1) and (2) comparable, the result of the taxable amount is as follows:

MI = EE – RE (-/+) AF – GNA + DI

The RE being the tax-exempted income, which is included in the operating surplus but is not covered by the tax, so is therefore deducted.