

DIRECT TAXES GAP ESTIMATES: METHODOLOGY AND PRELIMINARY RESULTS

M. Gallucci, R.V. Pansini, S. Pisani

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Direct taxes gap estimates: methodology and preliminary results

Marta Gallucci, Rosaria Vega Pansini, Stefano Pisani

Italian Revenue Agency; marta.gallucci@agenziaentrate.it

Abstract

This article responds to a widespread curiosity regarding PIT and CIT gap estimates produced by the Italian Revenue Agency. On one hand, policy-makers need to monitor tax evasion to set up and evaluate measures to counter tax evasion, and eventually to define possible changes in the tax system that promote compliance and thus improve tax fairness. On the other hand, experts in the field are interested in deepening a methodology which, although still under development, has proven to be promising and innovative. In fact, few countries adopt a top-down approach to estimate direct taxes gap, and even fewer when considering Personal Income Tax (PIT), because of the difficulty to identify a reference aggregate that can be compared between fiscal and statistical data. To overcome this issue, the Italian strategy consists in splitting the tax base according to income sources, estimating separately the tax gap relative to employees income, rental income and self-employment/business income. The present work refers to the latter, which is the larger component among the listed ones.

Sommario

Il presente articolo risponde ad un diffuso sentimento di curiosità rispetto alle stime del gap IRES e IRPEF effettuate da parte dell'Agenzia delle Entrate. Da una parte c'è il desiderio dei policy-maker di monitorare l'andamento dell'evasione al fine di mettere in campo strumenti per il contrasto del fenomeno e verificarne l'efficacia, nonché per definire eventuali riforme del sistema fiscale che possano migliorarne l'equità stimolando la *compliance*. Dall'altra, c'è l'interesse degli addetti ai lavori verso una metodologia che, sebbene ancora in fase di sviluppo, si è dimostrata degna di attenzione per la sua innovatività. Infatti, pochi paesi adottano una metodologia di tipo top-down per la stima del gap delle imposte dirette, e ancora meno per l'imposta sul reddito delle persone fisiche (PIT), in quanto è complesso identificare degli aggregati di riferimento che possano essere confrontati tra fonti fiscali e fonti statistiche. Per ovviare a tale difficoltà, la strategia adottata dall'Italia consiste nel suddividere la base imponibile tra le diverse fonti di reddito, provvedendo a stimare separatamente il gap relativo al lavoro dipendente, quello per i redditi da locazione e quello relativo ai redditi da impresa e lavoro autonomo. Il presente lavoro si riferisce a quest'ultima categoria, che è la prevalente tra quelle elencate.

JEL classification H25; H26; C18

Keywords: Tax gap, Direct taxes, Corporate income tax, Personal income tax

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1. Introduction

In this paper, we present the methodology currently adopted as part of the estimates of the tax gap developed by the Italian Revenue Agency with respect to direct taxes, that is corporate income tax (IRES) and personal income tax (IRPEF), the latter limited to incomes from self-employment and enterprise activities¹. These estimates are included in the official report on the Italian tax gap that the government annually submits to the Parliament². This method, recently established, should not be considered definitive because it is still under refinement and revision. The tax gap is the gap between tax revenue as it should be collected, according to the actual tax legislation, and the one as it is collected. According to this definition, the tax gap encompasses both non-deliberate actions by taxpayers (such as errors or omissions) and deliberate actions (such as fraud, evasion and avoidance) that lead to shortfalls in revenues.

Interest on income taxes gap has been increasing recently, with additional attention devoted to corporate income tax, CIT, whose complexity requires complex analytical approach and improved data coverage. Fighting the CIT tax gap has been at the heart of several European Union initiative, such as the anti-tax avoidance package³ and other international initiatives like the G20/OECD Base Erosion and Profit shifting initiative. The tax gap therefore leads not only to a loss of tax revenues, but it also influences people's perceptions of tax fairness. This is particularly important for personal income taxes (PIT) since the tax gap can have a significant impact on income distribution and perceived equity of the tax system. However, with respect to more established estimation techniques (such as those on VAT gap), fewer studies and applications are currently available for direct taxes. This is also explained by the specific computational difficulties connected, on the one hand, to the complexity of the definition of the tax base, which typically takes into account relevant aspects for tax purposes which are not considered in the macro indicators, and on the other hand, to the presence of progressivity-based tax systems that require not only knowledge of the total amount of the income but also of its distribution.

The proposed method is inserted in the context of the top-down estimates that, in general terms, provide for the identification of undeclared tax base (BIND) by comparing potential tax base (BIT), deduced from National Accounts data (NA), made comparable with fiscal classifications and definitions, and the declared tax base (BID), contained in administrative data (DF). Subsequently, it estimates the tax rate and quantifies the tax gap (TG)⁴. In this context, the natural benchmark for income taxes is found in the National Accounts by institutional sector, which put in evidence the distribution of national income between different types of subjects. This finds a match, albeit with some notable exceptions, with the Italian tax system, which, like many others, provides that the tax to be paid (CIT or PIT) depends on the legal status of the taxpayer. However, these data have limitations in terms of data availability and comparability for estimation purposes (for example, they do not allow a disaggregation by geographical area).

¹ The personal income tax base is the sum of all income received (with the exception of those subject to separate taxation) net of deductions. Such income can be grouped into three broad categories: income from employment, pensions and similar income (IRPEFdip); income from enterprise and self-employment (IRPEFaut); other incomes (residual component which amounts to about 5% of the total). In the following, when mentioning IRPEF (or PIT), we will refer only to the second category, unless otherwise specified.

² Italian Ministry of Economy and Finance (various years) available on the web site http://www.mef.gov.it/ministero/commissioni/rel_ev/

³ See https://ec.europa.eu/taxation_customs/business/company-tax/anti-tax-avoidance-package_en.

⁴ For further details see D'Agosto et al (2016).

This method, recently established, should not be considered definitive because it is still a work in progress, which needs further refinements and revision that will form the activity plan for the coming years.

This document is structured as follows: section 2 presents a brief review of the available literature; section 3 describes the target population of the analysis; section 4 identifies the Gross Operating Surplus as the reference aggregate and illustrates its computation for both potential and declared amounts; section 5 is dedicated to the individuation of the undeclared tax base (BIND) and to its attribution to IRES and IRPEF; section 6 shows how to determine the tax rate and the tax gap; section 7 illustrates currently available results and section 8 presents some final considerations, also with respect to the improvements expected with the revision of the methodology in process.

2. A brief review of methodologies used to estimate direct tax gap

Economic literature on tax evasion initially focused on developing a conceptual framework to explain and, thus, model the phenomenon from a theoretical point of view. The milestone paper by Allingham and Sandmo (1972) already identified some elements that, affecting the expected utility of the potential tax evaders, predictably influenced their decision, namely the probability of detection and the penalty rate associated with tax evasion. Other relevant aspects may be found in the structure of the tax system: for example, an higher level of tax rates seems to be negatively associated to tax compliance not only because of the increase of the monetary benefit from tax evasion but also because it may produce a less favourable perception of the fairness of the tax system (Bordignon, 1993). Perceived fairness is connected with non-strictly economic motivations of tax behaviour, among which we may also include tax morale (e.g. Dall'Anno 2009; Lisi, 2015) and cultural aspects (Çule and Fulton, 2009; Bame-Aldred et al., 2013).

If identifying the sources of tax evasion is a challenging task, it is even more complex to quantify its amount. This is clearly so, since tax evasion is by definition a non-observed phenomenon.

Over the years, various methods have been developed and refined in order to estimate the tax gap. Within these methods, two main approaches can be distinguished: the direct and the indirect one.

The first, also called bottom-up approach, is mainly based on microeconomic data coming from audits performed by the Revenue Agencies. There are two strategies to achieve this approach that are distinguished by the way taxpayers are selected to be audited: randomly or using a risk based approach. Random audit programmes cover randomly selected samples of taxpayers in order to be representative of the wider population the sample intend to represent. The risk based approach uses the operational audit targeted according to the strategy of the fiscal authority to contrast fiscal evasion. Unless specific random audit programmes are organized, the ordinary activity of revenue agency usually selects controlled taxpayers on a non-random bases (Alm et al. 1993) so that, in order to use these data, a correction for the selection bias is necessary.

The second methodology, also known as top-down method, employs macroeconomic indicators or information from National Accounts and financial services. The latter is further differentiated into two branches, one based on macroeconomic data and the other on econometric models. The top-down methods require a basic condition that the indicators used are not biased by the fiscal evasion. If the National Account data is used, for example, it is necessary that they are compiled independently of declared tax base and liability and that they include an estimate of the non

observed economy⁵ (Rubin, 2011). Among the first attempts to estimate direct taxes gap for Italy, we find examples of top-down approaches, such as Visco (1984), while more recently bottom-up studies, such as Fiorio and Amuri (2005) or Marino and Zizza (2012), seem to be prevalent.

In the last years, international institutions also joined the challenge of determining the amount of tax evasion. The European Commission dedicated a series of reports to “The Concept of Tax Gaps”, edited by the FISCALIS Tax Gap Project Group (FPG/041), the second of which relates to CIT gap (Fiscalis, 2018); in this report, there is a review of the currently available methodologies together with a survey of the experiences by member states. Several research articles examined in this context focused on novel methodologies to quantify tax avoidance and profit shifting, a topic which has received increasing interest in recent years both by academics (e.g. Finke, 2013; van 't Riet and Lejour, 2017) and by international organizations (see OECD, 2013a, 2013b). Also, the International Monetary Fund has devoted wide attention to tax gap estimation and it has developed its own methodology for CIT gap estimation (Ueda, 2018) within the RA-GAP program, following an approach which has several similarities with the method proposed in the present paper.

Besides the research activities conducted by academics and international institutions, an important contribution to the gap estimation comes from the Revenue Agencies as they have access to confidential information. According to the European Commission (2011), European fiscal authorities develop their own gap estimates applying different approaches⁶. In particular, UK (HMRC, 2019) uses top-down methods for indirect taxes and bottom-up for direct taxes; in Sweden, the tax authority adopts both methods and has prepared a program for measuring and monitoring evasion (Swedish National Tax Agency, 2008, 2014). In the same way, Revenue Agencies in Denmark, Estonia and Netherlands apply direct and indirect estimation methods separating by type of tax. In particular, the Danish Agency (Danish Tax and Customs Administration, 2009a, 2009b) has developed a comprehensive approach to gap estimation: a top down approach is applied to the personal income tax (such estimates are official and included in governmental documents) and an “every sector” approach to estimate the business gap, that is a bottom-up method in the form of random audit. In Italy, the Italian Revenue Agency contributes to the redaction of the annual report on tax evasion (Italian Ministry of Economics and Finance, 2019 and previous editions) producing estimates of several taxes among which the most relevant are VAT (D’Agosto et al. 2016), Regional Tax on Productive Activities (IRAP), CIT (IRES) and self-employed and enterprise component of PIT (IRPEFaut). The present work illustrates the methodology and results currently available with respect to the last two. As already mentioned, the main approach adopted by IRA is a top-down methodology based on National Account data⁷.

3. The identification of target population

The proposed top down approach aims to estimate the potential tax base and revenues from existing National Account data, with careful consideration between the coverage of statistical macro-

⁵ Non-observed economy (NOE) refers to all productive activities that may not be captured in the basic data sources used for compiling national accounts, including underground, informal and illegal activities. According to the “System of National Accounts 2008” (UN - SNA 2008) and the “European System of National and Regional Accounts” (Eurostat - ESA 2010), NOE is required to be included in national account figures in order to guarantee exhaustiveness.

⁶ Among non-European Authorities see IRS (2019), CIAT (2012) and Australian Taxation Office (2017).

⁷ Also a bottom-up approach, described in Appendix 1, is under development and preliminary results are exploited within this procedure as illustrated in paragraph 6.

economic data and the actual direct tax base. Consequently, the richness, exhaustivity and internal coherency of NA data are reflected on tax gap estimates. In fact, SNA is organized in an ordered sequence of accounts describing how income is generated, distributed, redistributed and used, and thus providing a multifaceted and comprehensive picture of the economic activity of a country, or part of it. To exploit this data source, in the first step it is necessary to implement a cross classification between the statistical target population and the fiscal one.

As mentioned, according to the Italian tax legislation, the direct tax due by each taxpayer depends on their legal form: IRES competes to corporations (SC) and public and private bodies, such as non-profit institutions (ENC), while IRPEF is paid by individuals (PF) and, by means of their members, by partnerships and unincorporated companies (SP)⁸. Table 3.1 shows a first macro connection framework between the legal form, relevant for tax purposes, and the classification by institutional sectors adopted in National Accounts.

Table 3.1 – Comparison between Institutional Sectors (NA) and legal forms

<i>Institutional Sectors (NA)</i>	<i>Legal forms for fiscal purposes</i>				
	Individuals (PF)	Unincorporated companies (SP)	Corporations (SC)	Non-profit institutions (ENC)	Government (AP)
Financial corporations		[Excluded from analysis]	[Excluded from analysis]	[Excluded from analysis]	
Non-financial corporations		IRPEFaut	IRES	IRES	
General government			[IRES]	[IRES]	[Excluded from analysis]
Households: Employees and Recipients of property and transfer income	[IRPEFdip]				
Households: Employers and own-account workers	IRPEFaut + “Minimum”	IRPEFaut			
Non-profit institutions serving households (NPIS)				[IRES] ⁹	

Despite the reference to “corporations”, the first two sectors may actually include both incorporated (SC) and unincorporated (SP) companies and their allocation in one of the two groups is based on the sector of economic activity. The financial sector has specific rules for accounting and determination of income, so that specific corrections to the methodology should be adopted; moreover, it is subject to a strict regulation that makes it difficult to assume the presence of tax evasion. Therefore, for the purposes of the present analysis, only the second one will be considered, so that companies operating in the financial sector will be neglected.

⁸ The acronyms adopted correspond to the name of the tax returns to be filled.

⁹ Non-profit institutions are subject to IRES if they perform commercial activities, in which case they are classified in the institutional sector of corporations, so that no residual tax base should remain in this cell.

As it can be seen from table 3.1, difficulties arise from the “entanglement” of the classifications: in fact, non-financial corporations include taxpayers subject to either IRES or IRPEF and, moreover, SP (subject to IRPEF) are not uniquely included in this sector since some of them (small companies with little commercial activity and less than five employees) are treated as households. To perform an homogeneous computation, therefore, it is necessary to have a quantitative representation of the SP category, so that a correct distinction between IRES and IRPEF taxpayers can be guaranteed.

The institutional units included in the Government sector¹⁰ may also have different status with respect to fiscal classification: some of them are explicitly identifiable as public administrations because of the filling of dedicated fields in tax returns. Moreover, publicly owned corporations that do not sell their services or that sell at non-economically relevant prices, are classified in the Government sector despite their legal autonomy. We assume that public administration is not subject to tax evasion and therefore we exclude it from the analysis. In National Accounts, households are generally classified according to their main source of revenue. The Italian terminology emphasizes the distinction between:

- consumers, whose source of income is represented by compensation of employees, property income, pensions and other transfers; from the fiscal point of view, this group has its exact correspondence in what we called “IRPEFdip” and will be neglected in the analysis;
- producers, whose incomes arise from enterprise or self-employment.

Ideally, the second group should be subject to IRPEFaut. However, as already mentioned and evidenced in Table 1.1, there is no perfect correspondence in classifications: first, because it does not include most unincorporated companies (which are treated as quasi-corporations); secondly, because it includes producers who benefit of tax advantages (such as the former “minimum taxpayers regime” and other provisions that have replaced it) which allow to pay a substitute flat tax instead of IRPEF¹¹ and shall be therefore excluded from IRPEF tax gap computation. The number of taxpayers subject to IRPEFaut has been limited by excluding professionals who do not have a structured organization. This was necessary because not all the economic aggregates needed to calculate the gap are available for the latter.

To sum up, the tax gap estimate here proposed covers 100% of IRES taxpayers and about 80% of IRPEFaut taxpayers. The procedure is applied to national data disaggregated by sectors of economic activity, defined on the basis of NACE Rev. 2 Classification¹². It should be noted that there may be lack of correspondence with respect to sectors of economic activity as resulting in fiscal data and National Accounts, even though both sources adopt NACE rev. 2 Classification. To deal with all these definitions and classifications issues, a specific working group between the Italian National Institute of Statistics and the Italian Revenue Agency has been set up. The most significant outcomes of this joint work were: to introduce in the estimation procedure information concerning the share of gross operating surplus to be attributed to each group of taxpayers and hence to each tax type; to produce a transition matrix reconnecting the statistical classification by economic activity to the fiscal one; to obtain a more precise quantification of the value added produced by “minimum” and other subsidized regimes, to better identify the target population.

¹⁰ The list of institutional units included in the Government sector is published on a yearly bases by the Italian Statistical Institute (ISTAT).

¹¹ For short, all these subsidized systems are referred to as “Minimum” despite this regime is not adoptable since 2012.

¹² Sections A (Agriculture, Forestry and Fishing; partially included up to 2015) K (Financial and insurance activities), O (Public administration and defence; compulsory social security), T (Activities of Households as Employers; Undifferentiated Goods and Services Producing Activities of Households for Own Use) and U (Activities of Extraterritorial Organisations and Bodies) are excluded from the analysis due to specific assumptions.

4. Gross operating surplus (GOS) as a proxy for the taxable base

Once the reconciliation scheme between the classification of economic operators in national accounts and that of taxpayers has been established, it is necessary to make the definitions of economic aggregates homogeneous. In this section, we illustrate the choice of the Gross Operating Surplus (GOS) as the reference point for the estimate, which is based on several reasons: first of all, it can be computed with respect to both potential and declared amounts, so that a direct measure of the undeclared component can be derived; moreover, its definition is standardized by SNA 2008/ESA 2010, so that cross-country comparisons are possible; finally, the choice to focus on the Gross Operating Surplus rather than the Net Operating Surplus is required since the latter does not include Consumption of Fixed Capital, which is not uniformly defined for statistical and fiscal purposes.

To show the linkage existing between GOS and the tax base, we will refer to the content of the income statement, that is the document in which a company reports its revenues and expenses in a certain period (usually the solar year) and determines the profit or loss of its activity. Generally, the income statement distinguishes an operating section, including revenues and costs of goods and services provided to customers, and a non-operating section, in which collateral activities (such as extraordinary operation or financial costs and gains) are illustrated. Both sections concur to determine the outcome of the period, that is the profit or loss for the year. This is particularly relevant for bigger companies, which follow ordinary accountability rules, whereas smaller company normally have simplified rules and reports; therefore, in the following, we will refer to the general case. Table 4.1 represents a simplified version of an income statement according to the Italian civil law, whose resulting amount, called profit or loss of the year, is the starting point for the computation of direct taxes taxable base.

Table 4.1 – Simplified income statement according to the Italian civil law

A) Revenue	Operating section
B) Expenses	
- goods and services	
- labour costs	
- depreciation and amortization	
- other operating expenses	Non-operating section
<i>Net operating surplus (A – B)</i>	
C) Financial gains and costs	
D) Value adjustments to financial assets	
E) Extra-ordinary activities¹³	
Result before taxes (A - B +/- C +/- D +/- E)	
21) Taxes	
22) Profit or loss of the year	

To identify the declared tax base, we consider the taxpayers subject to the “Regional tax on productive activities” (IRAP), exploiting available administrative information with respect to legal

¹³ This sub-section has been abolished starting from 2016.

form, sector of economic activity and territorial distribution. IRAP tax base is conceptually close to Gross Value Added adopted in National account, so that we will refer to it as «Fiscal Value Added». Declared Fiscal Value Added (PLd) can thus be obtained from IRAP tax returns data and is defined as:

$$PLd = \text{Revenue (A)} - \text{Expenses for good and services and other operating expenses (B)}^{14} \quad [4.1]$$

We then subtract Labour Costs¹⁵ to obtain GOS:

$$GOSd = PLd - \text{Labour costs (Wd)} \quad [4.2]$$

The difference between *GOSd* and the declared tax base (*BID*) is called *Ad* and comprises:

- Amortization and depreciation
- Non-operating section
- Fiscal corrections required by tax law
- Carried over losses and other deductions

For the potential side, Gross Value Added at Factor Cost from NA (VACF), as defined in ESA 2010¹⁶ 9.32, is corrected to adequate statistical definitions to fiscal ones in order to obtain a Potential «Fiscal Value Added» (PLP). Then Total labour costs (*Wt*) are subtracted to obtain Potential Gross Operating Surplus (GOSp):

$$GOSp = PLP - Wt \quad [4.3]$$

where *Wt* = declared labour costs (*Wd*) + undeclared labour costs (*Wnd*, estimated by ISTAT).

¹⁴ The concept of Revenue adopted in the income statement, which is also recalled in tax returns, is substantially equivalent to the definition of Output in National Accounts, while the Expenses considered in Equation 4.1 are similar to Intermediate Consumption (see note 16). Both aggregates are inclusive of the variation of the inventories.

¹⁵ This passage is required because labour cost information comes from different tax returns.

¹⁶ ESA2010 definitions of the principal magnitudes involved in the estimation process are reported below:

“Output (P.1) – 3.14 Definition: **output** is the total of products created during the accounting period. Examples of output include [...] the goods produced by a local KAU that remain in inventories at the end of the period [...]”

“Intermediate consumption (P.2) – 3.88 Definition: **intermediate consumption** consists of goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. The goods and services are either transformed or used up by the production process. [...] 3.92 Producer units do not record the use of goods in production directly. They record the purchases intended to be used as inputs less the increase in the amounts of such goods held in inventory.”

“9.31 **Gross value added** is recorded at basic prices. It is output valued at basic prices less intermediate consumption valued at purchasers’ prices.”

“9.32 **Gross value added at factor cost** is not a concept used in the ESA. It can be derived from value added at basic prices by subtracting other taxes (less subsidies) on production.”

5. Undeclared tax base: computation and attribution to CIT and PIT

A first measure of the undeclared component is obtained by difference:

$$GOSnd = GOSp - GOSd \quad [5.1]$$

GOSnd can be defined as an "economic gap" and measures the difference between the gross profit actually made by a taxpayer and the one he declares to the tax authorities. Consistently with the rules adopted by the national accounts, the "economic gap" is recorded on an accrual basis, i.e. it refers to the production activity actually carried out during the year, ignoring the losses carried forward from previous years which, on the other hand, have an impact on the tax gap.

The further step that needs to be taken is to identify the differences between GOSd and the declared tax base (BID), called Δd , which, as mentioned in the previous section, include: amortization and depreciation; non-operating section; fiscal corrections required by tax law; carried over losses and other deductions. To derive the corresponding non declared tax base (*BIND*) the same items listed in Δd must be considered to determine Δnd , so that:

$$\Delta p = \Delta d + \Delta nd$$

As a consequence, the potential direct tax base, BIT, is equal to:

$$BIT = GOSd + \Delta d + GOSnd + \Delta nd$$

from which one can derive

$$BIND = GOSnd + \Delta nd = GOSnd + (\Delta p - \Delta d) \quad [5.2]$$

Since Δp is unknown in amount and shares, a working hypothesis must be adopted. Possible options are:

- $\Delta d = \Delta p$, meaning that the elements that distinguish GOS from tax base do not affect the gap;
- $\Delta p = \Delta d \cdot (GOSp/GOSd)$, i.e. Δnd is proportional to $GOSnd$, with a proportion that, for each sector of economic activity, is the same as that computed on the declared side;
- mixed hypothesis: some elements in Δp are the same as in Δd while other components follow a proportionality rule – this hypothesis depends on the gap definition adopted.

In the first applications of this methodology, we adopted hypothesis b. This implies that even in the items included in the Δp the taxpayer shows the same degree of tax loyalty as follows when declaring gross profits.

Tax base aggregates, once quantified, must be split between CIT (IRES) and PIT (IRPEF) according to legal status. As mentioned before, declared tax bases are already distinguished by legal status thanks to different tax returns to be compiled by taxpayers. In order to split the potential base, instead, we apply a ratio, computed for each sector of economic activity, derived from NA data by institutional sectors, as corrected to take into account classification and definition issues (see par. 3 and 4). The undeclared component for each tax can thus be obtained by difference applying [5.1].

6. Determining tax rates and tax gaps

Once the undeclared tax bases (*BIND*) have been derived, the corresponding tax gaps are obtained by multiplying *BIND* for an implicit tax rate¹⁷ computed using the declared taxes and tax bases (*BID*). In general, direct taxes gap (*TG*) may be written as:

$$TG = BIND * TaxRate = [GOSnd + (\Delta p - \Delta d)] * TAXd / (GOSd + \Delta d) \quad [6.1]$$

The formula simplifies according to the hypothesis adopted for Δp :

- a) Under hp. a: $TG = GOSnd * TAXd / (GOSd + \Delta d)$
- b) Under hp. b: $TG = GOSnd * TAXd / (GOSd)$
- c) Under hp. c¹⁸: $TG = \frac{(GOSnd + \Delta p_1 - \Delta d_1) * TAXd}{GOSd + \Delta d_1 + \Delta d_2}$

The choice to use an implicit tax rate instead of the statutory one allows us to: indirectly consider aspects not covered by the procedure (such as special benefits that reduce the actual liability); reflect changes in the law which occur over time; take into account the composition of the base at macro level (while at individual level, with Δ known, the implicit tax rate corresponds to the statutory rate).

Things get more complicated when considering PIT since the Italian tax system is characterized by progressivity into tax brackets. This means that applying the implicit tax rate “as is” corresponds to assume that declared and undeclared income distributions are the same. To overcome this seemingly unrealistic hypothesis, therefore, we compute a tax rate differential (to be added to the implicit tax rate) using bottom-up estimates¹⁹. In practice, bottom-up estimates provide, for each sector of economic activity, a specific tax rate both for declared and undeclared amounts so that a correction factor can be derived by comparing the two tax rates.

In addition to the undeclared component, tax gap should also include the missing payments component (*TAXmp*), that is the difference between the declared tax and what is actually paid. This can be obtained through administrative data since the Italian tax law states that automated controls are to be performed on the whole population of taxpayers, comparing tax returns with payment forms data.

7. Main results

The exposition of the methodology has pointed out the crucial role of the tax rate in determining the tax gap. Therefore, the analysis of gap trends requires also to monitor implicit tax rates and to verify their coherency with statutory tax rates.

Figure 7.1 shows CIT tax rates: the statutory rate (dashed line) is higher than the implicit tax rates adopted in the estimates because the first is applied to the actual tax base while the latter are

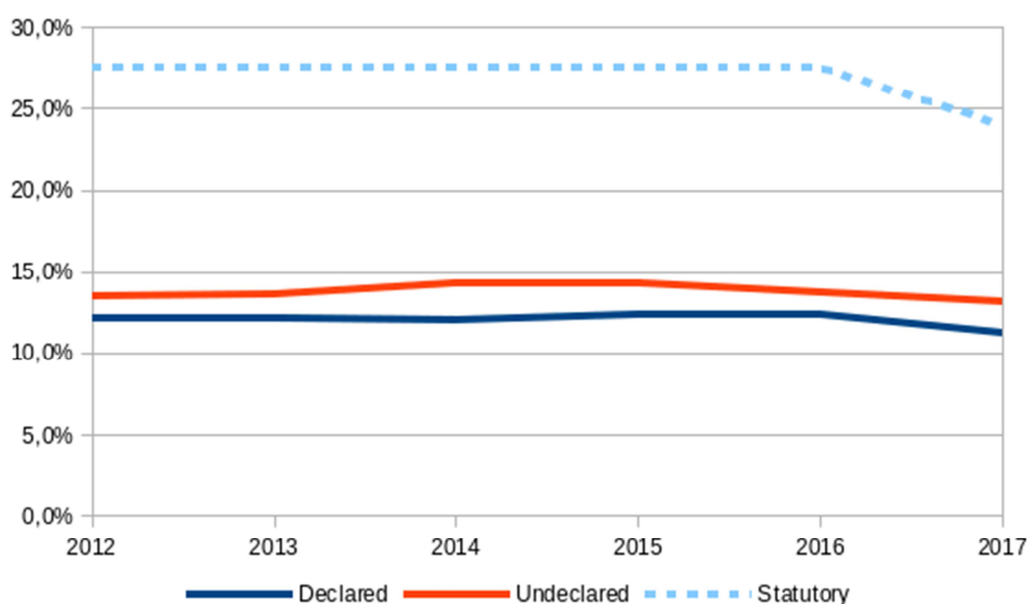
¹⁷ Tax rates are computed for each tax and for each sector of economic activity.

¹⁸ Hypothesis c can be expressed as follows: $\Delta p = \Delta p_1 + \Delta p_2$, $\Delta d = \Delta d_1 + \Delta d_2$ where $\Delta p_1 \neq \Delta d_1$ and $\Delta p_2 = \Delta d_2$

¹⁹ Bottom-up estimate procedure is detailed in Appendix 1.

computed using the gross operating surplus, which is a broader economic measure. It should be noted that the statutory tax rate has been held constant at 27.5% from 2008 till 2016, then it has been reduced to 24% since 2017 by the law n. 208/2015. Given the flat rate nature of CIT, in absence of changes is the law²⁰, both annual variation in implicit tax rates, and the observed difference between the declared and undeclared tax rates are to be ascribed only to the different composition of the tax base in terms of sectoral distribution: in other words, for example, the fact that the undeclared tax rate is systematically greater than the declared one means that tax evasion is concentrated in sectors of economic activity where the components which distinguish the GOS from the actual tax base have a reduced impact, thus determining a lower GOS to tax base ratio.

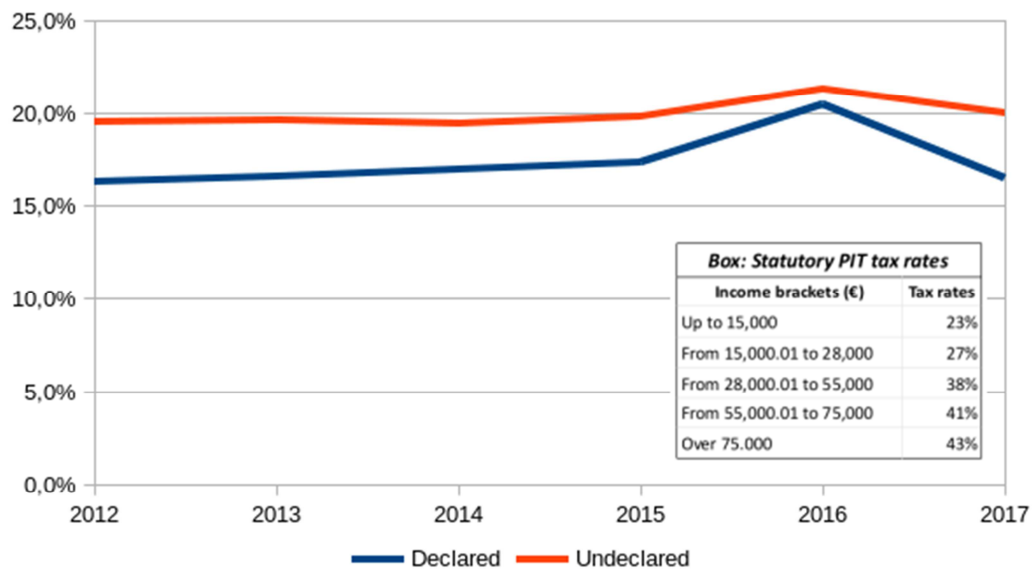
Figure 7.1 – CIT tax rates



Analogously, Figure 7.2 shows PIT tax rates. The statutory tax rates, which vary according to income brackets, have not been modified during the observation period, so they are not displayed in the graph but illustrated in the box. As a consequence, also the implicit tax rates are relatively stable over time. Again, implicit tax rates are less than the minimum statutory one, due to the elements which distinguish GOS and tax base. Moreover, the declared and undeclared implicit tax rate differ not only because of the sectoral distribution of the GOS but also because of the correction, derived from bottom-up results, to take into account the different distribution in income brackets, as mentioned in the previous section: it can be seen that the two effects determine an implicit tax rates on undeclared amounts which is systematically greater than the implicit declared rate; however, the difference between declared and undeclared tax rates is not constant in the observed years.

²⁰ In this respect, 2017 tax rate reduction is an exception, which partially reflects also on the implicit tax rates. It should be noted that the decrease of the statutory rate is more pronounced, meaning that the elements distinguishing GOS and tax base partially reduce the impact of the legal change. However, since these measures reflect provisional tax returns data, the full impact of this change may become more evident in the 2020 report, when final data will be available.

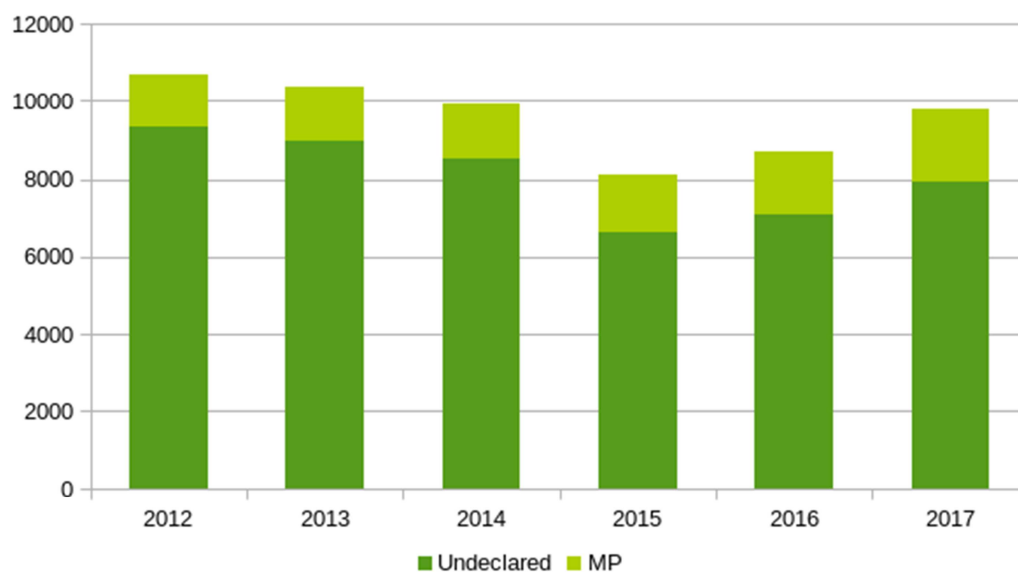
Figure 7.2 – PIT tax rates



In Appendix 2, we show the estimates of tax gap resulting from the application of the above exposed methodology, as presented in the update to the 2019 edition of the “Annual report on tax and contributions evasion”²¹. The main results are discussed in the following.

Values of CIT gap follows a decreasing trend from a maximum of 10.7 billion euros in 2012 to a minimum of 8.1 billion euros in 2015 (table A.2.1 and figure 7.3). Then in 2016 it increased to almost 9 billion euros, returning to almost 10 billion in 2017. The incidence of non-payment on the gap, for the entire period, shows slight fluctuations around an average value of about 4.3%.

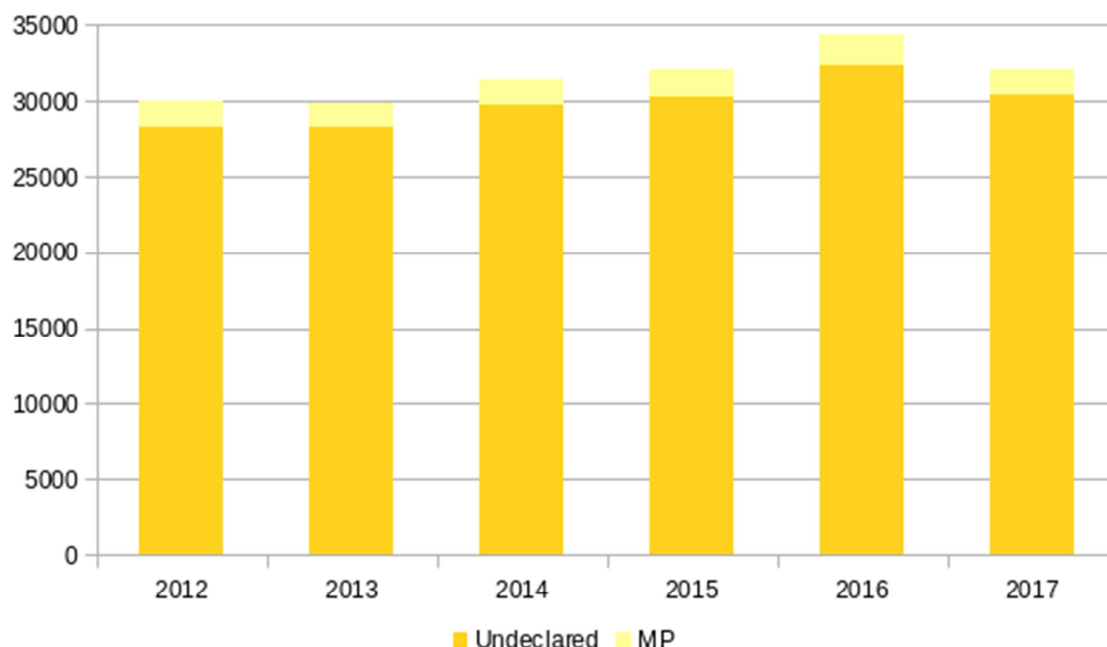
Figure 7.3 – CIT gap breakdown by Undeclared revenue and Missing Payments component



²¹ http://www.mef.gov.it/documenti-allegati/2019/aggiornamento_relazione_2019_x27_Novembre_2019x_FINALE.pdf

As for PIT gap values, displayed in figures 7.4 and detailed in table A2.2, on the whole it rises from about € 30 billion euros in 2012 to almost € 34 billion in 2016 before decreasing in 2017. Missing payment incidence is lower with respect to CIT gap, being around 3.7% on average.

Figure 7.4 – PIT gap breakdown by Undeclared revenue and Missing Payments (MP) component



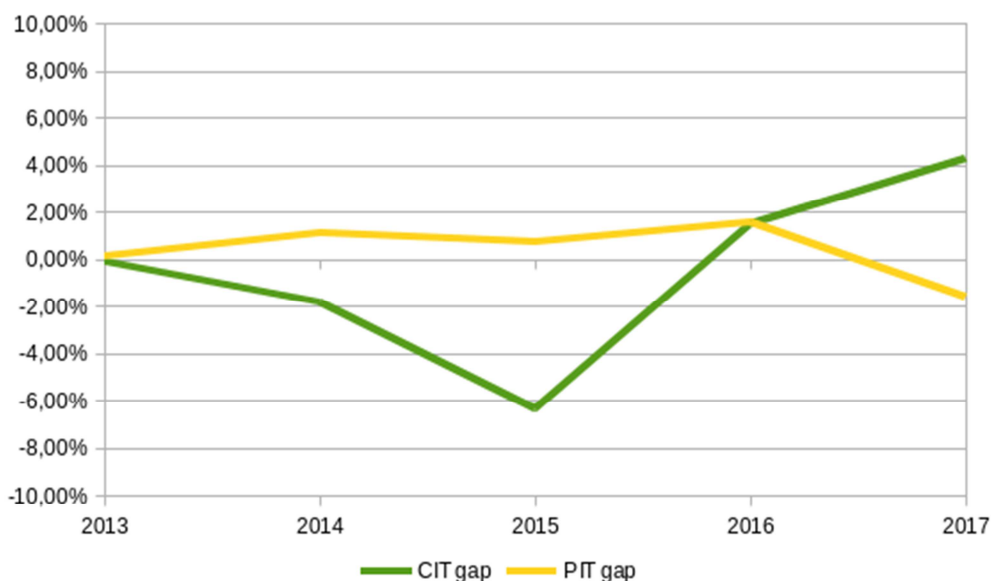
In order to sterilize the tax gap trend from exogenous elements such as possible regulatory innovations (e.g. a tax exemption for part of the taxpayers) or the phases of the economic cycle, we may consider the propensity to tax gap, that is the ratio between tax gap and potential revenue (defined as: tax actually collected + tax gap).

The propensity to gap represents the average attitude of the taxpayer not to fulfil tax obligations. Tables A.2.1 and A.2.2 show that the propensity is higher for the PIT, with values between 65% and 69%, rather than CIT, whose percentages vary between 22% and 30%. This evidence is also found in other countries²². One of the reasons that can explain this phenomenon is that CIT taxpayers are subject to accounting controls for internal purposes that make it more difficult to hide the tax liabilities compared to the taxpayers subject to the PIT (Santoro 2016, Slemrod 2007).

Figure 7.5 shows that the propensity dynamics, for both CIT and PIT, follow the trend already highlighted by the absolute values of the gap (figures 7.3 and 7.4). It can therefore be inferred that the decrease in the CIT gap in the years 2014 and 2015, as well as the decrease in the PIT gap in 2017 are attributable to a change in the attitudes of taxpayers towards compliance.

²² See for example IRS (2019) and HMRC (2019).

Figure 7.5 – Annual variation of the propensity to tax gap.
Percentage points of tax gap to potential gap.



8. Final remarks

This article responds to a widespread interest regarding PIT and CIT gap estimates produced by the Italian Revenue Agency, coming especially from experts in the field willing deepen this methodology which, although still under development, has proven to be promising and innovative. In fact, few countries adopt a top-down approach to estimate direct taxes gap, and even fewer when considering Personal Income Tax (PIT), because of the difficulty to identify a suitable aggregate to compare fiscal and statistical data.

The appeal of top-down estimates, such as those proposed in this paper, arises for some noticeable strengths which they exhibit with respect to bottom-up approaches. First of all, National Accounts guarantee both exhaustivity and internal coherency of data, and these features are reflected in tax gap results. Secondly, NA based methods have the advantage of improving the international comparability of the estimates. In fact, unlike tax data, National Accounts adopt internationally standardised definitions, set out in the United Nations “System of National Accounts” manual (SNA 2008). This allows to precisely identify what each country includes or excludes from the gap calculation. Moreover, they are very timely, since a provisional estimate for $t-2$ can be obtained at time t . Finally, they include a measure of completely hidden economy, incorporating in the figures the taxes due by potential taxpayers which, being unknown to the Revenue Agency, could not be captured by bottom-up techniques. This is also one of the reasons why they seem to be more adequate in measuring tax evasion in countries, like Italy, characterized by a large share of non-observed economy. Nevertheless, some weaknesses should be taken into account, since top-down methods are not able to fully capture tax avoidance and, moreover, cannot be produced at a very detailed level. For this reason, the Italian Revenue Agency is also working to further develop its bottom-up methodology, to obtain a more comprehensive knowledge of the tax gap phenomenon.

The Italian strategy to overcome the issue of identifying a suitable aggregate to compare the declared tax base with a corresponding measure inclusive of the undeclared component (potential

base), consists in splitting the tax base according to income sources, estimating separately the tax gap relative to employees income, rental income and self-employment/business income. Among those listed, the largest share pertains to the latter, which is the object of the present work. Nevertheless, the choice of this strategy just represents the first step of a complex path which we are still walking. So far, we managed to identify the gross operating surplus as the reference point in National Accounts and to derive the corresponding declared measure by merging information coming from different tax returns. We also made them comparable reconciling definitions and classifications; moreover, we adopted a working hypothesis which allowed to treat the GOS as a proxy for the tax base, assuming that there is a common proportionality between GOS and tax base when considering declared and undeclared amounts within the same sector of economic activity. Finally, we obtained a measure of the implicit tax rate computed on this proxy-base and employed it to compute the tax gap. Next steps are already in progress, since we plan to move forward to a better approximation of the tax base by relaxing the proportionality hypothesis and by taking into account calendar effects due to corporations which do not follow solar year accounting; at the same time, we also aim at achieving a broader comprehension of the phenomenon, obtainable through both dimensional and territorial disaggregation of the gap. Finally, we are pursuing a better coverage of the taxpayers population, developing alternative techniques for those who cannot be comprised in the current framework (e.g. financial sector, subsidised regimes..).

Despite their being the result of a “work in progress”, figures illustrated in the previous section allow to draw some tentative conclusions: first of all, CIT gap, whose taxpayers are more structured and subject to a stricter regulation, is about one third of PIT gap (both in amounts and percentage of potential gap). However, in the last years, CIT gap has shown an increasing trend, after several years of steady declining tendency. On the other side, PIT gap seems to have finally started an inversion of its persistent increase, although this result is far too preliminary to be considered reliable. Were these evidences confirmed in final estimates, their causes shall be carefully investigated. A tentative explanatory route may be found following the signal coming from the observed movements between the two groups: in fact, PIT taxpayers seem to be “escaping” from their natural placement not only (downwards) towards a more accessible substitute tax (with the extension of the “flat tax” regime), but also (upwards) towards the CIT environment, which has registered an increase in the number of so-called “unipersonal corporations”. Further analysis is required in order to verify whether this movement has brought less-compliant taxpayers within the CIT realm, thus worsening its tax gap figures. All this considered, it means that the road ahead is still long, not only to measure but also to tackle tax evasion, and the first path is somewhat instrumental to the second.

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Appendix 1: Bottom –up methodology

In the last years, the Italian Revenue agency has produced some very preliminary results applying the bottom- up methodology to data derived from risk-based or operational audits. Risk-based audits represent the most comprehensive type of control as they lead to a recalculation of all income and revenues from production activity. On the other hand, operational audits are affected by selection bias since taxpayers with the highest yield are overrepresented in the sample and this may lead to a biased tax evasion and tax gap. Among the statistical approaches that allow correcting for the selection bias, the Italian Revenue Agency applied the post stratification method²³. It is based on the construction of strata of taxpayers (both audited and non-audited) using variables that are relevant in the selection process (e.g. dimension of firms, region, sector of economic activity) and the assumption that there is no selection bias within each stratum.

Before tax gap computation, some data pre-processing is needed at different stages. The first is represented by data cleaning and outlier detection. The second step is represented by the imputation of some value of the tax base and tax where not available. Given the fact that the distribution of data from risk-based audits is characterized by a positive skewness, we choose to use the median value of the stratum²⁴. The final step is represented by the post-stratification procedure to the whole population of taxpayers. Using the grossing up factor w_i , we derive the estimate of undeclared tax base and tax gap by each stratum i , as:

$$\hat{Y}_i = Y_i * w_i = \frac{Y_i}{\alpha_i}$$

The total (population) tax gap is then computed as the sum of tax gap:

$$\hat{Z} = \sum_{i=1}^N \hat{Y}_i$$

From the post stratification procedure, we exclude some categories of taxpayers: bigger firms²⁵ since they are characterized by a high audit probability to be audited and so not really subject to a risk based assessment; taxpayers for with null-outcome audits; audited taxpayers that did not complete their tax return in the first place.

A final issues that should be addressed when dealing with audits data is timing. Given the characteristics of audits by the Italian Revenue Agency, we select those risk-based audits at a final

²³ A post stratification method has been also applied by the INSEE to correct national accounts for the share of underground economy in France (Louvot-Runavot, 2011) and by Fiorio and D'Amuri (2005) to estimate income tax evasion by employed and self-employed taxpayers.

²⁴ In the methodology used, strata are defined by sector of economic activity (6), firm size defined in terms of turnover (4), and macro-regions (4).

²⁵ We exclude firms with revenues higher than 50 million euros.

stage of the process, i.e. after a consultation with the taxpayer to determine the tax claim. We need on average two years after the year of the audit to have final data on all claims. Moreover, the Italian tax law states that one tax year can be audited until 5 years after the corresponding tax return has been completed. Considering this ‘timing’, estimates on a tax year are available with a seven-year lag. Table A1.1 provides a visual insight of the combination between audited year and year of audits used to complete bottom up estimates.

Table A1.1 – Tax year and year of audit

Audited Tax year	Starting year of Audit (x)												
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	2005		x	x	x	x	x						
	2006			x	x	x	x	x					
	2007				x	x	x	x	x				
	2008					x	x	x	x	x			
	2009						x	x	x	x	x		
	2010							x	x	x	x	x	
	2011								x	x	x	x	x
	2012									x	x	x	x
	2013										x	x	x
	2014											x	x
	2015												x

Appendix 2: CIT and PIT gap tables

Table A2.1 – CIT gap (amounts and percentages of potential CIT and GDP) – Years 2012-2017

	Year	2012	2013	2014	2015	2016	2017
CIT gap (millions €)	Undeclared (*)	9,359	8,958	8,514	6,602	7,089	7,953
	Missing payments (**)	1,347	1,424	1,429	1,527	1,639	1,839
	Total	10,705	10,383	9,943	8,128	8,729	9,792
CIT gap (% potential CIT)	Undeclared (*)	26.5%	26.2%	24.4%	18.5%	19.1%	22.2%
	Missing payments (**)	3.8%	4.2%	4.1%	4.0%	3.9%	4.1%
	Total	30.4%	30.3%	28.5%	22.1%	23.6%	27.9%
CIT gap (% GDP)	Undeclared (*)	0.6%	0.6%	0.5%	0.4%	0.4%	0.5%
	Missing payments (**)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
	Total	0.7%	0.6%	0.6%	0.5%	0.5%	0.6%

(*) Estimates for 2017 are to be considered as provisional and those for 2016 as semi-definitive.

(**) Missing payments data are extrapolated for the last two years.

Table A2.2 – PIT gap (amounts and percentages of potential PIT and GDP) – Years 2012-2017

	Year	2012	2013	2014	2015	2016	2017
PIT gap (millions €)	Undeclared (*)	28,335	28,273	29,686	30,335	32,407	30,373
	Missing payments (**)	1,616	1,667	1,718	1,803	1,926	1,805
	Total	29,950	29,940	31,405	32,138	34,333	32,178
PIT gap (% potential CIT)	Undeclared (*)	62.0%	61.9%	63.1%	63.6%	65.1%	63.6%
	Missing payments (**)	3.5%	3.7%	3.7%	3.8%	3.9%	3.7%
	Total	65.5%	65.6%	66.7%	67.4%	69.0%	67.4%
PIT gap (% GDP)	Undeclared (*)	1.7%	1.8%	1.8%	1.8%	1.9%	1.7%
	Missing payments (**)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
	Total	1.8%	1.9%	1.9%	1.9%	2.0%	1.9%

(*) Estimates for 2017 are to be considered as provisional and those for 2016 as semi-definitive.

(**) Missing payments data are extrapolated for the last two years.