TECHNICAL NOTES AND MANUALS

Estimating the Corporate Income Tax Gap: The RA-GAP Methodology

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Fiscal Affairs Department

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Estimating the Corporate Income Tax Gap: The RA-GAP Methodology[1]

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This technical note and manual (TNM) addresses the following issues:

- How do countries measure noncompliance and other revenue foregone in corporate income tax (CIT)?
- What is the methodology for estimating the CIT gap under the IMF RA-GAP (Revenue Administration – Gap Analysis Program)?
- What are the concrete steps to measure the CIT gap?
- What data are required to measure the CIT gap?
- How can the CIT gap be used to understand the CIT revenue performance?

[1] The 'RA-GAP' stands for 'Revenue Administration – Gap Analysis Program,' conducted by the Revenue Administration Divisions of the Fiscal Affairs Department, International Monetary Fund.

[2] The author gratefully acknowledges comments from Michael Keen, and colleagues in the RA-GAP team including Eric Hutton, Martin Knudsen, Michael Thackray, and Juan Toro in Fiscal Affairs Department (FAD), IMF. The feedback from all the countries which have participated in the program is also gratefully acknowledged, while all remaining errors are the author's.

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ABBREVIATIONS AND ACRONYMS

AC . . . . . Actual Collections of CIT

AC^{D} . . . . . Declared CIT Liability

BEPS . . . . . Base Erosion and Profit Shifting

BOP . . . . . Balance of Payments

CFC . . . . . Consumption of Fixed Capital

CIT . . . . . Corporate Income Tax

C-NTB . . . . . Current-year Net Tax Base

C-TB . . . . . Current-year Tax Base

C-TB^{D} . . . . . Declared Current-year Tax Base

EBITDA . . . . Earnings before Interest, Tax, Depreciation and Amortization

FAD . . . . . Fiscal Affairs Department of IMF

FAP . . . . . Financial Accounting Profit

FISIM . . . . . Financial Intermediation Services Indirectly Measured

GDP . . . . . Gross Domestic Product

GOS . . . . . Gross Operating Surplus

ISIC . . . . . International Standard Industrial Classification of All Economic Activities

IVA . . . . . Inventory Valuation Adjustment

NOS . . . . . Net Operating Surplus

NPI . . . . . Non-profit Institutions

NPISH . . . . . Non-profit Institutions Serving Households

PIT . . . . . Personal Income Tax

RA-GAP . . . Revenue Administration Gap Analysis Program

SUT . . . . . Supply and Use Tables

TB . . . . . Tax Base

TB^{D} . . . . . Declared Tax Base

TCA . . . . . Tax Credits and Additions

VAT . . . . . Value Added Tax

I. HOW DO COUNTRIES MEASURE NONCOMPLIANCE AND OTHER REVENUE FOREGONE IN CORPORATE INCOME TAX (CIT)?

Many countries are measuring tax revenues foregone through policy reliefs. They follow practice in publishing estimates of the fiscal impact of tax reliefs that are allowed in law. Common examples of such reliefs are the exemption from CIT of specific types of entities including public bodies, and special allowance and/or tax credits for specific activities. Such impacts are known as 'tax expenditures.'[1] Generally, these estimates are derived from declared data submitted by entities applicable to such reliefs.

It is less easy to measure revenue not collected through noncompliance of taxpayers, but an increasing number of countries are trying to do so. By their very nature, noncompliant behaviors are unlikely to be declared by taxpayers and may well be deliberately concealed; consequently, they are not easy to quantify through direct observation or survey. Even so, the fiscal impacts of noncompliance are of critical interest, not just to tax administrations, but also to finance ministries and other stakeholders.

It is becoming commonplace to estimate noncompliance for the value-added tax (VAT), but less so for the common for corporate income tax (CIT). The number of countries estimating VAT gaps is increasing, especially in European and Latin American countries, and the IMF's RA-GAP (Revenue Administration – Gap Analysis Program) projects supported its member countries to develop capacity for estimating VAT gaps.[2] However, the estimation for CIT gap is less common because it is more challenging to estimate CIT gaps than VAT gaps by some reasons.[3]

There are two main approaches that can be used to estimate CIT noncompliance:

- **Top-down approach:** A top-down approach aims to provide a comprehensive assessment of all tax revenue foregone through noncompliance by measuring the gap as the difference between actual base and revenue and estimated potential base and revenue using statistical data on macroeconomy.[4]
- **Bottom-up approach:** Bottom-up techniques, such as using results of random audits or operational audits targeted by some criteria, or other interventions by tax authorities, can be used to quantify the impact of specific noncompliant behaviors. As well, these can provide valuable insights into taxpayers' behaviors and risks, and they can be used to test and interpret top-down estimates. However, results of audits need to be interpreted with possible

1 OECD (2010) provides examples of estimating tax expenditures in advanced countries.

2 For European countries, EC (2016) summarizes country cases, and Poniatowski et al. (2017) provide recent updates of the VAT gap estimation by the European Commission. For Latin American countries, see Pecho et al. (2012). Hutton (2017) describes the methodology of the RA-GAP projects for VAT.

3 The theoretical tax base of the VAT is aggregate value added plus imports minus exports, so that it is straightforward to calculate it from macroeconomic data. But the relationship between the theoretical CIT base and macroeconomic data is more complicated, for various reasons, including the asymmetric treatment for profit-making corporations and loss-making corporations under CIT.

4 See Rubin (2011) for several methods of the top-down approach to estimate tax gaps for direct taxes, and examples of the results following top-down approach in Latin American countries are introduced in Pecho et al. (2012).

non-detection biases due to differences in the capacity of auditors and/or the scope of audits. In addition, conducting random audits appropriately designed is costly for tax administrations, while results of operational audits are subject to strong selection biases that need to be corrected to estimate noncompliance in the entire population.[5]

The IMF's RA-GAP methodology for CIT gap is based on the top-down approach. It aims to estimate the potential tax base and revenues from existing macroeconomic data with careful consideration for the theoretical differences between the coverage of statistical macroeconomic data and the actual tax base of CIT, and then compare the estimated results with actual declarations and revenues. Although the estimated gaps following the top-down approach will have margins of errors, it has the advantage of using available data without additional costs of collection and suits initial evaluations of overall CIT noncompliance in a country.

The top-down approach requires a basic condition that the macroeconomic data are compiled independently of declared tax base and liability. In countries where national accounts data primarily use data on incomes declared in tax returns to compile operating surplus of corporations, it would be meaningless to adopt the top-down approach because comparing the same things will not provide any useful information. Therefore, it is critical to confirm that the national accounts data are not directly using tax declarations before deciding to adopt the topdown approach. Also, it is important to understand how national accounts data are constructed to include unobserved economic activities.

This technical note explains the concept of the CIT gap, and the methodology adopted by the IMF's RA-GAP to estimate it. The rest of the note is structured as following. In section II, the concept of the CIT gap is explained; detailed steps to estimate the potential CIT base and liability are described in Section III. Appropriate use of actual declaration of CIT base and liability are also discussed. Necessary data sources for the estimation are explained in section IV, and extended analyses are provided in section V, including the analysis of CIT policy gaps to measure the effects of discretionary policy choice on potential CIT base and liability, and the use of CIT efficiency to understand overall revenue performance of CIT.

[5] The IRS in the United States uses the results of operational audits for estimating noncompliance of corporation income tax by correcting selection biases. See IRS (2016).

II. WHAT IS THE CIT GAP UNDER THE IMF RA-GAP (REVENUE ADMINISTRATION – GAP ANALYSIS PROGRAM)?

A. Top-down Estimate of the CIT Gap

In the IMF's RA-GAP framework, the tax gap is broadly defined as the difference between potential revenue from underlying economic activities and actual revenue. Under this broad definition, the tax gap can be decomposed into two main components: the impact of noncompliance (*compliance gap*), and the impact of policy choices (*policy gap*)[6]. This note focuses on measuring the compliance gap for CIT, by estimating potential CIT under current tax legislation in a country.

An important caveat is that the top-down gap estimates here do not consider behavioral changes by taxpayers under different administrative efforts and policies. The estimation method following the top-down approach assumes a simple, static model measuring the compliance and policy gaps given current levels of economic activities shown in statistical data. The gap estimates are therefore indicators of the efficiency of tax administration and policy, rather than exact estimates of additional revenues under greater administrative efforts and different policies.

A critical aspect of the top-down approach is that the estimated potential CIT base/liability relies on what is measured in national accounts data. This is because the potential CIT base/liability is directly estimated from national accounts data, and the estimated gap shows the difference between activities measured in national accounts and activities declared in tax returns. Therefore, if the economic activities of non-filers, for instance, are measured in national accounts, the measured gaps include the impacts of non-filers.[7] Also, under-declaration of sales and overdeclaration of cost will be reflected in the estimated gap, if national accounts data reasonably measure economic activities using various sources of data in a consistent way. If there are errors or biases in national accounts due to misreporting and non-responses in the original surveys, the estimated gaps are also subject to errors and biases.

In addition, unavailability of necessary data source may result in underestimation of CIT gaps. As discussed in section III, adjustments for several conceptual differences between national accounts data and taxable incomes requires additional data, and if those data are not available, it is necessary to directly use declared valued by taxpayers in CIT return data. This assumes that there is no difference between 'real values' and 'declared values' in the adjustments; however, this is of course not necessarily so, and there can be incentives for taxpayers to declare values in such a way as to reduce tax liability. Therefore, data limitations may be likely to create systematic biases in the estimated potential CIT base and revenues to the direction of underestimation of CIT gaps.

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6 It should be noted, however, that quantifying the policy gap for CIT more difficult because there is no natural reference policy framework for benchmarking the CIT base. This is discussed further in Section V.

7 In principle, national accounts are expected to measure total economic activities including "non-observed" economy, which are not captured in regular statistical enquiries, being concealed to avoid taxes or complying with administrative procedures. Many countries have had considerable success in compiling estimates of production that cover the non-observed economy as well as the observed economy. See EC, IMF, OECD, UN and World Bank (2009).

It should be noted that the top-down estimates for CIT gaps do not try to measure tax avoidance or BEPS (base erosion and profit shifting) by corporations. The estimated gaps measure tax evasion by noncompliance, and do not show how much national incomes that should have been sourced in a country are transferred to other countries by legal means because such activities are usually reflected in national accounts data as well.[8]

B. Measures for CIT Compliance Gaps

Gross operating surplus (GOS) of corporations reported in national accounts is close to aggregate earnings before interest, tax, depreciation and amortization (EBITDA) of domestic corporations. GOS shows the magnitude of value added that is produced by resident corporations and not allocated to employees through compensation or to governments through taxes on production and imports. Therefore, it has been used to present the theoretical magnitude of tax base for CIT in several preceding analyses, including Mendoza, Razin and Tesar (1994), and IMF (2014).[9]

It should be noted that GOS is an aggregated value in an economy, reflecting both positive and negative results of individual corporations' activities. Meanwhile, calculation of CIT liabilities is commonly asymmetric with regard to the treatment of profit-making corporations and loss-making corporations. In general, corporations are not allowed to claim direct reimbursement for losses in the year in which they arise, and therefore only aggregate results of profit-making corporations should be considered as a CIT base in a current year. Corporations with losses usually need to carry them over and deduct them from profits in later tax periods.[10]

In this note, three different concepts of CIT base are applied so as to allow careful consideration of the treatment in the results of loss-making corporations.

A. Current-year net tax base (C-NTB): An aggregated result reflecting both profit-making corporations and loss-making corporations in a current year; this is generally smaller than current-year tax base because losses made by loss-making corporations are netted out from aggregate profits in C-NTB.

B. Current-year tax base (C-TB): An aggregated result of profit-making corporations in a current year; this is before deducting carried-over losses.

C. Tax base (TB): An aggregate result of profit-making corporations in a current year minus deductions for carried-over losses; this is the base for calculating aggregate CIT liability in a year.

8 See OECD (2015) in detail.

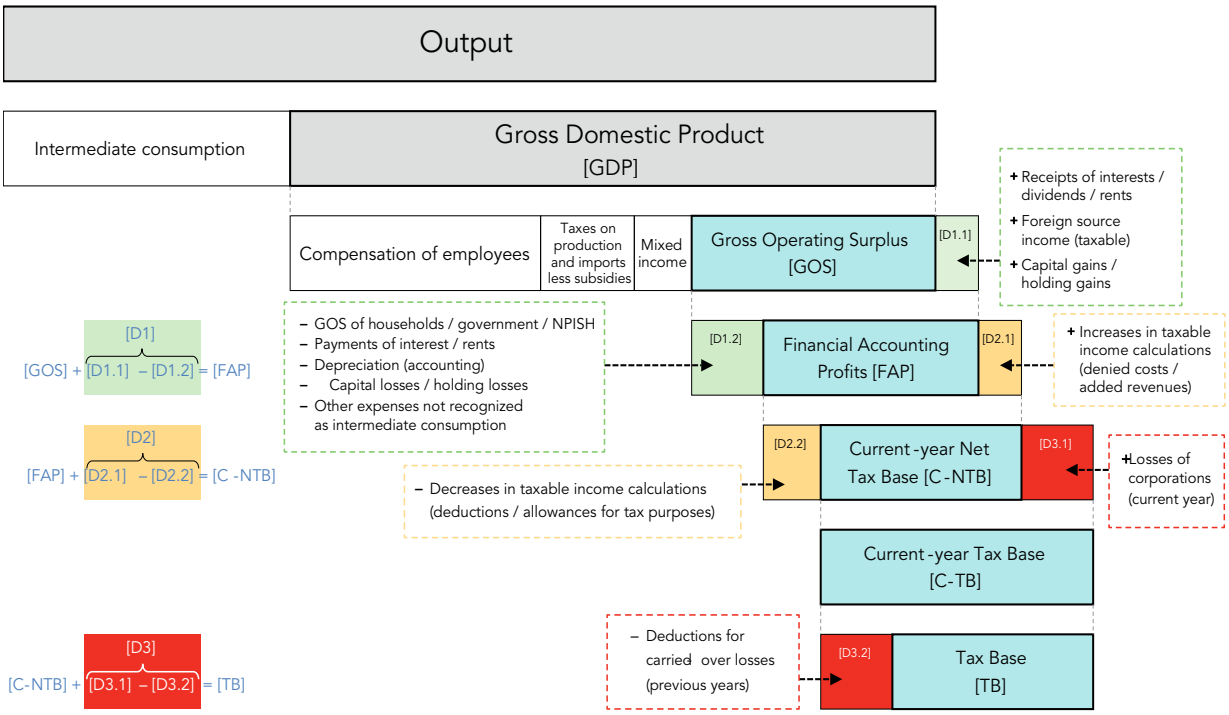
9 11 European Commission (2014) uses net operating surplus (NOS) plus/minus property incomes as the denominator to calculate implicit tax rate of taxes on capital incomes. NOS is calculated by subtracting consumption of fixed capital from GOS.

10 Some countries allow the offset of losses against profits in previous tax periods by reimbursing taxes paid for those years.

The RA-GAP framework for CIT gap starts from GOS and makes appropriate adjustments to reflect conceptual differences from the potential CIT tax base and liabilities. There are many conceptual differences between GOS and the actual tax base (TB) of CIT, that can be classified into three categories: D1, D2, and D3 (Figure 1).

- [D1] differences between GOS in national accounts and the aggregate financial accounting profit (FAP) of CIT taxpayers
- [D2] differences between aggregate FAP and aggregate current year net tax base (C-NTB)
- [D3] differences between aggregate C-NTB and aggregate tax base (TB) after considering losses and effects of carry-over losses

FIGURE 1. Theoretical Relationship between GDP and CIT Base

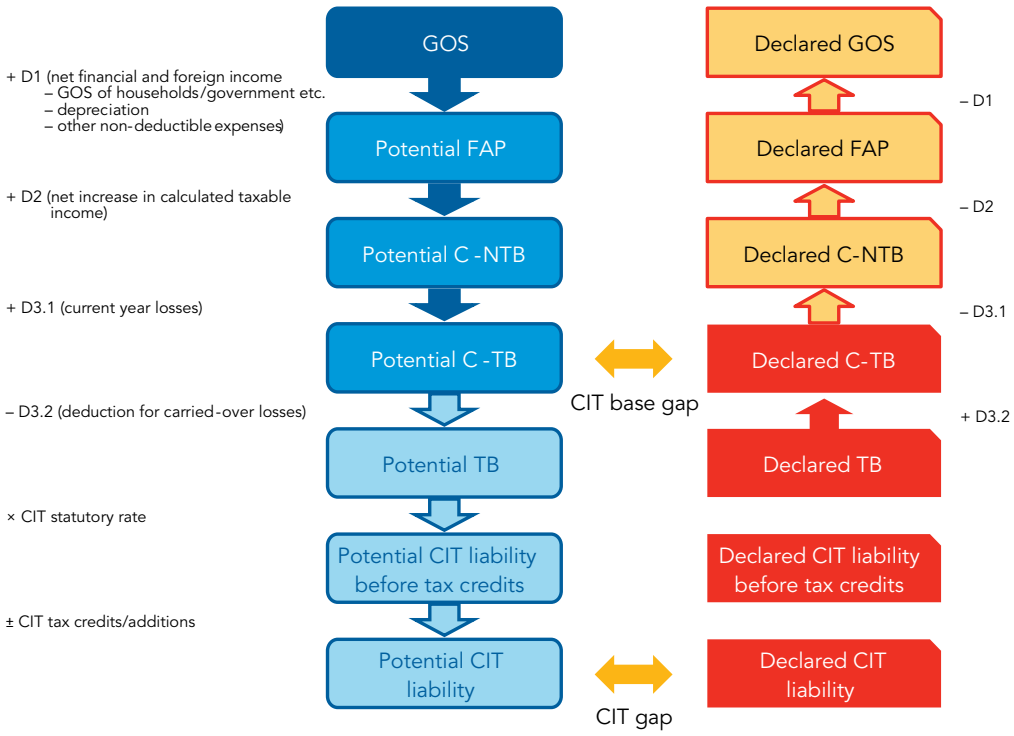


By adjusting GOS by the estimates for D1, D2 and D3, the aggregate potential FAP, C-NTB, and TB are estimated, and finally the potential CIT liability is calculated. The sequence of estimating steps for potential CIT base and liability is shown in the left-side flow in Figure 2, including the concepts of potential FAP, potential C-NTB, potential C-TB, potential TB, and potential CIT liability. The potential CIT liability is calculated by applying the statutory rate to the potential TB and reflecting tax credits and additional tax liabilities that are not proportional to the tax base.[11]

By using declared CIT return data, a set of data showing actual base and revenues can be prepared. Starting from the data on declared CIT liability and declared CIT base (TB) in the CIT return data, it is possible to calculate declared C-TB, declared C-NTB, declared FAP and declared GOS by estimating the magnitude of conceptual differences as shown in the right flow of Figure 2.

[11] If there are multiple CIT rates, the estimated aggregate base should be separated into different parts to which different CIT rates are applied. For instance, if a reduced rate is applied to small corporations, the base for such corporations should be separated using available distributional data.

FIGURE 2. Concept of CIT Gap



As primary measures for CIT compliance, two indicators are adopted in the RA-GAP framework; CIT base gap, and CIT gap. The CIT base gap is calculated as the difference between potential C-TB and declared C-TB, and the CIT gap is calculated as the difference between potential CIT liabilities and declared CIT liabilities.[12]

CIT base gap

The CIT base gap can be presented as a ratio with respect to the potential C-TB (i.e., its relative size to tax base), as well as a percent of GDP. It is expected to present how much taxpayers underreport their tax base, before considering deduction for carried-over losses and tax credits/additions. Because CIT tax base for each year can be volatile due to deductions for carried-over losses and other deductions, which are not relevant to any events in the current year, it is better to see the CIT base gap based on the C-TB to understand the changes in the gap excluding the effects of any impacts of such irrelevant factors.

[12] It is also possible to show the gap between GOS and 'declared GOS', but both GOS and declared GOS may include values not relevant to the CIT tax base, and the ratio of the gap with respect to GOS may be meaningless to understand the impact of non-compliance on the CIT base and collections.

CIT gap

The CIT gap can be presented as a ratio to the potential CIT liability, as well as a percent of GDP to show how large the impact of noncompliance is in relative terms.

In calculating the CIT gap, it is necessary to consider the effects of deductible CIT credits and additional CIT liabilities,[13] in addition to the CIT base gap. If reliable third-party data to estimate potentially deductible CIT credits and additional CIT liabilities are available, the CIT gap can be a more robust measure of CIT noncompliance than the CIT base gap because it can reflect noncompliance when taxpayers apply CIT credits or incur additional CIT liabilities.[14]

Sector CIT gaps

Both the CIT base gap and CIT gap can be estimated for individual economic activities by comparing potential CIT base/liability and actual CIT base/liability for particular segments, if GOS data and necessary adjustments can be classified into economic activities by using detailed national accounts data.[15] Such sector CIT gaps can show the differences in noncompliance across segments, as well as their relative importance for overall noncompliance. Such extended analyses may contribute to providing better insight into the causes of overall CIT gaps as well as useful information for making strategies for improving taxpayers' compliance.

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[13] Examples of additional CIT liabilities are minimum tax or alternative tax of which amounts are determined irrelevant of taxable incomes.

[14] However, if there are no reliable data for these it is necessary to use actual declared values to calculate the CIT gaps, and the estimated gap contains the same information as the CIT base gap.

[15] It is, however, difficult to have sector CIT gaps classified into a large number of individual economic activities because of different classification principles between national accounts and the tax administration. National accounts systems usually classify the activities of a single corporation into multiple sectors by using granular business establishment data, while the tax administration commonly classifies a single corporation into a single sector by its primary activity. Therefore, more detailed classification of economic activities for CIT gaps will increase the possibility of mismatches between potential values (based on national accounts) and actual values (based on tax returns) in a single sector.

III. WHAT ARE THE CONCRETE STEPS TO MEASURE THE CIT GAPS?

A. Determining the Scope of the CIT gap

Before starting on the estimation of potential CIT base, it is important to determine the appropriate scope of the analysis, especially the target segments in a country. The appropriate scope depends on the coverage of CIT legislation in regard to business entities, and availability of detailed data. Under the system of national accounts, any domestic economic entities engaging in transactions with other entities are classified into five institutional sectors: (1) S11 (non-financial corporations), (2) S12 (financial corporations), (3) S13 (general government), (4) S14 (households), and (5) S15 (non-profit institutions serving households; NPISH), and GOS is recorded in each sector. In national accounts, any incorporated (legal) entities producing market products as residents are classified as corporation (S11 or S12), and such entities usually consist of most part of the whole entities subject to corporate income tax in a country. Therefore, it is reasonable to set the scope of the analysis to entities classified into S11 and S12.

This means starting with GOS of S11 and S12 to estimate potential base/liability for corporations, and comparing the estimated results with declarations of entities classified into S11 and S12. It requires a list of entities classified into S11 and S12 to exclude any CIT declarations not classified in S11 and S12. Also, it is recommended to check if there can be any reasons to include entities classified into S13-S15 in a country, although it is not straightforward to estimate potential CIT base/liability from GOS data in these sectors.

S13: general government

The general government sector in national accounts consists mainly of central, state and local government units together with social security funds imposed and controlled by those units. In addition, it includes non-profit institutions (NPIs) engaged in non-market production that are controlled by government units or social security funds. NPIs are legal or social entities created for producing goods and services but whose status does not permit them to be a source of income or profit.[16] Some NPIs classified in S13 could be legally subject to CIT, but the magnitude of taxable income would be much smaller than S11 and S12. In addition, the GOS of S13 generally reflect cost related to non-market production, mainly consisting of consumption of fixed capital, which is not the CIT base, and it is not straightforward to estimate taxable income from other data sources. Therefore, in general, it is not necessary to include S13 in the CIT gap analysis, unless the magnitude of economic activities of NPI classified in to S13 is not negligible and noncompliance could be a problem.

S14: households

Output of the households sector, S14, include production of goods and services by non-legal entities that are not corporations, such as partnerships and individual entrepreneurs, and imputed rent of owner-occupied dwellings. The value added created in the production of

[16] It should be noted that not all the public corporations under control of the government are categorized in S13; if NPIs engage in the market production, i.e., sales of goods and services at economically significant prices (a '50% rule' – prices representing more than 50 percent of total costs – is applied in SNA2008), such NPIs are classified into S11 or S12.

goods and services by unincorporated business entities is recorded as mixed income, implicitly containing both remuneration for labor and returns to the owner as entrepreneur. Often such production activities are relatively small and may include informal and subsistence activities. In most countries, any business incomes of such unincorporated entities are not subject to CIT, but subject to personal income tax (PIT), so it is not necessary to treat mixed income in S14 as potential CIT base. If CIT legislation covers business incomes of all unincorporated enterprises, it is an option to include the mixed income of S14 as an additional tax base to reflect them. Apart from the unincorporated businesses, the value added of the imputed rents is usually recorded as GOS in S14, but they are usually not subject to any current taxes, and it is not necessary to consider it in estimating potential CIT base/liability.

S15: non-profit institutions serving households (NPISH)

NPIs that are not classified into S11-S13 fall into non-profit institutions serving households (NPISH), S15.[17] The same discussion as the one for S13 is applicable to S15; it is not necessary to include S15 in the CIT gap analysis, unless the magnitude of economic activities of NPI classified into S15 is not negligible and noncompliance could be a problem.

Due to a practical difficulty in estimating potential CIT base/liability for S12 (financial corporations), it can be reasonable to limit the scope of the CIT gap to S11 (non-financial corporations). For financial corporations, GOS is calculated by using a concept of economic value added. The value added of corporations providing financial intermediation service with loans and deposits is measured by FISIM (Financial Intermediation Services Indirectly Measured)[18], and the value added of insurance corporations is measured by output (premiums earned minus claims/benefits/increases in technical reserves) minus inputs (intermediate consumption, compensation to employees, and taxes on outputs and imports). However, financial accounting profits of financial corporations are highly affected by other factors, such as changes in asset price, increases/decreases in reserves and allowances, changes in deferred tax asset/liability, and the writing off of bad debts, and therefore it is more difficult to directly estimate FAP and taxable incomes from GOS than non-financial corporations. Therefore, unless sufficiently detailed data covering such factors can be provided, it is better to focus on S11.

After deciding the scope of the analysis, it is necessary to retrieve the corresponding GOS data from national accounts, and then adjust for incomes of entities not subject to CIT. Under specific CIT legislations, some entities may not be subject to CIT, even they are classified into S11 or S12. Typical examples are a central bank, corporations operating in free economic zones with tax exemption treatments, and some privileged sectors exempted from CIT. Because incomes of such corporations are included in GOS of S11 or S12, it is necessary to reduce the incomes of such corporations reflected in GOS by using relevant data for individual corporations exempted from CIT.

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[17] NPIs producing goods and services at economically significant prices are classified into S11 or S12.

[18] FISIM is measured by the difference between the rate paid to banks by borrowers and the reference rate plus the difference between the reference rate and the rate actually paid to depositors, representing charges for financial intermediation services. Interest payments/receipts at the reference rate is recorded as transactions of property incomes (payments/receipts), which are not recognized as the value-added generated by the financial institutions.

B. Differences between GOS and FAP

Description of conceptual differences

There are several conceptual differences between GOS in national accounts and financial accounting profits (FAP) of corporations. GOS is calculated from *output* by subtracting *input* (*intermediate consumption*) and primary incomes directly allocated to employees and government (*compensation of employees* and *taxes on production and imports minus subsidies*). On the other hand, FAP is calculated as the difference between *revenues/incomes* and *expenses/costs* following definitions of accounting standards. There are many differences that can be categorized in revenue side (differences between *output* and *revenue/income*) and expense side (difference between *input/primary incomes* and *expense/cost*). In particular, GOS does not include any effects of changes in asset prices because they are recognized as changes in the valuation of existing assets, and not regarded as newly created value added.

Typical items to be added to GOS on the revenue side are; receipt of interest, dividends, rent from land and natural resource, and capital/holding gains related to assets. These are not recorded as output in national accounts, while they are recognized as revenue/income in financial accounting. The holding gains are relevant to treatments of inventories; any profits or losses resulting from holding inventories do not consist of value added in national accounts, while they are reflected in financial accounting. Such profits or losses are estimated as inventory valuation adjustment (IVA), and excluded from GOS in national accounts. In estimating potential CIT base, it is necessary to added back the IVA to GOS.

Typical items to be subtracted from GOS on the expense side are; payments of interest and rent for land and natural resources, depreciation of assets, and capital/holding losses related to assets. They are not recorded as any inputs or other allocations subtracted from output in calculating GOS, while they are recognized as expense/cost in financial accounting. In addition, other financial costs, such as allowances for bad debt are treated as financial expense/cost, while they are not recognized as subtractions in calculating GOS in national accounts.

Accounting depreciation should be subtracted from GOS. Because consumption of fixed capital (CFC) in national accounts is based on repurchase cost, it is necessary to use accounting depreciation based on historical cost to deduct the values of depreciation.

Distinction between capital formation and intermediate consumption matters. In national accounts, research and development is treated as capital formation except in any cases where it is clear that the activity does not entail any economic benefit for its owner. Expenditures on mineral exploration and evaluation are also treated as capital formation, whether successful or not, because they are needed to acquire new reserves and so are all classified as gross fixed capital formation. In these cases, purchases of goods and services for R&D and software are not recognized as intermediate consumption, while such expenses are recognized as expense/cost in financial accounting.

Another important difference comes from the treatment of entities organized as foreign branches. In financial accounting, foreign branches of domestic corporations are regarded as the same entities as parents, but national accounts do not recognize foreign branches as resident units, and GOS does not include it. They are treated as non-resident quasi-corporations if they have substantial operations that can be separated from the rest of the entity. Therefore, in estimating FAP, it is necessary to add financial accounting profit for foreign branches.[19] On the contrary, branches of foreign corporations in a country are regarded as resident quasicorporations in national accounts, whose incomes are included in GOS. They are usually subject to CIT, and therefore it is not necessary to adjust them in the procedure of estimating FAP.

Procedures for adjustments

To adjust for the conceptual differences between GOS and aggregate FAP, it is necessary to consider individual items and estimate the adjustments needed item by item using available data. The procedures for positive adjustments (Table 1) show what should be added to GOS to estimate potential FAP.

Then it is necessary to consider individual items for negative adjustments to GOS using available data. The procedures for the negative adjustments (Table 2) show what should be subtracted from GOS to estimate potential FAP.

[19] To prevent double taxation, tax credits or allowance for foreign source incomes are given to tax liability/base subject to taxation in the branches' local jurisdictions.

TABLE 1. Procedures for Positive Adjustments to GOS

ITEMS	DATA SOURCES	ISSUES TO BE CONSIDERED
Interest (receipt)	National accounts, the allocation of primary income accounts, property income – resources	• To keep consistency with the GOS calculation, the receipt of interest should be after eliminating the component of FISIM, namely, the pure interest with respect to a reference interest rate.[1]
Distributed income of corporations (receipt)	National accounts, the allocation of primary income accounts, property income – resources	• Receipt of dividends and withdrawals of income from quasi-corporations needsto be added to estimate FAP.[2] • Reinvested earnings on foreign direct investment (FDI) should not be included, except for realized profits/losses of foreign branches that can be measured from financial statements.
Other investment income (receipt)	National accounts, the allocation of primary income accounts, property income – resources	• Receipt of investment income attributed to insurance policy holders should not be added to the tax base because it is usually directly recorded as premium supplements to insurers without being recorded as incomes of the recipients.
Rent (receipt)	National accounts, the allocation of primary income accounts, property income – resources	• Receipt of rent in national accounts covers income receivable by the owner of natural resource, such as land and subsoil assets, which are not included inoutput and GOS.
Current transfers (receipt)	National accounts, the secondary distribution of income account – resources	• Receipt of current transfers by corporations may include net social contributions[3] and other current transfers, such as non-life insurance claims (benefits) and donations, which need to be added to estimate FAP.
Capital transfers (receipt)	National accounts, capital account	• Receipt of capital transfers by corporations may include investment grant,an increase in net worth due to cancellation of debt by creditors, and transfersfrom government unit to cover large accumulated deficits, and they can be large and irregular. Therefore, it is recommended to check sources of large transfers, and whether they should be added to estimated FAP.
Inventory valuation adjustment	National accounts, supplementary table	• Holding gains can be substantial under inflationary circumstances.
Capital gains	Survey data or financial statements	• The revaluation accounts of national accounts or flow-of-funds data, showing holding gains of financial and non-financial assets, cannot be used for quantifying positive adjustment because they include unrealized capital gains, which should not to be added to estimate FAP.
Profits of foreign branches	Survey data or financial statements [or tax return data]	• If there is no other reliable data, declared values in tax returns as profits of foreign branches to calculate deductions for taxes paid abroad can be used as a proxy.
Other adjustments	Survey data or financial statements [or tax return data]	• Other items which are recognized as input in national accounts but not treatedas accounting costs/expenses include: cost of trading and issuing securities. • Other items which are not recognized as output in national accounts, but treatedas accounting incomes/revenues include: reversal of allowances/ reserves.

[1] This is because production of FISIM, which is measured as the difference between loan/deposit rates and the reference rate, is included in GOS. Financial intermediation services with loans and deposits are deemed to produce output of financial services (FISIM) when providing loans and deposits by the amount of differences between loan/deposit rates and a reference rate, and purchases of FISIM by other sectors are treated as intermediate consumptions.

[2] Receipt of dividends is usually excluded from taxable income to avoid double taxation. Such exclusions are explicitly considered in next subsection C, discussing differences between FAP and C-NTB.

[3] Receipt of net social contributions includes actual and imputed social contributions paid by households to corporations which directly provide social benefits to households under social insurance schemes. If most of social insurance schemes are operated by institutions classified in general government, then social contributions paid to corporations will be limited. These items may also include imputed contributions; for instance, if a corporation pays retirement payment to its employee, it is recorded as (1) payment of wage and salaries, (2) receipt of (imputed) social contribution from employees to a corporation, and (3) payment of social benefit from the corporation to the employees, if such retirement payment is regarded as a part of social insurance scheme.

TABLE 2. Procedures for Negative Adjustments to GOS

ITEMS	DATA SOURCES	ISSUES TO BE CONSIDERED
Interest (payment)	National accounts, the allocation of primary income accounts, property income – uses	• To keep consistency with the GOS calculation, the payment of interest should be after eliminating the component of FISIM, namely, the pure interest with respect to a reference interest rate.
Other investment income (payment)	National accounts, the allocation of primary income accounts, property income – uses	• Payment of investment income attributed to insurance policy holders should be subtracted to estimate FAP because they are also recorded as premium supplements implicitly paid from policy holders to insurers, and they are recognized as a part of output and GOS of insurance corporations.
Rent (payment)	National accounts, the allocation of primary income accounts, property income – uses	• Payment of rent in national accounts records income payable to the owner of natural resource, such as land and subsoil asset.
Current transfers (payment)	National accounts, the secondary distribution of income account – uses	• Payment of current taxes on income, wealth, etc. should not be subtracted, except for taxes deductible in calculating the CIT base.[1] • Social benefits other than social transfers in kind and other current transfers, including nonlife insurance net premiums, fines and penalties, and donations, need to be subtracted to estimate FAP.
Capital transfers (payment)	National accounts, capital account – payable	• It is recommended to check sources of large transfers, and whether they should be subtracted to estimated FAP.
Depreciation	Survey data or financial statements [or tax return data]	• If individual tax returns or financial statements are used to calculate aggregate accounting depreciation, it is necessary to check exhaustiveness of the data to cover full population.[2]
Capital losses	Survey data or financial statements	• The revaluation accounts of national accounts or flow-of-funds data, showing holding losses of financial and non-financial assets, cannot be used for quantifying negative adjustment because they include unrealized capital losses, which should not to be subtracted to estimate FAP.
Other adjustments	Survey data or financial statements [or tax return data]	Other items which are not recognized as input but treated as accounting expenses/costs are: current expenditure for R&D and software, provisions of allowances and reserves, stock options to employees.

1 It is necessary to check if there are deductible taxes in calculating CIT base for each country, such as local taxes on incomes. The current taxes do not include taxes on production and imports, such as VAT, excises, and property taxes.

2 National accounts provide data on 'consumption of fixed capital (CFC)', showing the decline in the current value of fixed assets owned and used by a producer in a year. This differs from accounting depreciation in that it is based on current (repurchase) values, instead of historical costs of asset acquisition of assets. Therefore, accounting depreciation cannot be replaced by CFC.

C. Differences between FAP and C-NTB

Description of conceptual differences

In calculating CIT base of individual corporations, there are several mandatory differences between financial accounting profit (FAP) and taxable income under CIT legislation. Typical differences reducing taxable income are: (1) exclusion of dividend receipts to avoid double taxation on corporate income, (2) exclusion of foreign source income subject to foreign tax to avoid double taxation, and (3) special allowances, reserves, and exemptions reducing taxable incomes under specific purposes (such as accelerated depreciations). Examples of differences increasing taxable income are: (1) disallowed expenses, such as entertainment expenses and donations, and (2) positive temporary differences due to special allowances and reserves with specific purposes (such as accelerated depreciations).

At the aggregated level, adjusting these differences to the potential FAP results in the aggregate potential net tax base for the current year (C-NTB). Because GOS and potential FAP are aggregated values including both positive results of corporations making profits and negative results of corporations making losses, the calculated C-NTB value also shows the net value reflecting both profits and losses.

Procedures for adjustments

The differences between FAP and C-NTB are declared by individual corporations. In general, it is not expected to have better data than aggregates derived from CIT tax returns, while it should be noted that use of this data implicitly assumes that the declarations for the items pertinent to these differences are correct.

Positive adjustments include specific items that cannot be deducted in calculating taxable income but accounting standards allow them to be deducted in calculating FAP. Some examples are following:

- Limitation on deductible donation amounts
- Limitation on deductible interest
- Limitation on deducting entertainment expenses
- Limitation on deducting fines and penalties
- Limitation on deductions of allowances and reserves
- Positive differences between accounting depreciation and tax depreciation

Negative adjustments include specific items that can be deducted in calculating taxable income but accounting standards do not allow them to be deducted from FAP. Some examples are following:

- Receipt of dividends
- Bad debt expenses
- Negative differences between accounting depreciation and tax deprecation
- Deductions for equity returns
- Specific deductions for calculating taxable income (such as for R&D expenses)
- Foreign source incomes not subject to domestic taxation
- Deductible income subject to other taxes (such as withholding tax or special levies)

BOX 1. Treatments for Foreign Source Incomes

To consider differences between FAP and C-NTB, it is necessary to distinguish between 'taxable' income and 'non-taxable' foreign source income in treating specific incomes possibly subject to double taxation by home and foreign countries due to a source based taxation rule and a resident based taxation rule. Whether incomes, such as business income of foreign branches and property income paid by foreign entities, create domestic tax liabilities depends on not only each country's domestic CIT legislation, but also CIT legislation in the foreign jurisdiction and tax treaties. This means that the statistics showing aggregate flows of incomes and financial transactions between resident and non-resident entities (such as national accounts and Balance of Payments (BOP) statistics) do not necessarily provide complete data for estimating the domestic CIT base.

For example, the OECD model tax treaty stipulates that income from foreign immovable properties is only taxable in the (foreign) countries in which they arise, while other property income (interest and dividends) is taxable in the countries where recipients reside (see Table 3 for classification in national accounts and BOP and treatments under OECD model treaty for specific incomes). Furthermore, there are many varieties of tax treaties, and so it is not simple to classify potentially 'taxable' income and 'non-taxable' income from the aggregated numbers given in national accounts and BOP statistics.

Unless concerns about foreign source income is one the main motivations for the CIT gap estimation, it is generally necessary to use tax return data to quantify 'non-taxable' foreign source income to be excluded from the potential tax base estimation in the process of transforming potential FAP to potential C-NTB. If this approach is adopted, the magnitude of the foreign income should be checked to ensure it is sufficiently smaller than the aggregate receipts of foreign source incomes in BOP data. If foreign source income is one of the main motivations for the CIT gap estimation, the adjustment made for them will need to be based on independent data sources, for example academic studies of offshore incomes or leaked data from offshore advisors or banks.

TABLE 3. Examples of Treatments for Foreign Source Income

TYPE OF INCOME	CLASSIFICATION IN NATIONAL ACCOUNTS AND BOP	TREATMENT IN OECD MODEL TREATY
Receipt of interest from foreign entities	Receipt of property income (interest)	Taxable, while foreign country can also tax with a certain limit
Receipt of dividends from foreign entities	Receipt of property income (dividends)	Taxable, while foreign country can also tax with a certain limit
Receipt of rent for immovable properties located in foreign counties	Receipt of property income (Withdrawals from income of quasi-corporations)[1]	Non-taxable
Receipt of royalties for owned patents and similar property from foreign entities	Exports of services	Taxable
Profits from international shipping and air transport services	Exports of services (if customers are non-residents) or final or intermediate consumption (if customers are residents)	Taxable
Business profits of foreign branches	Not included in GOS	Non-taxable, if permanent establishment exists in the foreign country

[1] When land located in a foreign country is owned by a resident entity, a notional resident unit is identified for statistical purposes as being the owner of the land in the foreign country. Then income arising from rent is recorded as direct investment income of the resident owner.

D. Differences between C-NTB and TB

Description of conceptual differences

Calculation of CIT liabilities are commonly asymmetric with regard to the treatments of profit and loss. In general, corporations are not allowed to claim direct reimbursement for losses in the year in which they arise, and they usually need to carry over losses and deduct them from profits in later tax periods, though some countries allow the offset of losses against profits in previous tax periods by reimbursing taxes paid for those years.

The Current-year Net Tax Base (C-NTB), estimated following the procedures above, is an aggregated value over the entire economy, reflecting both positive and negative results of individual corporations' activities. The potential CIT liabilities, however, should reflect only aggregate results of profit-making corporations in a current year, excluding the results of lossmaking corporations. Therefore, the potential C-NTB needs to be transformed to the potential C-TB (Current-year tax base), which should be larger than the C-NTB by the amount of absolute value of aggregate losses arising in the current year. So, the potential C-TB is calculated by adding the aggregate losses to the potential C-NTB.

Finally, the potential tax base (TB) can be derived by subtracting the deductible carriedover loss from the potential C-TB. The deductibility of carried-over loss is stipulated in CIT legislation, and it is usually limited to the amount of profit at the maximum.

Procedures for adjustments

The key data to convert the potential C-NTB to the potential TB are aggregate losses and aggregate deductible carried-over losses in a current year. For losses, if there are available corporate survey data showing the aggregate losses by corporations, such data should be used. But in most countries, there is no reliable data on the aggregate losses, other than financial statements or tax returns.

If the aggregate losses in tax return data need to be used, it should be noted that the losses declared in tax returns may include anomalies. This is because the declared amount of loss is not relevant to the amount of tax liability in the current year, and therefore misreporting and underreporting can be overlooked by tax administration. In general, audits for loss-making corporations are limited if audit targets are selected by tax administration from the perspective of achieving more revenues in the short run.

Therefore, it is necessary to exclude anomalies by carefully checking if there are internally inconsistent data. In particular, it is recommended to check internal inconsistency over time by comparing 'declared losses' with 'declared carried-over losses' in subsequent periods for the same taxpayers.

BOX 2. Magnitude of Differences between GOS and C-TB in the United States

To understand the relationship and the magnitude of differences between gross operating surplus (GOS) and the CIT tax base, it is helpful to consider the case of the United States. The Bureau of Economic Analysis (BEA), which is responsible for national accounts in the U.S. (NIPA), estimates GOS by using tax return data for CIT submitted to IRS by making necessary adjustments with respect to conceptual differences between CIT tax base and gross operating surplus and an estimated CIT gap using a bottom-up approach. This exercise provides a clear illustration of the quantitative significance of the links between GOS and C-TB.

The aggregate net corporate profit declared by taxpayers in 2010 was 1,254.2 billion USD, and the amount of misreporting (under-declarations) was estimated by IRS to be 401.5 billion USD by adopting the bottom-up approach using audit results. Then BEA adjusts both the positive and negative sides by considering differences between GOS and TB, including payment/receipt of property income (interest, dividends and rent), depreciations, foreign source income, inventory valuation adjustments, capital gains and losses, bad debt expenses, etc. by using survey data and CIT return data.

Table 1 shows the exact amounts of adjustments made by BEA to construct GOS from TB in 2010. It shows how these values can be different for each adjustment item and which adjustments may significantly contribute to the overall difference; the largest adjustment comes from payment and receipt of interest, and non-deductible interest also contributes to the difference. This suggests that careful treatment for payment/receipt of interest is the key to appropriately estimating the tax base from GOS. The next largest item is depreciation, and the differences between consumption of fixed capital in national accounts and depreciation in accounting reports are large. Other items are relatively small, but still there are non-negligible items, such as the receipt of dividends, foreign source income, bad debt expenses, and income outside the scope of CIT.

Although the relative importance may be different across countries, it is worth considering every item to estimate the potential tax base from GOS.

TABLE 4. Differences between GOS and N-CTB in the United States, 2010

GROSS OPERATING SURPLUS (CORPORATE BUSINESS)	2,842.7		
		RATIO TO GOS	
PLUS:	**(+) 2,715.5**		
(+) receipt of interest		(+) 1,773.5	62.4%
(+) foreign source income		(+) 336.1	11.8%
(+) dividends from domestic corporations		(+) 176.1	6.2%
(+) net capital gains from sales of property		(+) 152.3	5.4%
(+) non-deductible interest payment		(+) 129.7	4.6%
(+) costs of trading or issuing corporate securities		(+) 62.3	2.2%
(+) inventory valuation adjustment		(+) 41.0	1.4%
(+) business entertainment		(+) 17.8	0.6%
(+) other items		(+) 26.7	0.9%
MINUS:	**(-) 3,902.4**		
(–) payment of interest		(–) 1,883.4	–66.3%
(–) depreciation		(–) 1,209.2	–42.5%
(–) bad debt expense		(–) 316.3	–11.1%
(–) net current transfer payment		(–) 99.8	–3.5%
(–) intangible amortization		(–) 96.6	–3.4%
(–) income out of scope for CIT		(–) 84.9	–3.0%
(–) expenditures for intellectual property		(–) 55.3	–1.9%
(–) state and local taxes on corporate income		(–) 47.7	–1.7%
(–) expenditures for mining exploration		(–) 25.1	–0.9%
(–) excess of employer expenses for DB plans		(–) 20.7	–0.7%
(–) rent and royalties for natural resource		(–) 19.2	–0.7%
(–) depletion of domestic minerals		(–) 17.7	–0.6%
(–) other items		(–) 26.5	–0.9%
POTENTIAL NET TI-C	**1,655.7**		
ADJUSTMENT FOR MISREPORTING ON INCOME TAX RETURNS	**(–) 401.5**		
TOTAL RECEIPTS LESS TOTAL DEDUCTIONS, IRS	**1,254.2**		

Source: BEA (2015)

E. CIT Liabilities

By multiplying the potential TB by relevant CIT statutory rates and adjusting tax credits and additional liabilities, potential CIT liabilities can be finally derived. If there are multiple CIT rates, the estimated aggregate base should be separated into different parts to which different CIT rates are applied. CIT credits comprise two types: one is a deduction or tax credit for a specific purpose related to policy objectives, and the other is deduction to simply adjust companies' tax burden to consider other taxes or other jurisdictions, such as deductions for amounts collected by a withholding system, or deductions for tax levied by other countries. Additional tax liabilities considered here are extra liabilities which are not proportional to taxable incomes, such as minimum charges irrelevant to the amount of taxable incomes.

The aggregated tax credits and additional liabilities need to be estimated from survey data, or directly retrieved from tax return data. Again, if tax return data are used, it assumes that the declarations are correct and compliant.

F. Measuring Actual CIT Declarations

The declared CIT base and liability can be significantly different from actual CIT collection presented in revenue statistics. Therefore, it is important to separately analyze the difference between actual CIT collections and CIT declarations, considering the timing of payments, coverage of revenues, and unpaid arrears. It should be done by comparing the dataset of payment and the dataset of declarations. The values of CIT payments may include advance payments and interest or penalties, and reflect reimbursements, for which timing is different from declared tax period. The unpaid arrears need to be separately recorded as a CIT collection gap.

To estimate CIT base gaps and CIT gaps, it is necessary to have declared CIT base and liability that can be matched with the estimated potential CIT base and liability in terms of scope and timing. Because the measures of potential are based on national accounts data in which economic activities are usually recorded by calendar year (January to December), it is best to use appropriately aggregated data on the declared CIT base and liability that have accrued from economic activities in a particular calendar year. For that purpose, actual CIT declarations need to be classified based on the 'tax period' in which economic activities have been performed, rather than the timing of actual payments.[20]

If tax periods deviate from a calendar year, adjustments for allocating CIT declarations to a calendar year will be needed. One approximation method is to classify taxpayers with tax periods beginning between January and June into an 'early (E)' group, and taxpayers with tax periods beginning between July and December into an 'late (L)' group. This allows the collections for calendar year ***T*** to be calculated as:

$$TB_t^D = \sum_{i \in E} TB_{i,t}^D + \sum_{i \in L} TB_{i,t-1}^D .$$

Another option is to reallocate data on the tax base, liability and collections for each taxpayer, by apportioning returns to each calendar year covered by the return according to the relative numbers of months in each year, perhaps weighting each month to allow for growth and/or seasonal cycles in economic activity.

[20] There are two possible ways to measure actual CIT declarations for calculating the compliance gap: 1) the initial (original) declarations, and 2) the modified declarations as of a certain cutoff date. The initial declarations are measured at the original filing/payment deadline. The former measure will not change over time, and provides a basis for comparison as to how the gap evolves over time as the administration collects on arrears and yields additional assessments. The latter uses the declaration data assessed and/or modified up to a certain cutoff date, which will change according to the choice of cutoff date (though the effects become less important with increasing time between the filing and cutoff dates).

In terms of the scope of the analysis, it is necessary to prepare a set of declared CIT base and liability data matching with the scope of the potential CIT base and liability. For that purpose, it is desirable that individual CIT declarations are classified in terms of institutional sectors S11–15, following the classification used in the national accounts in a country and make a set of data matching with the scope of the estimation for potential CIT base and liability. For any further analyses for individual economic activities, it is necessary to have the same classification as the national accounts in terms of economic activities, such as sector classification following the same version of ISIC (International Standard Industrial Classification of All Economic Activities).

IV. WHAT DATA IS REQUIRED TO MEASURE THE CIT GAP?

A. National Accounts Data

As an independent source of statistics for the tax base, national accounts data need to be compiled on economic survey data, not relying on tax declarations. The reported values for economic activities are expected to include non-observed economy. Any documents explaining the compilation methodologies for national income help understand the coverage of national accounts data, including the scope of estimation for non-observed economy.

A desirable set of national accounts data includes following tables classified into five institutional sectors S11-15, and classified into individual economic activities following ISIC classifications.[21]

(1) Income generation

(2) Allocation of primary income account

(3) Secondary distribution of income account

(4) Capital account

(5) Inventory valuation adjustments

B. Registration Information of All Individual CIT Taxpayers

To appropriately classify CIT declarations and payments in line with the scope of the analysis and have necessary data to adjust GOS to TB, it is necessary to have complete individual CIT declarations with sufficient information for classification. Therefore, the registration information of all individual CIT declarations including following information is necessary:

(1) ATIN—Anonymized Taxpayer Identification Number[22]

(2) Date of registration and deregistration (if applicable)

(3) Institutional sector classification (S11-15)

(4) Economic activity classification consistent with national accounts

(5) Description of tax period, including starting month/ending month, if different from general convention

C. Individual Tax Return Data for All Taxpayers and Every Tax Period Being Studied

CIT declaration data are used to calculate declared CIT base and liability for each year, and estimate the magnitude of conceptual differences between GOS and TB. Therefore, detailed data for calculating financial accounting profits and taxable incomes are necessary. It needs to be

[21] However, standard national accounts tables do not usually include (2), (3), (4) classified by economic activities. Therefore, it is necessary to use individual financial statements and tax return data to classify aggregate values into economic activities.

[22] These are taxpayer identification numbers that have been transferred by algorithm to anonymized numbers that allow records from different data sources (e.g., registration and payment databases) to be linked together for each taxpayer without revealing the identity of the taxpayer to the analyst.

checked if the data are internally consistent for the same tax period, and current year losses and carried-over losses are intertemporally consistent for individual taxpayers.

(1) ATIN—Anonymized Taxpayer Identification Number

(2) Tax period

(3) CIT liability for the period

(4) Every line item showing CIT tax credits and additional CIT liabilities

(5) CIT liability for the period before considering tax credits and additional liabilities

(6) Applied CIT rate

(7) CIT base for the period (Declared TB)

(8) Deduction for carried over losses

(9) CIT base for the current year (Declared C-TB)

(10) Declared loss for the current year, if any

(11) Every line item used to calculate from financial accounting profits to taxable incomes

(12) Every line item used to calculate financial accounting profit/loss, including income/revenue and cost/expense items, or separate financial statement data showing the items

D. Individual Payment Data for All Taxpayers and Every Tax Period Being Studied

To understand the CIT collection gap and any other reasons for differences between declared CIT liability and actual CIT payment, it is necessary to have detailed data about CIT payment.

(1) ATIN—Anonymized Taxpayer Identification Number

(2) Tax period of CIT liability

(3) Date of transaction

(4) Amount of CIT payment, reimbursement, and offset against other tax credits/liabilities

E. CIT Aggregate Revenue Data

To check if individual tax return data are appropriately retrieved without errors, and understand the quantitative impacts of limiting the scope of the CIT gap analysis and collection gaps, it is worth comparing the headline (aggregate) CIT revenue data published by the government with (1) aggregate declared CIT liability for the year calculated from C, and (2) aggregate CIT payment for the year derived from D. This is also useful to understand the reasons for levels and changes in CIT efficiency ratios calculated from headline CIT revenue data. For this comparison, following data are necessary:

(1) Annual aggregate CIT revenue data published by the government in its revenue statistics

(2) Any classifications for the aggregate above, including advance payment, withholding taxes classified as CIT, settlement (clearance of underpayments / overpayments), and others (penalties and fees)

V. HOW CAN THE CIT GAP BE USED TO UNDERSTAND THE CIT REVENUE PERFORMANCE?

A. Measuring CIT Policy Gaps

In the procedure of analyzing the potential CIT base/liability, the impacts of different policy framework can be also analyzed. Conceptually, any reduction of potential CIT base/liability due to discretionary choice of policies can be recognized as CIT policy gap.[23] However, the analysis of the CIT policy gaps in a year may not be straightforward, for two reasons. One is that the concept of a benchmark CIT base without any discretionary policy decisions is not obvious, and the other is that different CIT policies in a year may affect the magnitude of both profits and losses in the current year, and through carried-over losses, tax base/liability in subsequent years.

To quantify the CIT policy gaps, it is necessary to determine a reference policy, and focus on the current year effects on CIT base or liability. It is proposed to show three different types of policy gaps measuring current-year quantitative implications of discretionary choice of policies, as following:

Policy gap A: effects of exempted entities or incomes

- The difference between the current year tax bases under the current policy framework and the bases under the alternative policy framework without any exempted entities and incomes in S11, non-financial corporations

Policy gap B: effects of special calculation methods for tax base

- The difference between the current year tax bases under the current policy framework and the bases calculated under an alternative policy framework which does not reflect any discretionary policies increasing and/or decreasing taxable incomes from financial accounting profits

Policy gap C: effects of special tax credits and additional liabilities

- The difference between the current tax revenues and the revenues under an alternative policy framework without any discretionary tax credits and additional liabilities

[23] The definition of the policy gap for VAT is provided by Keen (2013), as a difference between the potential VAT if all final consumption were taxed at the current standard rate without any exemptions and the potential VAT given the current policy framework. A graphical chart showing these concepts is provided in Hutton (2017).

B. CIT Efficiency Ratio

CIT efficiency ratio is one of the key drivers of CIT revenue relative to GDP. The CIT efficiency ratio is calculated as the ratio of actual CIT collections (AC) to reference tax base (GOS) multiplied by the standard CIT rate (τ).[24] The ratio of AC to GDP can be decomposed into three factors; the CIT statutory rate, 'capital ratio' (the ratio of GOS to GDP), and the CIT efficiency ratio, as in the following equation.[25]

$$\frac{AC}{GDP} = \frac{AC}{GOS} \times \frac{GOS}{GDP}$$
$$= \tau \times \left[\frac{AC}{\tau \times GOS}\right] \times \frac{GOS}{GDP}$$

The CIT efficiency ratios can vary across countries and fluctuate due to several reasons. For example, the ratio can fluctuate due to business cycles affecting taxable corporate incomes through various deductions, such as carried-over loss and other expenses, and differences between cash and accruals. In addition, any changes in the behaviors of corporations related to tax compliance may affect the fluctuation of the ratio.

To better understand trends and fluctuations of CIT efficiency ratio, it would be useful to know the quantitative impacts of major factors affecting the CIT efficiency ratio. The CIT efficiency ratio can be decomposed into 7 factors in the following equation.

$$\frac{AC}{\tau \times GOS} = \left[\frac{AC}{AC^D}\right] \times \left[\frac{AC^D}{\tau \times TB^D}\right] \times \left[\frac{TB^D}{C\text{-}TB^D}\right]$$
$$\times \left[\frac{C\text{-}TB^D}{C\text{-}TB}\right] \times \left[\frac{C\text{-}TB}{C\text{-}NTB}\right] \times \left[\frac{C\text{-}NTB}{FAP}\right] \times \left[\frac{FAP}{GOS}\right]$$

AC^D stands for declared tax liabilities arising in the year, and TB^D and $C\text{-}TB^D$ are declared tax base and declared current year tax base before subtracting deduction for carried-over losses.

[24] The concept of 'CIT-efficiency' is explained in IMF (2014), Appendix IV.

[25] CIT efficiency ratio can be calculated for (1) total economy, using total GOS and total CIT revenue (2) S11, using GOS of S11 and CIT revenues of S11 corporations, and (3) S11+S12, using GOS of S11+S12 and CIT revenues of S11 and S12 corporations. The ratio using total GOS is easy to calculate, but may include GOS of S13, S14 and S15 in the denominator, while they are not relevant to CIT base (as discussed in Section III.A), and therefore underestimate the efficiency. Therefore, it is desirable to use S11 or S11+S12 in analyzing CIT revenue performance by using the CIT efficiency ratio.

By using the decomposition, changes in the CIT efficiency ratio can be expressed the sum of changes in the following factors.

- The difference between actual cash collections (AC) and declared liabilities (ACD), showing timing effects and collection gaps
- The difference between declared liabilities (ACD) and declared liabilities before considering tax credits and additional liabilities, showing the effect of tax credits and additions, including the policy gap due to special treatment (policy gap C)
- The difference between TBD and C-TBD, showing the effect of deductions for carriedover losses
- The difference between C-TBD and C-TB, showing the effect of the CIT base gap
- The difference between C-TB and C-NTB, showing the effect of current year losses
- The differences between C-NTB and FAP, showing the effects of special calculation methods for tax base (policy gap B)
- The differences between FAP and GOS, including the effects of conceptual differences between GOS and FAP, including the effects of exempted entities or incomes (policy gap A)

The yearly change of the CIT efficiency ratio can be decomposed into the changes in these factors separately. It can provide better understanding of the factors affecting CIT revenues and their relative importance.

VI. FINAL REMARKS

This note has provided a detailed description of the concept of the CIT gap, and the methodology adopted by the IMF's RA-GAP to produce the gaps. A top-down approach to estimate potential CIT base/liability using statistical data requires that careful consideration be paid to the conceptual differences between GOS in national accounts and taxable income, and cautious use of existing data to quantify such conceptual differences.

The top-down approach for the CIT gap has the advantage of not relying on costly random audits or the use of audit results with selection biases, but needs some caution in estimating gaps and interpreting results. The quality of the analysis depends on the quality of national accounts data, CIT return data, and other available data sources to reflect features of CIT policies. Limitations in estimating CIT gaps for financial corporations and foreign incomes should be noted, and the scope of the analysis should be carefully tailored. Therefore, it is recommended to use the top-down approach as an initial/overall evaluation of taxpayers' noncompliance for non-financial corporations, and further bottom-up analyses are expected to play a complementary role to evaluate taxpayers' noncompliance in detail for individual segments.

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