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# **Estimating the Corporate Income Tax Gap: RA-GAP Top-Down Methodology**

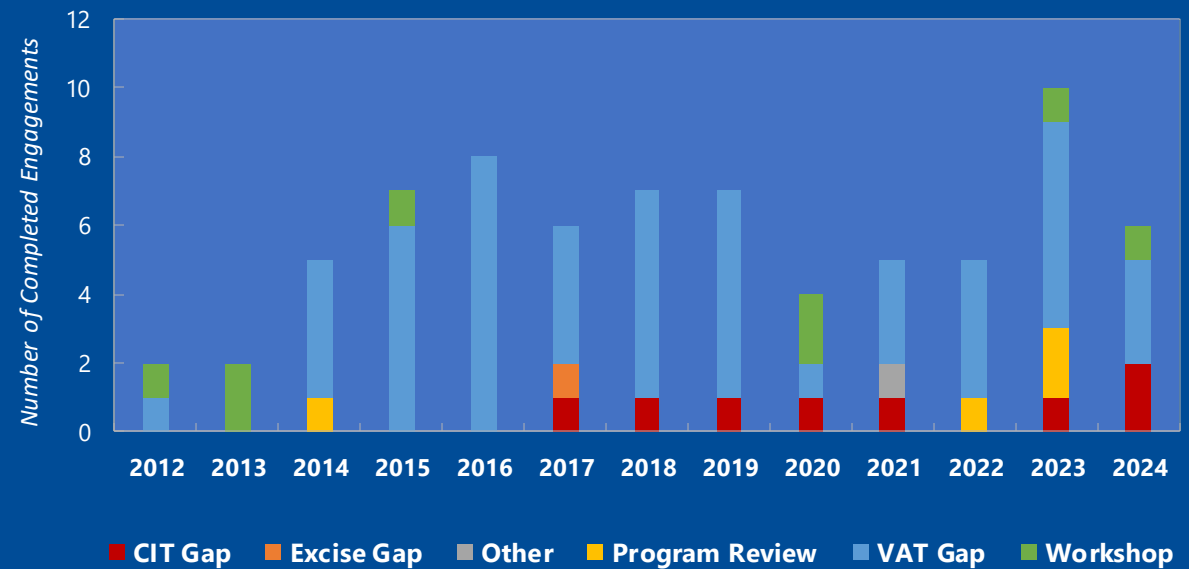
Patricio Barra  
Technical Assistance Advisor  
Fiscal Affairs Department

*"The views expressed in this presentation are of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management."*

# Context

- ❖ In our experience, it is becoming commonplace to estimate non-compliance for Value-Added Tax (VAT) by top-down techniques, but less so for Corporate Income Tax (CIT).
- ❖ In 2012-2024, the IMF's RA-GAP has assisted around 52 countries for estimating VAT gaps, but only to 8 countries for CIT gaps.

IMF's RA-GAP Technical Assistance Activities  
2012-2024



# RA-GAP methodology for CIT gap

The IMF's RA-GAP methodology for CIT gap is based on a top-down approach

- ❖ The goal is estimating the potential tax base (and potential tax liability) from existing macroeconomic data.
- ❖ National Accounts (NA) can comprehensively capture economic transactions with independence if they are being declared or not for tax purposes.
- ❖ Usually, NAs combines:
  - Financial statements,
  - Tax accounts, and
  - Ad-hoc surveys over industries or sectors
- ❖ If NAs were exclusively compiled using actual tax declarations, then the methodology would become meaningless.

# RA-GAP methodology for CIT gap

## Using the GOS for estimating potential CIT base

- ❖ For the VAT\*, the potential base is directly related to Value Added accounts (M, X, and GFCF are also needed).
- ❖ For the CIT, the potential base could be associated to the income account called “Gross Operational Surplus (GOS)”.

Output  
– Intermediate Consumption  
= Gross Value Added

Gross Value Added =  
Compensation of Employees  
+ Other taxes on production  
– Other subsidies on production  
**+ Gross Operating Surplus**

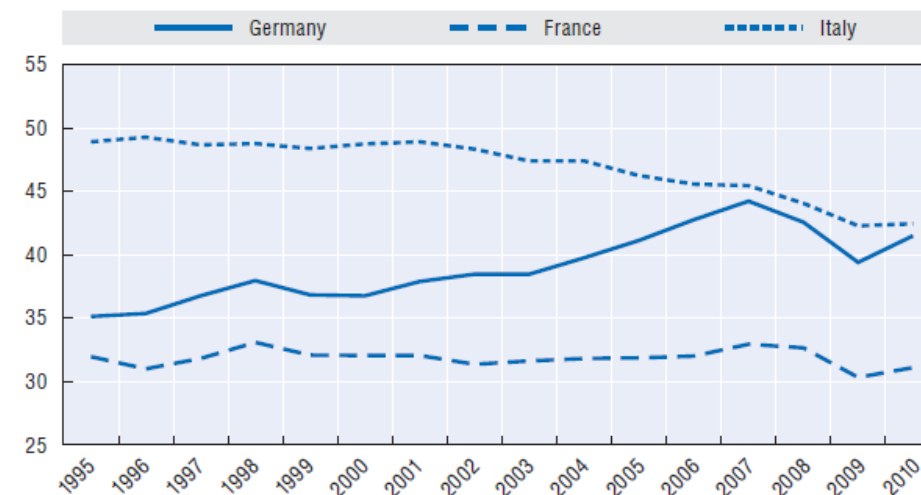
(\*) A VAT design based on final consumption as its macroeconomic base.


# RA-GAP methodology for CIT gap

## Using the GOS for estimating potential CIT base

- ❖ GOS is the portion of the income derived from production that is earned by the capital factor.
- ❖ GOS is usually estimated as a residual component (a few countries use direct estimations).

Figure 3.1. Profit rate for non-financial corporations  
Gross operating surplus/gross value added, in %



Source: OECD (2014) "Detailed National Accounts: Non-financial accounts by sectors, annual", OECD National Accounts Statistics (database), doi: <http://dx.doi.org/10.1787/data-00034-en>. OECD calculations.  
StatLink  <http://dx.doi.org/10.1787/888933143671>

# RA-GAP methodology for CIT gap

## Using the GOS for estimating potential CIT base

- ❖ In NAs, firms are usually classified into two groups: corporations (S11, S12) and “unincorporated enterprises” or “sole proprietorships”(S14AA).
- ❖ **S11 and S12** would be naturally associated to **CIT taxpayers**.
- ❖ If CIT legislation covers business incomes of unincorporated enterprises, then (a portion of) income from S14AA should be also included in the potential CIT base estimation.

### National Accounts - Institutional sectors

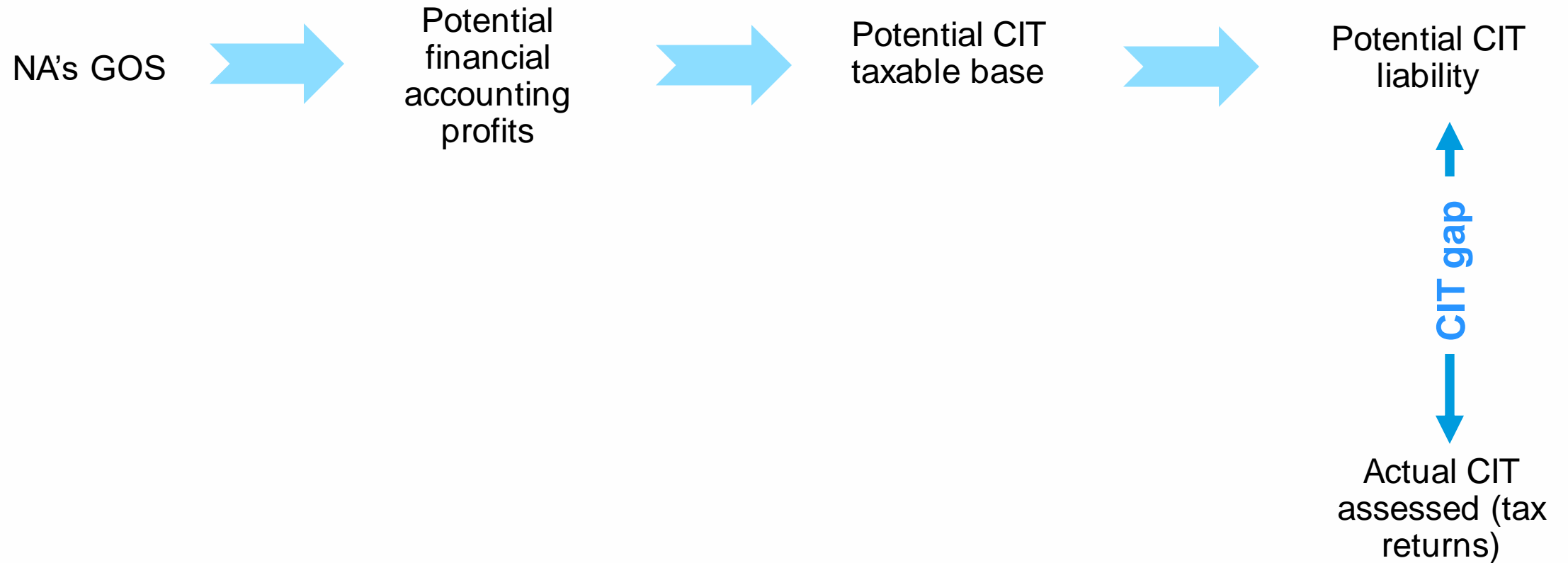
S11	Non-financial corporations
S12	Financial corporations
S13	General government
S14	Households
S14AA	Non-financial sole proprietorships
S14A	"Pure" Households
S15	Nonprofits institutions serving households
S1	Total economy

Source: OECD 2010 "Understanding National Accounts".

# RA-GAP methodology for CIT gap

## Steps for estimating the CIT gap

### *Direct approach*



# RA-GAP methodology for CIT gap

## CIT gap estimation model - *Direct approach*

	Primary source
<b>Gross operating surplus</b>	National Accounts
+ Receipt of interest	National Accounts
+ Receipt of distributed incomes from corporations	National Accounts
+ Receipt of any other investment income	National Accounts
+ Receipt of rents by ownership of natural resources not included in output (subsoil assets)	National Accounts
+ Receipt of current transfers from corporations (donations, insurance claims, etc.)	National Accounts
+ Receipt of capital transfers from corporations (investments grants, transfers from government, etc.)	National Accounts
+ Inventory valuation adjustments (holding gains by inflation causes)	National Accounts
+ Profits from foreign branches (taxable)	Financial statements
+ Capital gains	Financial statements
- Payments of interests	National Accounts
- Payments of other investment incomes	National Accounts
- Payments of rents by owner of natural resources not included in intermediate consumption (land and subsoil assets)	National Accounts
- Payments of current transfers	National Accounts
- Payments of capital transfers	National Accounts
- Depreciation/amortization (accounting)	Financial statements
- Capital losses / holding losses	Financial statements
- Other expenses not recognized as intermediate consumption (expenditure for R&D, provisions)	Financial statements



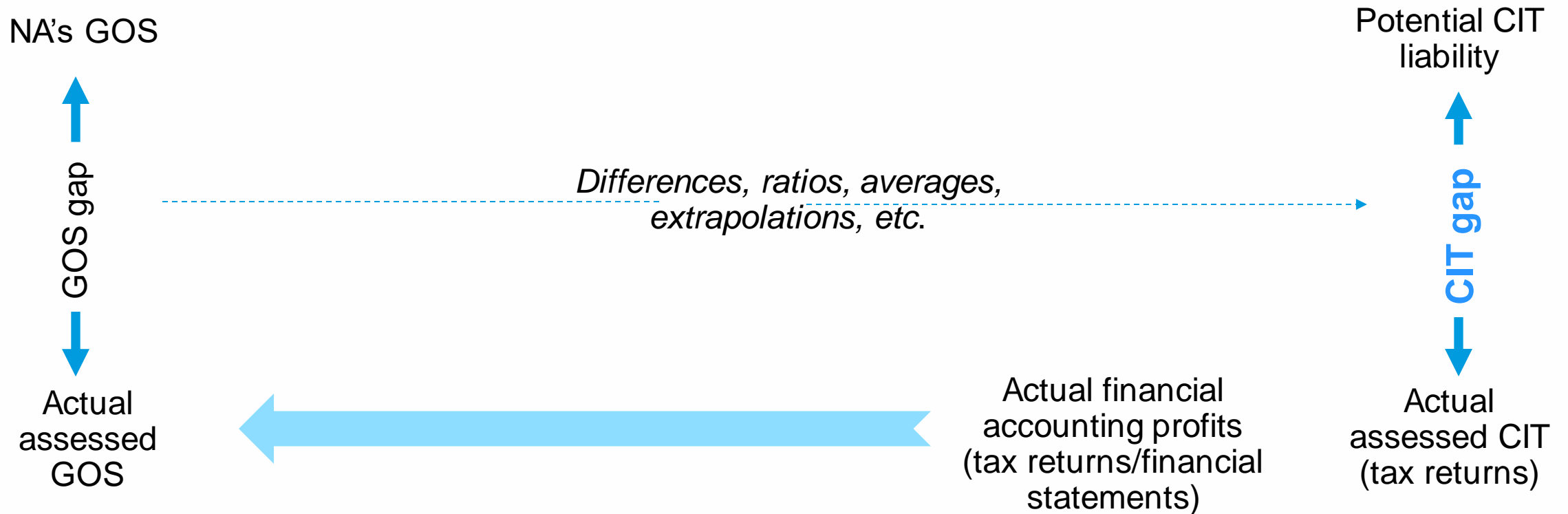
# RA-GAP methodology for CIT gap

## CIT gap estimation model - *Direct approach*

<b>=</b>	<b>Financial Accounting Profits</b>	
+	Increases in taxable income calculations by denied costs / added revenues	
	Limitation on deductible donations amount	CIT returns
	Limitation on deductible interest	CIT returns
	Limitation on deducting entertainment expenses	CIT returns
	Limitation on deducting fines and penalties	CIT returns
+	Positive differences between accounting depreciation and tax depreciation	CIT returns
-	Decreases in taxable income calculations (deductions / allowances for tax purposes)	CIT returns
	Receipts of dividends	CIT returns
	Bad debt expenses	CIT returns
	Foreign source incomes not subject to domestic taxation	CIT returns
-	Negative differences between accounting depreciation and tax depreciation	CIT returns
<b>=</b>	<b>Current-year Net Tax Base</b>	
+	Losses of corporations of the current year	CIT returns
<b>=</b>	<b>Current-year Tax Base</b>	
-	Deduction for carry-over losses (previous years)	CIT returns
<b>=</b>	<b>Tax Base</b>	
x	Effective CIT rate to Tax Base (%)	CIT returns
<b>=</b>	<b>Potential CIT liability before subtracting tax credits</b>	
-	Tax Credits	CIT returns
<b>=</b>	<b>Potential CIT liability after subtracting tax credits</b>	

# RA-GAP methodology for CIT gap

## Steps for estimating the CIT gap *Indirect approach*



# RA-GAP methodology for CIT gap

## CIT gap model - *Indirect approach*

		Primary source
	Total net sales	Financial statements / CIT returns
-	Cost of sales	Financial statements / CIT returns
-	Other net operating expenses	Financial statements / CIT returns
=	<b>Actual GOS</b>	Financial statements / CIT returns
-	Actual Tax Base	CIT returns
=	Absolute difference	Financial statements / CIT returns
	<b>PGOS</b>	National Accounts
-	Absolute difference	Financial statements / CIT returns
=	Potential Tax Base (absolute dif. method)	Financial statements / CIT returns
x	Effective CIT rate to Potential Tax Base (%)	CIT returns
=	Potential CIT liability before subtracting tax credits	CIT returns
-	Tax Credits	CIT returns
=	<b>Potential CIT liability after subtracting tax credits</b>	CIT returns

- ❖ The sales and costs included should be consistent with the output and intermediate consumption utilized in NAs.
- ❖ Alternatively, a relative difference between Actual GOS and Actual Tax Base (ratio) could be used to estimate the Potential Tax Base from the PGOS.
- ❖ Alternatively, the difference between AGOS and Actual Tax Base could be based on a sample of corporations identified as high tax compliance corporations.

# RA-GAP methodology for CIT gap

## CIT gap model

**CIT compliance gap = Potential CIT liability – Actual CIT liability**

Actual CIT liability:

- ❖ ‘Declared amount’ **for** a calendar year should be used to measure actual CIT liability.
- ❖ This may need reallocation of declared amount if calendar year and financial accounting year are different.
- ❖ Less recommendable to use ‘Cash collection’ in a calendar year or ‘Declared amount’ in a calendar year.

# Some considerations

- ❖ Some public enterprises could have a different CIT treatment compared to private corporations. A breakdown of the GOS for S11 would be useful to identify this special treatment.
- ❖ In some countries, several large units called “quasi-corporation” (for example NGOs, large legal firms, medical practices or co-operatives) are classified in S14, but they could be taxable for CIT purposes.
- ❖ In other countries, a number of “quasi-corporations” are included in S11, but they will not be under CIT obligations, so it should be necessary to exclude them.

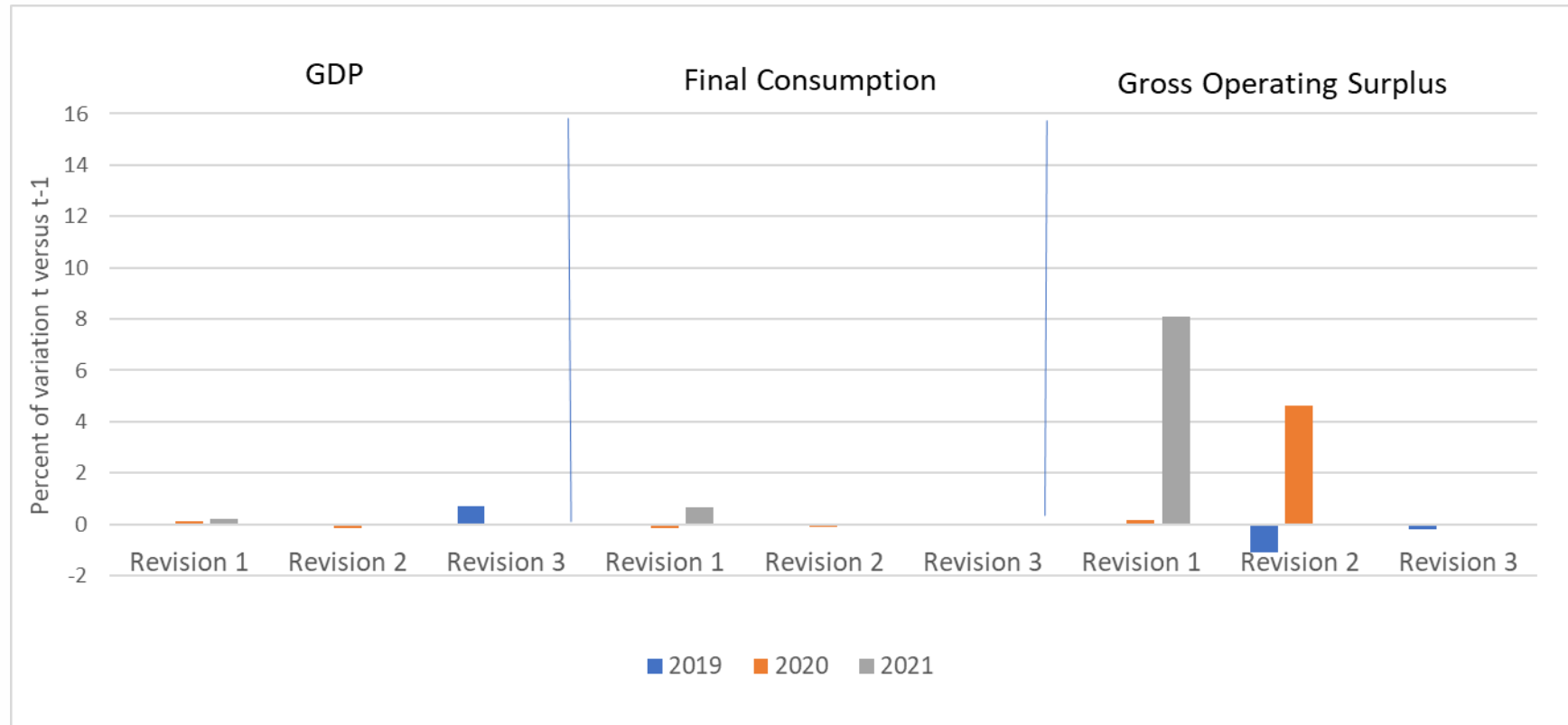
# Some considerations

- ❖ NAs of depreciation (consumption of fixed capital) differs from the depreciation declared by firms in their accounts. For that reason, it is recommendable to use the accounting balances to apply depreciation over GOS. Besides that, an adjustment for temporary differences (between FAP depreciation and tax depreciation) will be needed to compute the CIT tax base.
- ❖ Some S11 corporations operating under a special tax regime (Free Trade Zones, v.g.) can be differentiated in NAs.
- ❖ Provisional figures of GOS usually received higher adjustments than other macroeconomics aggregates, being necessary to update the CIT gap results more frequently than VAT gap results.

# Some considerations

Peru: Statistical revisions to provisional figures for GDP, FC, and GOS

Source: INEI



# Results: Costa Rica CIT gap estimates

## Direct approach

Table 2. Steps for Estimating Potential CIT Base and Liability, % of GDP

	Year			
	2012	2013	2014	2015
Gross operating surplus (S11)	25.1	24.0	24.2	24.3
[-] Gross operating surplus for Regímenes Especiales	2.0	1.9	2.0	2.1
Gross operating surplus for Régimen Definitivo	23.1	22.1	22.2	22.2
[+] Net receipts of property incomes	0.3	1.3	1.2	0.8
[-] Depreciations	4.3	4.2	4.0	4.0
[-] Other net payments of transfers and net deductions	3.8	3.5	3.9	4.7
Potential FAP	15.3	15.6	15.5	14.3
[+] Non-deductible costs	1.5	1.4	1.4	2.0
[-] Non-taxable incomes	2.5	1.9	2.2	2.1
[-] Profit under simplified regime	0.0	0.0	0.0	0.0
Potential C-NTB	14.2	15.1	14.6	14.2
[+] Current year loss	4.0	2.6	3.2	2.6
Potential C-TB	18.2	17.7	17.9	16.8
[-] Deduction for carried over loss	0.1	0.1	0.0	0.1
Potential TB	18.1	17.6	17.8	16.8
[x] Effective CIT rate to TB	27.7%	27.6%	27.6%	27.7%
Potential CIT liability before subtracting tax credits	5.0	4.9	4.9	4.7
[-] Tax credits	0.2	0.2	0.2	0.2
Potential CIT liability	4.8	4.6	4.7	4.5

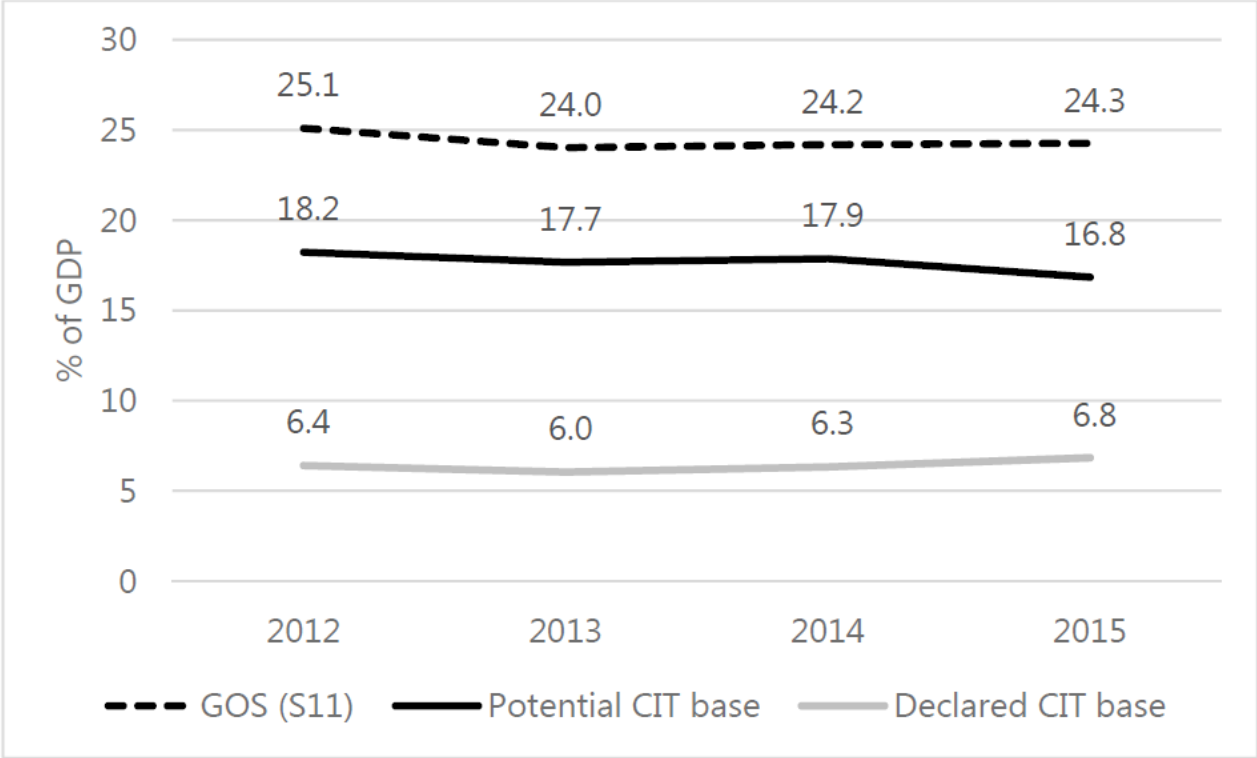
Source: Staff calculations.



# Results: Costa Rica CIT gap estimates

Direct approach

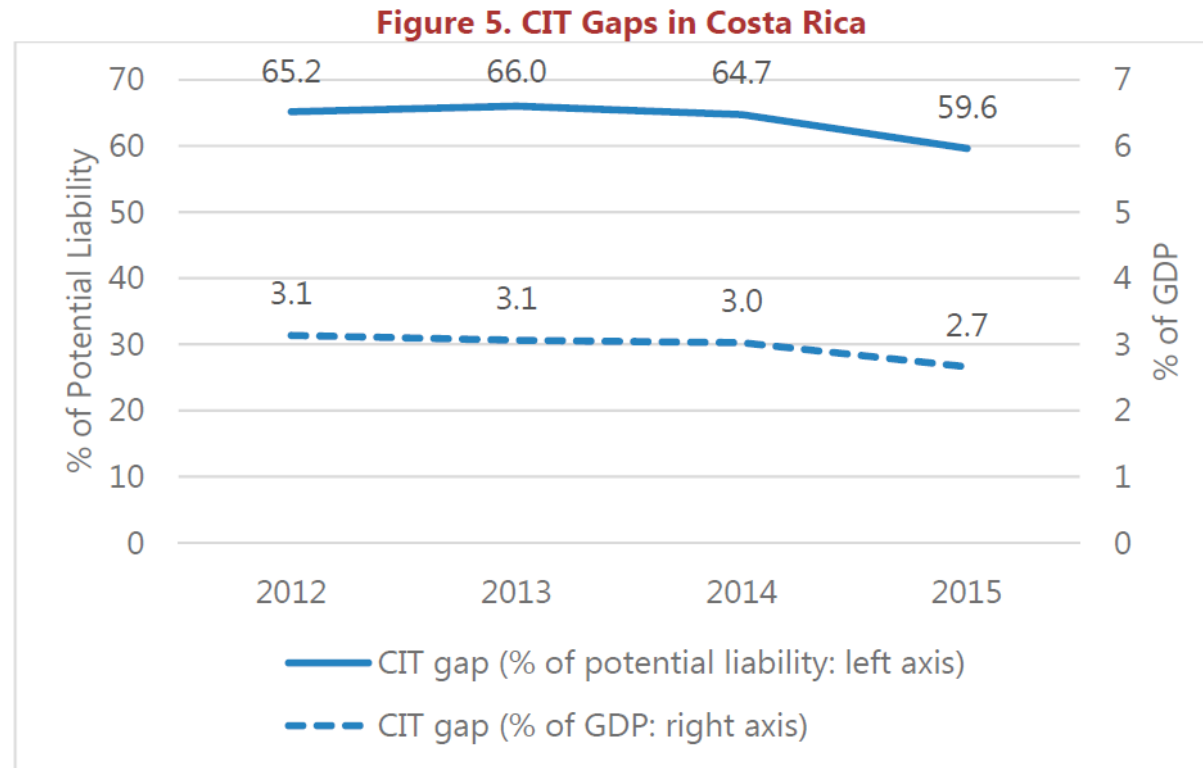
Figure 6. Potential CIT Base and Declared CIT Base



Source: Staff calculations.

# Results: Costa Rica CIT gap estimates

*Direct approach*

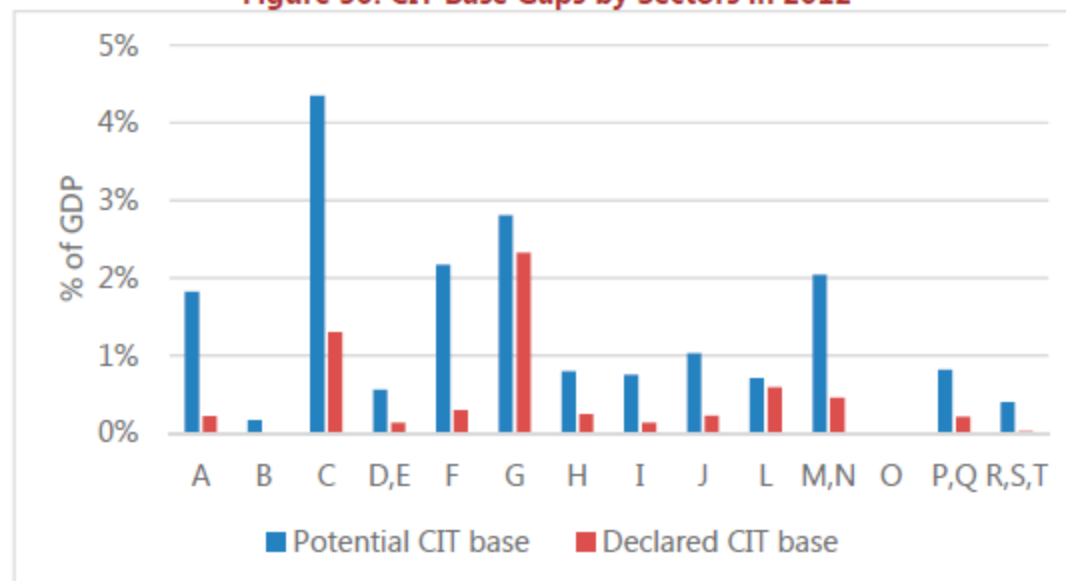


Source: Staff calculations.

# Results: Costa Rica CIT gap estimates

## Direct approach

Figure 30. CIT Base Gaps by Sectors in 2012

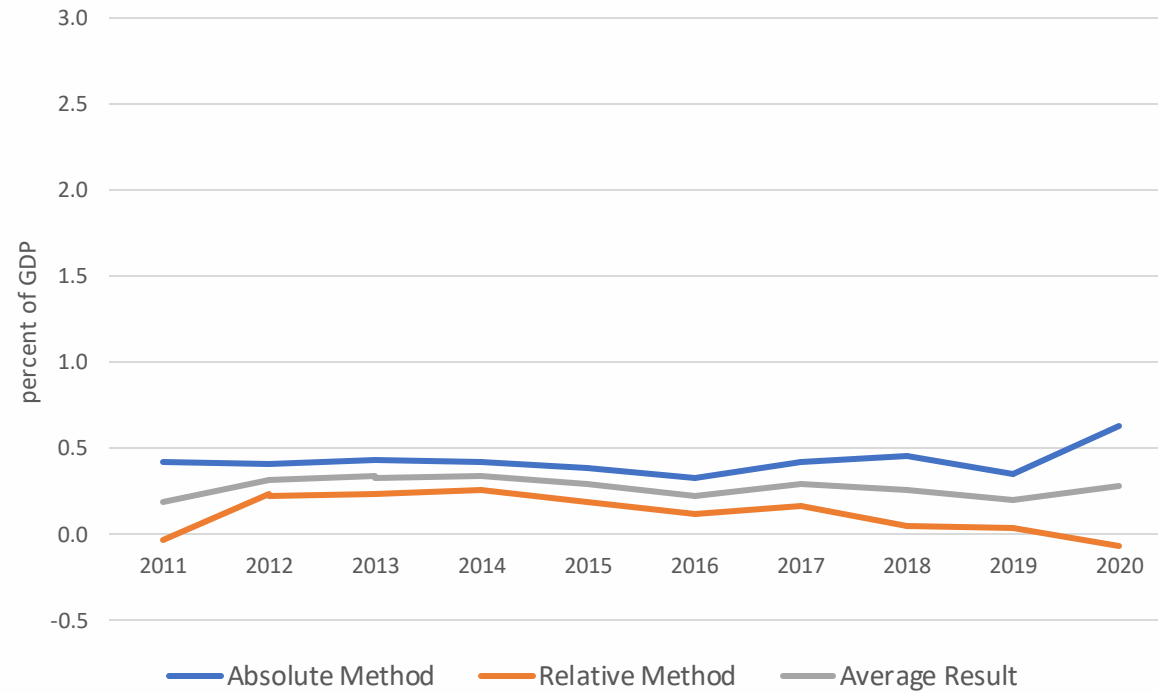


A Agriculture, forestry, fishing	H Transportation	O Public administration
B Mining	I Hotels, restaurants	P Education
C Manufacturing	J Information, communications	Q Health
D Electricity, gas	K Financial services	R Recreational services
E Water, sewerage	L Real estate	S Other personal services
F Construction	M Professional services	T Activities of households
G Trade	N Administrative, support services	

Source: Staff calculations.

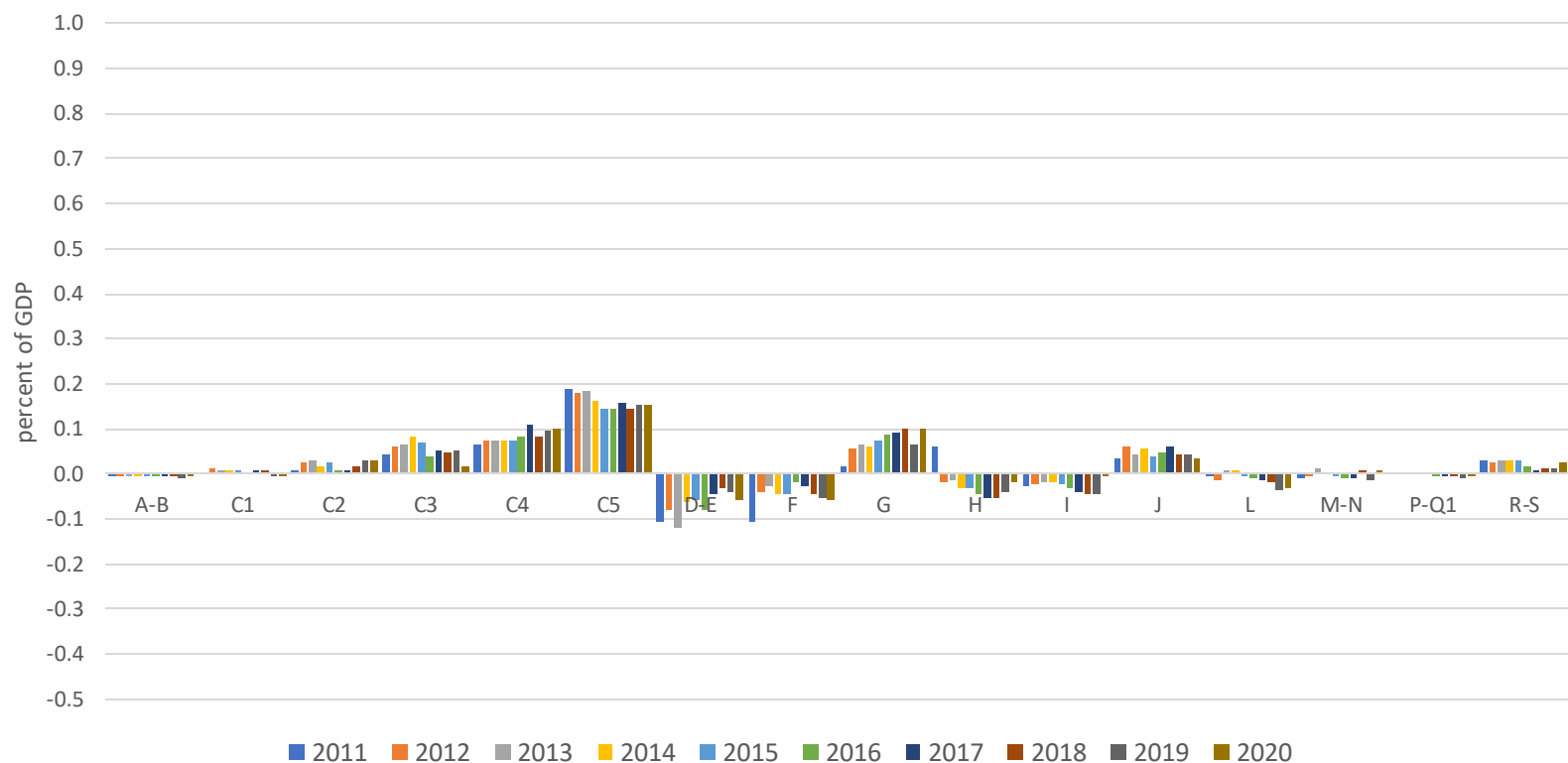
# Results: AE country CIT gap estimates

*Indirect approach*



# Results: AE country CIT gap estimates

## Indirect approach



A Agriculture, forestry, fishing	H Transportation	O Public administration
B Mining	I Hotels, restaurants	P Education
C Manufacturing	J Information, communications	Q Health
D Electricity, gas	K Financial services	R Recreational services
E Water, sewerage	L Real estate	S Other personal services
F Construction	M Professional services	T Activities of households
G Trade	N Administrative, support services	

Source: Staff calculations.

# Final comments

- ❖ Key assumption: NAs reasonably measure economic activities using conciliation techniques from various sources of data.
- ❖ Consistency between VAT gap and CIT gap top-down estimation techniques.
- ❖ Using tax returns data for some components in the estimation could bias the results (overreporting of deductions, credits, or losses) -> explore independent sources or different techniques.
- ❖ An overall CIT noncompliance estimate could be obtained in a relatively simple manner.
- ❖ The cost of producing estimates for several years is quite low.
- ❖ The top-down approach is expected to produce higher gap levels than bottom-up techniques (non-filers and non-registered gaps are usually out of the scope of bottom-up techniques).

# References

- Ueda (2018) 'Estimating the Corporate Income Tax Gap: The RA-GAP Methodology', IMF Technical Notes and Manuals 18/01.
- IMF (2018) 'Costa Rica : Technical Assistance Report-Revenue Administration Gap Analysis Program-Tax Gap Analysis for General Sales and Corporate Income Tax', IMF Country Report No. 18/124.

Gross operating surplus (S11: Non-financial corporations)		million colones	B2b	5,864,935	25.09%
GOS (S11)					25.1
Gross operating surplus (S11) - RE					472,524
					2.02%
					2.0
Gross operating surplus (S11) - RD					5,392,411
					23%
					23.1
					91.9%
<b>[Adjustments for property incomes in national Ajustes por rentas de la propiedad en las cuentas nacionales]</b>					
Receipts of:		Recursos			
Interest (D.41)		BCCR, CEI	million colones	D41	257,390
Distributed income of corporations (D.42)		BCCR, CEI	million colones	D42	152,347
Other investment income (D.44)		BCCR, CEI	million colones	D44	47,076
Rent (D.45)		BCCR, CEI	million colones	D45	1,002
Total receipts of property incomes					457,814
					1.96%
Payment of:		Empleos			
Interest (D.41)		BCCR, CEI	million colones	D41	382,455
Other investment income (D.44)		BCCR, CEI	million colones	D44	0
Rent (D.45)		BCCR, CEI	million colones	D45	6,262
Total payments of property incomes					388,718
					1.66%
<b>[Other positive adjustments for FAP]</b>					
Receipt of miscellaneous current transfer (D.75)		BCCR, CEI	million colones	D75	37,517
Receipt of capital transfer (D.99)		BCCR, CEI	million colones	D9r	8,478
Foreign source income					-
Holding gains/losses					-
Total positive adjustments					45,994
					0.2%
<b>[Other negative adjustments for FAP]</b>					
Other current taxes (D.59)		BCCR, CEI		D59	7,476
Social benefit (D.62)		BCCR, CEI		D62	172,086
Non-life insurance (D.71)		BCCR, CEI		D71	61,913
Payment of miscellaneous current transfer (D.75)		BCCR, CEI	million colones	D75	179,993
Payment of capital transfer (D.99)		BCCR, CEI	million colones	D9p	13,770
Depreciation of assets		BCCR, CCF	million colones		1,011,775
Purchases of goods and services for capital formation		BCCR, COU	million colones		131,965
Other deductions/allowances for financial accounting					371,214
Total negative adjustments					1,950,191
					8.34%
Potential FAP					3,557,311
					15.2%
					15.2



Potential FAP				3,557,311
				15.2%
				15.2
<b>[Non-taxable income and denied cost for taxable income]</b>				
Non-taxable income	D101 C34			1,336,171
Non-taxable income [digital]	D101 C34			692,899
Non-taxable income - C29 [digital]	D101S C29			327,689
Non-taxable income - interest [digital]	D101S C100			21,947
Non-taxable income - dividend [digital]	D101S C101			44,492
Non-taxable income - others [digital]	D101S C102			261,249
Interest [digital]	D101S C25			272,871
Dividends [digital]	D101S C26			39,407
Non-taxable income [non-digital]				643,273
Non-taxable income excluding return and discount [non-digital]				304,219
Non-taxable income - interest [non-digital]				11,527
Non-taxable income - dividend [non-digital]				59,809
Non-taxable income - others [non-digital]				232,883
Interest [non-digital]	D101 C30			143,317
Dividends [non-digital]	D101 C31			52,972
[-] Non-taxable income				631,908
				2.7%
				2.7
[+] Non-deductible cost	D101S C41	million colones		371,214
				1.6%
				1.6
[-] Profit under simplified regime	Revenue simp	million colones		4,139
				0.0%
				0.0
Potential C-NTB				3,292,478
				14.1%
				14.1
<b>[Current year loss]</b>				
Current year loss	D101 Negative TI			1,070,346
				4.6%
				4.6
Potential C-TB		million colones		4,362,824
Potential C-TB		% of GDP		18.7%
Potential C-TB		% of GDP		18.7
Deduction for carried over loss	Deducción por pérdida arrastrada			22,390
				0.1%
				0.1
Potential TB				4,340,434
Potential TB				18.6%
Potential TB				18.6
Effective CIT rate to TB				27.8%
Potential CIT liability before subtracting credits				1,204,473
CIT credits				95,993
Potential CIT liability				1,108,481
				4.7%
				4.74



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# **Personal Income Tax Gap under top-down techniques: some considerations**

Patricio Barra  
Technical Assistance Advisor  
Fiscal Affairs Department

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## DISCLAIMER

- ❖ The IMF's RA-GAP so far does not provide top-down estimates for PIT gap, nor does it recommend them as it does in the case of VAT and CIT gaps.
- ❖ However, we have recently developed technical assistance activities to review the potential reliability and limitations of programs developed under this approach in some countries.

# Approaches for potential PIT base

- (a) Employment surveys
- (b) Household expenditure surveys
- (c) National Accounts – Compensation to Employees (wages and salaries)
- (d) Businesses/Economic census

# Approaches for potential PIT base

## (a) Employment surveys

- ❖ Usually offer monthly or quarterly data on the workforce, occupation, unemployment, and personal income sources.
- ❖ Using different techniques (expansion factors), sample results can be extended to estimate national values.

## Considerations:

- ❖ Focus on employment questions
- ❖ High-income non-respondents
- ❖ Respondents may not disclose all sources of income (capital gains, interests, etc.)
- ❖ Comparability on income concepts
- ❖ Test potential income distribution

# Approaches for potential PIT base

## (b) Household expenditure surveys

- ❖ Provides information on the household budget, specifically on the distribution, amount and structure of income and expenditure.

### Considerations:

- ❖ Non-respondent bias could be reduced, but not eliminated
- ❖ Better revealed sources of spending
- ❖ Double-checking expenses versus income questions
- ❖ Available every 3-5 years
- ❖ Expansion factors from National Accounts
- ❖ Test a better potential distribution

# Approaches for potential PIT base

## (c) National Accounts – Compensation to Employees and GOS

- ❖ Provides information on employee compensation (wages and salaries), social security contributions. Additionally, it may be necessary to add a portion of mixed income or GOS representing individual agents with income subject to PIT.

### Considerations:

- ❖ Aggregated, they do not provide potential distribution
- ❖ Not easy to estimate GOS or mixed income related to PIT obligations
- ❖ Differences in GOS quasi-corporations with accounting profits taxable under PIT (GOS more similar to EBITDA, GOS includes losses for the year)
- ❖ Does not require expansion (it is an upper bound)

# Distribution challenges

**In most countries, the PIT is designed with a scale of progressive rates**

- ❖ To estimate the collection potential, a theoretical distribution of personal income is needed.
- ❖ If the surveys identified the respondents, the respondent could be matched one by one with what they declare in tax returns, but this is obviously impossible (statistical confidentiality).
- ❖ That is why indirect ways to achieve potential distribution must be sought.
  - Use the survey distribution, amplified to the universe, calculate the potential PIT for each individual and consider the sum as the potential collection.
  - Aggregate respondents into income percentile groups or PIT brackets, calculate a representative individual (average), estimate PIT, and then amplify to obtain potential collection.



# Distribution challenges

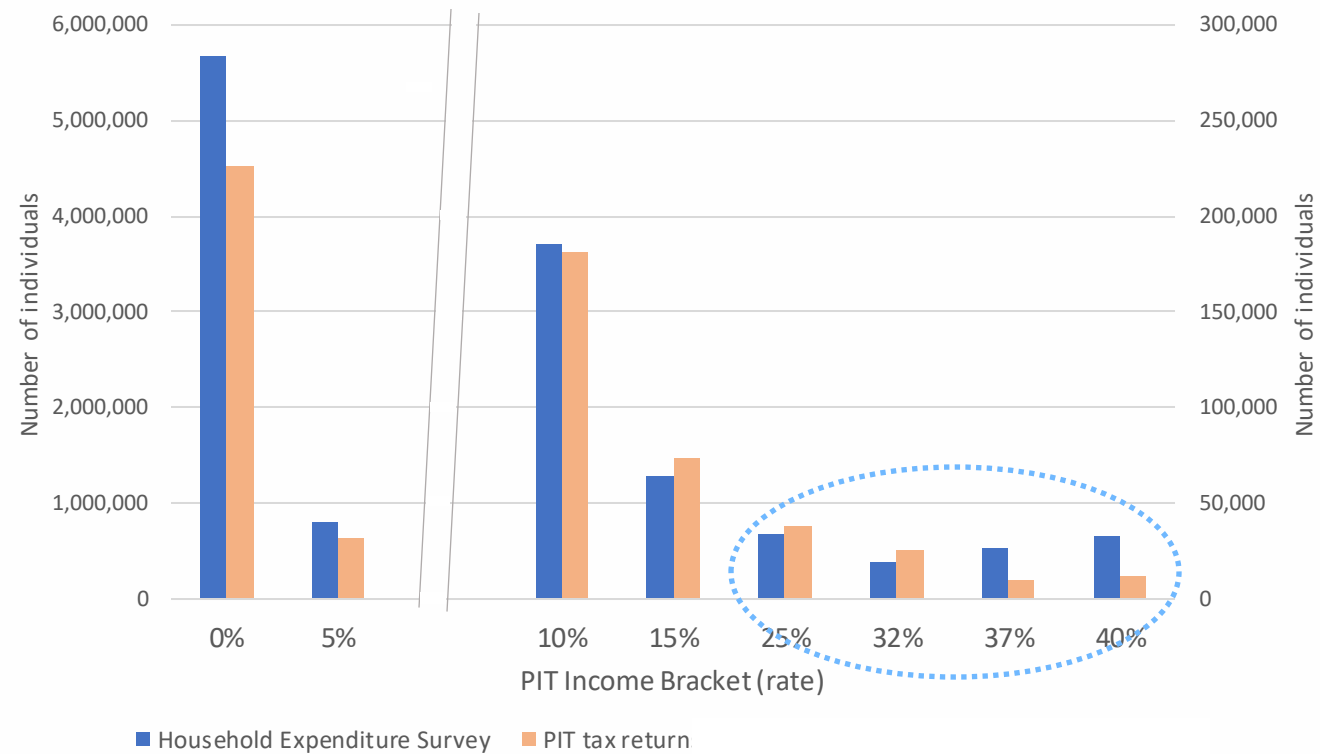
## Dominican, Republic: Reconciliation factors of incomes from the Expenditure Survey to National Accounts

Asalariados											
Decil	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	44%	45%	46%	47%	11%	40%	42%	45%	26%	43%	37%
2	48%	49%	50%	52%	21%	45%	48%	51%	32%	51%	45%
3	51%	53%	55%	58%	31%	49%	54%	57%	39%	59%	53%
4	55%	57%	60%	64%	41%	54%	60%	63%	46%	68%	61%
5	58%	61%	64%	69%	51%	58%	66%	69%	53%	76%	68%
6	62%	65%	69%	75%	61%	63%	72%	75%	60%	84%	76%
7	65%	69%	73%	81%	71%	67%	78%	81%	67%	92%	84%
8	69%	73%	78%	86%	81%	72%	84%	88%	74%	100%	91%
9	72%	77%	83%	92%	91%	76%	90%	94%	81%	108%	99%
10	76%	81%	87%	98%	102%	81%	96%	100%	88%	116%	107%

Ingreso Mixto											
Decil	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	48%	32%	22%	29%	33%	44%	44%	37%	42%	66%	73%
2	49%	37%	26%	33%	38%	50%	49%	44%	48%	67%	74%
3	50%	42%	29%	37%	43%	56%	54%	50%	53%	68%	75%
4	51%	47%	32%	42%	49%	63%	59%	57%	58%	69%	76%
5	52%	51%	35%	46%	54%	69%	64%	64%	63%	70%	77%
6	53%	56%	39%	51%	60%	75%	69%	70%	68%	71%	78%
7	54%	61%	42%	55%	65%	82%	75%	77%	73%	72%	79%
8	55%	66%	45%	60%	71%	88%	80%	83%	78%	73%	80%
9	56%	71%	48%	64%	76%	94%	85%	90%	83%	74%	81%
10	57%	75%	52%	69%	82%	101%	90%	96%	89%	75%	82%

# Distribution challenges

## Chile: PIT Gap Estimation in Number of Taxpayers - 2010



# Final comments

- ❖ Key assumption: Economic Surveys could capture potential individuals' incomes and its distribution.
- ❖ Bias derived from high-income non-respondents, respondents may not disclose all sources of income (capital gains, interests, etc.), respondents that maintain “consistency” with tax noncompliance.
- ❖ An overall CIT noncompliance estimate could be obtained in a relatively simple manner.
- ❖ The cost of producing estimates for several years is quite low.
- ❖ The top-down approach is expected to produce higher gap levels than bottom-up techniques (non-filers and non-registered gaps are usually out of the scope of bottom-up techniques).