



**FISCAL AFFAIRS**

# **Top-down approach to estimate VAT gap - I**

**ATI TAX GAP WORKSHOP**

**MARCH 19, 2024**

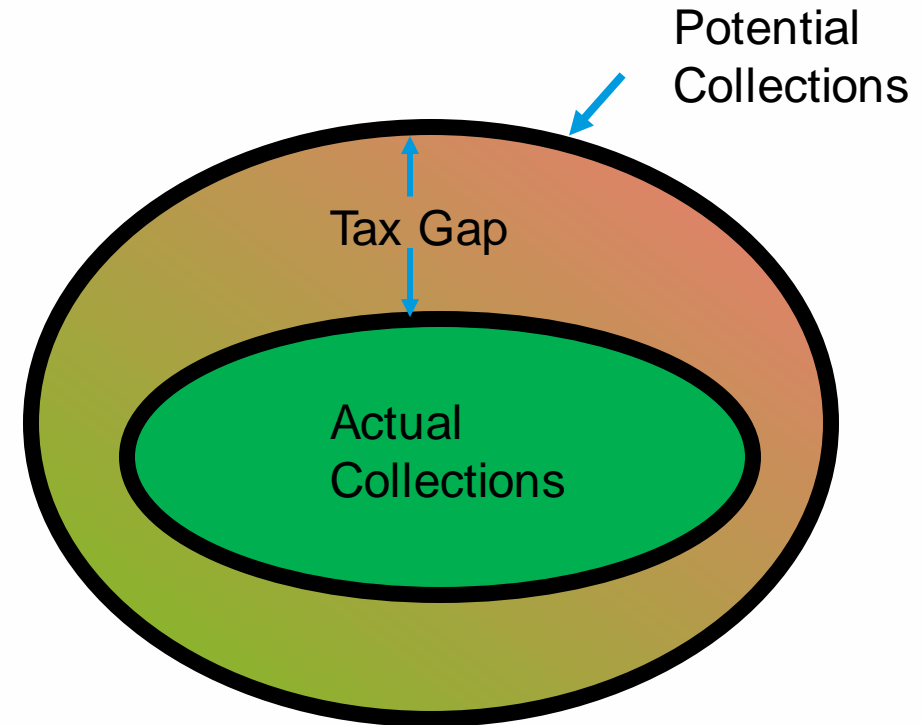
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# What is the VAT gap?

# Roughly defining the Tax Gap

A simple definition for the tax gap is that it is the difference between potential collections and actual collections

- This definition, however, is too simple:
  - What is meant by potential collections?
  - What is meant by actual collections?
- The answer to these questions can dramatically change the nature of what it is we are measuring.



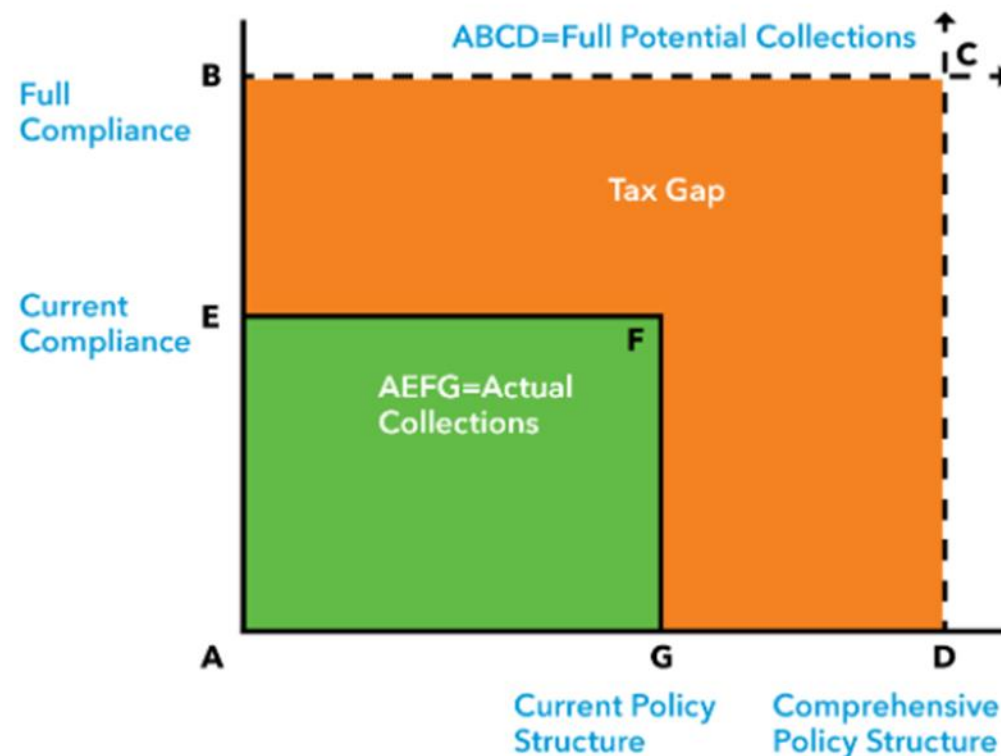
# Key definitions

Potential Collections (ABCD): the theoretical maximum tax revenue that could be collected.

Actual Collections (AEFG): tax revenue that was actually collected.

Comprehensive Policy Structure: a VAT policy structure where all goods and services are subject to the standard VAT rate.

Current Policy Structure: current VAT regulations that provide for reduced rates, exemptions, and other rules that alter the Comprehensive policy structure.

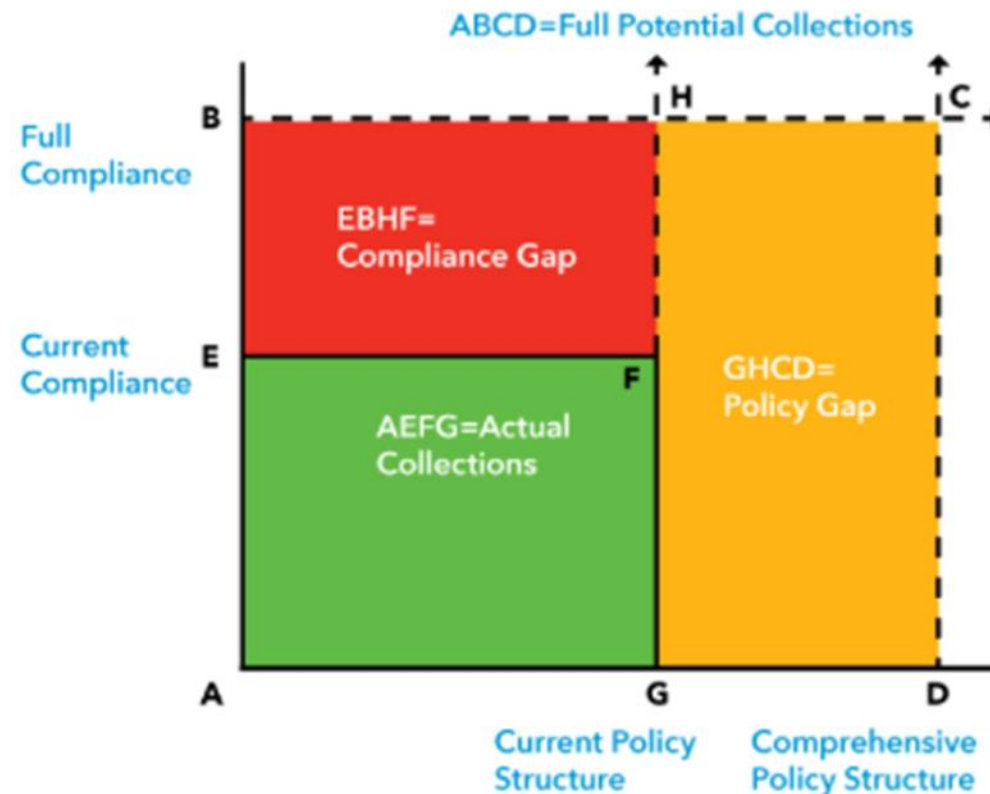


The vertical axis measures compliance and the horizontal axis measures policy structure.

# Breaking down the Tax Gap (1/2)

Compliance Gap (EBHF): the amount of potential tax not realized under the current policy structure due to less than full compliance. This is the difference between actual VAT collected under the current policy structure and the potential VAT estimated under the assumption of full taxpayer compliance.

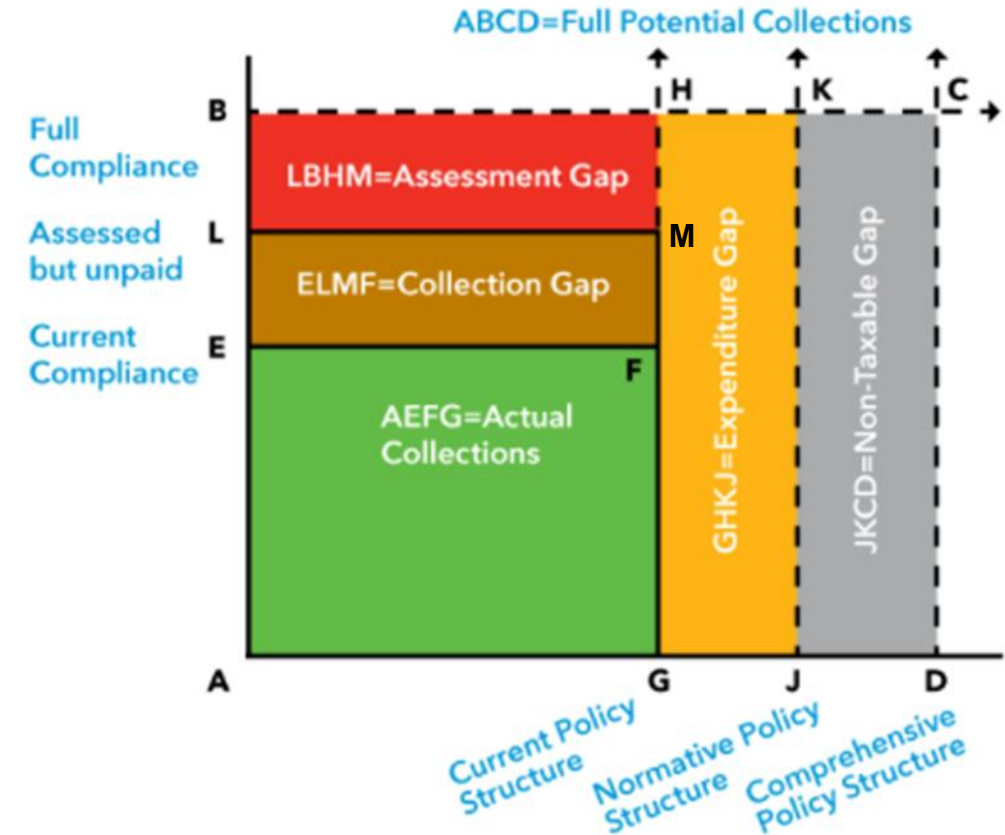
Policy Gap (GHCD): This is the difference between the potential collections under the comprehensive policy structure and potential collections under the current tax structure (assuming full compliance in both cases).



# Breaking down the Compliance Gap

The assessment gap (LBHM) measures the difference between the total amounts declared as assessed as being due versus the total potential amount of VAT which should have been declared or assessed.

The collections gap (ELMF) measures the difference between what taxpayers have declared as being due, or have had assessed as being due, and the amount of VAT collected.

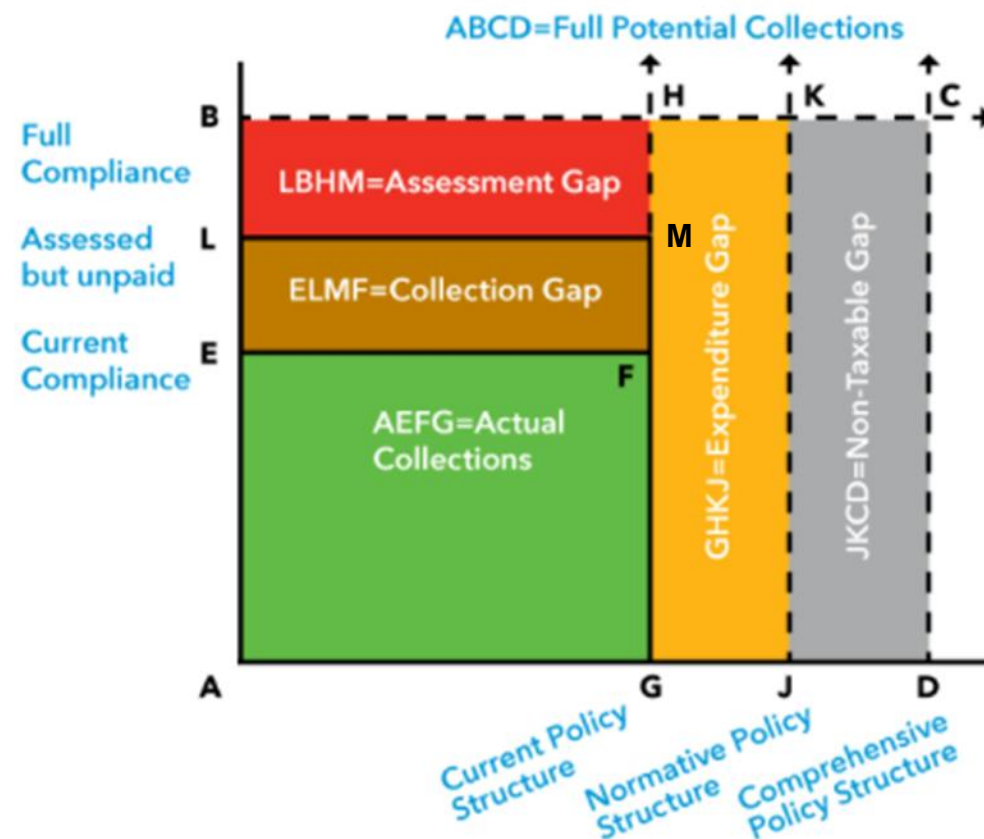


# Breaking down the Policy Gap

Normative Policy Structure captures all elements of the tax base, which could be taxed in practice, in contrast to the comprehensive base, which captures all elements taxable in theory.

Expenditure Gap is the difference between the potential VAT estimated using the normative policy framework and potential VAT estimated using the current policy framework.

Non-Taxable Gap is measured by subtracting the potential VAT estimated using the normative policy framework from the potential VAT estimated using the comprehensive policy structure.



# The Top-Down Approach



# Top-Down approach for estimating the VAT gap

- ▶ Use independent statistical data, typically from national accounts, to model a potential tax base.
- ▶ Two main approaches: production (supply) side (looking at value-added data) or consumption (demand) side (looking at commodity-data).
- ▶ The RA\_gap methodology integrates the two approaches by providing information from both the supply and demand sides.

# Qualifications to bear in mind

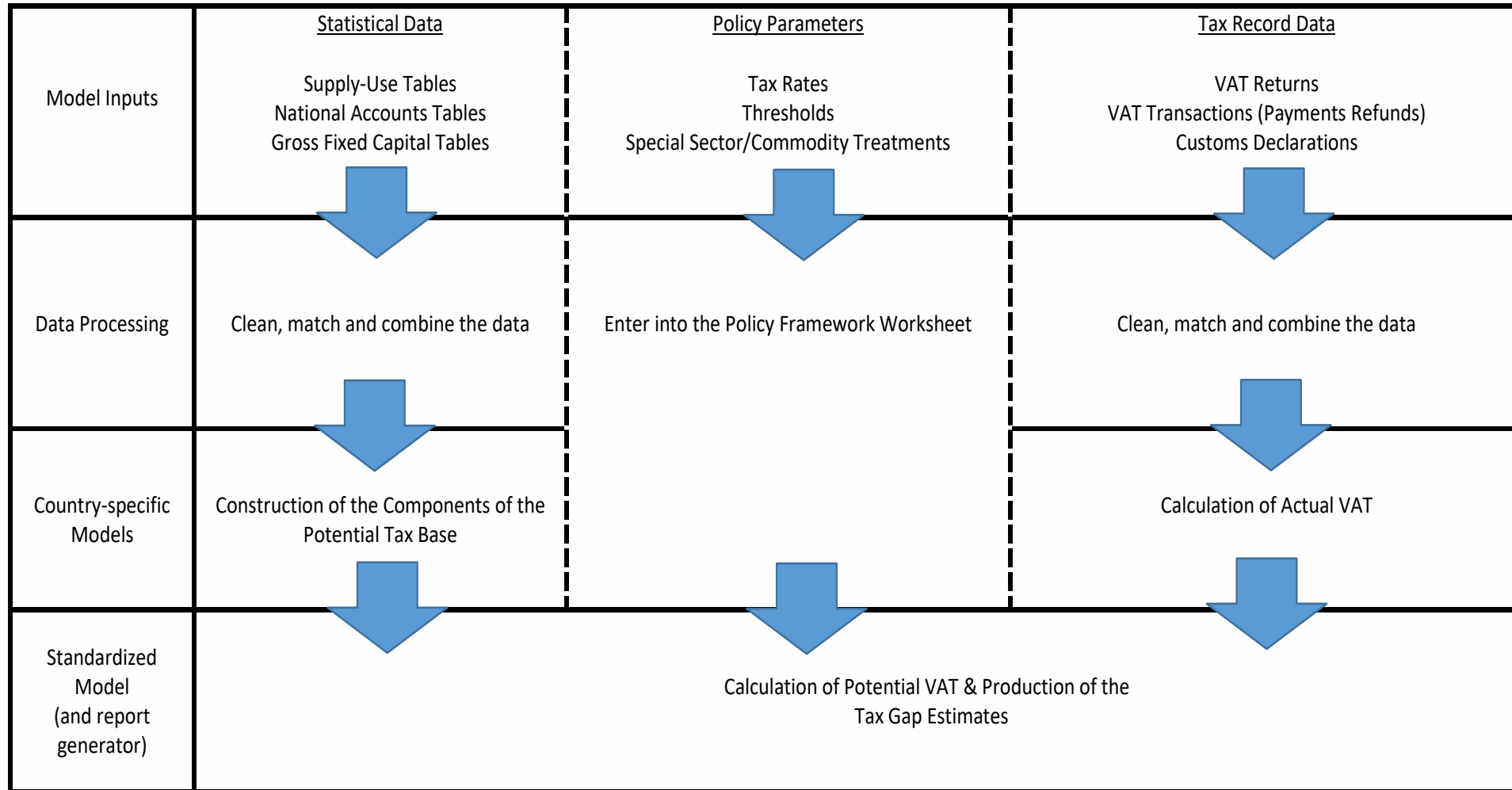
## Uncertainty (estimates not calculation)

- Potential VAT based on statistical data (Gaps in coverage of the data? National accounts definitions not always consistent with VAT definitions)
- Assumptions have to be made in the model
- Trend is more reliable than levels

## Opportunity

- Estimates overall size of compliance gap, not individual types of non-compliance; but
  - Measures all losses (e.g. underground economy), even those not yet identified; and
  - RA-GAPs sectoral decomposition aids diagnosis of risks and appropriate treatments

# RA-GAP approach to VAT gap analysis



# Potential VAT base and potential VAT

# Potential VAT base under the Comprehensive Policy Structure

- Supply side approach

$$PV\ Base = M + (O - X) - (N + I)$$

Where: M = iMports; O = Output; X= eXports; N = iNtermediate Consumption; I= Investment;

- Demand side approach

$$PV\ Base = C$$

Where: C = final Consumption

The two approaches are completely equivalent, as in the “Supply and Use table”

$$C = M + (O - X) - (N + I)$$

# Potential Base

## SUT: Supply Table

	Total supply at purchasers' prices	Trade margins	Transport margins	Taxes and Subsidies	Total supply at basic prices	Production - or - Output											Total Production	Imports	
						Agriculture, forestry and fishing	Manufacturing and other industry	Construction	Trade, transport, accommodation and food	Information and communication	Finance and Insurance	Real estate activities	Business services	Education, human health and social work	Other services	Public administration			
Supply of products																			
Agriculture, forestry and fishery products	128	1	1	2	124	87	0	0	0	0	0	0	0	0	0	0	0	87	37
Ores and minerals; electricity, gas and water	263	1	1	5	256	0	195	0	0	0	0	0	0	0	0	0	0	195	61
Manufacturing	2161	62	12	89	1998	2	1650	11	24	18	0	0	9	0	0	0	0	1714	284
Construction	261	0	0	17	244	0	7	232	3	2	0	0	0	0	0	0	0	244	0
Trade, accommodation, food & beverages; transport services	216	-64	-14	5	289	0	6	1	226	0	0	0	0	0	0	0	0	233	56
Finance and Insurance	159	0	0	0	159	0	0	0	0	0	146	0	0	0	0	0	0	146	13
Real estate services; and rental and leasing services	195	0	0	0	195	0	2	0	4	0	0	189	0	0	0	0	0	195	0
Business and production services	272	0	0	11	261	0	1	0	3	80	0	0	172	0	0	0	0	256	5
Community and social services	275	0	0	0	275	0	0	0	0	0	0	0	0	275	0	0	0	275	0
Other services	95	0	0	4	91	0	0	0	2	0	0	5	2	0	82	0	0	91	0
Public administration	168				168	0		0			0			0		168	168	168	0
Direct purchases abroad by residents	43				43	0		0				0		0		0		43	43
Domestic purchases by non-residents	0				0													0	0
<b>Total</b>	<b>4236</b>	<b>0</b>	<b>0</b>	<b>133</b>	<b>4103</b>	<b>89</b>	<b>1861</b>	<b>244</b>	<b>262</b>	<b>100</b>	<b>146</b>	<b>194</b>	<b>183</b>	<b>275</b>	<b>82</b>	<b>168</b>	<b>3604</b>	<b>499</b>	

# Potential Base

## SUT: Use Table

Use of products	Total Use at purchasers prices	Total Intermediate Consumption	Intermediate Consumption/Demand											Exports	Final Consumption Expenditure	Total gross capital formation	Gross Capital Formation		
			Agriculture, forestry and fishing	Manufacturing and other industry	Construction	Trade, transport, accommodation and food	Information and communication	Finance and Insurance	Real estate activities	Business services	Education, human health and social work	Other services	Public administration				Gross fixed capital formation	Changes in inventories	Acquisition less disposals of valuables.
Agriculture, forestry and fishery products	128	88	3	71	0	3	1	2	1	2	3	0	2	7	30	3	2	1	
Ores and minerals; electricity, gas and water	263	217	3	190	1	6	3	2	1	2	5	0	4	7	40	-1	0	-1	
Manufacturing	2161	990	32	675	80	44	16	16	19	19	46	5	38	422	573	176	161	5	10
Construction	261	40	1	9	5	3	1	1	1	1	11	0	7	6	2	213	190	23	
Trade, accommodation, food & beverages; transport services	216	119	3	65	3	25	4	4	2	4	4	0	5	55	42				
Finance and Insurance	159	104	1	36	7	18	1	3	6	7	7	1	17	2	53				
Real estate services; and rental and leasing services	195	57	1	15	1	8	2	5	2	4	8	1	10	1	115	22	22	0	
Business and production services	272	222	2	70	17	15	10	18	16	19	22	9	24	9	40	1	1	0	
Community and social services	275	34	0	1	0	0	0		0	1	24	0	8	2	239				
Other services	95	10	1	1	0	1	1	1	0	1	2	0	2	0	85				
Public administration	168	2	0	0	0	0	0	0	0	0	1	0	1	0	166				
Direct purchases abroad by residents	43		0		0				0		0			0	43				
Domestic purchases by non-residents			0		0				0		0			29	-29				
<b>Total</b>	<b>4236</b>	<b>1883</b>	<b>47</b>	<b>1133</b>	<b>114</b>	<b>123</b>	<b>39</b>	<b>52</b>	<b>48</b>	<b>60</b>	<b>133</b>	<b>16</b>	<b>118</b>	<b>540</b>	<b>1399</b>	<b>414</b>	<b>376</b>	<b>28</b>	<b>10</b>
<b>Total gross value added</b>		<b>1721</b>	<b>42</b>	<b>728</b>	<b>130</b>	<b>139</b>	<b>61</b>	<b>94</b>	<b>146</b>	<b>123</b>	<b>142</b>	<b>66</b>	<b>50</b>						

# Potential VAT (PV3) under the Comprehensive Policy Structure

$$PV3_s = \underbrace{\sum_c (M_{s,c} \times \tau_c)}_{\text{Import VAT}} + \underbrace{\sum_c (O_{s,c} - X_{s,c}) \times \tau_c}_{\text{Output VAT}} - \underbrace{\sum_c (N_{s,c} + I_{s,c}) \times \tau_c}_{\text{Input VAT}}$$

where:

s= sector of economic activity;

c= Commodity;

$\tau_c$  = Standard VAT rate that applies to commodity c.



## Potential VAT (PV2) under a “basic” normative policy structure

$$PV2_s = \sum_c (M_{s,c} \times \tau_c^L) + \left[ \sum_c (O_{s,c} - X_{s,c}) \times \tau_c^L \right] \times r_s - \left[ \sum_c (N_{s,c} + I_{s,c}) \times \tau_c^L \right] \times r_s \times (1 - e_s) \times \eta_{s,c}$$

### Differences with the Comprehensive Policy Structure

$L$  = standard, reduced and zero rates (equal to zero for exempted commodity),

$\eta_{s,c}$  = the proportion of input tax credits for commodity  $c$  by sector  $s$  allowed to be claimed,

$e_s$  = the proportion of output for a sector which is exempt output, and

$r_s$  = the proportion of output for a sector produced by registered businesses.

# The universal model is a little more complex

The universal model is designed to deal with more complex policy variations, such as

- Withholding\*
- reverse charge\*\*
- differential rates for imported goods vs domestic goods

It also takes advantage of some of the richness of the supply use tables to differentiate between

- three different types of output – market output, output for own use, and other non-market output,
- different types of investment – fixed capital goods, changes in stock, other investment, and
- exports versus re-exports.

\*Withholding: when taxpayer A is required to withhold the VAT due on their taxable purchases from taxpayer B and submit the VAT directly to the revenue authority instead of paying it to taxpayer B.

\*\*Reverse Charge: where a taxpayer is required to self-assess and submit VAT on an otherwise exempt purchase.

# Actual VAT

## Key definitions

**Accrued amounts (accruals):** Amounts paid, received, or declared at a given point in time aligned (accrued back) to the tax period the economic activity relates to.

**Cash amounts:** Amounts (payments or refunds) aligned to the date where the transfer of funds takes place (the transaction date).

**Assessment data:** All types of assessments made by the authorities or self-declared by taxpayers – that determine how much a taxpayer owes as a payment or is set to receive as a refund.

**Transaction data:** Data on payments (from taxpayers to government) and refunds (from government to taxpayers).

# Calculating accrued VAT

- VAT collected to date (on accrual basis) for sector  $s$ , for tax periods  $t$  in year  $y$

$$\begin{aligned} &= \sum_s \sum_{t \in y} \text{VAT on imports} + \sum_s \sum_{t \in y} \text{VAT payments by taxpayers} \\ &\quad + \sum_s \sum_{t \in y} \text{excess credits used as payment} - \sum_s \sum_{t \in y} \text{Net VAT creditable} \end{aligned}$$

- Excess credits used as payment calculation:
  - ▶ if the excess credit carried forward exceeds the amount of positive VAT due, then the amount of excess credit used as payment is equal to the amount of positive VAT due, otherwise if the excess credit available is less than the amount of tax due, the amount of excess credit used as payment is the full amount available.
- In the long run, cash-based VAT revenues should average out with the accrued values (ignoring penalties and interest).

## Actual VAT measures (1/2)

Measures	Use
<b>Net VAT revenue, official (AV0):</b> VAT revenue net of refunds, published officially by the tax authorities.	It is used as a benchmark for other measures.
<b>Net VAT revenue, cash (AV1):</b> VAT revenue net of refunds, calculated using transaction data aligned to the <i>date of the transaction</i> .	This is the basic cash-based measure, which is used as a general operational performance indicator.
<b>Net VAT revenue, accrual (AV2):</b> VAT revenue net of refunds, calculated using transaction data aligned to the <i>date of economic activity</i> .	This is also used as a general performance indicator.

## Actual VAT measures (2/2)

Measures	Use
<b>Net VAT assessed (AV3):</b> VAT payable net of VAT creditable, calculated using <i>assessment data</i> aligned to the <i>date of economic activity</i> .	The collection gap is equal to AV3 minus AV4.
<b>Net VAT accrued (AV4):</b> VAT revenue including excess credits used as payment and net of VAT creditable, calculated using <i>transaction and assessment data</i> aligned to the <i>date of economic activity</i> .	VAT gap is equal to Potential VAT minus AV4.

# Main Results



# Summing up

To measure the VAT gap, as illustrated earlier we need a model to estimate three versions of potential VAT (PV), using:

1. the **current** tax structure, which we label **PV1**.
2. a **normative** tax structure, which we label **PV2**.
3. the **comprehensive** tax structure, which we label **PV3**.

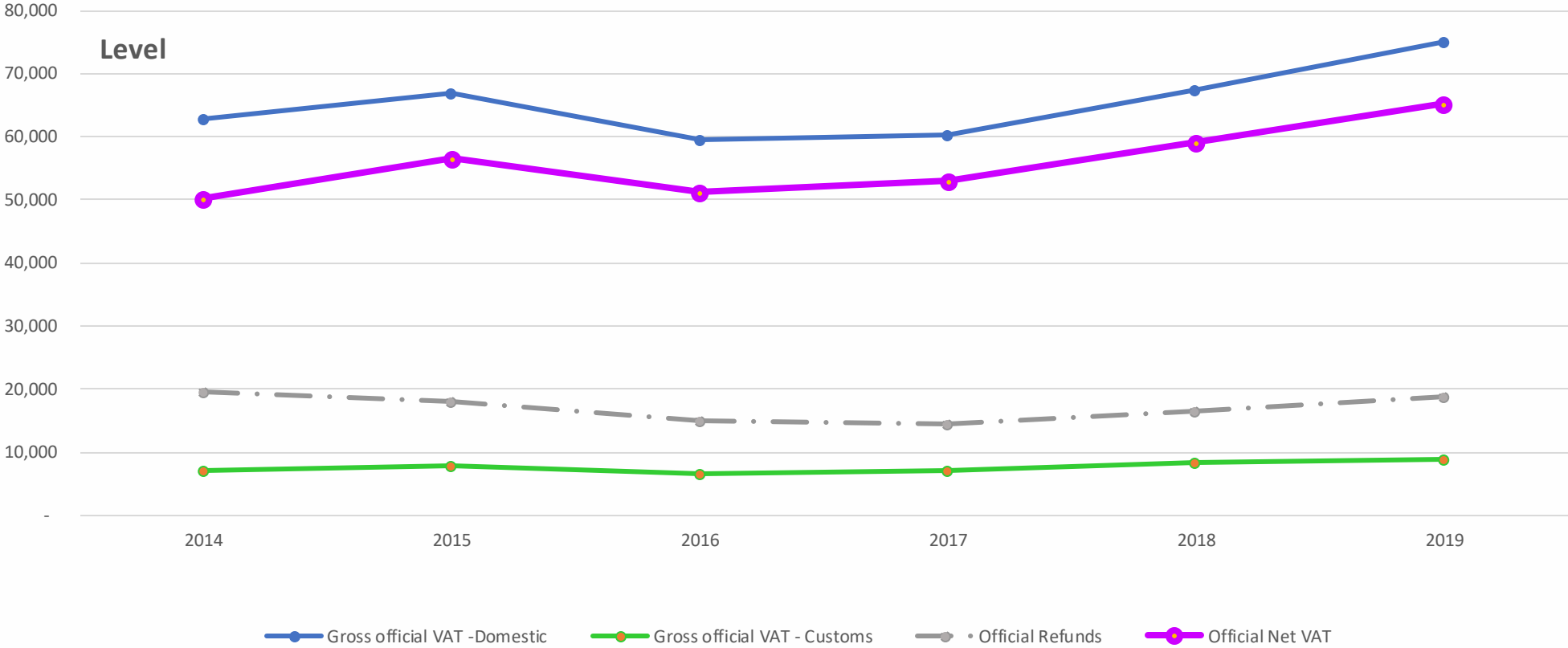
We also need data on the amount of VAT assessed, and the VAT collected against those assessments (**AV3, AV4**)

With all of this we can then determine:

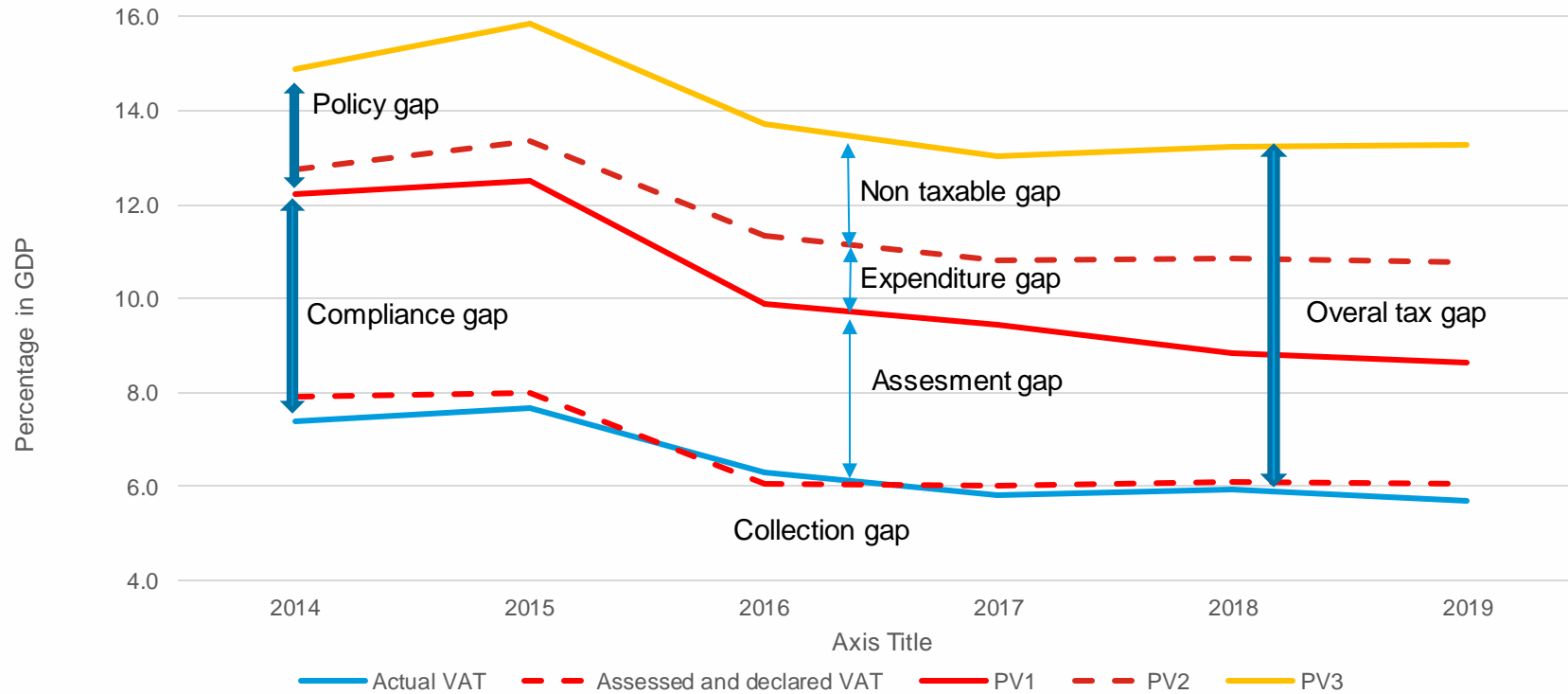
- the tax gap (**PV3 – AV4**)
- the policy gap (**PV3 – PV1**)
  - non-taxable gap (**PV3 – PV2**)
  - expenditure gap (**PV2 – PV1**)
- the compliance gap (**PV1 – AV4**),
  - assessment gap (**PV1 – AV3**)
  - collection gap (**AV3 – AV4**)

And, of course, we need sectoral information for all these variables in order to break our gap down by sector.

# Net official VAT Breakdown



# VAT gap components



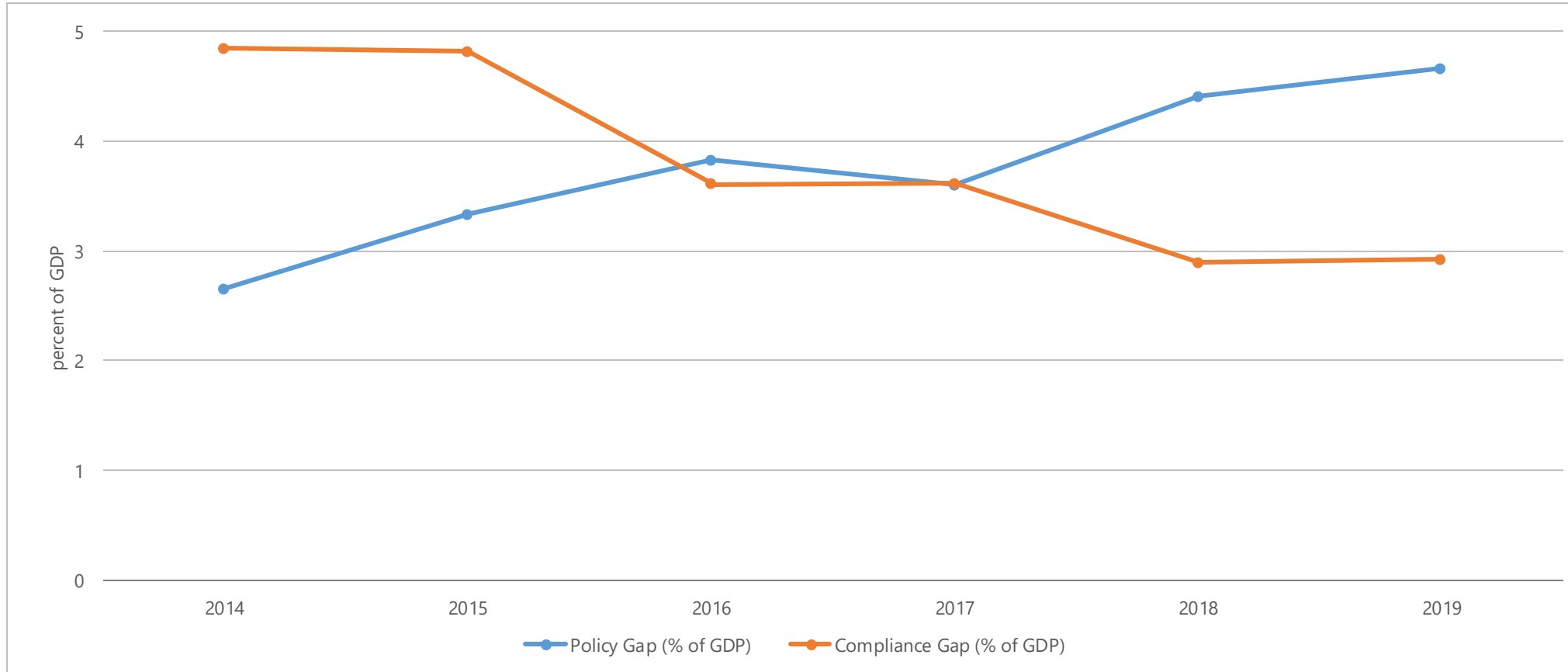
Where:

PV1 = potential VAT with current framework and no compliance gap

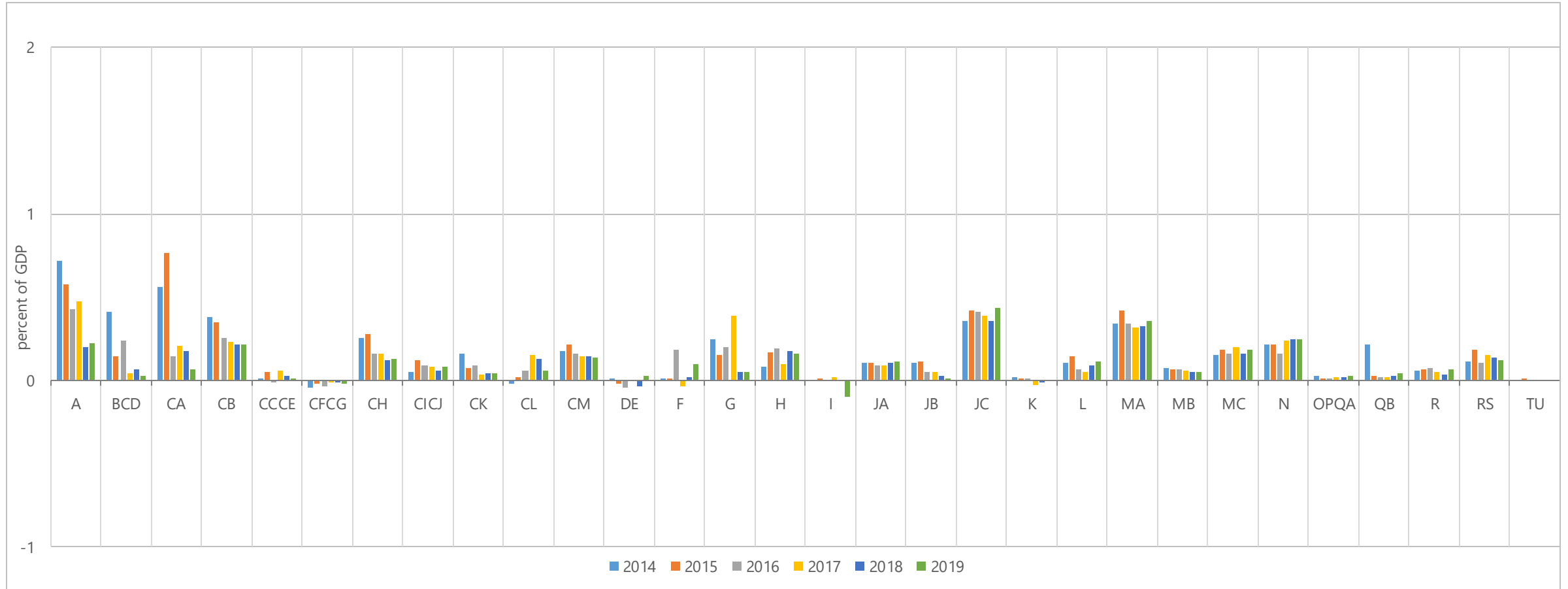
PV2 = potential VAT with no expenditure gap

PV3 = potential VAT with no policy gap

# VAT policy and compliance gap
























# Breakdown of VAT compliance gap by sector



## Now, download the model files to your laptop!

- ❖ From the shares folder for participants or from your email download the next files for the country “Taxovia” to be used in the afternoon practical session:

 Statistics	 	3/18/2024 5:47 AM	File folder	
 A-Model_Structure_v23	 	3/15/2024 2:31 PM	Microsoft Excel W...	29 KB
 B-Policy_Parameters_v23	 	3/15/2024 4:25 PM	Microsoft Excel W...	96 KB
 C-Tax_Base_Adjustment_Parameters_v23	 	3/11/2024 10:21 AM	Microsoft Excel W...	630 KB
 D-Data_Inputs_v23	 	3/15/2024 2:34 PM	Microsoft Excel W...	916 KB
 E-Potential VAT Model_v23	 	3/15/2024 4:25 PM	Microsoft Excel Bi...	2,389 KB
 F-VAT_Gap_Reports_v23	 	3/15/2024 4:25 PM	Microsoft Excel Bi...	2,549 KB

- ❖ Create a folder in a root drive C:/ or D:/ in with all those files in your laptop

**Thank you!**

**Back slides**



# Excess credits used as payments

If this data is not readily available (and it rarely is), then it must be calculated.

The calculation is fairly straightforward, but has to be performed on a taxpayer by taxpayer basis, for each tax period

For this calculation we need to use:

- A = net VAT due, and B = excess credits carried forward

Excess credits Used as Payments =

if  $A > 0$  and  $B > 0$   
then  
    if  $A \geq B$   
        then B  
        else A  
otherwise if either  $A \leq 0$  or  $B \leq 0$   
then zero

A	Agriculture, forestry and fishing
BCD	Mining and quarrying and manufacture of coke, and refined petroleum products
CA	Manufacture of food products, beverages and tobacco products
CB	Manufacture of textiles, apparel, leather and related product
CCCE	Manufacture of wood and paper products printing and chemicals
CFCG	Pharmaceutical products rubber and plastic
CH	Manufacture of basic metals and fabricated metal products, except machinery and equipment
CICJ	Manufacture of computer electronic, optical products and electrical equipment
CK	Manufacture of machinery and equipment n.e.c.
CL	Manufacture of transport equipment
CM	Other manufacturing, and repair and installation of machinery and equipmen
DE	Electricity, gas, water supply and waste management
F	Construction
G	Wholesale and retail trade; repair of motor vehicles, motorcycles, household and personal property
H	Transportation and storage
I	Accommodation and food service activities
JA	Publishing, audiovisual and broadcasting activities
JB	Telecommunications
JC	IT and other information services
K	Financial and insurance activities
L	Real estate activities
MA	Legal, accounting, management, architecture, engineering, and other technical activities
MB	Scientific research and development
MC	Other professional, scientific and technical activities
N	Administrative and support service activities
OPQA	Public administration education and Health
QB	Residential care and social work activities
R	Arts, entertainment and recreation
RS	Entertainment and other services activity
TU	Activities of households as employers and extraterritorials organization