

# A (brief) introduction to VAT gap modelling

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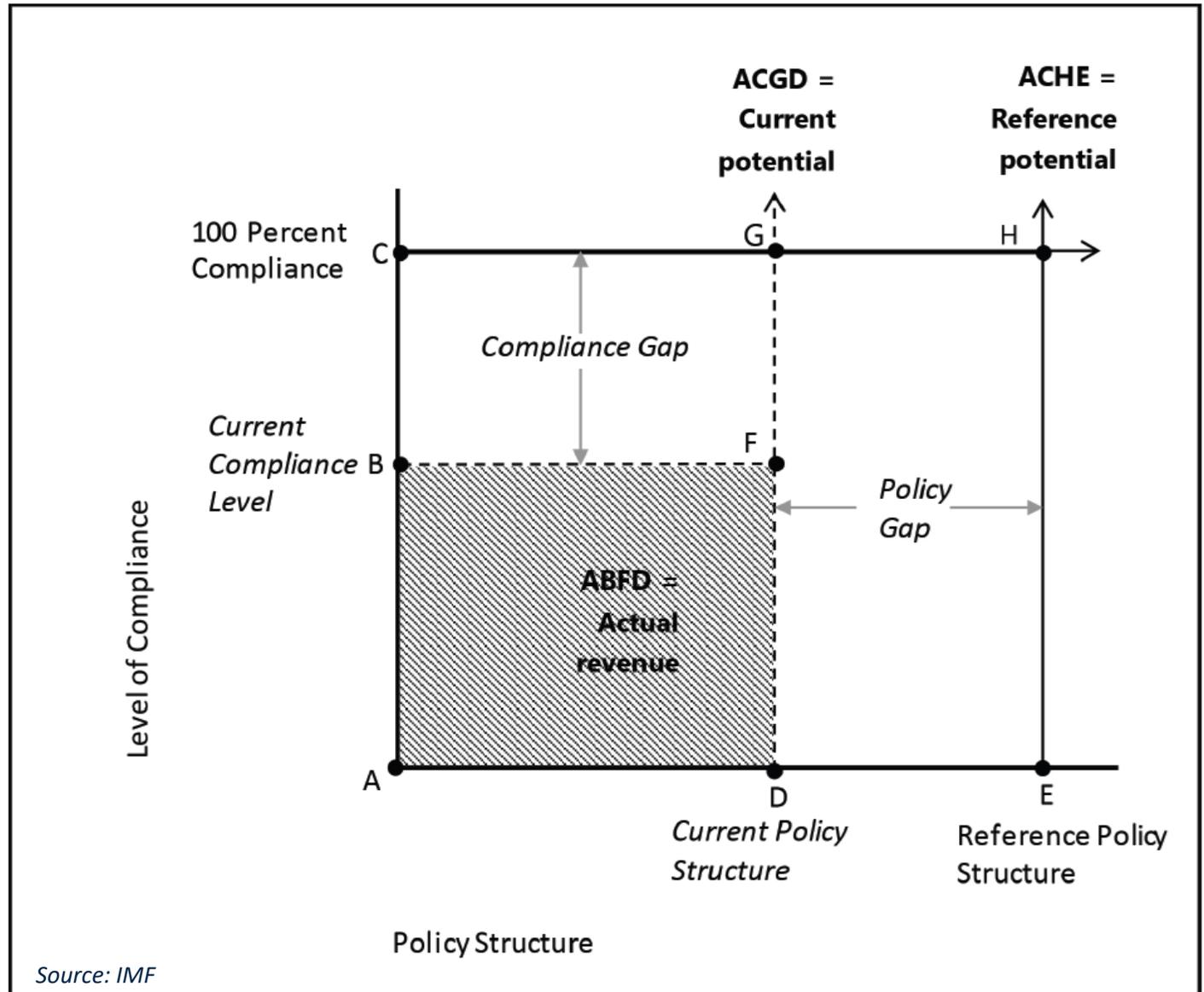


# What is the VAT gap?

**Total VAT gap** = “Reference potential revenue” (with standard rate applied to all consumption and 100% compliance) less actual revenue  
(ACHE - ABFD)

**Compliance gap** = “Current potential revenue” (with current policy settings) less actual revenue  
(ACGD - ABFD)

**Policy gap** = “Reference potential revenue” less “current potential revenue”  
(ACHE - ACGD)



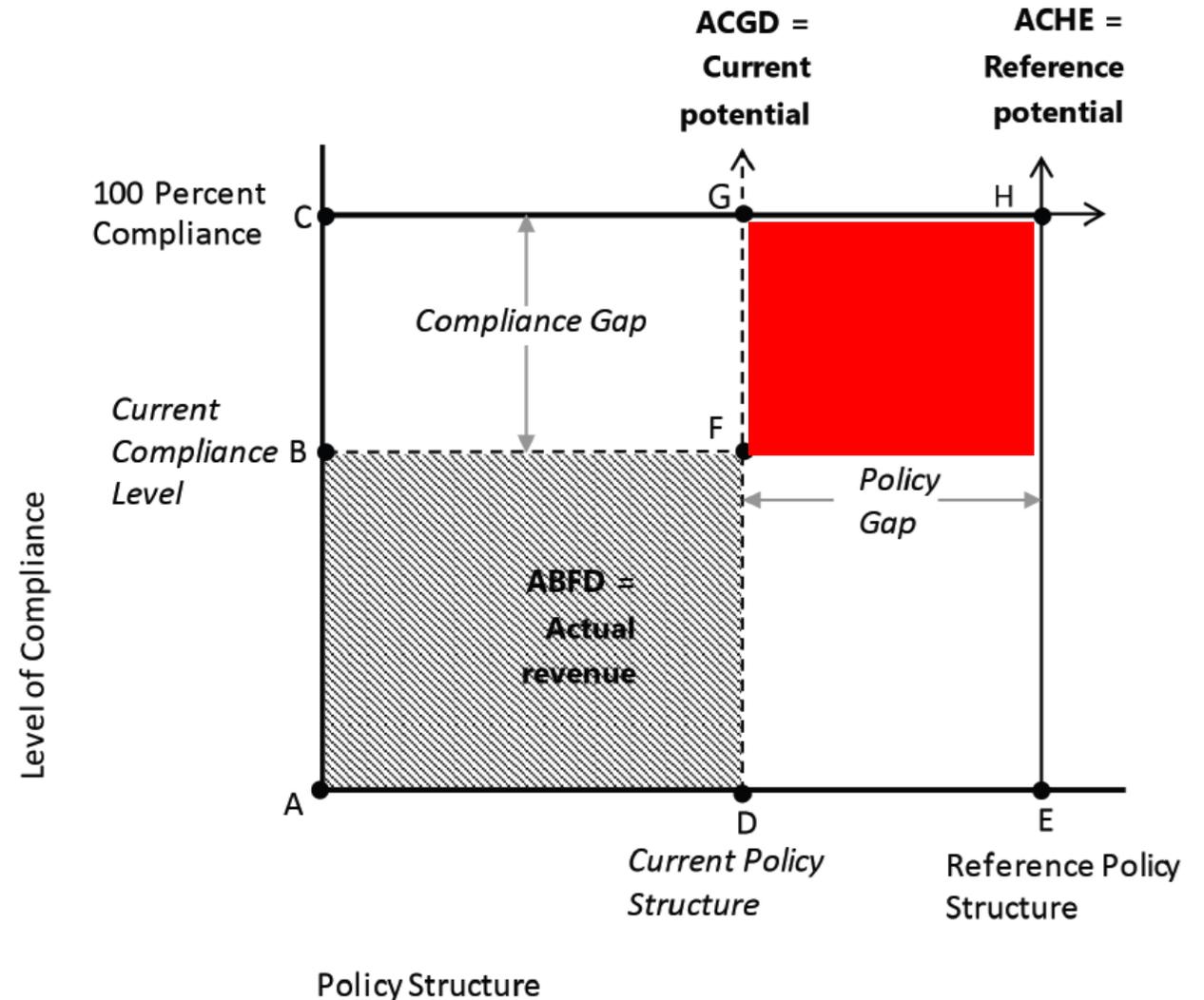
# What is the VAT gap?

**Total VAT gap** = “Reference potential revenue” (with standard rate applied to all consumption and 100% compliance) less actual revenue (ACHE - ABFD)

**Compliance gap** = “Current potential revenue” (with current policy settings) less actual revenue (ACGD - ABFD)

**Policy gap** = “Reference potential revenue” less “current potential revenue” (ACHE – ACGD)

Note that under this definition, the policy gap is calculated assuming perfect compliance, so it is greater than the revenue potential from just broadening the VAT base



Source: IMF

# VAT-GAP estimation approaches

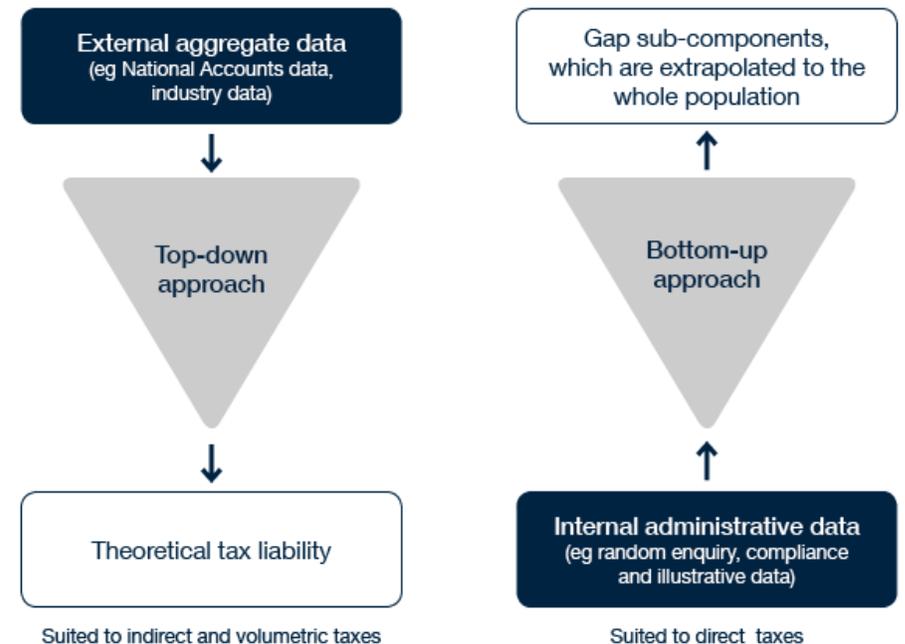
## Bottom-Up Approach:

- Utilizes audit data to identify risk factors that lead to non-compliance
- Uses statistical techniques like random audit sampling
- Extrapolates the non-compliance detected in a smaller sample to the entire population
- Provides insights into compliance behaviors and risks
- More costly to execute compared to a top-down approach

## Top-Down Approach:

- Utilizes national accounts data – Supply-Use Tables, VAT collection
- Measures the aggregate gap as the difference between estimated potential revenue and actual revenues
- Estimates total VAT gap, compliance gap and policy gap

## Bottom-up models vs Top-down models

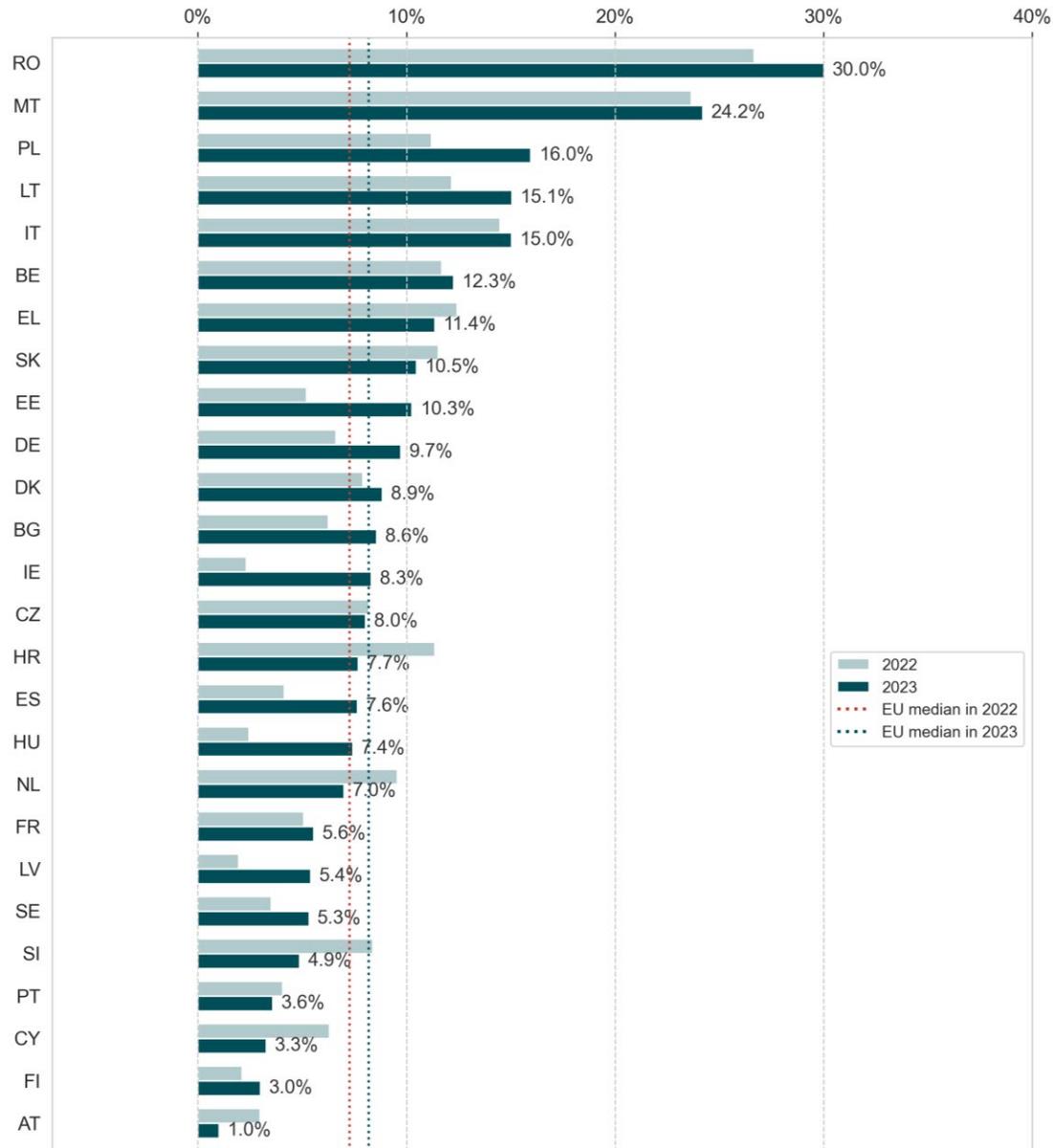


# Top-Down VAT gap model

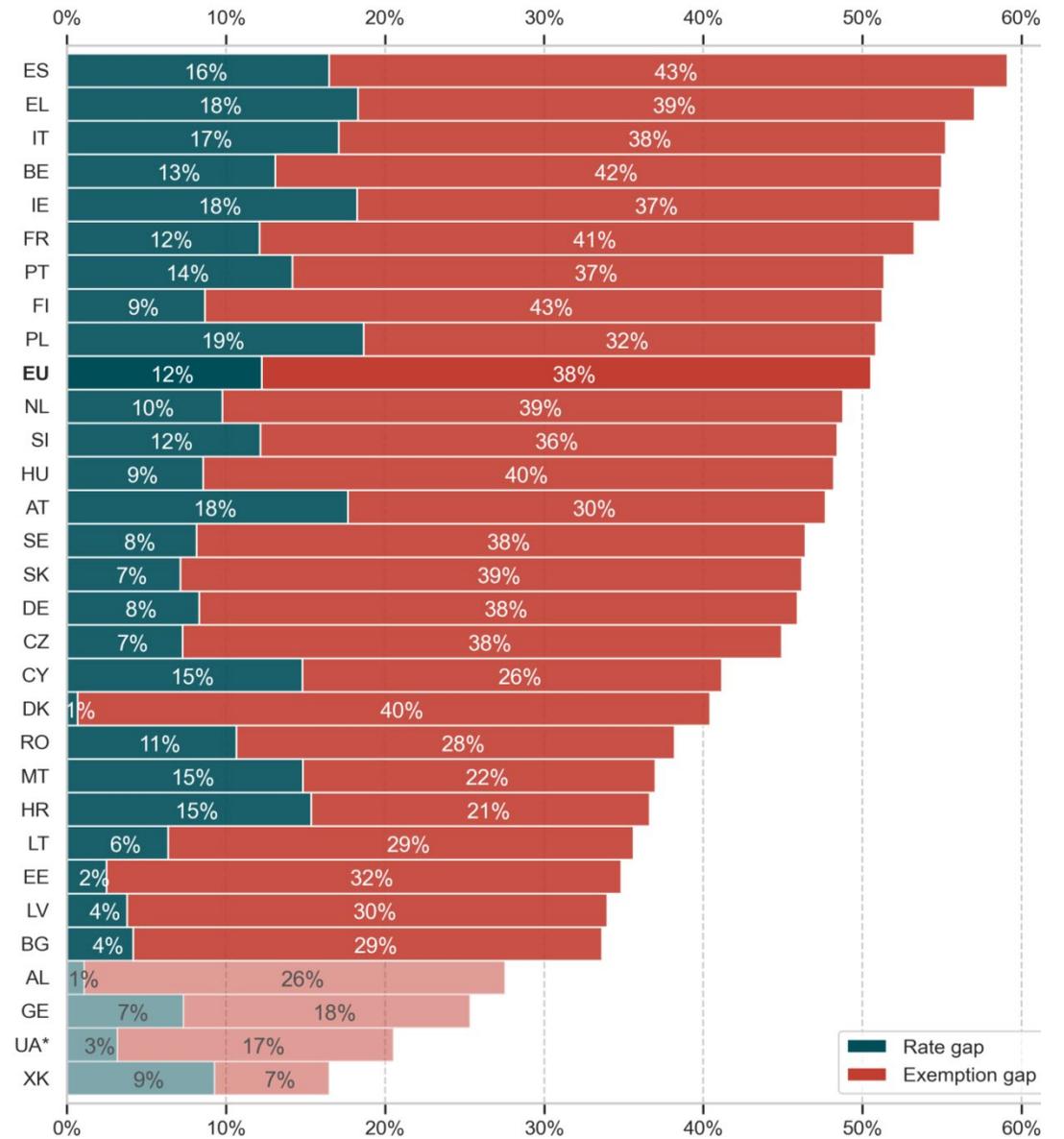
- Top-down approach generally preferred for VAT gap modelling
  - Lower cost + greater breadth of analysis
- In addition to estimating the total, compliance and policy gaps:
  - Potential to disaggregate compliance and policy gaps by sectors
  - Compliance gap can be decomposed into an assessment gap and a collections gap.
  - Policy gap can be further decomposed in a range of ways, e.g., rate gap vs exemption gap; by type of exemption.
  - Revenue foregone estimates can also be broken down by concession/sector
  - Revenue effects of simulated reforms
  - Distributional effects of existing provisions and of simulated reforms (if linked to household budget survey microdata)
- Some limitations:
  - Aggregation bias in taxable proportions
  - Time lag in the publishing of SUTs tables
  - Accuracy is highly dependent on the quality of national accounts statistics
  - Does not capture behavioral changes
  - Does not identify specific compliance behaviors creating the losses



# VAT compliance gap in EU countries, 2022-23



# VAT policy gap in EU countries, 2023



Source: European Commission et al. (2025) VAT gap in Europe report

# Data requirements

## Supply-Use Tables (from National Accounts)

- Should be fairly recent to ensure that the economic structure used in estimation resembles the current economy.
- Should be fairly disaggregated – to minimize aggregation bias and to provide granular view of VAT gap

		Sectors		Total output	Imports CIF	Total supply at basic prices	Trade and transport margins	Taxes less subsidies on products	Total supply at purchasers' prices	Total supply at purchasers' prices
		Industries (NACE)**								
		Goods	Services							
Commodities Products (CPA)*	Goods									
	Services									
Gross Output										

		Sectors		Total intermediate consumption at purchasers' prices	Final consumption expenditure by households	Final consumption expenditure by households	Final consumption expenditure by non-profit organizations serving households (NPISH)	Final consumption expenditure by government	Total final consumption expenditure at purchasers' prices	Gross fixed capital formation	Changes in inventories and acquisition less disposals of valuables	Gross capital formation	Exports FOB	Total final uses at purchasers' prices	Total use at purchasers' prices
		Industries (NACE)													
		Goods	Services												
Goods Products (CPA)	Goods														
	Services														
Value added															
Gross Output															

\*) CPA is the classification system of goods and services applied by the European Union

\*\*\*) NACE (Nomenclature of Economic Activities) is the European statistical classification of economic activities

# Data requirements

- COICOP data to compute taxable proportions for each product category in SUTs (exempt vs reduced rated vs standard rated)
- Microdata to undertake distributional analysis
- Actual VAT revenue data
  - Sector-by-sector if possible (or can use estimates of informality by sector for calibration, if available).
  - Accrued basis will better match with national accounts data.
  - Assessments vs collections.

## COICOP (Classification of Individual Consumption According to Purpose)

Description	Household annual consumption	Exempt	Reduced VAT Rate (8%)	Fully Taxable VAT Rate (18%)
<b>01 FOOD AND NON-ALCOHOLIC BEVERAGES</b>	<b>10000</b>			
<b>01.1 FOOD</b>	<b>4486</b>			
01.1.1 Bread and cereals	1121	0%	100%	0%
01.1.2 Meat	897	0%	100%	0%
01.1.3 Fish and seafood	538	0%	0%	100%
01.1.4 Milk, cheese and eggs	449	0%	100%	0%
01.1.5 Oils and fats	45	0%	100%	0%
01.1.6 Fruit	897	0%	100%	0%
01.1.7 Vegetables	404	0%	100%	0%
01.1.8 Sugar, jam, honey, chocolate and confectionery	90	0%	50%	50%
01.1.9 Food products n.e.c.	45	0%	100%	0%
...				
...				
12.6.2 Other financial services n.e.c.	1000	100%	0%	0%
<b>12.7 OTHER SERVICES N.E.C.</b>	<b>100</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>
12.7.0 Other services n.e.c.	10	100%	0%	0%

# The World Bank's R based VAT-GAP model

- The World Bank (and other institutions, e.g., IMF) provides technical assistance to countries in building VAT gap models and other analytical tools (e.g. microsimulation models).
- Options:
  - Simple excel-based VAT gap model.
  - New VAT-GAP model developed using the R open-source programming language and Shiny.
- Implemented in a range of countries.



# VAT Gap Model - intuitive and user-friendly graphical user interface

## Vertical tabs

Vertical tabs allow changing the functionality of the model, encompassing Input, Simulation Parameters, Run Simulation, Results, Charts, and Summary

The screenshot displays the VAT-GAP MODEL web application interface in two states, illustrating the use of vertical tabs for navigation.

**Top Screenshot (Initial State):**

- Browser address bar: `http://127.0.0.1:4416` | [Open in Browser](#) | [Publish](#)
- Page Title: VAT-GAP MODEL
- Vertical Tabs (Left):
  - Input (Selected)
  - Simulation parameters
  - Run simulation
  - Results
  - Charts
  - Summary
- Main Content Area:
  - Data Source:** Excel File
  - Upload Excel File:** Browse... No file selected
  - Header
  - Reset

**Bottom Screenshot (After Upload):**

- Page Title: VAT-GAP MODEL
- Vertical Tabs (Left):
  - Input
  - Simulation parameters
  - Run simulation
  - Results
  - Charts
  - Summary
- Main Content Area:
  - Data Source:** Excel File
  - Upload Excel File:** Browse... TaxableProportion.xlsx
  - Upload complete
  - Header
  - Reset

# Provides simulation\* output in tabular format

Results in a tabular format

Results available in Excel format for additional tailor-made analysis

VAT-GAP MODEL

Copy CSV Excel Print PDF Show entries Search:

Main results from simulation

variable	Actual	Simulation	Difference(Simulation-Actual)	Pct_Change(Simulation/Actual)	Difference as % of GDP
1 Benchmark_VAT (in LCU Billions)	633.64	633.64	0	0	0
2 Uncalibrated_VAT (in LCU Billions)	264.68	268.74	4.06	1.53	0.09
3 Calibrated_VAT (in LCU Billions)	145.21	147.44	2.23	1.54	0.05
4 Total_VAT_Gap (in LCU Billions)	488.43	486.2	-2.23	-0.46	0.05
5 Policy_Gap (in LCU Billions)	159.27	157.04	-2.23	-1.4	0.05
6 Compliance_Gap (in LCU Billions)	329.16	329.16	0	0	0
7 VAT_Benchmark_Rate (in %)	18	18	0	0	0
8 C_Efficiency	0.26	0.27	0.01	3.85	NA

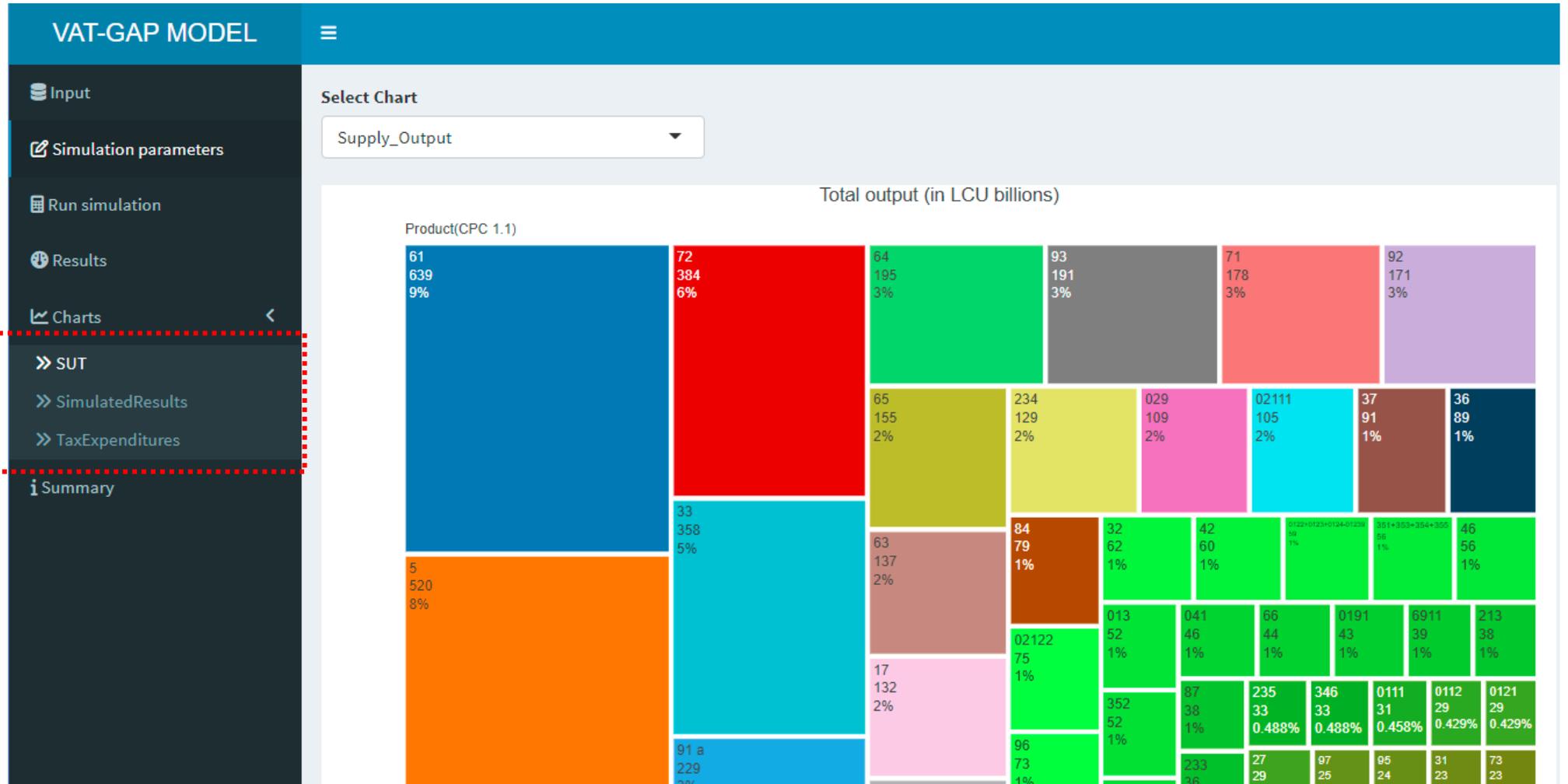
Showing 1 to 8 of 8 entries Previous 1 Next

\*) The simulation is based on artificial data

# Provides options to view analytical charts

## Results in a visual format

- Different types of Bar charts, Line chart, Tree map etc.
- Each visualization is downloadable and can be used for reports, analysis etc



**Thank you!**

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