United Nations University
World Institute for Development Economics Research

Practical session: Bottom-up estimation of the tax compliance gap

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2024 ATI Tax Gap Workshop | 19-21 March 2024 | Dar es Salaam, Tanzania

Exercise 1

Imagine that all the firms are audited in Taxovia.

a) What is the potential tax that could be collected for CIT?

Hint: $Potential\ tax\ =\ Payment\ +\ Recovery$

b) Calculate the VAT amount recovered.

c) Calculate the actual payment of PIT.

d) Calculate the tax gap for CIT, PIT, and VAT using the information provided.

Hint: $Tax\ gap = \frac{Recovery}{Payment+Recovery}$

Exercise 1 - Solution

a) CIT potential revenue: Payment (**A**) + Recovery (**B**)

- In Excel: C2 + F2 for the first row in the CIT return section

b) VAT recovered amounts: Potential VAT (**C**) – Payment (**A**)

- In Excel: G32 – C32 for the first row in the VAT return section

c) PIT payment: Potential PIT (**C**) – Recovery (**B**)

- In Excel: G62 – F62 for the first row in the PIT return section

d) The formula: $Tax\ gap = \frac{Recovery\ (\boldsymbol{B})}{Potential\ (\boldsymbol{C})}$

- In Excel: Column F divided by Column G.

Exercise 1 – Solution expanded

Reminder about the formula:

$$\boldsymbol{Tax\ gap = \frac{Recovery}{Recovery + Payment} = \frac{Recovery}{Potential}}$$

$$\boldsymbol{Potential\ tax = Recovery\ + Payment}$$

- In Excel, $\boldsymbol{Tax\ gap = \frac{Recovery\ (B)}{Recovery\ (B) + Payment\ (A)} = \frac{Recovery\ (B)}{Potential\ (C)}}$

- In Excel, $\boldsymbol{Potential\ tax = Recovery\ (B) + Payment(A)}$

Main takeaway: Calculating the tax gap for audited firms is easy. But we know not all firms (usually a small percentage) are audited.

Exercise 2

The reality is that a small group of firms are audited yearly due to resource constraints. Using the actual audit outcomes, we can predict the amount of tax recovered for unaudited firms.

Recall:

$$\boldsymbol{Tax\ gap} = \frac{\boldsymbol{Recovery}}{\boldsymbol{Recovery + Payment}} = \frac{\boldsymbol{Recovery}}{\boldsymbol{Potential}}$$

$$\boldsymbol{Potential\ tax} = \boldsymbol{Recovery}\ (\boldsymbol{Actual\ or\ Predicted}) + \boldsymbol{Payment}$$

Luckily, we have estimated the predicted recovery for the unaudited firms!

Exercise 2 - Questions

a) Calculate the total recovery for CIT.

b) Calculate the actual VAT recovery.

c) Calculate the potential PIT, then the predicted PIT recovery.

d) Calculate the tax gap for each tax type (CIT, PIT and VAT).

e) Calculate the economy-wide tax gap for each tax type (CIT, PIT and VAT)

Exercise 2 - Solution

a) CIT total tax recovered (B): Actual recovery + Predicted recovery
- In Excel: F3 + G3 for the first row in the CIT return

b) Actual VAT amounts recovered for audited firms = Potential VAT (C) – VAT payments (A);
- In Excel: I43 – C43 for the first row in the VAT return for **audited firms**

c) Potential PIT = Total recovery (B) + Payments (A)
- In Excel: H83 + C83 for the first row in the PIT return for **all firms**

Predicted PIT recovery = Potential PIT (C) – PIT payments (A);
- In Excel: I98 – C98 for the first row in the PIT return for **unaudited firms**

Exercise 2 – Solutions continued

d) The formula:

$$\boldsymbol{Tax\ gap = \frac{Total\ Recovery\ (B)}{Potential\ (C)}}$$

- In Excel: Column H divided by Column I.

e) Economy-wide:

$$\boldsymbol{Tax\ gap = \frac{\sum_{firms} Total\ Recovery\ (B)}{\sum_{firms} Potential\ (C)}}$$

- In Excel:
  - Sum(H3:H42)/Sum(I3:I42) for CIT
  - Sum(H43:H82)/Sum(I43:I82) for VAT
  - Sum(H83:H102)/Sum(I83:I102) for PIT

Exercise 2 – Solution expanded

Recap of the formulas:

$$\textbf{Tax gap} = \frac{\sum_{firms} \boldsymbol{Total\ Recovery}}{\sum_{firms} \boldsymbol{Potential}}$$

- In Excel, $\boldsymbol{Tax\ gap} = \frac{\boldsymbol{Recovery\ (B)}}{\boldsymbol{Recovery\ (B) + Payment\ (A)}} = \frac{\boldsymbol{Recovery\ (B)}}{\boldsymbol{Potential\ (C)}}$
- In Excel, $\boldsymbol{Potential\ tax} = \boldsymbol{Recovery\ (Actual\ or\ Predicted)} + \boldsymbol{Payment}$

Main takeaway: Tax gap of the registered tax base brings us closer to calculating the entire tax gap.

Exercise 3

The Ministry of Finance in Taxovia wants to know the industries contributing the most to the tax gap.

a) Calculate the sector recovery for the Construction and Mining sectors.

b) Calculate the sector potential tax for the Finance & Insurance sector.

c) Calculate the tax gap for each sector.

d) Which sector records the highest gap?

e) How can this information be used for tax policy or by the revenue authority?

Exercise 3 - Solution

a) Sector tax recovered = $Actual\ recovery\ +\ Predicted\ recovery$.

- In Excel:
  - Construction: sum(F3:G27), applies to all recoveries in the construction sector
  - Mining: sum(F53:G77), applies to all recoveries in the mining sector

b) Potential tax = $Sector\ payment\ (A)\ +\ Sector\ recovery\ (B)$

- In Excel:
  - Fin. & Insurance: sum(E28:G52), applies to payments and recoveries within the sector

c) Same formula still applies: $\frac{Sector\ recovery\ (B)}{Sector\ potential\ (C)}$

- In Excel: column **H** divided by column **I** for the specific sector

Exercise 3 - Solution

d) The mining sector records the highest tax gap

e) Size helps to determine policies and industry-level evasion. Policymakers are informed about the sectors where they should concentrate their efforts.

Exercise 3 – Solution expanded

Recap of the formulas:

$$\boldsymbol{Tax\ gap = \frac{Sector\ recovery}{Sector\ potential}}$$

$$\boldsymbol{Potential\ tax = Sector\ Recovery\ \ (B) + Sector\ Payments\ (A)}$$

- In Excel, $\boldsymbol{Tax\ gap = \frac{Sector\ Recovery\ (B)}{Sector\ Potential\ (C)}}$
- In Excel, $\boldsymbol{Potential\ tax = Sector\ Recovery\ (B) + \ Sector\ Payments\ (A)}$

Main takeaway: Industry gaps help gauge the level of evasion by sector. This helps to target policy or audit efforts.

Exercise 4

The Ministry of Finance in Taxovia wants to know how the tax gap has evolved over time.

a) Calculate the annual recovery for the 2001 and 2004 return years.

b) Calculate the annual potential tax for the 2002 return year.

c) Calculate the tax gap in each return year.

d) Which year records the highest gap?

e) How can this information be used for tax policy or by the revenue authority?

Hint: Think about policy reforms or regime changes.

Exercise 4 - Solution

a) Annual recovery = Actual recovery + Predicted recovery. The sum of predicted and actual recoveries.

- In Excel:
  - 2001: sum(F3:G22), applies to all recoveries in the 2001 return year
  - 2004: sum(F63:G82), applies to all recoveries in the 2004 return year

b) Annual potential tax for 2002 = Payment 2002 (A) + Recovery 2002 (B)

- In Excel: sum(E23:G42), applies to payments and recoveries in the 2002 return year

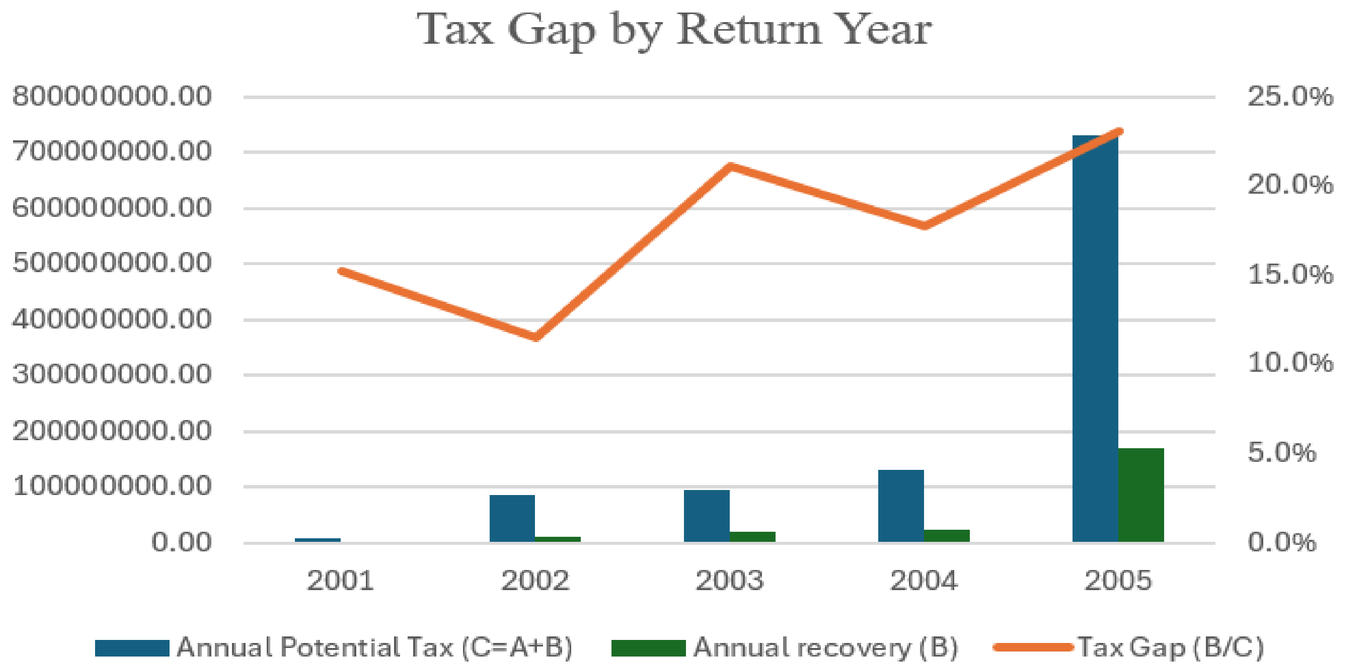
c) Same formula still applies: $\frac{Annual\ recovery\ (B)}{Annual\ potential\ (C)}$

- In Excel: column **H** divided by column **I** for the specific sector

Exercise 4 - Solution

d) The 2005 return year records the highest tax gap

e) Dynamic effect, check changes in policy, economic shocks. We can infer from the results how tax policy has affected revenue mobilization over the years.



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