WORLD BANK GROUP
Macroeconomics, Trade & Investment

Tax Effort and Tax Potential

Emilia Skrok
Practice Manager, World Bank

Outline

- Tax effort and capacity and why they matter
- Snapshot at tax revenue collection by region and income group
- An overview of drivers of tax effort
- Country Classification Based on Tax Collection and Tax Effort: Do we observe an overlap across studies?
- Approaches to measuring tax effort: Pros and Cons of the different approaches
- Alternative way to analyze tax effort: staring from an Individual?

Tax effort and capacity and why they matter

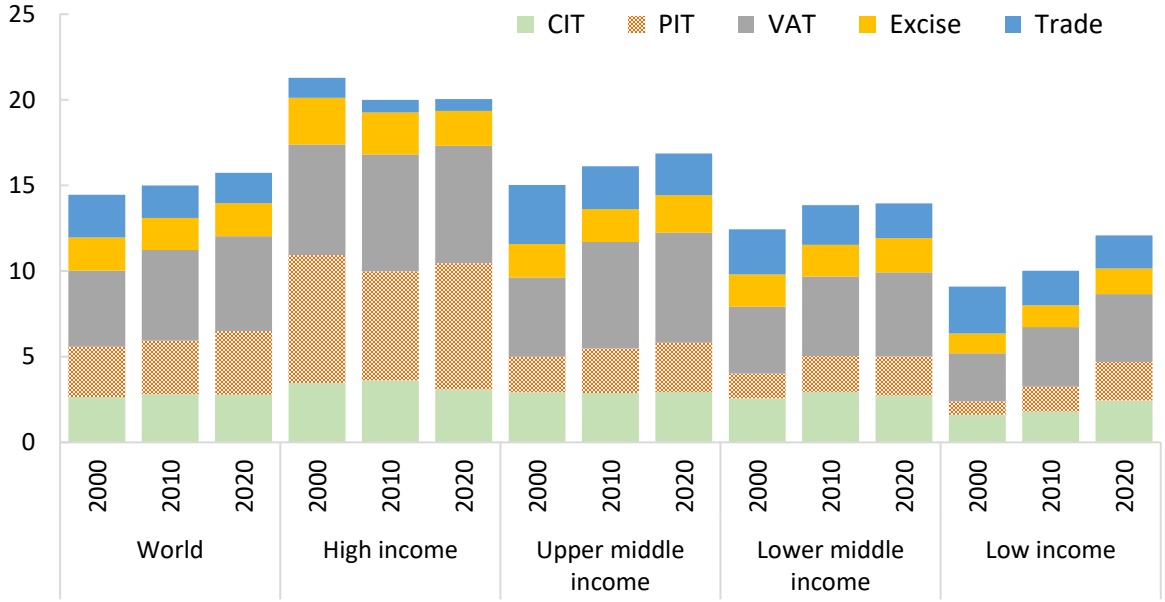
- **Taxable capacity:** The percentage of a country's national income above the minimum level required for people's sustenance and intact productive capacity of an economy.
  - Maximum tax revenues a government can receive with existing macroeconomic and socioeconomic characteristics, assuming efficient policy design and perfect tax compliance.

- **Tax Effort:** This is the ratio of actual tax revenues collected in a jurisdiction relative to its tax capacity.
  - How much of a country's tax capacity is being collected in tax revenues?

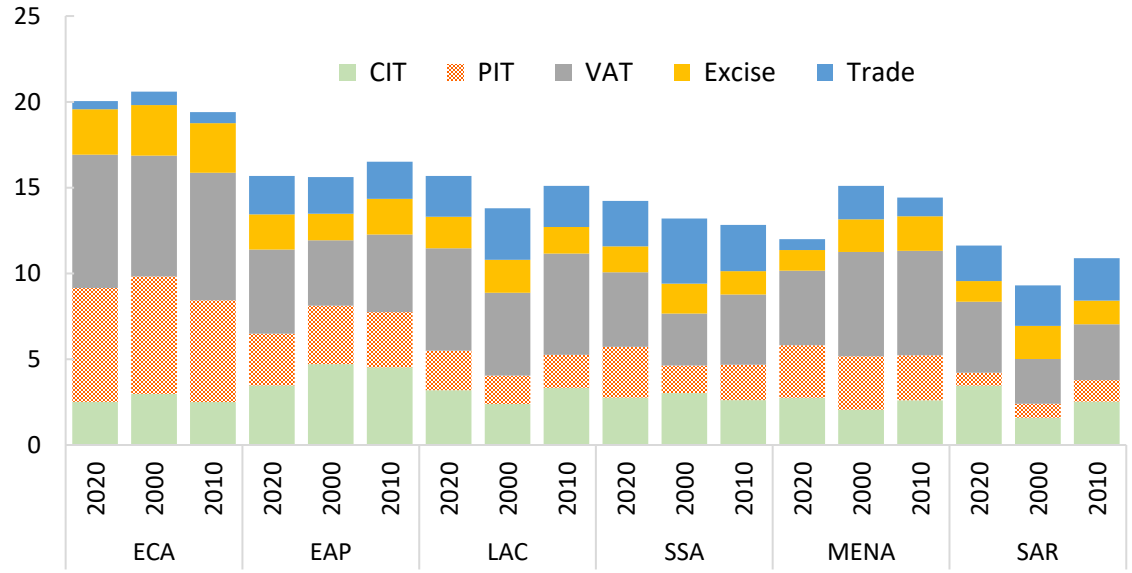
- **Importance:** The estimates are an indicator of the sufficiency of government revenues
- The estimates give policymakers an indication of how much domestic revenues a country can realistically be expected to collect, conditional on its income level.
  - On the one hand, poverty reduction policies demand sufficient revenue to improve access and quality of services for the people.
  - On the other hand, growth promotion policies require certain amount of income to be left for private consumption and investment.

Variation in Tax Revenue Collections (level and structure)

By income groups



By region

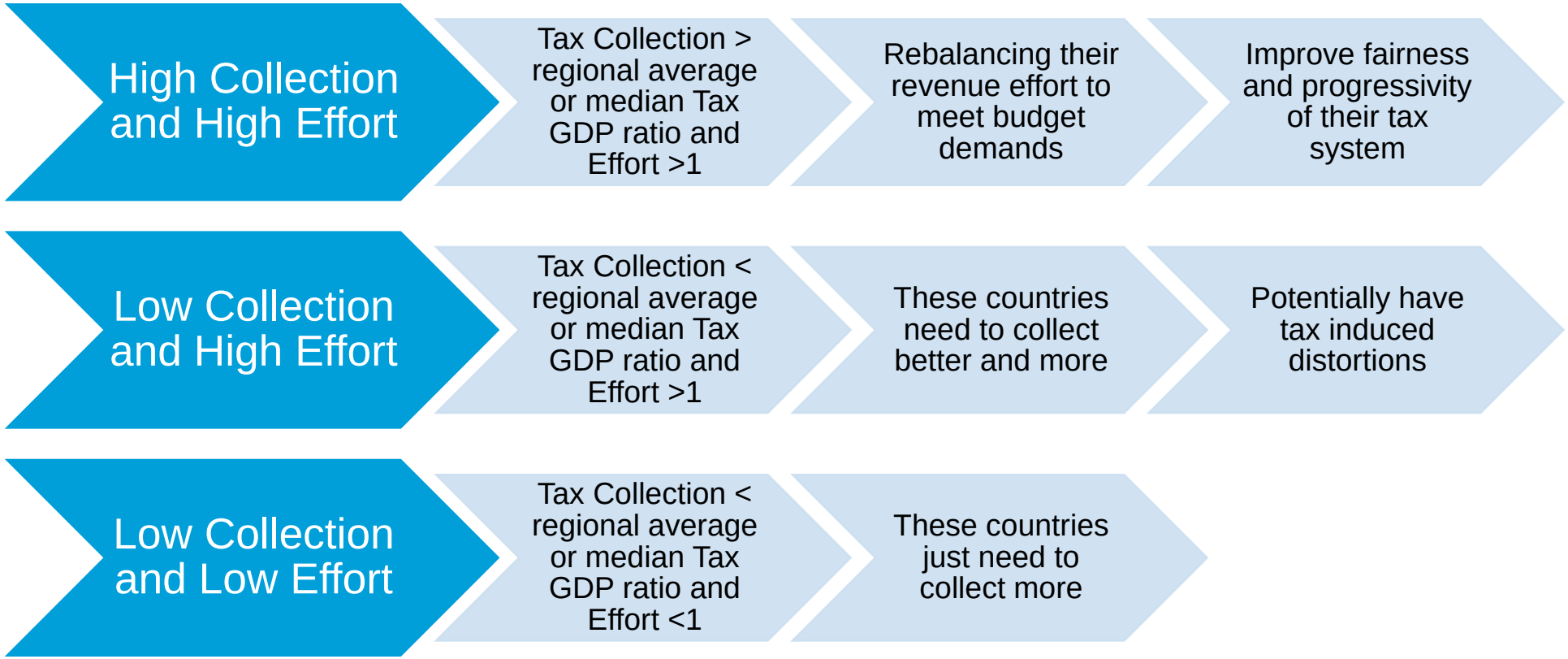


- **Total revenue collection still differs significantly by both region and income groups**
- **High income countries tend to have a relatively balanced tax-mix**
- **Consumption taxes remain main contributors in low-income and emerging economies**

Country Classification Based on Tax Collection and Tax Effort

Tax effort constructed as an index

- A “high tax effort” is the case when a tax effort is above 1. The country utilizes its tax base to increase tax revenues.
- A “low tax effort” is the case when a tax effort is below 1.The country may have a relatively substantial scope or potential to raise tax revenues



Summary from recent studies of the effects of the drivers of tax effort

Table 1: Summary of key findings of recent tax effort studies

Study	Mawejje & Sebudde (2019: T2 Col.1)		Langford & Ohlenburg (2016: T2 Col.1[$])		Cyan et al. (2013: T1 Col. 1)		Cyan et al. (2013: T2 Col. 2)		Fenochietto et al. (2013: T2 Col. 1)		Sen Gupta (2007: T7 Col. V)		Bird et al. (2004: T2 Col. 1)		Ghura (1998: T2 Col. 4)		Stotsky & WoldeMariam (1997: T 6 Col. 2)		Tanzi (1992: T12.5 '1998')	
Dependent variable	Non-resource tax excluding social security contributions		Non-resource tax excluding social security contributions		Tax + non-tax revenue		Tax + non-tax revenue		Tax + social security contributions		Central government revenue excluding grants		Tax revenue		Tax revenue		Tax revenue		Tax revenue	
Economic variables																				
GDP per capita	+	***			+	***	+	***	+	***	+	***	-	***	+	***	+		-	
Openness[#]	+	***	+	**					+	***	+	**	-		+	***	+	***	+	***
Agriculture share GDP	-	***			-	***	-	**	-	***			-	***	-	***	-	***	-	**
Manufacturing share GDP			+	*																
Services share GDP					-	***	-													
Construction share GDP					-	***	-	***												
Inflation	-	***	-	***	-	***	-	***							-	***				
Resource revenue	-																			
Crude petroleum production					-	***	-	**												
Oil-producer dummy															+	***				
Mining dummy															+	***				
Grants	+	**			-	***	-	***							-	**				
Income inequality	-				-	***	-	***	-	***										
Government debt					+	***					-	**							+	*
Change in government debt															+					
Globalization					+	***	+	***												
Gross fixed capital formation					+	***	+	**												
Aid / GDP											+	*								
Structural reforms															+	***				
Change in REER															+					
Change in terms of trade															+					

Effects of drivers cont'd

Study	Mawejje & Sebudde (2019: T2 Col.1)	Langford & Ohlenburg (2016: T2 Col.1$)	Cyan et al. (2013: T1 Col. 1)	Cyan et al. (2013: T2 Col. 2)	Fenochietto et al. (2013: T2 Col. 1)	Sen Gupta (2007: T7 Col. V)	Bird et al. (2004: T2 Col. 1)	Ghura (1998: T2 Col. 4)	Stotsky & WoldeMariam (1997: T 6 Col. 2)	Tanzi (1992: T12.5 '1998')
Dependent variable	Non-resource tax excluding social security contributions	Non-resource tax excluding social security contributions	Tax + non-tax revenue	Tax + non-tax revenue	Tax + social security contributions	Central government revenue excluding grants	Tax revenue	Tax revenue	Tax revenue	Tax revenue
Demographic variables										
Population density			-	- ***						
Share rural population	-									
Health expenditure	+ ***				+ ***					
UN education index		+ ***	+ ***	+ ***						
Age dependency ratio		+ **	+	- *						
Population growth							- ***			
Human capital index								+ **		
Governance / Institutional variables										
Corruption	- ***	- ***	- ***	- ***		+		- ***		
Law and order		- **				-				
Democratic accountability		- *								
Government stability						+				
Governance index							+ ***			
Observations	*2,422*	*1,664*	*1,079*	*1,094*	*?*	*376*	*104*	*415*	*249*	*66*
Estimation method	SFA	SFA	FE	SFA	SFA	SYS-GMM	OLS	IV-GLS	RE	OLS

Note: SFA = Stochastic Frontier Analysis; FE = Fixed Effects; SYS-GMM = System Generalised Method of Moments; IV-GLS = Instrumental Variable Generalised Least Squares; RE = Random Effects; OLS = Ordinary Least Squares. $ The governance variables in this study enter into the inefficiency equation. # Openness is defined as one of (i) imports, (ii) exports, or (iii) imports + exports as a share of GDP.

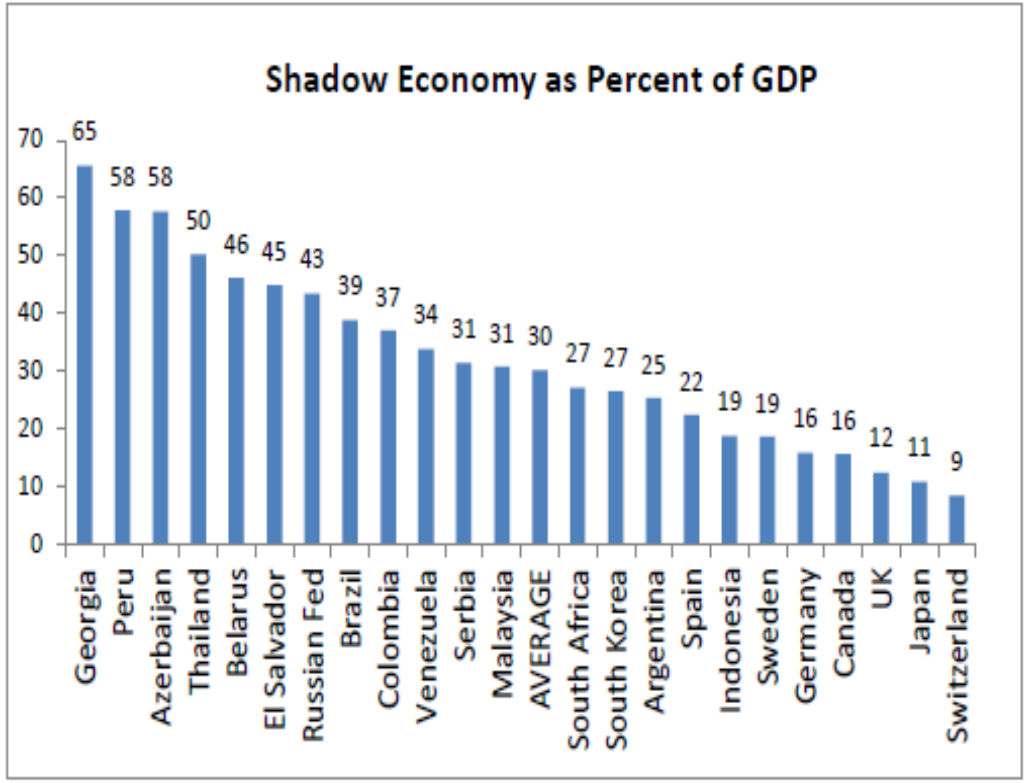
Does the size of the digital economy influence a country's tax capacity and effort?

An empirical question that is worth investigating.

- **Tax capacity can be enhanced:** The rapid acceleration of new technological innovation has propelled economies to grow at an unprecedented rate.
  - Higher growth implies higher revenue potential
- **Tax effort can be enhanced but challenges still exist:** The rise of the digital economy presents unique challenges for both domestic and international taxation.
  - Valuation of intangible assets, such as intellectual property and user data.
  - Taxation of digital businesses which do not require a physical presence in a jurisdiction where they earn large profits.
    - Challenges with allocating taxing rights.
- Digitization may improve countries' tax capacity; however, the above challenges may limit tax effort.

How about shadow economy and informality?

TAX COLLECTIONS	LOW		MEDIUM		HIGH	
LOW	**ECA**	**Others**	**ECA**	**Others**	**ECA**	**Others**
	Albania Armenia Azerbaijan Georgia	Argentina Chile Colombia Korea, Rep Mexico Peru Thailand Uruguay Venezuela	Kazakhstan Kosovo Kyrgyz Rep Turkey	Malaysia	Tajikistan	El Salvador Indonesia
MEDIUM	**ECA**	**Others**	**ECA**	**Others**	**ECA**	**Others**
	Moldova Poland Slovak Rep	Ireland Portugal	Bulgaria Macedonia Romania Russian Fed	Estonia Greece Japan Latvia Lithuania Tunisia	Ukraine	Brazil Canada Switzerland South Africa
HIGH	**ECA**	**Others**	**ECA**	**Others**	**ECA**	**Others**
			Croatia Czech Rep	Belgium Germany Hungary Netherlands	Belarus Bosnia&Herz. Montenegro Serbia	Austria Denmark Finland France



- **The larger the shadow, the greater is the underreporting and the consequent low tax effort.**

Source: Kwaja and Iyer, 2014.

Weak institutions and low tax capacity a major hindrance to revenue mobilization?

- Countries with low tax capacity and weak institutions tend to have low tax effort.
  - Need to invest in exiting the vicious cycle.
- Empirical evidence points to a two-way causality (Ayodele, 2019)
  - Countries with undeveloped institutions adversely affect tax capacity, which could further weaken institutions.
- Rationalizations of tax expenditures, improving and modernizing tax administration, improving tax legislation to better tax the digital economy, could propel these economies to improved Domestic Revenue Mobilization.
- Ensuring macroeconomic stability remains critical as it provides a conductive environment to support investment, which consequently improves tax capacity

Countries persistently found to have a low-tax effort across studies: Some overlaps

Paper	Low-effort countries (repeated in red across studies)
Revenue Potential, Tax Space, and Tax Gap: A Comparative Analysis (Kwaja and Iyer, 2014) WB WP series	(Table 3, Uses the "legal" definition): Argentina, Chile, Colombia, Korea, Rep, Mexico, Peru, Thailand, Uruguay, Venezuela, Albania, Armenia, Azerbaijan, Georgia, Moldova, Poland, Slovak Republic, Ireland, Portugal *Using the "economic" definition:* Switzerland, Thailand, Peru, Colombia, Chile, Azerbaijan, Ireland, Georgia, Venezuela, Mexico, Slovak Republic, Korea, Kosovo, Malaysia
Measuring tax effort: Does the estimation approach matter and should effort be linked to expenditure goals? (Musharraf Cyan, Jorge Martinez-Vazquez, Violeta Vulovic) International Center for Public Policy –Georgia State	Table 5, using half-normal (Stata default) and first specification (corruption not specified in model): Rwanda, China, Madagascar, Turkey, Zambia, Bhutan, Thailand, Switzerland, Luxembourg, Albania, Burkina Faso, Cambodia, Paraguay, Panama, Lao PDR, Australia
Tax effort revisited: new estimates from the Government Revenue Dataset (Kyle McNabb, Michael Danquah, and Abrams M.E. Tagem, 2021) WIDER WP series	Table 7, the TRE (z) model: Myanmar, Bahrain, Angola, Lesotho, Timor-Leste, Chad, Indonesia, Zimbabwe, Oman, Ethiopia, Uzbekistan, Vietnam, Malaysia, Botswana, Sudan, Sri Lanka, Jordan, Bangladesh, Romania, Benin
Tax Capacity and Tax Effort: Extended Cross-Country Analysis from 1994 to 2009 (Tuan Minh Le; Blanca Moreno-Dodson;Nihal Bayraktar, 2012) WB WP series	Albania, Dominican Rep., Oman, Canada, Argentina, Egypt, Panama, Japan, Armenia, El Salvador, Paraguay, Korea, Rep., Azerbaijan, Ethiopia, Peru, United States, Bahamas The, Guatemala, Philippines, Bahrain, Guinea, Senegal, Bangladesh, India, Sierra Leone, Burkina Faso, Indonesia, Sudan, Cameroon, Kazakhstan, Thailand, China, Lebanon, Uganda, Colombia, Madagascar, Yemen, Congo, Dem. Rep., Malaysia, Cong Rep, Mexico
Tax effort in SSA countries: evidence from a new dataset: Caldeira et al , 2020	Table 2, 2010-2015: Equatorial Guinea, Nigeria, Gabon, Chad, Congo (Rep.), Guinea-Bissau, Botswana, Mauritius

Other studies relating to tax effort

Paper	Low-effort countries (General comment)
Measuring Untapped Revenue Potential in Developing Countries: Cross-Country Frontier and Panel Data Analysis (Zeljko Bogetic, Dominik Naeher, Raghavan Narayanan, 2021) WB Policy Research Working Paper 9776	No table on countries, but LICs have the lowest score of tax effort overall
Tax Capacity and Growth: Is There a Tipping Point? (Vitor Gaspar, Laura Jaramillo, Philippe Wingender, 2016) IMF Working Paper 16/234	There's a list of when countries passed the tipping point of 12.88%, but this may not answer the question of which country has a low effort. Some countries pass the tipping point many times, suggesting they fall below in between, which suggests low effort at times. The table doesn't include countries which never passed the threshold, leaving out the most low-effort countries.

Approaches to Measuring Tax Effort

Cross-country comparison of Tax to GDP ratios	OLS-based estimates of tax effort	Stochastic Frontier	Revenue Adequacy: Expenditure-Revenue GAP

• A basic comparison of how much tax revenue a country raises relative to peers.
  • Ignores country-specific inefficiencies which account for differences in tax effort.
	• Estimated using Ordinary Least Squares (typically utilized in the empirical literature)
	  • May control for country-specific characteristics but may not account for unobservable country-specific inefficiencies.
		• Estimates the highest level of taxation feasible under country-specific conditions (economic, institutional, social and demographic).
		  • National income, economic structure of a country, tax administration and preference for public goods are accounted for.
			• Looks at the deviation between a country's desired level of tax revenues – as revealed by the persistent level of public expenditures and the current level of taxation for each country.
			  • The actual level of public expenditures (or some moving average of that variable) is used as an indicator of desired level of taxation in a country.

Pros and Cons of the Different Approaches

The use of Tax to GDP ratio and OLS	Stochastic Frontier	Revenue Adequacy: Expenditure-Revenue GAP
➢ **Pros:** Simplicity and comparability (to an extent). ➢ **Cons:** The ratios assume away countries' different socio-economic structures, institutional capabilities, and demographic trends, among other drivers of tax effort	➢ **Pros:** Identifies weak areas of administration and institutional environment. ▪ These sources of inefficiency are important to tax reform and typically are easier to reform. ➢ **Cons: D**oes not generate country-specific measures of tax potential that are aligned to national policy • Using data from other countries to estimate tax potential introduces noise through unobserved factors such as preferences for public goods and services; tax morale; attitude towards the role of the public sector	➢ **Pros:** Assesses tax effort while accommodating preferences for size of government in a country.

The conclusions from the different approaches tend to converge. The point estimates tend to be highly correlated as well, see Musharraf et al (2014)

An alternative way: staring from an Individual?

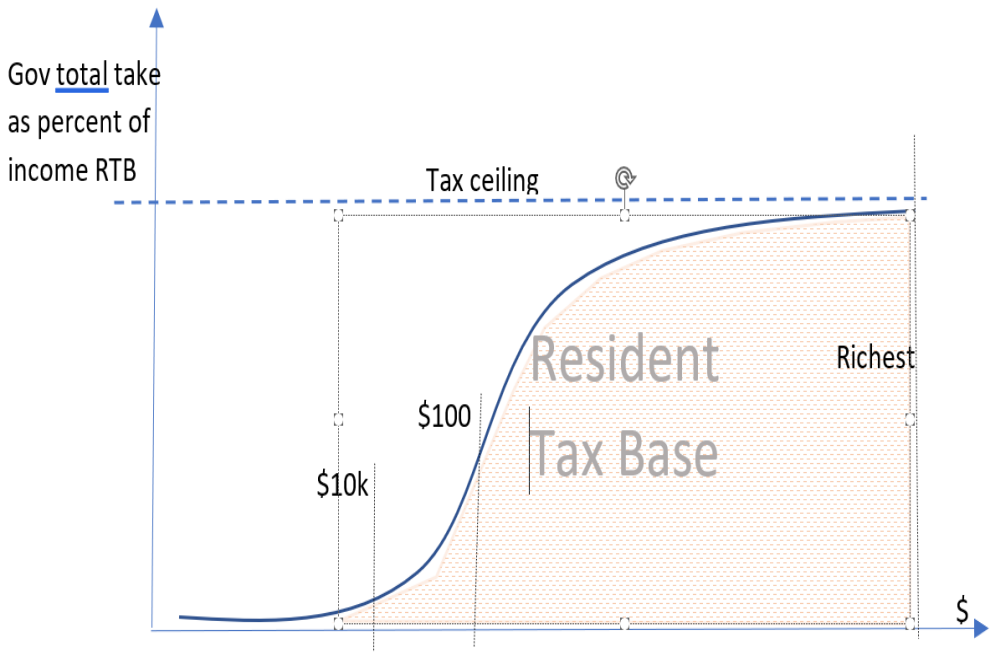
- **Taxing an Individual:** Conditional on the income distribution, what share of an individual's gross income should the government collect at minimum?

- What should be the threshold for Too-Poor-To-Tax?

- Can answers to these basic questions reshape the discussion on Tax Capacity?
- It should not matter if country is resources rich or not
  - Same approach for Burundi as for Nigeria, at least in first stage of analysis.

A sketch of new approach - I

- A potential tax base should be viewed as one which is undistorted by taxpayer's legal structuring of own economy
  - The dichotomy of "private" and "business" is then eliminated
- All voters become the core tax base, which we may call the Resident Tax Base (RTB)
  - The first step would be to establish the government share of the $10k, $100k and a ceiling
  - This becomes your tax potential/capacity
- Then revenue from Foreign Direct Investments and natural resources becomes additional revenue (secondary revenue):
  - These secondary revenues facilitate discussions of whether to expand government activity or reduce taxation of RTB?
  - Very tempting to reduce taxation of the RTB; Several resource rich countries end up with a low effort in the process! (low tax to GDP ratio)



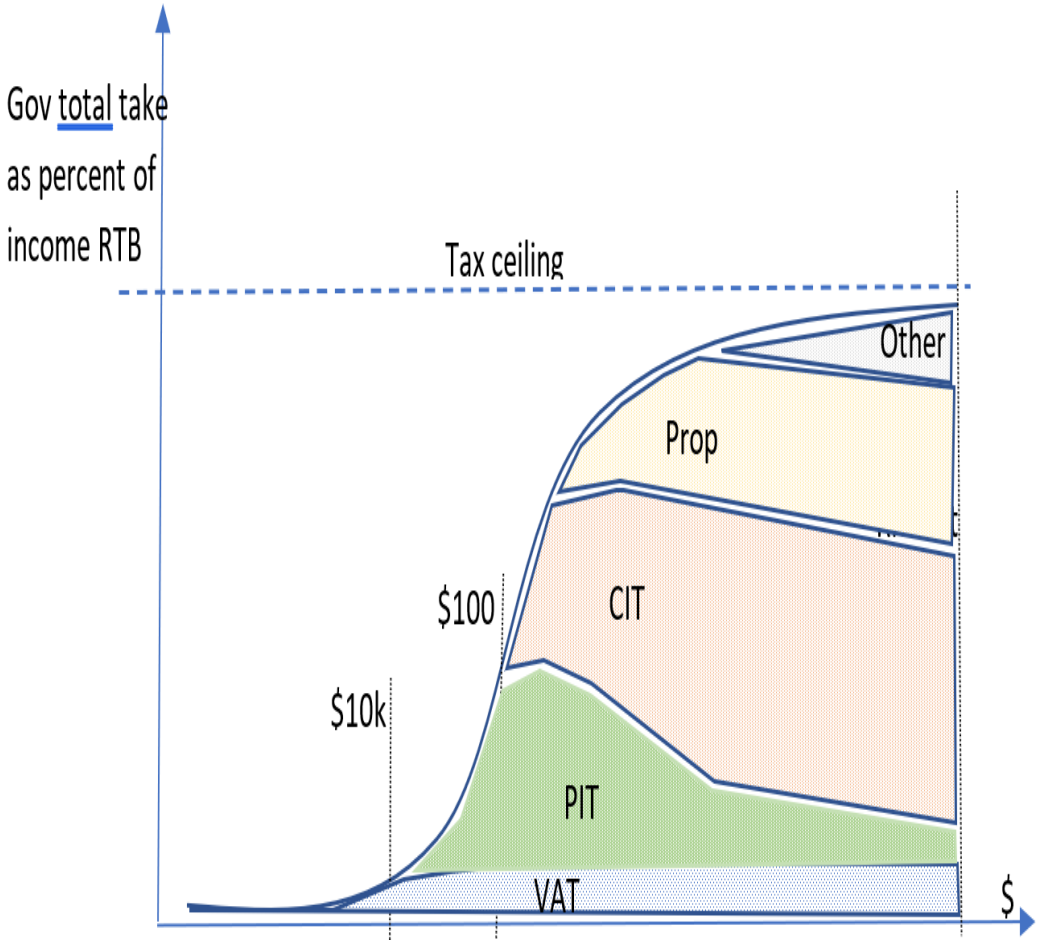
X-axis: Personal taxpayers from poor to rich relative to income (money) using the Alstadsaeter et al approach of consolidating controlled legal structures.

Alstadsæter et al (2016) discuss some of these ideas

A sketch of new approach - II

- The Resident Tax Base can be divided in four equal money size segments: From the lowest income individuals to the richest:
- Apply different tax instruments depending on an individual's income:
  - Use VAT, excise and carbon tax to secure the revenue from the low-income segment. Broadest base, which implies low rates should apply
  - Add PIT to get the right amount in the second segment: the cutoff for too poor to tax depends on the income level of the country
  - Use CIT as next step to capture revenue from the profits of earned by individuals
  - Top up with property, wealth tax and others for the wealthiest of individuals
- Consequently, the taxman will have effectively tapped into the country's resident tax base.

Now, should a country use revenue from natural resources and FDI to expand fiscal space or reduce taxation of resident tax base?

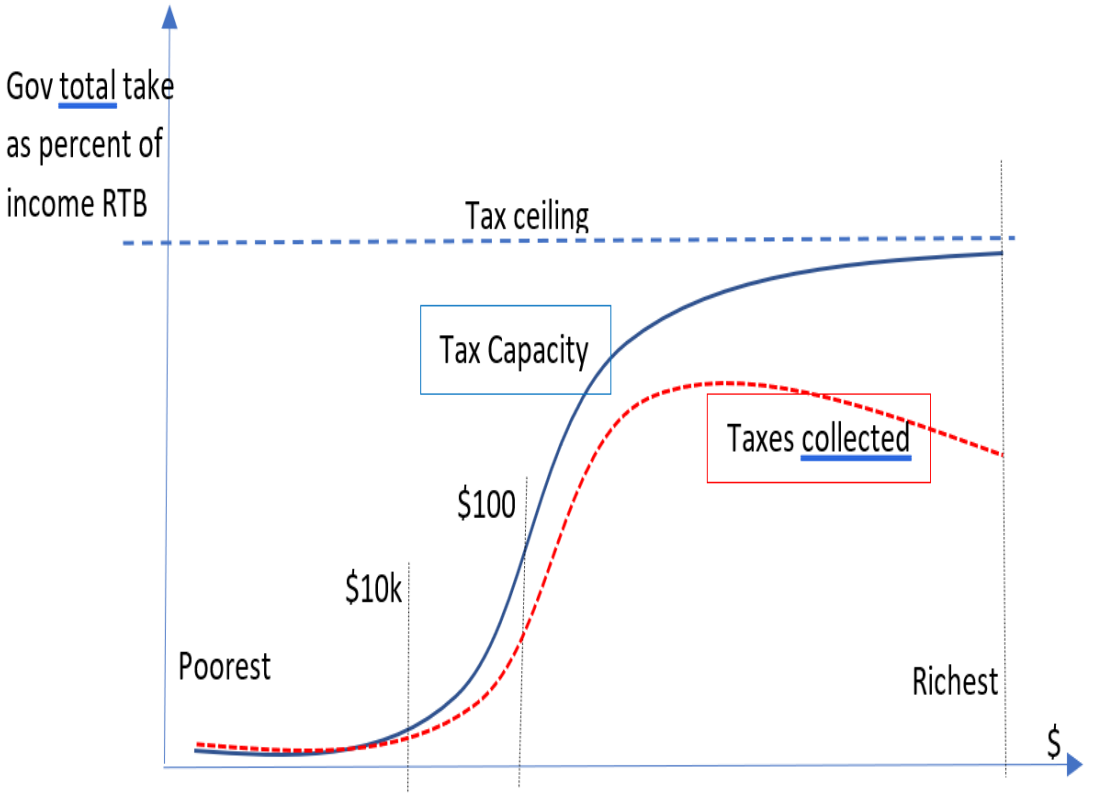


From Tax Capacity to Tax Effort

- **Mapping the total tax revenues collected to the income distribution of the country should give an indication of sources of additional revenue.**

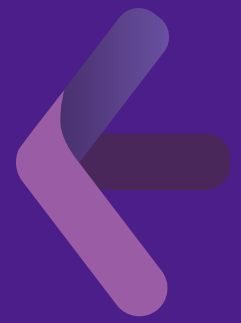
- Can we attempt to map tax collections to residents' income to identify tax gaps?
  - This will allow countries to tax better and not more
  - Introduce more progressivity in tax systems

- If critical flaws in thinking, please tell us!



Taxes collected/Tax Capacity gives the Tax Effort over the income distribution. Informs where the additional revenue is and what taxes to focus on.

Thank you!



From Tax Capacity to Tax Effort