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Domestic revenue mobilization in Sub-Saharan Africa and Latin America: A comparative analysis since 1980

Abel Gwaindepi

Abstract

Domestic revenue mobilization continues to feature on the agendas of international development agents and academic communities. There is, however, a strong focus on comparing the developed and developing countries with the aim of finding transferable lessons to the latter. Thus, most comparative studies default to comparing tax performances of developing countries with OECD averages. Interregional peer-to-peer or context-sensitive comparisons remain relatively unexplored. This paper compares the Sub-Saharan African countries (SSA) with the Latin American & Caribbean countries (LAC) since 1980. The paper focuses on tax efforts, revenue volatility and a context-sensitive analysis of the determinants of tax revenues. Using fiscal data from the International Centre for Tax and Development (ICTD), the world development indicators (WDI) and other publicly available datasets, the paper finds that although the LAC countries are performing better on tax collection, they lag behind the SSA countries on tax efforts. Revenue volatility is higher on average for the SSA countries than for the LAC countries. By implementing a panel framework of 83 countries from both regions, the paper finds that the standard tax determinants behave as theoretically expected but only for the upper-middle-income countries that are relatively developed. The implication for policy is that custom-built and second-best reforms are more appropriate for the poorer countries than any 'best practice' from the developed regions.

Keywords: Fiscal capacity; taxation; Sub-Saharan Africa; Latin America; tax effort; revenue volatility; public revenues; developing regions; comparative analysis

JEL codes: H20; H24; H27; N46; N47

Introduction

Latin America and Sub Saharan Africa share relatively similar historical developments (Bates, Coatsworth, & Williamson, 2007; Grabowski, 2010). In their study, Bates and Williamson (2007, p, 917) argue that after independence both regions faced "political instability, violent conflict, and economic stagnation". Taxation is one key theme of fruitful comparison across the two regions given that the challenges of raising adequate revenues are similar in both regions. For instance, the path-dependent reliance on trade taxes (until recently), natural resource taxes and indirect taxes has delayed the shift to direct forms of taxation. This implies that both regions have not gone beyond the easy-to-collect revenues and taxation remains their Achilles heel of democratic consolidation. This is so given that direct forms of taxes enhance state-society reciprocity that augments state legitimacy and democratic consolidation (Atria, Groll, & Valdes, 2018). Political instability, economic uncertainties, institutional debility, widespread tax evasions and reliance on primary exports are some of the features that impede stabilization of revenues and fiscal capacity in both regions (Atria et al., 2018; OECD, 2018b). Apart from the similarities, differences are also important in highlighting each region's uniqueness or different policy orientation that makes comparisons fruitful especially across countries at the same level of economic development.

Using a context-sensitive broad comparison of Sub-Saharan Africa (SSA) and the Latin America & the Caribbean (LAC) regions, this study contributes to the tax effort and fiscal capacity literature by exploring three fundamental tax issues. First, it offers tax revenue trends analysis for the two regions in a comparative approach. Second, it explores revenue volatility in both regions since revenue inadequacy tend to correlate with higher levels of instability (Dom, 2019). Third, it explores the determinants of tax revenues in the two regions by implementing a panel data analysis of 83 countries since 1980. The main research question is thus divided into three; how does the SSA region compare to the LAC region in tax collection since the 1980s; what are the differences or similarities in tax volatility between the two regions; do the standard determinants of tax revenues behave the same in the two regions in terms of their impact on taxation? The key variable to be explained is share of taxes in GDP but the tax share excludes revenues from natural resources and social contributions.

The paper demonstrates that the SSA lag behind the LAC regions in tax collection; that volatility has been higher in the SSA countries. As a corollary, another key finding is that in SSA countries the per capita income growth has not been associated with an increase in fiscal capacity (measured in tax shares in GDP excluding natural resource revenues and social

contributions). The third insight is that tax determinants behave as expected mostly in the upper-middle-income countries which are relatively richer while the results for the low income and lower-middle-income countries show mixed results. The key lesson from this study points to the need for tailor-made fiscal solutions in the poorest countries rather than best practices obtained from the developed regions. The paper is organized as follows. Section one motivates the study emphasizing the need for context-sensitive comparison. Section two reviews the theoretical and empirical literature. In the third section, the data and methods are discussed. The last section is the panel analysis and conclusion.

Motivation, theory and empirical literature

Motivation

Domestic revenue mobilization remains one major challenge among many development challenges in low-income countries. Most developing regions continue to have inadequate resources for various public expenditure outlays that improve living conditions. For this reason, sustainable revenue mobilization continues to feature explicitly in international development agendas such as the Strategic Development Goals (United Nations, 2015b) The recent Addis Tax Initiative outcome also emphasized the need for international partners to double their technical cooperation for coherent tax advice to member countries by 2020 (ATI, 2019). For similar reasons, taxation continues to be a subject of continual academic research. The existing research has suggested that the developing countries' tax shares in GDP are at a level that the developed countries attained a century ago (Besley & Persson, 2014, p. 105). The continued reliance on easy-to-collect revenues, such as indirect taxes, also demonstrates that fiscal capacity is yet to be strengthened in most developing regions.

The reality that the income levels are positively related to the amount of tax collectable brings its own challenges when conducting research of empirical nature. This is so because countries that have higher incomes per capita also do well on other various tax and non-tax measures (Besley & Persson, 2013). Since the amount collected is a function of tax policies in place and tax compliance among other factors, a major feature of the existing studies is that tax performance varies even across countries with similar economic fundamentals (Dom & Miller, 2018, p. 7). The implication is that context-sensitive analysis is crucial if policy lessons are to be drawn from tax research. Current tax policy and

performance from the global north have often led towards global 'best practice' reforms with no space for 'custom-built' or 'best fit' solutions as advocated by Bird (2013).

In the academic literature and development agents' work on taxation, there are idiosyncratic research questions and country and (or) regional focuses. The aim is often to deal with specific regional and country issues. For instance, many studies focus on developing regions such as Sub-Sahara Africa (Addison & Levin, 2012; Asongu, 2015; OECD, 2018b), some Latin America (Atria et al., 2018; ECLAC, 2019) and other studies uses world samples (Rodríguez, 2018) to study determinants of taxation. The outcome of this empirical research yields different results depending on the focus of the study and data used. The comparative front has rarely been exploited in a context-sensitive way, especially among the developing regions. A few exceptions do exist (Aizenman., Injarak., Jungsuk., & Park., 2015; Dom & Miller, 2018; Grabowski, 2010). Developed countries have been compared with developing countries and predictably the outcome of these studies have been to show the glaring difference between the developed and developing regions in tax collection (OECD, 2018a; Ortiz-Ospina & Roser, 2019; Rodríguez, 2018). This type of analysis presents the developed countries tax systems as benchmarks to be emulated by the developing regions. This can be called the 'OECD benchmark approach' where developed world tax averages are used as benchmark to demonstrate relative poor performance of the developing countries. Arguably, the institutional gap between the developed and developing regions weakens the scope of context-sensitive transferrable lessons to the later. While these first-to-third world comparisons have helped to show the magnitude of the gap in fiscal capacity, there is much to be learnt from comparisons rooted in emerging market context (Dom & Miller, 2018; Grindle, 2004).

Theoretical literature

Taxation is largely intertwined with state formation and economic development in general. For developing regions, taxation challenges are part of broader issues surrounding the consolidation and legitimacy of the state. The early seminal work of Schumpeter (1918) has been influential towards understanding taxation in the context of rudimentary state institutions. In '*The crisis of the Tax State*", he argued that tax systems essentially speaks to the core of the states and its history (Schumpeter, 1918). Following the processes of historical state development in Europe, a lot of work has been done showing that stronger fiscal capacity is positively correlated with stable and stronger states (Acemoglu & Robinson, 2016;

Bonney, 1999; Daunton, 2012; Yun-casalilla, O'Brien, Francisco, Comín, & Wong, 2013). The main theoretical lenses of this literature have been termed the bellicist theory of state formation. It was aptly summarized by Tilly in his famous aphorism "war made the state and the state made war" (Tilly, 1990, p. 85). The unrelenting warfare in Europe led to increased need for more revenues and led to the erection of tax institutions that were strengthened over time for the repayment of war debts. The result was the centralization of revenue collection that led to higher fiscal capacity states. The classic example given is the income tax imposed in 1799 by Great Britain during the Napoleonic wars. Although it was abolished after the war in 1814, it was reintroduced permanently in 1842 to become a permanent source of government revenues.

The bellicist theory has been found to be most suitable for the centralized states that emerged in Europe after the 1648 treaties of Westphalia (Niang, 2018). Another strand of literature has risen that argues that state formation, and therefore taxation, in non-European regions was radically different (Herbst, 2000; Hoffman, 2015; Johnson & Koyama, 2016). In other words, the non-European tax systems are not to be understood as failed versions of the western world. The African pre-colonial history, for instance, teaches us that political progress happened outside the state "but not between the extreme poles of centralization and anarchy" (Niang, 2018, p. 7). The implication of this is that in order to understand developing regions, the Eurocentric literature helps to a limited extent (Austin, 2007; Beramendi, Dincecco, & Rogers, 2019). In Sub-Saharan Africa, for instance, conflicts and warfare have been found to be associated with special-interest states that are characterized by high levels of civil conflicts (Beramendi et al., 2019). As Tilly (1990) acknowledged, the tax systems in developing regions need to be understood in their own merit rather than as attenuated deviations of European systems. This implies that the south-south comparisons are more suitable compared to north-south comparisons.

Theoretical lenses from political economy and fiscal sociology literature have also been influential towards our understanding of taxation in developing regions. Given the importance of economic structural features for taxation (Musgrave, 1969), the political-regime type is crucial in determining the amount of tax collected (Bird, 2013; Sokoloff & Zolt, 2007; Zolt & Bird, 2005). This literature elevates the role of elite power in fiscal capacity building (Beramendi et al., 2019; Kelsall, 2018; Lieberman, 2001; Mkandawire, 2010). Rather than a fiscal contract between the state and society, the states in the developing world grapple with the needs of the elites or ruling coalitions (North, Wallis, & Weingast, 2009). The state-elite interactions inform what is fiscally possible (Sokoloff & Zolt, 2007).

For instance, the Latin America's large farm-owning elites resisted property taxes but the same taxes became the basis for stable fiscal revenues in North America and Canada (Beramendi et al., 2019; Sokoloff & Zolt, 2007). Third world order (North, 2005) poses challenges that first-world tax approaches fail to solve.

It is therefore clear that one can understand taxation in developing countries better by embedding the analysis in the complex third world context. The Western or European tax standards and policies do serve a purpose of what is possible when institutions have evolved but any pre-made European best practice may not be the 'best fit' for the developing regions. Comparison across the third world context allows one to find out outliers and why certain policies work well in one country and not in another of comparable socioeconomic status. Next, we turn to the empirical literature.

Empirical literature

International development agents such as the IMF and academic researchers have spent considerable time trying to understand why developing countries collect so little revenues (Bahl & Bird, 2008; Besley & Persson, 2014; Kaldor, 1963; Keen, 2012). The research coming from the IMF staff has focused on expanding the theoretical arguments about the determinants of tax revenues (Fenochietto & Pessino, 2013; Stotsky & WoldeMariam, 1997; Teera & Hudson, 2004). These papers use the IMF data to analyse the determinants of tax revenues. This literature also solidified the idea of tax effort, which is the ratio between the actual tax share and the predicted tax share given the economic fundamentals of each country (Fenochietto & Pessino, 2013).

The *tax effort* literature has become a distinct literature that tries to determine if a country is exploiting all the taxable capacity or 'tax handles' in its economy (Musgrave, 1969). The literature explores whether the tax administration systems are exerting optimum effort in revenue collection given the existing economic fundamentals (Mkandawire, 2010; Teera & Hudson, 2004). The expectation is that countries with poor structural features, such as subsistence agriculture and low levels of industrialisation yield less tax revenue than those with higher levels of industrialisation (more of this in the method section). The tax effort literature has also permeated into academic research with different permutation and focus but the underlying question is on the determinants of tax revenues (Cage & Gadenne, 2018; Dom & Miller, 2018; Joshi, Prichard, & Heady, 2014). Some researchers have also taken a critical view of the IMF research that generalised tax effort across the world without taking into

account the regional uniqueness of the developing regions (Dom, 2019; Riswold, 2004). Similarly, the IMF's interventions in trying to boost tax administration in the developing regions have not been seen as effective. For instance, lately, the so-called Semi-Autonomous Revenue Authorities (SARAs) such as independent treasuries have not improved revenues in Sub-Saharan Africa (Dom, 2019, p. 214). The SARAs yielded more revenues but only in the short run but this diminished over time. One main reason is that the SARAs are not completely insulated from predation by corrupt ruling elites (Dom, 2019, p. 39). Concerning this failure, it would seem Bird (1992, p. 214) was predictably correct when he argued the governments were to take international advice with caution and "cease chasing after fundamentally non-existent panaceas to their fiscal problems."

A more recent trend in the literature has been to focus on one or two aspects when trying to understand the determinants of tax revenues for developing regions. One main recipient of academic focus is the so-called 'unearned money' in the form of natural resource rents and foreign AID (Asongu, 2015; Bhushan & Samy, 2014; Brun, Chambas, & Laporte, 2011; Mehlum, Moene, & Torvik, 2005). Natural resource abundance causes the investment in fiscal capacity to decline and hence it undermines the ability of the state to raise revenues in the future (Botlhole, Asafu-Adjaye, & Carmignani, 2012; Mehlum et al., 2005). Discovery of natural resources in period 1 with anticipated revenues for period 2 reduce efforts on domestic revenue mobilisation (Besley & Persson, 2014, p. 96). AID has also been associated with the 'Samaritan's dilemma' which cause aid-dependent countries to keep going back to the donors (Bhushan & Samy, 2014; Easterly, 2002; Yohou, Goujon, & Quattara, 2015). While the 'unearned money' is a challenge in developing countries, some researchers have argued that the institutional quality matter as a channel towards bad or good outcomes (Mehlum et al., 2005). According to Bothlhole *et al*, (2012, p. 145), natural resources are only detrimental to taxation if the institutions are poor. Aid, as a substitute form of financing, can also be positive if the recipient country has good governance (Sindzingre, 2007). As a result, the main message is that the problem of unearned money is conditional. If a country performs well on a number of indicators of governance, it tends to invest the unearned money efficiently.

Historically motivated reasons for the heterogeneity of tax revenues in developing regions have also emerged. Colonial heritage has been regarded as fundamental in explaining current fiscal patterns of Africa and Latin America (Bates et al., 2007; Keen, 2012; Mkandawire, 2010). The debate is that of 'fiscal inertia' that argues that once established taxation systems persist (Webber & Wildavsky, 1986). The theoretical logic behind

persistence is that taxes outlive their initial purposes and tend to 'ratchet' upwards with no tendency to decline (Peacock & Wiseman, 1961, p. 14). Mkandawire (2010, p. 1663), for instance, has argued that relative successful taxation in what were colonial labor-reserve countries in Sub-Saharan Africa hinged on the inherited colonial practices, which acted as initial conditions in the post-colonial era. Closely related to this is the classification of countries by their colonial metropolitan identities such as Francophone and Anglophone Africa or Spanish America (Frankema, 2011; Keen, 2012; Sokoloff & Zolt, 2007; Stotsky & WoldeMariam, 1997). Owing to the British common law traditions, it has been suggested that the Anglophone countries tend to perform better than the Francophone in tax collection (Keen, 2012, p. 7).

Empirically the tax effort literature divides the determinants of tax revenues into a few categories namely economic structural determinants, macroeconomic policy variables and institutional variables. The empirical literature demonstrates that there are many data sources, methodological choices and different sample sizes pursued (Prichard, 2016). This implies that the results tend to be sensitive to the methodology, sample size and region of focus (Bhushan & Samy, 2014, p. 7; Yohou et al., 2015, p. 2). As noted by Pritchard (2016, p. 50), "The *ad hoc* datasets have generated significant new concerns. The proliferation of alternative datasets has further reduced comparability across studies while making replication and verification difficult or impossible". The general concerns of GDP data inconsistencies from traditional sources worsens the problems (Jerven, 2013). This is so because GDP data is used to normalize the tax data for comparability across different nations. Using different GDP datasets tend to yield slightly different tax shares but these differences are not material for overall tax trends.

In table 1 below, we summarize the main determinants of fiscal capacity with their empirical outcomes as found in the literature. This summary of the empirical literature captures the common observations by researchers in both the tax effort literature and those in taxation and development literature in general. While the summary is not exhaustive on the debates especially on ambiguous variables, the table provides the empirical synopsis of what has been done. The empirical work reviewed in the table covers studies that cut across developed and developing regions.

Table 1. Determinants of tax revenues: Summary of existing studies

Category	Determinants	Explanation	Expectation	Examples
Economic structural determinants	GDP per capita	GDP/population	(+) Higher incomes means the tax base grows.	(Besley & Persson, 2013; Fenochietto & Pessino, 2013; Ortiz-Ospina & Roser, 2019; Stotsky & WoldeMariam, 1997)
	Trade (XM)	Imports plus exports as percentages of GDP	(+) Trade taxes are easy to tax at the ports	(Cage & Gadenne, 2018; Davoodi & Grigorian, 2007; Keen, 2012)
	Industry	Manufacturing value addition to GDP	(+) More revenue is obtained in an industrialized country	(Mkandawire, 2010; Teera & Hudson, 2004).
	Agriculture	Agriculture	(-) Agriculture in developing countries is hard to tax given that it is mostly subsistence in nature	(Mkandawire, 2010; Rodríguez, 2018)
Macroeconomic policy variables	Debt	Debt shares in GDP	(+/-) Debt repayment boost demand for fiscal capacity but may also create macroeconomic imbalances reducing tax revenue	+ (Bhushan & Samy, 2014; Mkandawire, 2010) - (Teera & Hudson, 2004)
	Inflation	Price fluctuations	(-) In developing countries inflation affect taxes due to long collection lags etc.	(Fenochietto & Pessino, 2013; Rodríguez, 2018)

Table 1. Determinants of tax revenues: Summary of existing studies, continued

Category	Determinants	Explanation	Expectation	Examples
'Unearned' money	Natural resources	Mostly oil and other minerals	(-/+) Reduces fiscal capacity building but may positively spur fiscal capacity if institutions are good.	-(Besley & Persson, 2014; Botlhole et al., 2012; Mehlum et al., 2005) +(Brun et al., 2011)
	AID	Mostly from foreign donors	(-) Aid acts as an alternative source diminishing tax efforts	(Asongu, 2015; Besley & Persson, 2014; Yohou et al., 2015)
Institutional quality variables	Corruption	Self-enrichment practices in public officials	(-) Corruption reduces both the potential and revenue and leads to misuse of the collected revenues	(Bahl & Bird, 2008; Baskaran & Bigsten, 2013; Botlhole et al., 2012)
	Conflicts	Political stability	(-) Conflicts cause disruptions of tax collection and some instances plunder of public resources	(Addison & Levin, 2012; van den Boogaard, Prichard, Benson, & Milicic, 2018)

Sources: Own table based on the cited literature

What is common from the above literature is that the cross-country empirical analysis is driven by the appeal for having more observations, hence more countries, for statistical reasons. As a result, developed countries are often mixed with developing countries (e.g. Piancastelli & Thirlwall, 2019; Rodríguez, 2018). The inevitable results of these studies are that they conclude with recommendations for widening the tax base and the need for tackling tax evasion in developing countries. This may not help much for developing countries and there remains relevancy for peer-to-peer comparisons that seek to find out why for instance Brazil has done well in a particular tax policy compared to Chile or South Africa.

The attention that Sub-Saharan countries continue to receive reveal that there is a lot that is still not clear that inter-regional comparative studies may reveal. This is also true for the focus on Latin America (Atria et al., 2018). What is certain is that fiscal capacity differs from country to country and across time (Prichard, 2016) but the regional comparisons are

crucial to determine what countries with similar characteristics can learn from each other. This heterogeneity means that there is no one model that fits all in terms of understanding taxation in developing countries. Classifications exist and these seek average patterns. For instance, countries are classified according to colonial heritage (Mkandawire, 2010), metropolitan identity (Fossat & Bua, 2013) and trading blocs (Ade, Rossouw, & Gwatidzo, 2017). In these types of grouping, it becomes easier to see the deviations from the regional norms. These classifications help to assess deviation from the group averages and identifying lagging and leading outliers with the intention of peer-to-peer comparative lessons (Dom & Miller, 2018). What remains underexplored in this tax effort literature is the comparative analysis across regions. This paper attempt to do this by comparing the SSA and LAC. Aizenman, Jinjarak, Kim and Park (2015) started with the direction of regional comparative analysis when they analyzed tax revenue trends in Asia and Latin America. Comparing the LAC and SSA regions is ideal given the indication that Latin America has experienced rising revenues in the recent period (OECD, 2017) while the Sub Saharan region has not done equally well (Dom 2019; OECD 2018).

Data and empirical analysis

This paper mainly uses the international organization namely the World Bank's World Development Indicators (WDI) for the covariates and the fiscal data from the International Centre for Tax and Development (ICTD). Other individual variables from other sources other than these two will be acknowledged throughout the study. These two sources complement each other due to the structure of their data.

The WDI provides broad economic, political, and institutional measures at an aggregated level while the main advantage of the ICTD data is that it combines many top tax datasets and harmonize them for comparability. The ICTD data is compiled from the OECD Revenue Statistics*;* OECD Latin American Tax Statistics*;* IMF Government Finance Statistics (GFS); IMF Article IV Staff Reports; CEPALSTAT Revenue Statistics in Latin America (Prichard, 2016). This implies that limitations inherent in these individual datasets are reduced in this ICTD dataset since it maximizes on the strengths in each dataset. For instance, the inclusion of the revenues from natural resources has caused tax shares to be inflated in the WDI dataset while the ICTD data has separated the resources revenues and taxes. The ICTD data also extract social contributions that are usually earmarked for specific purposes and should not be regarded as part of ordinary revenues. This makes it possible to have nuanced

questions regarding natural resources or pure taxes from other sources. The ICTD is focused mainly on taxes and has the disaggregated tax data. For instance, it splits total revenues into taxes, non-tax, direct taxes, indirect taxes, resource taxes, corporate taxes, social contributions and property taxes among others. This is important for tax effort because it allows one to disentangle the revenue that accrues to the governments due to fiscal capacity and revenues which is obtained through windfalls such as natural resources and 'unearned' foreign aid. For a comparison of LAC and SSA the disaggregated tax data brings nuance to the differences in the regions. Besides regional differences, the analysis can be split by income levels such as low income (LI), lower-middle-income (LMI) and upper-middle-income (UMI).

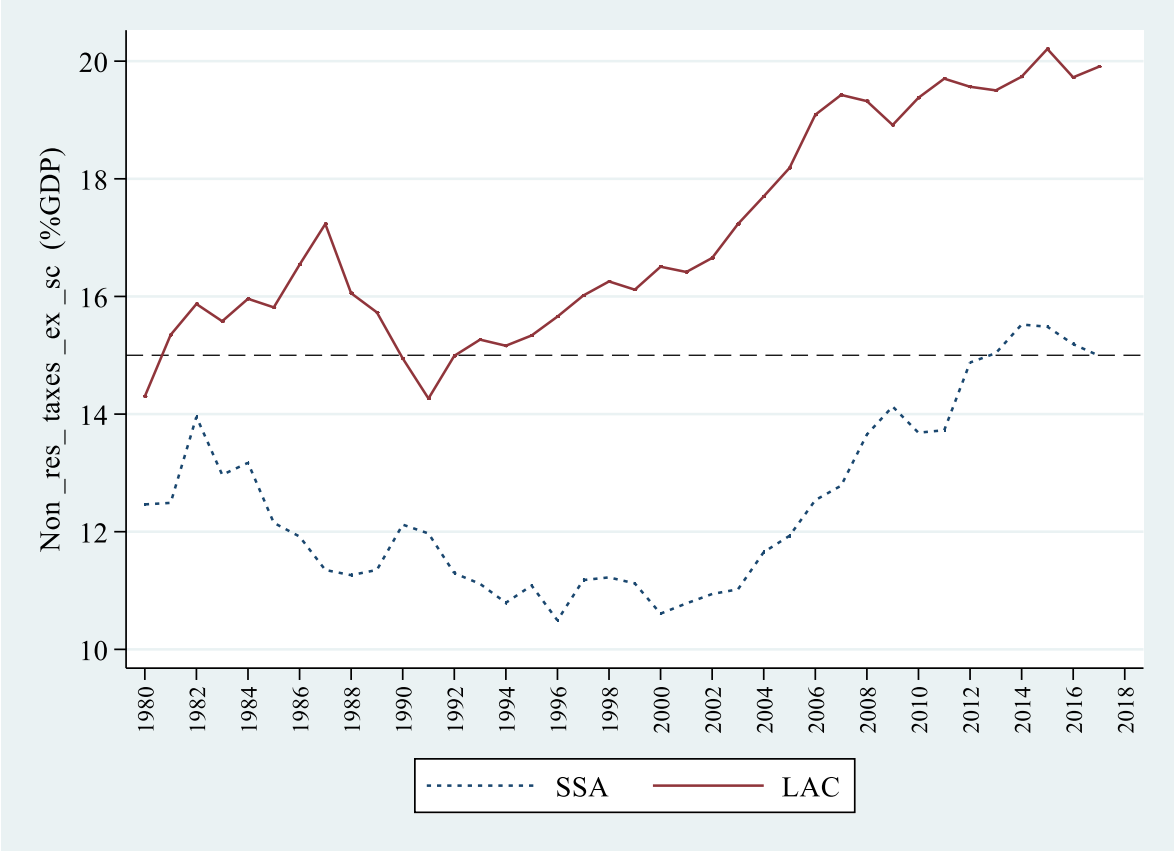
In terms of methodology, the study is divided into two analytical approaches. The first is concerned with the comparative analysis of the trends, volatility and tax effort in taxation in these two regions since 1980. Given that 1960 was a modal year of independence for African countries, it is reasonable that any taxes existing in this period were merely remnants of the colonial tax system and not reflecting efforts of new governments. Starting in 1980, two decades into the postcolonial period, comparison between the SSA and LAC becomes feasible since countries in both regions had various tax initiatives as independent states. The second analytical strategy takes advantage of the panel data to run a panel analysis but one that is geared towards exploring how determinants of taxes behave in the two regions and across income levels.

Trend analysis

The first point of comparison is in the aggregated taxes. Figure 1 below shows that although there has been a steady increase in tax shares (excluding resource taxes and social contributions), the SSA region has been consistently lower than the LAC region. This is hardly surprising given the LAC countries were independent many decades before the SSA countries. There was a substantial decline in taxes in the SSA between 1980 and 1996, a decline that lasted only for a few years in the LAC regions. The trend does mirror the so-called 'lost decades' (Bates et al., 2007; Easterly, 2002). A 15% benchmark line is used here for more perspectives since it has been found that "countries with tax revenues below 15 % of GDP have difficulties funding basic state functions" (UN, 2018, p. 1). While the average tax shares in the LAC regions reached 15% in 1997, the SSA took 15 years to reach 15%. While the catchup looks promising, it should be noted that this is only because it is an average where richer SSA countries pull the average upwards. As per figure A1 in the Appendix, the lower-

income countries, for instance, have not crossed the 15% mark. The Upper middle income (UMI) show more stable growth in both regions despite starting at different levels. The UMI countries in the LAC region started at around 10% while the SSA started at 16% but declining in the 1990s during the liberalization that accompanied the structural adjustments. The tax shares in figure 1 show that the liberalization was more devastating for the SSA region than the LAC region because recovery was quicker in the later.

Figure 1. Tax shares in Sub-Saharan Africa, and the Latin America & Caribbean

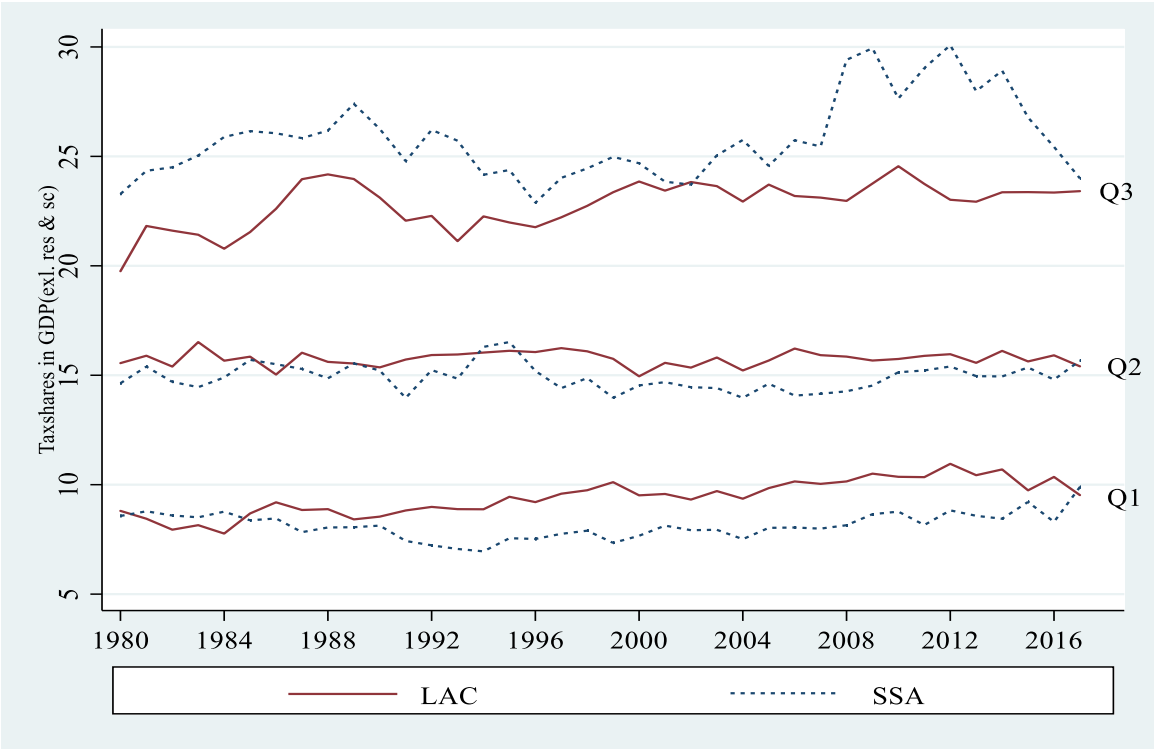


Source: Data from ICTD 2019

Further disaggregating the tax revenues by percentiles also brings a different nuance to the overall higher performance of the LAC region since 1980. Figure 2 below divides the data into percentiles by grouping the countries into three groups namely Q1 (bottom 33%), Q2 (66%) and Q3 for the top performers. The countries are listed in table A1 in the appendix. It is clear that the LAC regions have grown because the bottom two-thirds of the countries have mainly outperformed their peers in the SSA region. The SSA region has done better only in the high tax countries, outperforming the LAC countries for the entire period. What this

shows is that the poorer countries in the LAC regions have experienced higher growth in fiscal capacity than their counterparts in SSA. On the contrary, top countries in SSA have had better fiscal capacity building than their LAC counterparts. The overall trends are however driven by the bottom two thirds.

Figure 2. Taxation trends by percentiles



Source: Data from ICTD 2019

Figure 3 below shows the major contributors to total taxes as shares in GDP by income groups and regional differences. Rather than cross-sectional analysis, a historical panel allows one to study the trajectories each region has taken. Both the SSA and LAC regions still rely highly on indirect taxes, mainly taxes on goods and services, compared to direct taxes such as income tax whose growth has been modest. The indirect taxes in both regions have grown from 8% to about 12 % in 2017. The direct taxes remain at low levels of 6%. The taxes on trade have been on the decline in line with the general free trade movement (Cage & Gadenne, 2018). The SSA region seems to have lost more revenues due to the decline in trade taxes than the LAC region in which trade taxes never exceeded 4% since 1980. Both regions experienced a decline in corporate taxes from the 1980s and a modest growth has been experienced from 2005 onwards. The pressure of creating FDI friendly environment has been

partly the attributing factor to this decline of corporate taxes (OECD, 2008). The level of financial intermediation and large taxpayer offices has been seen as influential to yield more revenues from the corporates and partly explains the recent increase (Gordon & Li, 2005). The large informal sectors in these regions also limit the amount to be raised from corporates unless incentives are provided for formalization as well as putting more work in other hard-to-tax sectors (Keen, 2012).

Figure 3. Tax contributions from various sources (shares in GDP)

Source: Data from ICTD (2019)

Income tax experienced a less drastic decline that lasted for the 1980-90 decade than corporate taxes, which declined until the year 2000. Income tax increased in both regions with the LAC region on the lead until the SSA countries took the lead after 2010. The income tax increase that put the SSA on the lead is also mirrored in the category of individual taxes as shown in figure 3. The growth of individual taxes in SSA is evidently causing a divergent path for the two regions since the LAC remained modest at 2% while the SSA is approaching

5%. This is encouraging since the SSA region is projected to be populous than the LAC region, being the fastest-growing continent (United Nations, 2015a, p. 15). The implication for income taxes and individual taxes is large in the sense that these two categories are seen as important for solidifying state-society reciprocity, which leads to stronger fiscal capacity. While it is not evident that compliance is higher in the SSA regions, it is evident that the region is doing relatively well compared to the LAC regions.

Taxes on goods and services (including VAT) have been the most relevant contributor to the total taxes in both regions as shown in figure 3. The fasted growing revenue earner amongst all categories. These taxes have largely replaced the lost revenues in the declining trade taxes. While the LAC region is doing relatively better on the general taxes on goods and services, both regions show similar growth patterns from the 2000s onwards. The VAT is the largest component in taxes from goods and services. It has been referred to as the most important tax innovation of the 20th century since its base is reliable and broad-based (Dom & Miller, 2018; Riswold, 2004). There are concerns, however, owing to problems regarding its regressive distributional impact on the poor (Alavuotunki, Haapanen, & Pirttilä, 2019).

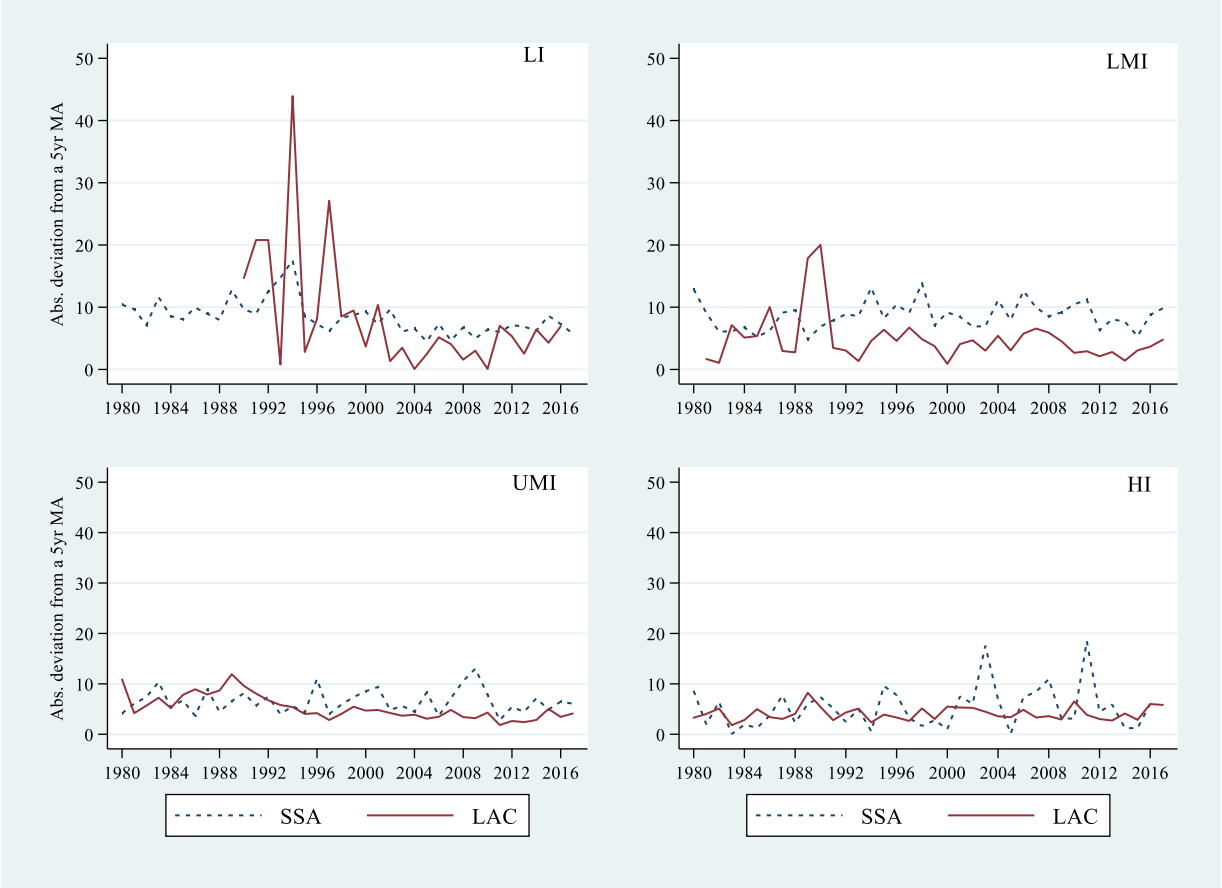
We turn to revenue volatility as an important aspect of taxation. It is important because the ability to budget and provide basic goods and services in a consistent and predictable manner requires stable revenues. This implies that there is a need for a stable flow of public revenues from taxes and other sources. Stable revenues over time allow service delivery to be smooth because governments can have stable expectations about how much is to be raised each year. This does not happen when public revenue is highly volatile. High volatility implies that countries cannot be certain about their yearly budgets and it also implies that public service provision and investment into physical capital is erratic at best. This paper follows (Dom, 2019) in measuring volatility as absolute percentage deviation of tax collection from a five-year moving average. Thus for each period t and country i volatility is measured as:

$$Vol_{it} = \frac{abs(Tax_{it} - \overline{Tax}_{it})}{\overline{Tax}_{it}} \quad (1)$$

Where $\overline{Tax}_{it}$ is the value of the five-year moving average for each country i in period t. This deviation allows one to see how volatile different forms of revenues are. The expectation is

that volatility can be a proxy for either poor fiscal capacity, which indicates that the government is not consistent in its efforts in collecting revenues. The other dimension is for one to see some periods with volatile revenues and trace possible policy changes or major shocks. The key indicator of interest here will be the total non-resource taxes (excluding contribution). The first step was to calculate volatility by region and the SSA has been more volatile than the LAC region. The divergent is bigger from 1990 onwards when the LAC region moved between 4%-8% while the SSA region moved between 10% and 14%. To get more nuance, the volatility was split by income groups that is LI, LMI, UMI and HI. Figure 4 below shows the results.

Figure 4. Revenue volatility by income level and region



Source: Data from ICTD 2019

In the LI category, the LAC countries show higher volatility between 1990 and 2000 but it falls under the SSA level from 2000 onwards. For the rest of the income groups, the SSA region shows higher volatility on all income levels than the LAC region. What this depicts at glance is that there is more stability in terms of tax revenue collection in the LAC region than

the SSA region. This is true for all income groups from 1990 onwards. This seem to support Dom (2019) who argues that in Sub-Saharan countries, SARAs have not caused more revenue collection and stability in the long run. Politicians may still well be able to decide who gets exemptions or what amount should be officially put in the coffers each year causing the higher volatility observed. The discretionary space of the revenue authorities tend to leave room for corruption and the elites have incentives to keep it despite any expert advice towards full autonomy (Besley & Persson, 2010; Fjeldstad & Therkildsen, 2008). The gap between what is collected and the potential remains big. Next, we turn to the tax effort trends exploring this gap.

The volatility of tax revenues can be linked to the tax efforts exerted by the tax authorities. A focus on fiscal capacity building has a goal of maximizing revenue collection. The maximum amount collectable is largely determined by the prevailing economic conditions. Tax effort is measured in literature by comparing the actual revenues the government is collecting against the estimated tax levels or taxable capacity (Fenochietto & Pessino, 2013; Mkandawire, 2010; Teera & Hudson, 2004). A big gap between the collected revenues compared to the potential revenues (predicted) implies that tax authorities are not maximizing the revenue potential in the economy. The obvious way to start is to consider the expansion of the tax base to reach the untaxed sectors of the economy. The tax effort as a measure of over-taxation or under-taxation is not cast in stone but has been found to be relevant amongst key indicators of whether a country has room for more revenues to be collected. Tax effort is measured as:

$$TaxEffort_{it} = \frac{Tax_{it}}{\dddot{Tax}_{it}} \quad (2)$$

Where,

$$\dddot{Tax}_{it} = \beta X_{it} + \delta_t + \epsilon_{it} \quad (3)$$

Where $\dddot{Tax}_{it}$ is the taxable capacity measured through predicted revenues given by equation 3. This equation (3) takes into account the year, δ_t, fixed effects and the main variable of interest is GDP per capita as a proxy for the tax base. Studies usually consider a cross-sectional measure of tax effort in a given year (e.g. Mkandawire, 2010) but in this study, the average for all the years is used as a measure of tax effort for each country for the period

under review. The superiority of this approach over the cross-sectional approach is that historical performances of both low and high efforts are accounted for in one composite measure. This country mean tax effort over time is given:

$$\overline{TaxEffort}_i = \frac{1}{N}\sum_{n=1}^{N} TaxEffort_i \qquad (4)$$

Where N shows the number of years since 1980. In addition, the motivation for an average tax effort over time is to measure the progress made by these countries as their economies transformed. The year-to-year fluctuations of tax effort may be desirable but the inherent volatility of the tax shares in developing regions will cause variability in tax effort that cannot be attributed to the effort of the tax authorities entirely. Figure A2 in the appendix shows the tax effort indices for the countries in the sample. The tax effort is a ratio of the actual to potential tax level and when it is below one it reflects that the economy has more taxable capacity unexploited but above one shows that the economy is exploiting all taxable capacity. For a more vivid illustration, the countries are grouped into three categories namely low tax effort, optimal tax effort and high tax effort. The next step was to calculate for each country the deviations or spreads from each group's mean. This helps in the sense that the spreads over group means show how countries perform relative to their peers.

Table 2 shows countries with the lowest tax efforts and how their efforts spread around the group mean. Poor countries tend to have lower tax efforts and this tend to be attributed to general poor fiscal capacity and underdeveloped tax systems. It is not strange, for instance, that countries such as the two Congos, Sudan, Liberia and others in the table are grouped in the low tax effort category. The unexpected outcome in table 2 is that Chile is amongst the countries with low tax effort given its level of development. The table shows that the countries performing optimally have smaller deviations around the group's mean with the standard deviation being 0.06. This implies that an average country in this group is collecting maximum possible revenue as the economic fundamental warrants. In other words, the gap between the actual and predicted revenues is minimal for most of the countries.

Table 2. Tax effort expressed as spreads over the group means

Low effort		Optimal tax effort		High effort	
Country	**Deviation**	**Country**	**Deviation**	**Country**	**Deviation**
Dominican Repub.	0.00	Togo	0.00	Burundi	0.72
Belize	0.15	Suriname	0.10	Lesotho	0.66
Tanzania	0.15	Senegal	0.09	Rwanda	0.44
Guatemala	0.13	Burkina Faso	0.08	Brazil	0.11
Peru	0.10	Ghana	0.07	Mauritius	0.07
Central A. Rep.	0.09	Honduras	0.06	Namibia	0.04
Sao Tome and Pr.	0.09	Ethiopia	0.04	Kenya	0.03
Cameroon	0.07	Trinidad & Tobago	0.04	Comoros	0.00
Argentina	0.07	Barbados	0.02	Malawi	-0.01
Costa Rica	0.06	Gambia, The	0.01	Jamaica	-0.07
Guinea	0.06	Angola	0.01	South Africa	-0.08
Venezuela, RB	0.05	Benin	0.01	Cabo Verde	-0.16
Madagascar	0.03	St. Lucia	0.00	Uganda	-0.20
Gabon	0.03	Grenada	0.00	El Salvador	-0.25
Bolivia	0.02	St. V. and the Gren.	0.00	Botswana	-0.31
Chile	0.01	Mauritania	0.00	Zimbabwe	-0.31
Sierra Leone	-0.01	Bahamas, The	0.00	Haiti	-0.31
Mexico	-0.06	Seychelles	-0.01	Cote d'Ivoire	-0.32
Liberia	-0.06	Nigeria	-0.01		
Paraguay	-0.13	St. Kitts and Nevis	-0.03		
Sudan	-0.14	Niger	-0.03		
Congo, Rep.	-0.18	Colombia	-0.05		
Panama	-0.19	Nicaragua	-0.08		
Equatorial Guinea	-0.29	Mozambique	-0.08		
Congo, Dem. Rep.	-0.32	Guinea-Bissau	-0.08		
		Zambia	-0.09		
		Mali	-0.10		
		Uruguay	-0.10		
		Ecuador	-0.12		
S.D	**0.13**	**S.D**	**0.06**	**S.D**	**0.32**

Source: Data from ICTD 2019

The high tax effort group shows that there is more variability regarding the spreads over the group mean given the highest standard deviation among the three groups. The fact that most upper-middle-income countries are in this group is also not surprising. As an index, tax effort for this group suggested that there is little to no room for more taxes to be raised given the existing economic fundamentals. The tax data used is at a central level and excludes municipal level but there are concerns that the citizens in this group are overtaxed. For instance in countries such as South Africa (Schussler, 2019) and Brazil (Gobetti & Orair, 2017). The talk of ‘tax revolts’ in the South African media (Schneider, 2019) is fueled by the fact that citizens pay high levels of taxes without seeing commensurate public service

delivery. This speaks to the fact that after achieving relative efficiency in collecting taxes, legitimacy may remain weak if the government do not invest in public services.

What is perhaps surprising in table 2 is that countries such as Zimbabwe and Haiti fall into the high tax effort category. The explanation for this may lay in the fact that some governments in poor countries make efforts to collect more tax revenues than levels warranted by the prevailing economic conditions. Zimbabwe, for instance, has a relatively strong revenue collection system, the Zimbabwe Revenue Authority (ZIMRA). In the last decade of the Mugabe regime, the tax base in Zimbabwe has been eroded due to poor economic growth and overall poor economic conditions of the citizens. The recent 2% tax introduced for all electronic transactions (KPMG, 2018), for instance, is evident of the fact that taxation in Zimbabwe exceeds what is perhaps feasible given prevailing economic conditions. With the majority of households relying on petty trading due to unemployment, there are also concerns that women are mostly affected because they are the ones involved in this kind of trading (Ligomeka, 2019).

Tax effort is important in terms of assessing whether countries are exploiting all possible avenues in the economy. It, however, remains a crude measure that has to be used contextually taking into account the country-specific factors, as highlighted above for Zimbabwe. According to Teera and Hudson (2004, p. 797), "a low index of tax effort does not necessarily indicate that the country should raise taxes or does a high index indicate that taxes should be lowered." Many factors come to play in the actual decisions of whether taxes should be lowered or increased. These include expenditure needs, administrative capacity, political acceptability and availability of other alternative sources of revenues.

The panel framework

With the focus on developing regions in this study, the empirical strategy seeks to explore the two regions as combined and split the analysis for the SSA and LAC regions. Following the standard literature in the tax and development literature, we run the following panel model for periods under study:

$$Taxshare_{it} = \alpha + \beta X_{it} + \delta R'_{it} + \psi_t + \mu_i + \mathcal{E}_{it} \quad (5)$$

Where $Taxshare_{it}$ is the share of tax in GDP, α is the overall constant, X_{it} is the regressor of theoretical interest, the per capita income as a proxy for the tax base. R'_{it} is a vector of other variables that may have an important bearing on a country's ability to collect tax revenues. ψ_t is the time effect for each country, μ_i is the country effect for each country and $\mathcal{E}_{it}$ is an overall error term. i = 1,2, 3,…..N are the cross-sectional units (countries in this case) and t = 1, 2, 3… T are periods in years from 1980-2018. Since the interest is on the comparative analysis across nations and the two regions, we use 5-year averages namely 1980-84, 1985-89 until 2018. This also removes short-term fluctuations in the data, another way of dealing with volatile data. This also helps to mitigate data quality issues especially for the 1980 decade where the poor countries had limited data recording capacity. We start with basic regressors in a stepwise approach and explore differences across regions and income levels:

$$Taxshare_{it} = \beta_0 + \beta_1 lngdppc_{it} + \beta_2 Agric_{it} + \beta_3 Trade_{it} + \beta_4 Oilrev_{it} + \beta_5 Mining_{it} + \beta_6 Logpopdensity_{it} + \beta_7 Industry_{it} \ldots + \psi_t + \mu_i + \mathcal{E}_{it} \quad (6)$$

Since the main goal is to explain domestic resource mobilisation, tax share excludes revenues from natural resources, AID, and social contributions. This allows the analysis to be purely on tax revenues that accrue because of fiscal capacity rather than 'unearned income'. Theoretically, the expected signs are discussed in the summary of the empirical literature above. For instance per capita income should be positively related to taxation hence we expect that $\beta_1 > 0$. In a similar vein, high share of agriculture in GDP implies a low level of industrialisation and a small tax base hence we expect to see that $\beta_2 < 0$. The full list of the variables is in table 3 below, which shows the variable descriptions and sources. The explanatory power of each variable will be fully explored in the next section, which discusses the results of the empirical testing.

Table 3. Variable description and source of data

Variable	Description	Source
Tax share	Non-resource taxes excluding social contributions (% GDP)	International Centre for Tax and Development 2019
Loggdppc	Log of per capita income in constant 2011 US$	World Bank Development Indicators 2019
Agric	Agriculture as a share of gross domestic product	World Bank Development Indicators 2019
Trade	Share of exports plus imports in gross domestic product	World Bank Development Indicators 2019
Oilrev	Oil rents (% of GDP)	World Bank Development Indicators 2019
Mining	Mineral rents (% of GDP)	World Bank Development Indicators 2019
logpopdens	Age dependency ratio (% of working-age population)	World Bank Development Indicators 2019
Indust	Industry, value added (annual % growth)	World Bank Development Indicators 2019
VAT	Value-added tax	International Centre for Tax and Development 2019
Agede	Age dependency ratio (% of working-age population)	World Bank Development Indicators 2019

Discussion of the panel results

Table 4 below reports the results of the estimated model. The model used is the fixed effects following different tests that suggested other models such as pooled OLS and random effects will not be suitable. Table 4 shows that the number of countries fluctuates between 83 and 78 due to missing data on some variables. Most of the covariates have the expected signs. The variables lngdppc, agriculture trade mineral, Vat and Oilrev show expected signs. Population density has an unexpected negative sign. Densely populated areas imply reduced administrative hurdles when collecting taxes than sparsely populated areas where the state may have difficulties broadcasting its reach. The unexpected sign may be because in developing countries, poverty is prevalent and the density does not imply that it easy to collect revenues. This makes it difficult for revenue collection even in urbanized centres as urbanization (not shown due to collinearity with population density) is also negatively correlated with tax shares. The dependency ratio (Agede) shows expected outcome but is scarcely significant.

Table 4. Determinants of tax revenues (dependent variable: Tax share)

VARIABLES	(Model 1)	(Model 2)	(Model 3)	(Model 4)
Lngdppc	1.247***	1.355***	1.363***	1.139**
	(0.335)	(0.305)	(0.422)	(0.436)
Agric		-0.114***	-0.113***	-0.105***
		(0.0365)	(0.0319)	(0.0304)
Trade		0.0234***		0.01023**
		(0.0321)		(0.01023)
Oilre				-0.104*
				(0.0571)
Miner			-0.0589*	-0.0423**
			(0.0524)	(0.0533)
logpopdens			-1.592	-1.531
			(1.615)	(1.611)
Indust				0.0231*
				(0.0236)
VAT			0.310*	0.295*
			(0.172)	(0.162)
agede				-0.0340*
				(0.0271)
Constant	-14.34*	-14.70**	-10.33	-2.690
	(7.526)	(7.284)	(7.133)	(9.559)
Observations	664	574	574	574
R-squared	0.145	0.383	0.425	0.442
Number of id	83	78	78	78
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 below do the same analysis but also splits the sample in two for SSA and LAC regional comparisons. Many variables maintain their initial attributes as in table 4 but there are some differences worth noting between the SSA and LAC regions. Although returning a positive sign Lngdppc becomes insignificant for SSA. This speaks to the fact that if the tax base is not expanded by the tax authorities, the growth of income per capita may not translate to fiscal capacity building. Mineral rents remain negative for the LAC countries but change to become positive, though insignificant for SSA. This suggests that mining in SSA has been associated with growth in fiscal capacity. One aspect of this is how mining revenues are classified because much of corporate taxes emanate from mining firms and it is not always easy to isolate revenues that are purely from mining-related activities. The SSA region also portrays a significant negative effect of the dependency ratio while this is insignificant for the LAC region. With Africa as the fastest-growing region (United Nations, 2015a, p. 15), the

burden on the working groups is relatively higher than what it is in LAC hence the dependence is negative and significant for the SSA countries.

Table 5. Determinants of tax shares by regions (dependent variable: Tax share)

VARIABLES	(Whole sample)	(SSA)	(LAC)
Lngdppc	1.139**	0.620	1.815***
	(0.436)	(0.691)	(0.570)
Agric	-0.105***	-0.100***	-0.129**
	(0.0304)	(0.0362)	(0.0520)
Trade	0.0123**	0.0102***	0.0100***
	(0.0108)	(0.0203)	(0.0102)
Oilre	-0.104*	-0.122*	-0.0971**
	(0.0571)	(0.0728)	(0.0453)
Miner	-0.0423**	0.0272	-0.160**
	(0.0533)	(0.0731)	(0.0666)
logpopdens	-1.531	-0.817	-2.182
	(1.611)	(1.907)	(2.496)
Indust	0.0123*	0.0201**	-0.0321**
	(0.0236)	(0.0012)	(0.0201)
VAT	0.295*	0.211	0.385***
	(0.162)	(0.226)	(0.120)
Agede	-0.0340	-0.0480*	-0.0150
	(0.0271)	(0.0397)	(0.0379)
Constant	-2.690	7.547	-16.66
	(9.559)	(16.93)	(10.73)
Observations	574	322	252
R-squared	0.442	0.388	0.576
Number of id	78	44	34
Country FE	YES	YES	YES
Year FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 below do the same analysis and split the sample by income groups. The income group split also allow sensitivity analysis by default. What the table shows is that the UMI countries drive the established strong correlation between lngdppc and tax shares. The results also show that agriculture (Agric) is negative and significant for only the LMI countries. Equally, mining still plays an important role in the LMI economies and is not significant for the UMI. The UMI countries such as South Africa, Brazil, Chile and Argentina, among others have moved considerable steps up the industrialization ladder compared to the LI countries. This is confirmed by the variable industry (Indust) which is significant for the UMI but negative and significant for the LI countries. In promotion of industrialization, LI countries tend to incentivize firms through tax incentives leading to the negative correlation between the tax

shares and industry value addition. Age dependency is also negative and significance but only for LI countries. This clearly shows that the poorest countries face significant challenges with taxation as population increases. The natural resource coefficient shows that abundance of resources is negatively associated with tax collection throughout all income groups.

Table 6. Determinants of tax shares by income groups (dependent variable: Tax share)

VARIABLES	(LI)	(LMI)	(UMI)
Lngdppc	-0.135	0.103	3.895***
	(0.578)	(0.550)	(1.016)
Agric	-0.0855	-0.192***	-0.0894
	(0.0545)	(0.0480)	(0.0755)
Trade	0.0012	0.0234*	00.0113*
	(0.0342)	(0.0034)	(0.0345)
Oilrev	-0.0856	-0.120**	-0.167**
	(0.0915)	(0.0543)	(0.0701)
Mining	0.0525	-0.308**	0.0171
	(0.104)	(0.146)	(0.0807)
logpopdens	-0.920	0.555	-13.06***
	(2.848)	(1.709)	(3.695)
Indust	-0.0031*	-0.0314	0.0345*
	(0.0023)	(0.0012)	(0.0203)
VAT	0.694**	0.101	0.445*
	(0.302)	(0.171)	(0.253)
Agede	-0.0968*	-0.0417	0.0103
	(0.0546)	(0.0567)	(0.0887)
Constant	25.79	16.09	-22.62
	(21.98)	(14.01)	(26.62)
Observations	228	162	105
R-squared	0.443	0.389	0.550
Number of id	48	46	34
Country FE	YES	YES	YES
Year FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Conclusion

This paper has shown that the LAC countries are performing better on tax collection than the SSA on average since 1980. The trend is hardly surprising given that the LAC countries have had more postcolonial time to strengthen their fiscal capacity than the SSA countries. Revenue volatility is also quite higher in SSA countries on all income levels, a worrying picture given that the region has the fastest-growing population that will require stable public services. This volatility points more to the fiscal uncertainty in the region owing to

inconsistency in policy and negative economic and political shocks. Through the tax effort indices, the paper shows, however, that the LAC region could be performing even better compared to SSA countries.

For the whole sample, the determinants of tax revenues behave as per theoretical expectations but this changes when the sample is split by region and income levels. The per capita income level, as a proxy for the tax base, is not associated with high tax shares in SSA and this suggests that the growth in incomes has not translated into more tax revenues for the poorest countries in the region. This support the trend analysis which showed that the SSA region has lagged behind the LAC region. The determinants of tax shares also vary in terms of explanatory power across income levels. The determinants portray the patterns observed in developed countries only in upper-middle-income countries. In the poorer lower-middle-income countries and the low-income countries, the results are mixed. The implications of this outcome is that for the poorer countries in both regions, policy advice need to be tailor-made. This reinforces the arguments that policy lessons need to be considered transferrable amongst countries at similar stages of development rather than on a developed against developing country basis. For future studies, what remains to be done is to compare tax reforms across the regions picking countries at similar stages of development. This allows one to explore whether countries at the same level of development perform well, or poorly, on tax collection relative to their peers and what explains the differences.

Appendix

Figure. A1 Tax shares by income groups in the LAC and SSA regions

Source: Data from ICTD 2019

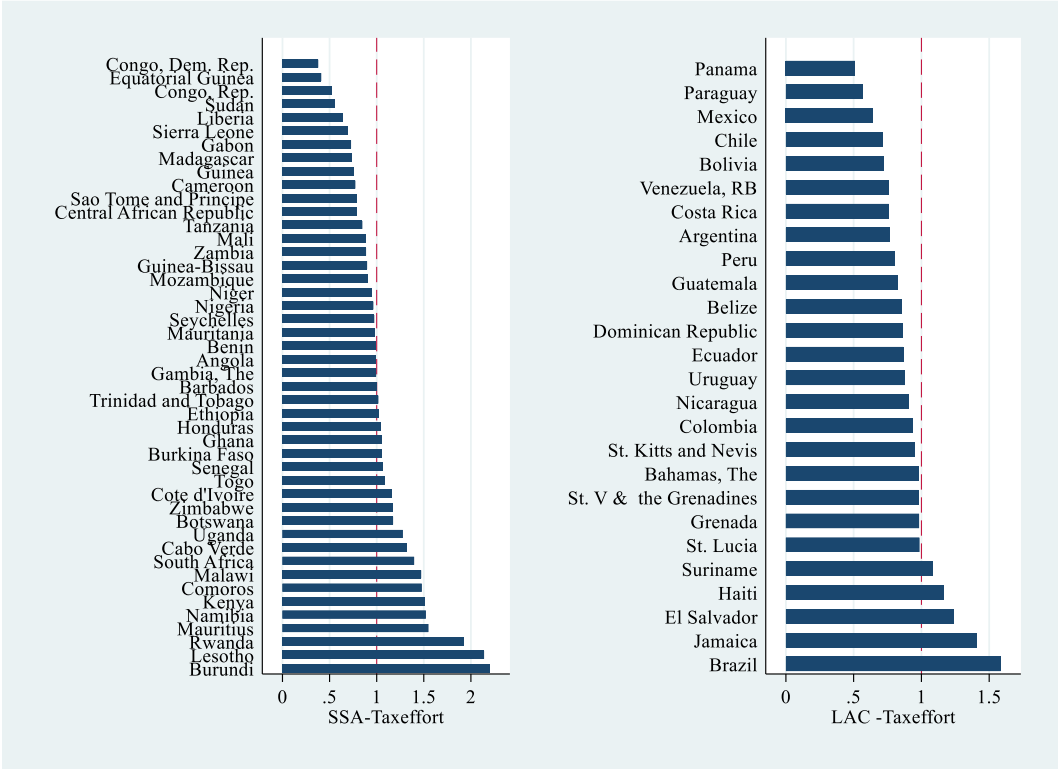
Table A1. List of countries by tax share performance in 2015

Sub - Saharan Africa			Latin America and the Caribbean		
Q1	**Q2**	**Q3**	**Q1**	**Q2**	**Q3**
Angola	Benin	Botswana	Guatemala	Antigua and Barbuda	Argentina
Chad	Burkina Faso	Eswatini	Panama	Bahamas, The	S. Kitts & Nevis
Comoros	Ethiopia	Lesotho	Paraguay	Chile	Venezuela
Congo, Democr. R.	Gabon	Mozambique		Costa Rica	Aruba
Equatorial Guinea	Kenya	Namibia		Dominican Republic	Barbados
Gambia, The	Malawi	St. Vincent & T..		Ecuador	Belize
Guinea	Mali	Seychelles		El Salvador	Bolivia
Guinea-Bissau	Mauritania	South Africa		Grenada	Brazil
Liberia	Mauritius			Haiti	Colombia
Madagascar	Rwanda			Honduras	Cuba
Sierra Leone	and Principe			Mexico	Dominica
South Sudan	Senegal			Nicaragua	Guyana
Sudan	Togo			Peru	Jamaica
Tanzania	Zambia			Suriname	
Uganda	Zimbabwe			Uruguay	

Table A2. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Taxshare	664	13.70784	6.613934	1.06	38.55294
Lngdppc	664	22.49455	1.928184	18.24835	28.52458
Agric	664	18.69565	15.59405	0.0914415	83
Trade	574	2.17E+10	7.15E+10	2.91E+07	8.60E+11
Oilre	663	2.223981	6.364909	0	48.26094
Mining	661	1.475353	3.789822	0	36.03754
Logpopdens	664	3.879797	1.440171	0.2965851	7.064994
Indust	664	1.71E+10	6.20E+10	1.17E+07	8.02E+11
VAT	664	5.163781	3.720984	0.0747731	25.10871
Agedep	664	79.50897	18.31	40.34755	112.8283

Figure A2. Tax efforts by regions



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