

# Institutional and Political Determinants of Statutory Tax Rates: Empirical Evidence from Sub-Saharan Africa

**Sanjeev Gupta, Carlos Mulas-Granados, Jianhong Liu, Danial Salman, and Kelsey Ross**

## Abstract

This paper investigates the extent to which institutional and political factors explain statutory tax rates in sub-Saharan Africa (SSA). In particular, it examines the effect of regulatory quality, political accountability, political fragmentation, the electoral cycle, and ideological orientation on corporate income tax (CIT) rates as well as top marginal personal income tax (PIT) rates during 1990-2017. Different from advanced economies, our results suggest that in SSA institutional (structural) factors are more important than political (conjunctural) ones. Better institutions (proxied by higher regulatory quality) are associated with lower tax rates, while weak political accountability (proxied by longer government tenures) and greater fragmentation (linked to polarization) lead to higher tax rates. The electoral cycle is weakly associated with higher CIT, and contrary to findings in advanced economies, the ideological orientation of the government does not appear to influence statutory tax rates in SSA.

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# 1. Introduction

There is considerable emphasis on low-income countries to mobilize more taxes from domestic sources to help finance the Sustainable Development Goals (SDGs). The Addis Ababa Agenda for financing development pays special attention to domestic resource mobilization in these countries. IMF estimates (Gaspar et al., 2019) that on average, low-income countries will need additional resources amounting to 15.4 percent of GDP to finance the SDGs in education, health, roads, electricity, and water by 2030. Of the additional needed financing, 5 percentage points of GDP would have to come from domestic taxes. In this regard, countries have been modifying their tax codes over the years to maximize tax collections in addition to implementing administrative reforms.

Where a government sets the rate for different taxes influences its revenue position. Although how the tax base is defined is equally critical for the tax yield and thus determines the final revenue collection capacity of a country. Akin to rates, the tax base can also change as part of budget policies, particularly if a government decides to grant tax concessions to different consumers and producers (Gupta 2018). However, consistent information on tax bases over time is nonexistent. Thus, the only way to analyze tax policy and the associated revenue collection is by investigating the determinants of tax rates.

Due to data limitations, the institutional and political determinants of tax policies have not been studied in sub-Saharan Africa (SSA). The literature that does explore tax policies in SSA tends to focus on challenges in mobilizing tax revenues (Kelly, 2000), rather than on the factors that influence tax rates which are principle instruments of tax policies. There is no empirical analysis to explain observed differences in tax rates in SSA, both between countries and within countries over time. The purpose of this study is to fill this gap.

Two considerations potentially affect tax policy in a country as legislators decide on tax rates. On the one hand, well-functioning institutions and regulations can translate tax rates into an efficient revenue system. The stronger these institutions, the lower tax rates need to be to generate one additional dollar of revenue. On the other hand, political considerations linked to political tenure, fragmentation, and electoral and ideological considerations of the party in government can affect tax policy rates in the short term.

In this paper, we exploit a new dataset of tax rates in SSA and analyze the effect of institutional and political factors on these tax rates between 1970 and 2017, after controlling for underlying economic conditions. We show that there has been a systematic decline in tax rates during the past three decades, but different countries have adjusted their personal and corporate income taxation at different paces, reaching different levels. We find that institutional and political factors matter: better institutions (proxied by higher regulatory quality) are associated with lower tax rates, while weak political accountability (proxied by longer government tenures) and greater fragmentation (linked to polarization) lead to higher tax rates. The electoral cycle is weakly associated with higher corporate income taxation, and contrary to findings in advanced economies, the ideological orientation of the government is not a statistically significant factor in influencing tax rates in SSA.

The rest of the paper is organized as follows. Section 2 describes the development of tax rates in SSA countries over the last three decades. Section 3 briefly reviews the literature on the determinants of tax rates. On the basis of the available literature, section 4 formulates some testable hypotheses. Section 5 performs the empirical analysis and discusses the main results. Section 6 concludes.

## 2. Data

We compiled corporate income tax (CIT), personal income tax (PIT) and value-added tax (VAT) data from IMF documents and cross-checked it against government publications, press releases, and the Ernst Young Tax Guides. This allowed us to generate a new dataset of tax rates in 45 SSA countries covering 1990–2017.

Figure 1 plots the development of CIT rates in SSA countries in terms of means and levels during the sample period. We observe a steady decline in the unweighted average CIT rate in the region, from 44 percent in 1990 to 29 percent in 2017, with some evidence of convergence over time.

**Figure 1. CIT Rates in SSA Countries, 1990–2017**

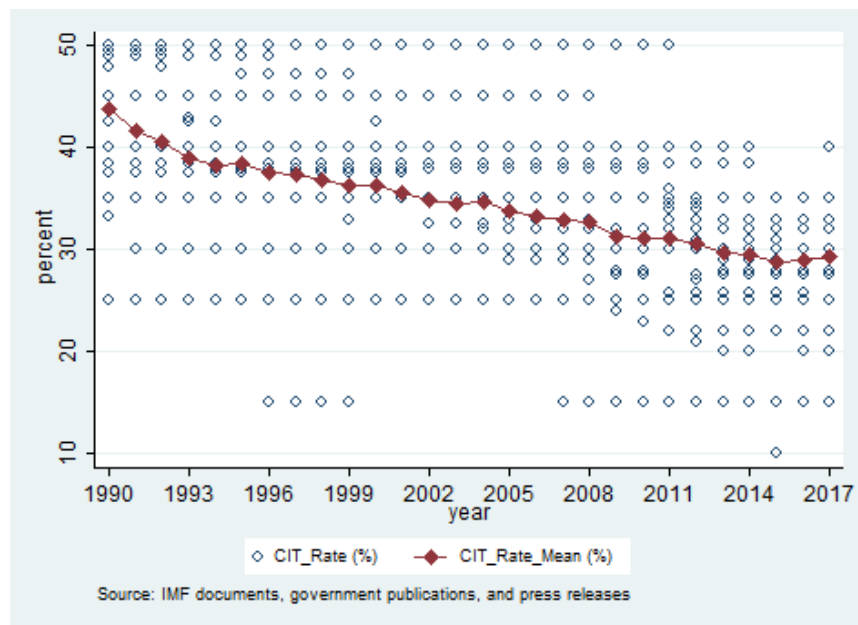
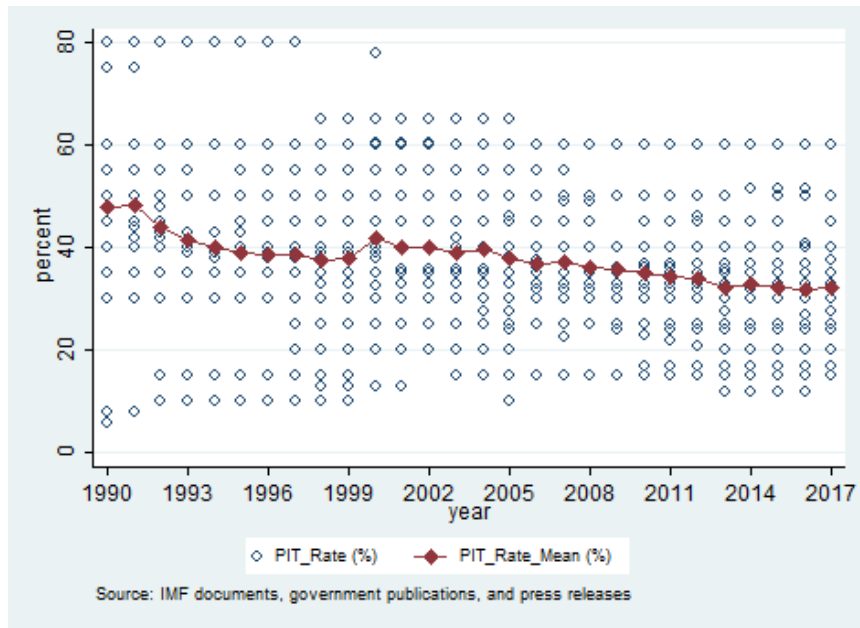


Figure 2 shows the evolution of the statutory top marginal PIT rates for the region in terms of means and levels. Similar to the statutory CIT rates, the PIT rates show a declining trend, although this trend is less pronounced, and displays greater heterogeneity.

**Figure 2. Top Marginal PIT Rates in SSA Countries, 1990–2017**



Finally, Figure 3 charts the evolution of the standard VAT rates in SSA. Contrary to personal and corporate taxation, the VAT data suggest that very few changes in the rates have been made in the last two decades. VAT rates remain relatively flat and homogeneous for the countries in our sample.

**Figure 3. VAT Rates in SSA Countries, 1990–2017**

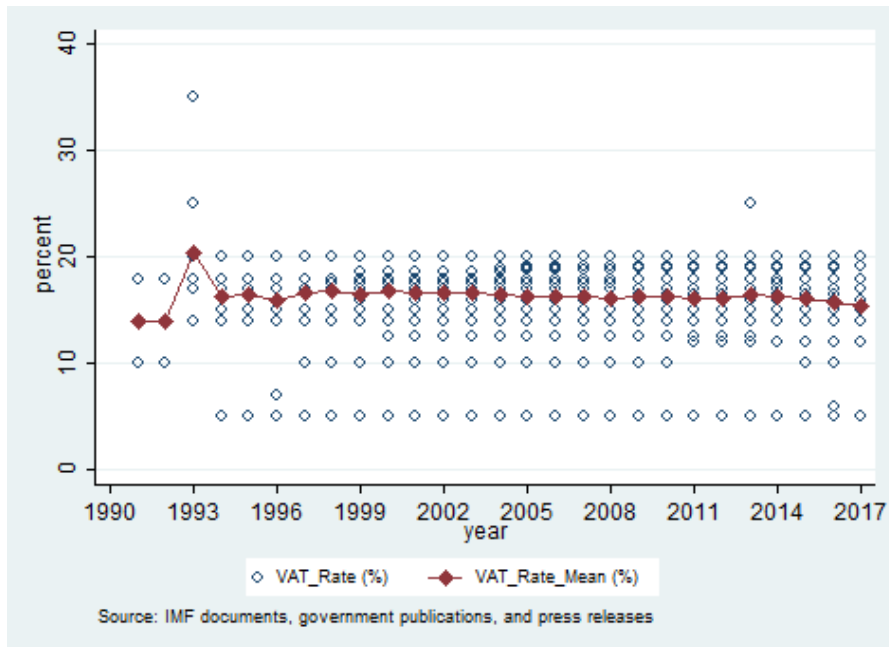
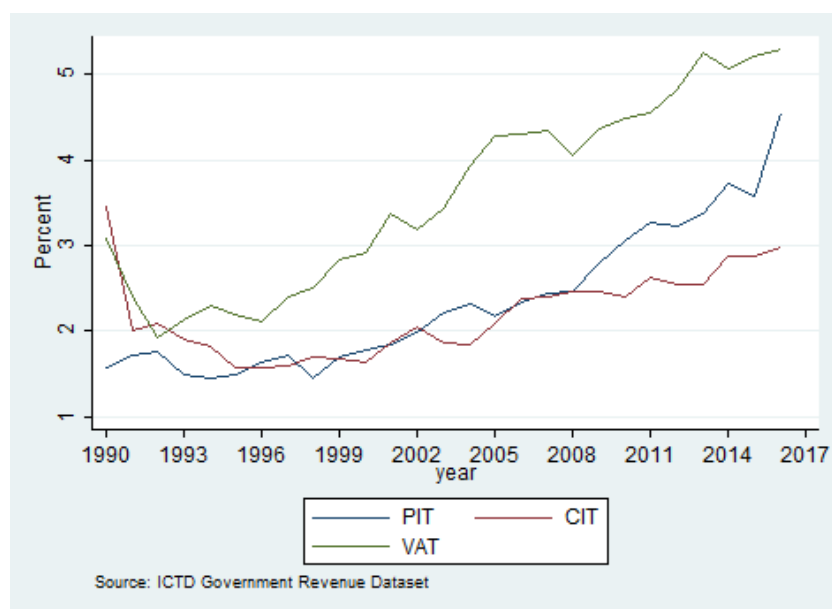


Figure 4 displays unweighted average tax revenue from PIT, CIT and VAT as a percent of GDP in SSA from 1990 to 2017. During this period, VAT revenue increased by about 3 percent of GDP. This is despite the fact that VAT rates have remained broadly unchanged since early 1990s. The increase in VAT revenue is attributable to expanding consumption in the formal/taxed sector and improved tax compliance. PIT revenue also increased by about the same amount during 1990 -2017, reflecting implementation of more progressive tax systems even though top marginal tax rates declined. CIT revenue went up by a percentage point of GDP, despite falling CIT rates.

**Figure 4. PIT, CIT, and VAT revenue as a percent of total tax revenue, 2000–2017**



### 3. Literature review

The existing literature on how institutional and political factors may affect tax policies has focused mostly on the OECD and Latin American countries and has identified several variables that influence the tax rates set by governments. Each of these variables are discussed below.

#### Institutional quality

As noted above, well-functioning institutions and regulatory quality can translate existing tax rates into an efficient revenue system. In such circumstances, the tax rates do not have to be as high to generate an additional dollar of revenue. Akitoby et al. (2020), Bird et al. (2008) and Lien (2015) found that good institutions have a positive impact on revenue collection in low- and low middle-income countries, including fragile states. This is because the rule of law and absence of corruption enhances the effectiveness of the revenue institutions of a

country (Akanbi, 2019). Aizenman and Jinjark (2009) argue that good institutional quality lowers the cost of collecting taxes. Countries with low level of institutional quality tend to rely more on “hard to collect” taxes such as widespread VAT and high personal and corporate income taxes, frequently resulting in a diminishing tax revenue. A similar relationship emerges when effective tax rates are studied instead of statutory rates (Fernández-Rodríguez et al., 2020).

### **Political accountability**

Political leaders are accountable to their citizens as long as they face real prospects of losing power in the future (Conconi et al., 2014), a mechanism that weakens with long government tenures, typically associated with less democratic regimes.<sup>1</sup> Miller (2009) argues that a longer incumbent political party tenure is associated with low government responsiveness, lack of accountability and high government corruption which may lead to higher tax rates. Genschel et al. (2016) find that in autocracies, the government’s primary concern is to keep elites happy and the best way to serve the interest of these elites is often by targeted discrimination and redistribution in their favor. They also assert that small autocracies may want to keep capital and corporate taxes high because they lack mass loyalty and therefore depend on more easily administered taxes such as the corporate tax or because loyal supporters can be rewarded through selective tax exemptions.<sup>2</sup> Additionally, the authors suggest that autocratic governments have fewer incentives to adjust to their competitive environment because they are less concerned about the general welfare of their populations and less able to lure in foreign capital with low corporate tax rates.

### **Political fragmentation**

Many studies find that the level of political fragmentation and polarization within a country affects the ability of the government to pursue tax reform and its type. In Argentina, the degree to which a single (same) party controls the central government and few of the largest regional units affects whether tax reforms are centralizing (Bonvecchi, 2010). In Colombia, Olivera et al. (2010) find that increased political fragmentation and limited unilateral executive power restricted tax reform attempts, especially structural (versus piecemeal) tax reform initiatives. In the European Union, findings suggest that the number of parties in a coalition is a better predictor of the lack of reforms than the economic business cycle or the rate of activity in the labor market (Castanheira et al., 2012). Also, in Europe, because of the competitive pressure of globalization, fragmented governments are found to carry out fewer, or smaller, CIT rate cuts. In addition to the number of parties in government, another

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<sup>1</sup> Besely and Kudamatsu (2007) also show that accountability can be weak in autocracies where the ruler is the main veto player and if the “selectorate” (the circle of secondary political actors) is not sufficiently strong to establish the necessary incentives to govern in their favor.

<sup>2</sup> Kenny and Winer (2006) show that autocracies make lesser use of harder to collect revenue sources than repressive regimes, since loyalty to the regime is lower in non-democratic countries.



measure of political fragmentation is the number of “veto players” in the relevant decision-making process. Basinger and Hallerberg (2004) find that the greater the number of veto players (and their ideological distance), the less likely it is that a change in tax systems will occur. Aizenmana and Jinjark (2008) argue that the efficiency of tax collection is affected by greater polarization and political instability.<sup>3</sup>

## **Electoral cycle**

The evidence on whether the election cycle is a political determinant of higher or lower tax rates is mixed. In OECD countries, CIT rates are less likely to be cut and more likely to be increased in the year after an election (Hallerberg and von Hagen, 2017). In the European Union however, Castanheira et al. (2012) find that there is no evidence that governments time their tax reforms with elections. But Foremny and Riedel (2014) find evidence that in Germany specifically, taxes are significantly reduced during election years and jump up in post-election years. Evaluated at the sample mean, the growth rate decreases and increases by more than 40 percent before and after election years. In Latin America, there is evidence that reforms that increase PIT and VAT are less likely during legislative electoral years (Hallerberg and Scartascini, 2017).

## **Ideology**

In advanced economies, the ideology of the party in government has traditionally been an important political determinant of tax policies. In Europe, leftist governments tend to impose higher CIT rates due to stronger preferences for public goods (Osterloh and Debus, 2012). But the effect of partisanship is more visible for statutory rates than for effective marginal tax rate, given that an increasing intensity in competition stemming from the integration of the European single market has been reducing the partisan bias in the last decades. Left-leaning OECD governments have also been found to be more likely to increase PIT rates in times of fiscal consolidation (Hallerberg and von Hagen, 2017) and to tax capital rather than labor, during normal times motivated by their goal of increasing the progressivity of the tax system (Angelopoulos et al., 2012).

## **4. Specification of hypotheses**

Based on the theoretical underpinnings suggested by the literature, this section develops some testable hypotheses to explain the variation in tax rates across SSA and to see if institutional and political factors found relevant in other regions are also important in SSA. The hypotheses are grouped into two categories. The first group considers institutional and political variables; while the second group includes four economic variables (such as banking

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<sup>3</sup> Note that Gehlbach and Malesky (2010) find the opposite effect – that increasing the number of veto players can lead to a greater probability of policy change.

crises) to control for the underlying economic conditions surrounding political economy decisions. A table of descriptive statistics is included in the Annex (Table 1).

## **Institutional and political variables**

Five testable hypotheses for political variables can be derived:

H1: Stronger institutions and better governance lead to lower tax rates as governments can generate more revenue from higher compliance. We take *Regulatory Quality* as a proxy for governance that captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development from the World Bank's Governance Indicators developed by Kaufmann et al. (2011).

H2: Weak political accountability linked to longer government tenures is more likely to be associated with extractive policies supported on higher tax rates. Such political conditions is measured by *Longest tenure of a veto player* from the Database of Political Institutions (DPI).<sup>4</sup> Veto players are defined as the president with largest party in the legislature for a presidential system, and as the prime minister and the parties in the government coalition in a parliamentary system.

H3: Fragmented governments which have less centralized political power are more likely to increase tax rates. We use *Polarization* (maximum difference in orientation among government parties) from DPI as a measure of political fragmentation.

H4: Governments are likely to increase tax rates after the elections, once the threat of voters' backlash has passed. A lagged dummy variable for a *Legislative Election* from DPI is added to the regression.

H5: Ideological orientation of the chief executive's party (right, center and left) influences the choice of tax policies. Given their comparative stronger preferences for larger size of governments, *Center-Left* governments are more likely to correlate with higher tax rates.

## **Economic variables**

To control for the effect of underlying economic factors and economic crisis, we include the following variables in our empirical analysis: real GDP per capita, general government gross

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<sup>4</sup> PIT rates in Cote d'Ivoire remained high at 60 percent during 2000–2011 and were lowered to 32 percent following the presidential election. As the new government's tenure lasted longer, PIT rates were gradually raised to 60 percent. A similar trend has been found in Senegal. PIT rates gradually increased from 48 percent in 1990 to 78 percent in 2000 as the government tenure increased. Following the 2000 Senegalese presidential election, PIT rate fell to 50 percent in 2001. Both CIT and PIT rates displayed an upward trend in Equatorial Guinea as government tenure increased from 1990 to 2017.

debt (percent of GDP), population, inflation and banking crisis<sup>5</sup>. The associated hypotheses can be summarized as follows:

H6: Richer countries (measured by real GDP per capita) are more likely to have large administrations and sustain more public spending therefore needing higher tax rates.

H7: Small countries (measured by the logarithm of *population*) are typically more open and subject to strong international competition. Seeking to attract foreign investment, they are thus more likely to have lower (corporate) tax rates.

H8: Countries lacking macroeconomic stability (proxied by *inflation*) are more likely to have higher tax rates.

H9: Indebted countries are more likely to have higher tax rates because of the need to pay for debt service, as measured by the debt to GDP ratio.<sup>6</sup>

H10: During *banking crises*, countries suffer deep recessions and are likely to implement higher tax rates to finance sizable bailouts and/or to compensate the sudden decline in public revenues.

## 5. Empirical analysis

To test these hypotheses, we estimate the equation below:

$$Tax\ Rate_{i,t} = \beta_0 + \beta_1 ECON_{i,t} + \beta_2 POL_{i,t} + \beta_3 (RQ_{i,t} * Tenure_{i,t}) + \lambda_i + \alpha_t + \varepsilon_{i,t} \quad (1)^7$$

where  $i$  denotes the country and  $t$  denotes the time period in years. The dependent variable is country  $i$ 's tax rate at time  $t$ . As there is little variation to exploit on VAT, we restrict our economic analysis to the CIT and PIT rates.  $ECON_{i,t}$  is a matrix of time-varying economic factors, while  $POL_{i,t}$  represents a series of political explanatory variables.  $RQ_{i,t} * Tenure_{i,t}$  is the interaction term of regulatory quality and longest tenure of a veto player. Based on the results of Hausman tests<sup>8</sup> at the 5% significance level, we include country and time fixed effects.  $\lambda_i$  are the country fixed effects while  $\alpha_t$  are the time fixed effects. Standard errors

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<sup>5</sup> A banking crisis is defined as systemic if two conditions are met: First, significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations) and second, significant banking policy intervention measures are implemented in response to significant losses in the banking system (see World Bank [Global Financial Development Report](#)).

<sup>6</sup> We also created a dummy variable of debt level where its value equals one if country's debt to GDP ratio is above median. The variable is interacted with polarization and the regression results are shown in section 5 (Table 1 & 2, column (7)).

<sup>7</sup> This is a reduced-form equation.

<sup>8</sup> Table 2 in Annex displays the coefficients of variables estimated via both random and fixed effect and the resulting Hausman test statistic.

are clustered at the country level in each case to allow for autocorrelation within countries. Results for CIT and PIT rates are displayed in Tables 1 and 2.

## **Empirical results**

The results in Table 1 show that our main hypotheses are confirmed. In countries with weak institutions and poor regulatory quality CIT rates tend to be higher. Similarly, weak accountability driven by longer tenures of a veto player is positively associated with higher CIT. It is noteworthy that the effect of weak political accountability on CIT prevails over that of strong regulatory institutions. Empirically, we should therefore expect higher rates of statutory taxation in countries with lower accountability associated with longer tenures of key veto players, despite the fact that good regulatory quality may have allowed some of these countries to maintain lower statutory rates. Weak revenue administration capacity and pervasive tax evasion which are typical of more authoritarian regimes are probably behind such empirical result.

Polarization has a positive effect on CIT rates, which indicates that fragmented governments are likely to increase tax rates. As expected, CIT rates are also likely to be raised in the year following a legislative election. And contrary to results from advanced economies, in SSA the ideological orientation of the government does not have an empirical effect on statutory tax rates. Among the economic factors included in the equation, richer and more populated countries are associated with higher levels of taxation. As expected, the variable that captures banking crises is systematically significant and shows that in times of distress, tax rates tend to go up.

There are several similarities in PIT results with those reported for CIT (Table 1). PIT rates are also negatively affected by higher regulatory quality and are positively associated with the tenure of a veto player. These results again confirm that better institutions require lower tax rates for the same amount of revenue collection, and that long-lasting political actors tend to increase tax rates as they engage in additional projects and potentially use tax exemptions to benefit political allies which support their long tenures. However, unlike CIT, the coefficient on the interaction term of regulatory quality with tenure is not significant. The positive effect of polarization on PIT rates is similar to the one found for CIT rates, suggesting that fragmented governments are likely to have a more progressive PIT structures.<sup>9</sup> Banking crisis and legislative elections are unrelated with the PIT rates.

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<sup>9</sup> The results are the same if total fractionalization variable as drawn from DPI is used instead of polarization variable.

**Table 1. Economic and Political Determinants of CIT Rates**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Real GDP per capita	0.469*** (0.053)		1.064 (0.795)	0.452*** (0.0287)	0.452*** (0.0533)	0.444*** (0.0519)	0.965 (0.768)
Population	5.001 (5.661)		23.63*** (6.756)	8.607** (4.088)	6.222 (5.740)	8.382 (6.716)	23.016*** (5.821)
Inflation	0.011 (0.029)		0.010 (0.024)	-0.00650 (0.0225)	-0.00467 (0.0281)	-0.0105 (0.0334)	-0.007 (0.021)
Public Debt	0.027* (0.016)		-0.009 (0.008)	0.0309* (0.0160)	0.00682 (0.0103)	0.00893 (0.0121)	
Banking Crisis	2.747** (1.148)		1.258** (0.520)	2.426*** (0.697)	1.093 (1.088)	1.138 (1.067)	1.414** (0.508)
Institutions (Regulatory Quality)		-0.656 (0.613)	-1.863* (0.935)	-0.819* (0.468)			-1.796** (0.852)
Accountability (Veto Players Tenure)		0.258*** (0.069)	0.239** (0.108)		-0.0242 (0.0562)		0.206* (0.110)
Institutions* Accountability		0.110** (0.042)	0.136** (0.058)				0.129** (0.058)
Fragmentation (Polarization)		0.854*** (0.270)	0.842*** (0.282)			-0.180 (0.631)	0.069 (0.319)
Elections		0.528* (0.303)	0.536* (0.291)				0.445 (0.286)
Ideology (Center)		-2.049 (1.223)	0.469 (1.336)				0.446 (1.444)
Ideology (Left)		-0.478 (0.965)	0.166 (0.760)				0.781 (1.045)
Public debt (dummy)							0.526 (0.757)
Public debt (dummy)*Polarization							1.184* (0.685)
No. Observations	770	306	269	720	721	605	269
R-squared	0.518	0.543	0.594	0.502	0.533	0.556	0.601
No. Countries	45	23	22	45	43	42	22
Year Fixed Effect	YES	YES	YES	YES	YES	YES	YES

Notes: \*\*\*, \*\*, and \* are significant respectively at the 1%, 5% and 10% level.

Standard errors in parenthesis clustered at the country level

**Table 2. Economic and Political Determinants of PIT Rates**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Real GDP per capita	0.579*** (0.066)		-0.339 (0.880)	0.600*** (0.060)	0.578*** (0.0634)	0.613*** (0.069)	-0.319 (0.774)
Population	0.250 (13.813)		30.09 (19.255)	8.698 (13.268)	-5.654 (12.323)	-3.655 (15.531)	30.615 (18.414)
Inflation	0.006 (0.008)		0.018 (0.034)	-0.00242 (0.006)	0.00329 (0.005)	0.00133 (0.006)	0.016 (0.041)
Public Debt	0.049** (0.023)		-0.008 (0.016)	0.0485* (0.026)	0.0345* (0.020)	0.0371* (0.021)	
Banking Crisis	0.852 (1.307)		-1.567 (2.410)	1.132 (1.380)	1.028 (1.607)	0.717 (1.419)	-1.327 (2.273)
Institutions (Regulatory Quality)		-1.065 (0.817)	-2.520* (1.449)	-1.147 (1.096)			-2.480* (1.410)
Accountability (Veto Players Tenure)		0.249** (0.097)	0.525*** (0.109)		0.126 (0.092)		0.491*** (0.110)
Institutions* Accountability		0.038 (0.080)	0.179 (0.112)				0.169 (0.111)
Fragmentation (Polarization)		0.694 (0.518)	1.375*** (0.373)			0.0927 (0.526)	-0.105 (0.450)
Elections		0.197 (0.538)	0.473 (0.588)				0.426 (0.649)
Ideology (Center)		-1.508 (2.327)	-0.834 (2.051)				-0.483 (1.771)
Ideology (Left)		1.120 (1.544)	0.104 (1.201)				1.214 (0.968)
Public debt (dummy)							-0.997 (0.895)
Public debt (dummy)*Polarization							2.413** (0.867)
No. Observations	711	302	260	678	688	577	260
R-squared	0.274	0.240	0.305	0.257	0.285	0.299	0.320
No. Countries	45	23	22	45	43	41	22
Year Fixed Effect	YES	YES	YES	YES	YES	YES	YES

Notes: \*\*\*, \*\*, and \* are significant respectively at the 1%, 5% and 10% level.

Standard errors in parenthesis clustered at the country level

## 6. Conclusion

In this paper, we studied the institutional and political determinants of statutory tax rates in SSA countries. Different from advanced economies, our results suggest that in SSA institutional (structural) factors are more important than political (conjunctural) ones. Better institutions as proxied by regulatory quality are associated with lower CIT and PIT rates. This is because compliance with taxes is higher in countries with enhanced governance, which implies that lower rates are needed to generate the same amount of revenues as compared to countries with weak institutions. Political accountability is also an important structural factor, since longer tenures are associated with higher tax rates. And tax rates are likely to be higher in more polarized and fragmented political systems. In general, conjunctural variables are less important. The relationship between electoral cycles and tax rates is weak, although we find some evidence that governments are more likely to increase CIT rates the year after a legislative election. Also, and contrary to conclusions for advanced economies, this paper finds no evidence of a partisan or ideological effect on tax rates in SSA.

While these empirical associations cannot be interpreted as strong evidence of causality, there are some policy implications that can be derived from the preliminary findings summarized in this paper. First, SSA countries in search of higher revenues to finance investments in the SDGs do not have to raise tax rates. Lower tax rates can deliver the desired amount of revenue provided a country's institutions are functioning, which would be more conducive for economic growth. Second, a moderate degree of political stability helps in maintaining a modest level of tax rates; a long tenure by the same party in government or, on the contrary, too much political volatility linked to party fragmentation, can both lead to higher tax rates. Finally, elections and ideology are not significant factors affecting underlying tax rates in SSA. Regardless of political discourses, evidence shows that those two variables have not been major determinants of tax policies in the last three decades.

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## Annex

**Table 1. Descriptive statistics and data sources**

	No. Observations	Mean	Std. Dev.	Min	Median	Max	Source
CIT Rate (%)	1048	34.20	7.01	10	35	50	IMF staff report
PIT Rate (%)	961	37.45	12.92	6	35	80	IMF staff report
Real GDP per capita (USD thousands)	1129	4.20	6.36	0.31	1.81	50.32	World Economic Outlook (WEO)
Ln (population)	1229	1.78	1.61	-2.66	2.17	5.24	WEO
Inflation rate (%)	1194	39.29	373.70	-18.23	6.32	9796.9 <sup>10</sup>	WEO
Public Debt (% of GDP)	852	65.63	56.82	0	51.02	466.7 <sup>11</sup>	WEO
Banking Crisis	1260	0.07	0.25	0	0	1	World Bank-Global Financial Development
Regulatory Quality	885	-1.97	1.81	-6.70	-1.80	3.25	Worldwide Governance Indicators (WGI)
Longest tenure of a veto player	1162	11.70	9.24	1	9	43	Database of Political Institutions (DPI)
Polarization	1005	0.07	0.35	0	0	2	DPI
Chief Executive Party Orientation <sup>12</sup>	470	2.42	.86	1	3	3	DPI
Legislative Election <sup>13</sup>	1177	0.18	0.38	0	0	1	DPI

<sup>10</sup> The Democratic Republic of Congo had high inflation rates during 1991–1996, especially in 1994 inflation rate rocketed to 9796.9.

<sup>11</sup> Liberia had public debt rates over 400% of GDP from 2003 to 2006.

<sup>12</sup> Chief executive party orientation of right, center, and left are assigned the value of 1, 2, and 3 respectively.

<sup>13</sup> If there is a legislative election held in certain year, the variable is assigned the value of 1, otherwise 0.

**Table 2. Hausman Test: Random effect versus Fixed effect**

Variables	CIT Rate		PIT Rate	
	Fixed effect	Random effect	Fixed effect	Random effect
Real GDP per capita	1.064 (0.795)	0.251*** (0.094)	-0.339 (0.880)	0.447* (0.247)
Population	23.63*** (6.756)	0.162 (0.173)	30.09 (19.25)	-0.042 (0.489)
Inflation	0.010 (0.024)	-0.037 (0.025)	0.018 (0.034)	-0.397*** (0.066)
Public Debt	-0.009 (0.008)	0.010 (0.008)	-0.008 (0.016)	0.044** (0.020)
Banking Crisis	1.258** (0.520)	-2.245 (1.540)	-1.567 (2.410)	-13.43*** (4.055)
Institutions (Regulatory Quality)	-1.863* (0.935)	-1.326*** (0.256)	-2.520* (1.449)	-0.372 (0.700)
Accountability (Veto Players Tenure)	0.239** (0.108)	-0.008 (0.036)	0.525*** (0.109)	-0.343*** (0.097)
Institutions* Accountability	0.136** (0.058)	-0.017 (0.014)	0.179 (0.112)	0.013 (0.038)
Fragmentation (Polarization)	0.842*** (0.282)	-0.409 (0.463)	1.375*** (0.373)	0.573 (1.208)
Elections	0.536* (0.291)	0.662 (0.573)	0.473 (0.588)	-0.955 (1.506)
Ideology (Center)	0.469 (1.336)	5.149*** (1.171)	-0.834 (2.051)	-5.644* (3.210)
Ideology (Left)	0.166 (0.760)	2.877*** (0.616)	0.104 (1.201)	1.649 (1.620)
Hausman test	chi2(12) = 95.51; Prob>chi2 = 0.0000		chi2(12) = 32.47; Prob>chi2 = 0.0012	

Notes: \*\*\*, \*\*, and \* are significant respectively at the 1%, 5% and 10% level.

Standard errors in parenthesis clustered at the country level