

The Determinants of Tax Revenue in Sub-Saharan Africa

Tony Addison and Jörgen Levin

Abstract

This paper identifies the determinants of tax revenue in sub-Saharan Africa using an unbalanced panel dataset of 39 countries over the period 1980-2005. A set of factors that can potentially influence tax revenues such as the tax base, structural factors, foreign aid and conflict, is considered in the econometric analysis. Our contribution is that besides the analysis of the determinants of the overall tax revenue, we further conduct the analysis about how these determinants affect the tax structure by including mainly three tax types including the international trade taxes, domestic indirect taxes, and domestic direct taxes. Firstly, our results significantly suggest that the overall tax to GDP ratio is higher in more open and less agricultural dependent economies, less populous and peaceful countries. The introduction of VAT also has a significant positive impact on the total tax-GDP ratio. We find evidence of relationships between the effect of openness and per-capita GDP on the trade-tax GDP ratio. The size of the agricultural sector and foreign aid affects the direct-tax GDP ratio negatively. VAT and a peaceful environment have a significant positive impact.

Keywords: tax revenue, tax structure, determinants, sub-Saharan Africa

1. Introduction

Tax revenue is of vital importance for the sustainability of both developed and developing countries. Firstly, taxation is the main source of central government revenue, since tax collection is mandatory and regular, which can guarantee the stability of income. Secondly, taxation aims to meet the social and public needs by providing public goods and services. Thirdly, government need tax revenue to establish armed forces and judicial systems to ensure the secure and justice of the society. In many poor developing countries, a low tax-revenue/GDP ratio prevents these nations from undertaking ambitious expenditure programs. Thus a rapid increase in domestic revenue and a corresponding increase in public services is a policy priority. However, one needs to be cautious about increased public spending and increased taxation, as distortionary taxes begin to reduce growth when pushed beyond certain levels: tax bases are not simply 'given' to governments: they can be grown or destroyed (Bird, 2008).¹

What the optimum level of the tax-GDP ratio is as much an ideological as a technical question. Governments of different political perspectives will have different goals in terms of public expenditure, which imply different levels o taxation. Indeed, tax revenue/GDP ratios various widely across regions. Table 1 indicates how the tax-GDP ratio has changed between 1990 and 2005 across regions. In Western Europe, the tax-GDP ratio increased from 38 percent to about 41 percent during the period. Although low income countries have a lower average tax-GDP ratio there is quite large variation within the group. However, there was little change in Middle East/North Africa and South Asia, collections stayed relatively constant around 14 and 11-12 percent, respectively. East Asia and Pacific increased the tax-GDP ratio from 21 percent to close to 30 percent. Performance in sub-Saharan Africa (SSA) and

¹ With regard to public spending, empirical evidence suggests that complementary effects between public and private investments are important to achieve higher growth rates. While expansion of both social and economic infrastructure is important in order to achieve higher growth rates, it should be noted that increased public spending can in one country be growth-enhancing, growth-impeding in another, due to the varying relative importance of both distortionary taxation and the externality being internalized (Devarajan, Easterly and Pack, 2002).

Latin America has improved slightly, overall tax collection has increased from 16-17 percent in 1990 to 19 percent in 2005. What is worth to point out is that the average tax-GDP ratio in SSA is, on average, higher than Middle East/North Africa, and South Asia.

Table 1: Tax-GDP ratios across regions

	1990	1995	2000	2001	2002	2003	2004	2005
East Asia and Pacific	21.5	19.9	19.9	20.6	22.2	22.7	26.1	29.9
Latin America and the Caribbean	16.3	17.1	17.3	17.9	18.3	18.7	18.8	19.6
Middle East and North Africa	13.8	14.3	13.0	13.4	14.2	14.3	14.5	14.3
South Asia	11.0	11.5	10.4	10.7	10.8	10.7	11.4	12.0
Sub-Saharan Africa	17.0	15.8	17.0	17.2	17.5	18.7	19.7	19.1
Western Europe	37.5	38.2	40.4	39.8	39.4	39.2	39.4	40.7
United States and Canada	31.6	31.7	32.8	31.8	30.1	29.6	29.5	30.2

Source: IMF (2008)

East Asia and Pacific is the only region with a substantial increase in the tax-GDP ratio. Average performance in other developing regions, including SSA, is still relatively poor.

Whereas the trend in tax-revenue shares in Africa is disappointing, resource rich economies have had a significant increase in domestic revenue since 2004 (OECD 2010). On average revenue from resource taxes was close to 10% of GDP in 2005, which is almost equivalent to the total amount of aid disbursed to sub-Saharan Africa. Revenue mobilization in resource-rich economies has been increasing, on average, by around 3 percent per year. This has mostly been driven by resource-related tax revenues that typically distract governments from generating revenue from more politically demanding forms of taxation.

Non-resource rich economies managed to increase revenue by 1.4 percent a year. Compared to the resource rich countries they have been more successful in improving the quality and balance of their tax mix. Non-resource related tax revenues have become less important while indirect, direct and trade taxes have increased its share. Thus, oil producing countries are primarily driving the remarkable quantitative rise in

average tax shares across the continent, while non-oil producers have made the most progress in broadening the tax base.

This paper focuses on exploring the determinants of tax revenue by using a dataset which includes an unbalanced panel data of 39 SSA countries over a time period covering the years from 1980 to 2005. In this paper, the factors that influence the tax revenue performance are divided into five aspects including the tax base, economic policies, external environment, structural factors, and the political environment including conflict. While a number of studies have analyzed some principal determinants of tax revenue, this paper extend the literature by providing a more well-rounded consideration of the determinants of the total tax revenue by using two-step efficient GMM regression method. Our contribution is that besides the analysis of the determinants of the overall tax revenue, we further conduct the analysis about how these determinants affect the tax structure. We carry on the regressions on mainly three tax types including the trade taxes, domestic indirect taxes and direct taxes.

The rest of the paper is organized as follows. Section 2 reviews the literatures on both the tax revenue performance and the empirical analysis. Section 3 presents the empirical model and discussed the testable hypotheses. Section 4 shows the data and methodology. Section 5 draws the empirical analysis and discusses the results, and the last section gives the conclusions and some possible recommendations.

2. Literature Review

2.1 Determinants of taxation

The observation that revenue performance in some developing countries is poor naturally seems to imply that the revenue effort should be increased, but how far and how fast the revenue-to-GDP ratio can be raised is sometimes unclear. The idea of a potential source of tax revenue has influenced the philosophy of taxable capacity or

tax effort.² A crude means of assessing taxable capacity is to relate tax revenue to GDP across countries, by using a regression model with explanatory variables that represent different elements of taxable capacity.³ A tax effort larger than one implies that the country utilizes its tax base well. However, a country with low tax effort (below one) is likely to have the potential to raise substantial additional revenue.

Bird et al. (2008) found that Latin American countries show consistently lower tax effort compared to other developing or transition countries. Performance in African countries shows a mixed performance. Some countries collect as little as half while others collect up to 2 to 3 times what they would be expected to (OECD, 2010). The latter group include to a large degree those countries with a high share of resource-related tax revenue. Thus, estimates of tax effort for some resource-rich countries turn out to be quite sensitive to whether resource-related tax revenues are considered or not. Using a tax effort measure that excludes resource-related tax revenues is revealing: more than half of the African countries (22 out of 42) collect more or what is expected. This suggests that in quite a number of countries domestic revenue mobilization is not constrained by the tax system but more by GDP growth and broader development.

From a policy perspective there is an important distinction between countries with a substantial share of resource-related tax revenues and those without. Resource revenue provides an opportunity for reducing distortionary taxation that may have a negative impact on economic activity, but it also provides the opportunity for maintaining highly inefficient subsidy programme (Collier, et. al (2009). Bornhorst et. al (2009) found that countries that receive large revenues from the exploitation of natural resource endowments are likely to reduce their domestic tax effort considerably.⁴ This is not necessarily worrying as reduced domestic tax burden could

² Lotz and Morss (1970) were the first to use the difference between actual and predicted tax ratios for conducting inter-country tax effort comparisons.

³ The actual tax ratio of an individual country can then be compared with the tax ratio predicted from the regression equation for that country. The ratio between the actual collection and the predicted capacity is used as a measure of tax effort.

⁴ Bornhorst et. al (2009) found a statistically significant negative relation, with a typical result being that a 1 percentage point increase in hydrocarbon revenue (in relation to GDP) lowers non-hydrocarbon revenues by about 0.2 percentage points

foster private sector activities consistent with an improvement in development prospects.

Accelerated development is in itself an important determinant of tax revenue. Structural factors exert the strongest influence on the tax revenue/GDP in low-income countries. Growing levels of per capita income, a shift from agricultural to industrial production, a change in consumer demand from basic necessities to manufactured goods and services, falling age-dependency ratios, and increasing urbanization all lead to rising shares of tax revenue in national income.⁵ This implies that policies which emphasize structural changes will aid countries in the development process.

More recent studies have found that not only do supply factors matter but that demand factors such as institutional quality has a significant impact in determination of tax effort (Bird et al. (2008)). As they conclude, a legitimate and responsive state one that secures the rule of law and keeps corruption under control appears to be an essential pre-condition for a more adequate tax collection effort. Chand and Moene (1997) argue that fiscal corruption is a key factor behind the poor revenue performance in a number of developing countries. There is also strong evidence to suggest that measures taken to reduce corruption could be expected to enhance tax revenue significantly (Gupta, 2007). As suggested by Bird et al. (2008) improving institutions such as enhancing voice or accountability and reducing corruption may not take longer nor be necessarily more difficult than changing supply-side factors. How to manage tax revenue effectively, and in particular in countries with weak institutions, is an active area of research itself and deserves more attention.⁶

Earlier literature reviewed tax revenue performance in SSA and found that tax revenue performance varies across SSA countries and revenue trends are not uniform; some countries have enjoyed sustained increase in tax revenue shares while

⁵ For example, Le et al. (2008) found that a country with higher income, lower population growth rate, more trade, lower agriculture share in GDP and higher institutional quality is likely to have a higher tax capacity. Gupta (2007) found that structural factors such as per capita GDP, share of agriculture in GDP, and trade openness are strong determinants of revenue performance. Ghura (1998) estimates tax equations for SSA and notes that a number of factors, such as macroeconomic and structural policies and the provision of public services by the government influence tax revenue effort.

⁶ Recent work by Persson and Besley (2010) introduce the capacity to tax as an important factor in the development process.

others have seen tax revenue shares weaken (Stotsky et al., 1997). More recently, Agbeyegbe et al. (2006) showed that import duties are still a significant source of revenues in SSA countries, though trade liberalization in the region has led to a reduced reliance on these taxes. And taxes on goods and services are a growing share of revenues, especially with the introduction of VAT in many of the countries in the past few decades, and a reform of excise taxes in many countries as well. Moreover, in countries with relatively well-functioning tax-systems income tax revenues constitute a significant share of revenues. Moreover, Keen et al. (2009) have showed the development in tax revenues of 40 SSA countries during the period from 1980 to 2005. They have found that there had clearly been an increase in the average tax shares in GDP since the late 1990s, but this was very largely due to a marked increase in revenue from natural resources. For non-resource related tax revenues, in contrast, there has been almost no change over the sample period. Finally, with regard to tax structures Keen et al. (2009) showed that there has been a downward trend in trade taxes and an upward trend in indirect taxes. Income taxes almost remained constant.

2.2 Literature Review on Empirical Analysis

Most of previous literatures have found that the income level, agriculture share, and other economic structure variables, and the degree of openness, among others, are often statistically significant in explaining the cross-country variation in the revenue ratio. Ghura (1998) analyzed determinants representing macroeconomic and structural policies and the level of corruption based on a panel data for 39 countries in SSA during 1985-1996. Using instrumental variables generalized least squares (IV-GLS) he found that an increase of the level of corruption lowers the tax-revenue. Mahdavi (2008) used a modified model with a number of explanatory variables based on 43 developing countries over the time period 1973-2002, using the GMM method with cross-section fixed effects. Total tax revenue was positively related to the degree of international trade, relative size of the urban population, adult literacy rate, and the level of development approximated by per capita income. However, an increase in

foreign aid, relative share of old-age population, population density, the degree of monetization, and the rate of inflation lead to lower tax revenue.

Agbeyegbe et al. (2006) used a panel data set covering 22 countries in SSA, over 1980–1996 using the System GMM method. Their study focused on the relationship between trade liberalization, exchange rates, and tax revenue variables. The writers conformed that trade liberalization is not strongly linked to total tax revenue. They found some evidence that exchange rate appreciation and higher inflation had a negative impact on tax revenues.

Khattry and Mohan Rao (2002) estimated determinants of total tax revenue using a fixed-effects regression framework based on a sample of 80 countries over a period covering 1970–98. The study found that structural characteristics, like per capita income and urbanization, have been significant in explaining the decline of income tax and trade tax revenues in low-income countries. Gupta (2007) contributes to the empirical literature on the determinants of tax revenue using data from 105 developing countries over 25 years with different estimation techniques, including both fixed and random effects, panel-corrected standard error estimation using Prais-Winsten regression as well as difference-GMM and system-GMM estimation.

3. Methodology and data

3.1 Methodology

The earlier literature used OLS or GLS approaches to do the empirical regressions. More recently, since a lot of the explanatory variables are likely to be endogenous, it is argued that GMM is a better method rather than OLS or GLS (Hayashi, 2000). This is also the approach used in this study. A two-step GMM regression is undertaken with four dependent variables, that is, the share of total tax revenue (TR_GDP), international trade tax revenue (TT_GDP), the domestic indirect tax revenue (IDT_GDP) and the domestic direct tax revenue (DT_GDP), respectively. We control for the unobserved fixed country-specific effects by including a full set of country

dummies. The instrument variables we use in this paper are the lagged values of all the independent variables. The specification of the model is explained by equation 1-4 as follows:

$$TR_GDP_{it} = (TR_GDP_{it})_{t-1} + \alpha_1 AGR_{it} + \alpha_2 OPEN_{it} + \alpha_3 lpcGDP_{it} + \alpha_4 URB_{it} + \alpha_5 \ln POP_{it} + \alpha_6 AID_GNI_{it} + \alpha_7 CONF1_{it} + \alpha_8 VAT_{it} + \varepsilon_{it} \quad (1)$$

$$TT_GDP_{it} = (TT_GDP_{it})_{t-1} + \alpha_1 AGR_{it} + \alpha_2 OPEN_{it} + \alpha_3 lpcGDP_{it} + \alpha_4 URB_{it} + \alpha_5 \ln POP_{it} + \alpha_6 AID_GNI_{it} + \alpha_7 CONF1_{it} + \alpha_8 VAT_{it} + \varepsilon_{it} \quad (2)$$

$$IDT_GDP_{it} = (IDT_GDP_{it})_{t-1} + \alpha_1 AGR_{it} + \alpha_2 OPEN_{it} + \alpha_3 lpcGDP_{it} + \alpha_4 URB_{it} + \alpha_5 \ln POP_{it} + \alpha_6 AID_GNI_{it} + \alpha_7 CONF1_{it} + \alpha_8 VAT_{it} + \varepsilon_{it} \quad (3)$$

$$DT_GDP_{it} = (DT_GDP_{it})_{t-1} + \alpha_1 AGR_{it} + \alpha_2 OPEN_{it} + \alpha_3 lpcGDP_{it} + \alpha_4 URB_{it} + \alpha_5 \ln POP_{it} + \alpha_6 AID_GNI_{it} + \alpha_7 CONF1_{it} + \alpha_8 VAT_{it} + \varepsilon_{it} \quad (4)$$

where, *i* indexes countries with values form 1 to 39 and *t* indexes the time with value form 1980 to 2005. For fixed effects specification, $\varepsilon_{it} = u_i + e_{it}$, where u_i denotes the country specific effects and e_{it} captures the random effects. We use an unbalanced panel data that covers 39 countries in SSA over the year from 1980 to 2005. Table 2 describes the variables used in the analysis. The literature on the determinants of tax revenue provides a set of testable hypotheses. As in other studies we look at the elements of tax base in this paper. They are the share of agriculture in GDP (AGR) and the ratio of the sum of imports and exports to GDP (OPEN). In many SSA countries, a large share of GDP is obtained from agriculture activities. However, the agriculture sector is traditionally a difficult sector to tax due to the prevalence of subsistence activities which are mostly informal activities. Thus, we can expect a negative relationship between the share of agriculture in GDP and the tax revenue-GDP ratio. In contrast, the trade-related taxes are easier to impose because

the goods enter and leave the country at specified locations. Thus it reflects a positive correlation between OPEN and the tax revenue-GDP ratio.

Table 2: Description of data

Variable	Observations	Mean	Std. Dev.	Min	Max
Tax-GDP	1008	16.0	8.0	1.2	43.4
Trade-tax-GDP	1007	5.2	4.3	0.2	26.8
Indirect-tax-GDP	1002	4.0	2.4	0.0	11.5
Direct-tax-GDP	1008	3.7	2.5	0.2	18.7
Agriculture/GDP	984	30.1	15.3	2.0	72.0
Openness/GDP	1010	52.6	32.1	3.4	203.3
Per capita GDP (log)	1014	-7.2	0.8	-9.9	-5.7
Population (log)	1014	3.6	1.3	0.2	6.4
Aid/GDP	983	14.8	16.9	-0.3	210.2
Urbanisation	1014	30.6	14.5	4.3	83.6
Conflict dummy	952	0.8	0.4	0.0	1.0
VAT dummy	1014	0.3	0.5	0.0	1.0

Structural factors in this paper include per capita GDP ($lpcGDP$), the population size ($\ln POP$), and the degree of urbanization in a country (URB). Population size and per capita income are entered in logarithms since the tax revenue is assumed to be nonlinear in the scale of the economy. Per capita GDP is a proxy for the development of a country and is expected to be positively related to the tax share since the tax revenue-GDP ratio increases with the development of the economy (i.e., $lpcDGP$ would be negatively related to tax share). Population size and the tax revenue-GDP ratio are predicted to be positively correlated due to the economies of scale in tax collection. The tax collection becomes more efficient in urban areas, since the general public is more likely to be well-educated and do better in understanding and complying with tax codes. We expect a positive relationship between urbanization (URB) and the tax revenue share.

The relationship between aid and tax revenue is essentially an empirical question. Gupta et al. (2003) point out that net foreign aid has a negative impact on the total tax revenue, which seems to be driven by a negative impact of grants on tax revenue,

whereas loans are associated with increased domestic tax revenue. One potential explanation they offer for why this might be the case is that loans may imply the need of a repayment, which serves as an incentive to increase the domestic tax effort. More recently Morrissey et al. (2010) showed that the effect of foreign aid on tax revenue is positive since a break point in the mid 1980s in developing countries.

We also include two dummy variables. The first is whether a country has had peace here defined as not experienced minor conflict or war. Addison et al (2002) argue that conflict affects the ability of states to raise revenues, it causes major reallocations of expenditure and, depending upon how the wartime fiscal deficit is handled, it affects macro-economic stability. Public revenues usually fall to very low levels in conflict-affected countries. Revenues from indirect taxes fall as economic activity shrinks, the quality of tax institutions declines, and governments become ever more dependent on import duties and other trade taxes (but the latter also tend to decline as external trade shrinks and as the quality, and honesty, of customs services deteriorates). Poor governance also reduces the legitimacy of taxation, and encourages tax evasion. The fall in revenues accordingly reduces the ability of governments to fund development expenditures.

The second dummy variable is whether the country has introduced VAT as an indirect tax. The spread of value-added tax (VAT) in developing countries has been dramatic over the decade of 1990s. Adopted by more than 130 countries, including many of the poorest, around three-quarters of all countries in sub-Saharan Africa, for example, the VAT has been, and remains, the key of tax reform in many developing countries. With the passing of time the importance of VAT in the revenue structure of many countries has increased significantly.

Before we turn to the empirical analysis, we firstly do some simple graphical analysis which briefly shows the relationship between the tax revenue and some of the explanatory variables. According to the simple graphical analysis results we get that per capital GDP, urbanization rate and the open index appear to have a strong positive relationship with the total tax revenue (Figure x-Figure x in appendix). There seems to be no apparent correlation between the xxx variables. It also appears that the some

variables such ashave negative relationships with the total tax revenue.

4. Results

The results in Table 4.1 suggest that the share of agriculture sector (AGR) has statistically negative significant effects on the total tax revenue GDP ratio. This negative effect is mainly through its negative effect on both direct and indirect tax revenue. Several factors contribute to this result. Firstly, a large part of the agricultural sector is small-scale with limited number of taxpayers paying tax on income or profits. Secondly, a substantial part of the output is consumed and not marketed. Thirdly, marketed agricultural products are to a large degree exempted from indirect taxation. Finally, the cost of verification of actual income is very high. A large share of agricultural products is also exempted from indirect taxes.

Table 1: GMM estimates of determinants of tax-GDP ratios

Variables	Tax-GDP ratio	Trade-tax GDP ratio	Direct-tax GDP ratio	Indirect-tax GDP ratio
Lagged tax/GDP	-0.280** (0.116)	0.276 (0.202)	-0.0693 (0.0777)	-0.268 (0.187)
Agriculture/GDP	-0.170*** (0.0647)	-0.0214 (0.0212)	-0.0275*** (0.0106)	-0.0326* (0.0171)
Openness/GDP	0.0616*** (0.0157)	0.0216** (0.00911)	0.00974 (0.00667)	0.00353 (0.00581)
Per capita GDP (log)	-2.628 (1.615)	2.330*** (0.706)	0.0861 (0.305)	-0.243 (1.004)
Population (log)	-5.727** (2.669)	-2.573** (1.020)	-1.261 (1.025)	2.364 (1.740)
Urbanization (%)	0.0541 (0.141)	0.0228 (0.0483)	0.0183 (0.0211)	0.0437 (0.0493)
Aid /GDP	-0.0279 (0.0229)	-0.00675 (0.00918)	-0.0213*** (0.00648)	-0.0142 (0.0139)
Conflict dummy	0.476* (0.260)	0.242 (0.202)	0.204*** (0.0786)	0.0588 (0.0840)
VAT dummy	2.322** (0.980)	0.290 (0.369)	0.693*** (0.168)	0.529* (0.278)
Observations	847	847	847	840
Number of country	37	37	37	37

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

Openness (OPEN) has a positive significant effect on the total tax revenue-GDP ratio. The significantly positive relationship between openness and the trade-tax GDP ratio is obvious since trade tax revenue is obtained from taxes on the exports and imports of country. SSA countries rely heavily on the trade tax revenues because they are relatively easier to assess and enforce than domestic taxes, as monitoring the entry and exit of goods into and from the country is generally straightforward. Openness is positively related to the domestic indirect taxes and positively related to the direct taxes, but the effects are not significant and consistent with Khattry and Rao's (2002) findings.

Per capita GDP is positively related to the total tax revenue ratio and insignificant. However, per capita GDP has a significantly negative relationship with trade taxes. These findings are quite consistent with Ghura's (1998) hypotheses. In the early stages of economic development, trade taxes are the major sources of government revenues since they are easier to collect and enforce than domestic taxes as we mentioned above. Yet, as countries develop, they will improve their public administrations, judicial systems and promote structural and institutional reforms, so that, the costs of the tax system will be gradually reduced. Thus, the dependence on the domestic taxes will increase and the dependence on the trade taxes will fall with the economic development of a country.

We find that population density is significantly negatively related to the total tax revenue and trade taxes, while the correlation is insignificant when it comes to indirect taxes. Population is an exogenous variable in our model, which means that it does not affect the tax revenues directly but through its effect on other endogenous variables like per capita income and agriculture output. In poor, mainly agricultural countries with limited physical and human capital and rudimentary technology, higher population density tends to reduce per capita income (Becker et al., 1999). Thus, higher population density related to lower per capita income, and hence reduces the tax-base. Moreover, higher population density has a significant negative impact on trade-tax GDP ratio. Moreover, the growth in the population density raises the demand of consumption, so that the consumption taxes increase which raises the

domestic indirect taxes. This is consistent with the result that population density is positively (but insignificant) related to indirect taxes.

Earlier studies have found that total tax revenue increases when a society becomes more urbanized but here the correlation is statistically insignificant. It is argued that urbanization increases both the need for tax revenues and the capacity to tax. On the demand side, greater urbanization leads to a greater need for public services. On the supply side, urbanization leads to larger taxable bases as economic activity tends to be concentrated in urban areas (Khattry et al., 2002). However, our results also show that urbanization is insignificant related to all tax-GDP ratios.

On the overall tax-GDP ratio we do not find any significant results. We find that foreign aid (AID_GNI) is significant and negatively related to the direct-tax GDP ratio. This could be explained by policy makers' decisions to use foreign aid as a substitute for domestic taxes and thus to try to free more resources for the private sector and increase investment by lowering income and capital taxes. The developmental reasoning behind such a policy could also be political economy reasons. Lowering income tax rates, or keep them at a low level, could be part of an election strategy.

The effect of peace on the level of total taxation is positive and significant. The effect is comparable large compared to other variables in our analysis and stress the strong link between tax-revenue and peace/conflict discussed above. Our results reveal that there is no significant effect on the trade-tax GDP ratio. However, there is a weak significant positive effect of peace on the direct-tax GDP ratio. A more democratic and peaceful political regime enjoys more legitimacy and loyalty among taxpayers which leads to a higher degree of voluntary compliance, compliance with taxation increases as the risk of conflict is reduced.

The dummy variable VAT we use in this paper is an indicator of whether a country has adopted the value-added tax or not. We show that the adoption of VAT has a significant positive impact on the total tax revenues and the effects on other tax types, except trade-taxes, are also positive and significant. This is consistent with claims made by proponents of the VAT, especially for developing countries, that it

would enhance efforts to mobilize much-needed tax revenue, not only directly but through wider improvements in tax administration and compliance which is mentioned by Keen et al. (2010).

5. Conclusion

This paper analyzes the determinants of tax revenue performance in sub-Saharan Africa by using a dataset which includes 39 countries in SSA over a time period covering the years from 1980 to 2005. A set of factors that can potentially influence tax revenues, dividing into five aspects including the tax base, structural factors, and foreign aid and conflict, is considered in the econometric analysis. Our main findings can be summarized as follows.

Firstly, our results significantly suggest that the overall tax to GDP ratio is higher in more open economies, a relatively smaller size of agriculture sector, less populous and peaceful countries. The introduction of VAT also has a significant positive impact on the total tax-GDP ratio. However, several of these variables affect the different components of total tax revenue in a statistically significant way. We find evidence of fairly strong relationships between some variables and the components of tax revenue. These include the positive effect of openness, per-capita GDP and a negative impact on the trade-tax GDP ratio. The size of the agricultural sector and foreign aid affects the direct-tax GDP ratio negatively. VAT and a peaceful environment have a significant positive impact. With regard to the indirect-tax GDP ratio it is only the size of the agricultural sector and whether a country has introduced VAT that has a significant positive impact.

Our results suggest several policy recommendations. Countries in SSA will benefit in terms of higher tax-revenue if formal activities, such as the manufacturing sector, is growing faster than the agricultural sector. Although our results did not show any significant relationship between foreign aid and the overall tax-GDP ratio, we found a significant effect between foreign aid and the direct-tax GDP ratio. This would suggest that reforming direct taxes would be a priority in donor-supported tax

reforms. The cost of conflict was found to be high in tax-revenue terms. We found a significant positive impact on peace on both the overall tax-GDP ratio and the direct-tax GDP ratio. Finally, the adoption of VAT in SSA these years has contributed positively to revenue performance.

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Appendix B: Countries by Income Level and Resource Status

Low-income countries	Lower-middle-countries	Upper-middle-income countries
Benin	Cameroon*	Botswana*
Burkina Faso	Cape Verde*	Equatorial Guinea*
Burundi	Lesotho	Gabon*
Central African Republic	Namibia*	Mauritius
Chad*	Swaziland	Seychelles
Comoros		
Congo, Republic of*		
Côte d'Ivoire*		
Ethiopia		
Gambia		
Ghana		
Guinea*		
Guinea-Bissau		
Kenya		
Madagascar		
Malawi		
Mali		
Mozambique		
Niger		
Nigeria*		
Rwanda		
São Tomé and Príncipe		
Senegal		
Sierra Leone		
Tanzania		
Togo*		
Uganda		
Zambia		
Zimbabwe		
29 countries	5 countries	5 countries

Notes:

Countries with * are classified as resource countries.

Income classification follows the World Bank 2006 country classification according to 2005 incomes.