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**Fiscal Capacity and Government Accountability
in Sub-Saharan Africa**

by

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Fiscal capacity and government accountability in sub-Saharan Africa

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Abstract

Historical evidence from the developed world suggests that the expansion of the modern states' fiscal capacity (i. e. its ability to tax citizens) eventually led to more democratic and less corrupt governments. Since sub-Saharan African countries are currently in a process of state building, we study whether a positive effect of fiscal capacity on government accountability prevails in contemporaneous sub-Saharan Africa, too. We conduct the empirical analysis with data covering 23 African countries over the 1960-2008 period. The results suggest that fiscal capacity increases government accountability in sub-Saharan Africa.

Keywords: Fiscal capacity, taxation, government accountability, democracy

JEL codes: H20, P14, O23

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1 Introduction

The ultimate measure of the state's power is its fiscal capacity: the amount and type of resources it has at its disposal. Some authors even *define* the state in terms of its ability to acquire revenues. The 16th century philosopher Jean Bodin stated that “financial means are the nerves of the state”. More recently, Douglass North described the state as an organization whose geographic boundaries are determined by its power to tax (North, 1981).

It is well known that a powerful state can be a mixed blessing. Countries with a powerful state that respects property rights and provides important public goods tend to be rich. In contrast, countries with predatory states tend to be poor.¹ Therefore, the challenge every society faces is to provide the state with the means to fulfill its legitimate duties, while at the same time preventing it from misusing its power to expropriate private resources. Countries that have been successful in sustaining high levels of fiscal/state capacity have typically found a solution to this challenge. By establishing an extensive bureaucracy that has the ability to monitor and tax the economic transactions of its citizens, such countries provide the state with the administrative means to extract large amounts of resources from the private sector. At the same time, they have established institutional barriers, from democratically accountable parliaments to the separation of powers, that commit the state to be accountable to its citizens.

This combination of administrative capability and institutional limitations has guaranteed a high degree of voluntary tax compliance (Andreoni et al., 1998; Frey and Torgler, 2007), thereby limiting monitoring and collection costs. It follows from this observation that to increase taxation, rulers not only built capable tax administrations, but were also forced to become more accountable. By most accounts, they progressively allowed citizens to participate in the formulation of public policy, established efficient bureaucracies, and subjected themselves to the rule of law.

¹Leeson (2007) illustrates this fact on the basis of the experiences in Somalia. He shows that in this country, measures of social welfare improved *after* the collapse of state structures. His explanation for this finding is that Somalian governments did more harm than good to their citizens, so that, from the citizen's point of view, anarchy was preferable to a state that was excessively predatory.

Historical evidence is consistent with the hypothesis that the building of the accountable state and the expansion of its fiscal capacity were related developments. Attempts by the state to increase taxation were often met with resistance by citizens and demands for a voice in the formulation of public policies and/or for less corrupt administration. Often cited examples are the American rebellion against the British with its goal to prevent “taxation without representation”, the convocation of the Estates-General by Louis XVI to address the financial difficulties of the absolutist state, and the repeated struggles between British monarchs and Parliament to gain control over tax policy. In all these cases, significant limits on the power of the state were put in place after the state had acquired the institutional capability and displayed the willingness to increase levels of taxation. Moreover, in many modern countries, the most important role of parliament is to approve the budget, to decide on new taxes, and to hold the executive accountable to the public.

Even though historians and political scientists have argued for a long time that fiscal capacity leads eventually to more accountable governments (Tilly, 1992; Moore, 2007), the economics literature has paid little attention to this direction of causality. Democracy and the quality of government are usually perceived as having an exogenous effect on taxation and public good provision. The reverse relationship, i. e. an independent effect of taxation on the accountability of the state tends to be neglected.²

There are, however, a few exceptions that quantitatively analyze the effect of fiscal capacity and/or related variables on government accountability. Ross (2004) explores how taxation affects representation for a large number of countries with pooled cross-section regressions. Similarly, Herb (2005) explores the relationship between non-tax revenues and democracy in a cross-country sample. Berger (2009) finds that in Nigeria, subnational regions where the British colonialists had invested in fiscal capacity during colonial period tend to have better

²For example, one major strand of the literature in political economy argues that democracy enables poor voters to enforce redistributive policies, and through this channel increases the tax burden (for a review, see Gould and Baker (2002)). The best known contribution along these lines is probably Meltzer and Richard (1981), who use the median voter model to explain levels of redistribution. Another strand of the literature explores how corruption and other measures of the quality of government influence fiscal policies. For example, Rajkumar and Swaroop (2008) show that the efficacy of public spending is dependent on the quality of government. Acemoglu and Verdier (2000) study theoretically how redistributive interventions of the government affect corruption and through this channel the size of government. However, neither strand of the literature explores the possibility that democracy and the quality of government itself may be a function of taxation.

governments and higher administrative quality. In addition, there exists a large literature on the “resource curse” which finds that countries that receive large incomes from natural resources are less democratic and exhibit lower government quality (Ross, 2001; Treisman, 2007). Similarly, several contributions find that development aid, which is another source of non-tax income, has a detrimental effect on government quality (Knack, 2001, 2004). None of these studies, however, explicitly investigate the implications of fiscal capacity on government accountability.

Given, on the one hand, the contributions suggesting an independent effect of fiscal capacity on government accountability, and, on the other hand, the scarcity of econometric evidence that is concerned with this direction of causality, the goal of this paper is to study whether fiscal capacity has an effect on government accountability.

We explore this question using data from 23 sub-Saharan African countries over the 1960-2008 period. Several authors argue that sub-Saharan Africa is currently in a process of state building that is similar to the establishment of the modern state in the Europe (Kirby and Ward, 1991; Thies, 2004). African countries also vary considerably in their fiscal capacities (Di John, 2009) and in their levels of democracy and government quality (Wiseman, 1995). Therefore, they provide a promising testing ground. In addition, studying the link between fiscal capacity and accountability can lead to insights that may help to formulate development strategies for this part of the world. Indeed, the link between government accountability and taxation in sub-Saharan Africa has received some attention in recent development policy debates (Olson, 2001).

Following our previous discussion, we understand in this paper the term accountability as encompassing two distinct dimensions. A political dimension which relates to the ability of the citizens to influence policy through the ballot box (democracy), and an administrative dimension which captures to what extent the institutions of the state are efficient, free of corruption, and subject to the rule of law (quality of government).

We begin our empirical investigation by using the instrumental variables approach to identify the effect of fiscal capacity on the two dimensions of accountability. The instrumental variables approach is commonly applied to identify the effect of fiscal capacity on some vari-

able of interest. For example, (Dinecco and Prado, 2010) use this approach to study the effect of fiscal capacity on economic growth. As suggested by the recent theoretical literature on fiscal capacity, such studies use variables based on historical international wars as instruments. The reason is that because states have to expend considerable resources to fight wars, those countries that were often engaged in warfare in the past had to expand their fiscal capacity (Besley and Persson, 2009a). Consequently, one may expect a correlation between the incidence and severity of past international wars and contemporaneous fiscal capacity. Indeed, Dinecco and Prado (2010) show in a world-wide sample that the number of historical war casualties a country has suffered in international wars is strongly correlated with its contemporaneous fiscal capacity.

However, in the African context, historical international war casualties cannot be used as an instrument because international wars have been rare in Africa, even after decolonization. We decided that the best alternative war-based instruments are the number of wars fought by a colonizing power against native populations in the territory of a contemporaneous African country and the casualties suffered by this power during these wars. We use these instruments based on the premise that if a colonizing power had to fight a many wars and/or suffered high casualties during the colonization process, then it would perceive the colonized tribe/kingdom as a serious threat. Therefore, it would have an incentive to build up its fiscal capacity in order to have sufficient resources available to keep the native population under control.

The results of the instrumental variables regressions suggest that there is a positive relationship between certain proxies for fiscal capacity and the two dimensions of government accountability. However, diagnostic tests for the suitability of the instruments in these regressions suggest that historical war-casualties based instruments are problematic when used in the context of sub-Saharan Africa. We find that the weak identification statistics are low and that we cannot exclude the possibility that the instruments are correlated with the error term in the second stage regressions. Even though the instrumental variables regressions exhibit these problems, we decided to report the results since instrumental variables regressions are the standard approach used in the literature to study the implications of fiscal capacity.

Yet, we use in a second step approaches that rely on the temporal dimension of our data to identify the effect fiscal capacity on government accountability. More specifically, we first estimate models where we explain levels of accountability at the end of our sample period with levels of fiscal capacity at the beginning. Second, we attempt to explain long-run changes in accountability with initial levels of fiscal capacity. Finally, we fully exploit the panel structure of our dataset and estimate System-GMM models using five- and ten-year averaged data. In these models, we explain levels of accountability in the contemporaneous five- or ten-year period, respectively, by the level of fiscal capacity in the previous five- or ten-year period.

On balance, our results suggest, in line with the instrumental variables regressions, that there is a positive relationship between certain measures of fiscal capacity and both dimensions of government accountability.

The remainder of this paper is organized as follows. The next section provides a short description of the fiscal systems of African countries and discusses their potential link with government accountability. Section 3 introduces the data. Sections 4 to 6 present the results. Finally, Section 7 concludes.

2 Fiscal capacity and government accountability in sub-Saharan Africa

In this paper, we are interested in the implications of the state's fiscal capacity for government accountability. What is meant by the term fiscal capacity is the extractive capability of the state, i. e. the amount and type of resources the state could theoretically extract if it chose to do so, and the extent to which this extraction can be done "efficiently". This hypothetical power is, of course, not measurable. What can be done is to infer upon this power through observable proxy variables. The most widely used are the tax to GDP ratio and the share of income taxes in total tax revenue (Besley and Persson, 2009a; Dinecco and Prado, 2010). The tax to GDP ratio can thought of as measuring the total extractive capability of the state. The share of income taxes in total tax revenues measures the extent to which revenues are raised through the relatively advanced and efficient income tax.

Using these proxies, we find that there are noticeable differences in fiscal capacity between African countries, both with respect to the overall tax intake and with respect to the composition of revenues. According to the World and African Development Indicators (see below for a description of these data), Namibia had on average a tax to GDP ratio of 28% during the 1960-2008 period, whereas the Democratic Republic of Congo had a ratio of 1.2%. With respect to the composition of revenues, Botswana collected over 57% of its revenue from relatively advanced taxes on income and profits, while Guinea only collected around 10%.

Several explanations have been put forward for these differences. First, economic factors have been mentioned. Di John (2009), for example, relates the capacity to tax, *inter alia*, to the share of subsistence agriculture in total output, the size of the informal sector, the number of small establishments, and the share of total consumer spending made in modern establishments.

Second, it is argued that the differences in fiscal capacity can be explained by the colonial past. According to Amin (1972), African countries can be divided in three groups: the Africa of (i) the cash-crop economies, (ii) the concessionary companies, and (iii) the labor reserves. In the cash-crop economies, production was left to peasants while marketing was dominated by mercantile houses or state marketing boards. In the Africa of the concessionary companies, colonial powers gave concessions to private companies for the extraction of minerals and the production of crops on large plantations. The labor reserves colonies had a large settler population, whereas the native inhabitants were used as cheap labor. Amin argues that non-labor reserves economies tended to rely more on trade taxes. The labor-reserves economies, on the other hand, were characterized by a small foreign minority that was pitted against a large native population, which motivated the ruling elite to accept high tax rates.

On the one hand, it is a reasonable conjecture that the fiscal infrastructure left in place by the colonizers has had an effect on the development paths of African countries (Olsson, 2009). On the other hand, most African countries have been independent for around 50 years by now and consequently have had time to shape their own tax policies. That they are capable to formulate their own policies and are not exclusively bound by the colonial past is, for example, shown by Kasara (2007). She finds that taxation of agricultural products

within African countries varies according to whether a particular product is produced in a region dominated by co-ethnics of the chief executive. Similarly, Block (2002) shows that governments in Africa use fiscal policy strategically to affect election outcomes. African countries therefore have some leverage regarding their tax policies, and it is a reasonable conjecture that their decisions regarding taxation will eventually impact levels of democracy and the quality of government.

That the effect of taxation on representation found in Europe has, at least historically, also existed in Africa is hinted by several rebellions by African kingdoms/tribes against taxes imposed by the colonial authorities. One straightforward example is the Hut Tax War in present-day Sierra Leone. After the British unilaterally imposed a tax on the size of huts, a collection of local tribes rose up in rebellion (Abraham, 1972, 1974). This unwillingness to pay taxes may force African rulers, as in Europe at the dawn of the modern age, to grant citizens a larger say in policy and provide them with better quality government, at least if other revenue sources are unavailable.

Yet, there are also reasons to be skeptical that the link between fiscal capacity and accountability exists in Africa. On the one hand, unlike European countries, most modern African states receive significant amounts of natural resource income and large sums of development aid. Income from natural resources implies that governments are not dependent on negotiating with their populace for revenues. The availability of such rent income may therefore diminish the link between taxation and accountability in Africa (Ross, 2004). Similarly, development aid represents a source of income to African rulers which frees them from the need to form an implicit social contract with their citizens, offering more democracy and better governance in return for more taxes (Moss et al., 2006; Brautigam et al., 2008). On the other hand, rulers have to engage with donors if they want to receive aid, which might provide a counter-weight against predatory behavior. Thus, while aid might diminish the link between fiscal capacity and accountability, its implications as a whole for accountability may not be as bad as that of rent income.

Another feature of the contemporaneous fiscal landscape in Africa is the emergence of autonomous revenue authorities (Fjeldstad and Moore, 2009). These are revenue collection

institutions that operate independently from the finance ministries. The idea behind their establishment was to de-politicize tax administration and to make it more efficient, in particular by paying higher salaries than in other branches of the public sector. While it is contentious whether these revenue authorities have indeed improved the quality of tax administration, the fact that they are only indirectly accountable to the finance ministry and other political institutions may mean that their emergence may have weakened the link between fiscal capacity and accountability.

Finally, the historical narratives relating taxation to representation usually involve the existence of an external threat to the state (Besley and Persson, 2009a,b). In other words, it is argued that governments started to require higher taxes only because they had to fight wars against other states. In Africa, however, there have been few wars where nation states fought other states.³ Therefore, it may be argued that African countries never had an incentive to invest in their extractive capabilities. On the other hand, wars are not the only reason why public officials may want to raise revenues. Also, the fact that only few actual wars were fought does not imply that African governments did not perceive external threats (Thies, 2007). The potential for an external war may have been sufficient to incentivize them to invest in their fiscal capacities, even if only few actual wars have been fought.

Overall, there are some reasons why we should expect an effect of fiscal capacity on government accountability in contemporaneous Africa, and others that suggest that this link may either not be present or are ambiguous about the direction of the exact nature of the relationship. Therefore, it is essentially an empirical question whether and how fiscal capacity and accountability are related in Africa. In the next sections, we explore this question.

3 Data

The first issue that needs to be addressed when attempting to empirically analyze the relationship between fiscal capacity and accountability is to find accurate measures for both. Useful proxies for fiscal capacity should capture the amount of revenues the state can collect,

³Herbst (2000) mentions in particular geographical and demographic conditions as impediments to interstate wars in Africa. Low population density combined with inaccessible territories made it both difficult and relatively unattractive to gain control over large territories in the hinterland.

if it choose to do so, and to what extent these revenues are collected through “advanced” revenue sources. For example, revenues obtained from rent income or development aid can be used to provide public goods, and as such can be interpreted as an indicator of fiscal capacity, but collecting such revenues requires neither a complex bureaucracy nor the compliance of citizens with the tax authorities. On the other hand, collection of income taxes requires both an advanced bureaucracy and the compliance of citizens, but revenues from income taxes alone might be insufficient to fund the variety of public goods that is expected from the state.

Besley and Persson (2009a) and Dinecco and Prado (2010) use the share of income taxes in total tax revenues as their first measure of fiscal capacity, arguing that the importance of income taxes is a good proxy for the capacity of the tax administration. Second, they use the tax to GDP ratio as a “catch-all” measure of fiscal capacity. Third, they use the share of non-trade taxes in total tax revenue, arguing that trade taxes are inefficient and that therefore a large trade tax share indicates low fiscal capacity.

We follow these authors and use the share of income taxes in total tax revenues and the tax to GDP ratio as our first two indicators of fiscal capacity. However, while the share of non-trade taxes is a reasonable measure of fiscal capacity, the non-grant share of revenues (grants from other foreign governments, international organizations, etc.) appears to be more appropriate for African countries given the important role of development aid for public budgets in many sub-Saharan African countries. Knack (2009) shows that aid is negatively related to the efficiency of the tax system. Also, Baunsgaard and Keen (2005) show that poorer countries have not been able to replace revenue losses due to trade liberalization, which suggests that small revenues from trade taxes may rather indicate low instead of high fiscal capacity in the African context. For these reasons, we use the non-grant share in total revenues as our third measure of fiscal capacity in this paper.

We collected data on the share of income taxes in total tax revenue, the tax to GDP ratio, and the share of non-grant revenue in total revenues primarily from the World Bank’s World Development Indicators dataset (WDI), which provides observations from the 1960s onwards. Whenever the WDI data exhibit missing values, we replace the values with the data provided in the African Development Indicators (ADI) if the ADI data is available. The ADI data is

only available from the 1990s onwards, but is more complete during this period than the WDI data.⁴

As with fiscal capacity, we have to operationalize the concept of accountability. One important dimension of accountability is to what extent the government is politically accountable to its citizens, i. e. if it can be voted out of office if it implements policies that are not supported by the majority of the population. This aspect of accountability can be summarized under the heading “democracy”. A second dimension of accountability is the quality of government, i. e. whether or not the government is corrupt, whether the bureaucracy is meritocratic, and whether property rights are secure. These two dimensions of accountability are not necessarily related, i. e. democratic governments are not necessarily less corrupt and vice versa. We thus use separate measures for the two dimensions of accountability.

Several organizations provide measures that attempt to empirically operationalize the abstract concepts of democracy and government quality. They differ not only with respect to the definitions that are applied, but also with respect to coverage and construction. Widely used measures for democracy are constructed by the Polity IV project (Marshall and Jaggers, 2002), Freedom House, the World Bank (the “voice and accountability” measure), and Vanhanen (2003). Similarly, widely used measures to capture the quality of government are available from the International Country Risk Guide (ICRG) of the PRS Group, the World Bank, and Transparency International.

In this paper, we use the combined polity score from the Polity IV database (Marshall and Jaggers, 2002) to measure democracy, i. e. our first dimension of government accountability. Its advantage is that it is, for the countries in our sample, available from the beginning of the 1960s, and thus reaches further back than any other measure. The combined polity score can assume values from -10 (strongly autocratic) to +10 (strongly democratic).

To measure the second dimension of accountability, the quality of government, we use the quality of government index from the ICRG. This measure has the advantage, compared to the alternatives, that it provides consistent information over a relatively long time-frame, i. e.

⁴The correlation between the WDI and ADI values, when both are available, is over 0.85 for the income tax and the tax/GDP ratio. The correlation coefficient is lower, i. e. 0.61, for non-grant ratio. Note, however, that there are only 38 jointly defined observations for the non-grant ratio in the WDI and ADI datasets.

from 1984 onwards. The quality of government score can assume values between 0 (lowest quality) to 1 (highest quality), and takes into account the degree of corruption, the extent to which “law and order” prevail, and the bureaucratic quality.

Our final dataset consists of 23 sub-Saharan countries, listed in Table 1, for which observations are jointly available for the three measures of fiscal capacity and two measures of accountability. Even though our sample is limited to only about half of the countries located in sub-Saharan Africa, it should be reasonably representative. It covers all major regions of this part of the world and includes large and small, rich and poor, and English and French-speaking countries.

In Figure 1, we plot the average value of our proxy for democracy, the combined polity score, during the sample period against the average value of each of the three measures of fiscal capacity for the 23 countries. This figure reveals, first, a strong positive linear relationship between the income tax ratio and the polity score, and second, an equally strong positive relationship between the tax to GDP ratio and the polity score. It is noteworthy that these positive relationships are not driven by only a few outliers. On the other hand, there does not seem to be any relationship between the non-grant ratio and the proxy for democracy.

In Figure 2, we plot the average value of the ICRG index, our measure for the quality of government, against the average value of each of the three measures of fiscal capacity. We find a positive relationship between the quality of government index and both the income tax and the tax to GDP ratios, but no relationship between the non-grant ratio and the quality of government. As for democracy, these findings do not seem to be driven by outliers.

Obviously, the findings from these figures can only be preliminary as they neither control for any covariates nor take account of potential endogeneity between the measures for fiscal capacity and government accountability. Yet, they suggest that the non-grant share and the other two measures of fiscal capacity have different implications for accountability. The correlation coefficients for the cross-section averages reported in Table 3 provide a reasonable explanation for the differing effects of the non-grant ratio and the other two measures of fiscal capacity. They show that the three measures of fiscal capacity are positively correlated. However, the correlation between the non-grant ratio variable with the other two is relatively

weak. Overall, this suggests that the three proxies capture different aspects of fiscal capacity, which are not necessarily related.

The correlations reported in Table 3 also show that the democracy and quality of government indices capture similar, but not entirely identical, aspects of accountability. On average, more democratic countries tend to have higher quality governments and vice versa, but the correlation is around 0.7 and hence far from perfect.

Finally, we provide some summary statistics on the cross-section averages of the variables used in the regressions in Table 4. They reveal that there is considerable variation between the 23 countries in both fiscal capacity and accountability. The country average of the combined polity score ranges from -7.8 to + 6.8, and the quality of government variable ranges from 0.1 to 0.7. Similarly, the share of income taxes in total tax revenue ranges from 10.5% to 57.8%, the tax to GDP ratio from 1.2% to 28.2%, and the non-grant share of revenues from 27% to 92%.

4 Instrumental variables estimation

We start the empirical analysis by estimating a model where we regress the two measures of government accountability on the three measures of fiscal capacity while attempting to take potential endogeneity of the latter into account. In other words, we estimate

$$\text{Accountability}_i = c + \alpha \text{Fiscal capacity}_i + \delta \mathbf{x}_i + \epsilon_i, \quad (1)$$

where Accountability refers either to democracy, measured by the combined polity score, or to the quality of government, measured by the ICRG quality of government index; Fiscal capacity is the country's fiscal capacity, measured either as the income tax ratio, the tax/GDP ratio, or the non-grant ratio; c is the constant, \mathbf{x} is a vector of control variables (see below), and ϵ the error term. All variables are included as cross-section averages.⁵

⁵The time-dimensions for which data are available vary between variables. In particular, the ICRG quality of government index is only available for the 1984-2008 period. All other variables are, at least for some countries, available for the period 1960-2008 (but there are several missing variables in the case of the proxies for fiscal capacity). The only exception is one element of the \mathbf{x} vector: GDP per capita, for which our data covers the 1960-2007 period.

Since we have only 23 observations, we have to be conservative in the number of control variables. The vector \mathbf{x} therefore consists of three variables only: the log of GDP per capita, the urbanity ratio and the share of the under-24 year old. All three variables can be perceived as capturing various socio-economic determinants of accountability. GDP per capita is likely to be correlated with the educational level of the population, which in turn is likely to be related to democracy. In addition, it is a reasonable conjecture that the richer a society is, the more people can afford to invest time and resources to participate in the political process. The urbanity ratio is likely to be correlated with the ability of the population to participate in the political process as well. First, by making it easier to organize political action. Second, by bringing citizens more closely to the centers of political power, i. e. the large cities. Finally, young people are often those fueling demands for more democracy. On the other hand, there is also evidence that the likelihood of violent conflict is higher if a society is too young (UNDP, 2006).

We use the instrumental variables approach to take account of the endogeneity between accountability and fiscal capacity. Besley and Persson (2009a) argue that past external wars can be used as instruments for fiscal capacity. Dinecco and Prado (2010) show that past external war casualties perform well as instruments in a world-wide sample. However, past external wars, i. e. where two nation states confronted each other, cannot be reasonably used in sub-Saharan Africa because most modern African states were only formed during the decolonization process. In fact, even during the post-colonial period, external wars have been rare in Africa. Except for the two World Wars, the Correlates of War database (version 3) records only one external war in sub-Saharan Africa before 1945, and two external wars thereafter.

As an alternative to external wars, we use information on what the Correlate of War database calls *extra-state wars*, i. e. wars fought between states and non-state actors that are not civil wars. Extra-state wars refer to, for example, wars between a colonial power and native populations.

We calculated the number of wars fought between African pre-colonial kingdoms/tribes and colonial powers before 1945 and the total casualties of the colonizing power using the

Correlates of War database. We then mapped the respective kingdoms/tribes to contemporaneous countries, and used the number of wars and the aggregated casualties suffered by the colonizing power as instruments for current fiscal capacity of a given African country (see also the data appendix).

In the non-African context, the number of casualties suffered by a country (or its predecessors) is usually proposed as instrument for that country (Besley and Persson, 2009a; Dinecco and Prado, 2010). However, in sub-Saharan Africa, data on casualties suffered by a given kingdom/tribe in wars with colonizing powers is often unavailable, forcing us to use casualties by the colonizing power instead. But while it would be preferable to have, for comparative purposes, data on casualties suffered by African kingdoms/tribes, casualties suffered by the colonizing power might actually be a better predictor for current day fiscal institutions in Africa given that many of these institutions in contemporaneous African states were established and shaped by the colonizing powers. As the amount of revenues they had to raise likely depended, at least to some extent, on the threat posed by the colonized people, i. e. their underlying ability to challenge the colonizers militarily, battle casualties suffered by the colonizing power can be a reasonable indicator of subsequent buildup of fiscal capacity in order to deal with such threats.

The results from estimating Model (1) with these instruments are reported in Table 5. They suggest, first, that there is a positive relationship between the tax revenue to GDP ratio and both measures of government accountability. Second, they indicate that the income tax ratio has a positive effect on democracy. The non-grant ratio, however, is not significantly related to either measure of accountability. Reliance on income taxes and a higher tax intake, measured with the tax/GDP ratio, thus seems to lead to more democracy and a better quality of government.

At first sight, these results might lead us to conclude that there is a positive effect of fiscal capacity on measures of government accountability if the former is measured either by the income tax ratio or by the total tax intake of the state. However, such a conclusion would only be warranted if the instruments performed well. Indeed, the diagnostic tests suggests two problems with these instruments. The first is that they do not seem to be strong predictors of

the proxies for fiscal capacity. The weak-identification test statistic (Kleibergen-Paap rk Wald F statistic) are relatively low in all regressions. The second problem is that the instruments do not appear to be exogenous in most regressions, as suggested by the significant or almost significant over-identification tests (Hansen-J).

Overall, the regressions provided in Table 5 indicate that the instrumental variables approach using war casualties as instruments for fiscal capacity alone is not sufficient to establish the effect of fiscal capacity on democracy in sub-Saharan Africa. In the next sections, therefore, we exploit the temporal dimension of our data to explore this question further.

5 Long-run effects of fiscal capacity and accountability

In this section, we exploit the temporal dimension of our data to identify the effect of fiscal capacity on government accountability by estimating two sets of cross-section models. In Section 5.1, we estimate cross-section models where we explain a country’s final level of the measures of accountability in our dataset by its initial values of the measures of fiscal capacity. In Section 5.2, we estimate models where we explain the change in the measures of accountability by the initial values of the measures of fiscal capacity.

5.1 Initial fiscal capacity and final levels of accountability

We begin by estimating the following model

$$\text{Accountability}_{i,t=T} = c + \alpha \text{Fiscal capacity}_{i,t=1} + \beta \text{Accountability}_{t=1} + \delta \mathbf{x}_{i,t=T} + \epsilon_i. \quad (2)$$

Model (2) explains the last available value of the measures of accountability in country i ($\text{Accountability}_{i,t=T}$) with the first available value of the measures of fiscal capacity ($\text{Fiscal capacity}_{i,t=1}$). To take account of the effects of the colonial heritage on contemporaneous levels of fiscal capacity and democracy, we also include the initial level of our proxies for accountability. That is, we control for initial values of democracy and government quality, respectively. Further control variables are the last available values of the log of GDP per capita, the urbanity ratio, and the share of the under-24 year old.

In Table 6, we report the results from estimating Model (2). We find that the estimated effect of the income tax ratio on democracy is significantly positive, while it is insignificant with respect to the quality of government. The coefficient on the tax to GDP ratio is positive both in the democracy and the quality of government regressions, but only significant in the latter. Overall, these results suggest that fiscal capacity, if measured by the income tax ratio or the tax/GDP ratio, is conducive for democratization and the quality of government, respectively. The significance levels of the coefficients of interest are, however, low in some of the models.

5.2 Initial levels on subsequent changes

To investigate the temporal relationship between fiscal capacity and accountability further, we explore whether initial values are related to subsequent changes. The model that we estimate is

$$\Delta\text{Accountability}_i = c + \beta\text{Fiscal capacity}_{i,t=1} + \gamma\text{Accountability}_{i,t=1} + \delta\mathbf{x}_i + \epsilon_i, \quad (3)$$

where $\Delta\text{Accountability} = \text{Accountability}_{t=T} - \text{Accountability}_{t=1}$ is the difference between the last and the first available value of the two measures of accountability in country i . All other variables are defined as in Model (2). The control variables are included as cross-section averages since we explain changes over relatively long time periods.

In Table 7, we report the results from estimating Model (3). These results are consistent with those reported in Table 6. Higher initial fiscal capacity, if measured with either the income tax or the tax to GDP ratio, is generally positively and significantly related to the change in both democracy and the quality of government. There is also strong evidence for a reversion to the mean in democracy. Countries with a higher level of democracy or government quality experienced significant reductions in these dimensions of accountability during the sample period.

6 Dynamic panel data models

In this section, we fully exploit the panel structure of the dataset by estimating dynamic fixed effects models. The advantage of these models is, first, that they can reveal short-term relationships between fiscal capacity and accountability. Second, we can control for country-specific time-invariant effects by including cross-section fixed effects, and control for common shocks by including time fixed effects. The disadvantage is that there might not be sufficient within-variation to detect any meaningful effects.

We use five and ten-year averaged data to control for short term variability in the fiscal variables, for example due to business cycle effects (which might lead to imprecise measurement of the fiscal capacity variables and thus to measurement error). To take account of potential endogeneity between fiscal capacity and accountability, we again exploit the temporal structure of the data and lag the measures of fiscal capacity by one five- or ten-year period average, respectively. We also include a lagged value of our measure for accountability to take account of persistence. The model that we finally estimate is

$$\text{Accountability}_{i,t} = c_i + \gamma_t + \alpha \text{Fiscal capacity}_{i,t-1} + \beta \text{Accountability}_{i,t-1} + \delta \mathbf{x}_{i,t} + \epsilon_{i,t}, \quad (4)$$

where Accountability, Fiscal capacity and \mathbf{x} are defined as previously (albeit as five and ten-year averages, respectively), c_i denotes the cross-section fixed effects, γ_t are time fixed effects, and ϵ the error term. The $t - 1$ refer to the previous five or ten year period, respectively.

Models that simultaneously include fixed effects and a lagged dependent variable cannot be estimated by OLS or an analogous estimator (i. e. the within-estimator) because of the Nickell-Bias (Nickell, 1981). While Judson and Owen (1999) show that the bias can generally be ignored when the time dimension is larger than 30, the time dimension here is much lower than 30 because the data has been averaged over five or ten years, respectively. We therefore use the System-GMM approach to estimate Model (4).

The results are reported in Table 8. We find that they are largely in line with those in the previous sections. The income tax ratio, in particular, has a significantly positive effect on democracy in both the five and ten year average models. In the remaining regressions, the

coefficients of the fiscal capacity proxies, while not significant, are generally positively related to the measures of accountability as well.

7 Conclusion

The goal of this paper was to explore the effect of fiscal capacity on government accountability in sub-Saharan Africa. After describing our proxies for fiscal capacity and accountability, we have explored this issue with the instrumental variables approach. Even though the results suggested that there is a significantly positive effect of fiscal capacity, i. e. the income tax and tax revenues to GDP ratio, on proxies for government accountability, we also found that the instruments are questionable because they were either weak or directly related to both the proxies for fiscal capacity and accountability. Alternative instruments suffered from similar problems.

Therefore, we explored the issue further by exploiting the temporal dimension of our dataset. We found that higher fiscal capacity, if measured by the share of income taxes in total tax revenue and/or the tax revenues to GDP ratio, leads to higher levels for both measures of accountability. However, the results were particularly strong when using the income tax ratio as proxy for fiscal capacity and democracy as proxy for accountability.

The non-grant share of revenues and both measures of accountability, on the other hand, are unrelated. This may either suggest that this particular variable is not an accurate measure of fiscal capacity, or that grants have ambiguous effects in Africa. In particular, grant revenue consists of foreign aid, and it is possible that aid has conflicting effects on public policies. It may be that, on the one hand, it has harmful consequences by incentivizing rulers to be less accountable to their citizens since they can get funds from elsewhere. On the other hand, donor countries may require that governments maintain some minimum degree of accountability, both in the dimension of democracy and government quality (Collier, 2006). These two effects might cancel each other out, leading to statistically insignificant estimates.

While there are, of course, many differences between the development of the modern state in the West and the state building processes in contemporaneous sub-Saharan Africa, it appears

that the fundamental relationship between the power and the willingness of the state to tax and the degree of its accountability to its citizens is present in Africa as well. From a policy perspective, the results in this paper suggest that investing in fiscal capacity, in particular by expanding direct taxation and increasing total tax intake, may lead to more accountable governments. Donors may therefore want to expand projects that address governance and fiscal capacity simultaneously.

Future work on the themes addressed in this paper involves identifying alternative proxies for fiscal capacity. While the variables used in this paper have regularly been applied in the literature, they are nonetheless crude. Replication of this study with an indices approach to measure fiscal capacity, possibly based on surveys of country experts, may provide additional insights. Second, studies at a more disaggregated level, exploring for example the link between local taxes and the quality of service delivery, can complement the findings in this study. Finally, searching for alternative instruments that are more strongly correlated with the proxies of fiscal capacity and/or accountability might be useful as well.

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Table 1: COUNTRIES

Botswana	Kenya	Uganda
Burkina Faso	Madagascar	Zambia
Cameroon	Mali	Zimbabwe
Congo, Dem. Rep.	Namibia	
Congo, Republic of	Niger	
Cote d'Ivoire	Senegal	
Ethiopia	Sierra Leone	
Gambia, The	South Africa	
Ghana	Sudan	
Guinea	Togo	

Table 2: DEFINITION AND SOURCE OF VARIABLES

Label	Description	Source
Measures of fiscal capacity		
Income tax ratio	Taxes on income, profits and capital gains as % of total tax revenue	World Development Indicators/ African Development Indicators
Tax/GDP ratio	Tax revenue as share of GDP	World Development Indicators/ African Development Indicators
Non-grant ratio	Non-grant revenues as share of total revenues (100%- grants and other revenues/total revenues)	World Development Indicators/ African Development Indicators
Measures of accountability		
Democracy	Combined Polity Score (the sum of the polity autocracy and democracy scores), range -10 – +10, higher values indicate more democracy	Marshall and Jaggers (2002)
Quality of government	ICRG quality of government index	PRS Group
Control variables		
GDP per capita	log of (real) GDP per capita (constant prices, chain series)	Penn World Table on 6.3
Urbanity	100%-share of rural population	African Development Indicators
Young	Share of population ≤ 24	African Development Indicators
Instruments		
Historical wars	Number of extra-state wars (colonial power against sub-Saharan African Kingdom / Tribe) before 1945	Own calculations based on Correlates of War database
Historical war casualties	Accumulated state casualties (i. e. casualties suffered by colonial power) in extra-state wars before 1945	Own calculations based on Correlates of War database

Note: Several of these variables were obtained from Teorell et al. (2010)

Table 3: CROSS-CORRELATION TABLE

	Democracy	Quality of government	Income tax ratio	Tax/GDP ratio	Non-grant ratio	GDP per capita	Urban	Young
Democracy	1.000							
Quality of government	0.714	1.000						
Income tax ratio	0.569	0.474	1.000					
Tax/GDP ratio	0.727	0.779	0.626	1.000				
Non-grant ratio	-0.001	0.019	0.093	0.316	1.000			
GDP per capita	0.401	0.601	0.644	0.619	0.161	1.000		
Urban	0.121	0.151	0.338	0.260	0.192	0.603	1.000	
Young	-0.277	-0.226	0.021	-0.185	-0.224	-0.404	-0.643	1.000

Table 4: SUMMARY STATISTICS

Variable	Mean	Std. Dev.	Min.	Max.	N
Democracy	-1.907	4.127	-7.805	6.791	23
Quality of government	0.426	0.125	0.123	0.658	23
Income tax ratio	28.036	12.761	10.451	57.754	23
Tax/GDP ratio	14.396	6.531	1.212	28.179	23
Non-grant ratio	73.833	17.626	26.98	92.067	23
GDP per capita	0.578	0.624	-0.197	2.029	23
Urban	27.117	11.078	9.044	51.428	23
Young	63.441	2.322	58.249	67.05	23

Note: Summary statistics for GDP per capita are for logarithmized values

Table 5: EFFECT OF FISCAL CAPACITY ON ACCOUNTABILITY IN SUB-SAHARAN AFRICA, IV REGRESSIONS, CROSS-SECTION AVERAGES, 1960-2008

	Democracy			Quality of government		
	(I) b/z	(II) b/z	(III) b/z	(IV) b/z	(V) b/z	(VI) b/z
Income tax ratio	0.233* (1.724)			-0.000 (-0.052)		
Tax/GDP ratio		0.429*** (2.672)			0.022*** (4.719)	
Non-grant ratio			0.070 (0.408)			-0.006 (-1.143)
GDP per capita	-0.003 (-0.001)	0.087 (0.051)	3.216* (1.822)	0.163* (1.751)	-0.009 (-0.148)	0.170*** (3.406)
Urbanity	-0.197*** (-3.025)	-0.100* (-1.820)	-0.151* (-1.755)	-0.005** (-2.306)	-0.003 (-1.272)	-0.005 (-0.868)
Young	-1.124*** (-4.446)	-0.566*** (-2.773)	-0.488 (-1.053)	-0.010 (-0.869)	-0.010 (-1.205)	-0.018 (-0.878)
N	23	23	23	23	23	23
F	13.383	5.618	1.976	6.905	15.993	2.999
RMSE	2.708	2.587	3.804	0.091	0.086	0.125
Overid. test (p-val.)	0.079	0.087	0.085	0.088	0.770	0.156
Weak id. test statistic	3.211	4.250	1.392	3.211	4.250	1.392

^a Instrumental variable regressions of the two measures of accountability (democracy, quality of government) on the three measures of fiscal capacity (income tax ratio, tax/GDP ratio, non-grant ratio)

^b Instruments are number of historical extra-state wars (fought between a colonizing power and native tribes/kingdoms) and historical extra-state war casualties suffered by the colonial power

^c Stars indicate significance levels at 10%(*), 5%(**) and 1%(***)

^d z-statistics in parentheses

^e Significance tests based on robust standard errors

^f Hansen-J test is used to test for overidentification

^g Kleibergen-Paap rk Wald F statistic is used to test for weak identification

Table 6: EFFECT OF INITIAL FISCAL CAPACITY ON FINAL ACCOUNTABILITY IN SUB-SAHARAN AFRICA, 1960-2008

	Democracy _{t=T}			Quality of government _{t=T}		
	(I) b/z	(II) b/z	(III) b/z	(IV) b/z	(V) b/z	(VI) b/z
Income tax ratio _(t=1)	0.219** (2.259)			-0.001 (-0.466)		
Tax/GDP ratio _(t=1)		0.226 (1.039)			0.006* (1.749)	
Non-grant ratio _(t=1)			-0.005 (-0.104)			0.000 (0.317)
Democracy _(t=1)	-0.158 (-1.419)	-0.070 (-0.388)	-0.023 (-0.125)			
Quality of government _(t=1)				0.020 (0.186)	0.001 (0.006)	0.019 (0.172)
GDP per capita _(t=T)	-1.323 (-0.661)	0.205 (0.087)	0.780 (0.351)	0.108*** (2.662)	0.075* (1.859)	0.096** (2.308)
Urbanity _(t=T)	-0.174** (-2.198)	-0.143 (-1.615)	-0.167* (-1.804)	-0.002 (-0.986)	-0.002 (-0.741)	-0.002 (-0.935)
Young _(t=T)	-0.499 (-1.084)	-0.354 (-0.691)	-0.551 (-1.102)	-0.001 (-0.137)	0.003 (0.291)	-0.001 (-0.055)
N	23	23	23	23	23	23
F	3.367	1.480	0.715	1.985	2.801	1.818
RMSE	4.233	4.477	4.624	0.092	0.087	0.093
R2	0.273	0.186	0.132	0.331	0.402	0.326

^a OLS regressions of the final value of the two proxies for accountability on initial values of the three proxies for fiscal capacity

^b Stars indicate significance levels at 10%(*), 5%** and 1%(***)

^c z-statistics in parentheses

^d Significance tests based on robust standard errors

Table 7: EFFECT OF INITIAL FISCAL CAPACITY ON CHANGE IN ACCOUNTABILITY IN SUB-SAHARAN AFRICA, 1960-2008

	Δ Democracy			Δ Quality of government		
	(I) b/z	(II) b/z	(III) b/z	(IV) b/z	(V) b/z	(VI) b/z
Income tax ratio _(t=1)	0.269*** (3.005)			0.004* (1.793)		
Tax/GDP ratio _(t=1)		0.280 (1.463)			0.009*** (3.141)	
Non-grant ratio _(t=1)			0.028 (0.469)			0.000 (0.139)
Democracy _(t=1)	-1.178*** (-7.650)	-1.053*** (-5.871)	-1.010*** (-5.743)			
Quality of government _(t=1)				-0.969*** (-9.280)	-0.986*** (-11.073)	-0.932*** (-8.127)
GDP per capita	-2.501 (-1.226)	-0.768 (-0.297)	0.723 (0.316)	0.014 (0.262)	0.012 (0.291)	0.064 (1.381)
Urbanity	-0.056 (-0.410)	0.041 (0.382)	0.058 (0.479)	-0.005* (-1.911)	-0.004* (-1.756)	-0.004 (-1.342)
Young	-0.245 (-0.400)	0.214 (0.308)	0.419 (0.638)	-0.020 (-1.303)	-0.016 (-1.468)	-0.012 (-0.757)
N	23	23	23	23	23	23
F	9.894	6.007	5.415	14.867	19.647	10.861
RMSE	4.463	4.654	4.880	0.098	0.089	0.103
R2	0.661	0.631	0.594	0.766	0.808	0.745

^a OLS regressions of the long-run changes in government accountability on the initial values of the three proxies for fiscal capacity

^b Stars indicate significance levels at 10%(*), 5%** and 1%(***)

^c z-statistics in parentheses

^d Significance tests based on robust standard errors

Table 8: EFFECT OF FISCAL CAPACITY ON GOVERNMENT ACCOUNTABILITY IN SUB-SAHARAN AFRICA, DYNAMIC PANEL DATA MODELS, 5 AND 10-YEAR AVERAGES, 1960-2008

	5-y. averages						10-y. averages					
	Democracy			Quality of government			Democracy			Quality of government		
	(I) b/z	(II) b/z	(III) b/z	(IV) b/z	(V) b/z	(VI) b/z	(VII) b/z	(VIII) b/z	(IX) b/z	(X) b/z	(XI) b/z	(XII) b/z
Income tax ratio _{t=-1}	0.136** (2.185)			0.001 (0.811)			0.132* (1.932)			0.002 (0.500)		
Tax/GDP ratio _{t=-1}		0.142 (1.320)			0.005 (1.130)			0.084 (0.530)			-0.002 (-0.155)	
Non-grant ratio _{t=-1}			0.018 (0.867)			-0.000 (-0.088)			0.023 (0.828)			0.001 (0.211)
Democracy _{t=-1}	0.439** (2.158)	0.578*** (3.039)	0.637*** (3.164)				0.676** (2.081)	0.676** (2.101)	0.677** (2.108)			
Quality of government _{t=-1}				0.403** (2.422)	0.366*** (2.743)	0.378*** (2.653)				1.743 (0.942)	1.642 (1.023)	1.517 (1.112)
GDP per capita	-1.193 (-1.404)	-0.258 (-0.322)	0.300 (0.276)	0.074* (1.732)	0.062* (1.777)	0.089*** (2.665)	-2.917* (-1.907)	-1.650 (-1.278)	-1.186 (-0.706)	-0.160 (-0.489)	-0.101 (-0.541)	-0.092 (-0.442)
Urbanity	-0.027 (-0.574)	-0.009 (-0.272)	-0.005 (-0.114)	-0.002 (-1.086)	-0.001 (-0.780)	-0.001 (-1.049)	-0.010 (-0.162)	0.007 (0.122)	0.005 (0.079)	0.005 (0.962)	0.006 (1.051)	0.005 (1.139)
Young	-0.183 (-1.084)	-0.070 (-0.539)	-0.004 (-0.027)	0.004 (0.634)	0.005 (0.806)	0.004 (0.618)	-0.168 (-0.696)	-0.063 (-0.301)	-0.028 (-0.120)	0.020 (1.480)	0.021 (1.624)	0.021* (1.659)
Time fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	99	100	100	66	66	66	61	61	61	33	33	33
Groups	23	23	23	23	23	23	22	22	22	21	21	21
χ^2	514.196	762.601	949.480	213.243	356.158	212.207	138.031	142.390	142.352	12.952	16.257	19.202
Overid. test (p-val.)	1.000	1.000	1.000	0.261	0.242	0.219	0.297	0.338	0.358	0.732	0.827	0.763

^a Models explaining the effect of the three measures of fiscal capacity in the previous five- or ten-year period, respectively, on the measures of accountability in the current five- or ten-year period, respectively

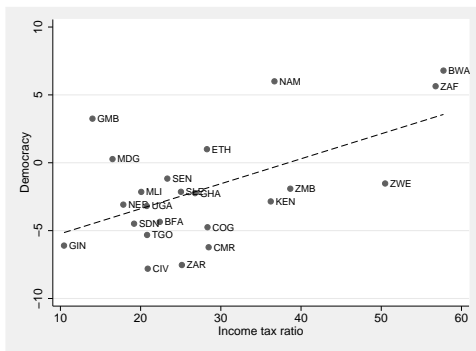
^b Models are estimated with System-GMM

^c Stars indicate significance levels at 10%(*), 5%(**) and 1%(***)

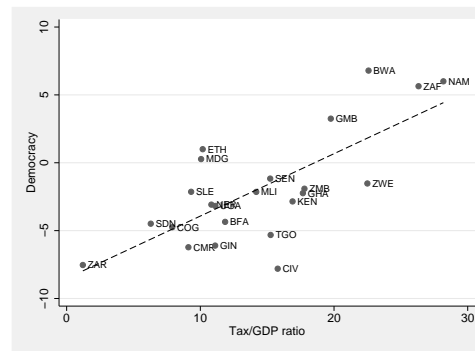
^d z-statistics in parentheses

^e Significance tests based on robust standard errors

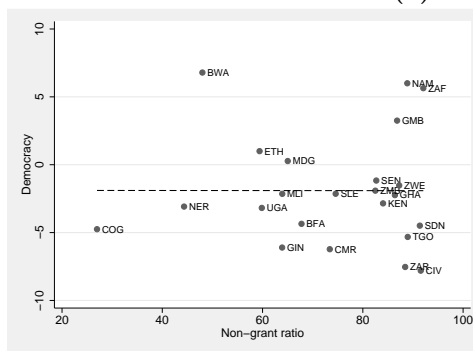
^f Hansen-J test is used to test for overidentification



(a) INCOME TAX RATIO



(b) TAX/GDP RATIO



(c) NON-GRANT RATIO

Figure 1: BIVARIATE RELATIONSHIPS BETWEEN MEASURES OF FISCAL CAPACITY AND DEMOCRACY

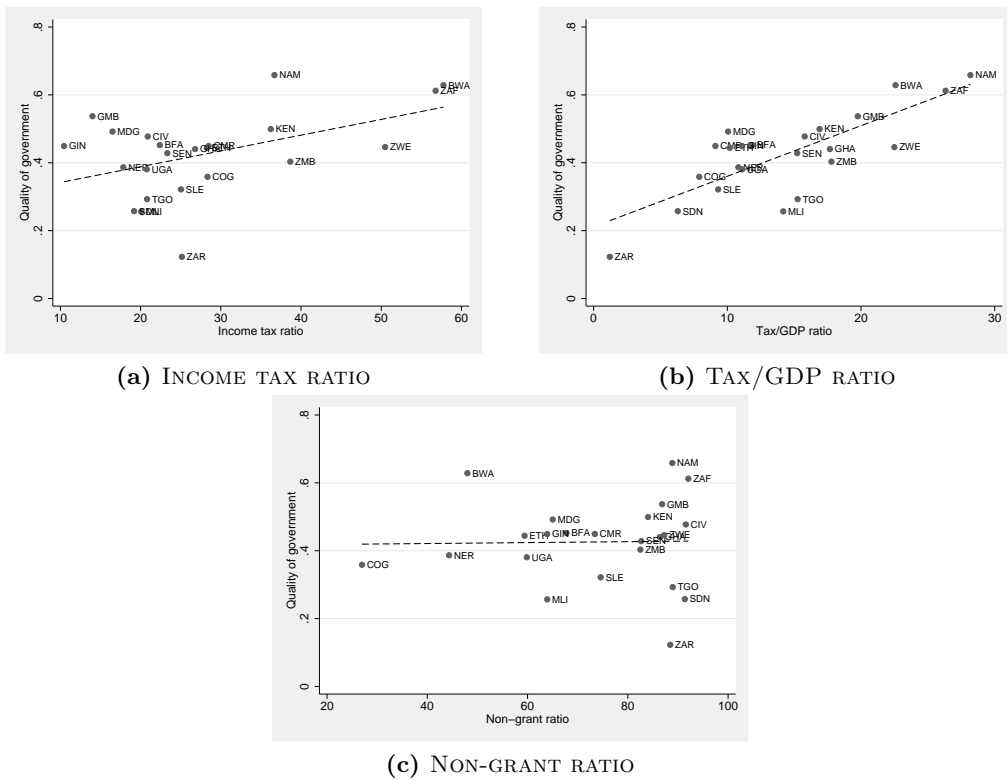


Figure 2: BIVARIATE RELATIONSHIPS BETWEEN MEASURES OF FISCAL CAPACITY AND QUALITY OF GOVERNMENT

Table 9: DATA APPENDIX ON HISTORICAL WARS IN SUB-SAHARAN AFRICA (BEFORE 1945)

Country	Historical wars	Historical war casualties (suffered by colonizers)	Historical war combatants
Burkina Faso	0	0	-
Botswana	0	0	-
Cote d'Ivoire	1	1	Mandino-war 1885 (France - Wassoulou empire)
Cameroon	0	0	-
Congo, Republic of	0	0	-
Ethiopia	4	16.475	British - Ethiopian 1867, Egypt - Ethiopian 1875, Italo - Ethiopian 1887, Italo - Ethiopian 1895
Ghana	3	1.25	British - Ashanti 1824, British - Ashanti 1873, British - Ashanti 1893
Guinea	1	1	Mandino-war 1885 (France - Wassoulou empire)
Gambia, The	0	0	-
Kenya	0	0	-
Madagascar	2	7	France - Madagascar 1883, France - Madagascar 1894
Mali	1	1	Mandino-war 1885(France-Wassoulou empire)
Namibia	1	2	Germans - Herero & Nama 1904
Niger	0	0	-
Sudan	2	36	Egypt & British - Mahdi 1882, Egypt & British - Mahdi 1896
Senegal	2	2	France - Senegalese 1857, France - Senegalese 1890
Sierra Leone	1	2	Sierra Leone Rebels - British 1898
Togo	0	0	-
Uganda	0	0	-
South Africa	8	54.3	British - Zulu 1838, British - Kaffir 1846, British - Kaffir 1850, British - Kaffir 1877, British - Zulu 1879, British - Transvaal 1880, Boer War 1899, British - Zulu 1906

^a Death are scaled in 1000