

Fiscal Capacity and the Quality of Government in Sub-Saharan Africa

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Summary. — Historical evidence from the industrialized world suggests that the expansion of the modern state's capacity to tax eventually led to more democratic and less corrupt governments. Using a dataset that covers 31 sub-Saharan African countries over the 1990–2005 period, we study whether the positive effect of fiscal capacity on the quality of government prevails in contemporaneous sub-Saharan Africa as well. The results provide consistent evidence that within sub-Saharan Africa, fiscal capacity decreases corruption and increases democracy.

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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).

A powerful state is a mixed blessing. Countries with a state that respects property rights and provides essential public goods tend to be rich. Countries with predatory states that curtail the economic and political freedom of their citizens tend to be poor.¹ The challenge, therefore, that 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 these means to suppress dissent and expropriate private wealth.

Societies that have been successful in building an effective and accountable state have found a solution to this challenge. By establishing an extensive bureaucracy that has the ability to monitor and tax almost all economic transactions, successful societies provide the state with the administrative capability to extract large amounts of resources from the private sector. At the same time, they have erected institutional barriers, from democratically accountable parliaments to the separation of powers, that commit the state to be accountable to its citizens.

This observation suggests that to increase taxation, rulers not only built capable tax administrations, but were also forced to increase the quality of governance. 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.

Historical evidence is consistent with the notion 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 by citizens with demands for an administration that was responsive to their needs and free

of corruption. Well known 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.

Even though historians and political scientists have repeatedly argued that fiscal capacity leads to higher quality governments (Moore, 2007; Tilly, 1992), the economics literature has paid little attention to this direction of causality. The quality of government, most notably the level of democracy, is usually perceived as having an exogenous effect on taxation and public goods provision. The reverse relationship, i.e., an independent effect of taxation on the quality of government, tends to be neglected.²

Nevertheless, there are a number of studies that analyze related questions. Ross (2004) explores how taxation affects representation for a large number of countries with pooled cross-section regressions. Herb (2005) explores the relationship between nontax revenues and democracy in a cross-country sample. Berger (2009) finds that in Nigeria, subnational regions where the British had invested in fiscal capacity during the colonial period tend to have better governments and higher administrative quality. In addition, there exists a large literature on the “resource curse” which finds that countries

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that receive large incomes from natural resources are less democratic and exhibit lower government quality (Ross, 2001; Treisman, 2007). None of these studies, however, explicitly investigate the implications of fiscal capacity on the quality of government in a cross-country setting.

Given, on the one hand, the historical narratives that suggest 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 the quality of government.

We explore this question using a dataset that covers 31 sub-Saharan African countries over the 1990–2005 period.³ 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 Europe (Kirby & Ward, 1991; Thies, 2004). African countries furthermore vary considerably in their fiscal capacities (Di John, 2009) and with respect to the quality of their government (Wiseman, 1995). For these reasons, they provide a promising testing ground.

Studying the link between fiscal capacity and government quality is not only of academic interest; it is also important from a policy perspective. It is well recognized that well-functioning governments are necessary for economic development (Acemoglu, Johnson, & Robinson, 2001). Despite much progress, there is still room for governments in sub-Saharan Africa to improve in this regard. By empirically establishing whether fiscal capacity has an effect on different dimensions of government quality, this paper derives feasible policy recommendations for policy makers concerned with this part of the world.

Our empirical analysis faces several challenges. The first challenge is to find an accurate proxy for a country's fiscal capacity. Several measures have been used to proxy fiscal capacity in the literature: e.g., the tax to GDP ratio, the share of income tax revenues in total government revenues, or the government's "tax effort". For reasons that we outline below, we use the tax to GDP ratio as our primary proxy for fiscal capacity. However, we also report robustness tests where we measure fiscal capacity with the income tax share and the government's tax effort.

The second empirical challenge is to account for endogeneity due to reverse causality between the quality of government and fiscal capacity. For example, higher quality governments might be able to raise more revenues. Any positive effect of fiscal capacity on the quality of government found in OLS regressions might therefore be biased. We solve this endogeneity problem primarily through instrumental variables regressions with cross-section averages. We use the share of manufacturing exports in total merchandise exports as instrument. We establish that this instrumental variable is strongly correlated with the tax to GDP ratio along the cross-sectional dimension. We are also able to rule out reverse causality between this instrument and the indicators for government quality with a reasonable degree of certainty.

Nevertheless, it is a shortcoming that the instrument does not induce truly exogenous variation in the tax to GDP ratio. Also, concerns about omitted variables bias because of unobserved country specific heterogeneity cannot be fully dispelled in regressions with cross-section averages. Therefore, we report robustness tests by exploiting the panel dimension of our dataset and estimating System-GMM regressions.

The regression results indicate that fiscal capacity has a positive effect on two dimensions of government quality: the absence of corruption and the level of democracy. As the final step of the analysis, we therefore study which causal links

are responsible for this finding. That is, we discuss whether fiscal capacity has a positive effect on government quality because citizens demand more accountability from their leaders if they have to shoulder a larger fiscal burden or whether the availability of revenues allows leaders to offer citizens a more responsive and less corrupt administration.

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 quality. Section 3 discusses the data. Sections 4 and 5 present the results. Finally, Section 6 concludes.

2. FISCAL CAPACITY AND GOVERNMENT QUALITY IN SUB-SAHARAN AFRICA

The concept of fiscal capacity refers to 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 takes place "efficiently". This hypothetical power is not measurable. What can be done is to infer upon this power through observable proxy variables, for example the tax to GDP ratio, the share of income taxes in total tax revenue, or the government's tax effort.

There are noticeable differences in the level and composition of revenues between African countries. According to the World and African Development Indicators, for example, Namibia had on average a tax to GDP ratio of 28% during the 1990–2005 period, whereas the Democratic Republic of Congo (Zaire) had a ratio of about 5%. With respect to the composition of revenues, South Africa collected on average around 51% of its revenue from taxes on income and profits, while Guinea only collected around 8% from this tax base.

Several explanations have been put forward for such differences. Some authors emphasize economic factors. 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. Other authors explain differences in fiscal capacity 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 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 and the native inhabitants were used as cheap labor. Amin argues that nonlabor 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.

It is, on the one hand, 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) and Mkandawire (2010), for example, provide empirical evidence to this effect. On the other hand, most African countries have by now been independent for about 50 years and consequently should have had sufficient 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 shown for example 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 can to some extent autonomously decide their tax policies, and it is a reasonable conjecture that their decisions regarding taxation will eventually impact the quality of government.

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 or 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 more influence over policy decisions and provide them with better quality government.

Yet, there are also reasons to be skeptical that the link between fiscal capacity and accountability exists in Africa. 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 citizens 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 (Brautigam, Fjeldstad, & Moore, 2008; Moss, Pettersson, & van de Walle, 2006). 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.

Finally, the historical narratives relating taxation to representation usually involve the existence of an external threat to the state (Besley & Persson, 2008, 2009). In other words, it is argued in this literature that governments began to expand taxation only because they had to fight wars against other states. In Africa, however, there have been few wars where nation states fought other nation states.⁴ Therefore, it may be argued that African countries never had an incentive to invest in their extractive capabilities. Yet, 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 mere possibility of external wars 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 quality 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 the quality of government are related in present-day sub-Saharan Africa.

3. DATA

The first issue that needs to be addressed in an empirical analysis of the relationship between fiscal capacity and government quality is to find accurate measures to empirically operationalize these two concepts. Good proxies for fiscal capacity should capture the amount of revenues the state can collect, if

it choose to do so, and to what extent these revenues are collected through “advanced” revenue sources. Previous contributions by Besley and Persson (2009) and Dincecco and Prado (in press) use the share of direct taxes (notably income taxes, social security contributions, and payroll taxes) in total tax revenues as one measure of fiscal capacity. Their argument is that the importance of direct taxes is a good proxy for the capacity of the tax administration, because direct taxes are difficult to administer. Second, they consider the tax to GDP ratio as a “catch-all” measure of fiscal capacity. Third, they use the share of nontrade taxes in total tax revenue, arguing that trade taxes, while relatively easy to administer, are inefficient and that therefore a large trade tax share indicates low fiscal capacity.

Another reasonable proxy for fiscal capacity is a tax effort variable (Mkandawire, 2010). The government’s tax effort is defined as the ratio of tax revenues actually raised to the tax revenues that the government *should* raise given the country’s fundamental economic structure. This measure therefore captures the extractive capacity of the state.

In the following, we will use the tax to GDP ratio as our primary measure of fiscal capacity. The reason why we prefer this variable to other tax ratios is that tax to GDP ratios are relatively small in Africa. In such a situation, an increase in levels of taxation implies in all likelihood a meaningful expansion in fiscal capacity. Other candidates such as the income tax ratio may be less accurate indicators of fiscal capacity. For example, an increase in the income tax ratio could primarily signify growing income inequality rather than expanding fiscal capacity.

Tax effort, on the other hand, is theoretically as reasonable a proxy for fiscal capacity in sub-Saharan Africa as the tax to GDP ratio. However, tax effort is subject to a higher degree of measurement error because it has to be estimated in a first stage regression. Moreover, using tax effort is econometrically almost equivalent to using the tax to GDP ratio and including appropriate control variables. That is, tax effort explicitly takes into account the economic fundamentals of a country. But in models which include the tax to GDP ratio and economic control variables, the economic fundamentals are implicitly accounted for.

For such reasons, we use tax to GDP ratio rather than the tax effort variable as our main measure of fiscal capacity. However, we also establish the robustness of our findings by reporting results from regressions with the income tax revenues to total revenues ratio and a tax effort variable as proxies for fiscal capacity.

Data on tax to GDP ratios in sub-Saharan Africa are obtained from different sources. Our primary source is the OECD’s African Economic Outlook (AEO), which provides data from the year 2000 onward.⁵ The AEO dataset has the advantage that it covers all sub-Saharan African countries. The disadvantage is that it is only available for 2001 and 2002 for the 31 countries included in our sample.⁶

To establish the robustness of our results to the use of other data sources, we additionally conduct robustness tests with data on tax to GDP ratios from the World Bank’s World/African Development Indicators (WDI/ADI).⁷ The disadvantage of the World Bank data is that it is only available for 23 of the countries in our sample. However, these data have the advantage that they cover a longer time period, i.e., 1990–2005.

The reliability of the tax data is an issue in the current context (see for example Endnote 7). However, the reliance on different data sources should offer some degree of protection against grossly misreported data. Indeed, the tax to GDP ratios from the WDI/ADI and the AEO are generally very sim-

ilar. Moreover, the results reported further below point in the same direction irrespective of what data source is used.

As with fiscal capacity, we have to operationalize the concept of government quality. Instead of using a composite index, we study three distinct dimensions of the quality of government. The first dimension is the extent to which a country is free of corruption. The second is the quality of a country’s bureaucracy. The third is the extent to which a country is democratic. We use three variables provided in the ICRG of the PRS group to operationalize each of these three concepts.⁸

The corruption measure in the ICRG assesses the extent of corruption in the political system. An example for the type of corruption covered by this definition are bribes that are demanded from firms for import and export licenses or for tax assessment purposes. More generally, the ICRG measure takes actual and potential corruption in the form of patronage, nepotism, or secret party fundings into account. Countries are classified according to the level of corruption in a particular year on a 0 to 6 scale. Higher values indicate lower levels of corruption.

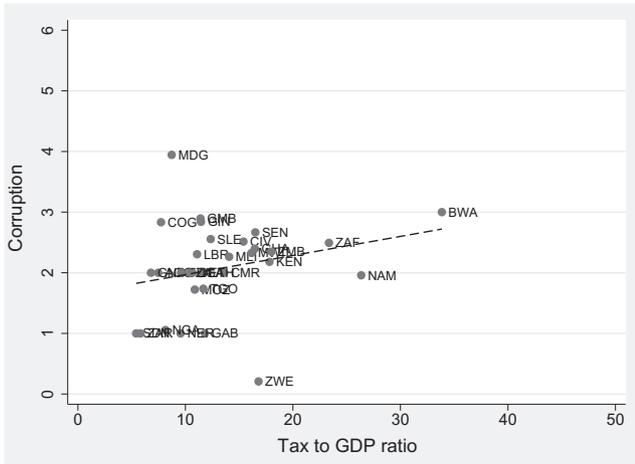
The measure for bureaucratic quality assesses to what extent the bureaucracy functions as a “shock absorber” when governments change. The idea is that in countries with high bureaucratic quality, the bureaucracy tends to be insulated from

political pressures, and therefore government change does not induce disruptions in public services or a sudden deterioration in governance. Countries are classified on a 0 to 4 scale, with higher values indicating more bureaucratic quality.

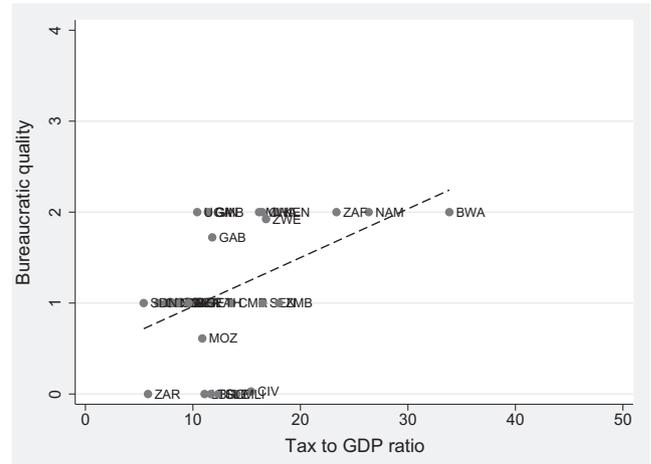
The extent of democracy is captured in the ICRG with a measure called democratic accountability. This measure indicates the responsiveness of the government to the people. It takes, inter alia, into account whether there are free and fair elections, whether there is an independent judiciary, and whether there are constitutional or legal guarantees of personal liberties. This indicator ranges from 0 to 6, with higher values indicating more democracy.

While we focus on the ICRG data in our main regressions, we establish the robustness of our results to the use of data on government quality from other sources. In particular, we report regressions with indicators obtained from the worldwide governance indicators (Kaufmann, Kraay, & Mastruzzi, 2010) and the institutionalized democracy score from the Polity IV database (Marshall & Jaggers, 2002).

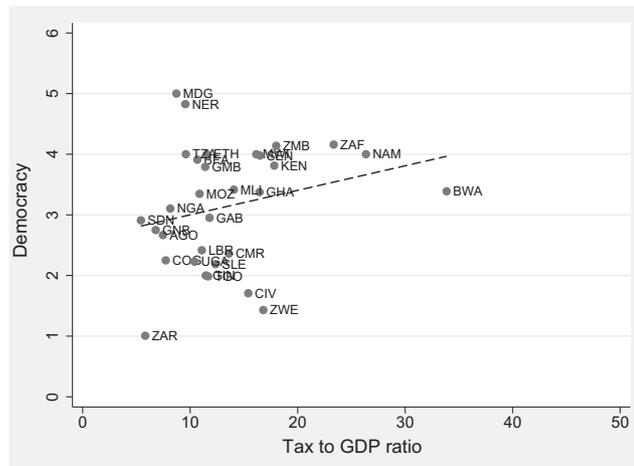
Our final dataset consists of 31 sub-Saharan countries (listed in Endnote 3), for which observations are jointly available for the potential measures of fiscal capacity and three measures of accountability. The time dimension covered is altogether 1990–2005 (note that the full cross-section and time



(a) Corruption



(b) Bureaucratic quality



(c) Democratic accountability

Figure 1. Bivariate relationships between the tax to GDP ratio and indicators for the quality of government, country-averages for 2000–05.

dimensions will be exploited only in the System-GMM regressions; see below for more details). Even though our sample does not cover all 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.

Before we analyze the effect of fiscal capacity on government quality econometrically, we provide a short overview of the distribution of the variables of interest. In Figure 1, the average tax to GDP ratio is plotted against the average value of the three indicators of government quality over the period 2000–05 for the 31 sub-Saharan African countries in our sample. The bivariate relationship is positive. The figure shows, for example, that Namibia has a large tax to GDP ratio. At the same time, it scores high values in the ICRG variables measuring the absence of corruption, bureaucratic quality, and democratic accountability. On the other hand, the Democratic Republic of Congo has a low tax to GDP ratio. At the same time, it exhibits low values with respect to all measures of government quality.

4. RESULTS

(a) Baseline results

We begin the empirical analysis with cross-section instrumental variables regressions using country averages. More specifically, we estimate the following model:

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

where the dependent variable is either the extent of corruption, bureaucratic quality, and democratic accountability and the main proxy for fiscal capacity is the tax to GDP ratio. \mathbf{x} is a vector of control variables that are included in some regressions, and ϵ the error term. To account for potential reverse causality, we instrument the proxy for fiscal capacity with the share of manufacturing exports in total merchandise exports.⁹ We provide more details on the instrumental variable further below.

The vector \mathbf{x} consists of four variables: the development aid to GDP ratio,¹⁰ economic openness,¹¹ the share of agriculture in GDP,¹² and (the log of) GDP per capita.¹³ These control variables were chosen because they might have an effect on both fiscal capacity (or, more precisely, on the tax to GDP ratio) and the quality of government.

First, donor's might allocate more development aid to countries that have little own source revenues and thus limited fiscal capacity. At the same time, they might attempt to influence recipient countries to become more democratic and more accountable to their citizens. On the other hand, it is possible that aid revenues enables autocratic rulers to buy off opposition groups by means of redistributive transfers might be higher. Thus, aid might help bad governments to survive (Bermeo, 2011).

Second, more open countries might find it harder to levy high tax rates because they are more subject to tax competition (Devereux, Lockwood, & Redoano, 2008). On the other hand, countries that are more open to trade may also be subject to frequent income shocks. Therefore, demand for income smoothing by means of redistributive transfers might be higher in more open countries, which would imply higher levels of taxation (Rodrik, 1998). At the same time, more open countries might also be more democratic and less corrupt because of international pressure.

Third, the share of agriculture in GDP captures the importance of rural areas for a country. The government might find it harder to raise revenues from individuals employed in this sector, for example because they are barely producing at subsistence levels. At the same time, it might be more difficult for citizens to participate in the political process or voice their demands effectively when they live primarily in rural areas. They will be farther away from the centers of political power, which are typically located in cities, and the organization of political action will therefore be more difficult.

Finally, countries with higher GDP per capita might tax more if demand for public goods increases disproportionately in income, as suggested by Wagner's Law (Wagner, 1911). At the same time, richer countries might also have higher quality governments because, e.g., citizens are more educated and therefore more likely to demand a voice in policy making.

Apart from the covariates, another important variable is the instrument for fiscal capacity. As indicated above, we use the share of manufacturing exports in total merchandise exports. As is well known, any instrument has to be strongly correlated with the endogenous variable in the first stage regression, while being uncorrelated with the error term in the second stage regression. We first discuss instrument strength. Instrument validity, i.e., whether the instrument is uncorrelated with the error term, is discussed at the end of this section.

The theoretical rationale for why the share of manufacturing exports can be expected to be strongly correlated with the tax to GDP ratio is that countries whose merchandise exports consist to a large extent of manufactured products tend to have a relatively large middle class. In order to exploit the tax base that a large middle class represents, the government must invest in its fiscal capacity. Consequently, there should be a strong positive correlation between the manufacturing share in total merchandise exports and the level of fiscal capacity.

Table 1 presents the first-stage regressions for Model (1), both with and without additional control variables. This table shows that the share of manufacturing exports in total

Table 1. First stage regression for IV results

	I b/t	II b/t
Manufacturing exports	0.228*** (6.004)	0.186*** (4.141)
Development aid		0.155 (1.511)
Openness		0.003 (0.094)
Agriculture		-0.005 (-0.039)
GDP per capita		3.725* (1.794)
Weak id. statistic	36.050	17.151
N	26	26

^a This table presents the first stage of IV regressions of the tax to GDP ratio on the three dimensions of government quality (estimated with OLS).

^b The tax to GDP ratio is used as a proxy for fiscal capacity.

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio.

^d Weak identification is tested with the Cragg–Donald Wald F statistic.

^e t -Statistics in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

merchandise exports is a significant predictor of the tax to GDP ratio. The weak identification test statistic moreover suggests that this instrument is strong. The test statistic is in both cases above 10.

Note that while the data on tax to GDP ratios cover the period 2001 and 2002, the dependent and control variables are available over a longer period. We therefore average in these (and subsequent) regressions the data for all variables over the period 2000–05 (i.e., we average all available observations in this period for all variables). Note also that while our database includes 31 countries, we use in these regressions only 26 these because of missing data for the instrumental variable.

In Table 2, we report the second stage regressions of Model (1) and, for comparative purposes, the corresponding OLS regressions. We find a positive relationship between the tax to GDP ratio and each of the three indicators of government quality in the OLS regressions. For bureaucratic quality, however, the indicator is insignificant once control variables are added.

In the instrumental variables regressions, the effect of fiscal capacity becomes larger for corruption and democratic accountability. According to the OLS models with control variables, an increase in the tax to GDP ratio of one percentage point results in an increase in the indicator for the absence of corruption and the indicator for democratic accountability by 0.06 points. Once the tax to GDP ratio is instrumented with the share of manufacturing exports in total merchandise exports, the estimates suggest that a one percentage point increase in the tax to GDP ratio increases the indicator for the absence of corruption by 0.13 points and the indicator for democratic accountability by 0.08 points. The coefficient is significant in the corruption model, but insignificant in the model for democratic accountability.

Overall, there is convincing evidence that fiscal capacity reduces corruption. That the estimated coefficient for fiscal capacity in the model for democratic accountability is not significant at conventional significance levels can be explained by the fact that we have few degrees of freedom. Note that we have only 26 observations in these regressions, which lead by construction to relatively large standard errors. Nevertheless, the fact that the *z*-statistic in model IV II is with 1.39 relatively large – despite the small sample size – suggests that fiscal capacity has genuinely a positive effect on democracy.

The size of the estimated coefficients indicate that fiscal capacity has a noticeable effect on corruption and democratic accountability. If the Democratic Republic of Congo were to expand its tax to GDP ratio (which was at 5.8% in the 2001–02 period according to the AEO data) to the level exhibited by Kenya (which was 17.8%), it could increase its average corruption score from 1 to 2.59, leading to a level of corruption roughly similar to Cote d'Ivoire or Sierra Leone. Democratic accountability in the Democratic Republic of Congo would increase from 1 to 1.93 and would be roughly equivalent to the level of democracy in Togo.

Why are the instrumental variables estimates for the effect of fiscal capacity on corruption and democratic accountability larger than the OLS ones? *Ex ante*, we should have expected the opposite effect. That is, if there is an independent effect of government quality on tax revenues (i.e., reverse causality), the numerical values of the IV estimates should be smaller than those of the OLS regressions. The explanation might be that the part of the tax to GDP ratio that is strongly correlated with the manufacturing share in total merchandise exports captures fiscal capacity particularly well. Other reasons for a high tax to GDP ratio, for example large revenues from taxes on natural resources, might not signify fiscal capacity but

Table 2. *Effect of fiscal capacity on the quality of government, instrumental variable estimates, cross-section averages, 2000–05*

	OLS I b/t	OLS II b/t	IV I b/z	IV II b/z
<i>Absence of corruption</i>				
Total tax revenue to GDP ratio	0.033 (1.328)	0.055 (1.609)	0.068** (2.105)	0.133*** (2.680)
Development aid		0.023 (1.066)		0.015 (0.708)
Openness		–0.006 (–0.910)		–0.007 (–1.198)
Agriculture		–0.025 (–1.039)		–0.009 (–0.352)
GDP per capita		–0.515 (–1.180)		–0.709 (–1.614)
<i>N</i>	26	26	26	26
<i>F</i> (second stage)	1.764	1.416	4.089	1.820
<i>Bureaucratic quality</i>				
Total tax revenue to GDP ratio	0.047** (2.148)	0.015 (0.461)	0.043 (1.557)	–0.013 (–0.311)
Development aid		–0.007 (–0.356)		–0.004 (–0.241)
Openness		0.003 (0.480)		0.003 (0.651)
Agriculture		–0.019 (–0.859)		–0.025 (–1.191)
GDP per capita		–0.024 (–0.060)		0.044 (0.119)
<i>N</i>	26	26	26	26
<i>F</i> (second stage)	4.615	1.466	2.238	1.386
<i>Democratic accountability</i>				
Total tax revenue to GDP ratio	0.014 (0.448)	0.056 (1.299)	0.028 (0.712)	0.078 (1.398)
Development aid		0.006 (0.240)		0.004 (0.177)
Openness		–0.009 (–1.162)		–0.010 (–1.376)
Agriculture		–0.032 (–1.065)		–0.028 (–0.982)
GDP per capita		–0.931 (–1.702)		–0.986** (–1.998)
<i>N</i>	26	26	26	26
<i>F</i> (second stage)	0.200	1.254	0.468	1.205

^a This table presents OLS and the second stage of IV regressions of the tax to GDP ratio on indicators of government quality with country averages for the period 2000–05. The indicators for the quality of government are corruption, bureaucratic quality, and democratic accountability. (Scaling: higher values indicate lower corruption, better bureaucratic quality, more democratic accountability.)

^b The tax to GDP ratio is used as a proxy for fiscal capacity.

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio (the corresponding weak identification statistics (Cragg–Donald) is presented in Table 1).

^d *t*-Statistics (OLS models) and *z*-statistics (IV models) in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

merely the availability of an easily accessible source of revenue. In essence, the tax to GDP ratio could be a somewhat inaccurate measure for fiscal capacity; and it is well known that measurement error results in attenuation bias, leading to coefficient estimates that are biased toward zero (Greene,

2003). It appears that the OLS regressions reported in Table 2 suffer more from attenuation bias because of measurement error than from bias because of reverse causality.

Finally, consider the effect of the control variables on government quality. We find that most of them have no statistically significant effect. The exception is GDP per capita which is negatively and either significantly or almost significantly correlated with the indicators for the absence of corruption and the indicator for democratic accountability. These results suggest that economic development and government quality are not necessarily related. While a high quality of government can be perceived as an end in itself, it is not deterministically associated with higher income levels (Khan, 2007; North, Wallis, Webb, & Weingast, 2007; Svensson, 2005).

(b) *Instrument validity*

The manufacturing share in total merchandise exports must be a valid instrument for the instrumental variables regressions to produce consistent estimates. There are several reasons why an instrument might be invalid. One is that the exclusion restriction is wrong; that the instrument belongs in the second stage regression. This is unlikely in the present case: the likelihood that the *relative* importance of manufacturing exports (i.e., as a share of total merchandise exports) matters for the quality of government is small. The second reason is omitted variable bias. In particular, unobserved country-specific heterogeneity might be a concern. The obvious way to address this concern would be to expand the set of control variables. Yet, including additional control variables involves a trade-off between consistency and efficiency; and with only 26 observations, this solution quickly becomes impractical. Therefore, we decided to retain a parsimonious specification in these instrumental variables regressions, and to address the concern of unobserved country-specific heterogeneity in a robustness test by estimating a set of models that exploit the panel structure of the dataset.

While unobserved heterogeneity might be problematic, the most likely reason for instrument invalidity in the present context is reverse causality between the manufacturing share in merchandise exports and the quality of governments. We therefore establish in the following empirically that the manufacturing export share is in all likelihood a valid instrument.

To motivate the use of the manufacturing export share as instrument, we argued that a large manufacturing sector would result in a large middle class. The government, we argued further, would then have an incentive to invest in its fiscal capacity to exploit the tax base that the middle class represents. In short, we proposed that causality runs from the structure of the economy to the size of the middle class to higher fiscal capacity, and then to higher government quality. However, it is possible that the degree of administrative and democratic accountability itself is one determinant of the size of the middle class, and that a sizable middle class has to exist before a large manufacturing sector can emerge. There might be, in other words, a causal effect of government quality on the size of the middle class, which then affects the structure of the economy, and thereby the level of fiscal capacity. If this direction of causality exists and is empirically important, our instrument variables regressions could be invalid.

How important is this type of reverse causality in sub-Saharan Africa? We establish in the following that it is not particularly important. Our strategy is based on the following argument. If the quality of government really determines the size of the middle class, then our proxies for government quality should be strongly correlated with proxies that measure the

importance of the middle class, even if we control for the structure of the economy with the manufacturing share in total merchandise exports. If, on the other hand, the quality of government is irrelevant for the size of the middle class, it should not be strongly correlated with proxies for the latter once we control for the manufacturing share in total merchandise exports.

Table 3 reports a set of regressions that operationalize this argument. The independent variables of interest in all regressions are the three indicators for government quality and the manufacturing share in total merchandise exports. In each set of regressions, the dependent variable is a proxy for the size of the middle class. We consider two proxies: (i) the share of the population with either income or consumption between 250\$ and 750\$ per month and (ii) between 500\$ and 1000\$ per month (in both cases PPP-adjusted).¹⁴

Both proxies for the size of the middle class follow essentially the definition advanced by Birdsall (2010). According to Birdsall (2010), every individual with income/consumption above 10\$ a day and below the 95th percentile of the income distribution in his or her country is part of the middle class. Since the cutoffs at 10\$ per day (which is roughly equivalent to 250\$ per month) and the 95th percentiles are arbitrary, we report results for two different income/consumption intervals, i.e., the 250\$ to 750\$ and the 500\$ to 1000\$ interval.

While the definition of Birdsall (2010) is reasonable, the problem that we face in operationalizing this definition in this paper is that we have for most countries only data on the distribution of consumption rather than income (in fact, Namibia is the only country for which we have data on the income distribution). Consumption, however, is to some extent determined by redistribution, which itself will be a function of the quality of the government (and in particular of democracy). Nevertheless, consumption should be a reasonable proxy as it will reflect to a large degree the underlying income distribution.

We observe from the regressions reported in Table 3 that the indicators of government quality are consistently insignificant. The manufacturing share is usually positively related to both indicators for the size of middle class and is sometimes significant. In other words, the quality of government appears to be irrelevant for the size of the middle class in sub-Saharan Africa. The share of manufacturing exports in total merchandise exports, on the other hand, has generally a positive and sometimes significant coefficient. This pattern of results, therefore, supports the rationale that underlies our identification strategy. Simultaneously, the pattern suggests that reverse causality between government quality and the manufacturing share in total merchandise exports or more generally between government quality and the size of the middle class is unlikely for sub-Saharan Africa.

(c) *Robustness*

A further concern with the baseline results is their robustness. Do the results change if instead of the tax to GDP ratio other proxies for fiscal capacity are used? Do other proxies for government quality lead to different conclusions? Do large tax to GDP ratios merely reflect the availability of natural resource income rather than fiscal capacity? Do unobserved country-specific effects drive the results? This section attempts to answer such questions.

The robustness tests consist in replications of the baseline models with the full set of control variables (results for the control variables are omitted in the regressions tables to save space). Except in the set of panel data models, we continue to instrument the proxy for fiscal capacity with the share of

Table 3. Tests for the validity of the instrument (share of manufacturing exports as determinant of the size of the middle class), OLS estimates, cross-section averages, 2000–05

	I b/t	II b/t	III b/t	VI b/t
<i>Population share with income/consumption between 250\$ and 750\$ (PPP-adjusted)</i>				
Manufacturing exports	0.059 (1.239)	0.027 (0.702)	−0.007 (−0.178)	−0.003 (−0.045)
Corruption	−0.961 (−1.015)			−0.086 (−0.069)
Bureaucratic quality		0.232 (0.314)		0.026 (0.035)
Democratic accountability			1.005 (1.608)	0.963 (1.101)
Development aid	−0.015 (−0.218)	−0.029 (−0.423)	−0.026 (−0.419)	−0.024 (−0.340)
Openness	0.018 (0.801)	0.014 (0.599)	0.013 (0.593)	0.013 (0.547)
Agriculture	0.007 (0.096)	0.011 (0.145)	0.018 (0.249)	0.018 (0.228)
GDP per capita	3.931*** (3.046)	4.300*** (3.349)	5.220*** (3.941)	5.152** (3.002)
<i>N</i>	22	22	22	22
<i>F</i>	10.314	9.569	11.557	7.516
<i>Population share with income/consumption between 500\$ and 1000\$ (PPP-adjusted)</i>				
Manufacturing exports	0.044** (2.680)	0.030** (2.243)	0.017 (1.203)	0.023 (0.909)
Corruption	−0.421 (−1.273)			−0.126 (−0.289)
Bureaucratic quality		0.143 (0.548)		0.069 (0.265)
Democratic accountability			0.384 (1.752)	0.318 (1.041)
Development aid	0.005 (0.197)	−0.001 (−0.035)	−0.001 (−0.034)	0.002 (0.100)
Openness	−0.003 (−0.386)	−0.005 (−0.616)	−0.005 (−0.708)	−0.005 (−0.601)
Agriculture	0.020 (0.774)	0.023 (0.822)	0.025 (0.968)	0.025 (0.903)
GDP per capita	1.354*** (3.001)	1.519*** (3.347)	1.866*** (4.013)	1.765** (2.945)
<i>N</i>	22	22	22	22
<i>F</i>	8.843	7.943	9.834	6.482

^aThis table presents OLS regressions with two proxies for the size of the middle class: share of the population with either income or consumption (i) above 250\$ and below 750\$ per month and (ii) above 500\$ and below 1000\$ per month (PPP-adjusted) as dependent variables. Explanatory variables are potential determinants of the size of the middle class. These regressions are intended as a test of our identification strategy.

^b*t*-Statistics in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

manufacturing exports in total merchandise exports in all regressions.

(i) Resource rents

In Table 4, we explore whether the tax to GDP ratio truly reflects the government's fiscal capacity or whether high values for this ratio merely indicate large incomes from taxing the sale of oil and other natural resources. That is, it is possible that instead of exploiting natural resources themselves, the government leaves the exploitation to private firms but siphons off any profits by means of taxes. In such a situation, a large tax to GDP ratio may not really reflect the ability of the government to extract private incomes from

the average citizens but only the availability of natural resources.

We expand the baseline model by explicitly including oil and natural resource rents as share of GDP¹⁵ as control variables. If the results were driven by the availability of oil or natural resources, the coefficient for the tax to GDP ratio should turn insignificant.

The results are collected in the rows entitled *oil rents* and *natural resource rents*, respectively. We observe that controlling for oil rents and natural resource rents does not change the main conclusions from the baseline models. The tax to GDP ratio continues to be positively related to the indicators for corruption and democratic account-

Table 4. *Effect of fiscal capacity on the quality of government, robustness checks with natural resource income, instrumental variable estimates, cross-section averages, 2000–05*

	Corruption b/z	Bureaucratic quality b/z	Democratic accountability b/z
<i>Oil rents</i>			
Total tax revenue to GDP ratio	0.167* (1.804)	−0.051 (−0.680)	0.172* (1.763)
Oil rents	0.018 (0.586)	−0.020 (−0.803)	0.051 (1.532)
<i>N</i>	26	26	26
<i>Natural resource rents</i>			
Total tax revenue to GDP ratio	0.180* (1.783)	−0.042 (−0.532)	0.153 (1.455)
Natural resource rents	0.024 (0.723)	−0.015 (−0.565)	0.038 (1.095)
<i>N</i>	26	26	26

^a This table presents the second stage of IV regressions of the tax to GDP ratio on indicators of government quality with country averages for the period 2000–05. These models are estimated to check the robustness of the baseline results in Table 2 when oil/natural resource income is explicitly controlled for. The indicators for the quality of government are corruption, bureaucratic quality, and democratic accountability. (Scaling: higher values indicate lower corruption, better bureaucratic quality, more democratic accountability.)

^b The row entitled *oil rents* collects regressions where oil rents as share of GDP is included as control variable. The row entitled *natural resource rents* collects regressions where natural resource rents as share of GDP is included as control variable.

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio.

^d All regressions include the following control variables (results omitted): Development aid, Openness, Agriculture, and GDP per capita.

^e z-Statistics in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

ability. Oil and natural resource rents, on the other hand, are insignificant.

(ii) *Alternative measures for fiscal capacity*

Table 5 collects a set of robustness tests where we study how the use of alternative measures of fiscal capacity affects the results. In the row entitled *tax effort*, we report regression results where we use instead of the tax to GDP ratio the government's tax effort as proxy for fiscal capacity. The tax effort variable is constructed as follows. First the tax to GDP ratio is regressed on the full set of control variables from the baseline regressions (all variables are country averages for the period 2000–05). This specification of the first stage largely follows Mkandawire (2010) and OECD (2010). Then the actual tax to GDP ratio is divided by the predicted tax to GDP ratios. If this ratio is positive, then the government displays a positive tax effort and *vice versa*.

In the second stage, the tax effort variable is used as proxy for fiscal capacity in the baseline model instead of the tax to GDP ratio. As in the previous models, the tax effort variable is instrumented with the share of manufacturing exports in total merchandise exports. We find that the results in the second stage regression are qualitatively similar to the baseline results. Countries that display higher tax efforts have significantly or almost significantly lower levels of corruption and higher levels of democratic accountability.

In the row entitled *income tax to total revenues ratio*, we use the share of revenues from income taxes in total revenues¹⁶ instead of the tax to GDP ratio as proxy for fiscal capacity. In these regressions, the country averages are calculated over the period 1990–2005 (since the data are taken from the WDI/ADI datasets). The results are consistent with the baseline findings. A large income tax ratio is positively related to indicators for corruption and democratic accountability. In

the case of democratic accountability, the effect is also almost significant.

In the row entitled *WDI/ADI tax data*, we report regressions with data on tax to GDP ratios from the WDI/ADI datasets. These regressions are intended to establish the robustness of the baseline results to the use of a different data source for tax to GDP ratios. As in the regressions with the income tax ratio, we use country averages over the period 1990–2005. The results are qualitatively similar to the baseline findings. Fiscal capacity continues to be positively related to the indicators for corruption and democratic accountability. In the case of democracy, the coefficient is also significant.

Overall, therefore, we can conclude that the results are robust to the use of alternative proxies for fiscal capacity and different data sources. They consistently point in the same direction as the baseline results and usually display similar significance levels.

(iii) *Alternative indicators for the quality of government*

In Table 6, we report a third set of robustness tests where we use different indicators for the quality of government. As an analog for the ICRG corruption indicator, we use the corruption indicator from the Worldwide Governance Indicators (Kaufmann *et al.*, 2010). As analog for the ICRG's bureaucratic quality indicator, we use the government efficiency measure from the same source. Finally, as the analog for the ICRG's democratic accountability indicator we use the Polity IV's institutionalized democracy score (Marshall & Jaggers, 2002). The results indicate that using different indicators for government quality results in essentially the same findings as in the baseline regressions. In fact, they are even more in line with the notion that fiscal capacity enhances the quality of government. Corruption is lower and democracy more pronounced in countries with a higher tax burden. Interestingly,

Table 5. *Effect of fiscal capacity on the quality of government, robustness checks with alternative proxies and data for fiscal capacity, Instrumental variable estimates, cross-section averages, 2000–05 and 1990–2005*

	Corruption b/z	Bureaucratic quality b/z	Democratic accountability b/z
<i>Tax effort variable</i>			
Tax effort	2.412** (2.527)	−0.234 (−0.310)	1.415 (1.368)
<i>N</i>	26	26	26
<i>Income tax to total revenues ratio</i>			
Income tax to total revenue ratio (WDI/ADI)	0.035 (0.810)	0.025 (0.698)	0.122 (1.600)
<i>N</i>	22	22	22
<i>WDI/ADI tax data</i>			
Total tax revenue to GDP ratio (WDI/ADI)	0.042 (1.006)	0.031 (0.714)	0.148*** (2.662)
<i>N</i>	22	22	22

^a This table presents the second stage of IV regressions of proxies for fiscal capacity on indicators of government quality with country averages over the period 2000–05 and 1990–2005, respectively. These models are estimated to check the robustness of the baseline results in Table 2 to alternative proxies and data for fiscal capacity. The indicators for the quality of government are corruption, bureaucratic quality, and democratic accountability. (Scaling: higher values indicate lower corruption, better bureaucratic quality, more democratic accountability.) Different tax variables are used as proxies for fiscal capacity.

^b The row entitled *tax effort* uses tax effort as measure for fiscal capacity (calculated with country averages over the period 2000–05). The row entitled *income tax to total revenues ratio* uses the share of income tax revenues in total revenues as measure for fiscal capacity (country averages are calculated over the period 1990–2005). The row entitled *WDI/ADI tax data* uses tax to GDP data from the World Bank's World and African Development Indicators instead of the data from the OECD's AEO (country averages are calculated over the period 1990–2005).

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio.

^d All regressions include the following control variables (results omitted): Development aid, Openness, Agriculture, and GDP per capita.

^e *z*-Statistics in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

government efficiency is also positively and significantly related to the tax to GDP ratio.

(iv) GMM estimations

While the previous sections establish that there is a positive relationship between fiscal capacity and two dimensions of government quality, i.e., absence of corruption and democratic accountability, there might remain concerns regarding the empirical approach. First, while we provide evidence suggesting that reverse causality is unlikely, the fact that the instrument is not derived from a true (natural) experiment remains a cause for concern. The second shortcoming is that the results rely only on cross-section averaged data. Biased estimates because of unobserved country-specific heterogeneity is therefore a possibility.

We address both concerns simultaneously by estimating dynamic panel data models. In particular, we rely on the System-GMM approach developed by Blundell and Bond (1998, 2000). These models control for unobserved heterogeneity by including country-fixed effects.¹⁷ Moreover, by using different instruments the System-GMM results are also robust with respect to the potential invalidity of share of manufacturing exports as an instrument.

We estimate the following dynamic panel data model

$$\text{Quality of government}_{i,t} = c_i + d_t + \gamma \text{Quality of government}_{i,t-1} + \alpha \text{Fiscal capacity}_{i,t} + \delta \mathbf{x}_{i,t} + \epsilon_{i,t}. \quad (2)$$

This model differs from Model (1) in that it includes a lagged dependent variable to account for the persistence in the measures of government quality. That is, the extent of government quality in the previous period might affect

both contemporaneous levels of government quality and levels of taxation. Moreover, cross-section and year fixed effects (c_i and d_t) are included to control for country specific heterogeneity and common shocks. All other variables are defined as in Model (1).

To account for the potential endogeneity of the tax to GDP ratio, lags of the levels and first differences are used as instruments. Using lags as instruments might be problematic if there is significant autocorrelation in the error term in levels. While we cannot exclude this possibility, note that we perceive these regressions as a robustness test only. Even if the System-GMM estimates are biased, the source of the bias will be different than in the instrumental variables regressions. If the System-GMM results point nonetheless in the same direction, they can be interpreted as a confirmation of the instrumental variables results.¹⁸

Note that in addition to the tax to GDP ratio, the lagged dependent variable needs to be instrumented in the same fashion as well. The reason is that the error term and the lagged dependent variable are by construction correlated once Model (2) is transformed in such a way as to eliminate the fixed effects (Roodman, 2001).¹⁹

Table 7 collects the results. We report for each of the three measures of government quality two sets of regressions. First, regressions where we use tax to GDP data from the AEO. As indicated previously, we have only 2 years of observations from this source. However, data are available for 31 countries. Second, we also report regressions with the tax to GDP data from the WDI/ADI. The data from this source range from 1990 to 2005, but is only available for 23 countries. All regressions are estimated with a collapsed instrument set, since over-identification tests become unreliable if the number of

Table 6. *Effect of fiscal capacity on corruption, instrumental variable estimates, cross-section averages, 2000–05*

	IV I b/z	IV II b/z
<i>Kaufmann et al. (2010) corruption score</i>		
Total tax revenue to GDP ratio	0.086*** (4.883)	0.103*** (3.594)
<i>N</i>	26	26
<i>Kaufmann et al. (2010) government efficiency score</i>		
Total tax revenue to GDP ratio	0.066*** (4.375)	0.055** (2.456)
<i>N</i>	26	26
<i>Polity IV institutionalized democracy score</i>		
Total tax revenue to GDP ratio	0.273*** (2.686)	0.444*** (2.982)
<i>N</i>	26	26

^a This table presents the second stage of IV regressions of the tax to GDP ratio on indicators of government quality with country averages for the period 2000–05. These models are estimated to check the robustness of the baseline results in Table 2 when government quality is measured with different indicators. The indicators for the quality of government in these regressions are the corruption and government efficiency measures from the Worldwide Governance Indicators (WGI) project (Kaufmann *et al.*, 2010) and the Polity IV's institutionalized democracy score (Marshall & Jaggers, 2002). (Scaling: higher values indicate lower corruption, more efficient government, and more institutionalized democracy.)

^b The tax to GDP ratio is used as a proxy for fiscal capacity.

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio.

^d All regressions include the following control variables (results omitted): Development aid, Openness, Agriculture, and GDP per capita.

^e *z*-Statistics in parentheses.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

instruments is too large relative to the number of observations (Roodman, 2001, 2009). We use the robust one-step procedure in all estimations.

The bottom of the table reports diagnostic tests for each of the models: both Sargan and Hansen overidentification test and first- and second-autocorrelation tests. The Sargan-test is not robust to non-i.i.d errors but suffers less from the “many-instruments problem”. The Hansen-*J* test is robust but can suffer from the many-instruments problem. As a consequence, this test might report implausibly large *p*-values. Indeed, the Hansen-*J* tests in Table 7 are generally very high in the regressions with the WDI/ADI dataset.

Another requirement for the System-GMM regressions to produce reliable estimates is that there is no second-order autocorrelation in the differenced errors (first-order autocorrelation is expected and does not invalidate the results). However, the second-order autocorrelation tests for the tax to GDP ratio from the WDI/ADI are rejected in Table 7 (the corresponding test for the regressions with the AEO data cannot be calculated due to the small time dimension of the data). Consequently, using the second lags of the endogenous variables as instruments might be problematic. One solution is to restrict the lag length: we therefore use only the third and further lags as instruments in the regressions with the WDI/ADI data.

What are the results? In the regressions with the absence of corruption as dependent variable, we find that the tax to GDP ratio is consistently positive. In the regressions with the WDI/ADI data, the coefficient is also significant. These estimates suggest that a one percentage point increase in the tax to GDP ratio leads to a rise in the absence of corruption index, depending on the model, by about 0.04–0.08 points.

For bureaucratic quality, on the other hand, the results are ambiguous. The sign of the estimated coefficient for the tax to GDP ratio differs between the regressions with the AEO and the WDI/ADI data. Note, however, that the coefficient is positive and displays large *z*-statistics when the WDI/ADI data are used. Given that the estimated coefficient for the lagged dependent variable is larger than one in the regressions with

Table 7. *Effect of fiscal capacity on indicators for the quality of government, GMM estimates, 2001–02 (OECD AEO tax data) and 1990–2005 (WDI/ADI tax data)*

	OECD AEO tax data		WDI/ADI tax data	
	GMM I b/z	GMM II b/z	GMM III b/z	GMM IV b/z
<i>Corruption</i>				
Total tax revenue to GDP ratio	0.006 (0.406)	0.005 (0.168)	*	0.079** (2.467)
Corruption _{<i>t</i>-1}	0.818*** (4.160)	0.902*** (9.561)	0.663*** (3.664)	0.501*** (3.140)
Development aid		-0.001 (-0.234)		-0.001 (-0.290)
Openness		0.000 (0.092)		-0.001 (-0.192)
Agriculture		0.000 (0.104)		-0.001 (-0.123)
GDP per capita		-0.043 (-0.289)		-0.426* (-1.755)
<i>N</i>	61	60	155	154
Countries	31	31	23	22
χ^2	44.344	508.537	1891.613	2841.800
Sargan test (<i>p</i> -val.)	0.043	0.068	0.840	0.827
Hansen test (<i>p</i> -val.)	0.335	0.356	1.000	1.000
AR(1)-test (<i>p</i> -val.)	-	-	0.200	0.614

(continued on next page)

Table 7 (continued)

	OECD AEO tax data		WDI/ADI tax data	
	GMM I b/z	GMM II b/z	GMM III b/z	GMM IV b/z
AR(2)-test (<i>p</i> -val.)	–	–	0.038	0.040
Instruments No.	16	20	42	46
<i>Bureaucratic quality</i>				
Total tax revenue to GDP ratio	–0.003 (–1.350)	–0.004 (–0.597)	0.032 (1.030)	0.042 (1.552)
Bureaucratic quality _{<i>t</i>-1}	1.052*** (61.761)	1.068*** (56.869)	0.879*** (14.446)	0.834*** (16.733)
Development aid		0.007 (1.628)		–0.004 (–1.235)
Openness		0.001 (1.010)		0.000 (0.045)
Agriculture		0.000 (0.137)		0.000 (0.005)
GDP per capita		0.020 (0.401)		–0.216 (–1.491)
<i>N</i>	61	60	155	154
Countries	31	31	23	22
χ^2	5274.816	1.4e+04	7301.410	5.0e+04
Sargan test (<i>p</i> -val.)	0.024	0.016	0.116	0.129
Hansen test (<i>p</i> -val.)	0.990	0.952	1.000	1.000
AR(1)-test (<i>p</i> -val.)	–	–	0.062	0.052
AR(2)-test (<i>p</i> -val.)	–	–	0.841	0.986
Instruments No.	15	19	42	46
<i>Democratic accountability</i>				
Total tax revenue to GDP ratio	0.001 (0.093)	0.004 (0.191)	0.024 (0.600)	0.052 (1.102)
Democratic accountability _{<i>t</i>-1}	1.100*** (7.095)	1.126*** (7.260)	0.797*** (9.096)	0.782*** (7.478)
Development aid		0.011 (1.181)		0.006 (1.145)
Openness		0.002 (0.691)		0.000 (0.090)
Agriculture		0.008 (0.837)		–0.003 (–0.359)
GDP per capita		0.149 (0.606)		–0.225 (–0.966)
<i>N</i>	61	60	155	154
Countries	31	31	23	22
χ^2	69.856	122.248	851.224	5.3e+04
Sargan test (<i>p</i> -val.)	0.219	0.288	0.307	0.405
Hansen test (<i>p</i> -val.)	0.601	0.580	1.000	1.000
AR(1)-test (<i>p</i> -val.)	–	–	0.020	0.038
AR(2)-test (<i>p</i> -val.)	–	–	0.019	0.031
Instruments No.	16	20	42	46

^a This table presents System-GMM regressions of the tax to GDP ratio on indicators of government quality. The indicators for the quality of government are corruption, bureaucratic quality, and democratic accountability. (Scaling: higher values indicate lower corruption, better bureaucratic quality, more democratic accountability.)

^b The columns entitled *OECD AEO tax data* reports regressions with the tax to GDP variable provided in the OECD's AEO. The columns entitled *WDI/ADI tax data* reports regressions where the tax to GDP ratio from the WDI/ADI database is used.

^c *z*-Statistics in parentheses.

^d Significance tests based on robust standard errors.

^e Sargan and Hansen-*J* tests are used to test for overidentification.

^f Only third order lags are used as instruments in the regressions with the WDI/ADI tax to GDP ratio because of the evidence for second order autocorrelation in these regressions. The instrument set is collapsed throughout.

^g All models include time fixed effects. Results are omitted.

* Significance level at 10%.

** Significance level at 5%.

*** Significance level at 1%.

the AEO data, the WDI/ADI results might be more reliable than the results with the AEO data.

Finally, the estimated coefficient consistently displays a positive sign for democratic accountability but is never significant. The numerical values are around 0.02 and 0.05 in the regressions with the WDI/ADI data. The numerical values when using the AEO data are close to 0. However, note once again that the estimated coefficient for the lagged dependent variable is over one in the AEO models, indicating that they are unreliable.

The System-GMM estimates for corruption are in line with the results from the cross-section models, both in terms of sign and significance. While they are insignificant for democratic accountability, they point in the same direction as the instrumental variables regressions. While the insignificance of the estimates does not provide for a conclusive confirmation of the baseline findings, it does not contradict them either. We presumably require larger samples and more observations to reach definite conclusions with respect to the over-time relationship between fiscal capacity and democratic accountability.

5. CAUSAL CHANNELS

The previous results establish that fiscal capacity has a positive effect on two dimensions of the quality of government. But what remains unexplored hitherto are the specific causal channels. In particular, two distinct theories are consistent with the positive reduced form effect of fiscal capacity on the absence of corruption and the level of democracy. The first theory is that the availability of revenues enables the government to offer their citizens better services. For example, the government can pay higher wages to its officials if it has more revenues. In turn, the officials might have fewer incentives to be corrupt. The second theory is that citizens demand more accountable governments if the state imposes a larger fiscal burden on them. The government, in turn, might quietly acquiesce to such demands in order to forestall unrest or revolution.

Which of these two theories explains the positive effect of fiscal capacity on government quality? If it is the first theory – i.e., availability of revenues enabling the government to provide better services – then revenues from sources other than taxation should display the same positive effect on government quality as the tax to GDP ratio. In particular, revenues derived from development aid or from natural resource rents should lead to better governments. However, the results reported in the previous sections consistently indicate that neither development aid nor oil or natural resource rents have a significant effect on government quality. Moreover, if it is the availability of revenues as such that is responsible for the positive effect, then other proxies for fiscal capacity than the tax to GDP ratio should be irrelevant. In particular, the income tax to total revenues ratio, which we used as an alternative proxy for fiscal capacity in Table 5, should have no positive effect on government quality. Yet this proxy for fiscal capacity displayed a positive effect on the absence of corruption and the level of democracy. In the case of democracy, the effect was also almost significant.

These arguments indicate that fiscal capacity leads to better governments because citizens expect and demand less corrupt and more democratic governance if they shoulder a large fiscal burden. In the following, we establish the validity of this theory more directly by using data from the fourth round of the Afrobarometer survey conducted in 20 Sub-Saharan African countries in 2008 and 2009. This survey asks for citizens' opinions on a range of issues. In particular, citizens are asked about their opinions regarding government behavior: how their government should and actually does behave. We relate

citizens' responses to three particular questions to the tax to GDP ratio in order to establish whether citizens expect or witness more democratic and less corrupt governments in countries with a higher tax to GDP ratio. The questions relate to citizens' opinions regarding whether (i) democracy is always preferable to autocracy, (ii) whether governments should be under the control of citizens, and whether (iii) officials who commit crimes go unpunished.

The regression results are collected in Table 8. The dependent variables are either binary or ordinal.²⁰ The variable of interest is the tax to GDP ratio. The regressions are estimated without and with the standard control variables (results are not reported for the control variables to save space). All control variables are averaged over the 2000–08 period. While the fourth round of the Afrobarometer survey was conducted in 20 countries, only 16 of these are included in our sample. Standard errors are always clustered at the level of a respondent's province or region.

Table 8. *Fiscal capacity and citizens' opinion on how the government does/should behave, instrumental variable estimates, cross-section averages, 2000–08*

	IV I b/z	IV II b/z
<i>Democracy preferable</i>		
Total tax revenue to GDP ratio	0.001 (1.013)	0.004* (1.960)
Countries	16	16
N	18,321	18,321
<i>People should control governments</i>		
Total tax revenue to GDP ratio	0.017*** (4.817)	0.012* (1.847)
Countries	16	16
N	21,663	21,663
<i>Likelihood that criminal officials are not persecuted</i>		
Total tax revenue to GDP ratio	-0.025*** (-4.562)	-0.069*** (-8.308)
Countries	16	16
N	20,685	20,685

Standard errors are clustered at the level of a respondent's province or region.

^a This table presents the second stage of IV regressions of the tax to GDP ratio on citizens opinions on how the government does/should behave. The data source is the fourth wave of the Afrobarometer survey in 2008/2009. The row entitled *democracy preferable* reports regressions where the dependent variable is a dummy indicating whether citizens believe that democracy is always preferable (1) or if sometimes nondemocratic government is preferable (0). The row entitled *people should control governments* reports regressions where the dependent variable is an ordinal variable indicating whether citizens believe the government is like an "employee" and should be controlled by the people (larger values) or whether the government is like a "parent" who should take care of the people (lower values). The row entitled *likelihood of persecution of criminal officials* reports regressions where the dependent variable is an ordinal variable indicating whether citizens believe that corrupt or otherwise criminal officials will be persecuted (smaller values) or not (larger values).

^b The tax to GDP ratio is used as a proxy for fiscal capacity.

^c The share of manufacturing exports in total merchandise exports is the instrument for the tax to GDP ratio.

^d The regressions in the column labeled IV I are estimated without control variables. The regressions reported in the column labeled IV II are estimated with the following control variables (results omitted): Development aid, Openness, Agriculture, and GDP per capita.

^e z-Statistics in parentheses.

* Significance level at 10%.

** Significance levels at 5%.

*** Significance levels at 1%.

The first row of Table 8, entitled *democracy preferable*, reports the results regarding citizens' responses on whether they think that democracy is always preferable to autocracy. The dependent variable is 1 when a respondent answers that democracy is always preferable. The estimates indicate that it is more likely that the dependent variable is 1 in countries with higher tax to GDP ratios. The coefficient is consistently positive. It is also significant once control variables are included.

The row entitled *people should control governments* reports the regressions results where the dependent variable is an ordinal indicator of the degree of the respondent's agreement with the statement that "the people should be the bosses who control the government" rather than with the statement "people are like children; the government should take care of them like a parent". The regression results indicate that respondents in countries with higher tax to GDP ratio agree more with the first statement. In other words, citizens in countries with higher fiscal capacity are more likely to voice the opinion that the people should control the government.

Finally, the row entitled *likelihood that criminal officials are not persecuted* reports regressions where the dependent variable is an ordinal indicator measuring the respondent opinions on how often criminal officials go unpunished. The estimated coefficient for the tax to GDP ratio is significantly negative, which suggests that citizens in countries with higher tax to GDP ratios believe that persecution of criminal officials is more likely.

The combined weight of the evidence therefore indicates that the positive reduced form effect of fiscal capacity on the quality of government is primarily driven by changing citizens' expectations on how the government should behave when it imposes a large tax burden on them. That is, fiscal capacity has a positive

effect on the absence of corruption and the level of democracy because citizens demand more accountability if taxes are high and rulers apparently acquiesce to these demands.

6. CONCLUSION

The goal of this paper was to explore the effect of fiscal capacity on the quality of government in present-day sub-Saharan Africa. To study this effect, we primarily relied on regressions with cross-section averages, using an instrumental variables approach. In addition, we conducted a number of robustness tests. While the statistical significance of the estimates was sometimes questionable in the case of democracy, our results indicate that fiscal capacity leads to lower corruption and more democracy. Overall, therefore, we can conclude that the fundamental relationship between fiscal capacity and the quality of government that prevailed in Europe at the dawn of the modern age is present in contemporaneous sub-Saharan Africa as well.

Further analysis of the causal channels indicated that fiscal capacity enhances the quality of government because citizens demand more accountable administration when they have to bear a larger fiscal burden. These results therefore suggest that the reason why fiscal capacity leads to higher-quality governments is that citizens begin to voice demands for more accountability. Donors interested in good governance and the strengthening of civil society in sub-Saharan Africa should therefore consider investments in fiscal capacity as an indirect but effective way to improve the quality of government and to motivate citizens to participate in the political process.

NOTES

1. Leeson (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 Somali governments did more harm than good to their citizens, so that, from the citizens' point of view, anarchy was preferable to a state that was excessively predatory.

2. For 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 & Baker (2002)). The best known contribution along these lines is 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. See also Acemoglu and Robinson (2012) for a recent and comprehensive discussion of these issues.

3. The cross-section and temporal dimensions differ between individual models depending on the availability of the relevant data; see the discussion below. The countries included are Angola, Botswana, Burkina Faso, Cameroon, Democratic Republic Congo, Republic of Congo, Cote d'Ivoire, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tanzania,

Togo, Uganda, Zambia, and Zimbabwe. In some regressions, we also use data that cover the period 2000–08. See below for more details.

4. Herbst (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.

5. The data were retrieved from the OECD's OECD.Stat interface.

6. The data are available from 2000 onward. However, it is available annually only from 2006 onward, i.e., after the end of our sample period in 2005.

7. In the regressions with the World Bank data, we use the WDI as default. Whenever the WDI data exhibit missing values, we replace them (with one exception, see below) with data from the African Development Indicators (ADI) to maximize the sample size. The correlation between the WDI and ADI values, when both are available, is at least around 0.9. Looking at the values of the proxies for fiscal capacity within individual countries, we find that they are usually very similar or even identical in the WDI and ADI datasets. However, there are some differences in the tax variables from these two sources which are due to obvious errors in the ADI data. One striking example is the Democratic Republic of Congo for which the WDI reports, for example, an average tax to GDP ratio of 5% whereas the ADI reports an average tax to GDP ratio of 0.15%. For the Democratic Republic of Congo, therefore, we do not replace missing values in the WDI with ADI data, since a tax to GDP ratio of almost 0 is implausible.

8. Comprehensive definitions can be found at http://www.prggroup.com/ICRG_Methodology.aspx.
9. Data source: ADI.
10. Data source: ADI.
11. Data source: Penn World Tables and Teorell, Samanni, Charron, Holmberg, and Rothstein (2010).
12. Data source: WDI and Teorell *et al.* (2010).
13. Data source: Penn World Tables and Teorell *et al.* (2010).
14. Data source: World Bank's PovcalNet database (PovcalNet: the online tool for poverty measurement developed by the Development Research Group of the World Bank).
15. Data source: WDI.
16. Data source: WDI.
17. The fixed effects are dealt with either by first-differencing and using the lags as instrument (the difference equation) or by using lagged first differences as instruments for the levels (the levels equation). See Roodman (2001) for details.
18. An alternative to using lags would be to instrument the tax to GDP ratio with the share of manufacturing exports in total merchandise

exports. However, this would raise the same questions about the validity of the manufacturing export share instrument as in the last section. Moreover, it turns out that changes in the share of manufacturing in total merchandise exports are weak predictors of the contemporaneous changes in the tax to GDP ratio. While there is obviously a stable long-run relationship between the manufacturing exports share and the tax to GDP ratio, tax revenues appear to take some amount of time to adjust to increases in the manufacturing exports share.

19. That is, Model (2) has to be either demeaned or first-differenced to eliminate the fixed effects. This results in the so called Nickell-Bias (Nickell, 1981) and thus leads to wrong estimates if the lagged dependent variable is not appropriately instrumented.

20. The exact questions as listed in the codebook are as follows (the questions numbers are Q30, Q18, Q45D):●. "Which of these three statements is closest to your own opinion. Statement 1: Democracy is preferable to any other kind of government. Statement 2: In some circumstances, a nondemocratic government can be preferable. Statement 3: For someone like me, it doesn't matter what kind of government we have."●"Which of the following statements is closest to your view? Choose Statement 1 or Statement 2. Statement 1: People are like children; the government should take care of them like a parent. Statement 2: Government is like an employee; the people should be the bosses who control the government."●"In your opinion, how often, in this country: Do officials who commit crimes go unpunished?"Citizens are allowed to respond that they do not know the answer or are indifferent (e.g., "for someone like me, it does not matter what kind of government we have" or "agree with neither"). We set such responses to missing.

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APPENDIX A SUMMARY STATISTICS

Variable	N	Mean	Std.	Min.	Max.
Absence of corruption (ICRG)	31	2.072	0.751	0.208	3.944
Bureaucratic quality (ICRG)	31	1.138	0.728	0.000	2.000
Democratic accountability (ICRG)	31	3.132	1.000	1.007	5.000
Kaufmann <i>et al.</i> (2010) corruption score	31	−0.663	0.546	−1.410	0.931
Kaufmann <i>et al.</i> (2010) government efficiency score	31	−0.738	0.558	−1.675	0.700
Polity IV institutionalized democracy score	30	3.783	2.839	0.000	9.000
Total tax revenue to GDP ratio (AEO)	31	13.252	6.122	5.419	33.850
Tax effort	31	1.008	0.327	0.401	1.677
Manufacturing exports	26	21.900	20.754	1.899	87.968
Development aid	31	11.843	10.049	0.359	34.839
Openness	31	70.803	28.622	31.460	143.254
Agriculture	31	29.736	16.558	2.283	71.079
GDP per capita	31	0.520	0.814	−1.036	2.188
Oil rents	31	7.216	17.027	0.000	62.504
Natural resource rents	31	11.571	16.884	0.269	65.642
Population share with income/consumption between 250\$ and 750\$	26	2.669	3.629	0.000	14.295
Population share with income/consumption between 500\$ and 1000\$	26	0.649	1.188	0.000	5.420
Income tax to total revenue ratio (WDI/ADI)	23	20.027	11.223	5.161	50.930
Total tax revenue to GDP ratio (WDI/ADI)	23	14.316	6.052	4.590	27.980
Democracy preferable	18,321	0.868	0.338	0.000	1.000
People should control governments	21,663	2.252	1.146	1.000	4.000
Likelihood that criminal officials are not persecuted	20,685	1.563	1.021	0.000	3.000

This table presents summary statistics for the cross-section averages of all variables used in the regressions. The number of observations differs from the sample sizes reported for some regressions because of missing data on the instrument. The cross-section averages for all except the WDI/ADI tax variables and the Afrobarometer data are calculated for the period 2000–05. For the WDI/ADI tax variables, the relevant period is 1990–2005. The data from the Afrobarometer have only a cross-section dimension.