



Taxation and accountability in sub-Saharan Africa

New evidence for a governance dividend

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Key messages

- Historical experiences in the west suggest that taxation improves government accountability. However, for contemporary developing countries this connection is less clear, as their circumstances differ markedly from those encountered by western nations in the past.
- Using new governance data, this paper shows that tax revenue, as opposed to non-tax revenue, and accountability are still positively linked in contemporary developing countries. This effect is mainly driven by direct taxation.
- From a policy perspective this is good news, as many donor agencies have appealed to the state-building narrative in their recent shift to domestic resource mobilisation. This paper presents evidence in support of that position. A governance dividend from taxation is still possible today.

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Contents

Acknowledgements	3
List of tables and figures	5
Acronyms	6
1 Introduction	7
2 How taxation improves accountability	9
2.1 In theory	9
2.2 In reality	10
2.3 The evidence	10
2.4 The hypotheses	11
3 Methodology	12
3.1 Baseline models	12
3.2 Instrumental variable approach	12
3.3 Identification assumption	13
4 Data	15
5 Results	19
5.1 Baseline models	19
5.2 Decomposing the effect of taxation	21
6 Robustness	24
6.1 Instrumental variable approach	24
6.2 Placebo test – types of accountability	25
6.3 Sensitivity checks	26
7 Putting tax bargaining into perspective	27
7.1 A small-N perspective	27
7.2 A large-N perspective	28
8 Conclusion	31
References	32
Appendix A List of Countries	37
Appendix B Data	38
Appendix C Robustness	41

List of tables and figures

Tables

Table 1	Effect of taxation on accountability	20
Table 2	Effect of tax sub-components on accountability	22
Table 3	2SLS estimation of the effect of taxation on accountability	25
Table 4	Effect of taxation on different accountability measures	26
Table 5	Effect of taxation on accountability in comparative perspective	30
Table B1	Summary statistics	38
Table B2	Variable definitions and sources	39
Table B3	Composition of the vertical accountability index	40
Table B4	Correlation matrix of accountability indicators	40
Table C1	Effect of taxation on accountability using five-year averages	41
Table C2	Effect of tax components on accountability using five-year averages	42
Table C3	Effect of tax on accountability using lags	42
Table C4	Effect of tax on accountability excluding one country at a time	43
Table C5	Effect of tax on accountability controlling for resource rents	44
Table C6	Effect of taxation on accountability including time trends	45

Figures

Figure 1	Boxplot of vertical accountability per decade	16
Figure 2	Vertical accountability in Uganda	17
Figure 3	Scatter plots of tax and accountability	18
Figure 4	Absolute changes in accountability scores	27

Acronyms

2SLS	2-stage least squares
ERPI	Exchange rate pressure index
FE	Fixed effect
FE-LDV	Fixed effect lagged dependent variable
GDP	Gross domestic product
GDPPC	Gross domestic product per capita
GRD	Government Revenue Dataset
GST	Goods and services taxes
IMF	International Monetary Fund
IV	Instrumental variable
KP	F-stat Kleibergen-Paap F statistic
L.acc	Lagged accountability
LDV	Lagged development variable
LT	effect Long-term effect
ODA	Official development assistance
OLS	Ordinary least squares
OLS-FE	Ordinary least squared fixed effects
SARA	Semi-autonomous revenue authority
ToT	Terms of trade
VAT	Value-added tax
V-DEM	Varieties of Democracy

1 Introduction

In 1995 the Ghanaian government replaced the existing system of sales taxes with a value-added tax (VAT). Under International Monetary Fund (IMF) pressure, the VAT was introduced at relatively short notice in response to a worsening fiscal outlook. This was met with large public protests – arising initially from frustration at the new tax but quickly turning into a catalyst for much broader demands for political change. According to Prichard (2015), these tax protests did not only have short-run political effects, such as the resignation of the long-standing minister of finance, but they also put pressure on the government to move towards more inclusive and accountable governance.

Historically, the link between taxation and accountability is well-established. According to Tilly (1990), the consolidation of the nation state in Europe is a story of war; war made states and states made war. As the costs of war rose, rulers increasingly had to bargain to obtain the revenue needed to fight them. This bargaining gradually expanded the rights and representation of the taxpaying parts of the population. Revenue pressures have been linked with the introduction of representative institutions in England, where parliament gained former control over the Crown in 1688; in France, where they led Louis XV to convene the Estates General in 1789; in Spain, where the demise of the Cortes led to a freeze of taxation; and in the United States, where the imposition of new taxes by the British government helped produce the rebellion of 1776 (Ross, 2004). Thanks to scholars such as Mick Moore (2004a, 2008), this ‘governance dividend’ argument has found its way into the policy discourse of international development actors (e.g. OECD, 2010). However, its validity for contemporary developing countries is increasingly questioned given their access to new forms of finance such as aid, and also because the ‘evidence was never abundant’ (Moore, 2015a: 6). This paper seeks to contribute to that. In what follows, I test the

theoretical prediction of a governance dividend using data on taxation and accountability from 47 African countries between 1980 and 2015.

The literature on the politics of taxation is large and rich. We know a great deal about how political systems impact on the tax structure (Besley and Persson, 2011; Bueno de Mesquita et al., 2017; Gould and Baker, 2002; Steinmo, 1996). The role of political regimes in taxation has received particular attention, with a focus on the differences between democratic and authoritarian regimes (Boix, 2001; Cheibub, 1998; Fauvelle-Aymar, 1999; Garcia and von Haldenwang, 2016; Gould, 2001; Thies, 2004; Timmons, 2010). Conversely, taxation can also contribute to state-building: through the social contract based on tax bargaining, and through the institution-building incentive provided by the revenue imperative. The former has the potential to lead to the development of a representative democracy, the latter could strengthen state (bureaucratic) capacity (Bräutigam, 2008).

For the purposes of this paper, I am interested in the tax bargaining argument, and specifically in its ‘no taxation without representation’ version. Is there still a link between taxation and accountability in contemporary developing countries? Accountability is defined as the ability of citizens to hold politicians and the state to account, and is assumed to be a precondition for democracy. While there can exist a degree of accountability without full democratisation, there cannot be full democracy without accountability (Lindberg, 2013; Lührmann et al., 2017). The focus, then, is not on democratisation as such but rather on one of its constituent elements: accountability. Nevertheless, this paper does fit in with the broader literature on democratisation (Lipset, 1959; Przeworski et al., 1999; Rustow, 1970) and its determinants (Acemoglu et al., 2005; Barro, 1999; Boix, 2003; Glaeser et al., 2007), notably during democratisation’s ‘third wave’ (Huntington, 1993; Teorell, 2010) and in

particular in sub-Saharan Africa (Bratton and Van de Walle, 1997; Englebert and Dunn, 2013; Lindberg, 2006).

This paper's contribution to the literature is fourfold. First, using new data, I unpack the relationship between taxation and democracy by directly examining the effect taxation has on accountability. I provide new quantitative evidence showing that increased taxation correlates with improvements in accountability scores. Total tax revenue, as opposed to non-tax revenue, which proxies for resource rents, correlates positively with accountability scores. Second, I go beyond aggregate taxation and assess the contributions of the main sub-components of total tax: direct taxation, taxes on goods and services, and trade taxation. In line with theoretical predictions, direct taxation is most strongly correlated with improvements in accountability scores. Third, I use an instrumental variable (IV) strategy to overcome omitted variable bias and reverse causality arguments. Building on work by Morrissey et al. (2016), I develop an instrument for tax revenue

based on terms of trade and exchange rate shocks, assuming that these shocks impact on tax revenue but do not directly affect accountability scores. The IV confirms the results, suggesting a causal interpretation for the relationship between taxation and accountability. Finally, I put the magnitude of the effect of taxation into perspective, showing that it is not insignificant – neither statistically nor when compared to alternative predictors of accountability.

This working paper continues as follows. I start with a discussion of the taxation–accountability argument in the next section. Section 3 briefly discusses the statistical set-up of the paper, with particular attention on the IV strategy. The data is introduced in section 4 and the baseline results follow in section 5. Section 6 contains a number of robustness checks including the IV estimation. Before concluding, section 7 puts the effect of taxation into perspective by comparing it to the impact of a number of recent country-specific political events, as well as by comparing its explanatory power to that of alternative theories of democratisation.

2 How taxation improves accountability

The core proposition this paper examines is that *higher levels of taxation bring about more capable, accountable and responsive governments*. While state formation is an undoubtedly complex process, it is worth considering this rather bold generalisation more closely. The core of the argument is pretty intuitive. Every government needs revenue. If a government has to raise its revenue from taxing its subjects, it can try to coerce them into paying or encourage (quasi) voluntary compliance. Below, I briefly sketch the key parts of the argument relevant for this paper; the relationship between taxation and governance is more fully discussed in Moore (2004a, 2008, 2015b) and Prichard (2015).

2.1 In theory

Rulers are more likely to allow more accountability if its benefits outweigh its costs (Dahl, 1971). Taxation improves the benefits. The modern roots of the argument lay in the fiscal sociology literature, which suggests that the drivers of social, economic and political change can be understood by appreciating how (western) states have grappled with the challenge of raising revenue (Schumpeter, 1918). Contemporary interest was revived in the 1980s. Levi (1988) and Bates and Lien (1985) provide the main theoretical framework. The core of the argument revolves around a bargain over tax revenue between the ruler and the taxpayers. The key is that a ruler in search of revenue has to make concessions to taxpayers in order to secure quasi-voluntary tax compliance. Relying solely on coercive taxation is impossible as at least a part of the tax base is mobile, and thus allows taxpayers to evade taxation. Taxpayers

care about their prosperity. They will try to resist taxation, or try to make sure that their money is well spent. Hence, a bargaining process ensues in which taxpayers trade compliance in return for more scrutiny over how the money is spent and raised. This tax bargaining will not only make the ruler more responsive to taxpayers, but taxpayers will also demand increased accountability to institutionalise the ruler's responsiveness (Moore, 2007).

This tax bargaining can be *direct*, in the sense that there is an explicit negotiation and clear exchange (Moore, 2008; Prichard, 2015). England's historical experience fits this ideal type best. Alternatively, this bargaining process can be more *indirect*. Prichard (2015) distinguishes two forms of indirect tax bargaining: *taxpayer resistance* and *strengthened political capabilities of taxpayers*. The first refers to active avoidance when taxpayers lack the means to negotiate, for example because of collective action problems. This resistance could undermine the fiscal position of the government, creating incentives for it to make concessions. Fiscal pressures such as these led the French monarchy to convene the Estates General in the 18th century. The second involves the idea that taxation politically engages taxpayers by raising their stakes in the political process. It could encourage them to coordinate and overcome collective-action problems, potentially strengthening civil society and longer-term political mobilisation. The American experience is more commensurate with this mode of indirect bargaining. But both direct and indirect tax bargaining broadly rely on similar logics, and yield similar outcomes. They force the state to become more responsive and accountable.

2.2 In reality

Elegant as the argument is, the reality of democratisation might be more complex. One of the most important concerns is that the circumstances under which European states democratised are fundamentally different to the ones encountered by contemporary developing countries (Tilly, 1990). These differences might have altered, weakened or eliminated the relationship between taxation and accountability (Moore, 2004a, 2015a). Two points underpinning this concern are particularly relevant to this paper. First, the argument presupposes that governments need taxation to meet their revenue requirements. However, many contemporary African countries have access to alternative sources of revenue – what Moore (2004a) calls unearned revenue – either in the form of natural resource rents or in the form of aid. If this lowers the need to tax, then it might equally lower incentives to improve the governance framework. While most of the recent research does not find that aid has a negative impact on taxation (Morrissey et al., 2014), access to natural resource revenue has been linked with authoritarian rule and economic mismanagement, a finding also referred to as the ‘political resource curse’ (Collier and Hoeffler, 2005; Dunning, 2008; Ross, 1999).

Second, politicians now possess a wider set of tax policy tools. For citizens to engage in tax bargaining they must ‘feel’ the tax burden. Experimental evidence confirms that taxpayers respond to the salience of a tax (Fochmann and Weimann, 2013; Jacobsen and Piovesan, 2016; McCaffery and Baron, 2006). If salience varies across tax types, then the effect of taxation on accountability might vary accordingly. J.R. McCulloch (1845) and J.S. Mill (1848) saw long ago that direct taxation is more likely to result in public discontent than indirect taxation. More recent evidence indeed suggests that not all taxes are equally salient to taxpayers (Cabral and Hoxby, 2012; Sausgruber and Tyran, 2005). Excise taxes, for example, are more visible than sales taxes (Chetty et al., 2009). According to Bracco et al. (2013), politicians exploit less salient taxes to avoid being held to account during elections. Thus, recent changes, such as

the shift to VAT, might have lowered the visibility of taxation with potential consequences for the relationship between taxation and accountability.

Yet, there is little empirical evidence showing that, for example, the introduction of VAT has been decreased political action in sub-Saharan Africa. On the contrary, the Ghanaian example shows just how important VAT has been as a catalyst for tax bargaining, and Ghana is not the only example (see Fjeldstad and Moore, 2008). However, the salience of major tax reform, such as the *introduction* of a VAT, is probably larger than a VAT *rate change*. On the other hand, the absence of major direct tax reform is significant. Although steadily increasing since the early 2000s, personal income taxation, in particular, remains low in most African countries, suggesting that it is politically too costly. Instead, many governments are especially reliant on corporate income tax, and taxes withheld by larger businesses. Various trade or tax associations have emerged across Africa in response (Gloppen and Rakner, 2002), but it is doubtful that this has improved accountability. The perceived increase in tax exemptions for businesses (Moore, 2015b) suggests that governments have become more responsive, but only to a small number of select business interests.

2.3 The evidence

Strong evidence for the link between taxation and accountability remains elusive. Qualitative studies have provided strong narratives about these links in particular cases. Bräutigam (2008), for instance, shows how the colonial export tax on sugar incentivised the strengthening of state capacity and democratic accountability in Mauritius. For Somaliland, Eubank (2012) presents evidence that dependence on local tax revenue provided those outside government with the necessary leverage to press for inclusive, representative and accountable institutions. The most extensive qualitative analysis is Prichard’s comparative analysis (2015) of both direct and indirect tax bargaining in Ghana, Kenya and Ethiopia. The body of quantitative evidence is small but growing. At the subnational level, we have evidence that reliance on local taxation is linked with more democratic rule (e.g. Berger, 2009; Gervasoni, 2010). Some of the first cross-country evidence comes from

Ross (2004) who finds a significant and positive association between increased taxation and democracy in a large panel of countries. Prichard et al. (2018) repeat this analysis and include non-tax revenue: their results provide evidence for a ‘political resource curse’ but are less conclusive on the role of taxation. Nevertheless, both studies suffer from endogeneity issues, which Baskaran (2014) tries to address by instrumenting tax revenue with the introduction of VAT and semi-autonomous revenue authorities (SARAs). It is questionable, however, how exogenous SARAs really are (Dom, 2018). Nevertheless, Baskaran’s results broadly confirm the positive impact of taxation. Interestingly, this link disappears when African countries are dropped from the sample. A more recent paper finds a positive effect of the introduction of VAT on democratisation (Kato and Tanaka, 2018).

Hence, questions remain about the causality of the evidence. Moreover, many of the empirical studies have focused on democracy indicators as the dependent variable, mostly because of a lack of good quality accountability data. Yet, the theory is not about democracy as such. As Levi (1999: 117) puts it: ‘[tax bargaining] offers a better and more convincing account of the emergence of proto-democracy than of democracy’. Rather, the theoretical predictions revolve around accountability and responsiveness (Moore, 2008). Accountability here refers to an institutionalised system through which rulers justify their actions to citizens, and through which citizens can reward or punish rulers (Schedler, 1999). This vertical accountability, between citizens and rulers, is distinct from other types of accountability such as horizontal or diagonal accountability (Lührmann et al., 2017). Also important is that accountability is distinct from, though closely related to, responsiveness, which refers to the ability of the state to meet citizens’ needs. This distinction is empirically important as rulers might disarm tax protests by offering to satisfy citizens’ needs without improving accountability. This would weaken the expected relationship between tax and accountability

(Timmons, 2005). However, this effect may only be temporary as increased responsiveness creates its own pressures to institutionalise this behaviour through accountability mechanisms (Prichard, 2015). According to Lindberg (2013), one of the desired effects of accountability is indeed to make the state responsive. Empirically, the paper by Baskaran and Bigsten (2013), which examines the impact of taxation on the quality of government, is therefore conceptually closest to the theory of tax bargaining. Their results do not show any impact of taxation on the International Country Risk Guide’s Democratic Accountability Index. However, it still conflates accountability and responsiveness. Moreover, their regression results are based on an extremely small sample, even for sub-Saharan Africa.

2.4 The hypotheses

From this review of the literature two sets of hypotheses arise. The general prediction is that there exists a positive correlation between taxation and accountability. When rulers depend on earned, as opposed to unearned, income in the form of taxation, they will be forced to bargain with citizens over taxation since they cannot completely resort to forceful taxation. The theory predicts that they will ‘buy off’ taxpayers’ compliance by becoming more responsive and accountable. In contrast to the existing literature (e.g. Ross, 2004; Baskaran, 2014; Prichard et al., 2018), I directly test this argument by focusing on accountability instead of democracy indicators. Accountability scores are expected to improve following increases in taxation. A second set of predictions flowing from the literature involves the composition of taxation. If citizens’ political engagement depends on the salience of a tax and salience varies across different types of taxes, then we should expect the relationship between accountability and taxation to vary accordingly. More specifically, accountability scores should respond more to changes in direct taxation than to changes in indirect taxation.

3 Methodology

3.1 Baseline models

For the analysis of the impact of taxation on accountability scores, I draw on a number of econometric estimations. The baseline model will be a standard fixed effects (FE) estimator, but I will also provide the standard ordinary least squares (OLS) estimates for comparison. The baseline FE model has the following specification:

$$Accountability_{i,t} = \alpha_i + \delta_t + \beta_1 Tax_{i,t} + \beta X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Accountability_{i,t}$ is the relevant accountability score for country i in period t , and $Tax_{i,t}$ is the independent tax variable of interest where β_1 captures the effect from taxation on accountability. The tax variables are all measured as shares of gross domestic product (GDP). Thus, I am not directly examining the impact of major tax innovations, such as the introduction of a VAT or a SARA. Instead, tax-to-GDP ratios can be seen as an average tax rate.¹ Therefore, the regression coefficient β_1 can be interpreted as what would happen if the average tax rate is changed at the margin.

I also include a full set of country fixed effects, α_i , as well as year fixed effects, δ_t . The former account for country-specific time invariant unobservables, such as the geographical size of a country which is generally negatively correlated with democratisation (Boix, 2003; Teorell, 2010). The latter take into account global developments which affect countries similarly. Finally, $X_{i,t}$ captures a vector of control variables, and $\varepsilon_{i,t}$ is the standard error term.

However, tax revenue might be endogenous, resulting in inconsistent FE estimates. Considering equation 1, endogeneity concerns may arise in two ways. The estimate of β_1

will be biased if the tax variable is correlated with the error term. One particular way in which they might be correlated is through past accountability scores. As we have seen, there is a large strand of the literature which considers the effect of governance on taxation. It is argued that tax compliance will improve if a state is more legitimate, responsive and accountable (Bird, 2008). Thus, past accountability scores might be an important omitted variable as they potentially correlate with both contemporary tax levels and accountability scores. Therefore, I will estimate an FE lagged dependent variable (FE-LDV) model to ensure that tax levels are (conditionally) uncorrelated with past accountability scores:

$$Accountability_{i,t} = \alpha_i + \delta_t + \beta_1 Tax_{i,t} + \beta X_{i,t} + \gamma Accountability_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

where γ captures the effect of the lagged dependent variable. This somewhat changes the interpretation of β_1 , as it now only captures the short-run effect of tax on accountability. Also, it should be noted that adding a lagged dependent variable is not without problems. The FE-LDV is not asymptotically consistent when T is small (Nickell, 1981). In the sample, each country is, on average, observed 33 times. This should be enough for a nearly negligible level of bias in β_1 (Judson and Owen, 1999). Nevertheless, the possibility cannot be excluded.

3.2 Instrumental variable approach

To deal with time-varying omitted variables and to circumvent the possibility of Nickell bias, I resort to an IV estimator. This has the additional advantage that it also addresses the second endogeneity issue:

1 This becomes clear if one considers: revenue = rate \times income. Thus, $\frac{revenue}{income} = rate$.

reverse causality between taxation and governance. While the LDV model allows us to control for past accountability scores, it does not address the possibility of contemporaneous reverse causality. That is, we cannot be sure that the coefficient estimate is picking up a causal effect from taxation on accountability, as it can also be interpreted as the reverse effect. It is plausible that if perceived accountability is higher, more tax is raised.

I therefore instrument the tax level in the robustness section of this paper to check the baseline findings and to obtain consistent estimates. The purpose of the IV is to use only that part of the variation in the tax variable that is uncorrelated with the error term. The IV strategy will exploit exogenous shocks to tax revenue. The motivation for this approach is a recent study by Morrissey et al. (2016). In that paper, the authors find that tax revenue performance in developing countries is heavily impacted by shocks, in particular by terms of trade and exchange rate shocks. Assuming that these shocks are uncorrelated with accountability scores, conditional on the included controls, they can be used as instruments. I come back to this assumption below.

I operationalise these two shocks following Morrissey et al. (2016). The exchange rate pressure index (ERPI) proxies for export demand and foreign capital flow shocks. It is defined as a weighted average of percentage changes of two policy variables, the exchange rate in local currency units (E) and the size of the reserves (RES), and is constructed as follows:

$$PI_{i,t} = W_{E,i} \frac{\Delta E_{i,t}}{E_{i,t-1}} - W_{RES,i} \frac{\Delta RES_{i,t}}{RES_{i,t-1}} \quad (3)$$

where $PI_{i,t}$ is the pressure index in year t in country i , and $W_{E,i}$ and $W_{RES,i}$ are country-specific weights. The construction of these weights is as follows:

$$W_{E,i} = \frac{\sigma_{RES,i}}{\sigma_{RES,i} + \sigma_{E,i}}, W_{RES,i} = \frac{\sigma_{E,i}}{\sigma_{RES,i} + \sigma_{E,i}} \quad (4)$$

Here, $\sigma_{RES,i}$ is the standard deviation of $RES_{i,t}$ in country i in 1980-2015, $\sigma_{E,i}$ is the same for $E_{i,t}$. To reduce the impact of outliers, the pressure index is transformed:

$$ERPI_{i,t} = sign(PI) \times \log(1 + |PI|) \quad (5)$$

The ERPI captures the logic that in response to an adverse balance of payment shock a country can employ two strategies. Either the government can allow the exchange rate to depreciate or it can use its international reserves to defend the exchange rate. Insofar as exchange rate pressures are linked with trade and capital outflows, they will mostly affect direct taxation through their impact on corporate and personal incomes.

The second exogenous shock I use is a terms of trade (ToT) index. It is defined as the percentage ratio of the export unit value indices to the import unit value indices, and is measured relative to the base year 2000. This index thus measures the relative prices of a country's exports and imports. When a country's net barter ToT index increases, its exports become more expensive or its imports become cheaper. As such, ToT shocks are most likely to influence trade taxation, although increased import or export prices might also affect corporate income taxation.

These two instruments are employed to estimate β_1 in a two-stage least squares (2SLS) model, given by:

$$\begin{aligned} Accountability_{i,t} &= \alpha_i + \delta_t + \beta_1 Tax_{i,t} + \beta X_{i,t} + \varepsilon_{i,t} \\ Tax_{i,t} &= \theta_i + \mu_t + \pi_1 ERPI_{i,t} + \pi_2 ToT_{i,t} + \pi X_{i,t} + v_{i,t} \end{aligned} \quad (6)$$

3.3 Identification assumption

Model 6 is identical to the linear model above (model 1), except now taxation is treated as endogenous, and instrumented by a ToT and an exchange rate shock. If the IV strategy is successful, the coefficient β_1 on tax can be given a causal interpretation. For this, two conditions must be fulfilled. First, the instruments, i.e. the exchange rate and ToT shocks, must be related to tax revenue. This can be tested. As I show below, this condition is fulfilled – at least for one of the instruments.

Second, the instruments should not have any direct effect on the accountability scores. The construction of the instrument makes this plausible as it captures relative changes, not the level of the relevant economic indicator.

It is therefore not capturing the long-term relationship between economic development and democracy. Rather, it focuses on the short-term impact of economic shocks on tax revenue, which are assumed to be independent of accountability levels. Unfortunately, this exclusion restriction cannot be tested explicitly.

From the literature there are few reasons to believe that exchange rate or ToT shocks directly influence accountability levels. Broader economic crises have been linked to regime change, as was the case in Indonesia in the late 1990s, but there is little evidence that different regime types systematically map onto accountability scores. Nevertheless, economic shocks can affect democratisation processes. Military regimes, for example, are more likely than one-party states to democratise following exogenous economic shocks (Geddes, 1999). Teorell's results (2010) support this link between economic shocks (measured as growth rates) and democratisation. This could be a problem since democratisation and accountability scores are not unrelated. If these economic shocks impact democratisation through their effect on taxation, then this does not invalidate the approach as I am indifferent to the origins of the tax changes. However, if these economic shocks have an effect on accountability other than through taxation, then this invalidates

the approach. Therefore, the growth rate will be included in the estimation as a proxy for economic crises to close this backdoor path.

The ToT shock might be more problematic, as for example dependency theories make the argument that democratisation and trade (including capital flows) are related. A wealthy and powerful 'core' set of democratic countries support the autocratic elites in poor and marginalised 'peripheral' countries to secure access to beneficial trading routes (Bollen, 1983). This implies a negative correlation between trade volumes on the one hand, and democracy levels on the other. Alternatively, it has been argued that international trade might facilitate the spread of democratic ideas, suggesting a positive relationship between trade and democracy. Most of the evidence on the impact of trade on democracy tends to support a negative impact (Rigobon and Rodrik, 2005; Teorell, 2010). In the opposite direction there is consistent evidence that democracy positively impacts trade and foreign direct investment in particular (Adserà and Boix, 2002; Asiedu and Lien, 2011; Yu, 2010). It is important to stress that the identification strategy relies on shocks, not levels. However, to address potential concerns, a measure for trade openness is also included in the IV estimation.

4 Data

To test these hypotheses I rely on an unbalanced panel dataset of 49 sub-Saharan African countries covering the period 1980 to 2015. I exclude only South Sudan and Somalia because of data limitations, leaving 47 countries. A full list of the included countries can be found in Appendix A.

Data on accountability is taken from the Varieties of Democracy (V-DEM) database, version 7.2 (Coppedge et al., 2017). The V-DEM dataset is a relatively new initiative aimed at producing better indicators of democracy. It is one of the largest social science databases with over 350 indicators on democracy and political systems, with worldwide coverage from 1789 to the present in the most recent release. Through this multidimensionality it attempts to better reflect the complexity of the concept of democracy. A recent comparison of the V-DEM data with the Polity2² and Freedom House³ data shows that the former outperforms the latter with respect to the underlying definitions, measurement scales as well as the theoretical justification of the aggregation procedures. Moreover, the procedures underlying the data construction process are more transparent (Boese, forthcoming).

From this database I take the Vertical Accountability Index (*v2x_veracc*), which was introduced by Lührmann et al. (2017). This vertical accountability index captures the extent to which citizens have the power to hold the government accountable. It focuses on the relationship between citizens and their elected representatives. The mechanisms of vertical accountability include formal political participation on the part of the citizens, such as being able to freely organise in political parties and participate in free and fair elections, including

for the chief executive. This index is created using Bayesian structural equation models with a combination of *de facto* and *de jure* measures for (1) the quality of the elections, (2) the percentage of the enfranchised population, (3) the way in which the chief executive is elected and (4) the quality of the party system. More details on its construction can be found in Lührmann et al. (2017), but a summary is provided in Table B3 in the Appendix. It is thus a close operational match for the theoretical accountability concept of interest, described above. The only modification I make is to rescale the variable so that it ranges from 0 to 100, instead of from -5 to 5.

Figure 1 gives boxplots for this index per decade. It is clear that since the 1980s accountability scores have improved across sub-Saharan Africa. This is in line with the stylised fact of the wave of democratisation across the region starting in 1989 (Huntington, 1993). Yet, progress seemed to have slowed down in recent years. The median accountability value moved from around 47 in the 1980s to around 53 in the 1990s, and on to 56 in the 2010s. However, significant variation remains. Over the first two decades scores ranged from 35 to 65, with Mauritius being an upper outlier in the 1980s. However, by the 1990s Mauritius was no longer an outlier as African countries further democratised. While median accountability scores stabilised towards the end of the 2010s, variation reduced further with scores ranging from 42 to 65 – Eritrea being the sole lower outlier with a score of 36 in 2015.

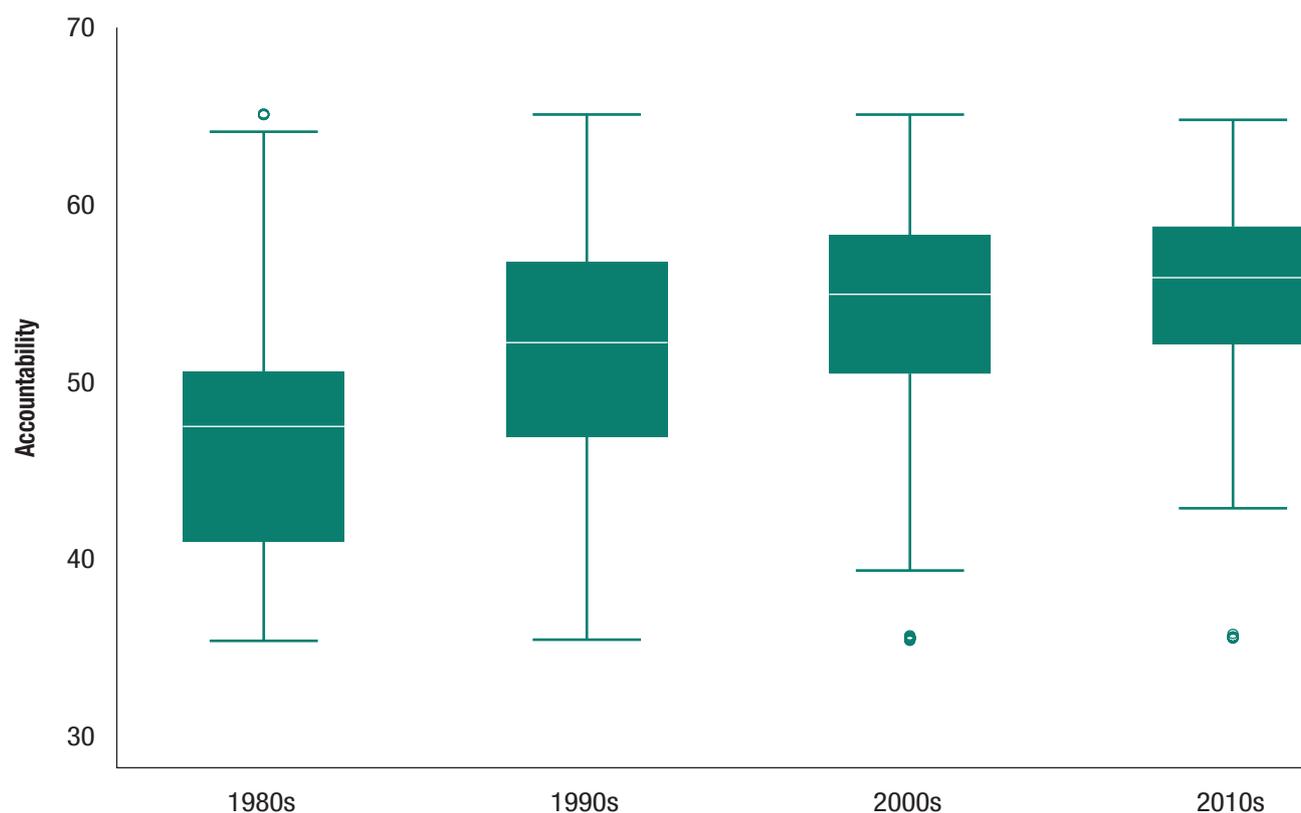
The only other publicly available accountability index with worldwide coverage is the World Bank's Voice and Accountability Index⁴. It aggregates perception-based indices from various

2 <http://www.systemicpeace.org/>

3 <https://freedomhouse.org/>

4 <http://info.worldbank.org/governance/wgi/#home>

Figure 1 Boxplot of vertical accountability per decade



Source: The author drawing on Lübrmann et al. (2017).

Note: this figure presents boxplots of the vertical accountability scores per decade. They display the interquartile range (between 25th and 75th percentile) and the median. The ends of the whiskers represent the upper and lower values within 1.5 times the interquartile range beyond the 25th and 75th percentile. Any points beyond this are considered outliers and receive their own markers.

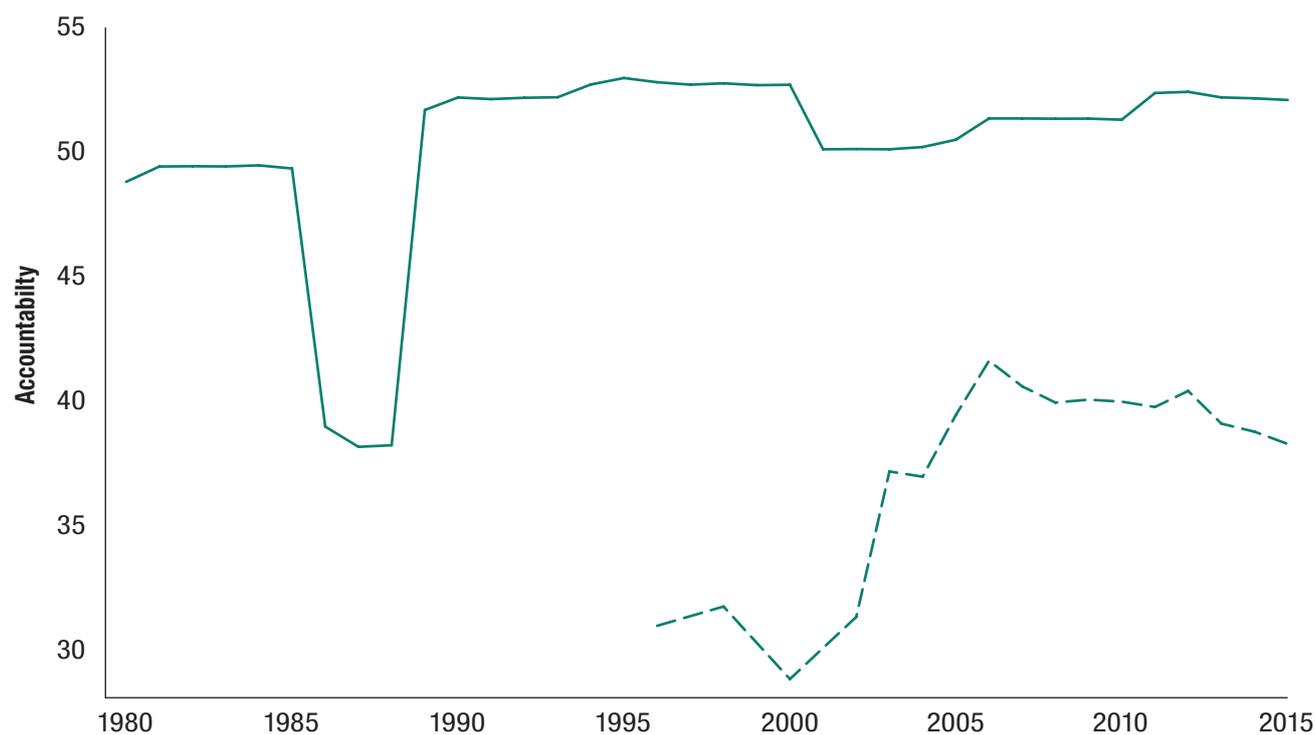
sources using an unobserved components model (Kaufmann et al., 2010). However, V-DEM's index is preferable for two reasons. First, the length of the time series of the World Bank's accountability index is limited, making it less useful for the sort of analysis pursued in this paper.

Second, it has been criticised for lacking both conceptual consistency and validity (Thomas, 2010). The V-DEM measure addresses both. It has wider coverage and is conceptually closer to the definition of accountability (Lübrmann et al., 2017). Figure 2 shows the evolution of both indices for Uganda. As is immediately clear, the V-DEM measure spans a longer time period. The impact of the coup d'état in 1985 at the end of the civil war is apparent. The accountability index only recovers in 1989 when new parliamentary elections took place. In the early 2000s the V-DEM and World Bank measures portray qualitatively different trends. According to the

World Bank's measure, accountability shoots up, surpassing late-1990s levels. However, the V-DEM measure shows that accountability dropped in 2000 and, while improving again by the mid-2000s, has not yet surpassed its 1990s levels. This is more in line with the history of political events. In 2000, Ugandans rejected in a referendum a move to a multiparty system in favour of a no-party movement system – a definite worsening of vertical accountability. While the multi-party system was reinstated in 2005, it arguably did not reach its 1990s level as presidential term limits were simultaneously removed.

Tax data is obtained from the Government Revenue Dataset (GRD). It has become the go-to dataset for cross-country taxation research in developing countries. While not without issues, its coverage, scope and consistency outperform the available alternatives, leading to a re-assessment of some of the existing research

Figure 2 Vertical accountability in Uganda



Source: The author drawing on World Bank (Kaufmann, D. and Kraay, A. (2018) *Worldwide Governance Indicators*. World Bank: Washington D.C. retrieved from <http://info.worldbank.org/governance/wgi/#home>) and Coppedge et al. (2017).

Note: this figure presents the evolution of the accountability scores for Uganda as measured by the World Bank's Voice and Accountability Index and by V-DEM's vertical accountability index between 1980 and 2015.

on taxation and development (Prichard, 2016). The GRD provides detailed information on various individual taxes as a share of GDP at both the central and general government level. In this paper, I focus on the general government and retain the main sub-components of total revenue: total tax revenue, direct tax revenue, tax revenue from goods and services, international trade tax revenue and total non-tax revenue as a proxy for natural resource revenue.⁵

For some parts of the analysis I rely on additional variables as instruments or to control for other confounding factors. Summary statistics for all the variables used in this paper are found in Table B1 in the Appendix, while the precise definitions and sources of the variables can be found in Table B2.

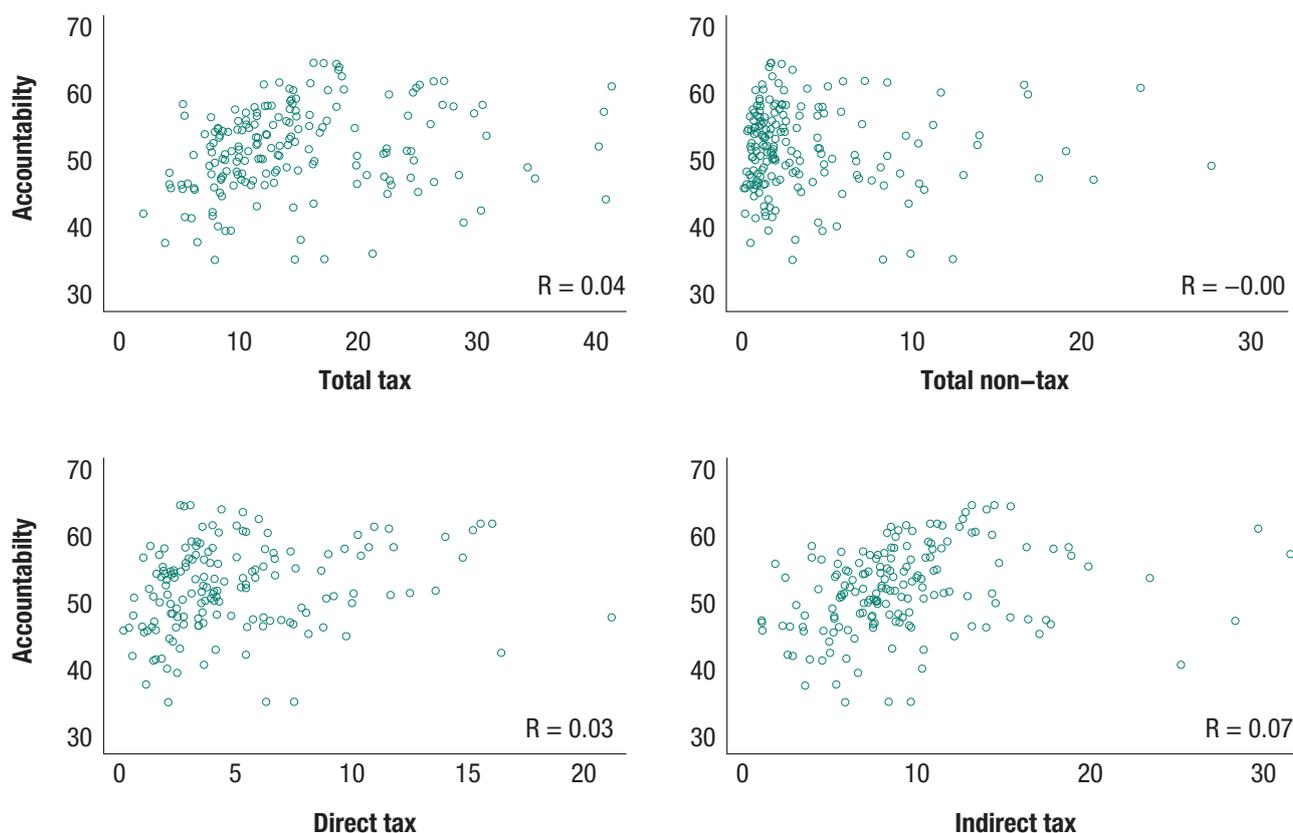
How do the accountability scores correlate with different tax measures? Figure 3 provides simple bivariate scatter plots using country-decade observations for the entire period of the dependent variable, accountability, and four revenue measures: total tax revenue, total non-tax revenue, direct tax revenue and indirect tax revenue. As expected, total tax revenue correlates positively with accountability scores, whereas total non-tax revenue correlates negatively, but only weakly, with accountability. Both sub-components of total tax revenue, direct and indirect revenue, seem to correlate positively with accountability scores. However, Figure 3 also highlights two other features. First, there is significant heterogeneity even for countries with similar revenue levels. For example, for countries that raise around 17% of GDP in tax revenue,

⁵ The tax revenue variables include resource-related tax revenue. The GRD does provide tax data net of resource revenue, however, despite its efforts the data is not able to fully capture the resource component of tax revenue. This leads to missing data in the cleaned data series. Hence, I prefer the original series. Note that if resource revenue is an important part of total tax revenue this should bias the estimations against finding a positive impact of tax on accountability. I do, nevertheless, include a measure for total non-tax revenue, and later on natural resource rents, as a control for natural resource wealth.

the accountability score ranges from below 40 to around 65. Second, there appear to be a number of outliers. With respect to total non-tax revenue, Equatorial Guinea, the Republic of the Congo and Botswana are the only countries to surpass 20% of GDP. For direct tax revenue the Republic of the Congo and Angola are the two countries in the lower right quadrant, combining relatively high revenue with low accountability scores. Finally,

Lesotho and the Seychelles are the two countries to consistently collect more than 20% of GDP as indirect tax revenue. However, from the plots it is not clear that they significantly influence the observed correlations. Of course, these plots are merely descriptive and do not allow us to make causal inferences as they do not account for other confounding factors. This is the objective of the next section.

Figure 3 Scatter plots of tax and accountability



Source: The author.

Note: the figure displays the scatter plots of the vertical accountability index with total taxation, non-tax revenue, direct and indirect tax revenue. It also fits a linear regression line and shows the R2 value. The scatter plots are based on country-decade observations.

5 Results

The hypothesis tested in the first part of this section is that taxation positively affects accountability scores. This expectation follows from the literature on the governance dividend argument, which states that rulers will institutionalise accountability mechanisms in exchange for (quasi) voluntary compliance by taxpayers. In addition, direct taxation is expected to affect accountability more than indirect taxation due to difference in the salience of the tax. The second part of this section tests this latter expectation.

5.1 Baseline models

I start by regressing accountability on total tax revenue and total non-tax revenue (excluding aid). Conditioning on non-tax revenue implies that we are examining the effect of tax on accountability while keeping the level of non-tax revenue constant. This allows us to control for the ‘political resource curse’ side of the story, i.e. that accountability might be affected by unearned income. Thus, I directly examine the contribution of changes in tax or earned revenue on accountability scores.

The baseline results are presented in Table 1. The dependent variable in all regressions is the vertical accountability score from the V-DEM dataset. I start with a parsimonious OLS model in column I. The specifications become more

demanding as we move to column VII. Column II introduces the country and year fixed effects, while the lagged dependent variable is added in column V. Standard errors are robust to heteroskedasticity and clustered at the country level in the FE models. Additional controls are added in columns III, IV, VI and VII.

The first control is a measure of national income, GDP per capita. Tax efforts and revenues are closely related to the level of economic activity and development (Besley and Persson, 2013). Not only does the ability to tax improve with economic development, but new tax handles also become available (Bräutigam et al., 2008). If income also correlates with accountability scores, then this would cause omitted variable bias. Indeed, modernisation theory broadly states that democracy unfolds as countries move up the socio-economic ladder (Lipset, 1959), implying a correlation between income levels and democracy and possibly accountability scores. The direction of this effect is not uncontested (Acemoglu et al., 2008, 2014). However, reviewing the literature, Englebert and Dunn (2013) find that although income is usually one of the most significant predictors of democracy, it does a poor job at predicting democratisation in African countries. Nevertheless, given the possibility of omitted variable bias I include a measure for the level of economic development.

Table 1 Effect of taxation on accountability

	I OLS	II FE	III FE	IV FE	V FE-LDV	VI FE-LDV	VII FE-LDV
Tax	0.176*** (0.023)	0.217*** (0.072)	0.255*** (0.064)	0.358* (0.206)	0.067*** (0.021)	0.078*** (0.019)	0.107** (0.052)
Non-tax	-0.079** (0.035)	-0.037 (0.051)	-0.030 (0.059)	-0.031 (0.058)	-0.011 (0.018)	-0.008 (0.020)	-0.008 (0.019)
GDPPC			0.178 (0.967)	0.173 (0.944)		-0.059 (0.290)	-0.060 (0.286)
ODA			0.018 (0.023)	0.017 (0.023)		0.004 (0.011)	0.004 (0.011)
Tax ²				-0.002 (0.005)			-0.001 (0.001)
L.acc					0.726*** (0.032)	0.720*** (0.034)	0.720*** (0.033)
LT effect					.247	.279	.382
N	1,460	1,460	1,389	1,389	1,437	1,369	1,369
Groups		47	47	47	47	47	47
Adj. R ²	0.040	0.390	0.395	0.395	0.726	0.721	0.721

Source: The author.

Note: the table shows regression results of vertical accountability on tax and non-tax revenue. Except for model (I), all models include country and year fixed effects. Robust standard errors in parentheses, clustered at the country level from model (II) onwards. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. GDPPC = GDP per capita; L.acc = lagged accountability term; LT effect = long-term effect.

In addition, I include a measure for official development assistance (ODA). Aid could have consequences similar to those of other forms of non-tax income. It might lessen the need for taxation, thus reducing the scope for revenue bargaining and governance reform (Moore, 2008). If aid is omitted, this could bias downward the coefficient on taxation. Alternatively, donors might disburse aid strategically to reward democratisation. If aid contributes to domestic resource mobilisation, as suggested by Morrissey (2015), then this implies an upward bias in the tax coefficient when aid is not accounted for. Regardless of the reason, omitting aid would risk biasing the coefficient on tax. Finally, a quadratic term is included for tax revenue to capture potential non-linearities in the relationship between tax and accountability.

The results are relatively stable across the different specifications. All estimations show a positive and significant correlation between tax and accountability. According to the simple OLS, a one percentage point increase in tax

revenue, holding total non-tax revenue constant, is associated with a 0.176 increase in the vertical accountability score. The magnitude of this effect grows when we move to the FE estimator, suggesting that unobserved country-specific or year-specific factors lead to a downward bias in the OLS result. The FE estimate is 0.217 and statistically significant at the 1% level. It increases to 0.358 when all the controls are added. However, since none of the controls are significant, I prefer model II because it is the most parsimonious. In the FE-LDV models, the magnitude of the coefficient decreases to about 0.067, but again it remains statistically significant at the 1% level. This sharp drop is to be expected, as the coefficient in the LDV model corresponds to the short-run effect, while the OLS and FE estimators capture the unrestricted long-term effects (LT effect). The LT effect implied by the FE-LDV model is included at the bottom of the table and can be calculated as:

$$LT\ Effect = \frac{\beta_1}{(1-\gamma)} = 0.247 \quad (7)$$

The importance of this short-term effect is worth underlining, as a number of factors could work against finding any short-run impact at all. Most importantly, rulers could respond to tax bargaining with increased responsiveness in the short term. While there would still be pressures to institutionalise accountability systems to secure this responsiveness over time, this does have the potential to weaken the short-term relationship between tax and accountability. With respect to the control variables, the general absence of any significance is noteworthy, even though the models were not explicitly constructed to examine their impact on accountability. Only the lagged accountability term is consistently significant across the models, implying significant persistence in the accountability measure. More surprising are the estimates on non-tax revenue. While the sign suggests a negative correlation, as predicted by theory, the coefficient is only significant in the OLS model. In contrast to Prichard et al. (2018), the results here do not provide support for a ‘political resource curse’. Furthermore, neither aid nor per capita income levels appear to be significant in any of the specifications. The result on GDP per capita thus goes against the findings of Jensen and Wantchekon (2004) and is more in line with the conclusions by Englebort and Dunn (2013). The point estimate on aid is insignificant and very close to zero, suggesting that there is no relation between aid levels and accountability. Finally, the quadratic term is also insignificant.

The estimates from the preferred specification (II) indicate a long-term impact of taxation on accountability of 0.217 per percentage point increase in the tax-to-GDP ratio. If we take these numbers at face value, they imply that if, for example, Burundi, which had an average tax ratio of 13.71% during the sample period, were to increase its level of tax revenue to that of Swaziland, which had an average rate of 19.98%, Burundi could improve its accountability score by around 1.36 points. Since Burundi’s average accountability score was 47.27 during the sample period, the results suggest that by increasing the tax ratio by about 6.27 points Burundi could reach a level of accountability that is on par with Mozambique (average accountability score 48.63). To reach Botswana’s level of

accountability (average of 61.05), Burundi would have to raise its tax ratio to 50.84%. Another way to look at this is to assess how much of the in-sample increase in accountability can be explained by taxation over the sample period. The average tax ratio increased from 14.04% in 1980 to 16.47% in 2015, or a 2.43 percentage point rise. This translates into an expected 0.52 point increase in the accountability score. On average the accountability score for sub-Saharan Africa improved by 8.33 points over the period. Increases in taxation can thus explain around 6.25% of this improvement.

However, these calculations should be viewed as illustrative only, and not as carrying great precision. Different specifications will give rise to different results, and the simple use of point estimates ignores their underlying standard errors. Moreover, the results from the estimations are average treatment effects and mask possible heterogeneous effects. Finally, the specifications here impose a linear functional form with limited non-linearity.

Overall, the effect appears to be small (discussed in section 7). Nevertheless, regardless of their size, these initial results are consistent with the governance dividend argument. They hold even when accounting for non-tax revenue, which suggests there is more to the argument than the ‘political resource curse’. The evidence here provides explicit support for the taxation side of the coin. Taxation, on its own, is positively linked with accountability in both the short and long term.

5.2 Decomposing the effect of taxation

From the discussion before, the possibility emerged that the relationship between taxation and accountability is not necessarily uniform across different types of taxes. It could depend on the visibility and salience of a tax. For instance, indirect taxes, such as a VAT, were argued to be less visible than direct taxes and therefore less likely to stir up resistance and thus to provoke tax bargaining. However, the many examples of tax resistance to, for example, the introduction of VAT have called this into doubt (Moore, 2004b). Yet, there is likely to be a difference between the

visibility of an announced (major) tax reform and perceptions by taxpayers of the burden of alternative tax rates. The specifications used in this analysis are not set up to capture the effect of an introduction of a tax innovation, like VAT, but rather to capture the effect of a change in the marginal rate. Compared to the latter, the former is more visible and will therefore most likely stir up more resistance. After all, the prices of products and services on the market are continuously varying. So, the question I look at here is whether there is a difference between marginal changes in direct tax rates and indirect rates.

In Table 2 I replace total tax revenue with its main sub-components: direct tax revenue and indirect tax revenue, with the latter comprising revenue from goods and services taxes (GST) and trade tax revenue. All models include country and year fixed effects. Compared to the baseline

models we lose two, and later three, countries due to missing data on the sub-components of tax for Chad, Gabon and Djibouti.

In the first column I include the main sub-components: direct and indirect tax revenue. Contrary to theory, both are significantly and positively related to accountability. From an accountability perspective it does not seem to matter what the source of tax revenue is. However, once I further decompose indirect tax revenue into revenue from GST, which includes VAT revenue, and trade tax revenue, things change. Across all models, direct taxation remains positively linked with accountability scores, with a coefficient estimate ranging between 0.211 and 0.280 in the long-term models and 0.08 in the short-term models. But a difference now appears between GST and trade tax revenue. The coefficient on GST is never

Table 2 Effect of tax sub-components on accountability

	I FE	II FE	III FE	IV FE-LDV	V FE-LDV
Direct tax	0.211* (0.116)	0.280** (0.118)	0.281** (0.131)	0.088** (0.037)	0.087** (0.039)
Indirect tax	0.296*** (0.105)				
Non-tax	-0.014 (0.050)	-0.015 (0.071)	-0.029 (0.085)	-0.002 (0.031)	-0.005 (0.034)
GST		0.135 (0.165)	0.144 (0.166)	0.063 (0.063)	0.064 (0.063)
Trade tax		0.333** (0.134)	0.357** (0.145)	0.085* (0.046)	0.092* (0.048)
GDPPC			0.640 (1.761)		0.012 (0.548)
ODA			0.004 (0.022)		-0.003 (0.011)
L.acc				0.724*** (0.040)	0.721*** (0.041)
N	1,182	1,073	1,046	1,061	1,035
Groups	45	45	44	45	44
Adj. R ²	0.384	0.381	0.371	0.713	0.706

Source: The author.

Note: the table shows regression results of vertical accountability on the different sub-components of taxation. All models include country and year fixed effects. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

statistically significant, whereas the one on trade tax revenue is larger and statistically significant at the 5% level in most models. It appears that indirect taxation, in the form of GST, does not impact accountability in the same way direct taxation does. However, it should be noted that in the underlying data it is not always possible to completely separate GST and trade taxes, as a large part of VAT is collected at the border in many African countries and might be counted as trade tax revenue rather than as GST revenue.

Overall, these results are not as clear cut as some theories might predict. With regard to direct taxation, the picture is clear. The results are consistent with the story that direct taxation is felt particularly hard by taxpayers, who engage in tax bargaining as a consequence. It is less clear for indirect taxation. While on aggregate,

indirect taxes are also positively correlated with accountability scores, there are differences between GST and trade taxes. Consistent with theory, GST does not seem to provoke tax bargaining, showing no association with changes in accountability scores. This supports the idea that direct taxation is more visible to taxpayers than indirect taxation, and therefore has more potential to result in revenue bargaining leading to the institutionalisation of accountability mechanisms. However, the significant impact of trade taxation is intriguing and not easily interpreted. One possibility is that trade taxes are visible to business and large taxpayers and may feature in business lobbying. The implication would be that business can influence the quality of elections and party system. Regardless of the cause, this result warrants further research.

6 Robustness

6.1 Instrumental variable approach

In the previous section the lag of the dependent variable was included to deal with the possibility of reverse causality. However, it does not exclude the possibility of contemporaneous reverse causality. That is, we are not sure that the coefficient on tax is not picking up the simultaneous effect from accountability on taxation. To address this concern I estimate an instrumental variable model as specified in section 3.2. Tax revenue is instrumented using a ToT shock and an exchange rate shock. At the same time, this approach will deal with other time-varying unobservables which might confound the relationship between taxation and accountability.

The results presented in Table 3 include both the first and second stage results, respectively panel B and panel A. The table includes both the standard FE estimates, for reference, and the 2SLS estimates, and this with and without additional controls. The first condition for instrument validity, i.e. that the instruments are significantly related to the endogenous variable, is tested in panel B. Somewhat surprisingly, and in contrast to the findings by Morrissey et al. (2016), the ToT shock does not appear to significantly impact tax revenue. Hence, this instrument does not pass the first validity test. However, the ERPI is strongly related to tax revenue, suggesting a negative impact significant at the 1% level. Moreover, it is not impacted by the inclusion of the controls. Thus, at least one of the instruments

significantly affects the independent variable of interest. This is confirmed by the test statistics. The Kleibergen-Paap F statistic tests the strength of the instruments. I prefer it to the Cragg-Donald Wald statistic because the latter is not valid where the independent and identically distributed (i.i.d.) assumption is violated, as I assumed when I opted for robust standard errors. The reported F statistics are well above the relevant critical values provided by Stock and Yogo (2002). Therefore, I conclude that the first condition is met.

Having established the validity of the instrument, let us now examine the results from the second stage. These results are provided in columns II ad IV, respectively with and without controls, of Panel A of Table 3. Columns I and III, also with and without controls, show the OLS-FE results for comparison. One thing to note is that the sample size decreases when the controls are included. This is due to missing data for two countries: São Tomé and Príncipe and Ethiopia. Overall, I find that taxation positively affects accountability. Again none of the control variables significantly affect accountability. Interestingly, the 2SLS estimates of the coefficients on tax are larger than the OLS-FE estimates, which suggests the OLS-FE is downward biased due to other unobserved time-varying factors. The 2SLS results confirm the positive impact of taxation on accountability scores. Moreover, they suggest a causal interpretation for the relationship between taxation and accountability.

Table 3 2SLS estimation of the effect of taxation on accountability

	I OLS-FE	II 2SLS-OLS	III OLS-FE	IV 2SLS-FE
Panel A: 2SLS estimates				
Total tax	0.217*** (0.072)	0.586** (0.256)	0.193** (0.076)	0.667** (0.296)
Total non-tax	-0.037 (0.051)	0.009 (0.051)	0.025 (0.083)	0.087 (0.071)
GDPPC			-0.173 (1.024)	-1.122 (1.318)
ODA			0.013 (0.029)	0.007 (0.028)
Growth			0.012 (0.025)	0.010 (0.025)
Trade			0.011 (0.010)	0.011 (0.011)
N	1,460	1,177	1,059	1,059
Groups	47	47	45	45
KP F-stat		25.16		24.44
Adj. R2	0.390		0.287	
Panel B: First-stage regression				
ERPI		-1.973*** (0.287)		-1.903*** (0.275)
ToT		0.001 (0.007)		-0.001 (0.008)
Total non-tax		-0.070 (0.093)		-0.132 (0.097)
GDPPC				1.776 (1.591)
ODA				0.014 (0.015)
Growth				-0.004 (0.027)
Trade				0.002 (0.011)

Source: The author.

Note: the table shows 2SLS results of the effect of taxation on accountability. Panel A presents 2SLS estimates instrumenting tax revenue with the exchange rate pressure index and the ToT shock indicator. Panel B presents the corresponding first stage estimates. All models include country and year fixed effects.

Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

6.2 Placebo test – types of accountability

Another concern is that the accountability measure might be correlated with other aspects of governance. If this were the case, then the previous findings would not tell us anything about the relationship between taxation and accountability as they might be picking up taxation's effect on other governance indicators. To address this concern I regress taxation on three other indicators related to accountability: diagonal, horizontal and judicial accountability. Precise definitions of the alternative measures are given in Table B2 in the Appendix, but they can be roughly defined as follows: diagonal accountability captures oversight by civil society organisations and media activity; horizontal accountability refers to checks and balances between institutions; and judicial accountability is a measure of the extent to which the judiciary is held to account. These indices are all measured on the same scale as the vertical accountability index and also come from the V-DEM dataset.

This procedure can be thought of as a placebo test. These accountability measures are highly correlated, as illustrated in Table B4 in the Appendix. However, if the hypothesis is correct, then the relationship between taxation and governance should operate through its effect on vertical accountability, i.e. between citizen and state, not through the other types. The results from the alternative measures are collected in Table 4. The reported estimates are based on the parsimonious FE-LDV model to allow for the fact that there is significant persistence in most governance indicators. As before, standard errors are robust to heteroskedasticity and are clustered at the country level. All estimates, except for the one for vertical accountability, are close to zero and statistically insignificant. As expected there does appear to be significant persistence in all accountability measures. The key message here is that taxation is not significantly correlated with any of the other governance measures, only with vertical accountability. This is consistent with the theoretical predictions and addresses the concern that our previous estimates might have been biased due to correlation between the dependent variable and other governance indicators.

Table 4 Effect of taxation on different accountability measures

	I Vertical	II Diagonal	III Horizontal	IV Judicial
Tax	0.067*** (0.021)	-0.001 (0.011)	0.006 (0.012)	-0.006 (0.014)
Non-tax	-0.011 (0.018)	-0.002 (0.009)	-0.022 (0.028)	-0.028 (0.019)
L.vertical acc.	0.726*** (0.032)			
L.diagonal acc.		0.914*** (0.012)		
L.horizontal acc.			0.843*** (0.013)	
L.judicial acc.				0.888*** (0.015)
N	1,437	1,437	1,437	1,437
Groups	47	47	47	47
Adj. R2	0.726	0.940	0.833	0.773

Source: The author.

Note: the table shows regression results of the effect of tax and non-tax revenue on different types of accountability. All models include country and year fixed effects. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

6.3 Sensitivity checks

I perform a number of sensitivity checks to assess the robustness of the relationship between taxation and accountability. All of these tests are reported in the Appendix to this paper. Specifically, I show that the results are qualitatively unchanged when:

1. I re-estimate Table 1 using five-year averages to address the possible effect of cycles in Table C1
2. I re-estimate Table 2 using five-year averages to address the possible effect of cycles in Table C2
3. I use lagged values for tax and non-tax revenue in Table C3
4. I drop one country at a time to assess the impact of potential outliers in Table C4
5. I replace total non-tax revenue with total resource rents as a proxy for unearned income in Table C5
6. I replace the year fixed effects with a linear and quadratic time trend to capture the trend in accountability scores in Table C6.

7 Putting tax bargaining into perspective

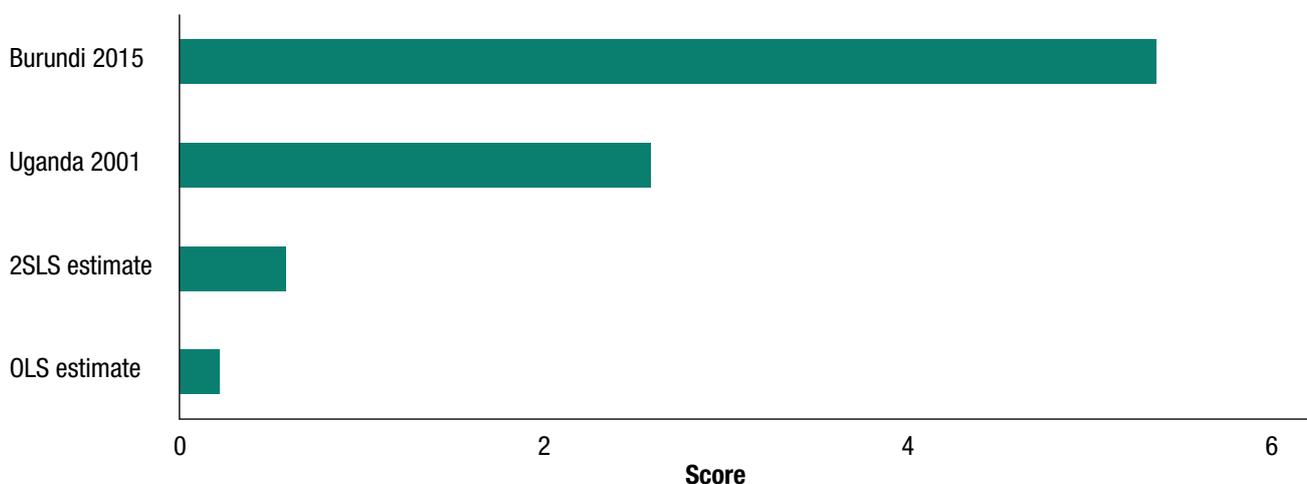
The estimated effect of taxation on accountability scores found in the previous sections might appear rather modest in size, posing questions about the relevance of taxation for accountability. However, it is difficult to meaningfully interpret these magnitudes. Therefore, this section attempts to put them into context by first comparing them to country-specific political events and subsequent accountability changes, and second by comparing them with predictions yielded by alternative theories.

7.1 A small-N perspective

In 2015 Burundi's vertical accountability index dropped markedly. Its components for free and fair ('clean') elections and space for opposition parties were hit particularly hard. On 25 April 2015 the incumbent president of Burundi, Pierre

Nkurunziza, announced his intention to run for a contested third term in the 2015 presidential elections. The announcement sparked a prolonged period of popular protests which were violently repressed. A coup attempt followed, but failed. Yet, the violence continued. Despite the widespread opposition both within and outside his party, Nkurunziza ultimately succeeded with his third-term bid (Daley and Popplewell, 2016). However, the elections were far from free and fair. The United Nations concluded that 'freedoms of expression, assembly and association, essential conditions for the effective exercise of the right to vote, remained severely impaired' (MENUB, p.1, 2015a), and that overall the elections took place in 'a climate of widespread fear and intimidation' (MENUB, p.1, 2015b). These events are clearly captured by Burundi's accountability index, which dropped by more than five points, as shown in Figure 4.

Figure 4 Absolute changes in accountability scores



Source: The author based on own calculations and Coppedge et al. (2017)

Note: this figure shows the absolute changes in the vertical accountability scores of Burundi and Uganda, after respectively its 2015 political crisis and its 2001 elections. It also includes the estimated effects from the baseline FE and 2SLS models.

In 2001 Uganda's index also fell significantly. In 2000 the country *formally* abandoned its multi-party system and held elections on a no-party basis in the following year. Party activities became subject to strict limitations, but Uganda's main political party, the National Resistance Movement, did not go as far as to entirely forbid political opposition. Minor political organisations were allowed a minimal presence as long as they did not constitute an effective challenge to the ruling Movement organisation (Carbone, 2003). Nevertheless, this tightening of the political space implies a clear reduction in opportunities for political participation. The scope for citizens to hold governments to account thus decreased, as is noticeable in Uganda's vertical accountability score, which dropped by nearly three points. As was the case for Burundi, the underlying components which were most affected were the ones related to 'clean' elections.

These cases illustrate two things. First, they re-affirm the conceptual validity of the accountability measure. Second, they give a sense of magnitude. Figure 4 compares the absolute changes in the accountability scores of Burundi and Uganda with the estimated effect of taxation on accountability. Both the baseline results and the 2SLS result are included, respectively a 0.217 and a 0.667 point increase in the accountability score per percentage point increase in the tax ratio. Clearly, the effect of the political events in the selected countries had a major impact. In comparison, the effect of taxation is very modest in size. Simply taking the 2SLS estimates at face value, Burundi would have to increase its tax ratio by nine percentage points to offset the negative impact of the 2015 political crisis. The equivalent increase for Uganda is four percentage points. However, comparing country-specific events with an econometric cross-country result is not entirely fair. It is worth emphasising that the estimated effects are *average* effects and that their confidence intervals are not taken into account. These estimates might hide important

cross-country heterogeneity (something not examined in this paper). Moreover, they remain blind to the contextual factors that shape country-specific events (Prichard, 2015). Therefore, a more informative exercise is comparing the explanatory power of tax bargaining to that of alternative explanations in a large-N context.

7.2 A large-N perspective

Using additional data but relying on the same empirical model as before, I estimate the respective impacts of alternative predictors of accountability. This large-N perspective serves a dual purpose. First, it is an additional check for omitted variable bias. If the accountability effect of taxation remains unchanged after the inclusion of the alternative predictors, then we can be confident that our coefficients in the baseline model are not driven by a failure to take these into account. Second, it allows us to better assess the magnitude of the effect of taxation on accountability.

Given the lack of empirical studies on the determinants of accountability, I borrow from the broader literature on the determinants of democracy instead. The aim is not to provide a complete comparison of all possible determinants of accountability, but rather to put the effect coming from tax bargaining into perspective.

While not uncontested,⁶ Lipset's modernisation theory (1959) remains one of the most prominent theories of democratisation.⁷ He argues that democracy unfolds as countries move up the socio-economic ladder. Economic growth facilitates social and cultural change through, for example, industrialisation and urbanisation (Inglehart and Welzel, 2010). In turn this is said to culminate in the emergence of a broad middle class demanding political participation. The presence of GDP per capita in our empirical specification already captures the modernisation argument to an extent. However, it has been suggested that it is not the level of economic

6 In particular, the direction of the causality between democracy and economic development has been subject to intense scholarly debate (Przeworski et al., 2000; Boix, 2003; Persson and Tabellini, 2009; Acemoglu et al., 2014).

7 Note that some alternative theories, such as structural explanations of democracy pointing to the importance of country size and colonial heritage are accounted for through the fixed effects.

development that matters but rather the growth rate of the economy (Diamond, 1992). Therefore, economic growth is included as well in addition to the urbanisation rate.

Another important mechanism through which socio-economic development impacts democratisation is education. Education is not only hypothesised to instil democratic values into people's minds, but also to raise the benefits of political participation (Glaeser et al., 2007). However, the empirical evidence on this link is ambiguous (Barro, 1999; Evans and Rose, 2012; Teorell, 2010), and appears to be highly sensitive to specification choices (Acemoglu et al., 2005). Nevertheless, I include a measure for the average number of years of education among citizens older than 15.

As already mentioned, class struggle is an important factor in Lipset's theory of democratisation. Although it is still debated whether it is the working class rather than the middle class that drives democratisation (Collier and Gunning, 1999; Rueschemeyer et al., 1992), economic inequality has been linked with democratisation (Boix, 2003). Sokoloff and Engerman (2000) argue that in societies that began with greater degrees of inequality, elites institutionalised this inequality by setting up exclusive political institutions. However, Acemoglu and Robinson (2000) point out that this relationship is more complex as elites also have an incentive to extend the franchise to prevent social unrest. In turn, decreasing inequality can foster citizenship thereby strengthening democratic values (Pereira, 2015). Teorell (2010), however, does not find inequality to have been a significant predictor of democratisation during the third wave. Yet, I include a measure for the distribution of resources in society.

Finally, a vibrant civil society also plays an important role in Lipset's argument. It not only 'trains in the skills of politics' but it also 'helps increase the level of interest and participation in politics' (Lipset, 1959: 84). Furthermore, it serves to check the power of the state (Teorell, 2010). Media proliferation is particularly important in this regard as it enhances the government's

responsiveness by improving the flow of information (Besley and Burgess, 2001). Yet, the media itself is not a fundamental determinant of democracy, as a strong media is unlikely to emerge under authoritarian conditions. However, once a level of democracy is established, the presence of a strong media will increasingly safeguard the democratic process (Teorell, 2010). Nevertheless, a measure for how routinely the major print and broadcast media criticise the government is included into the empirical specification.

Measures for each of the four mechanisms are introduced separately in a regression based on equation 1. The control variables from the baseline specification, non-tax revenue, aid and per capita GDP, are retained. I also run a regression including all predictors together. All predictors are standardised in the sense that they represent deviations from the mean divided by the standard deviation. This ensures that the estimated coefficients can be directly compared, but they have to be interpreted in terms of standard deviations.

Table 5 contains the results. First to note is that the coefficient estimate on taxation is positive and highly significant. This suggests that the previous estimations were not biased by omitted variable bias. According to the full model in column IV, a one standard deviation in taxation increases accountability by 0.231 points. Looking at the other variables, there appear to be relatively few statistically significant predictors of accountability. In line with the literature on democratisation, the growth and media variables are significantly and positively related with accountability scores. However, the coefficient estimate on education is significant but negative. While studies have found negative estimates before, they were never statistically significant (Acemoglu et al., 2005; Teorell, 2010). This result is therefore somewhat puzzling. Two possible explanations arise. Either we should not read too much into this coefficient as it might be a statistical artefact, or the mechanisms linking democracy and education might differ from the ones linking accountability and education. Either way this warrants further research.

Table 5 Effect of taxation on accountability in comparative perspective

	I	II	III	IV
Tax	0.279*** (0.066)	0.271*** (0.071)	0.259*** (0.069)	0.231*** (0.068)
Non-tax	-0.060 (0.050)	-0.021 (0.040)	-0.013 (0.032)	-0.031 (0.036)
ODA	0.036 (0.045)	0.029 (0.040)	0.006 (0.037)	-0.002 (0.037)
GDPPC	0.095 (0.155)	0.008 (0.141)	0.180 (0.131)	0.188 (0.158)
Urban pop.	0.109 (0.310)			0.099 (0.193)
Growth	0.034* (0.020)			0.038** (0.018)
Education	-0.395* (0.214)			-0.251* (0.149)
Equality		0.095 (0.178)		0.113 (0.149)
Critical media			0.510*** (0.095)	0.536*** (0.098)
N	1,258	1,389	1,389	1,258
Groups	47	47	47	47
Adj. R2	0.382	0.397	0.501	0.501

*Note: the table shows regression results of vertical accountability on tax and indicators of alternative theories. In order to make the estimates comparable, all regressors are standardised in the sense that they represent deviations from the mean divided by the standard deviation. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.*

In terms of magnitudes, the sizes of the significant coefficients differ. The largest correlation is observed for the variable measuring the extent to which media are critical of the government, as also found by Teorell (2010). It suggests that a one standard deviation in this measure increases the accountability score by 0.536. Economic growth on the other hand seems to have a much smaller effect. Here, a one standard deviation improves the accountability score by 0.04. The estimated effect for taxation sits in between these two, and is roughly comparable to the effect of education, albeit in the opposite direction. Thus, while taxation's effect on accountability might appear modest at first, it is not insignificant, neither statistically nor when compared to the magnitude of alternative predictors.

8 Conclusion

This paper started with the observed link between taxation and calls for improved governance and accountability in Ghana. According to the tax bargaining argument, taxation and governance are linked. In their quest for revenue, governments directly or indirectly have to negotiate with taxpayers to secure quasi-voluntary tax compliance. In return for their compliance, taxpayers demand scrutiny over how their money is raised and spent. This bargaining process will, over time, make the ruler more responsive to taxpayers' needs, but will also give rise to accountability mechanisms institutionalising this responsiveness.

However, while this link is well-established historically, particularly for western countries, the validity of the argument has been put in doubt for contemporary developing countries. The context in which they find themselves now differs significantly from those that western countries faced in the past, the argument goes. Contemporary developing countries have access to alternative sources of funding such as resource revenue and development aid as well as to a larger set of tax policy tools. Since taxpayers must 'feel' the tax burden, the use of less salient taxes could potentially undermine the state-building function of taxation.

The purpose of this paper has been straightforward. With a panel dataset of 47 African countries and relying on new governance data, it has checked whether increased taxation correlates with improved accountability in sub-Saharan Africa. The findings confirm that taxation is still positively linked with accountability levels in contemporary developing countries. Moreover, by instrumenting tax revenue with ToT and exchange rate shocks, it gives a causal interpretation to this relationship. In addition, when taxation has been decomposed,

the evidence suggests that the effect on accountability is heterogeneous across the main sub-components of taxation. Direct taxation is found to have the most consistent governance effect, while no evidence has been found for an effect from taxes on goods and services.

From a policy perspective this is good news, as many donor agencies have appealed to the state-building narrative in their recent shift to domestic resource mobilisation. This paper presents evidence in support of that position. However, although both direct and indirect taxes are positively linked with accountability, the picture changes slightly when indirect taxation is decomposed. Goods and service taxation, which includes VAT, is not found to have an effect. Given the cross-classification of VAT in some countries, this evidence is merely suggestive. Nevertheless, it does raise questions about the governance dividend that can be expected. On the contrary, the potential contribution to state-building from direct taxation seems large. Yet, it receives far less international attention.

There are, however, limitations to this study. The evidence points to a clear link between tax and accountability *on average* across sub-Saharan Africa. The link is not guaranteed in each individual case. Moreover, the paper has not explored the mechanisms through which this link flows, has it established the necessary conditions which have to be in place. Prichard's (2015) work is more informative in this regard. Yet, it is constrained by its small-N context. Exploring these mechanisms and conditions in more detail and validating them in a large-N framework remains work for the future. Nevertheless, the findings in this paper do support the core of the argument. A governance dividend from taxation is still possible today.

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Appendix A

List of Countries

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Rep. of Congo, Dem. Rep. of Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Appendix B Data

Table B1 Summary statistics

Variable	Mean	Std. dev.	Min.	Max.	N
Accountability	51.51	7.21	35.43	65.15	1,687
Total tax	14.68	8.12	0.60	54.31	1,528
Total non-tax	3.70	5.04	0	46.48	1,485
Direct tax	4.94	3.94	0.12	28.11	1,228
Indirect tax	9.35	5.27	0.47	43.32	1,313
GST	4.73	3.05	0	16.80	1,210
Trade tax	4.50	4.54	0.03	36.41	1,244
Diagonal accountability	52.43	7.91	32.50	66.45	1,687
Horizontal accountability	49.11	8.30	29.65	66.03	1,687
Judicial accountability	50.34	10.18	25.78	71.83	1,687
Voice and accountability	37.75	14.6	6.48	70.49	797
GDPPC	1801.14	2,680.56	115.79	20,333.94	1,619
ODA	12.25	12.76	-0.26	181.10	1,575
Exchange rate	4,021,461.00	164,417,600.00	0	6,723,052,073.00	1,672
Reserves	1,520,794,147.00	5,565,650,748.00	-628,535.00	53,599,283,557.00	1,454
ToT	116.57	44.29	21.40	357.58	1,582
Growth	1.31	7.58	-50.23	140.50	1,571
Trade	74.53	47.42	6.32	531.74	1,518
Education	6.09	0.63	4.00	8.00	1,674
Urban population	34.19	16.11	4.34	87.16	1,688
Equality	54.58	2.20	50.38	59.02	1,687
Critical media	51.06	12.44	17.83	78.63	1,687
Natural resource rents	12.4	12.94	0	89.17	1,610

Table B2 Variable definitions and sources

Variable name	Definition	Source
Vertical accountability	Vertical accountability captures the extent to which citizens have the power to hold the government accountable through elections and participation in political parties.	V-DEM
Total tax revenue	Total tax revenue excluding social contributions. Expressed as a percentage of GDP.	GRD
Total non-tax revenue	Total non-tax revenue, excludes ODA grants. Expressed as a percentage of GDP.	GRD
Direct tax revenue	Total direct taxes excluding social contributions, calculated as the sum of taxes on income, profits and capital gains, taxes on payroll and workforce and property tax. Expressed as a percentage of GDP.	GRD
Indirect tax revenue	Total indirect tax revenue. Includes taxes on goods and services, taxes on international trade and other taxes. Expressed as a percentage of GDP.	GRD
Goods and services tax revenue	Total taxes on goods and services. Expressed as a percentage of GDP.	GRD
Trade tax revenue	Total taxes on international trade. Expressed as a percentage of GDP.	GRD
Diagonal accountability	Diagonal accountability covers the range of actions and mechanisms that citizens, civil society organisations, and an independent media can use to hold the government accountable.	V-DEM
Horizontal accountability	Horizontal accountability concerns the power of state institutions to oversee the government by demanding information, questioning officials and punishing improper behaviour. This form of accountability ensures checks between institutions and prevents the abuse of power.	V-DEM
Judicial accountability	Judicial accountability refers to the extent to which judges are found responsible for serious misconduct.	V-DEM
World Bank voice and accountability	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	WDI
GDP per capita	GDP per capita is the gross domestic product divided by the population. Data are in constant 2010 US dollars.	WDI
ODA	Net ODA consists of disbursements of loans made on concessional terms and grants. Expressed as a percentage of gross national income.	WDI
Exchange rate	Official exchange rate determined by national authorities or determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the US dollar).	WDI
Reserves	Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities.	WDI
Terms of trade index	Net barter terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000.	WDI
Growth	Economic growth rate. Calculated as the percentage change in GDP per capita (constant 2010 US dollar).	WDI
Trade	Trade volume (imports plus exports) as a share of GDP.	WDI
Education	Average years of education among citizens older than 15.	V-DEM
Urban population	Urban population refers to people living in urban areas. Expressed as a percentage of the total population.	WDI
Equality	The equal distribution of resources index measures the extent to which resources – both tangible and intangible – are distributed in society.	WDI
Critical media	Measures how routinely the major print and broadcast media criticise the government.	WDI
Natural resource rents	Total natural resource rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. Expressed as a percentage of GDP.	WDI

Note: WDI = World Bank Development Indicators.

Table B3 Composition of the vertical accountability index

Category	Variable	Name	Description
Indicators	Electoral regime index	v2x_elecreg	At this time, are regularly scheduled elections on course, as stipulated by election law or well-established precedent?
	Percent suffrage	v2elsuffrage	What percentage of adult citizens has the legal right to vote in national elections?
	Elected chief executive	HoEel	Is the chief executive (head of state or head of government) directly elected in multi-party elections, or by directly elected parliament?
Clean elections	Election Management Body (EBM) autonomy	v2elembaut	Does the EMB have autonomy from government to apply election laws and administrative rules impartially in national elections?
	EMB capacity	v2elembcap	Does the EMB have sufficient resources to administer a well-run national election?
	Election voter registry	v2elrgstry	In this national election, was there a reasonable accurate voter registry in place and was it used?
	Election other voting irregularities	v2elirreg	In this national election, was there evidence of other intentional irregularities by incumbent and/or opposition parties, and/or fraud?
	Election government intimidation	v2elintim	In this national election, were opposition candidates/parties/ campaign workers subjected to repression, intimidation, violence, or harassment by the government, the ruling party, or their agents?
	Election free and fair	v2elfrfair	Taking all aspects of the pre-election period, election day, and the post-election process into account, would you consider this national election to be free and fair?
	Elections multi-party	v2elmulpar	Was this national election multi-party?
Political parties	Party ban	v2psparban	Are any parties banned?
	Barriers to parties	v2psbars	How restrictive are the barriers to forming a party?
	Opposition parties' autonomy	v2psoppaut	Are opposition parties independent and autonomous of the ruling regime?

Note: the vertical accountability index was created using Bayesian structural equation models with measures for (1) having clean elections, (2) the percentage of the enfranchised population, (3) the way in which the chief executive is elected and (4) the quality of the party system. The clean elections variable is a function of the dichotomous indicator of the presence of elections which is weighted by the seven measures of clean elections. The quality of the party system is a function of the three political party variables. For more details see Lührmann et al. (2017).

Table B4 Correlation matrix of accountability indicators

	Vertical	Diagonal	Horizontal	Judicial
Vertical	1			
Diagonal	0.798	1		
Horizontal	0.747	0.782	1	
Judicial	0.386	0.431	0.504	1

Appendix C Robustness

Table C1 Effect of taxation on accountability using five-year averages

	I OLS	II FE	III FE	IV FE	V FE-LDV	VI FE-LDV	VII FE-LDV
Tax	0.170*** (0.048)	0.238*** (0.081)	0.284*** (0.069)	0.330 (0.223)	0.187*** (0.060)	0.202*** (0.061)	0.193 (0.170)
Non-tax	-0.092 (0.076)	-0.069 (0.084)	-0.043 (0.098)	-0.046 (0.099)	-0.032 (0.062)	-0.021 (0.076)	-0.021 (0.075)
GDPPC			0.298 (1.054)	0.296 (1.047)		0.574 (0.682)	0.575 (0.685)
ODA			0.033 (0.042)	0.032 (0.042)		0.032 (0.032)	0.032 (0.033)
Tax ²				-0.001 (0.006)			0.000 (0.004)
L.acc					0.418*** (0.052)	0.400*** (0.056)	0.400*** (0.057)
LT effect					.321	.336	.321
N	306	306	293	293	270	263	263
Groups		47	47	47	47	47	47
Adj. R2	0.035	0.484	0.498	0.496	0.596	0.580	0.578

Note: the table shows regression results of vertical accountability on tax and non-tax revenue using five-year averages. Except for model (I), all models include country and period fixed effects. Robust standard errors in parentheses, clustered at the country level from model (II) onwards. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Table C2 Effect of tax components on accountability using five-year averages

	I FE	II FE	III FE	IV FE-LDV	V FE-LDV
Direct tax	0.190** (0.094)	0.260*** (0.092)	0.246** (0.109)	0.209* (0.111)	0.162 (0.131)
Indirect tax	0.264* (0.139)				
Non-tax	-0.055 (0.068)	-0.021 (0.087)	-0.041 (0.096)	0.018 (0.064)	-0.005 (0.078)
GST		0.029 (0.224)	0.103 (0.217)	0.198 (0.156)	0.206 (0.167)
Trade tax		0.340* (0.171)	0.340* (0.173)	0.281** (0.125)	0.293** (0.139)
GDPPC			0.278 (1.498)		1.092 (1.109)
ODA			0.008 (0.041)		0.010 (0.024)
L.acc				0.335*** (0.075)	0.334*** (0.075)
N	264	245	238	221	219
Groups	45	45	44	45	44
Adj. R2	0.481	0.491	0.466	0.548	0.537

Note: the table shows regression results of vertical accountability on the different sub-components of taxation using five-year averages. All models include country and period fixed effects. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Table C3 Effect of tax on accountability using lags

	I Lags, 0	II Lags, 1	III Lags, 3	IV Lags, 5
Tax	0.217*** (0.072)	0.215*** (0.066)	0.185*** (0.056)	0.162*** (0.051)
Non-tax	-0.037 (0.051)	-0.056 (0.047)	-0.051 (0.037)	-0.003 (0.033)
N	1,460	1,427	1,346	1,259
Groups	47	47	47	47
Adj. R2	0.390	0.383	0.361	0.334

Note: the table shows regression results of vertical accountability on the lags of tax and non-tax revenue. All models include country and year fixed effects. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.10$.

Table C4 Effect of tax on accountability excluding one country at a time

Excluded	Coeff.	Std. Error	p-value	
Angola	0.218	0.081	0.010	***
Benin	0.215	0.072	0.005	***
Botswana	0.219	0.072	0.004	***
Burkina Faso	0.205	0.072	0.007	***
Burundi	0.233	0.070	0.002	***
Cameroon	0.219	0.072	0.004	***
Cape Verde	0.218	0.073	0.004	***
Central African Republic	0.219	0.072	0.004	***
Chad	0.215	0.074	0.006	***
Comoros	0.217	0.072	0.004	***
Congo, Dem. Rep.	0.201	0.070	0.006	***
Congo, Rep.	0.230	0.083	0.008	***
Cote d'Ivoire	0.217	0.072	0.004	***
Djibouti	0.214	0.072	0.005	***
Equatorial Guinea	0.215	0.073	0.005	***
Eritrea	0.218	0.072	0.004	***
Ethiopia	0.217	0.072	0.004	***
Gabon	0.221	0.073	0.004	***
Gambia, The	0.212	0.071	0.005	***
Ghana	0.190	0.069	0.008	***
Guinea	0.229	0.074	0.003	***
Guinea-Bissau	0.212	0.072	0.005	***
Kenya	0.217	0.072	0.004	***
Lesotho	0.185	0.072	0.013	**
Liberia	0.240	0.070	0.001	***
Madagascar	0.213	0.071	0.005	***
Malawi	0.221	0.072	0.004	***
Mali	0.212	0.073	0.006	***
Mauritania	0.224	0.072	0.003	***
Mauritius	0.212	0.071	0.005	***
Mozambique	0.203	0.073	0.008	***
Namibia	0.213	0.073	0.006	***
Niger	0.216	0.073	0.005	***
Nigeria	0.214	0.072	0.005	***
Rwanda	0.222	0.071	0.003	***
Sao Tome and Principe	0.216	0.074	0.006	***
Senegal	0.221	0.072	0.004	***
Seychelles	0.225	0.073	0.004	***
Sierra Leone	0.222	0.073	0.004	***
South Africa	0.215	0.073	0.005	***
Sudan	0.213	0.071	0.004	***
Swaziland	0.256	0.064	0.000	***
Tanzania	0.217	0.072	0.004	***
Togo	0.229	0.073	0.003	***
Uganda	0.223	0.073	0.004	***
Zambia	0.221	0.073	0.004	***
Zimbabwe	0.209	0.077	0.009	***

Note: the table shows the regression result of vertical accountability on total tax revenue. The regressions also include non-tax revenue, as well as country and time fixed effects, and excluded one country at a time. The standard errors were clustered at the country level.

*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Table C5 Effect of tax on accountability controlling for resource rents

	I OLS	II FE	III FE	IV FE	V FE-LDV	VI FE-LDV	VII FE-LDV
Tax	0.145*** (0.023)	0.201*** (0.070)	0.224*** (0.062)	0.340 (0.210)	0.058*** (0.019)	0.064*** (0.017)	0.100** (0.049)
Res. rents	-0.117*** (0.014)	0.003 (0.033)	-0.015 (0.032)	-0.011 (0.033)	0.000 (0.010)	-0.004 (0.010)	-0.002 (0.010)
GDPPC			0.118 (1.073)	0.100 (1.042)		-0.095 (0.293)	-0.100 (0.287)
ODA			0.010 (0.033)	0.009 (0.032)		0.001 (0.011)	0.001 (0.011)
Tax				-0.003 (0.005)			-0.001 (0.001)
L.acc					0.745*** (0.030)	0.738*** (0.031)	0.737*** (0.030)
LT effect					.228	.245	.379
N	1,473	1,473	1,431	1,431	1,445	1,405	1,405
Groups		47	47	47	47	47	47
Adj. R2	0.077	0.397	0.403	0.404	0.742	0.738	0.738

Note: the table shows regression results of vertical accountability on tax and non-tax revenue. Non-tax revenue is proxied by total natural resource rents. Except for model (I), all models include country and year fixed effects. Robust standard errors in parentheses, clustered at the country level from model (II) onwards. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Table C6 Effect of taxation on accountability including time trends

	I FE	II FE	III FE	IV FE-LDV	V FE-LDV	VI FE-LDV
Tax	0.220*** (0.072)	0.262*** (0.064)	0.342* (0.198)	0.068*** (0.021)	0.081*** (0.020)	0.102* (0.051)
Non-tax	-0.046 (0.044)	-0.037 (0.053)	-0.038 (0.052)	-0.015 (0.016)	-0.009 (0.018)	-0.009 (0.018)
GDPPC		0.112 (0.929)	0.109 (0.911)		-0.047 (0.301)	-0.047 (0.298)
ODA		0.017 (0.019)	0.017 (0.019)		0.008 (0.011)	0.008 (0.011)
Tax2			-0.002 (0.005)			-0.000 (0.001)
L.acc				0.726*** (0.032)	0.717*** (0.034)	0.717*** (0.034)
Trend	33.467** (13.089)	40.807*** (14.187)	41.668*** (14.448)	14.772*** (4.459)	15.972*** (4.942)	16.211*** (4.859)
Trend2	-0.008** (0.003)	-0.010*** (0.004)	-0.010*** (0.004)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
LT effect				.250	.285	.359
N	1,460	1,389	1,389	1,437	1,369	1,369
Groups	47	47	47	47	47	47
Adj. R2	0.366	0.378	0.378	0.719	0.714	0.714

Note: the table shows regression results of vertical accountability on tax and non-tax revenue. The estimation includes a linear and quadratic time trend instead of year fixed effects. Except for model (I), all models include country fixed effects. Robust standard errors in parentheses, clustered at the country level. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.



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