Quality of sub-national government and regional development in Africa

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Abstract

Despite widespread interest in government quality and economic development, the role of sub-national government has been largely overlooked. This represents an omission in Africa, given ongoing processes of devolution in much of the continent. In this article, we consider the impact of sub-national government institutions on economic development in 356 regions across 22 African countries. We create a novel index of sub-national government quality based on large-scale survey data and assess its impact on regional economies using satellite data on night light luminosity. To address causality concerns, we instrument sub-national government quality with data from pre-colonial societies. Our results show a positive and significant relationship between sub-national government quality and regional economic development, even when controlling for the quality of national level institutions. Better sub-national governments are a powerful but often overlooked determinant of development in Africa.

Keywords: Institutions, quality of government, regions, Africa, decentralisation

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1. Introduction

Quality of government (QoG) – sometimes defined as "the impartiality of institutions that exercise government authority" (Rothstein and Teorell, 2008: 165) – is increasingly seen as important for economic development. Higher quality government implies better provision of public goods, improved processes of resource allocation, and more efficient democratic processes (La Porta et al., 1999). It may improve trust in government, ensure the effective rule of law, and increase social capital (Rothstein, 2003). Based on these ideas, a series of studies have found that quality of government matters at a national level (e.g. Acemoglu et al. 2001; Easterly, 2001; Rodrik et al., 2004; Rothstein, 2011; Acemoglu and Robinson, 2012), and policymakers have launched a host of initiatives aiming to improve governance (Langbein and Knack, 2010).

The vast majority of studies on quality of government have focused on national government. Sub-national or regional government quality has attracted far less attention. However, in recent years a smaller subset of research has increasingly sought to investigate how sub-national governments affect geographical differences in economic output and regional economic performance, using new indicators to measure sub-national government quality (e.g. Charron et al., 2014). A series of studies have considered variations in quality of sub-national government, finding it plays an important role in explaining sub-national differences in economic performance in Europe (Rothstein et al., 2013; Charron et al., 2014; Rodríguez–Pose and Garcilazo, 2015; Crescenzi et al., 2016) and China (Cai and Treisman, 2005; Cole et al., 2009; Rodríguez–Pose and Zhang, 2019).

However, research on sub-national government quality has mainly focused on Europe and Asia.[1] The rest of the world – especially the developing world – remains a black box. There has been a dearth of studies examining how local and regional institutions shape economic performance in Africa. This is a surprising omission for two reasons. First, sub-national government institutions have historically played an important role in African countries. The colonial history of many African states involved forms of 'indirect rule' that empowered local state apparatuses to govern on behalf of colonial empires (Mamdani, 1996a). This created "a dependent but autonomous system of rule, one that combined accountability to superiors with a flexible response to the subject population, a capacity to implement central directives with one to absorb local shocks" (Mamdani, 1996a: 60). Given the scholarship

which demonstrates how institutional culture persists over time, it is important to further investigate the role of modern-day sub-national institutions (Tabellini, 2008; North, 1990; Young, 1994; La Porta et al., 1999; Acemoglu and Robinson, 2012). Second, over the past two decades, many African states have been undergoing an accelerated process of devolution (see Bratton, 2012; Erk, 2015). While the experience of different African states has been diverse (e.g. Snyder, 2001; Olowu, 2003), sub-national governments have become increasingly responsible for driving the development agenda in many African countries. This has raised concerns that variations in the performance of sub-national governments can create significant inequalities in economic outcomes (Wilfart, 2018).

Notwithstanding this importance of sub-national government institutions in much of Africa, there is little quantitative evidence on their importance for economic development. This paper addresses this gap. It produces for the first time a sub-national government quality index for many regions in Africa. The index, constructed using Afrobarometer survey data, covers 356 regions in 22 countries across Africa. This is then used to estimate the impact of sub-national government quality on regional GDP, as measured by satellite images of night time luminosity – an increasingly used proxy for GDP, which overcomes data availability issues and avoids problems of data comparability between states (see Henderson et al., 2011). To overcome any issues of endogeneity, and to establish a causal relationship between government quality and economic performance, we use data on the political decentralisation of pre-colonial African societies as an instrument for modern day sub-national government quality.

Our analysis shows a positive and significant relationship between sub-national government quality and differences in regional wealth in African countries. The findings are robust to a large set of controls including geography, topography, natural resources, central government quality, infrastructure, FDI, and education levels. One concern is that better economic performance may influence sub-national quality of government. However, the relationship we identify seems to be causal, as the results hold in instrumental variable (IV) regressions. Given that these results exist independently of national government quality, we argue for a greater focus on the role of sub-national government institutions in economic development, particularly given ongoing processes of devolution.

The rest of the paper is structured as follows. Section 2 reviews the literature examining the relationships between government quality and economic development, with a focus on Africa. Section 3 provides an overview of the data, and Section 4 presents some descriptive analysis, while section 5 provides the results of our regression models. In Section 6 a range of robustness tests are undertaken, and we conclude in Section 7.

2. Quality of sub-national government and economic development in Africa

The importance of national government institutions – particularly government quality – for economic development has become widely researched (e.g. La Porta et al., 1999; Rothstein and Teorell, 2008; Rothstein, 2011). In line with most of this literature, this paper's conceptualisation of 'government institutions' refers to the official architecture of government agencies, bureaucratic structures and personnel. This architecture is responsible for delivering services and creating and enforcing the rules and incentives that shape political, social and economic interaction. While a number of African countries and regions may have formal non-governmental institutions, such as ethnic tribes or kingdoms (e.g. Uganda's Buganda Kingdom) that have some governance functions, we do not include these in our definition of present-day 'sub-national government institutions'.

Our definition of 'quality of government' builds on Rothstein and Teorell (2008). According to them, government quality involves impartiality in the exercise of public authority. Impartiality is understood as a procedural norm which is separate to the development and content of policies. A government with good quality can be thought of as possessing low levels of corruption, high levels of trust and accountability to its citizens, and as able to deliver services effectively. Therefore, while democracy is important for government quality, it is not a synonym for it.

The emerging consensus is that national-level government institutions have played, and will continue to play, a fundamental role in explaining variations in national economic development (Knack and Keefer, 1995; Mauro, 1995). This is because governments are responsible for protecting property rights, meeting the needs of their people by providing basic public services, and preserving the rule of law. These three elements, when taken together, are responsible for creating the overall environment for economies to prosper (Acemoglu et al., 2005). Thus, if formal government institutions only protect the property

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rights of a small elite, then investment and participation from other groups may be disincentivised or crowded out (Acemoglu and Robinson, 2005). These issues can then compound and result in pervasive corruption, rent-seeking, insider-outsider problems, clientelism, nepotism and, subsequently, culminate in an overwhelming reduction in economic activity (Rodríguez-Pose & Storper, 2006).

Some, however, have been less convinced about the role of government institutions in explaining variations in economic development. For example, Glaeser et al. (2004) argue that human capital matters more than institutions, as authoritarian regimes have witnessed improvements in economic performance over time. In contrast, Diamond (1998) takes a much longer perspective. While acknowledging the role of 'idiosyncratic cultural factors' in promoting economic development in places such as China (1998:11), he argues that differences in development may be deeply rooted in history (even going back to periods before the existence of formal institutions). He makes a grand historical argument that the foundations of modern-day economic activity have been shaped by Neolithic geographical endowments (e.g. plant and animal species) that influenced agricultural productivity. Agricultural productivity, in turn, increased population density, promoted specialisation of labour and industry, and led to innovative activity. As a result, this endowment advantage led to some regions becoming more economically prosperous than others.

So far, most research on government institutions has considered the national level. Yet, to fully understand the role of government institutions in spurring economic activity, we need to examine all parts of a country's governmental architecture. This means studying the role of sub-national governments – core institutions which have been previously overlooked by the majority of studies that focus solely on the national-level. This is a surprising omission given the "global trend to devolution" (Rodríguez-Pose & Gill, 2003) and the so-called "devolution revolution" which has taken place over the past three decades through decentralisation of policy-making and government services (Snyder, 2001).

Devolution can be understood as the process whereby a central government formally cedes power to lower tiers of government – such as sub-national governments or local councils (Ribot, 2002). The process may be undertaken to improve democratic representation, better match public resources to local needs, or enhance local service delivery. Devolution is underpinned by the assumption that sub-national governments are better placed to understand

the preferences of the people they represent (Tiebout, 1956; Rodríguez-Pose & Gill, 2003). As a result, there has been an upsurge in literature which examines the impact of decentralisation on the quality of governments (e.g. Prud'Homme, 1995; Treisman, 2002; Treisman, 2007; Faguet, 2014).

In addition to the global trend towards devolution, research has stressed the importance of examining sub-national units – particularly in the domain of comparative politics (Snyder, 2001). This is because sub-national analyses allow researchers to better understand the spatially uneven nature of political and economic processes. This therefore improves the ability to understand, describe and theorise about such complex processes.

Hence, a smaller subset of literature has emerged which uses quantitative methods to investigate the role of sub-national governments in promoting economic activity. While some studies examine Asian countries (Cai and Treisman, 2005; Cole et al., 2009; Rodríguez-Pose and Zhang, 2019), most of this literature has focused on Europe. Charron et al. (2014) conducted the first comprehensive cross-regional examination of sub-national government quality and regional economic activity in Europe. They created a sub-national government quality index covering 172 European regions in 18 countries. To produce this index, they compiled a survey of 34,000 Europeans at a regional level, with parameters based on the World Governance Indicators. They found strong evidence that high quality regional governments are associated with higher levels of GDP and better health and education outcomes. However, issues of endogeneity and reverse-causality may have affected their findings. Rodríguez-Pose and Di Cataldo (2015) addressed those concerns through an IV analysis, using literacy rates in the Austro-Hungarian Empire from 1880 as an instrument for regional government quality. They found a positive, significant, and causal relationship between European sub-national government quality and regional innovation. Moreover, they found that sub-national government institutional quality in European regions trumped more traditional determinants of economic activity and growth, such as education, innovation, and infrastructure provision.

In Africa, sub-national government quality may play a similar – if not enhanced – role. Nevertheless, similar studies to those conducted in Europe and Asia on African regions have largely been absent. This is a significant oversight for two reasons. First, like in other parts of the world, African countries have been undergoing accelerated processes of devolution since

the 1990s. As often national governments lacked the capacity to impose effective government, finding it hard to levy taxes, particularly in rural areas (Herbst, 1997), decentralisation was sold as a solution to address existing governance problems. Many African countries have undergone processes of decentralisation, so sub-national governments have become increasingly responsible for planning and implementing regional economic development. This represents a shift away from the previous dominant belief that central governments should entirely drive the agenda (Handley et al., 2009). Given their growing role in policymaking, African regional governments deserve to be examined more closely.

Second, sub-national government institutions have historically played an important role in African societies. The colonial era in Africa frequently saw European empires exercise power indirectly by empowering local state apparatuses – typically Native Authorities – to rule on their behalf (Mamdani, 1999:867). These local apparatuses were frequently organised around pre-existing ethnic or religious groups and communities. Locals were appointed as 'chiefs' or 'administrators' to organise society in lieu of direct rule by permanent colonial settlers (Mamdani, 1996b:52). According to Mamdani (1999:869), this form of rule was expanded by the British originally from the colony of Natal to Nigeria, Uganda, and the territory of Tanganyika in the early 20th century, after which it was subsequently "emulated" by the French after 1918, the Belgians in the 1930s, and the Portuguese in the 1950s. Moreover, according to Herbst (1997:122), most colonial states did not extend the administrative apparatus of national governments beyond the capital city. Therefore, areas outside the capital city were influenced more by local governance arrangements than by national governments. Sub-national governments – in one form or another – have therefore played a long-spanning role in organising people within African societies. These patterns of devolution can still be picked up in patterns of decentralisation today (Ali et al., 2019).

It becomes even more important to evaluate sub-national African institutions once we understand the effect pre-colonial and colonial local administrations have on present-day sub-national governments. A wide range of research has demonstrated that institutional culture persists over long periods of time (North, 1990, Young, 1994; La Porta et al., 1999; Acemoglu and Robinson, 2012). Our definition of 'institutional culture' builds on Tabellini's (2010) work, whereby he sought to explain why some governments, which on paper share similar bureaucracies, laws and resources; act in very different ways. He found that variations in culture influenced differences in government performance. Culture is a broad and complex

topic, involving as common factors a set of normative values and morality, which can be passed down between generations. Culture therefore dictates what people view as being 'right' or 'wrong'. It governs peoples' voting decisions and how bureaucracies themselves function. For example, if there is a normalised culture of corruption, this may filter through to how governments act.

Building on this literature on cultural persistence, Duranton et al. (2009), argue that the relationship between historical government institutions and present-day government institutions is based upon shared social and cultural traits, which persist over time and still determine differences in development. These findings make the political centralisation of pre-colonial African societies a useful instrument for present-day sub-national government quality. Michalopoulos and Papaioannou (2013a) have reported that political centralisation of pre-colonial ethnic institutions determines present day differences in economic development in Africa. We therefore hypothesise that pre-colonial African societies may have affected local state apparatuses during colonial rule, which, in turn, influenced modern day sub-national government. As indicated by Murdock (1959) and Herbst (2000), many pre-colonial societies had forms of organised bureaucracies, property rights, and norms and processes for dispute resolution. Our identification strategy rests on the assumption that high levels of political centralisation (in other words a more top-down government architecture) in pre-colonial societies has led to higher levels of sub-national government quality in African regions.

Despite the important role of sub-national government institutions, few studies have examined sub-national government quality in Africa. These studies have tended to find nuanced results which show the importance of local variation in sub-national government quality. For example, Smith's ethnographic study (2012) investigated factors which lead to a deterioration in the quality of sub-national governments. He found that donor funded development projects played a central role in reinforcing clientelism and patronage networks in Nigeria's Abia State. Tidemand et al. (2014) demonstrated that inequality in funding provided to Tanzanian local government authorities led to an increase in unequal service delivery within the country. Meanwhile, Knutsen et al. (2017) found that an influx of revenue from opening new mines caused sub-national government officials in Sub-Saharan Africa to demand further bribes.

While these studies have made important contributions to understanding the role of sub-national governments in African settings, our paper builds on this literature in three ways. First, it goes beyond individual case studies and attempts to identify the economic implications of sub-national government institutions by examining 356 regions in 22 countries. Second, the use of econometric methods allows us to conduct a cross-country and cross-regional study. Finally, we consider the causal impact – something which has been overlooked in the African institutional literature.

3. Measuring sub-national government quality in Africa

To overcome this gap in existing knowledge, we build a model linking differences in sub-national government quality with regional economic development. Given the absence of official sub-national data on GDP for most African countries, we exploit satellite data on night-time luminosity as the dependent variable. To measure sub-national institutional quality, we create a new index using Afrobarometer data.

3.1 Quality of Sub-National Government

The explanatory variable of interest is a newly developed index of sub-national government quality. This is created using Rounds 5 (2013) and 6 (2015) of the Afrobarometer surveys. The surveys cover around 200,000 individuals in nationally representative samples across 37 different African countries.[2] Interviews are geocoded and can be traced to both their administrative level 1 regions (e.g. provinces) and administrative level 2 regions (e.g. municipalities). All respondents are randomly selected, such that every adult citizen has an equal chance of being surveyed (Afrobarometer, 2014). Furthermore, samples are distributed across urban and rural areas in proportion to their share of the national population.[3]

We construct the sub-national index for a total of 22 African countries: Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Egypt, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Malawi, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa and eSwatini (Swaziland at the time of surveying). However, due to data availability issues, a handful of regions were omitted. Some of these are low population density or desert regions of Algeria (Adrar, Tindouf, Tamanghasset, and Naama) and Egypt (Al Wadi, Al Jadid, and Shamal Sina), alongside areas experiencing conflict (Boko Haram-ravaged states of Yobe, Borno, and Adamwa in northeastern Nigeria), and a small number of relatively low-

population regions in Malawi (Nsanje), Namibia (East and West Kavango) and Guinea (Faranah). We also exclude countries such as Uganda and Zimbabwe which do not have second tiers of government.

Perhaps the most important definition of QoG comes from Rothstein and Teorell (2008). They argue that QoG can be thought of both in terms of inputs, or the access to public authority, and outputs, or manner in which exercise of authority occurs. They suggest that impartiality is at the core of QoG, based on the idea that high QoG allows citizens to trust that their dealings with the government will be removed from special considerations, preferences, or pre-existing relationships. Because of this, QoG is inversely related to corruption, which entails special treatment, positively connected to both trust and the extent to which local actors are willing to contact government agencies. While Rothstein and Teorell (2008) separate out policy effectiveness from quality of government, they note that both are likely to be related. Given that other seminal studies of QoG have also considered effectiveness (La Porta et al., 1999), we argue that it is important to consider these measures in any indicator of QoG.

Building on these theoretical ideas, we select eight questions from Afrobarometer to measure sub-national quality of government (see Appendix Table 2). These include the level of corruption of sub-national government officials (e.g. frequency of bribes); the trust respondents have in sub-national officials; the perceived performance in office of local government actors; and the quality of the services they are responsible for. The responses to these questions are pooled into a subjective sub-national regional government quality index, which reflects – in line with the OECD's Handbook on Constructing Composite Indicators (Nardo et al., 2005) – the opinions of African citizens about their regional government institutions.

Although the number of surveyed individuals varies by region and survey round, there is a mean value of approximately 200 respondents for each (admin 1) region per round.[4] By combining rounds 5 and 6, we end up with an average of around 400 respondents per region. To construct the index of sub-national government quality, some steps are taken. First, we standardise the scale of each question. Each question is given an equal weighting and the scores combined to form a sub-national government quality rating for reach respondent.

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These measures are then averaged at a regional-level. The resulting index is rescaled to form a number between 0 (low government quality) and 100 (high government quality).

More specifically, the index is constructed as follows:

$$SNGQ_r = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where

$$x = \frac{\sum_{i=1}^{8} q_i}{8}$$

$SNGQ$ is the sub-national government quality index for each region r; x is the individual-level sub-national government quality rating; q is the response to each of the eight Afrobarometer questions; and n is the total number of Afrobarometer respondents in each region. The Appendix provides further detail on the methodology behind the index.

3.2 GDP Data

The dependent variable is the log GDP levels from 2015. However, most African countries do not publish official sub-national GDP data. To address this shortcoming, we use satellite data of night-time light luminosity, following Henderson et al. (2012), who found that night lights are an accurate indicator of sub-national economic activity (other examples include Tanaka and Keola, 2017; Russ et al., 2018). We use data from the Visible Infrared Imaging Radiometer Suite Day/Night Band (VIIRS-DNB), which provide greater resolution than the Defence Meteorological Satellite Program's Operational Linescan System (DMSP-OLS) data typically used in spatial economics studies. VIIRS data are available every 15 arc seconds for each pixel area (approximately 0.5km $\times$ 0.5km). Gas flares, moonlight, and sunlight (potential sources of noise) have been filtered out, such that just electric lighting is measured. The data are highly sensitive to low levels of visible light, which is important when deriving economic activity indicators for more rural (and thus less-electrified) areas (Ou et al., 2015) in Africa. To adjust for the population of each region and to ensure that the night light emissions are not driven purely by a population effect, we use log population as a control variable (as per Michalopoulos and Papaioannou, 2018) using the UN's Gridded Population of the World database to ensure that our night light data is not simply driven by a population effect.

3.3 Geographic Data

We also use several geographic, topographic, and climate controls. The geographic controls are log average distance to gold mines from GOLDATA; log average distance to water from the GSHHG Database; log average distance to national borders, calculated using GADM Shapefiles; and log average distance to petroleum sites, from the Peace Research Institute Oslo. These controls account for any locational advantage that may affect GDP.

Our topographic controls include log average ground slope and log average elevation data from the Consortium for Spatial Information. These measures are important in addressing any variations in terrain and ruggedness that could impact regions.

We also control for log average yearly temperature of each region using data the University of Delaware's Climate Data Archive. This control accounts for other regional disparities that may affect the cultivability of a regions' land, which in turn would affect its GDP levels.

3.4 Further Economic Data

Several economic controls are also included. These consist of employment and education levels, which are calculated from round 5 and 6 of the Afrobarometer surveys; infrastructure, proxied through a road density measure (i.e. the percentage of a region covered by roads) and calculated using raster data from OpenStreetMap; and (log) greenfield and brownfield Foreign Direct Investment data from Orbis (2015). These measures account for exogenous economic factors behind variations in regional GDP.

3.5 Institutional data at national level

We include a measure of national level devolution: the World Bank's Administrative Decentralisation Index (Ivanya and Shah, 2012). This measures the regulatory control regional governments have over their own functions by looking at whether governments can conduct their own policies regarding hiring, firing, setting terms of employment. It then measures the resources of regional governments by looking at the ratio of regional government employment to national government employment (excluding health, education, and police sectors). A continuous composite index of between 0-1 is then calculated for each country.

As a further institutional check, we control for levels of central government quality using the Government Effectiveness measures of the World Bank's 2015 World Governance

Indicators. As a robustness test, we use three alternative measures of central government quality: Transparency International's (2015) Corruptions Perception Index, and IHS Markit's (2015a; 2015b) Government Instability Index, and their Political Risk Index. Central government quality controls are used to account for variations in national-level institutions that would impact GDP levels.

Institutional quality is often higher closer to the main administrative and/or commercial capital cities (e.g. Michalopoulos and Papaioannou, 2013). This is because agglomeration effects appear to be most prominent in capital cities – they have greater resource endowments and larger labour pooling effects; a strong foundation for better quality institutions. Knowledge flows can spill over onto neighbouring areas, and these knowledge flows have been found to experience distance decay effects (Rodríguez-Pose and Crescenzi, 2008). Thus, regions near capital cities may benefit from such spillovers. Especially in Africa, regions near capital cities may also benefit from the widely observed favoured treatment of capitals, which generally receive a preferential allocation of resources to harness political rents (e.g. Ades and Glaeser, 1995; Lee and Luca, 2019). Therefore, to address questions about whether the results are driven by capital cities, we include a capital city dummy variable.

4   Sub-National Government Quality and Regional GDP

Mapping the 2013-2015 sub-national government quality index for the 22 African countries included in the analysis uncovers a high degree of variation in government quality across African regions. Figure 1 provides a cross-sectional illustration of this variation. The subjective opinions of Africans about their regional institutions point to a greater level of satisfaction in western Kenyan states such as Nandi, West Pokot, and Turkana; Erongo in western Namibia; North-West District in Botswana; Diffa in eastern Niger; El Bayadh, Saida, and Mascara Provinces in northwestern Algeria; as well as parts of Egypt such as Matrouh, Qena, and Aswan. The highest dissatisfaction is found across southern Nigeria, including Abia, Ogun, and Benue states; parts of northern Algeria such as Batna, Oum el Bouaghi, and Annaba; as well as Tana River in Eastern Kenya. There is no evidence in the government quality index of a polarisation between capitals and the rest of the country – e.g. Dakar ranks highly in the case of Senegal, but Rabat, Gauteng province, Maputo, Niamey, or Accra are perceived to have lower government qualities than the average of Morocco, South Africa, Mozambique, Niger, and Ghana, respectively. Nor is there a marked urban/rural pattern.

Many rural areas in, for example, northeastern Kenya, northern Ghana, southern Egypt, and northern Mozambique perform better than other more densely populated areas in their countries, while this trend does not hold for Guinea, Senegal, Namibia, or Niger. Differences in sub-national government quality also do not necessarily reflect differences in cross-national government quality. Figure 2 provides an illustration of national government quality (measured through the World Bank's 2015 World Governance Indicator, which is calculated from a wider range of data sources including expert surveys – see Kraay et al, 2010). This allows for a comparison between regional government quality with the quality of corresponding national institutions. The best levels of national government quality are found towards Southern Africa, with Botswana, Namibia, and South Africa topping the ranks. Burundi, Guinea, and Liberia have the worst government quality among the countries involved in the analysis. There is some divergence between regional and central government quality, which in part may be because many of the variables we use are specifically related to citizen perceptions at a local level; the measure of Central Government Quality is instead reliant on expert surveys.

Insert figure 1 around here

Insert figure 2 around here

Figure 3 provides a descriptive overview of regional-level measures of nightlight density – our proxy for GDP levels. We can see several administrative level 1 regions with high night light density in Northern Africa. These regions include Cairo, Alexandria, and Qalyubia in Egypt; Algiers and Oran in Algeria; or Casablanca in Morocco. Moreover, a number of Southern African regions such as Gauteng in South Africa and Gaborone in Botswana similarly emit high levels of night lights. In West Africa, Rivers, an oil-rich state in Southern Nigeria; and Dakar in Senegal have high levels of GDP. Finally, Mombasa in Kenya has the highest level of regional GDP in East Africa. Rural states in Nigeria, such as Taraba and Ebonyi, as well as Inhambane in Mozambique and Kasungu in Malawi have some of the lowest levels of regional GDP in our sample. This pattern reflects a familiar geography of GDP throughout African sub-national regions. We would expect that regions with higher population levels would possess higher levels of nightlight density. Therefore, it is important to account for levels of population when conducting our analysis.

Before anything can be directly inferred from these figures, we need to account for sources of endogeneity, such as omitted variables bias and reverse causality. To do so, we first use an OLS model, followed by a Two-Stage Least Squares (2SLS) Instrumental Variable (IV) model, with the political centralisation of pre-colonial ethnic societies as an instrument for current day sub-national government quality.

5 The model and the econometric analysis

5.1 The model

In the first instance, we use a reduced form OLS model measuring the impact of sub-national government quality on GDP. The analysis is based on variants of the following specification:

$$(1) \qquad lnY_{rc} = \alpha + \beta SNGQ_{rc} + \mathbf{X}'_{rc}\varphi + u_{rc}$$

lnY_{rc} is the level of GDP in 2015 for region *r* in country *c* as measured in satellite data on night-time light density. SNGQ is the sub-national government quality index created from rounds 5 and 6 of Afrobarometer. **X** is a vector of covariates affecting GDP levels. These are the various economic, geographic, topographic, climate, and institutional controls discussed previously. We cluster standard errors at the country level. Appendix Table 1 provides a further overview of the data and their sources.

As the observations for regions in Africa are not independent, but nested in countries, we can use a variety of approaches to deal with the problem of nested-observations. The two more commonly used are country fixed-effects and country-level clustering. Country-fixed effects have two disadvantages. First, they prevent us controlling for country-level factors that, in the context of our research, would be of particular importance to determine subnational levels of development, as is the case of variations in institutional quality. Cross-country differences in the quality of institutions are as relevant, if not more, than within country institutional differences for economic development. Second, the introduction of country fixed effects leads to significant multicollinearity problems with the regional devolution variable included in the analysis. This variable is essential in the framework of our research. Hence, our

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alternative approach is to cluster the standard errors at the level of the country, which would take into account potential correlations between the errors within countries, as these are bound not to be independently and identically distributed.

5.2. Econometric analysis

OLS Results

Insert table 1 around here

Overall, the OLS results displayed in Table 1 match our initial expectations: sub-national government quality is positively associated with GDP. We run two sets of regressions – with standard errors clustered at the region and country level. Columns (1 and 3) show that in the entire sample, there is a positive relationship between sub-national government quality and regional economic performance (when controlling for a range of location and topographic factors). Our controls include central government quality, suggesting that the effect of sub-national government quality is independent of this, and a range of other covariates, such as infrastructure, education, employment, the amount of aid invested in a region and the stock of FDI, are considered.

In line with previous results by Rodríguez-Pose and Ezcurra (2011), greater regional autonomy is, however, not associated with high GDP. This may be a consequence of hasty decentralisation processes, lack of resources to conduct independent policies, limited capacity by local governments, or a combination of all three. Moreover, decentralisation processes may be too recent to have made an impact.

An important concern is that our results may be skewed by the location of capital cities. To address this, in columns (2 and 4) we add a capital city dummy. When we account for regions with capital cities, we see that sub-national government quality remains positively associated with regional GDP at the 1% significance level.[5]

In sum, a statistically significant relationship between regional government quality and GDP exists across Africa, even when controlling for factors such as education, infrastructure, and

national government quality. We would expect to see a high degree of correlation between sub-national governments and regional economic performance because more-developed areas are likely to have greater resources, higher reserves of human capital and, therefore, better quality institutions. We are more interested, however, in examining whether sub-national government quality drives economic performance. To do so, we need to undertake an identification strategy which establishes causality and addresses endogeneity resulting from omitted variables bias.

Identification strategy

To address causality concerns we use a IV model. The instrument is the level of political centralisation of pre-colonial African societies – i.e. the 'Jurisdictional Hierarchy of Local Communities'. The data is obtained from anthropologist George P. Murdock's *Ethnographic Atlas*, a database of 1167 societies that were mapped, coded, and published in the *Journal of Ethnology*. This database has been widely used in recent institutional literature focusing on African economic performance (e.g. Gennaioli and Rainer, 2007; Nunn, 2008; Nunn and Wantchekon, 2011; Michalopoulos and Papaioannou, 2013b; Sinding Bentzen et al., 2019). The variable attributes the value of 0 to groups "lacking any form of centralized political organization", 1 for "petty chiefdoms", 2 for "large paramount chiefdoms/small states", and 3 or 4 for "large states". For our index of political centralisation, we combine all 'large states' into a single category, and therefore use four values to represent the four categories.

The Ethnographic Atlas data was constructed from a team of fieldworkers as well as archival research (Murdock, 1967).[6] For each ethnic group Murdock identified the earliest period for which satisfactory data existed prior to widespread European colonisation in order to describe their characteristics (Gennaioli and Rainer, 2007). Murdock's dataset for Africa does not attempt to capture the full complexities of centuries of local community administrative organisations. Instead, it measures the level of local community centralisation on the eve of widespread European colonisation, based on existing work which shows that that pre-colonial political institutions still matter for political structures now (Sinding Bentzen et al., 2019).[7]

We determine which pre-colonial African societies corresponds to current day administrative regions by overlaying them to identify the area of intersection (see Figure 4). In cases where more than one society fits into a region, we assigned a weighting of jurisdictional hierarchy levels based on the percentage of intersection. The results are shown in figure 5. We have

dropped observations where there are missing values in Murdock's map although this does not have a significant impact on the OLS estimates provided in Table 1.

Insert figure 4 around here

Insert figure 5 around here

The second stage estimating equation involves variations on the following:

$$(2) \qquad\qquad SNGQ_{rc} = \alpha + \emptyset C_{rc} + \mathbf{X'}_{rc}\varphi + u_{rc}$$

Here we treat sub-national government quality (SNGQ) as endogenous and data on the centralisation of pre-colonial African societies (C) as an exogenous variable.

Instrumental variable results

Insert table 2 around here

Table 2 reports a significant and causal impact of sub-national government quality on regional economic performance. Column (1) demonstrates that sub-national government quality exerts a significant impact on regional economic activity when controlling for location, climate, and topographic factors. Adding in central government quality in column (2) does not have a major impact on the significance and magnitude of this relationship. In column (3) we similarly see that this causal relationship holds when controlling for economic factors. Finally, in column (4) we use the capital city dummy to assess whether our previous results were driven by regions hosting the capital cities of a country. We see that this also does not have a large impact on the magnitude and significance of the relationship between sub-national government quality and regional GDP.

Of note is the coefficient and significance of central government quality. In column (2) central government quality has a positive and significant relationship with regional GDP, however the magnitude of this relationship is much smaller than sub-national government quality. As more controls are added in in columns (3) and (4), central government quality becomes less significant and the magnitude of the relationship diminishes. While this may seem unexpected given the long literature on the importance of central government quality, this finding aligns more with the work of Michalopoulos and Papaioannou (2013b), who used

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regression discontinuities in African regions and found that national-level institutions had close to zero effect on regional economic activity. It also supports the work of political scientists, such as Herbst (2000), who challenged the widespread assumption regarding the sole importance of present-day national-level institutions in explaining economic performance within African contexts.

To meet the exclusion restrictions of a valid instrument, we need to ensure that the instrument is relevant and exogenous. The instrument of jurisdictional hierarchy of pre-colonial societies is relevant, as the first stage f-tests are greater than 10 (the rule of thumb for instrument relevance). However, given that the f-test is less than 25 in all cases, we have employed the Anderson-Rubin test which is robust to weak instruments. In each case, the Anderson-Rubin p-value is well under 0.05, thereby indicating that our results still hold. Regarding instrument exogeneity, we have previously discussed the extensive literature, which suggests that institutional culture persists over time. We address these and other concerns in the robustness tests section below. As with any instrument, it is important to caveat this finding – the results here are consistent with a causal explanation, but they can never prove it.

6. Robustness Tests

6.1 Instrument exogeneity in IV estimates

In Appendix Table 4 we examine whether our instrument acts through central government quality as well as sub-national government quality. This would render our instrument endogenous. To test this theory, we run the instrument through central government quality and find that the f-test is less than 2, thereby indicating that it is not a valid instrument for national-level institutions. This finding upholds our initial assumption that pre-colonial societies influenced the make-up of local-level institutions during colonialism, which in turn affected sub-national institutions following independence.

Another potential concern is that colonisation and the creation of colonial borders was influenced by the quality of pre-colonial institutions. In other words, colonial powers decided to settle in areas which had higher quality proto-local governments. If this were the case, then pre-colonial institutional quality may be endogenous. However, a range of literature has disputed this, arguing that colonial borders were created exogenously (in the late 19th century,

culminating in the 1884-1885 Berlin Conference) at a time when Europeans had limited knowledge of local conditions (Michalopoulos and Papaioannou, 2016).

However, it is possible that Europeans may have known more about coastal regions – especially in Western Africa – prior to 1884. To address this concern, in Appendix Table 5, we drop all coastal regions from our analysis and re-run our IV estimates. Again, we find no major changes in the magnitude or significance of sub-national government quality's impact on GDP.

6.2 Alternative measures of central government quality

Given the existence of several central government quality indicators, we repeat our IV analysis using different measures. This is to ensure that we do not rely on a single measure of central government quality that biases the results. In addition to the World Governance Indicators, we use Transparency International's Corruptions Perceptions Index, IHS Markit's Government Instability Index, and IHS Markit's Political Risk Index. The results of these analyses are presented in Appendix Table 6. No significant discrepancies with our original findings are in evidence. Sub-national government quality still has a positive, significant, and causal impact on regional economic performance, while the instrument again satisfies the exclusion restriction with all first stage F-tests larger than 10.

6.3 Estimations with alternative time period

In Appendix Table 7, we repeat the analysis using data from 2016 instead of 2015. This is to ensure our results remain consistent over different cross-sections. Given that the sub-national government quality index is constructed using data from 2013 and 2015, we can only repeat the analysis with data after 2015. The latest available year of VIIRS night lights data comes from 2016, which therefore restricts us to analysing 2015 and 2016 cross-sections. While we see some variances in the OLS results – with Sub-National Government Quality becoming insignificant in column (1), once controlling for capital cities the significance returns. Nonetheless, the IV results remain unchanged across all permutations which indicates a positive, significant, and causal relationship between sub-national government quality and regional GDP in 2016.

6.4 Estimations without low-sample regions

Our final check addresses the concern that the results may be driven by regions with a low number of observations in Afrobarometer. We repeat the basic regression (given in Table 1, Column 2) using alternative samples of the data. The full regression table appears in Appendix Table 8. We run the model excluding regions with < 50 observation and then those with < 100 observations. The coefficient is close in both cases to that in in the full model (0.021): 0.018 and statistically significant at the 5% level, when excluding those with < 50 observations; and 0.016 and significant at the 10% level, when excluding those with < 100). Given that the coefficient remains similar in magnitude, the reduction in statistical significance may result from the smaller sample size and imprecision added in the weighting process. We cautiously conclude that our results are not likely to be biased in a major way by low-observation regions.

7. Conclusion

This paper has addressed a significant gap in the literature regarding the role of sub-national governments in influencing the economic performance of African regions. Despite near-consensus that government institutions matter for economic performance, few studies have considered sub-national government institutions – especially outside of Europe and Asia. While African states have a varied history of sub-national government institutions and apparatuses (Oluwu, 2003), sub-national governments have tended to be relatively and increasingly important, given the more recent trends towards devolution. Given this, the lack of evidence on the relationship between sub-national government quality and economic development represents an important gap. To properly understand the role of institutions in promoting economic activity, research should go beyond the traditional analyses of national-level government institutions to fully account for variations in sub-national government quality in Africa.

In this paper, we have addressed this gap by creating a new index of sub-national government quality for 356 African regions. The index was then used to investigate the relationship between quality of sub-national government and regional GDP, as proxied by night light density. We employ data on the level of jurisdictional hierarchy of pre-colonial societies as an instrument for sub-national government quality. This instrument was found to be relevant and exogenous, thereby meeting the criteria for the exclusion restriction.

The principal finding is that sub-national government quality has a positive, statistically significant, and robust relationship with regional economic development in Africa. These results hold when controlling for a wide range of other factors that may be correlated with GDP (e.g. education levels, infrastructure endowments, aid, and FDI). The instrumental variable analysis suggests that this effect is causal, rather than due to more developed localities having better government. Moreover, we find that sub-national government quality has an effect, independent of national government quality. This finding may be somewhat controversial, as it goes against some of the more prominent theories explaining economic activity that see national government institutions as fundamental to economic performance (e.g. Acemoglu et al., 2005). However, it is consistent with more recent research by Michalopoulos and Papaioannou (2013b), who established through regression discontinuity designs that national-level government institutions did not have as large an impact on regional economic activity than was previously believed.

The results have implications for both academic work and policy. Outside the European and Asian cases, academic work on government institutions – and, therefore, most development policies – has tended to focus on the national level context. However, in Africa like elsewhere in the world, sub-national government institutions fulfil a range of important functions that are at the heart of differences in development. Hence, sub-national government quality shapes past and future development prospects, even in a context where decentralisation and regional autonomy have not yielded the expected economic returns. For policy, these results highlight the importance of building capacity, increasing voice, transparency, and accountability, and stemming corruption at a sub-national level. Focusing on these issues at national level does not suffice. If the sub-national government dimension continues to be overlooked, it is likely that most governmental improvements at the national level will end up diluted and the benefits will not reach ordinary citizen.

Our research opens up several potential avenues for examination. One question is the extent to which sub-national government quality influences economic performance in the context of better (or worse) national government quality (particularly if sub-national governments may in some cases be a substitute for national governments). A second would be to identify the exact mechanisms that impact sub-national government quality or decomposing the index and determining the channels through which sub-national government quality affects GDP.

Moreover, if sub-national government quality matters for regional economic performance, then what are its effects on other important economic factors such as spatial inequalities, productivity, innovation, or employment? In order to fully grasp how institutions impact important economic indicators, we must extend our understanding on the impacts of sub-national government quality.

References

Acemoglu, D., & Robinson, J. A. (2005). *Economic origins of dictatorship and democracy*. Cambridge University Press.

Acemoglu, D., & Robinson, J.A. (2012). *Why nations fail: the origins of power, prosperity and poverty*. New York: Crown.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, *91*(5), 1369-1401.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic Growth*, *1*, 385-472.

Ades, A., & Glaeser, E. (1995). Trade and Circuses, *Quarterly Journal of Economics*, 110, 195-227.

Afrobarometer (2014). Round 6 survey manual. *Afrobarometer Network*.

Ali, M., Fjeldstad, O. H., Jiang, B., & Shifa, A. B. (2019). Colonial legacy, state-building and the salience of ethnicity in Sub-Saharan Africa. *The Economic Journal*, *129*(619), 1048-1081.

Balestri, S. (2013). GOLDATA: The Gold deposits dataset Codebook. *CSCC Working Papers*, (1), 2-30.

Bratton, M. (2012). Citizen Perceptions of Local Government Responsiveness in Sub-Saharan Africa. *World Development*, 40(3), 516–527.

Cai, H., & Treisman, D. (2005). Does competition for capital discipline governments? Decentralization, globalization, and public policy. *American Economic Review*, *95*(3), 817-830.

Charron, N., Dijkstra, L., & Lapuente, V. (2014). Regional governance matters: Quality of government within European Union member states. *Regional Studies*, *48*(1), 68-90.

Cole, M. A., Elliott, R. J., & Zhang, J. (2009). Corruption, governance and FDI location in China: A province-level analysis. *The Journal of Development Studies*, *45*(9), 1494-1512.

Crescenzi, R., Di Cataldo, M., & Rodríguez-Pose, A. (2016). Government quality and the economic returns of transport infrastructure investment in European regions. *Journal of Regional Science*, *56*(4), 555-582.

Diamond, J. M. (1998). *Guns, germs and steel: a short history of everybody for the last 13,000 years*. London: Random House.

Duranton, G., Rodríguez-Pose, A., & Sandall, R. (2009). Family types and the persistence of regional disparities in Europe. *Economic Geography*, *85*(1), 23-47.

Easterly, W. (2001). *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics*. Boston: MIT Press.

Erk, J. (2015). Iron houses in the tropical heat: Decentralization reforms in Africa and their consequences. *Regional and Federal Studies, 25*(5), 409-420.

Faguet, J. P. (2014). Decentralization and governance. *World Development*, *53*, 2-13.

Gennaioli, N., & Rainer, I. (2007). The modern impact of precolonial centralization in Africa. *Journal of Economic Growth*, *12*(3), 185-234.

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2004). Do institutions cause growth?. *Journal of Economic Growth*, *9*(3), 271-303.

Handley, G., Higgins, K., Sharma, B., Bird, K., & Cammack, D. (2009). *Poverty and poverty reduction in sub-Saharan Africa: An overview of the issues*. London: Overseas Development Institute.

Hartung, J. (1983). In defense of Murdock: A reply to Dickemann, *Current Anthropology*, *24*(1), 125-126.

Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American Economic Review*, *102*(2), 994-1028

Herbst, J. (1997). Responding to state failure in Africa. *International Security*, *21*(3), pp.120-144.

Herbst, J. (2000). *States and power in Africa*. Princeton, New Jersey: Princeton University Press.

Holmberg, S., Rothstein, B. and Nasiritousi, N., 2009. Quality of government: What you get. *Annual Review of Political Science*, *12*, pp.135-161.

IHS Markit (2015a), Government Instability Index. Available from: http://ihsmarkit.com/index.html

IHS Markit (2015b), Political Risk Index. Available from: http://ihsmarkit.com/index.html

Ivanyna, M., & Shah, A. (2012). *How close is your government to its people? Worldwide indicators on localization and decentralization*. Washington, DC: The World Bank.

Jerven, M. (2011). A clash of disciplines? Economists and historians approaching the African past. *Economic History of Developing Regions*, *26*(2), 111-124.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & Politics*, *7*(3), 207-227.

Knutsen, C. H., Kotsadam, A., Olsen, E. H., & Wig, T. (2017). Mining and Local Corruption in Africa. *American Journal of Political Science*, *61*(2), 320–334.

Kraay, A., Kaufmann, D., & Mastruzzi, M. (2010). *The worldwide governance indicators: methodology and analytical issues*. Washington, DC: The World Bank.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *The Journal of Law, Economics, and Organization*, *15*(1), 222-279.

Langbein, L. and Knack, S. (2010). The worldwide governance indicators: Six, one, or none?. *The Journal of Development Studies*, *46*(2), pp.350-370.

Lee, N. and Luca, D. (2019). The big city bias in access to finance: Evidence from almost 100 countries. *Journal of Economic Geography*, 19(1), 199–224.

Mamdani, M. (1996a). *Citizen and Subject: contemporary Africa and the legacy of late colonialism.* New Jersey: Princeton university Press.

Mamdani, M. (1996b). Indirect rule, civil society, and ethnicity: The African dilemma. *Social Justice*, *23*(63-64), 145-150.

Mamdani, M. (1999). Indirect rule, civil society, and ethnicity: the Africa dilemma. *Out of One, Many Africas: Reconstructing the Study and Meaning of Africa*, 189-196.

Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, *110*(3), 681-712.

Michalopoulos, S., & Papaioannou, E. (2013a). Pre-colonial ethnic institutions and contemporary African development. *Econometrica*, *81*(1), 113-152.

Michalopoulos, S., & Papaioannou, E. (2013b). National institutions and sub-national development in Africa. *The Quarterly Journal of Economics*, *129*(1), 151-213.

Michalopoulos, S., & Papaioannou, E. (2016). The long-run effects of the scramble for Africa. *American Economic Review*, *106*(7), 1802-48

Michalopoulos, S., & Papaioannou, E. (2018). Spatial patterns of development: A meso approach. *Annual Review of Economics*, *10*, 383-410.

Murdock, G. P. (1959). Africa its peoples and their culture history. New York, McGraw-Hill.

Murdock, G. P. (1967). Ethnographic atlas: a summary. *Ethnology*, *6*(2), 109-236

Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman, A., & Giovannini, E. (2005). *Handbook on constructing composite indicators.* Paris: OECD.

NASA Socioeconomic Data and Applications Center (2017), Gridded Population of the World Version 4. http://sedac.ciesin.columbia.edu/data/collection/gpw-v4

North, D. (1990) *Institutions, institutional change and economic performance.* Cambridge University Press, New York.

Nunn, N. (2008). The long-term effects of Africa's slave trades. *The Quarterly Journal of Economics*, *123*(1), 139-176.

Nunn, N., & Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, *101*(7), 3221-52.

Olowu, D., (2003). Local institutional and political structures and processes: recent experience in Africa. *Public Administration and Development: The International Journal of Management Research and Practice*, *23*(1), pp.41-52.

Orbis, (2018). *Orbis-Bureau van Djik database*. Available from: https://www.bvdinfo.com/en-gb/our-products/data/international/orbis

Ou, J., Liu, X., Li, X., Li, M., & Li, W. (2015). Evaluation of NPP-VIIRS night-time light data for mapping global fossil fuel combustion CO2 emissions: a comparison with DMSP-OLS night-time light data. *PloS one*, *10*(9), e0138310.

Porta, R. L., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, *106*(6), 1113-1155.

Prud'Homme, R. (1995). The dangers of decentralization. *The World Bank Research Observer*, *10*(2), 201-220.

Ribot, J. (2002). *Democratic decentralization of natural resources: Institutionalizing popular participation*. Washington DC: World Resources Institute.

Rijpma, A., & Carmichael, S. G. (2016). Testing Todd and matching Murdock: Global data on historical family characteristics. *Economic History of Developing Regions*, *31*(1), 10-46.

Rodríguez-Pose, A., & Crescenzi, R. (2008). Research and development, spillovers, innovation systems, and the genesis of regional growth in Europe. *Regional Studies*, *42*(1), 51-67.

Rodríguez-Pose, A., & Di Cataldo, M. (2014). Quality of government and innovative performance in the regions of Europe. *Journal of Economic Geography*, *15*(4), 673-706

Rodríguez-Pose, A., & Garcilazo, E. (2015). Quality of government and the returns of investment: Examining the impact of cohesion expenditure in European regions. *Regional Studies*, *49*(8), 1274-1290.

Rodríguez-Pose, A., & Gill, N. (2003). The global trend towards devolution and its implications. *Environment and planning C: Government and Policy*, *21*(3), 333-351.

Rodríguez-Pose, A., & Storper, M. (2006). Better Rules or Stronger Communities? On the Social Foundations of Institutional Change and Its Economic Effects. *Economic Geography*, *82*(1), 1–25.

Rodríguez-Pose, A., & Zhang, M. (2019). Government institutions and the dynamics of urban growth in China. *Journal of Regional Science*. https://doi.org/10.1111/jors.12435

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, *9*(2), 131-165.

Rothstein, B. (2011). *The quality of government: Corruption, social trust, and inequality in international perspective*. Chicago, IL: University of Chicago Press.

Rothstein, B. O., & Teorell, J. A. (2008). What is quality of government? A theory of impartial government institutions. *Governance*, *21*(2), 165-190.

Rothstein, B., (2003). Social capital, economic growth and quality of government: The causal mechanism. *New Political Economy*, *8*(1), pp.49-71.

Rothstein, B., Charron, N., & Lapuente, V. (2013). *Quality of government and corruption from a European perspective: a comparative study on the quality of government in EU regions*. London: Edward Elgar.

Russ, J., Berg, C., Damania, R., Barra, A. F., Ali, R., & Nash, J. (2018). Evaluating transport infrastructure projects in low data environments: an application to Nigeria. *The Journal of Development Studies*, *54*(8), 1406-1425.

Sinding Bentzen, J., Hariri, J. G., & Robinson, J. A. (2019). Power and Persistence: The Indigenous Roots of Representative Democracy. *The Economic Journal*, *129*(618), 678-714.

Smith, D. J. (2012). AIDS NGOS and corruption in Nigeria. *Health & Place*, *18*(3), 475-480.

Snyder, R. (2001). Scaling down: The sub-national comparative method. *Studies in Comparative International Development*, *36*(1), 93-110.

Tabellini, G. (2008). Institutions and culture. *Journal of the European Economic Association*, *6*(2-3), 255-294.

Tanaka, K., & Keola, S. (2017). Shedding light on the shadow economy: a night-time light approach. *The Journal of Development Studies*, *53*(1), 32-48.

Tidemand, P., Sola, N., Maziku, A., Williamson, T., Tobias, J., Long, C., & Tilley, H. (2014). Local Government Authority (LGA) fiscal inequities and the challenges of 'disadvantaged' LGAs. *London: Overseas Development Institute.*

Tiebout, C. M. (1956). A pure theory of local expenditures. *Journal of Political Economy*, *64*(5), 416-424.

Transparency International. (2015). *Corruption Perceptions Index*. London: Transparency International.

Treisman, D. (2002). Decentralization and the Quality of Government. *unpublished paper, Department of Political Science, UCLA*.

Treisman, D. (2007). *The architecture of government: Rethinking political decentralization*. Cambridge: Cambridge University Press.

Wessel, P. & Smith, W.H.F. (2017). A Global Self-consistent, Hierarchical, High-resolution Geography Database. *University of Hawaii.*

Wilfart, M. (2018). The politics of local government performance: Elite cohesion and cross-village constraints in decentralised Senegal. *World Development*, 103, 149-161.

Willmott, C. J. & K. Matsuura (2018) Terrestrial Air Temperature and Precipitation: Annual Time Series (1950 - 2017), University of Delaware.
http://climate.geog.udel.edu/~climate/html_pages/README.ghcn_ts2.html

World Bank, Worldwide Governance Indicators (2015). Washington DC: World Bank.

Young, C. (1994). *The African colonial state in comparative perspective*. New Haven: Yale University Press.

Zuo, C., (2015). Scaling down: subnational comparative case studies in comparative politics and Chinese politics. *European Political Science*, *14*, 318-339.

Figures and tables

Figure 1: Sub-National Government Quality, 2013-15
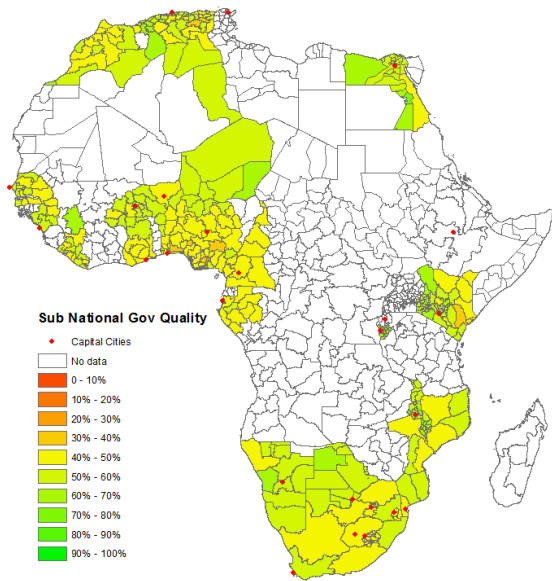
Source: Afrobarometer, pooled 2013 and 2015

Figure 2: Central Government Quality, 2015
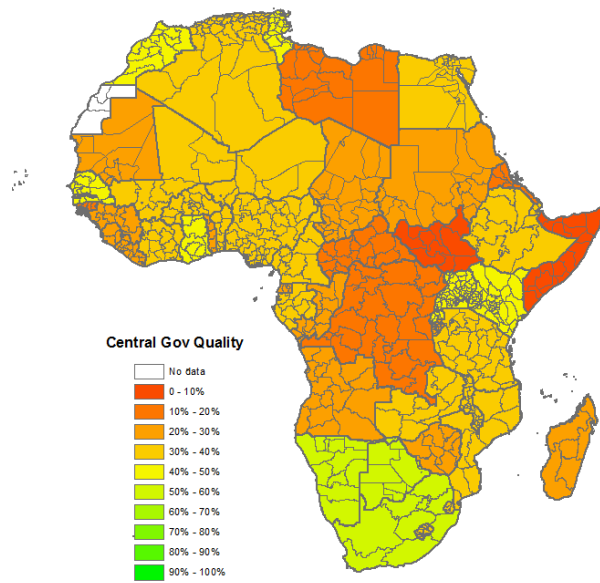
Source: World Governance Indicators, 2015

Figure 3: Nightlight Luminosity (GDP) 2015

Nightlight Density

- ◆ Capital Cities
- ☐ No Data
- ☐ 0.01 - 0.291052
- ☐ 0.291053 - 0.393797
- ☐ 0.393798 - 0.586020
- ☐ 0.586021 - 1.770090
- ☐ 1.770091 - 55.519000

Figure 4: Intersection of pre-colonial societies with current administrative boundaries

Figure 5: Levels of jurisdictional hierarchy in pre-colonial societies
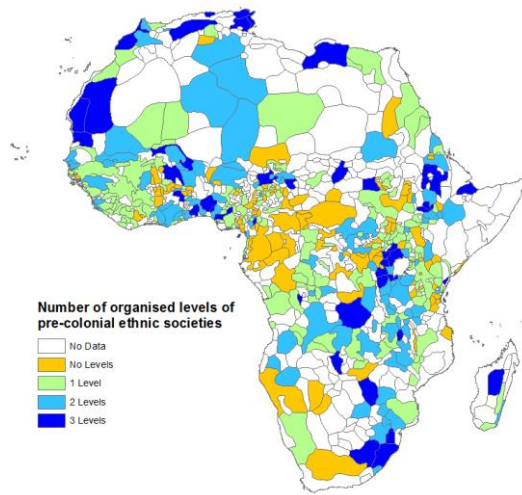
Table 1. OLS Estimates of impact of sub-national government quality on GDP

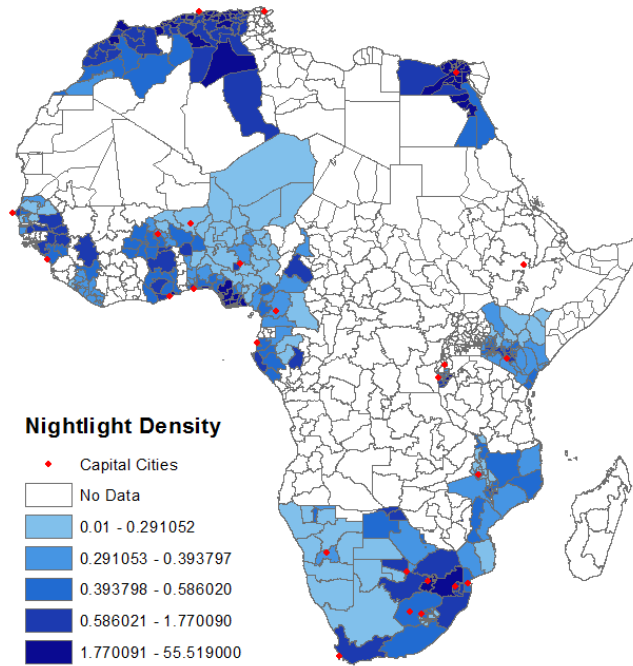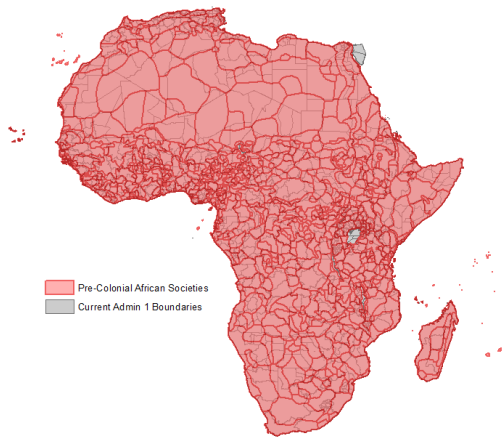|	Errors clustered at the regional level		Errors clustered at the country level	
Dependent variable Log GDP	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Sub National Gov Qual	0.0152** (0.007)	0.0208*** (0.006)	0.0152** (0.007)	0.0208** (0.008)
Log Population	0.1610*** (0.040)	0.1355*** (0.037)	0.1610** (0.059)	0.1355** (0.058)
Devolution Index	-1.1065*** (0.251)	-1.1554*** (0.246)	-1.1065*** (0.332)	-1.1554*** (0.302)
Log Temperature	-0.4420 (0.441)	-0.4632 (0.420)	-0.4420 (0.367)	-0.4632 (0.326)
Central Gov Qual	0.0249*** (0.008)	0.0255*** (0.008)	0.0249** (0.011)	0.0255** (0.011)
Employment	-0.1427 (0.091)	-0.1701* (0.087)	-0.1427 (0.106)	-0.1701 (0.103)
Education	0.9272** (0.435)	0.6961* (0.411)	0.9272 (0.547)	0.6961 (0.553)
Infrastructure	-0.0185** (0.008)	-0.0248*** (0.008)	-0.0185 (0.015)	-0.0248 (0.015)
Log FDI	0.0572*** (0.011)	0.0505*** (0.010)	0.0572*** (0.015)	0.0505*** (0.015)
Capital City Dummy		0.9099*** (0.257)		0.9099*** (0.220)
Constant	6.1393*** (1.916)	5.7890*** (1.847)	6.1393* (3.098)	5.7890* (2.980)
Location Controls	Yes	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes	Yes
Observations	339	339	339	339
R^2	0.5791	0.6103	0.5791	0.6103
Adjusted R^2	0.560	0.591	0.560	0.591

The table reports cross-regional, cross-country OLS estimates linking regional development with sub-national government quality. The dependent variable is log of GDP as measured in night light density. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors are clustered by region in regressions 1-2 and country in 3-4. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope.

Table 2. IV Estimates of impact of sub-national government quality on GDP

VARIABLES	(1) Log GDP	(2) Log GDP	(3) Log GDP	(4) Log GDP
Sub National Gov Qual	0.178***	0.167***	0.149***	0.156***
	(0.0481)	(0.0423)	(0.0408)	(0.0427)
Log Population	0.209***	0.205***	0.155**	0.136**
	(0.0732)	(0.0707)	(0.0619)	(0.0614)
Devolution Index	1.582***	-2.090***	-1.849***	-1.912***
	(0.579)	(0.544)	(0.480)	(0.500)
Log Temperature	-0.622	-0.304	-0.0882	-0.175
	(0.389)	(0.204)	(0.210)	(0.194)
Central Gov Qual		0.0472***	0.0280***	0.0275***
		(0.00982)	(0.0105)	(0.0106)
Employment			0.0798	0.00902
			(0.168)	(0.172)
Education			0.915	0.358
			(0.840)	(0.823)
Infrastructure			0.0223	0.0122
			(0.0167)	(0.0155)
Log FDI			0.0318*	0.0246
			(0.0174)	(0.0172)
Capital City Dummy				1.257***
				(0.355)
Constant	-5.419	-5.222	-4.058	-4.221
	(4.312)	(3.578)	(3.112)	(3.082)
Location Controls	Yes	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes	Yes
First stage F-test	21.48	21.82	21.91	20.85
Anderson-Rubin P-Value	0.000	0.000	0.000	0.000
Observations	241	241	238	238
R^2	-0.243	-0.060	0.131	0.142

The table reports cross-regional, cross-country 2SLS IV estimates associating regional development with sub national government quality. Dependent variable is log of GDP as measured in night light density. Standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope. First stage results are displayed in Appendix Table 3.

Appendix Table A1

Variable	Definition	Source
Sub-National Government Quality	Index of sub-national government quality (author's calculation)	Afrobarometer Rounds 5 and 6
Night time light emissions (GDP)	Log of night light density measured using the Visible Infrared Radiometer Suite (VIIRS)	National Oceanic and Atmospheric Administration
Distance to gold mines	Log average distance to gold mines (kms)	GOLDATA (Balestri, 2013)
Distance to water	Log average distance to water (kms)	GSHHG Database
Distance to national borders	log average distance to national borders (kms)	GADM
Distance to petroleum	log average distance to petroleum sites (kms)	PRIO
Slope	log average ground slope (degrees) from Shuttle Radar Topography Mission dataset at 500m resolution	Consortium for Spatial Information
Elevation	log average elevation (metres) from Shuttle Radar Topography Mission dataset at 500m resolution	Consortium for Spatial Information
Temperature	Monthly average of daily mean temperature (2015 and 2016)	University of Delaware's Climate Data Archive
Employment	Afrobarometer Question: "Employment status?" Responses: 0=No (not looking), 1=No (looking), 2=Yes, part time, 3= Yes, full time, 9=Don't know, 98=Refused to answer, -1=Missing.	Afrobarometer Rounds 5 and 6
Education	Afrobarometer Question: "What is your highest level of education?" Responses: 0=No formal schooling, 1=Informal schooling only (including Koranic schooling), 2=Some primary schooling, 3=Primary school completed, 4=Intermediate school or Some secondary school / high school, 5=Secondary school / high school completed , 6=Post-secondary qualifications, other than university e.g. a diploma or degree from a polytechnic or college, 7=Some university, 8=University completed, 9=Post-graduate, 99=Don't know [Do not read], 98=Refused to answer, -1=Missing	Afrobarometer Rounds 5 and 6
Infrastructure	Index of road density (percentage of total area) - authors' calculations.	OpenStreetMap
Foreign Direct Investment	$ millions	Orbis
Population	Log population levels	UN's Gridded Population of the World database (NASA, 2017)
Central Government Quality	Government Effectiveness Score (0-100)	World Governance Indicators

Corruptions Perception Index	Central government corruption levels (0=very corrupt, 100= not corrupt)	Transparency International
Government Instability Index	Government instability of central governments (0 = stable, 10= unstable)	IHS Markit (2015a)
Political Risk Index	Political risk rating of central government (0 = low risk, 10= high risk)	IHS Markit (2015b)
Devolution Index	Administrative decentralization index (0 = not decentralized, 1=completely autonomous sub-national governments)	Ivanya and Shah (2012)

APPENDIX TABLE A2

Afrobarometer questions used to create the index of sub-national government quality

Question	Min. response	Max. response
Trust		
How much do you trust each of the following, or haven't you heard enough about them to say: Your Metropolitan, Municipal or District Assembly?	1	4
During the past year, how often have you contacted any of the following persons about some important problem or to give them your views: A local government councillor?	1	4
Corruption		
How many of the following people do you think are involved in corruption, or haven't you heard enough about them to say: Local government councillors?	1	4
How many of the following people do you think are involved in corruption, or haven't you heard enough about them to say: Tax Officials (e.g. Ministry of Finance officials or Local Government tax collectors)	1	4
Performance		
Do you approve or disapprove of the way the following people have performed their jobs over the past twelve months, or haven't you heard enough about them to say: Your Elected Local Government Councillor?	1	4
Service Delivery		
How much of the time do you think the following try their best to listen to what people like you have to say: Local government councillors?	1	4
What about local government? I do not mean the national government. I mean your Metropolitan, Municipal or District Assembly. How well or badly would you say your local government is handling the following matters, or haven't you heard enough about them to say: Maintaining local roads?	1	4
What about local government? I do not mean the national government. I mean your Metropolitan, Municipal or District Assembly. How well or badly would you say your local government is handling the following matters, or haven't you heard enough about them to say: Maintaining local market places?	1	4

APPENDIX TABLE A3: First-Stage IV Results

VARIABLES	(1) Sub Nat Gov Qual	(2) Sub Nat Gov Qual	(3) Sub Nat Gov Qual	(4) Sub Nat Gov Qual
Pol_centralisation	2.161***	2.211***	2.167***	2.122***
	(0.466)	(0.473)	(0.463)	(0.465)
Devolution Index	10.81***	12.05***	10.54***	10.49***
	(2.168)	(2.249)	(2.306)	(2.300)
Log Population	-0.965***	-0.979***	-0.853**	-0.782**
	(0.331)	(0.337)	(0.337)	(0.338)
Log Temperature	0.875	0.273	0.254	0.493
	(0.882)	(0.837)	(0.889)	(0.894)
Central Gov Qual		-0.0924*	-0.0585	-0.0557
		(0.0543)	(0.0650)	(0.0650)
Infrastructure			-0.220***	-0.187**
			(0.0748)	(0.0752)
Log FDI			0.148	0.165
			(0.102)	(0.101)
Employment			-1.917**	-1.676*
			(0.944)	(0.965)
Education			-0.349	1.230
			(4.571)	(4.580)
Capital City Dummy				-3.552***
				(1.275)
Constant	56.83***	57.74***	53.45***	52.78***
	(10.86)	(10.79)	(10.56)	(10.50)
Location Controls	Yes	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes	Yes
Observations	241	241	238	238

Appendix Table A4 – IV Estimates (instrumenting through central government quality)

VARIABLES	(1) Log GDP	(2) Log GDP	(3) Log GDP
Central Gov Qual	0.456	0.399	0.399
	(0.385)	(0.298)	(0.300)
Devolution Index	-6.489	-5.156	-5.195
	(5.409)	(3.571)	(3.600)
Log Population	0.169	0.255	0.245
	(0.215)	(0.204)	(0.203)
Log Temperature	2.445	0.787	0.743
	(4.016)	(1.696)	(1.708)
Sub National Gov Qual	0.0656	0.0344	0.0381
	(0.0419)	(0.0245)	(0.0249)
Infrastructure		-0.122	-0.128
		(0.0973)	(0.0982)
Log FDI		-0.118	-0.122
		(0.136)	(0.137)
Employment		-1.407	-1.446
		(1.014)	(1.025)
Education		1.461	1.170
		(1.668)	(1.647)
Capital City Dummy			0.660
			(0.788)
Constant	-3.522	-1.654	-1.735
	(13.41)	(8.952)	(8.952)
Location Controls	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes
First stage F-test	1.10	1.54	1.54
Observations	241	238	238
R^2	-5.566	-2.983	-2.972

The table reports cross-regional, cross-country 2SLS IV estimates associating regional development with sub national government quality. Dependent variable is log of GDP as measured in night light density. Standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope

Appendix Table A5 – IV Estimates (excluding coastal regions)

VARIABLES	(1) Log GDP	(2) Log GDP	(3) Log GDP
Sub National Gov Qual	0.116***	0.0859**	0.0840***
	(0.0422)	(0.0341)	(0.0324)
Devolution Index	-1.565***	-1.181***	-1.179***
	(0.584)	(0.444)	(0.399)
Log Population	0.119*	0.0751	0.0586
	(0.0663)	(0.0549)	(0.0522)
Log Temperature	-1.575***	-1.359***	-1.398***
	(0.521)	(0.496)	(0.452)
Central Gov Quality	0.0476***	0.0258**	0.0271**
	(0.0129)	(0.0118)	(0.0109)
Infrastructure		0.0140	0.00330
		(0.0153)	(0.0135)
Log FDI		0.0447***	0.0348***
		(0.0156)	(0.0133)
Employment		-0.156	-0.221*
		(0.125)	(0.119)
Education		1.083	0.692
		(0.756)	(0.687)
Capital City Dummy			1.312***
			(0.364)
Constant	4.341	6.484*	7.383**
	(4.170)	(3.365)	(3.057)
Location Controls	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes
First stage F-Test	14.49	18.65	18.63
Observations	185	182	182
R^2	0.220	0.428	0.502

The table reports cross-regional, cross-country 2SLS IV estimates associating regional development with sub national government quality. Dependent variable is log of GDP as measured in night light density. Standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope.

Appendix Table A6 – Alternate Measures of Central Government Quality

VARIABLES	(1) Log GDP	(2) Log GDP	(3) Log GDP
Sub National Gov Qual	0.155***	0.152***	0.149***
	(0.0416)	(0.0452)	(0.0424)
Devolution Index	-1.777***	-1.570***	-1.553***
	(0.484)	(0.476)	(0.460)
Log Population	0.268***	0.168***	0.186***
	(0.0779)	(0.0634)	(0.0629)
Log Temperature	-0.0595	-0.169	-0.174
	(0.178)	(0.275)	(0.249)
Infrastructure	0.00743	0.0336**	0.0335**
	(0.0180)	(0.0166)	(0.0165)
Log FDI	0.0258	0.0392**	0.0379**
	(0.0177)	(0.0182)	(0.0171)
Employment	0.0318	0.166	0.141
	(0.160)	(0.187)	(0.178)
Education	0.747	0.860	0.849
	(0.859)	(0.858)	(0.841)
Corruption Perceptions Index	0.0492***		
	(0.0131)		
Government Instability Index		-0.0860	
		(0.127)	
Political Risk Index			-0.167
			(0.121)
Constant	-6.628*	-3.880	-3.474
	(3.446)	(3.522)	(3.364)
Location Controls	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes
First stage F-test	20.75	18.39	20.00
Observations	234	238	238
R^2	0.116	0.088	0.122

The table reports cross-regional, cross-country 2SLS IV estimates associating regional development with sub national government quality. Dependent variable is log of GDP as measured in night light density. Standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope. Individual fixed effects for living conditions and occupation.

Appendix Table A7 – Alternative Cross-Section

VARIABLES	(1) lnviirs	(2) lnviirs	(3) lnviirs	(4) lnviirs	(5) lnviirs
Sub National Gov Qual	0.0101	0.0157***	0.134***	0.108***	0.113***
	(0.00615)	(0.00590)	(0.0350)	(0.0306)	(0.0320)
Central Gov Qual	0.0186***	0.0195***	0.0360***	0.0227***	0.0228***
	(0.00675)	(0.00640)	(0.00749)	(0.00809)	(0.00799)
Devolution Index	-0.817***	-0.861***	-1.551***	-1.333***	-1.364***
	(0.248)	(0.242)	(0.461)	(0.386)	(0.395)
Log Population	0.271***	0.245***	0.315***	0.253***	0.234***
	(0.0391)	(0.0368)	(0.0609)	(0.0513)	(0.0505)
Employment	-0.118	-0.150*		0.0254	-0.0432
	(0.0932)	(0.0897)		(0.139)	(0.142)
Education	1.244***	1.091***		1.556***	1.225**
	(0.369)	(0.348)		(0.565)	(0.526)
Infrastructure	-0.0249***	-0.0308***		0.00458	-0.00399
	(0.00926)	(0.00922)		(0.0139)	(0.0133)
Log FDI	0.0525***	0.0447***		0.0286*	0.0208
	(0.0118)	(0.0108)		(0.0153)	(0.0145)
Log Temperature	-0.216	-0.234	-0.133	0.131	0.0568
	(0.339)	(0.316)	(0.156)	(0.162)	(0.144)
Capital City Dummy		0.929***			1.095***
		(0.265)			(0.301)
Constant	4.551***	4.198***	-4.761	-3.706	-3.703
	(1.579)	(1.492)	(3.115)	(2.588)	(2.532)
Location Controls	Yes	Yes	Yes	Yes	Yes
Topographic Controls	Yes	Yes	Yes	Yes	Yes
First stage F-Test	-	-	21.92	22.78	21.8
Observations	339	339	241	238	238
R^2	0.647	0.675	0.306	0.482	0.505

The table reports cross-regional, cross-country OLS (1)-(2) and 2SLS IV (3)-(6) estimates associating regional development with sub national government quality. Dependent variable is log of GDP as measured in night light density. Standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Location controls include log distance from national borders, log distance from water, log distance from petroleum deposits and log distance from gold deposits. Topographic controls include log elevation and log slope.

Appendix Table A8 – Results excluding low-observation regions

VARIABLES	(1) lnGDP	(2) lnGDP
Specification	Excluding regions with < 50 observations	Excluding regions with < 100 observations
Sub National Gov Qual	0.0188**	0.0162*
	(0.00785)	(0.00946)
Central Gov Qual	0.0180**	0.0132
	(0.00736)	(0.00878)
Employment	-0.201**	-0.0938
	(0.0926)	(0.103)
Education	1.044**	2.018***
	(0.480)	(0.694)
Log FDI	0.0441***	0.0311**
	(0.0107)	(0.0121)
Capital City Dummy	0.836***	0.782***
	(0.255)	(0.267)
Devolution Index	-0.885***	-0.636**
	(0.252)	(0.273)
Log Population	0.174***	0.223***
	(0.0443)	(0.0609)
Log Temperature	-1.614***	-1.214***
	(0.416)	(0.464)
Constant	9.417***	6.925***
	(1.952)	(2.358)
Topographic Controls		
Observations	291	211
R-squared	0.628	0.624

ENDNOTES

[1] Zuo's (2015) review essay on sub-national comparative research suggested that African and Eastern European countries are "much less frequently analysed", pp. 320.

[2] A reviewer makes the important point that this assumes that regional population distributions are equal, which may not be the case.

[3] Afrobarometer results do not generalise to the entire African continent. Afrobarometer has not surveyed many countries with authoritarian regimes or suffering from conflict.

[4] The mean is 177 observations; median is 125.

[5] Weighting regions by number of Afrobarometer observations leads to little change in the main coefficient ($\beta = 0.151$).

[7] There are some well-known critiques of Murdock's data (Jerven, 2011) – namely that Murdock at times relied on official colonial records of pre-colonial ethnic groups. These records, it is argued, are likely to be inaccurate. Murdock, however, devoted much of his career to championing the continual verification and updating of his dataset (see Murdock, 1967). The quality of the dataset has been partly verified through subsequent independent studies (e.g. Michalopoulos & Papaioannou, 2013a; Rijpma & Carmichael, 2016).