

*Original Research*

# Allocation of Public Expenditure on Agriculture in Sub-Saharan Africa: The Importance of Democracy and Quality of Governance

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## Abstract

The objective of this study is to produce a statistical investigation of the determinants of public expenditure in and for agriculture in Sub-Saharan Africa with particular emphasis on the effects of democracy and quality of governance. The data for the study covers the period 1996-2018 in 32 Sub-Saharan African countries. In the quantitative analyses, we perform two estimations: country fixed effects and feasible generalized least squares regressions. We find that only civil liberties positively determine the allocation of public expenditures to agriculture. The strength of democratic institutions and government voice and accountability have no real effect on the allocation of public spending to agriculture. Regarding the quality of governance, only political stability positively determines the allocation of public expenditure to agriculture. Our findings have strong implications for policymakers and different governments, which shows that it is more desirable to shift public expenditures towards the agricultural sector by institutionalizing the governance and improving democratic institutions. Also, our findings cast some doubt on the exact public policy channels through which political institutions affect agricultural growth.

**Keywords:** Public spending, agriculture, democracy, quality of governance.

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## Introduction

### *Background and main motivations*

In this paper, we address the question of why Sub-Saharan African countries differ in terms of the financial resource allocation policies, particularly budgetary, that benefit the agricultural sector. Public spending on the agricultural sector is one of the most important variables in a country's development stages. Interestingly, in Sub-Saharan Africa, public spending is the best means of state intervention in the agricultural sector (Benin et al., 2009, 2011), although there is still both theoretical and empirical debate in the literature on state intervention. Following the neoliberal ideology of the Washington Consensus, in its economic philosophy, the market is self-regulating in the economic system. The state is seen as a creator of artificial conflicts (Hayek, 1943) and distortions (Friedman, 1970) in the global market sphere. Well defended by the neoclassical current, public consumption (budget deficit and associated effect on interest rates) crowds out private investment, slows down economic recovery in the short term and reduces capital accumulation in the long term. Moreover, strong state involvement is known to reduce individual incentives, economic efficiency and the agility of the market to effectively perform its allocative and adjustment function (Aschauer, 1989). However, for the agricultural, the role of public investment remains widely argued (Fan, 2008; Rada & Buccola, 2012).

With widespread rural poverty and small-scale farming in Africa, the "conventional wisdom" supports an important role for agriculture in African development (Diao et al., 2010). For proponents of agriculture as the epicentre of development, its poor performance reflects a long-standing "urban bias" (Bates, 1981; Lipton, 1977; Myrdal, 1958) and underinvestment (funding gap) in the sector (Bezemer & Headey, 2008; Fan, 2008). This urban bias is linked to the neglect of agriculture by governments and donors (De Janvry & Sadoulet, 2016). Promoting agricultural productivity and accelerating agricultural growth in Africa are often seen as core strategies for the overall development of the continent (Binswanger & Townsend, 2000; Hayami & Ruttan, 1985; Lewis, 1954; Ranis & Fei, 1961; World Bank, 2007). Since the majority of the poor and undernourished population is largely dependent on agriculture, these strategies can be particularly effective in reducing poverty and hunger. However, agricultural growth lags behind overall economic growth and also, agricultural performance still lags behind other developing regions of the world (Benin et al., 2016).

The development literature offers many hypotheses to explain the chronic underperformance of Africa's agricultural sector. The ambiguity of the role of agriculture in development is a particularly fundamental perception for those making critical policy and investment decisions. The global food price spike of 2007-2008 and subsequent periods that led to food crises in many African countries prompted varied, often productivity-reducing responses from several governments on the continent (Benson et al., 2013; Headey et al., 2012; Wodon & Zaman, 2010). This has rekindled concerns about knowledge gaps on appropriate strategies to increase and sustain higher levels of agricultural production and productivity. In a political economy, the state intervenes in the economy in several forms. Musgrave (1969) defines the role of the state in three separable functions: resource allocation, distribution, and stabilization. Mueller (2003)

distinguishes between "redistributive" and "allocative" policies, while (Rausser, 1982, 1992) distinguishes between "predatory" and "productive" policies. The allocative policy goes hand in hand with the redistributive one since the states that have had to grant more support and/or taxes are those that also allocate more direct expenditures to agriculture (De Gorter & Swinnen, 2002; Rausser, 1982). One redistributive policy is direct supports to farmers in developed countries (consumers in developing countries), but which generate economic inefficiencies (Anderson, 2016; Anderson et al., 2013, 2019; Anderson & Nelgen, 2012; Johnson, 2016). Public investments in agricultural R&D (Alston, 2009, 2018) are the most obvious of allocative policies (Mogues, 2015).

Previous studies have suggested that democracy and the quality of governance are key factors in the active allocation of public goods (Acemoglu & Robinson, 2006; Ahlborg et al., 2015; Aidt & Eterovic, 2011; Aidt & Jensen, 2003; Boix, 2003; Deacon, 2003; Lake & Baum, 2001; McGuire & Olson, 1998; Rothstein, 2011; Rothstein & Teorell, 2008; Schmitter & Karl, 1991). In the political economy of agricultural policy, several recent studies have shown the role of political institutions on agricultural protection in the developing world (Olper et al., 2014; Olper & Raimondi, 2013), in Africa (Bates & Block, 2011, 2013; Poulton, 2014), and on agricultural research and development spending (Rausser et al., 2011; Swinnen, 2018; Swinnen et al., 2000). However, not only did all of these studies fail to incorporate governance quality, but they also only focused on aspects of public spending (agricultural subsidies or research and development). Moreover, only Olper (2001) is one study that shows the role of democracy as well as institutional quality on agricultural protection. In this paper, we investigate whether these concepts are applied in the case of public spending on agriculture in Sub-Saharan Africa.

### *Objectives and relevance*

To improve the performance of the agricultural sector, not only is public support needed directly within the sector (investment in), but investments in infrastructure and human capital in rural areas (investment for) are also important (Fan et al., 2008; Mogues et al., 2015). It is important to understand what shapes the policy choice for allocating public resources to the agricultural sector. Indeed, the objective of this study is to produce a statistical investigation of the determinants of public spending on agriculture in Sub-Saharan Africa with a particular emphasis on the effects of democracy and the quality of governance. As will be discussed in more detail below (2.2), public expenditure to agriculture includes the different budgetary shares allocated to the rural sector (agriculture, environment, health, education, electrification, etc.). This research contributes to important literature on the political economy of agriculture in developing countries (Bates & Block, 2011, 2013; Mogues & Rosario, 2016; Olper et al., 2014; Olper & Raimondi, 2013). In addition, this work conduct certain drivers and/or barriers to agricultural public spending such as taxation, per capita income, government size, debt, term of trade, inequality, per capita land ownership, agricultural labour, agriculture's share of GDP, rural population, financial development, as well as women's labour force participation. These variables are thus included as controls in our regressions. This study starts with new data for a panel of 32 Sub-Saharan African countries over the period 1996-2018.

### *Structuring the paper*

The following section presents the methodological approach to analysis. We will review the theoretical and empirical approaches to the relationship between democracy and the quality of governance on the one hand and the allocation of public expenditure on the other. From this review, two empirical hypotheses are then formulated. In this section, the data and methods of analysis are presented. Section 3 highlights and analyzes the results while section 4 discusses some major implications, no less crucial for policy decisions. Section 5 analyzes the robustness while section 6 concludes the paper and gives perspectives for future research.

### **Methods: theoretical and empirical approaches**

#### *Major predictions and assumptions*

The determinants of public policy in agriculture had several explanations in the theories of the "new political economy. In institutional analyses, institutional factors constrain both, directly and indirectly, the decision-making process, for example, through their actions on institutional games (North, 1990; Olson, 1965). Thus, economic theory has produced substantial literature to explain the political economy of public spending (Mueller, 2003; Weingast & Wittman, 2006). To the agricultural sector, traditional approaches to agricultural economics in political economy have been primarily descriptive or have assessed the level and effectiveness of policy instruments against the economic efficiency paradigm. However, literature has emerged since the 1970s using the political economy or public choice approach to study state intervention in agriculture (Dethier, 2008). De Gorter & Swinnen, (2002) identify two key political economy approaches to agricultural policy: the policy support function approach and the collective action approach. Originating from the pioneering work of (Downs, 1957), the political support function addresses whether voters are rewarded by politicians for their votes through the provision of public goods and whether voters reward politicians for the provision of public goods through the delivery of votes. Facchini (2018) identifies three main theoretical groups: demand models, supply models, and constitutional models.

Starting with demand models, in a democracy, the main political exchange is between politicians and voters. Government spending was determined by the choices of voters since democracy is an expression of popular sovereignty. These choices were themselves determined by the political preferences of the voters, including their political ideology and/or personal interests. From this perspective, the dynamics of the public sector are explained by the determinants of political ideology and self-interest. Theoretical models based on the median voter theorem predict that democracies tend to redistribute from the rich to the poor (Swinnen, 2018). An increase in the number of low-income voters, such as following an expansion of voting rights, would change the position and preferences of the median voter and shift public policy away from the preferences of the rich. Hence the possible explanation for the size of government by focusing on voters' demand for redistribution. This redistribution can be achieved both through an expanded welfare state and through a reorganized tax system, which relies more heavily on direct taxation than on indirect taxation (Profeta et al., 2013). Indeed, democratization allows low-income groups to participate in the political process and, therefore, should propose policies that

favour these groups, such as those for the unemployed, the sick, the poor, and the elderly, and would thus tend to promote equality. Instead, under a non-democratic regime, the size of the public sector and the amount of redistributive spending would be low, since a significant portion of the electorate is excluded from the decision-making process. Similarly, democratic regimes could lead to policy reforms if these reforms create more winners than losers (Giavazzi & Tabellini, 2005).

This standard prediction based on the median voter theorem, however, has been challenged in richer and more appropriate theoretical frameworks. Insofar as the relevant policy space is multidimensional if taxes and government spending are considered simultaneously. Indeed, if each of these includes multiple elements, it becomes problematic to apply the traditional median voter framework, as it is well known that a Nash equilibrium of the majority vote may not exist (Profeta et al., 2013). The theory must rely on various political economy mechanisms such as probabilistic voting and lobbying models (Profeta, 2002). In this model, tax and public spending issues can attract and shift votes. This case can be seen in the votes of non-ideological citizens (potentially a large portion of the electorate) who typically decide which party to vote for by calculating the benefits derived (primarily fiscal) from one party over other parties (Hettich & Winer, 2005; Profeta, 2007). As the swing voter rather than the median voter becomes decisive, the strong association between democracy and redistributive demand predicted by the median voter no longer necessarily holds. In the supply-side model, public spending is not only determined by the demand of the majority, interest groups and bureaucrats, but also by the ability of a country's tax system to capture private sector resources. So, known as the fiscal leviathan (Brennan & Buchanan, 1980) the state maximizes the size of its budget and its tax revenues to finance the provision of public goods that will improve the welfare of its constituents, especially when faced with a budget deficit constraint. This reduces the possibility of resorting to debt (Yogo & Njib, 2018).

Finally, regarding constitutional rules, (Persson & Tabellini, 2003, 2005) have made important theoretical contributions to the analysis of the relationship between electoral systems and economic policy. To relate some of these broader ideas to agricultural policymaking, it is appropriate to examine the political system, the "constitutional choice," within the framework that defines the degree of "insulation" afforded to policymakers (Aghion et al., 2004). As such, the political regime determines the extent to which the government, once appointed, can or cannot govern without ex-post control. A non-isolated leader, on the other hand, needs to build large majorities to pass legislation, and many interest groups may have ex-post veto power through the principle of collective action. According to Olson (1965) collective action approach, which in 1971 was widely applied to agricultural policy (Olson, 1971). According to this theory, a government responds to the activities of interest lobbyists who organize themselves for collective action as a pressure group. The outcome is determined by this action, which depends on the ability to overcome organizational costs. In agriculture, these costs are, for example, related to the geographical dispersion of farmers and the costs of communication. Hence, Olson (1971) explains why rich countries subsidize their farmers while developing countries tax theirs. Subsequently, many economists have extended Olson's analysis (Hardin, 1982; Peltzman, 1976).



Empirically, when considering a more radical shift to a democratic system with effective governance institutions, the possibilities of seeking support through public expenditure for a sector are tested both by systems of accountability and by the existence of a larger number of interest groups with diverse policy priorities. Swinnen et al. (2000) find using a political support function approach in a panel of 37 high-income and developing countries that with an increase in a measure of political rights from low, both protection and agricultural research spending decrease. A further improvement in political rights to even higher levels, however, has no additional effect on agricultural protection through subsidies and leads to an increase in agricultural public goods spending back to the levels of the lowest political rights regime. That study tests the model employed by De Gorter & Swinnen, (1998).

Olper and Raimondi (2013) study the effect of electoral rules and forms of government on public policy outcomes for 50 years (including data from 74 developing and emerging countries). Using cross-sectional and panel analyses, they find strong evidence that the specific nature of democratic institutions has important consequences for public policy. Proportional and presidential democracies, compared to majoritarian and parliamentary democracies, give more public support to agriculture and less to food consumers. Thus, democratization reduces agricultural taxation and/or increases agricultural subsidies. The magnitude of these constitutional effects is stronger for import-competitive sectors and staple food crops. Recently, Olper et al. (2014) analyze the impact of democratic reforms in the same sample of countries over the same time with identical estimation techniques. As result, they provide evidence that democratization leads to a reduction in agricultural taxation, an increase in agricultural subsidies, or both. Their empirical results are consistent with the predictions of the median voter model because political transitions have occurred mainly in countries with a majority of farmers. Based on these arguments, one can expect a significant effect of democracy, for example via a political competition on the adoption of policies that strengthen incentives for agriculture (Bates and Block, 2011, 2013).

**Hypothesis 1:** The more democratic a country is, the more it allocates spending to agriculture.

Despite theoretical reasons to expect a positive effect of democratic factors on the provision of public goods, some scholars argue that democratic institutions alone do not guarantee success in providing these goods (Ahlborg et al., 2015). First, elected leaders often work with short time horizons (Keefer, 2007) whereas the provision of public goods, particularly in the form of investments in agriculture, is a long-term endeavour (Min, 2008). Second, in African countries, democratic accountability may still be crucial to the relative interest of political leaders in providing public goods, but it may not be so relevant to their ability to do so. During elections, politicians may try to deliver on their promises to the electorate, even in cases where the necessary financial resources are not available. This argument is consistent with Nordhaus (1975) theory of the political-economic cycle, which results from the discretionary manipulation of fiscal and monetary policy by a government. Third, several studies also show how corruption and clientelistic practices (i.e., the exchange of goods and services for political support) can undermine government performance even when democratic institutions are in place (Bratton & van de Walle, 1997; De la Croix & Delavallade, 2009; Delavallade, 2006; Min, 2008). The importance

of such factors should not be underestimated: "bad governance," characterized by corruption, patronage, and nepotism, is a "spectre that haunts democracy in the world today" (Diamond, 2007).

From a political economy perspective, few scholars would dispute that the efficiency with which governments manage the provision of public goods are determinants of agricultural taxation/subsidy structures, and in turn of agricultural growth (Binswanger & Deininger, 1997; Knack & Keefer, 1995). The institutional framework determined by the legal, bureaucratic, and regulatory system, directly and indirectly, constrains decision making through its effect on competition in the political system, conditioning the ability of groups to represent their interests. Institutions define the incentive and opportunity structure of participants that condition economic and political exchanges (North, 1990; Rauser, 1992). Discussing the quality of institutions that would affect the ability of agricultural interest groups to lobby for public spending and investment to benefit their sector, Olper (2001) distinguishes between the quality of bureaucracy and the protection of property rights through the International Country Risk Guide index and analyzes the effect of these institutions on agricultural protection. The results suggest that the non-linear relationship for political openness also holds for property rights after controlling for political openness. In other words, as bureaucratic quality and rule of law improve from a low base, protection increases as agricultural producers face reduced transaction costs to undertake activities to influence policy in favour of the agricultural sector. However, with even greater improvements in these institutions, there are no longer gains in protection because, constraints are imposed on agricultural producer groups through controls on their influence and increased competition from a multiplicity of interest groups (Mogues, 2015).

**Hypothesis 2:** The better the quality of governance in a country, the more efficiently it allocates public expenditure to agriculture.

#### *Variables: description and sources*

The description of the variables is presented in Table 1 in the Appendix. National budgetary expenditure on agriculture is the main dependent variable in this study. It is one of the sources of public funding available to governments (Aragie & Balié, 2020; Christiaensen & Martin, 2018).

#### *The different measures of democracy*

Democracy is one of the variables of interest in this study. Typically, democracy is measured by specific indexes such as civil liberties and political rights. Civil liberties include aspects of freedom of expression and belief, rights of association and organization, rule of law and personal autonomy, and individual rights; while political rights reflect the electoral process, political pluralism and participation, and the functioning of government. Following Freedom house, civil liberties are measured on a scale of 1 to 7, with 1 representing the highest degree of freedom before the law and 7 the lowest as well as political rights which on the same scale, 1 represents the highest degree of freedom and 7 the lowest (Mundlak et al., 2012). But, both of these indicators are partial. For example, the civil liberties index has a classification bias (Papaioannou and

Siourounis, 2008). From this, we retain the index of fundamental rights (i.e., the aggregation of three sub-attributes: access to justice, freedoms, and social rights and equality) from the new base developed by the International Institute for Democracy and Electoral Assistance (IIDEA) (Tufis, 2019). The second group of indicators is based on the Polity2 index as found in the PolityV dataset (Marshall & Gurr, 2020). The Polity2 index ranges from -10 (strong autocracy) to +10 (strong democracy). Polity2 index of 10 and 0 indicates a strong democratic and autocratic government, respectively (Maruta et al., 2020). The Polity2 indicator is not an ideal measure. For example, Plümper & Neumayer (2010) show that it has some problematic aspects, especially during transitions. For example, Cheibub et al. (2010) suggest that some parts of the mean range of the Polity2 indicator are close to representing random noise and that a dichotomous measure of democracy such as the one originally provided by Alvarez et al. (1996) and later extended by Cheibub et al. (2010) should be preferred if it is not clear how the intermediate scores are calculated. Despite these limitations, we consider the Polity2 to be a reliable indicator for capturing incremental changes in policy variables.

### The different measures of the quality of governance

Six dimensions of governance are categorized (Kaufman et al., 2011): voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption. Scores range from -2.5 to 2.5, with higher scores corresponding to better results. Three main groups of variables define governance quality (Kaya & Kaya, 2020): political governance quality composed of voice and accountability and political stability and absence of violence. To clarify, only the variable "political stability and absence of violence" will be considered to explain the quality of governance. Indeed, the "voice and accountability" variable tends to explain democracy (Ahlborg et al., 2015) and will be adopted as its alternative measure. The quality of economic governance composed of two variables such as government effectiveness and regulatory quality and the quality of institutional governance captured by rule of law and control of corruption. As a prelude, we test the correlations between these variables (Table 1).

Table 1. Correlation matrix of governance quality indicators

	PolStab	GovEffet	regular	RuLaw	Corup Cont
PolStab	1				
GovEffet	0.6766	1			
QRegul	0.6357	0.8783	1		
RuLaw	0.7807	0.9029	0.8709	1	
CorupCont	0.6845	0.8377	0.7387	0.8772	1

In addition to the individual measures of governance quality, we wanted to capture the importance of each group of indicators (IQgE and IQgI) and all indicators simultaneously. However, because the indicators are highly correlated with each other (Table 4), we cannot use all of them simultaneously in the same regression to determine their role due to multicollinearity. Consequently, in an attempt to see the concurrent effect of these indicators while escaping the possible multicollinearity problem, we constructed an index



of governance quality by taking simple averages of five items (IQG5)<sup>1</sup> and each group consisting of two items (IQgE and IQgI) drawing on recent work (Ahlborg et al., 2015; Kaya and Kaya, 2020) to determine the relative importance of the governance quality indicators.

### Control variables

**Taxation:** Taxation has been used in agriculture (Beghin and Kherallah, 1994; Olper, 2001) in the case of agricultural protection. **GDP per capita:** This variable defines the level of development by the improvement in GDP per capita (in constant 2010 dollars) and its use on research spending (Rausser et al., 2011; Swinnen et al., 2000). **The size of government:** it captured the government consumption expenditures. **Public debt:** this is approximated by total debt service (i.e., government spending on interest and principal payments) mainly because we have more observations for the latter. **Inequality:** inequality is commonly measured in previous research by the Solt (2020) Gini index. **Financial development:** this indicator materializes the role of financial intermediation (Castañeda-Rodríguez, 2018). **Agricultural value-added:** this variable is regularly used as a determinant of taxation (Castañeda Rodríguez, 2018), is applied in this study because of its sectoral (agricultural) specificity. **Agricultural trade** is a proxy for the (increasing) costs of agricultural expenditures (Rausser et al., 2011; Swinnen et al., 2000) and also measures external taxation (Olper, 2001). **Land per capita:** this variable approximates the truly fixed relative endowment income ("fixed income") in agriculture (Rausser et al., 2011; Swinnen et al., 2000). **The share of agriculture in total employment:** this variable measures the contribution of agriculture to total employment. This variable is a proxy for the relative size of the lobby group or lobbying (Rausser et al., 2011; Swinnen et al., 2000). **The structure of the agricultural population:** this variable captures the different changes in the structure of the agricultural population measured by the proportion of the rural population with the total population (Swinnen, 2018). **Women participation in the labour force:** this is measured by the percentage of the labour force (Castañeda-Rodríguez, 2018; Profeta & Scabrosetti, 2010). Indirectly, this variable can capture the importance of women's work in public financing policies in support of agriculture, given the weight of women in the quest for food security and the fight against poverty.

### *Description of the data*

Our statistical analysis uses country-level data over the period 1996-2018 for 32 Sub-Saharan African countries. The selection of countries and periods is based on data availability. Our focus on governance does not allow for analysis before 1996. The countries included in this study are listed in Appendix 2. Note that the number of observations varies from country to country. Therefore, the dataset is a non-cylindrical panel. We used the logarithm for some regular variables. Table 2 summarizes the variables used in the quantitative analyses and highlights some important descriptive statistics.

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<sup>1</sup> To test the internal consistency between items, we calculated Cronbach's alpha. This test gives an alpha of 0.8568, which proves the strong credibility of our index. For the IQgE and IQgI indexes, the alpha values are 0.8763 and 0.8695. Recall that the simple average of a statistical series X is the sum of the numbers  $n_i$  over the total number T.

Table 2. Descriptive statistics of the sample

	Number of observations	Mean	Standard errors	Médiane	Minimum	Maximum
lnGovAgVa	727	1.917	1.224	1.926	-1.29	5.596
lnTaxTot	1012	-1.878	.591	-1.89	-4.45	-.428
lnGDPCH	1026	7.042	1.052	6.791	5.234	9.929
lnGovCon	884	2.603	.497	2.631	-.093	4.205
lnGovDeb	1019	3.926	.846	3.97	0	6.4
lnAgGDP	966	2.864	.869	3.16	.603	4.37
lnReXM	514	.387	.49	0	0	2.303
lnFemLabor	1058	4.083	.31	4.178	2.887	4.487
lnAgLandH	1080	-3.857	.611	-3.775	-6.182	-2.17
lnAgW	1081	6.965	1.9	7.265	2.303	10.445
lnPopRu10	1081	4.057	.343	4.125	2.364	4.528
lnReGini	713	3.773	.168	3.761	3.178	4.19
lnPrivCrd	1028	2.575	.921	2.606	-.91	7.85
Polity22	1034	1.901	5.16	3	-9	10
LiberCiv	966	.604	.153	.638	.116	.862
VoiAccount	1078	-.597	.733	-.677	-2.226	1.007
PolStab	1078	-.505	.907	-.376	-3.315	1.282
GovEffet	1078	-.746	.622	-.752	-2.446	1.057
QRegul	940	-.689	.631	-.647	-2.645	1.127
RuLaw	940	-.699	.664	-.702	-2.606	1.077
CorupCont	1078	-.616	.621	-.713	-1.869	1.217
IQgI	940	-.658	.626	-.682	-2.238	1.094
IQgE	940	-.722	.61	-.708	-2.524	1.085
IQG5	940	-1.629	1.566	-1.668	-6.401	2.287

## Results

Two empirical models we estimate are based on the standard models of determinants in comparative economics used by Olper (2001) and Profeta et al. (2013). The first relates democracy to agricultural public financing policies:

$$Y_{i1t} = \alpha_1 + \delta_r + \phi_t + \beta_j X_{i1t} + \gamma_d D_{it} + \mu_{i1t} \quad 1.1$$

Where  $Y_{i1t}$  represents our dependent variable (source of financing through agricultural government spending in country  $i$  in year  $t$ );  $X_{i1t}$  the set of control variables;  $D_{it}$  is a policy variable designed to capture the level of democracy via its multiple indicators;  $\alpha_1$  is a joint intercept;  $\delta_r$  and  $\phi_t$  are country  $i$  and year  $t$  fixed effects, respectively;  $\beta_j$  materialize the coefficients of the control variables;  $\gamma_d$  materialize the coefficients of the democracy variables; and  $\mu_{i1t}$  is an unobserved error term.

The second specification relates the quality of governance to public financing policies aimed at the agricultural sector:

$$Y_{i2t} = \alpha_2 + \varphi_r + \theta_t + \beta_l X_{i2t} + \gamma_n QG_{it} + \mu_{i2t} \quad 1.2$$

Where  $Y_{i2t}$  is our dependent variable (source of financing through agricultural public expenditure) in-country  $i$  in year  $t$ ;  $X_{i2t}$  is the set of control variables;  $QG_{it}$  is a policy variable designed to capture governance quality;  $\alpha_2$  is a joint intercept;  $\varphi_r$  and  $\theta_t$  are country  $i$  and year  $t$  fixed effects, respectively;  $\beta_l$  materialize the coefficients of the control variables;  $\gamma_n$  is the coefficients of the governance quality variables; and  $\mu_{i2t}$  is an unobserved error term.

### *Choice of analysis method*

According to Burnside & Dollar (2000) and Maruta et al. (2020), institutional quality changes weakly over time. Thus, the small variation over time in the factors of democracy and governance quality makes it impossible to use the internal estimator because of time-invariant covariates. Therefore, fixed effects are not the right estimator for our analysis. The random-effects model must be the right choice. However, the rather long period of our study ( $T = 23$  years) does not favour random effects. We opt for country fixed effects models (Profeta et al., 2013). In the comparative economics literature, econometric approaches are employed by researchers relating measures of democracy in its multidimensionality with the dependent variable while incorporating intra-country and/or year variation (Albalade et al., 2012; Papaioannou and Siourounis, 2008; Profeta et al., 2013). Similar research is done regarding the other institutional factor, the quality of governance, but with methods like panel OLS (Ahlborg et al., 2015). Of course, the crucial difference is that Papaioannou and Siourounis (2008) study aims at estimating the impact of democracy on economic growth, while Albalade et al. (2012) study targets the institutional determinants of military spending and Profeta et al. (2013) study targets intermediate outcomes such as tax revenues and government spending. From the above, our study approaches the latter. Moreover, our study approaches that of Ahlborg et al. (2015) for governance quality. The difference is only that the former study deals with access to electricity. We deal with the allocation of public agricultural expenditures. To standardize our study, we will provide estimates using panel data with country-specific effects over the entire period covered to facilitate discussion of the fit and consistency of our results across specifications. Different specifications are provided depending on whether we use dummy year variables instead of a trend variable (see Albalade et al., 2012).

## **Discussion**

### *Analysis of correlations and multicollinearity of variables*

The correlations between the variables are reported in appendix 3 for the democracy factors and appendix 4 for the quality of governance. Given the high correlation, we suspect that there are problems of multicollinearity between variables such as GDP per capita and value-added in the agricultural sector. The multicollinearity test is performed for each regression using the VIF (Variance Inflation Factor) method (Marquardt, 1970) and the values are reported in each results table. We retain the argument of Fox (2016) who evoke the multicollinearity problem when the VIF is greater than 5.

*Econometric results and main discussion*

Table 3. Public Agricultural Expenditures and Democratic Factors: Country Fixed Effects

Spécifications	(1)OLS panel	(2)	(3)	(4)	(5)	(6)
Variables	lnGovAgVa					
lnTaxTot	-0.768*** (0.257)	-0.952*** (0.271)	-0.827** (0.368)	-0.830** (0.374)	-0.748** (0.307)	-0.821** (0.331)
lnGDPCH	0.675** (0.269)	0.819*** (0.276)	-0.627 (0.596)	-0.638 (0.634)	-0.865** (0.419)	-0.791 (0.575)
lnGovCon	0.178 (0.197)	0.157 (0.196)	0.498*** (0.184)	0.498*** (0.186)	0.415*** (0.157)	0.506*** (0.187)
lnReGovDebt	-0.241*** (0.0613)	-0.239*** (0.0608)	-0.0525 (0.0604)	-0.0537 (0.0638)	-0.249*** (0.0560)	-0.0718 (0.0647)
lnAgVaGDP	-1.819*** (0.264)	-1.664*** (0.273)	-1.435*** (0.302)	-1.437*** (0.305)	-1.262*** (0.284)	-1.294*** (0.349)
lnReXM	0.272*** (0.0914)	0.306*** (0.0921)	0.202* (0.117)	0.202* (0.117)	0.159 (0.107)	0.188 (0.115)
lnFemLabor	2.305*** (0.478)	2.398*** (0.476)	3.025** (1.353)	3.051** (1.357)	1.826 (1.231)	3.372** (1.579)
lnAgLandH	1.246*** (0.136)	1.205*** (0.136)	1.360*** (0.328)	1.362*** (0.324)	1.127*** (0.305)	1.216*** (0.364)
lnAgW	-0.0275 (0.116)	0.0190 (0.117)	1.038*** (0.339)	1.028*** (0.389)	1.052*** (0.317)	0.875** (0.388)
lnPopRu10	3.899*** (0.606)	4.254*** (0.626)	-3.895* (2.329)	-3.879 (2.361)	-3.501* (2.019)	-4.142* (2.276)
lnReGini	1.183** (0.485)	1.246** (0.482)	-1.681** (0.796)	-1.681** (0.799)	-1.084 (0.683)	-1.779** (0.767)
lnPrivCrd	0.527*** (0.153)	0.544*** (0.152)	0.954*** (0.212)	0.953*** (0.212)	0.899*** (0.201)	0.912*** (0.209)
Trend	0.0383*** (0.00919)	0.0479*** (0.0103)			-0.0406* (0.0240)	
Polity22		-0.0250** (0.0124)	0.0114 (0.0186)	0.0107 (0.0232)		
(Polity22) <sup>2</sup>				0.000186 (0.00321)		
LiberCiv					1.720*** (0.685)	
VoiAccount						0.256 (0.175)
Constant	-26.31*** (5.112)	-30.90*** (5.555)	-43.21*** (6.792)	10.56 (14.92)	12.41 (12.05)	12.34 (13.73)
Years dummies	No	No	Yes	Yes	No	Yes

Spécifications	(1)OLS panel	(2)	(3)	(4)	(5)	(6)
Variables	lnGovAgVa					
Country fixed effects	No	No	Yes	Yes	Yes	Yes
Observations	190	190	190	190	190	190
R squared adjusted	0.642	0.650	0.709	0.810	0.774	0.812
Fisher test	24.25***	23.20***	15.61***	20.94***	34.61***	14.22***
VIF	4.34	4.34	4.34	4.71	4.43	4.35

Source: Author from STATA 16. Standard errors are in parentheses, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Model 1 shows the traditional determinants in the absence of control for democratic factors. Thus, it shows that taxation negatively affects the allocation of agricultural public expenditures. This result is consistent with the neoclassical approach in which high levels of taxation discourage economic activity and eventually reduce fiscal capacity; that is, low tax rates are associated with better economic performance. Following endogenous growth theory, Barro (1990) argues that an increase in the tax rate generates resources for the state to finance productive public expenditures (e.g., agricultural R&D, rural roads), but at the same time reduces the net marginal productivity of private capital. GDP per capita determines agricultural public spending along with some democracy variables (the strength of democratic institutions, civil liberties, and participatory engagement). The size of government positively explains agricultural spending when controlling for democratic factors (the strength of democratic institutions and their square, civil liberties, and voice and accountability). In addition, factors such as trade openness, per capita land ownership, agricultural employment, credit allocated to the private sector, and female labour participation positively determine the allocation of government spending to agriculture (Table 3) with variations by the specification. In contrast, public debt, agricultural value-added, rural population share and income inequality show negative and significant influences at conventional thresholds. Note that these results vary by the specification. For example, public debt is negative and insignificant when controlling for year fixed effects and not the trend with the strength of democratic institutions. Also, the rural population share is positive and significant when controlling for the trend with the strength of democratic institutions and participatory engagement. Since the population is predominantly agricultural, the negative effect shows the importance of their democratic strength, i.e., the voting weight they have to influence politicians' decisions. Bates and Block (2011) argue that the factors that make it difficult for farmers to organize politically (large numbers and dispersion), make them potentially very powerful in an electoral setting.

In the following, some interesting relationships emerge. First, we find no significant relationship between total public spending on the agricultural sector and democratic institutions when considering the robust Country Fixed Effects method. However, the correlations are negative in the absence of Country Fixed Effects. Second, there is a positive correlation between the protection of civil liberties (1% threshold) and the amount of government spending on agriculture. This result is consistent with the collective action hypothesis. Indeed, the multiplication of pressure groups in democracies



in pursuit of conflicting policy objectives could prevent the serious policy distortions that would occur if a single pressure group had exclusive influence over the incumbent politician (Grossman & Helpman, 1994). Moreover, in more democratic countries, civilians through the force of groups such as the media can exert greater influence on the agricultural budget and, as a result, the share of agricultural spending increases. Our results suggest that this effect begins to be felt at a threshold of democracy confirming those found by Profeta et al. (2013) for general government spending. For the time trend, the negative (positive) effect indicates that public spending on agriculture decreases (increases) slightly per year. This result seems to be true if we take the case of the countries in our sample, since, despite the commitments made by the Heads of State and Government since the Maputo Summit and its aftermath, many countries have not achieved the objectives set (10% of the budget for agriculture each year). Budget allocations are still sluggish and sometimes decline from one year to the next. It should be noted that when country fixed effects are taken into account, this result shows its consistency.

The empirical question of democracy is complex in terms of results. Given that democracy is multidimensional, a single indicator does not allow us to draw reliable and consistent conclusions. Thus, in terms of our results, hypothesis 1 is confirmed for civil liberties and invalidated for the strength of democratic institutions. As Profeta et al. (2013) argued, these results may raise doubts about the exact policy channels through which institutions affect public spending. Regarding the determining importance of governance, Rajkumar & Swaroop (2008) believe that better quality public spending can only be achieved in the presence of good governance.

Table 4. Quality of governance as a determinant of public agricultural expenditure financing

Spécifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	lnGovAgVa							
lnTaxTot	-0.593*	-0.823**	-0.792**	-0.907**	-0.917**	-0.888**	-1.037**	-0.764**
	(0.302)	(0.371)	(0.321)	(0.392)	(0.355)	(0.387)	(0.408)	(0.361)
lnGDPCH	0.355	-0.700	-0.159	-0.449	-0.341	-0.539	-0.120	-0.339
	(0.287)	(0.657)	(0.529)	(0.715)	(0.624)	(0.667)	(0.725)	(0.539)
lnGovCon	0.208	0.482**	0.239*	0.425**	0.476***	0.430**	0.408**	0.298**
	(0.166)	(0.185)	(0.132)	(0.179)	(0.179)	(0.181)	(0.173)	(0.134)
lnReGovDebt	-0.231***	-0.0474	-	-0.0587	-0.0566	-0.0576	-0.0919	-
	(0.0663)	(0.0593)	0.275***	(0.0800)	(0.0610)	(0.0789)	(0.0806)	0.225***
lnAgVaGDP	-1.855***	-	-	-	-	-	-	-
	(0.267)	1.422***	1.166***	1.287***	1.461***	1.285***	1.311***	1.001***
	(0.305)	(0.295)	(0.310)	(0.302)	(0.317)	(0.306)	(0.301)	
lnReXM	0.223**	0.207*	0.0924	0.241	0.198*	0.242	0.206	0.138
	(0.0916)	(0.120)	(0.136)	(0.153)	(0.117)	(0.152)	(0.155)	(0.134)
lnFemLabor	1.533**	2.827**	0.0843	2.612*	2.854**	2.664*	2.198	0.172
	(0.623)	(1.284)	(1.299)	(1.545)	(1.336)	(1.537)	(1.547)	(1.281)
lnAgLandH	1.138***	1.356***	1.044***	1.375***	1.487***	1.302***	1.358***	1.343***

Spécifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	lnGovAgVa							
	(0.203)	(0.347)	(0.315)	(0.458)	(0.363)	(0.423)	(0.375)	(0.380)
lnAgW	0.0358	0.977***	1.422***	1.085***	1.040***	1.073***	1.121***	1.244***
	(0.132)	(0.324)	(0.378)	(0.379)	(0.337)	(0.383)	(0.384)	(0.361)
lnPopRu10	3.372***	-3.866	-2.774	-4.013	-3.262	-4.194	-3.120	-2.960
	(0.642)	(2.494)	(2.308)	(2.791)	(2.188)	(2.797)	(2.866)	(2.425)
lnReGini	1.019**	-1.680**	-0.616	-1.619	-1.511*	-1.647*	-1.327	-1.144
	(0.442)	(0.816)	(0.827)	(0.977)	(0.771)	(0.979)	(1.005)	(0.834)
lnPrivCrd	0.554***	0.932***	1.021***	0.956***	0.989***	0.961***	1.018***	0.921***
	(0.146)	(0.220)	(0.217)	(0.252)	(0.212)	(0.259)	(0.240)	(0.246)
Trend	0.0293***		- 0.0617**					-0.0411
	(0.0104)		(0.0270)					(0.0291)
PolStab	0.164***							
	(0.0871)							
GovEffet		0.108						
		(0.237)						
QRegul			- 0.697***					
			(0.191)					
RuLaw				-0.100				
				(0.268)				
CorupCont					-0.160			
					(0.232)			
IQgI						- 0.000845		
						(0.00906)		
IQgE							-0.344	
							(0.297)	
IQG5								- 0.0193**
								(0.00847)
Constant	-18.43***	12.33	7.661	10.43	6.191	11.61	4.576	13.61
	(6.115)	(16.47)	(12.99)	(17.39)	(15.04)	(17.04)	(18.07)	(13.21)
Years dummies	No	Yes	No	Yes	Yes	Yes	Yes	No
Country fixes effets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	190	190	166	166	190	166	166	166
R sward Adjusted	0.649	0.809	0.780	0.803	0.810	0.803	0.806	0.770
Fisher test	33.23***	20.41***	28.32***	17.76***	20.61***	17.64***	17.94***	29.23***
VIF	4.57	4.18	4.12	4.66	4.31	4.64	4.49	4.74

Source: Author from STATA 16. Standard errors are in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The quality of governance also explains public spending on agriculture in various ways (Table 4). Political stability positively and significantly explains public spending on agriculture at the 1% level. The result shows that a higher level of stability has a beneficial effect on public spending on agriculture. It is also true that the effect is large in magnitude and highly statistically significant. This is important because political instability and the absence of violence/terrorism can lead to military and security spending at the expense of spending in productive sectors such as agriculture. Thus, stability benefits the agricultural in budget allocation. This result contrasts with that found by (Kaya & Kaya, 2019).

Regulatory quality negatively explains the allocation of public spending to agriculture. It is important to recall that the regulatory quality indicator is related to the government's ability to formulate policies and regulations that enable private sector development. Thus, the relationship between regulatory quality and government spending can be seen as closely related to the trade-off or potential complementarity between private sector participation in a given sector and government spending in the same sector. The result shows that there is a significant trade-off between private sector participation and public spending in the agricultural sector since regulatory quality shows a negative and significant correlation. Furthermore, given its strong statistical value (-0.697%), this trade-off relationship is not economically strong for the panel of countries. Moreover, this result seems to support the argument of the anti-Keynesian theories of the 1990s which considers fiscal policy useless for two main reasons: on the one hand, state authorities inefficiently use fiscal policy, for electoral purposes instead of regulation and; on the other hand, budget deficits are harmful to production, as they produce a rise in interest rates through the decline in private demand. Also, we observe that the simple average index of these five indicators negatively affects spending on agriculture at the 5% threshold. This result demonstrates the poor quality of governance and the prevalence of poor regulatory quality, corruption (e.g., linked to rent-seeking behaviour), and persistent non-compliance with rules and laws in Sub-Saharan Africa. We also find that the overall governance quality index is significant, yet some variables are not individually significant. This trend can be attributed to the multicollinearity and potential overlap between the five governance quality indicators under consideration. Based on these results, we conclude that (positive) political stability is the main determinant of public spending on agriculture. This result supports hypothesis 2 for this indicator. The hypothesis is invalidated for the quality of regulation (negative).

### **Robustness Analysis: Use of Feasible Generalized Least Squares**

In addition to the different strategies (individual estimation by specification and estimation with mean indexes) used to capture the robustness of our results, the question of the estimation method can also arise. Thus, as for the democracy factors and the quality of governance, we use Feasible Generalized Least Squares (FGLS) to relatively confirm the robustness of the previous strategies. We find that public agricultural expenditure is affected by the same variables of the democracy dimension in the absence of country-specific effects (Appendix 6). This confirms the robustness of our previous analyses. From the quality of governance, the results are sensitive to the methods of analysis. Thus, we can deduce that public spending seems to suffer from the dispersal of governance.

## Conclusions and policy implications

The objective of this paper is to investigate the determining role of democracy and quality of governance in the allocation of public expenditures in support of agriculture in Sub-Saharan Africa. As a result, on the democratic side, public spending on agriculture is not influenced by the strength of democratic institutions (taking into account country fixed effects) while the protection of civil liberties represents the main determinant of the allocation of spending on agriculture. Regarding the quality of governance, we deduce that public spending on agriculture seems to suffer from dispersal of governance in our sample between 1996 and 2018 and that only political stability is the main determinant. Looking at the different estimates applied, the results show a variety of democracy indicators that explain political decisions on public financing. The same is true for the quality of governance. However, some of these results do not confirm those found by previous research, which allows us to enter the debates on the role of democracy and good governance in public development policy decisions. It emerges that the results depend on the context of the study and the estimation method just as Profeta et al. (2013) thought. Furthermore, the results cast doubt on the exact channels through which a government can act to better allocate budgetary expenditures in agriculture. Through the political economy approach, one politico-economic implication is that efforts to reform the agricultural sector in general and promote food crops, in particular, require strengthening democratization processes by empowering local governments and institutionalizing good governance. The concept of the State as regalian is being questioned in Sub-Saharan African countries. One explanation can be found in the empirical literature (Fosu, 2015; Fosu, 2019; Ravallion, 2012). When institutions and governance systems are weak, the resulting high inequalities undermine civic engagement and collective decision-making and, as a result, lead to biased actions that work against policies to promote economic growth and reduce poverty.

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## Appendixes

Table A1. Description of variables and sources

Name of the variable	Description of the variable	Coding the variable	Source
National budget expenditures	We consider the intensity of agricultural public spending, which is the share of public spending in agricultural value added.	GovAgVa	ReSAKSS
Total taxation	It is measured as a percentage of GDP.	TaxTot	ICTD
GDP per capita	This variable defines the level of development by the improvement in GDP per capita (in constant 2010 dollars).	GDPCH	WDI
Size of government	It is captured by government consumption expenditures as a % of GDP and takes into account productive government expenditures for social programs (health and education expenditures) and non-productive expenditures.	GovCon	WDI
Public debt	It is approximated by total debt service (i.e., government expenditures for interest and principal payments) primarily because we have more observations for the latter.	GovDeb	WDI
Agricultural value added as a percentage of GDP	It measures the contribution of agriculture to GDP.	AgGDP	WDI
Agricultural trade	It is measured by net exports in real terms.	ReXM	ReSAKSS
		FemLabor	WDI
Land availability per capita	This variable captures the availability of land per farmer. This variable approximates the truly fixed relative endowment income ("fixed income") in agriculture.	AgLandH	USDA-ESR
Agricultural work	This variable measures the contribution of agriculture to total employment.	AgW	USDA-ESR
Agricultural population	This variable captures the different changes in the structure of the agricultural population and thus materializes the structural transformation.	PopRu10	WDI
Inequality	It is measured by the Gini index.	ReGini	SWIID version 8.2 de SOLT
financial development	It is represented by the value of credits granted to the private sector in relation to GDP.	PrivCrd	WDI
Polity2	The Polity2 index ranges from -10 (strong autocracy) to +10 (strong democracy).	Polity22	POLITYV
Civil liberties	The civil liberties defined are the aggregation of three sub-attributes: Access to justice, freedoms, and social rights and equality. This is the index of fundamental rights.	LiberCiv	IIDEA
Voice and accountability	It measures perceptions of the extent to which a country's citizens can participate in choosing their government, as well as freedom of expression, freedom of association and freedom of the media.	VoiAccount	WGI

Name of the variable	Description of the variable	Coding the variable	Source
Political stability and absence of violence	It measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism.	PolStab	WGI
Government effectiveness	It measures perceptions of the quality of public services, the quality of the civil service and its degree of independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to these policies.	GovEffet	WGI
Quality of the regulation	It measures the perceived ability of the government to formulate and implement sound policies and regulations that enable and promote private sector development.	QRegul	WGI
Rule of law	It measures perceptions of the extent to which agents trust and abide by the rules of society, and in particular the quality of contract enforcement, property rights, police and courts, and the likelihood of crime and violence.	RuLaw	WGI
Control of corruption	It provides a better understanding of the extent to which public power is exercised for private purposes, including both petty and grand forms of corruption, as well as the control of elites and private interests over the state.	CorupCont	WGI
Institutional Governance Quality Index	It is composed of two variables such as government effectiveness and regulatory quality.	IQgI	WGI
Economic Governance Quality Index	It is composed by the rule of law and the control of corruption.	IQgE	WGI
Average governance quality index	It is composed by the five indicators except voice and responsibility.	IQG5	WGI

Table A2. Country listed in study

South Africa	Congo	Kenya	Uganda
Angola	Ivory Coast	Lesotho	Senegal
Benin	Eswatini	Malawi	Seychelles
Botswana	Ethiopia	Mali	Sierra Léone
Burkina Faso	Gambia	Madagascar	Tanzanie
Burundi	Ghana	Namibia	Togo
Cameroon	Guinea-Bissau	Niger	Zambia
Cape Verde	Mauritius	Nigeria	Zimbabwe

Table A3. Correlation matrix with democracy factors

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) lnGovAgVa	1.000															
(2) lnTaxTot	0.222	1.000														
(3) lnGDPCH	0.015	0.813	1.000													
(4) lnGovCon	0.152	0.602	-0.522	1.000												
(5) lnReGovDebt	-0.443	-0.409	-0.195	0.083	1.000											
(6) lnAgVaGDP	-0.295	-0.815	-0.704	0.285	0.369	1.000										
(7) lnReXM	-0.003	-0.312	0.115	-0.129	0.384	0.067	1.000									
(8) lnFemLabor	-0.010	-0.550	-0.629	0.177	-0.113	0.256	-0.404	1.000								
(9) lnAgLandH	0.220	0.077	0.154	-0.142	0.089	-0.002	0.097	-0.345	1.000							
(10) lnAgW	0.142	-0.674	0.187	-0.022	-0.045	-0.274	0.131	-0.052	-0.358	1.000						
(11) lnPopRu10	0.064	-0.452	-0.836	0.530	0.204	0.677	0.088	0.356	-0.302	0.054	1.000					
(12) lnReGini	0.259	0.665	0.152	-0.192	-0.177	-0.261	0.264	0.046	-0.082	0.007	-0.061	1.000				
(13) lnPrivCrd	-0.005	0.823	0.219	0.224	-0.234	0.013	-0.181	-0.339	-0.258	-0.148	-0.063	-0.253	1.000			
(14) Polity22	-0.010	0.106	-0.086	0.041	0.065	0.259	0.232	-0.085	-0.264	0.525	0.292	-0.007	0.060	1.000		
(15) LiberCiv	0.075	0.043	0.437	-0.369	0.018	-0.069	0.207	-0.301	0.248	0.268	-0.331	-0.042	-0.036	0.465	1.000	
(16) VoiAcoun	0.113	0.220	0.219	-0.192	-0.065	0.020	0.235	-0.076	-0.072	0.435	-0.065	0.137	-0.027	0.754	0.748	1.000



Table A4. Correlation matrix with governance quality factors

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
(1) lnGovAgVa	1.000																					
(2) lnTaxTot	0.200	1.000																				
(3) lnGDPCH	-0.011	0.820	1.000																			
(4) lnGovCon	0.144	0.596	-0.529	1.000																		
(5) lnReGovDebt	-0.468	-0.351	-0.212	0.045	1.000																	
(6) lnAgVaGDP	-0.265	-0.816	-0.703	0.303	0.421	1.000																
(7) lnReXM	-0.007	-0.313	0.148	-0.214	0.339	0.049	1.000															
(8) lnFemLabor	0.020	-0.559	-0.621	0.195	-0.116	0.234	-0.427	1.000														
(9) lnAgLandH	0.229	0.051	0.137	-0.126	0.096	0.016	0.108	-0.339	1.000													
(10) lnAgW	0.085	-0.684	0.177	-0.057	-0.080	-0.239	0.126	-0.038	-0.367	1.000												
(11) lnPopRu10	0.082	-0.463	-0.835	0.518	0.213	0.683	0.049	0.341	-0.281	0.076	1.000											
(12) lnReGini	0.233	0.682	0.208	-0.264	-0.205	-0.305	0.267	0.057	-0.094	-0.003	-0.136	1.000										
(13) lnPrivCrd	-0.011	0.824	0.229	0.243	-0.208	0.002	-0.178	-0.337	-0.261	-0.167	-0.074	-0.225	1.000									
(14) PolStab	0.276	0.282	0.079	-0.326	-0.207	-0.064	0.063	0.303	0.213	-0.008	-0.158	0.358	-0.373	1.000								
(15) GovEffet	0.040	0.454	0.423	-0.334	-0.123	-0.090	0.279	-0.207	0.036	0.476	-0.156	0.172	-0.120	0.482	1.000							
(16) QRegul	-0.047	0.359	0.415	-0.262	-0.128	-0.049	0.169	-0.259	-0.024	0.357	-0.159	0.220	0.050	0.450	0.818	1.000						
(17) RuLaw	0.082	0.272	0.093	-0.265	-0.093	0.179	0.177	0.066	0.115	0.196	-0.016	0.160	-0.174	0.731	0.760	0.681	1.000					
(18) CorupCont	-0.026	0.487	0.056	-0.187	0.059	0.236	0.226	-0.001	0.225	0.079	-0.071	0.001	-0.143	0.553	0.653	0.626	0.797	1.000				
(19) IQgI	0.035	0.406	0.080	-0.242	-0.025	0.216	0.210	0.038	0.174	0.151	-0.043	0.092	-0.169	0.686	0.750	0.692	0.957	0.937	1.000			
(20) IQgE	-0.000	0.422	0.440	-0.316	-0.131	-0.075	0.240	-0.243	0.009	0.442	-0.165	0.204	-0.044	0.490	0.961	0.945	0.759	0.672	0.759	1.000		
(21) IQG5	0.112	0.422	0.229	-0.335	-0.134	0.035	0.199	0.030	0.149	0.227	-0.137	0.243	-0.217	0.820	0.842	0.801	0.936	0.832	0.937	0.863	1.000	

Table A5. The importance of the factors of democracy: MCGF model

Spécifications	(1)	(2)	(3)	(4)
Variables	lnGovAgVa			
lnTaxTot	-0.728*** (0.247)	-0.732*** (0.249)	-0.359 (0.234)	-0.480** (0.237)
lnGDPCH	1.123*** (0.250)	1.133*** (0.265)	0.351 (0.236)	1.015*** (0.267)
lnGovCon	0.230 (0.158)	0.232 (0.158)	0.209 (0.169)	0.248 (0.165)
lnReGovDebt	-0.0315 (0.0512)	-0.0308 (0.0540)	-0.204*** (0.0518)	-0.0210 (0.0529)
lnAgVaGDP	-1.697*** (0.220)	-1.692*** (0.220)	-1.881*** (0.246)	-1.814*** (0.223)
lnReXM	0.371*** (0.0802)	0.369*** (0.0817)	0.219*** (0.0773)	0.343*** (0.0834)
lnFemLabor	3.377*** (0.438)	3.384*** (0.459)	1.859*** (0.396)	3.259*** (0.488)
lnAgLandH	1.443*** (0.144)	1.441*** (0.144)	1.189*** (0.138)	1.419*** (0.144)
lnAgW	-0.000520 (0.101)	-0.000229 (0.101)	-0.0438 (0.105)	-0.0798 (0.101)
lnPopRu10	4.719*** (0.565)	4.732*** (0.576)	3.357*** (0.538)	4.302*** (0.572)
lnReGini	1.493*** (0.390)	1.488*** (0.392)	1.358*** (0.393)	1.418*** (0.396)
lnPrivCrd	0.513*** (0.126)	0.511*** (0.127)	0.393*** (0.127)	0.432*** (0.127)
Tendance			0.0380*** (0.00753)	
Polity22	-0.0249** (0.0120)	-0.0247* (0.0145)		
(Polity22) <sup>2</sup>		-0.000130 (0.00231)		
LiberCiv			1.408*** (0.498)	
VoiAccount				0.0119 (0.0950)
Constant	-39.23*** (5.109)	-39.39*** (5.316)	-20.43*** (4.246)	-34.29*** (5.559)
Years dummies	Yes	Yes	No	No
Observations	190	190	190	190
Wald test	566.2***	563.69***	456.43***	553.79***

Source: Author based on STATA 16. Standard errors are in parentheses,  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A6. The Importance of Governance Quality Factors: MCGF Model

Spécifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	lnGovAgVa							
lnTaxTot	-0.200 (0.243)	-0.532** (0.224)	-0.651** (0.290)	-0.486* (0.259)	-0.525** (0.230)	-0.458* (0.252)	-0.693** (0.269)	-0.522* (0.278)
lnGDPCH	0.183 (0.254)	1.134*** (0.286)	0.766** (0.308)	1.049*** (0.323)	1.056*** (0.246)	1.068*** (0.335)	1.321*** (0.327)	0.850** (0.336)
lnGovCon	0.310* (0.173)	0.252 (0.166)	0.117 (0.183)	0.169 (0.176)	0.241 (0.165)	0.185 (0.176)	0.169 (0.174)	0.117 (0.179)
lnReGovDebt	-0.205*** (0.0517)	-0.0249 (0.0541)	-0.259*** (0.0560)	-0.0397 (0.0643)	-0.0184 (0.0528)	-0.0418 (0.0642)	-0.0729 (0.0661)	-0.262*** (0.0592)
lnAgVaGDP	-1.732*** (0.243)	-1.785*** (0.229)	-1.468*** (0.265)	-1.699*** (0.255)	-1.797*** (0.226)	-1.707*** (0.256)	-1.655*** (0.240)	-1.321*** (0.279)
lnReXM	0.202** (0.0787)	0.358*** (0.0779)	0.289*** (0.0835)	0.376*** (0.0917)	0.358*** (0.0824)	0.362*** (0.0886)	0.376*** (0.0835)	0.306*** (0.0852)
lnFemLabor	1.079** (0.492)	3.417*** (0.466)	2.276*** (0.446)	3.417*** (0.582)	3.373*** (0.465)	3.360*** (0.582)	3.571*** (0.503)	2.447*** (0.493)
lnAgLandH	1.085*** (0.148)	1.449*** (0.147)	1.192*** (0.142)	1.418*** (0.159)	1.442*** (0.150)	1.395*** (0.154)	1.429*** (0.148)	1.223*** (0.145)
lnAgW	0.0585 (0.109)	-0.0680 (0.104)	0.0162 (0.117)	-0.0873 (0.112)	-0.0754 (0.101)	-0.105 (0.113)	-0.0453 (0.109)	-0.0179 (0.118)
lnPopRu10	2.849*** (0.582)	4.511*** (0.577)	3.829*** (0.645)	4.430*** (0.649)	4.369*** (0.529)	4.487*** (0.676)	4.862*** (0.639)	4.099*** (0.695)
lnReGini	1.021*** (0.393)	1.432*** (0.392)	1.885*** (0.483)	1.618*** (0.479)	1.435*** (0.393)	1.593*** (0.483)	1.763*** (0.468)	1.649*** (0.502)
lnPrivCrd	0.347*** (0.124)	0.430*** (0.125)	0.446*** (0.139)	0.399*** (0.139)	0.446*** (0.126)	0.369*** (0.142)	0.453*** (0.136)	0.307** (0.139)
Trend	0.0344*** (0.00777)		0.0469*** (0.00819)					0.0564*** (0.0102)
PolStab	0.202*** (0.0712)							
GovEffet		1.40414 *** (.12594)						
QRegul			-0.465*** (0.163)					
RuLaw				-0.139 (0.137)				
CorupCont					-0.0415 (0.126)			
IQgI						-0.00568 (0.00601)		
IQgE							-0.415** (0.180)	
IQG5								-

Spécifications	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	lnGovAgVa							
								0.0160*** (0.00584)
Constant	-13.01** (5.076)	-36.95*** (5.669)	-30.55*** (6.012)	-36.64*** (6.770)	-35.58*** (4.817)	-36.44*** (6.995)	-42.48*** (6.549)	-31.28*** (6.794)
Years dummies	No	Yes	No	Yes	Yes	Yes	Yes	No
Observations	190	190	166	166	190	166	166	166
Wald test	463.18***	564.37***	402.60***	450.55***	560.13***	447.06***	481.47***	359.37***

Source: Author from STATA 16. Standard deviations are in parentheses, \*\*\* p<0.01, \*\* p<0.05, \*p<0.1.

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