Ethnic Inclusiveness of the Central State Government and Economic Growth in Sub-Saharan Africa*

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Abstract

We estimate the effect of the share of ethnic groups included in the central government on economic growth, distinguishing between democracies and autocracies in a panel of 41 Sub-Saharan African countries over the period from independence to 1999. We exploit evidence from the Ethnic Power Relations database, which categorises the politically relevant ethnic groups regarding access to state power. We take advantage of the time variation of political participation, using Fixed-Effects, Difference-GMM and System-GMM estimations. Our dynamic-panel and error-correction growth models display a robust positive effect of the proportion of included groups in democracies. Such effect is offset in autocracies, and the difference is often significant. This finding withstands the introduction of various controls and specification checks. Our results support the view that institutional improvements must accompany the promotion of inclusiveness in low-income and weakly-institutionalised countries.

1 Introduction

Power sharing arrangements between ethnic groups are prevalent features in African politics. Francois et al. (2015) explain how leaders share power by conceding advantages to rival factions thus securing their positions.[1] Nevertheless, what are the economic consequences of these political circumstances? We investigate whether political inclusion is economically beneficial, thanks to new measures on the representation of ethnic groups in the central state decision instances, combined with commonly used institutional indicators.[2] The obvious advantage of inclusiveness is that broader strands of the population benefit from productivity-enhancing public goods. In comparison, the coordination problems engendered by multiple views in the public debate might create inefficiencies counterbalancing these gains, even more in weak institutional environments.[3] This issue is essential, as low income and divisions have been identified as root causes of internal conflicts (Collier and Rohner, 2008; Blattman and Miguel, 2010). Therefore, evaluating whether inclusiveness and power-sharing arrangements facilitate economic success in periods of stability in societies that follow the logic of clientelism and ethnic politics might reveal a way out of the poverty trap (Collier et al., 2003; Cammett and Malesky, 2012).

The role played by ethnic divisions in the incidence of conflicts and the deterioration of macroeconomic policies has been recognised as essential in explaining the underdevelopment of Sub-Saharan Africa.[4] Yet, the way in which the economic growth empirical literature accounts for ethnic diversity is still unsatisfactory as the Ethno-Linguistic Fractionalisation Index (ELF), which is the most commonly used measure, suffers from the absence of time-variation. Unfortunately, this shortcoming rules out the estimation of panel models, which deal with the endogeneity stemming from omitted variable bias (Caselli et al., 1996). Furthermore, the aggregation problem persists; i.e., there is no definite way to assess which fault line across groups is relevant concerning growth in each specific country. Regarding these concerns, we propose an alternative methodology based on the information contained in the Ethnic Power Relations database on the inclusion in the central government of all politically organised ethnic groups across time for a global sample of countries.[5] More pre-

[1] These authors gathered evidence of proportionality between political representation and demographic shares in the ethnic belonging of cabinet members in 15 African states. They describe the internal functioning of African polities and show that inclusion serves as a coup-proofing device.

[2] See Cederman et al. (2009).

[3] Indeed, it is not a priori clear whether a broader coalition is necessarily better. For instance, Besley and Kudamatsu (2007) and Easterly (2011) confirm that autocracies can be economically prosperous. Still, the detrimental consequences of exclusion cannot be understated. Concerning Ghana, Abdulai (2017) establishes that the central origin of the relative advancement of Northern and Southern regions is the exclusion of the lagging Northern regions from productive economic investments.

[4] See for instance Easterly and Levine (1997), Alesina et al. (2003), Alesina and La Ferrara (2005), Banful (2009), and Blattman and Miguel (2010).

[5] See Cederman et al. (2009), who empirically study the likelihood of armed rebellion and centre infighting in ethnically divided societies. They find that a large excluded population makes rebellion more likely and that

cisely, we estimate how the proportion of politically relevant ethnic groups included in the central state coalition affects economic prosperity in countries of Sub-Saharan Africa, taking into account the role of institutional quality. We estimate standard panel growth regressions with the logarithm of GDP per capita as dependent variable and error-correction panel models with first differences and levels.[6] This approach is possible thanks to the time dimension of the data. Instead of traditional diversity measures, our main explanatory variable is the number of groups included in the central state coalition divided by the total number of ethnopolitically relevant groups in the country. One notable improvement of this measure, as opposed to the conventional fractionalisation, is that it leaves open the question of which cleavage is salient and mobilised and allows differences between countries and over time. We interact this variable with an indicator reflecting the general ease to divert public resource towards ethnic-specific purposes constructed with the Polity IV Index (Marshall et al., 2017).[7]

Using Fixed-Effects, Difference-GMM and System-GMM estimations, we find a statistically significant positive effect of inclusion in our sample for country-years with strong institutions.[8] When institutions are weak, the effect is indistinguishable from zero and the difference compared with the strong-institutions impact is often negative and significant. Even if our results are robust to extensions up to 2010, we concentrate on the period before the year 2000 in our baseline because the 11th September attacks constitute an unprecedented event, which has influenced U.S. foreign policy, and the internal relationships between ethnic groups in developing countries. All estimations have country and year fixed-effects to account for constant country characteristics and global shocks, and our baseline controls include investment and government expenditure as shares of GDP. We show that the results are robust to the inclusion of additional controls for internal conflicts, coups, natural resources, openness to trade, official development aid, life expectancy and schooling and various specification checks. The baseline error-correction estimations imply that a change in the number of included groups from 2 to 3 out of 4 ethnopolitically relevant groups like the one that occurred in 1970, in Benin, a country with weak institutions at that time, would decrease per capita GDP growth by about 0.15% the next year. The same change would instead have resulted in a 1.5% increase in a strongly-institutionalised country. This figure compares well with the 13% long-run impact on the level of GDP as estimated in the dynamic panel data specification that displays an autocorrelation coefficient in GDP series around 0.9. Our results support the view that in low-income and weakly-

the number of competing elites in the power-sharing arrangement increases the probability of infighting.

[6] We use the evolution of GDP per capita as a measure of efficiency because it is not possible to distinguish productive from wasteful public spending in time-series macro-data. The fact that public spending as a share of GDP receives a negative coefficient in our estimations confirms this intuition.

[7] We use a binary variable based on an underlying threshold condition on the Polity IV Index from Marshall et al. (2017) to denote the ability to capture public resources. This index reveals how a country fares on an autocracy-democracy scale and the components of this index are related to the openness of the political process and how entrenched incumbent politicians are. Keefer and Vlaicu (2008) and Banful (2009) show that the ability to embezzle and institutions are intricately linked.

[8] We restrict the sample to Sub-Saharan African countries because of the particular relevance of ethnicity in politics in this region (Fearon, 1999).

institutionalised countries, the promotion of inclusiveness must be accompanied by institutional improvements.

2 Related Literature

It has been widely argued that ethnolinguistic diversity is a burden to economic development. The most extensively used measure of diversity, the Ethno-Linguistic Fractionalisation Index (ELF), has been built on data collected by Soviet ethnographers and recorded in the Atlas Narodov Mira. It has appeared in cross-country growth regressions, first, in Mauro (1995), as an instrument and, subsequently, in Easterly and Levine (1997), as an explanatory variable. Easterly and Levine (1997) and Alesina et al. (2003), for instance, find a negative relationship between ELF and growth, whereas Collier (2000) discovers that it is specific to non-democratic regimes. However, Posner (2004b) criticises the use of the ELF index on account of the fact it is based on outdated data and includes all the ethnographically distinct groups irrespective of the effective political organisation and access to state power. The ELF index sometimes uses the wrong cleavages for the issue studied.[9] To illustrate, Posner (2004c) studies the case of the Chewa and Tumbuka ethnic groups of both Zambia and Malawi. These groups are political allies in Zambia, where they account for a small part of the population, whereas, in Malawi, where each group is demographically large, they are adversaries.

Also, the theory of the relationship between diversity and development still lacks a clear and satisfactory causation mechanism. The logic of the ELF is inadequate because conflicts and inefficiencies are the outcomes not of everyday encounters between individuals, but rather the competition between ethnopolitical movements over the control of the central state (Cederman et al., 2009). For instance, Caselli and Coleman (2013) present a model with only two ethnic groups, which is undoubtedly a too restrictive assumption for our purpose. Ashraf and Galor (2011), for their part, present a micro-founded mechanism relating the cultural diversity among conformists and nonconformists in the population where fractionalisation enhances knowledge creation. However, because it has only two groups and treats cultural differences and transmission instead, this model is silent on the effect of ethnic divisions. The mechanism in Alesina and La Ferrara (2005) comes under a reduced form, where the variety of skills brought about by diversity increases the production possibility frontier but diversity as such drives the economy below this frontier.

In comparison, the importance of the functioning of the state underpins our approach, as opposed to considering conflicts between ethnic groups under the condition of state failure or assuming that it is ethnically neutral (Cederman et al., 2010). We consider the state as an institution that is captured by the elites of some ethnic factions. The new element here is that we deduce the aftermath

[9] Desmet et al. (2012) tackle this problem by trying to determine which level of aggregation in a linguistic tree is the most relevant for various matters: conflicts, economic performance or efficiency of public good provision. Unfortunately, this methodology does not integrate the possibility that different levels of aggregation are relevant in different countries.

of this rivalry regarding economic development. We adopt the constructivist idea of Posner (2004a) that ethnic groups are products of political and historical processes rather than fixed entities with foundations extending back in time. Their contractions, expansions, amalgamations, and divisions thus require measures of ethnic diversity that are variable over time.

To date, few papers have examined the interplay between inclusion, exclusion and comparative development. Birnir and Waguespack (2011) find a positive effect of inclusion of ethnic groups in the decision-making process in democracies thanks to the stability and support resulting from the included groups for the implemented policies. We construct our main independent variable similarly to their 'Ethnic Group Cabinet Inclusion', i.e., the proportion of electorally active ethnic groups represented in the cabinet in any given year. We elaborate by (1) using this variable in a sample of countries where the underlying mechanism is more likely to be challenged by inefficiencies, (2) interacting this variable with institutional indicators and (3) applying more advanced econometric techniques that treat the endogeneity problem.

A particularity of this investigation is that we account for an interaction of the share of included groups with institutions in the model specification. Rodriguez (2006) criticises the linear assumption of most growth models and shows that this leads to omitted variable bias if the actual relationship is non-linear. He suggests that adding interaction terms to the specification is a step towards resolving this issue. There are a few papers that study the effect of a particular variable on growth conditional on institutions. Among these, Collier (2000) finds that the level of ethnic diversity has detrimental effects on economic performance in the context of dictatorships, but that this effect disappears in democracies. Boschini et al. (2013) study a potential reversal of the resources curse by good enough institutions by interacting export shares of different primary commodities with an institutional index.[10] In a cross-sectional framework, Rodrik et al. (2004) find that institutions trump openness to trade and geography, two rival explanations. However, Acemoglu et al. (2008) find that once controlling for country fixed-effects, the relationship between development and what remains of short-term fluctuations in institutions disappears in both directions. Acemoglu et al. (2009) further add that, once fixed-effects are controlled for, the relationship between income and transitions from and to democracy has no statistical significance. These elements remove the potential concerns that the findings of this article could be engendered by short-term fluctuations in institutions only, and that there could be reverse causality from income to institutions even within a given country and in a short time span. Reverse causality is evident across countries or in the long run, but this is not a concern in our Fixed-Effects framework.[11] In the next section, we rationalise the basic mechanism of this article by a theoretical model.

[10] However, the absence of fixed-effects in their estimations casts doubt on the existence of omitted variable bias due to unobservable historical fixed country characteristics.

[11] Furthermore, Bueno de Mesquita and Downs (2005) show that economic recovery does not necessarily imply democratisation. Przeworski et al. (2000) discredit any notion of a trade-off between democracy and development, i.e., economic development does not engender democracies, but democracies are much more likely to survive in wealthy societies.

3 Strategic Contributions to the Public Good

The strategic nature of contributions to a public good justifies the link between participation in central power by ethnic groups, quality of the institutions, and economic performance. Indeed, many theoretical and empirical contributions buttress the relevance of ethnic divisions and public good provision for economic development, such as North (1990) and Besley and Ghatak (2010), which underline the role played by property rights. We integrate this element in a model with an institutional index capturing the ability of the agents to divert public resources towards members of their ethnicity. Following the models of coalition formation in weakly-institutionalised polities, such as Francois et al. (2015) and Driscoll (2008, 2012), we assume the existence of a winning coalition of ethnic groups jointly controlling the state. Since these theories imply that external and internal threats may affect the equilibrium coalition, we consider the consequences of a broader inclusion regarding economic performance. In our model, the essential arbitrage is between present consumption in the form of patronage and contribution to a common public good. Negative externalities result from patronage, which reduces a growth-enhancing public good. We construct a model where, beyond the institutional index, the ability to capture rents is affected by de facto power, i.e., the sway on the machinery of society or the threat posed to opposing factions, as in North (1990) and Acemoglu and Robinson (2006). Our model predicts that the strength of these negative externalities depends on the number of political actors, which operate against the effect of the larger fraction of the population included in the formal sector. Therefore, the inclusion of additional groups in the coalition is beneficial for economic growth, as long as the institutions of the country are good enough, which is in line with the empirical evidence of Section 4.

The population is composed of a set of N ethnicities, denoted $\mathcal{N}$. By assumption, there is a winning coalition $\mathcal{W}$ of ethnic groups in the central government, and we examine the effect on production of the inclusion of an additional ethnic group k in the winning coalition, which becomes $\mathcal{W} \cup \{k\}$. Each ethnicity has a size n_i and the size of the winning coalition is normalised to unity, i.e., $\sum_{i \in \mathcal{W}} n_i = 1$. For simplicity, this size corresponds simultaneously to de facto power and productive capacity. This share is related to the number of seats in the ministerial cabinet of an ethnic group, which is indeed proportional to the demographic share (Francois et al., 2015). Every player in the game observes such shares accurately, but not us, apart from the inclusion in the government.

The interactions between the members of this coalition materialise through an investment game to spend government income T, which stands for taxes, natural resources rents, foreign aid and seignorage. We assume that T is exogenously given, to separate the income of the government from the outcome of the political system of clientelism, characterised by the exchange of goods for political support (Robinson and Verdier, 2013; Wantchekon, 2003). Specifically, each ethnicity in $\mathcal{W}$ maximises its utility given by:

$$U_i(C_i, G) = \ln C_i + \beta \ln G \tag{1}$$

where $\beta < 1$ stands for the taste for public goods, reflecting the fact that groups value the ethnicity-specific spending more than the general spending. This assumption relates to the lack of cooperation observed in this context. The amount C_i is patronage directed by the elite of group i towards the members of their ethnicity. It includes geographically or culturally targeted public goods as well as sheer private advantages and does not contribute to productivity gains. The amount G is devoted to the general interest public spending, made up of infrastructures, health and education. This type of use raises the productivity of the workers in the formal sector, as expressed in the production function (6), below. The government budget constraint is

$$G + \sum_{i \in \mathcal{W}} C_i \quad = \quad T. \tag{2}$$

The role of de facto power in attracting resources appears in a limit on the amount C_i by the influence share n_i of the ethnicity in the winning coalition, expressed in the resource constraint (3).

$$C_i \quad \leq \quad n_i \, T(1 - D) \tag{3}$$

where D is an institutional index ranging from 0 to 1, which embodies how hard it is to embezzle public resource for patronage purposes. For instance when institutions are entirely autocratic, i.e., when $D = 0$, the constraint reduces to $C_i \leq n_i \, T$. In that case, all public resources are subject to diversion. At the opposite, when institutions are entirely democratic, i.e., when $D = 1$, the constraint reduces to $C_i = 0$, and there is no patronage.

The equilibrium C^* is such that each ethnicity chooses C_i^* to maximise (1) subject to (2) and (3) when the other ethnicities choose C_{-i}^*. In Appendix A, we show that this equilibrium exists and is unique, and describe it in Proposition 1, where $N_{\mathcal{S}}$ denotes the number of elements in a set of ethnic groups $\mathcal{S}$.

Proposition 1 *For a winning coalition $\mathcal{W}$,*

(i) there exist a unique partition $(\mathcal{S}, \mathcal{J})$ of $\mathcal{W}$ such that the equilibrium values are

$$C_i^* = \begin{cases} \left(1 + \sum_{j \in \mathcal{J}} n_j (D-1)\right) \frac{T}{N_{\mathcal{S}} + \beta} & \text{for } i \in \mathcal{S} \\ n_i \, (1 - D) \, T & \text{for } i \in \mathcal{J}. \end{cases} \tag{4}$$

(ii) Hence, the equilibrium public good quantity is

$$G^* \quad = \quad \frac{T \, \beta}{N_{\mathcal{S}} + \beta} \left(1 + \sum_{j \in \mathcal{J}} n_j (D-1)\right). \tag{5}$$

At the equilibrium, the ethnic groups of the winning coalition $\mathcal{W}$ are partitioned into two sets, $\mathcal{S}$ and $\mathcal{J}$, which contain respectively $N_{\mathcal{S}}$ and $N_{\mathcal{J}}$ elements. The set $\mathcal{S}$ contains the groups among $\mathcal{W}$ with

a more substantial influence, who have a slack resource constraint (3) and contribute to the public good G, while $\mathcal{J}$ contains the $N_{\mathcal{J}} = N_{\mathcal{W}} - N_{\mathcal{S}}$ other groups with less influence, who have a tight resource constraint (3) and do not contribute.

Part (i) of the proposition states that the groups in $\mathcal{J}$ distribute as much patronage as their resource constraint allows. For their part, the groups in $\mathcal{S}$ strategically capture a fraction of the remainder inversely proportional to $N_{\mathcal{S}} + \beta$, where $\beta < 1$ is the taste for public good. Part (ii) of the proposition gives the equilibrium public good provision, given in equation (5), where $N_{\mathcal{S}}$ is the number of contributing groups and $\sum_{j\in\mathcal{J}} n_j$ is the total size of the groups who are not contributing.

We deduce the consequences regarding economic performance of the equilibrium shift from $\mathcal{W}$ to $\mathcal{W} \cup \{k\}$, with a Cobb-Douglas production function:

$$Y = AK^{\alpha}L^{1-\alpha} \tag{6}$$

where A is a parameter capturing total factor productivity. For our closed-form results, we use $\alpha = 0.5$. We assume that the common public good spending G feeds the stock of capital K, which fully depreciates, i.e., $K = G$. Furthermore, we assume that the workers of the included groups are involved in the formal production process while the workers of the excluded groups are limited to an informal sector, not explicitly present in the model:

$$L = \sum_{i\in\mathcal{W}} n_i \, .$$

A broader inclusion triggers opposing forces. On the one hand, the effect of a greater workforce in the formal sector, $L = \sum_{i\in\mathcal{W}\cup\{k\}} n_i$ is positive. On the other hand, the inefficiency in public good provision engendered by the larger ruling coalition, is negative. The following proposition expresses the threshold for the institutional index above which inclusion is beneficial. Based on Francois et al. (2015), we assume that $\mathcal{W}$ contains the most influential ethnic groups and that k is the most influential group in the set of non-included groups $\mathcal{N} \setminus \mathcal{W}$, so that the composition of the set $\mathcal{S}$ remains unchanged.

Proposition 2

$$D > \frac{n_k + \sum_{i\in\mathcal{J}} n_i}{1 + n_k + \sum_{i\in\mathcal{J}} n_i}$$

is equivalent to

$$Y(\mathcal{W} \cup \{k\}, D) > Y(\mathcal{W}, D)$$

In other words, the output is greater with the broad coalition as long as the institutional index is above the threshold given by

$$\hat{D} = \frac{n_k + \sum_{i\in\mathcal{J}} n_i}{1 + n_k + \sum_{i\in\mathcal{J}} n_i}.$$

Proposition 2 provides us with a testable implication of the model, i.e., that inclusion is beneficial when institutions are good enough but becomes detrimental when they are below some threshold. We develop a framework to test this conjecture in the next section.

4 Empirical Strategy

In this section, we present our empirical investigation on the effect of the ethnic inclusiveness of the central government on economic growth in Sub-Saharan Africa. We pay attention to the evolution of GDP per capita with respect to the explanatory variables of interest: the share of ethnic groups included in the government, an institutional dummy and their interaction. To face potential econometric issues, we estimate dynamic panel data growth models (DPD) and growth error-correction models (ECM) with a range of techniques: Fixed-Effects (FE), Difference-GMM (DGMM) and System-GMM (SGMM) (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). The following subsections present the empirical model, the data, the econometric issues and the results.

4.1 Empirical Model

Equation (7) describes the baseline dynamic panel data growth model used in this article.

$$\begin{aligned} y_{i,t} &= (1-\beta)\, y_{i,t-1} + \alpha_1\, S_{i,t} + \alpha_2\, S_{i,t} * A_{i,t} + \alpha_3\, A_{i,t} \\ &\quad + \alpha_4\, X_{i,t} + \eta_i + \zeta_t + \epsilon_{i,t} \end{aligned} \tag{7}$$

The dependent variable $y_{i,t}$ is the log of real GDP per capita in country i in year t. As usual in this type of model, a lagged dependent variable $y_{i,t-1}$ is present among the independent variables and β is the rate of conditional convergence (Moral-Benito, 2010). $S_{i,t}$ is the explanatory variable of interest along with the interaction $S_{i,t} * A_{i,t}$, where $S_{i,t}$ is the share of ethnic groups included in the government in country i at time t. It is the ratio of the number of included groups relative to the total number of politically relevant ethnic groups.[12]

$$\mathsf{S}_{i,t} = \frac{\mathcal{W}_{i,t}}{\mathcal{N}_{i,t}}$$

$A_{i,t}$ is an autocracy dummy-variable, present also in non-interacted form. This insertion is necessary to ensure that the results are not provoked by institutions only. In the baseline specification, it takes

[12] $\mathcal{W}_{i,t}$ denotes the number of politically relevant ethnic groups included in the ruling coalition and $\mathcal{N}_{i,t}$ denotes the total number of politically relevant ethnic groups.

the value one when the Polity IV Index is negative and zero otherwise.[13]

$$A_{i,t} = \begin{cases} 1 & \text{if} \quad \text{Polity2}_{i,t} \leq 0 \\ 0 & \text{if} \quad \text{Polity2}_{i,t} > 0 \end{cases}$$

We express our main conjecture supported by Proposition 2, i.e., that the share of included groups has a positive effect on growth with democratic institutions and an attenuated effect in dictatorships in Hypothesis 1.

Hypothesis 1 : $\alpha_1 > 0 \quad \text{and} \quad \alpha_2 < 0$.

To improve the quality of our estimates, we control for country-specific time-varying factors that influence the dependent variable. The vector $X_{i,t}$ contains investment and government expenditure as shares of GDP, and in some specifications controls for internal conflicts, coups, the presence of diamonds and oil production per capita. The η_i's are country fixed-effects that are useful to diminish omitted variable bias. The ζ_t's are year fixed-effects. They are essential because they incorporate cyclicality at the level of the region and thus temper possible concerns that could arise when using a yearly panel.

We discuss here the assumptions underlying our estimations methods. For all Fixed-Effects estimations, the error term $\epsilon_{i,t}$ capturing all other omitted factors is supposed to be strictly exogenous, i.e.,

$$E[\epsilon_{i,t}|y_{i,t-1}, X_{i,t}, S_{i,t}, A_{i,t}] = 0 \tag{8}$$

for all i and t. The moment conditions (8) express that, given the values of the explanatory variables, $y_{i,t-1}, X_{i,t}, S_{i,t}$ and $A_{i,t}$, the error term is on average zero. These standard Fixed-Effects estimations constitute the first step to recognising the patterns linking the essential elements of our model even if, because of the presence of a Lagged Dependent Variable (LDV), these moments are in general not zero. This disparity is the reason why we use generalised methods of moments, which rely on more plausible conditions. Nevertheless, an advantageous feature of this specification already, is that the regressors can correlate with the fixed effects η_i under this assumption, without causing bias.

Based on Bond et al. (2001), for the Difference-GMM estimations, we assume instead that the error term of the equation in first difference is orthogonal to the instruments matrix that comprises the lagged explanatory variables in level, limited to lags up to three. Explicitly, we assume that the moment conditions

$$E[\Delta\epsilon_{it} y_{i,t-s-1}] = 0 \text{ and } E[\Delta\epsilon_{it} x_{i,t-s}] = 0 \tag{9}$$

[13] We consider this relationship using alternative measures of democracy in robustness check VII in Appendix.

for $t = 3, \ldots, T$ and $s = 1, 2, 3$ are valid so that we can use the explanatory variables as GMM-style instruments.

A potential drawback of estimating a model of the form (7) is that it includes non-stationary processes, like, for instance, the upward-trending GDP series. To circumvent this issue, we propose to estimate models in error-correction form where all variables enter in first difference and thus are not subject to non-stationarity only because of an upward trend. The past values of the dependent and the explanatory variables are also included and form the long-run or cointegrating relationship, assumed to be unique. As proposed in Engle and Granger (1987), we estimate the short-run dynamics and the long-run relationship of the error-correction model in one step, by including the lagged GDP per capita in level and all the lagged regressors in level involved in the long-run relationship in addition to the first differences. Equation (10) describes the baseline growth error-correction model.

$$\begin{aligned} \Delta y_{i,t} \quad = \quad & \theta_1 \, \Delta S_{i,t} + \theta_2 \, \Delta (S_{i,t} * A_{i,t}) + \theta_3 \, \Delta A_{i,t} + \theta_4 \, \Delta X_{i,t} \\ & + \beta_1 \, y_{i,t-1} + \beta_2 \, S_{i,t-1} + \beta_3 \, S_{i,t-1} * A_{i,t-1} + \beta_4 \, A_{i,t-1} + \beta_5 \, X_{i,t-1} \\ & + \xi_i + \nu_t + \epsilon_{i,t} \end{aligned} \tag{10}$$

This specification follows the panel version of the model of Engle and Granger (1987) proposed by Westerlund (2007). If the series are integrated of order one and if there exists a long-run cointegrating relationship between the variables, equation (10) involves only stationary processes and thus permits estimations unobscured by spurious correlations. The dependent variable is the first difference of the log GDP per capita in country i in year t. The short-run dynamics of the equation includes the first differences of the same variables as in the previous model, and the θ_j's are the short-run impact parameters. Here, the variables of interest are the first differences of $S_{i,t}$, denoted $\Delta S_{i,t}$ and the first differences of the interaction with the autocracy-dummy $\Delta (S_{i,t} * A_{i,t})$. Following Proposition 2, we can express our conjecture as[14]

$$\textbf{Hypothesis 2 :} \; \theta_1 > 0 \quad \text{and} \quad \theta_2 < 0.$$

Similarly, the error term is assumed to be strictly exogenous for the Fixed-Effects estimations of the ECM. For the Difference-GMM estimations, we assume the standard moment conditions again, similar to (9), but where the x_i's now are the explanatory variables of (10) instead. All the regressions include the ξ_i's country fixed-effects and the ν_t's year fixed-effects for the same reasons as above. We use the year fixed-effects as exogenous IV-style instruments in all estimations.

4.2 Data

The data are from the Penn World Tables (Heston et al., 2012), the Polity IV project (Marshall et al., 2017), the Ethnic Power Relation dataset version 3 (Cederman et al., 2009) and other sources.

[14] The focus here is on the short-run dynamics as the standard errors of parameters of the long-run relationship are not valid due to stationarity.

4.2.1 Dependent variable

Our dependent variable, the log real GDP per capita comes from the Penn World Tables version 7.1. We use the series *'rgdpch'* which is a chain method, and price deflated measure of production. The resulting series is thus more comparable across countries and time than nominal series. Even if such data are not perfect, they provide a proper proxy of relative wealth creation and have the advantage of being broadly available.

4.2.2 Independent Variables

1.*Main Explanatory Variable:* Our autocracy binary-variable is constructed with the Polity IV Index (series *'polity2'*). This index is based on evaluations of the competitiveness and openness of the electoral process, the restrictions in the political process and the constraints on the executive. It attributes values on a 21 points discrete scale ranging from -10 for perfect autocracy to +10 for perfect democracy to all countries and over time. One potential concern is that the interaction between institutions and inclusion is built on elements that measure the same aspects twice, but, on the contrary, the Polity IV project makes the greatest attempt at measuring the political environment rather than dictatorial choices (Glaeser et al., 2004) and does not already comprise information on the inclusion or exclusion of ethnic groups.[15]

The Ethnic Power Relations dataset contains the information on the inclusion and exclusion of politically relevant ethnic groups from the central government. Based on experts' assessments, this project codifies the status of each politically relevant ethnic group for each year in a global sample of countries. The status of the groups in power is either *'monopoly'*, *'dominant'*, *'senior partner'* or *'junior partner'*, and that of the groups excluded from central power is either *'separatist'*, *'powerless'* or *'discriminated'*. As in the study of Birnir and Waguespack (2011), the share of groups included in the government is the ratio of the number of groups with an included status relative to the total number of groups. The reason why we do not need to incorporate explicitly the distinct status types in our analysis is that it does not matter in the particular mechanism under consideration. This dataset has a major advantage compared with the Minorities at Risk data (Gurr, 1993), which concentrates exclusively on disadvantaged minorities and is thus unable to relate the dynamics of power in the central decision instances to economic performance outcomes.

[15]Indeed, there is a variable for Fragmentation in the dataset, which codes the presence of a separate polity in the territory, but this variable does not come in the Polity IV Index. The *'polity2'* index comprises elements of ethnic politics in the PARREG category, but all these are related to the political process in general and not to the outcome of whether particular ethnic groups are excluded or included in the central government. Furthermore, *'polity2'* adopts a coding scheme that attributes specific labels to typical political arrangements. The dichotomous approach that we use in the empirical analysis is well suited to capture the split between polities where the ethnic divisions in the government are likely to create inefficiencies, and those where not. In comparison, the fact that 'Competitiveness of Political Participation and Regulation of Participation' involves ethnic elements apprehends precisely the phenomenon that we want to measure.

2.*Baseline Controls:* We use other series from the Penn World Tables. The share of investment in GDP and the share of government expenditure in GDP are traditional controls in growth regressions. They affect long-run development through the capital stock and public infrastructures. These baseline controls are present in all our estimations.

3.*Additional Controls:* Above these baseline controls, we use a battery consisting of (i) coups, (ii) civil conflicts, (iii) oil production per capita and (iv) diamond production.[16] These controls are important because violence and political instability affect the ability of the state to provide a safe environment conducive to economic prosperity. Controlling for the presence of natural resources is also paramount as they affect the structure of the economy and the capacity of private agents to afford bribes and private advantages to the benefit of public officials. These two elements can in some cases seriously impede the capacity of the economy to grow.

Powell and Thyne (2011) provide coding of the coups that occurred worldwide between 1950 and 2010. It is a control in the equation. Coups are sharp illegal attempts by the military or other elite to overthrow the chief executive, which do not necessarily involve violence. The war variable derives from the listing of Fearon and Laitin (2003), combining various sources of information. These authors consider various internal conflicts, which have taken place post-1945 based on the following criteria: (1) the conflict involved fighting between the state and opposing forces, which tried to usurp control of the state, take power in a region or to change government policies, and (2) reaches 1,000 battle deaths per year in general and (3) 100 battle deaths per year on the side of the government. The variable used in our analysis is a dummy variable equal to one if an internal conflict was ongoing in the country-year and zero otherwise. Information on diamond and oil production per capita is present in Lujala et al. (2005). The information on diamonds takes the form of an indicator equal to one if the country produced diamonds in a given year and zero otherwise. The oil per capita variable is the total value of production divided by the population of the country, and the source is the CIA Factbook. Our estimation sample spans over from the year of independence to 1999. The panel is thus unbalanced because the independence dates of the countries of Africa differ. In our baseline, we use the largest sample for which the information needed is available.

Table I gives descriptive statistics of the main variables by country. Because our main approach involves within estimates, we give the pooled means and the within-country standard deviations of the main variables in Table II.

4.*Supplementary Controls:* We use Openness to Trade from the Penn World Tables, which equals the ratio of the sum of exports plus imports to GDP. Some other additional controls stem from the World Bank Development Indicators. We use life expectancy at birth and secondary schooling enrolment rates to stand for health and human capital and Official Development Aid as a share of GDP.

[16] We use data on coup occurrences from Powell and Thyne (2011). Fearon and Laitin (2003) provide the war data used in our analysis. The data on natural resources is from Lujala et al. (2005).

4.3 Econometric Issues

In the following subsection, we discuss the econometric issues faced and solutions of this investigation.

4.3.1 Endogeneity

Endogeneity is a prevalent concern in the traditional cross-country growth literature where correlations between the explanatory variables and unobservable productivity differences or fixed historical factors lead to inconsistency of the estimates (Caselli et al., 1996). Therefore, we use a panel data approach in this article, which is a reliable method to tackle such an issue because Fixed-Effects estimations take advantage of the within-countries fluctuations to remove unobserved heterogeneity, by differencing the influence of all fixed characteristics. A chief advantage of this method is that correlations between the explanatory variables and the fixed-effects do not create bias.[17]

To deal with the potential endogeneity issue due to the presence of a lagged dependent variable and other perhaps endogenous regressors, we use the Difference- and System-GMM estimation methods.[18] In macroeconomic empirical studies, most variables are interrelated and hence possibly endogenous thus complicating the causality interpretation. All variables expressed as percentages of income are necessarily endogenous in growth regressions as the denominator in these variables is GDP.[19] To resolve this problem, the Difference- and System-GMM estimation techniques were developed in a series of papers starting with Holtz-Eakin et al. (1988) and followed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). They use moment conditions on the lagged explanatory variables in level and first difference to solve endogeneity issues. It is assumed that past realisations of the instruments are uncorrelated with the error term. Caselli et al. (1996) were the first to use Difference-GMM in a panel cross-country growth context, but later Bond et al. (2001) argued in favour of System-GMM because the differenced variables are weak instruments for levels of GDP due to the persistence of the latter. Roodman (2009) warns that System-GMM must be

[17] Some other advantages of the panel data structure are the increase in the number of degrees of freedom, which leads to a more accurate parameter inference and the ability to uncover dynamic relationships (Hsiao, 2007). Because it ignores between-countries differences, this estimation method sometimes suffers from the lack of variation of right-hand side variables and thus possibly gives large estimated standard errors and insignificant results. Tables III and IV show that this is not the case in our empirical investigation. Moreover, the attenuation bias that pulls the estimates towards zero in the presence of positively auto-correlated series gives even more certainty to the significance of the results (Griliches and Hausman, 1986; Hauk and Wacziarg, 2009). A disadvantage is that it can only estimate the impact of variables that vary over time as the fixed effects control for all constant factors. Nevertheless, our Mundlak estimations presented in Table VI somehow circumvent this issue. Furthermore, we exploit the cross-country variability in the OLS estimations of Table XIII.

[18] The FE estimator is consistent only if residuals are not autocorrelated.

[19] To illustrate, Liberia is the largest commodity exporter, but this is because it has a very low GDP of 878 dollars per capita per year, ranked 181st out of 185 countries in the world.

handled cautiously and suggests limiting the instruments lag length, a remedy adopted here.

4.3.2 Non-Stationarity

A potential adverse effect of non-stationarity is spurious regression. Taking first differences of the variables stabilises the mean and consequently reduces the risk to draw false inference. Nevertheless, the specification of the Error Correction Model of equation (10) must be justified in relation to the estimation techniques that we use. Initially, the DGMM, and SGMM methods were designed to instrument for the endogeneity of a lagged dependent variable in a dynamic panel data model of the form of equation (7). In the ECM expressed in equation (10), this variable would be the lagged growth rate of GDP per capita, and we omit it from the regressors of our equation. Despite that, it is still relevant to use these estimation methods when the other explanatory variables are suspected to be endogenous, which is the case here. Moreover, the interpretation of the coefficients in terms of impact on growth is more sensible and straightforward with this formulation. Furthermore, the choice to include this variable should be based on its significance in the regression.[20] Besides, the equation that we use follows the standard ECM formulation proposed by Westerlund (2007).

4.3.3 Data Frequency

The preferred specifications of this article use a yearly panel. Usually, in cross-country panel growth regressions, averages over five-year periods or data spaced in time by five-year intervals are applied to diminish the consequences of measurement errors and cyclicality in the series (Durlauf et al., 2005). For instance, the papers of Islam (1995), Naudé (2004) and Acemoglu et al. (2008) belong to this line of research. However, Cerra and Saxena (2008) find that faster-than-normal recoveries do not necessarily follow crises or growth collapses and argue that it makes little sense to average over periods. Bond et al. (2010), Birnir and Waguespack (2011), Collier and Goderis (2012) and Boschini et al. (2013) perform the yearly panel alternative.[21] The vulnerability of this option to measurement error bias

[20] In the Fixed-Effects and System-GMM estimations, this term has a statistically insignificant coefficient if we add it to the regressors. In the DGMM estimations, the new term is significant at 5%, but as adding it does not alter the results, we prefer to take it out altogether to facilitate comparability and interpretation of the results.

[21] Boschini et al. (2013) use a yearly panel and a global sample of countries to investigate the resource curse. They interact various types of primary exports in GDP with institutional measures in level (Polity, ICRG) and find that democratic institutions moderate the curse. Birnir and Waguespack (2011) use a global yearly panel to estimate a dynamic panel data model. Their panel is unbalanced because they select only the country years with democratic institutions in their empirical analysis. Collier and Goderis (2012) study the short-run impact of commodity export prices on growth and prefer to use the original yearly data, with regional fixed-effects only. They find that commodity export price booms have favourable consequences for growth in the short-run but that, in the long run, non-agricultural booms create adverse effects in countries with weak institutions. Bond et al. (2010) use a yearly panel as well and find a positive connection between the investment rate and growth, thanks to the amount of variability in both series. They filter the adjustments to occasional shocks

and inconsistency resulting from cyclicality must be acknowledged even though here, the presence of year and country fixed-effects mitigate this issue, unlike in the examples given above.

Here, a yearly panel is preferable because the aggregation over prolonged periods is very likely to mask the effect as the timing of the institutional changes and variations in the number of included ethnic groups do not necessarily coincide with the period cut-off points. Moreover, with a yearly panel, the persistence of institutions and coalitions diminishes the endogeneity concern for the variables of interest. This reduction is due to the observation of multiple draws of the same data generating process with identical values of $A_{i,t}$ and $S_{i,t}$ over the years where the regime endures and is presumably exogenous. Moreover, the weakness of the linkage between development and short-term fluctuations in institutions moderates the risk of endogeneity bias due to this variable. Such a weak connection removes the potential concerns that the finding of this article could be engendered by institutions only and that there could be reverse causality from income to institutions even within a given country and in a short time span.

The sample used comprises 41 Sub-Saharan African countries from independence to 1999. Due to the specific independence date of each country, we use an unbalanced panel with various starting years, but once a country joins the sample, we have data for all years. In the robustness check of Table XI, we extend the sample to 2010.

4.3.4 Construction of the Autocracy Indicator

In this article, we account for the position of the country on the autocracy-democracy scale with a binary variable based on an underlying threshold condition on the *'polity2'* score. There is a debate among political scientists with supporters of dichotomous, polychotomous, continuous and multidimensional approaches to democracy (Przeworski et al., 2000; Boix et al., 2013). Dichotomous measures are better at capturing the necessary conditions for democracies and are more transparent, whereas continuous measures sometimes sum the components together and disregard how these interact in the political process. Acemoglu et al. (2009) study transitions from and to democracy using both approaches and find identical results, i.e., that the correlation between development and transitions is not statistically significant any more with fixed-effects. They criticise the modernisation hypothesis stating that economic growth generates democracy.

Here, we construct our autocracy index with a threshold of zero on the combined polity score. We use the same threshold as Epstein et al. (2006) for instance. The *'polity2'* combined score is calculated by the Polity IV project of Marshall et al. (2017) by subtracting the autocracy score from the democracy score, both calculated by adding values attributed to categories for each component. A classification associated with a democratic or autocratic functioning of the polity increases the corresponding score. This threshold of zero can thus be interpreted as the cut-off point above which a country is democratic rather than autocratic. Following the practical logic of Collier and Adcock (1999), who argue that the particular empirical question must guide this choice, the frequently-used

with a dynamic econometric specification.

threshold of +5 is not able to capture the different types of functioning between regimes in Africa. The change in the effect of inclusion is observed between autocracies and closed democracies rather than between intermediate regimes and full democracies.[22]

As recommended by Bogaards (2010), we justify our choice by empirical reasons. In fact, we tried the various possibilities of changing the threshold of the dichotomous index and using three regime categories. It appears that the threshold that we use is the most appropriate to capture this effect. Because our main strategy consists of within estimations, we inspected the time profiles of the main variables by country. For the Polity IV Index, we observed that *our threshold at zero captures most of the large variations of the Polity IV Index in the sample.* The index rarely crosses the +5 threshold. The interpretation of our finding is that when the institutions are above this threshold of zero, even if the country is not meeting the standards of advanced democracies, the functioning of the state is sufficiently good to make the efficiency gains of inclusion larger than the costs of patronage. The dichotomous approach is pertinent because of the linearity of our empirical models described in equations (7) and (10). Moreover, it is difficult to maintain that a change in the Polity IV Index from -8 to -3 would have the same effect as a change from -3 to +2 or a change from 3 to 8. The dichotomous measure that we use resolves this problem. In the robustness check of Table XIV, we estimate our model with the Autocracy in Level variable, instead of the indicator. We prefer our baseline results for their interpretation.

4.4 Results

We divide the presentation of the results in three parts. The following two subsections present the estimation results of (7), the baseline dynamic panel data growth model and (10), the baseline growth error-correction model. In the Appendix, we discuss the introduction of supplementary controls, Mundlak (1978) estimations, the use of alternative institutional measures, System-GMM estimations and various other robustness checks.

4.4.1 Baseline Dynamic Panel Data Growth Regression Estimates

Table III presents the estimates of equation (7) by FE (in columns 1 and 3) and by DGMM (in columns 2 and 4). We display the estimated coefficients with the country-level clustered robust standard errors below in parentheses. The variables 'War', 'Coup', 'Oil per Capita' and 'Diamond Production' are four additional controls added to the specification in columns 3 and 4. The estimated coefficient on 'Share of Included Groups' (SIG) is positive in all estimations, while the coefficient on the SIG-Autocracy interaction is always negative. Besides, in all estimations, the coefficient on the variable 'Share of Included Groups' is positive and statistically significant at the 1% level. In all FE estimations, the negative coefficient on the interaction is significant at 5%. In our preferred DGMM estimation with the additional controls, it is larger in absolute value than the coefficient of 'Share of Included Groups'

[22] This +5 threshold would be better suited for advanced economies.

and significant at 10%. The additional controls receive the expected signs. Oil and diamonds have favourable effects in the short run. 'War' and 'Coup' have negative estimated coefficients.[23]

The FE coefficient estimate of column 4 of 0.0578 implies that if the number of included groups rose from 2 to 3 out of 4 politically relevant ethnic groups like in Benin in 1970, then the GDP per capita would increase by around 13% in the long run, if the country had been a democracy.[24] To perceive the magnitude of this effect, we can compare it to the change in investment rate that would provoke an equivalent increase in GDP, which is 7.77%.[25] Given the average investment rates in these countries, this corresponds almost to an increase in investment by half. In a dictatorship like Benin in 1970, this political shift would have a smaller impact, provoking a 2% increase in long-run GDP.[26]

To investigate the validity of the DGMM regressions, we present the p-values of the AR(1) and AR(2) tests of serial autocorrelation in the residuals. The null hypothesis of the AR(1) test is the absence of first-order serial correlation. This order of autocorrelation is expected in the residuals of DGMM, and SGMM estimations and a rejection of the null is a normal situation (Roodman, 2009). The null hypothesis of the AR(2) test is the absence of second-order serial correlation. If this hypothesis is not rejected, we can use the dependent variable lagged two periods or more, and the other explanatory variables lagged one period or more as instruments.

The p-values of the Sargan and Hansen tests for the joint validity of the instruments are displayed. The Sargan test is not valid in the presence of heteroskedasticity while the Hansen test is robust to that. The null hypothesis holds that the instruments are valid and these statistics suggest that our instruments are indeed sound. Roodman (2009) states a caveat about this and warns against instruments proliferation that could break the validity of the Hansen-stat. We take measures to minimise such concern. The strategy adopted in this article is to limit the lag length of the instruments to three. Another verification is that using a range of estimation methods (FE, DGMM and SGMM) keeps the conclusion intact. This approach addresses the suspicion that the lack of transparency of SGMM could have led to significant results. An arbitrage must be carried out between the facts that FE and DGMM are more transparent than SGMM, but that DGMM and SGMM are better when endogeneity is present. In this study, the tests indicate that the lagged variables are credible instruments for DGMM and SGMM estimations. Besides, all estimations have standard errors that are robust to heteroskedasticity clustered at the country level. They also have year fixed-effects, used as IV-style instruments in the GMM estimations. GMM-style instruments comprise the explanatory variables lagged 1 to 3 periods.

[23] These results are available upon request.

[24] The short-run elasticity must be divided by one minus 0.887, the coefficient on lagged GDP per capita, to obtain the long-run elasticity. $\frac{0.0578}{1-0.887}\frac{1}{4} = 0.1279$. Using the figures in column 1, this estimated increase would be 17% instead.

[25] The short-run impact of the change is $0.0578\frac{1}{4} = 0.01445$. To match this with a change in investment requires an increase of $\frac{0.01445}{0.186} = 0.0777$.

[26] $\frac{0.0578-0.0484}{1-0.887}\frac{1}{4} = 0.02079$ where 0.0484 is the coefficient on the interaction between Autocracy and SIG.

4.4.2 Baseline Growth Error-Correction Model Regression

In Table IV, we present the estimates of equation (10). Columns 1 and 3 display FE estimates and columns 2 and 4 show DGMM estimates. In columns 3 and 4, we add the controls 'War', 'Coup', 'Oil per Capita' and 'Diamond Production' in the short-run dynamics and the long-run equilibrium relation. The short-run coefficient of the Share of Included Groups is positive and significant at least at the 5% level in all estimations. In the DGMM estimations of this table, we find that the coefficient of the interaction is negative and significant at 10 % in column 2 and at 1% in column 4, with the additional controls, where the negative short-run effect even becomes larger in absolute value than the positive effect. This finding suggests that including more groups in the coalition would at least not have a positive effect on growth in non-democracies.

The numerical values of these coefficients must be interpreted in terms of short-run dynamics. For the preferred specification in column 4 for instance, a change from two to three included groups in a country with four ethnopolitical factions, as before, would result in a growth of GDP per capita 1.52% higher the next year in a democracy. This number compares well with a 13% long-run impact on the level of GDP as estimated in the previous subsection. The estimated coefficient on lagged GDP was 0.887 which means that long-run impacts are slightly less than 10 times larger than short-run impacts, almost exactly what we find here. The short-run impact would be -0.15% in a non-democracy. Furthermore, the coefficient on $\Delta\text{Autocracy}_t$ is small and insignificant and changes sign across models, which is consistent with Acemoglu et al. (2009).

The signs of the explanatory variables of interest confirm the previous analysis. The share of included groups has a positive coefficient in the short run as well as in the long-run relation. The interaction receives a negative coefficient in all estimations both in the short-run and long-run and is significant in the short-run most of the time. The controls receive the expected signs as well.

The Appendix details the robustness analysis. We (V) add supplementary controls for life expectancy, openness to trade and official development aid to the ECM specification, (VI) estimate a random-effects model with the methodology of Mundlak (1978), (VII) use alternative measures of institutions instead of Polity IV, (VIII) estimate the dynamic-panel and error-correction models with System-GMM, (IX) assess the sensibility of our GMM estimates to changes in the lag structure of the instruments, (X) replace the share included groups by the share of the included population, (XI) extend the sample to 2010, (XII) add country-specific time trends beyond time fixed effects in the ECM, (XIII) estimate simple cross-sectional linear models, and (XIV) replace the autocracy indicator by a variable of the level of autocracy. The insights from these robustness checks are in line with our baseline results.

5 Conclusion

We predict that the inclusion of additional groups in the coalition is beneficial for economic growth as long as the institutions of the country are good enough. The reason is that when institutions are

weak, the negative externality resulting from having one more player in the political negotiation offsets the productivity gains from public goods. We cannot go as far as supporting the view that, in the absence of the first-best outcome of democracy, the second-best is a control shared by a limited number of insiders even if others have supported this type of idea. Glaeser et al. (2004) reveal that developing countries come out of poverty thanks to the good policies pursued by dictators and improve their institutions subsequently. Besley and Kudamatsu (2007) study successful autocracies in which a selectorate can depose a poorly performing dictator.

Since their independence, the countries of Sub-Saharan Africa, all ethnically and politically divided, have experienced various degrees of success regarding inclusiveness of the political process, quality of institutions and economic performance. We have explored empirically the conditions that make the inclusion of ethnic groups in the central state government beneficial regarding efficiency. We have suggested that the general enhancement of production brought about by a broader coalition may be offset in autocracies due to a coordination failure problem among ethnic factions in the provision of public goods.

We have shown empirically that the positive effect of inclusiveness is at least partially reduced in autocracies and that the total effect could even be non-significantly different from zero in these regimes. This positive effect is estimated to be a 1.5% gain in yearly GDP growth for an increase in the relative number of included groups of a quarter, an estimate almost perfectly in line with the 13% long-run estimate. We have found an institutional threshold below which the effect of inclusion on performance in autocracies is significantly lower than that in democracies. Whether a coalition is narrow or broad is almost irrelevant with low-quality institutions. Even though this result is disconcerting, it does not necessarily cast doubt on the promotion of ethnic inclusiveness in these societies. Instead, it might imply that *in low-income and weakly-institutionalised countries, the promotion of inclusiveness must be accompanied by institutional improvements*.

This work could be extended fruitfully by considering techniques specifically designed for the estimation of nonstationary heterogeneous panels like the pooled-mean group estimator of Blackburne (2007). Nevertheless, the main weakness of this type of work comes undoubtedly from the endogeneity problem. In these macroeconomic time series, all variables relate to each other. Because this interdependence is prevalent between institutions and income, we are cautious in interpreting our results causally. Due to the lack of good external instruments, we have to rely on methods of internal instrumentation.

Table I: **Descriptive Statistics by Country**

Variables	Angola		Benin		Botswana		Burkina Faso		Burundi		Cameroon	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	0.705	0.119	-0.100	0.144	1.241	0.636	-0.529	0.155	-0.772	0.194	0.539	0.183
Share of Included Groups	0.200	0.000	0.750	0.139	1.000	0.000	1.000	0.000	0.618	0.215	1.000	0.000
Autocracy	1.000	0.000	0.700	0.464	0.000	0.000	0.925	0.267	1.000	0.000	1.000	0.000
Investment over GDP	0.287	0.122	0.202	0.046	0.436	0.110	0.193	0.080	0.126	0.048	0.147	0.034
Government over GDP	0.369	0.085	0.109	0.022	0.093	0.021	0.143	0.033	0.140	0.038	0.059	0.010
War	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237	0.431	0.000	0.000
Oil per capita	1.949	0.857	0.021	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.307
Diamond Production	1.000	0.000	0.000	0.000	0.853	0.359	0.000	0.000	0.000	0.000	0.000	0.000
Coup	0.040	0.200	0.150	0.362	0.000	0.000	0.150	0.362	0.158	0.370	0.025	0.158
	CAR		Chad		Congo		Cote d'Ivoire		DRC		Eritrea	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	-0.216	0.193	-0.279	0.117	0.549	0.334	0.346	0.146	-0.573	0.410	-0.204	0.099
Share of Included Groups	0.645	0.163	0.449	0.196	0.495	0.206	0.570	0.072	0.208	0.056	1.000	0.000
Autocracy	0.825	0.385	1.000	0.000	0.800	0.405	1.000	0.000	1.000	0.000	1.000	0.000
Investment over GDP	0.104	0.036	0.073	0.021	0.316	0.143	0.121	0.052	0.206	0.097	0.249	0.065
Government over GDP	0.134	0.032	0.536	0.044	0.087	0.022	0.072	0.014	0.034	0.012	0.371	0.075
War	0.050	0.221	0.875	0.335	0.050	0.221	0.000	0.000	0.300	0.464	0.000	0.000
Oil per capita	0.000	0.000	0.000	0.000	2.054	1.420	0.029	0.040	0.020	0.018	0.000	0.000
Diamond Production	1.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000
Coup	0.075	0.267	0.150	0.362	0.150	0.362	0.025	0.158	0.050	0.221	0.000	0.000
	Ethiopia		Gabon		Gambia		Ghana		Guinea		Guinea-Bissau	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	-0.898	0.122	2.317	0.313	0.232	0.063	0.260	0.100	-0.267	0.088	0.038	0.100
Share of Included Groups	0.144	0.099	0.863	0.286	1.000	0.000	0.868	0.069	0.567	0.244	0.492	0.181
Autocracy	0.860	0.351	1.000	0.000	0.171	0.382	0.744	0.441	1.000	0.000	0.808	0.402
Investment over GDP	0.138	0.043	0.384	0.139	0.043	0.015	0.268	0.114	0.112	0.030	0.285	0.076
Government over GDP	0.065	0.021	0.062	0.018	0.139	0.038	0.077	0.020	0.057	0.011	0.088	0.047
War	0.440	0.501	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.272
Oil per capita	0.000	0.000	10.838	4.930	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.000
Diamond Production	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000
Coup	0.100	0.303	0.025	0.158	0.057	0.236	0.209	0.412	0.073	0.264	0.115	0.326

(*continued*)

	Kenya		Lesotho		Liberia		Madagascar		Malawi		Mali	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	0.090	0.044	-0.344	0.222	-0.320	0.710	-0.039	0.140	-0.605	0.186	-0.599	0.190
Share of Included Groups	0.639	0.039	1.000	0.000	0.351	0.172	0.838	0.237	1.000	0.000	0.588	0.192
Autocracy	0.919	0.277	0.706	0.462	1.000	0.000	0.775	0.423	0.833	0.378	0.800	0.405
Investment over GDP	0.141	0.040	0.330	0.159	0.129	0.054	0.101	0.021	0.382	0.146	0.190	0.043
Government over GDP	0.049	0.014	0.085	0.027	0.077	0.015	0.064	0.008	0.108	0.037	0.110	0.044
War	0.000	0.000	0.000	0.000	0.267	0.450	0.000	0.000	0.000	0.000	0.150	0.362
Oil per capita	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diamond Production	0.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Coup	0.027	0.164	0.088	0.288	0.100	0.305	0.050	0.221	0.000	0.000	0.075	0.267

	Mauritania		Mozambique		Namibia		Niger		Nigeria		Rwanda	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	0.321	0.307	-1.026	0.113	1.261	0.039	-0.314	0.257	0.304	0.206	-0.390	0.159
Share of Included Groups	1.000	0.000	0.600	0.136	0.545	0.000	0.221	0.148	0.379	0.261	0.500	0.000
Autocracy	1.000	0.000	0.760	0.436	0.000	0.000	0.850	0.362	0.700	0.464	1.000	0.000
Investment over GDP	0.192	0.107	0.136	0.043	0.266	0.060	0.178	0.059	0.152	0.075	0.089	0.039
Government over GDP	0.168	0.077	0.081	0.015	0.088	0.005	0.223	0.035	0.015	0.004	0.324	0.088
War	0.000	0.000	0.800	0.408	0.000	0.000	0.000	0.000	0.100	0.304	0.368	0.489
Oil per capita	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.866	0.493	0.000	0.000
Diamond Production	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Coup	0.100	0.304	0.040	0.200	0.000	0.000	0.125	0.335	0.175	0.385	0.053	0.226

	Senegal		Sierra Leone		Somalia		South Africa		Sudan		Swaziland	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	0.204	0.066	-0.304	0.222	-0.412	0.194	1.575	0.184	0.177	0.082	1.036	0.289
Share of Included Groups	1.000	0.000	0.575	0.134	1.000	0.000	0.419	0.232	0.077	0.000	1.000	0.000
Autocracy	1.000	0.000	0.744	0.442	1.000	0.000	0.000	0.000	0.900	0.305	1.000	0.000
Investment over GDP	0.110	0.032	0.052	0.016	0.233	0.025	0.216	0.040	0.033	0.024	0.542	0.095
Government over GDP	0.078	0.008	0.069	0.017	0.140	0.030	0.052	0.008	0.215	0.056	0.052	0.018
War	0.275	0.452	0.231	0.427	0.633	0.490	0.240	0.431	0.667	0.479	0.000	0.000
Oil per capita	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.083	0.005	0.020	0.000	0.000
Diamond Production	0.000	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.533	0.507
Coup	0.025	0.158	0.205	0.409	0.033	0.183	0.000	0.000	0.200	0.407	0.033	0.183

(*continued*)

	Tanzania		Togo		Uganda		Zambia		Zimbabwe	
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Log GDP per capita	-0.505	0.167	-0.030	0.168	-0.409	0.160	0.167	0.288	-0.928	0.173
Share of Included Groups	0.333	0.000	0.563	0.167	0.295	0.174	1.000	0.000	0.654	0.224
Autocracy	1.000	0.000	1.000	0.000	0.737	0.446	0.639	0.487	0.371	0.490
Investment over GDP	0.250	0.082	0.184	0.086	0.105	0.016	0.144	0.082	0.038	0.011
Government over GDP	0.221	0.049	0.122	0.028	0.161	0.010	0.176	0.055	0.232	0.087
War	0.000	0.000	0.000	0.000	0.368	0.489	0.000	0.000	0.371	0.490
Oil per capita	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diamond Production	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.458
Coup	0.000	0.000	0.075	0.267	0.132	0.343	0.083	0.280	0.000	0.000

Note: Table I contains the means and standard deviations of the main variables by country, for the years from independence to 1999.

Table II: **Descriptive Statistics: Pooled Means and Within-Country Standard Deviations**

Variables	Pooled Mean	Within-Country St. Dev.
Log GDP per capita$_t$	0.021	0.234
Share of Included Groups	0.639	0.142
Autocracy	0.801	0.293
Investment over GDP	0.187	0.074
Government over GDP	0.129	0.037
War	0.175	0.285
Oil per capita	0.418	0.847
Diamond Production	0.411	0.113
Coup	0.081	0.266

Note: Table II contains the means of the pooled data and within-country standard deviations of the main variables, for the years from independence to 1999.

Table III: **Baseline Dynamic Panel Data Growth Regression Estimates**

Dependent variable is Log GDP per capita in t				
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
Log GDP per capita$_{t-1}$	0.901***	0.788***	0.887***	0.735***
	(0.0271)	(0.0524)	(0.0290)	(0.0609)
Share of Included Groups	0.0684***	0.0807***	0.0578***	0.0449**
	(0.0192)	(0.0239)	(0.0192)	(0.0225)
Share of Included Groups * Autocracy	-0.0434**	-0.0415	-0.0484***	-0.0594*
	(0.0162)	(0.0273)	(0.0161)	(0.0304)
Autocracy	0.0169	0.0184	0.0177	0.0295
	(0.0120)	(0.0205)	(0.0114)	(0.0214)
Investment over GDP	0.177***	0.122**	0.186***	0.131*
	(0.0365)	(0.0620)	(0.0371)	(0.0676)
Government over GDP	-0.198***	-0.407***	-0.207***	-0.388***
	(0.0717)	(0.107)	(0.0739)	(0.122)
Additional Controls	No	No	Yes	Yes
Number of countries	41	41	41	41
Observations	1,420	1,376	1,420	1,376
R^2	0.891		0.893	
AR(1)-p		<0.001		<0.001
AR(2)-p		0.343		0.315
Sargan-p		0.002		<0.001
Hansen-p		1		1
Number of instruments		978		978

Note: *** p<0.01, ** p<0.05, * p<0.1. Baseline Dynamic Panel Data Growth Regression Estimates. See equation (7) in the text. Share of Included Groups interacted with Autocracy (polity2≤0) in Sub-Saharan African Countries. Fixed-Effects (in columns 1 and 3) and Difference-GMM (in columns 2 and 4) Estimations. Yearly panel over the period from independence to 1999. Robust standard errors clustered at the country level in parentheses. All regressions have country and year fixed-effects. In columns 3 and 4, we control for the additional controls, listed in subsection 4.2.2.2.

Table IV: **Baseline Error-Correction Model Growth Regression Estimates**

Dependent variable is Δ Log GDP per capita in t				
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
ΔShare of Included Groups$_t$	0.0521***	0.0847***	0.0451**	0.0607***
	(0.0180)	(0.0244)	(0.0193)	(0.0229)
ΔShare of Included Groups * Autocracy$_t$	-0.0330	-0.0440*	-0.0398*	-0.0668***
	(0.0217)	(0.0229)	(0.0220)	(0.0250)
ΔAutocracy$_t$	-0.00959	-0.00296	-0.00390	0.0134
	(0.0195)	(0.0163)	(0.0189)	(0.0175)
ΔInvestment over GDP$_t$	0.329***	0.229*	0.323***	0.223*
	(0.105)	(0.122)	(0.103)	(0.122)
ΔGovernment over GDP$_t$	-0.500***	-0.670***	-0.492***	-0.642***
	(0.134)	(0.187)	(0.132)	(0.203)
Log GDP per capita$_{t-1}$	-0.0793***	-0.351***	-0.0860***	-0.396***
	(0.0209)	(0.0588)	(0.0228)	(0.0635)
Share of Included Groups$_{t-1}$	0.0642***	0.140***	0.0561**	0.109***
	(0.0215)	(0.0334)	(0.0216)	(0.0308)
Share of Included Groups * Autocracy$_{t-1}$	-0.0420**	-0.0450	-0.0418**	-0.0743**
	(0.0175)	(0.0362)	(0.0173)	(0.0379)
Autocracy$_{t-1}$	0.0183	0.00555	0.0159	0.0239
	(0.0123)	(0.0257)	(0.0120)	(0.0249)
Investment over GDP$_{t-1}$	0.121***	0.125**	0.135***	0.156*
	(0.0271)	(0.0630)	(0.0284)	(0.0802)
Government over GDP$_{t-1}$	-0.107*	-0.530***	-0.120*	-0.526***
	(0.0577)	(0.156)	(0.0598)	(0.184)
Additional Controls	No	No	Yes	Yes
Number of countries	41	41	41	41
Observations	1,417	1,374	1,417	1,374
R^2	0.188		0.210	
AR(1)-p		< 1e-4		< 1e-4
AR(2)-p		0.579		0.567
Sargan-p		< 1e-4		< 1e-4
Hansen-p		1		1
Number of instruments		850		850

Note: *** p<0.01, ** p<0.05, * p<0.1. Baseline Growth Error-Correction Model Estimates. See equation (10) in the text. Effect of the first difference of the Share of Included Groups interacted with Autocracy (polity2≤0) in Sub-Saharan African Countries. Fixed-Effects (in columns 1 and 3) and Difference-GMM (in columns 2 and 4) Estimations. Yearly panel over the period from independence to 1999. Robust standard errors clustered at the country level in parentheses. All regressions have country and year fixed-effects. In columns 3 and 4, we control for the additional controls, listed in subsection 4.2.2.2.

Appendix A: Proofs

Proposition 1

Proposition 1 here is a corollary of Proposition 1 in Pecher (2018). The maximisation problem expressed in equations (1) to (3) is equivalent to the problem of Proposition 1 in Pecher (2018), by replacing x^i by C_i, $Y_t - X$ by G, and $\beta\alpha$ by β in $\nu^i(x^i, X)$ to obtain equation (1) in this article, and C_t^i by C^i and $P_t^i\ Y_t$ by $n_i\ T\ (1 - D)$ in the resource constraint (3) to obtain the resource constraint (3) in this article.

Proposition 2

Using Proposition 1 and the production function (6), the output with a coalition $\mathcal{W}$ and an institutional index D is

$$Y(\mathcal{W}, D) = A \sqrt{\frac{\beta\, T}{N_{\mathcal{S}} + \beta} \left((\mathrm{D} - 1) \sum_{i \in \mathcal{J}} n_i + 1 \right)}. \tag{11}$$

The output with the broad coalition $\mathcal{W} \cup \{k\}$ and an institutional index D is

$$Y(\mathcal{W} \cup \{k\}, D) = A \sqrt{\frac{\beta\, T}{N_{\mathcal{S}} + \beta} \left((\mathrm{D} - 1)(n_k + \sum_{i \in \mathcal{J}} n_i) + 1 \right) (1 + n_k)}. \tag{12}$$

To establish Proposition 2, a lemma is that the difference between the output with a broad and a narrow coalition decreases when institutions improve. By the monotonicity of the square root function, this is the case because

$$\left((\mathrm{D} - 1)(n_k + \sum_{i \in \mathcal{J}} n_i) + 1 \right) (1 + n_k) - \left((\mathrm{D} - 1) \sum_{i \in \mathcal{J}} n_i + 1 \right) \tag{13}$$

is an increasing function of D. The threshold $\hat{D}$ is obtained by reducing (13) equal to zero with respect to D.

Appendix B: Robustness Analysis

(V) Supplementary Controls

Table V reports the results of FE and DGMM estimations of the Error-Correction Model of equation (10) with supplementary controls compared with Table IV. The instrumentation is similar to that of

the previous table. In columns 1 and 2, life expectancy and secondary schooling are added to the long-run relationship and in the short-run dynamics. This addition substantially diminishes the sample size as these variables are not available for all country-years of the initial sample. Nevertheless, this does not alter the main finding of the present paper. These two new control variables receive very small coefficients reflecting the fact that they are already accounted for in the fixed effect due to their small time-variability.

In columns 3 and 4, we add openness to the specification. Again, this does not change the conclusion. Openness has a negative and significant coefficient. In the DGMM estimation of column 4, we see again, as in Table IV, column 4, that the coefficient on the interaction is larger in absolute value than the coefficient on SIG. In columns 5 and 6, aid is added to the specification. Likewise, this does not change the conclusion. Aid receives a negative coefficient, but this is probably due to a reverse causality. This coefficient surely cannot be interpreted as a causal effect. In the DGMM estimation of column 6, the coefficient on the interaction is again larger in absolute value than the coefficient on SIG.

(VI) Random-Effects model with the methodology of Mundlak (1978)

In Table VI, we estimate a Random-Effects Model with the specification proposed by Mundlak (1978) as expressed in equation (14).

$$\begin{aligned} y_{i,t} &= (1-\beta)\, y_{i,t-1} + \alpha_1\, S_{i,t} + \alpha_1\, S_{i,t} * A_{i,t} + \alpha_3\, A_{i,t} \\ &\quad + \alpha_4\, X_{i,t} + \alpha_5\, \overline{Z}_i + \zeta_t + v_{i,t} \end{aligned} \tag{14}$$

This equation is similar to (7), but estimated with random effects. The country means $\overline{Z}_i$'s of all explanatory variables are added to the regressors and stand for the fixed effects. Mundlak (1978) shows that this estimation accurately reproduces the Fixed-Effects estimates for the time-varying controls in the case of a perfectly balanced panel. This result is generalised to the case of an unbalanced panel in Verheyden (2015) and is verified here, except for a small imprecision due to machine roundings. These results confirm the conclusions of the paper. In column 1, we estimate the model without additional controls. We add them in columns 2 and 3. Additionally, we augment the specification in column 3 with a vector of fixed country characteristics from the CIA Factbook, for imperial past, mountainous terrain, landlocked country, tropical region, export of oil and export of primary products. The estimations confirm the sign, magnitude and significance of our previous results.

(VII) Alternative Measures of Institutions

Instead of using the Polity IV Index, we replicate our estimations using two alternative measures of democracy, the Democracy Index of Vanhanen (2000) and the *'constraint on the executive'* variable of the Polity project. Vanhanen's Democracy Index is a parsimonious measure based exclusively on participation and competition of the electoral process. It excludes, for instance, elements linked to civil

and political liberties, at least directly. Compared with Polity, it has the advantage of being based on documented electoral and non-electoral data on political events, instead of subjective evaluations. This measure is highly correlated with Polity. We use the threshold value of 6, approximately equal to the sample mean, to reconstruct the Autocracy indicator. Our second alternative, '*constraint on the executive*', is a subcategory of the Polity IV Index (EXCONST). It refers to the degree of institutionalised constraints on the decision-making powers of the government by various kinds of accountability groups. We use a threshold of 4 to denote autocracies, that is, countries where the limitations on executive authority are not considered substantial.

In Table VII, we present the estimates of the error-correction model in (10), but instead using the Constraints on the Executive to construct the autocracy index in columns 1 to 2, and then using Vanhanen's Democracy Index instead in columns 3 to 4. The finding is the same except that the interaction is not significant any more. However, the conclusion that the sum of the coefficients of the short-run impacts of inclusion $\theta_1 + \theta_2$ is not statistically different from zero remains.

(VIII) System-GMM

In Table VIII, we display estimates of the DPD and ECM models (equations (7) and (10)). For the System-GMM estimations, we add the standard moment conditions

$$E[u_{it}\Delta y_{i,t-1}] = 0 \text{ and } E[u_{it}\Delta x_{i,t}] = 0 \tag{15}$$

for $i = 1, \ldots, N$ where $u_{it} = \eta_i + \epsilon_{it}$ is the combined error term. These moment conditions express that first differences of the explanatory variables are uncorrelated with the combined error term. For the DPD estimations, the signs of the coefficients concur with our previous findings. In the ECM, the magnitude and the significance are also reflected. For the SGMM estimations, we adapt the instrumentation to gain precision and to diminish the instrument count. Only the explanatory variables that appear in first-difference in equation (10) lagged 1 to 2 periods are used as GMM-style instruments. The lagged variables in level are considered predetermined and accordingly not included as GMM-style instruments. Again, all estimations have year fixed-effects, and standard errors displayed in parentheses are robust to heteroskedasticity clustered at the country level. The year dummies are used as IV-style instruments in all GMM estimations. We add the conditions expressed in (15) to the system, but where $x_{i,t}$ now includes only the variables in first difference. We consider the lagged variables of the long-run relationship as predetermined in the System-GMM estimations of the ECM. These variables are in consequence not used as GMM-style instruments. This alternative increases the precision of the estimation because it tames the collinearity caused by using the System-GMM estimator, which involves moment conditions with levels and first differences together with an ECM model that has explanatory variables in level and first difference. It also helps in reducing the instrument count.

(IX) Instruments Lag Structure in Difference-GMM and System-GMM.

In Table IX, we verify the robustness of the results of Table IV and VIII to changes in the lag structure of the GMM instrumentation. In columns 1 to 4, we use lags 1 to 4 instead of lags 1 to 3 of the explanatory variables as instruments. In columns 5 and 6, we use lags 1 to 5 instead. In columns 3 to 6, we add the additional controls. The general result does not change substantially.

(X) Share of Included Population Interacted with Autocracy (polity2$\leq$0)

Related to the idea of Cederman et al. (2009) that large portions of the population excluded from central power generate conflicts, we construct a variable 'Share of the Included Population', which is one minus the share of the excluded population, taken from the EPR dataset. Table X is a variation to Table IV, where we replace the 'Share of Included Groups' by the 'Share of the Included Population'. The signs of the main variable are the same as in the baseline, with larger values and stronger significance for the negative coefficients of the interaction between autocracy and inclusion.

(XI) ECM with Samples Extended to 2010

In Table XI we replicate the estimations of the Error Correction Models with samples extended to years from 2000 to 2010, with solely the baseline controls as the control variables from Lujala et al. (2005) are not available after 1999. Columns 1a and 1b display Fixed-Effects estimates and columns 2a and 2b display Difference-GMM estimates. The significance and value of the estimates are stable regarding changes in the final year of the sample.

(XII) ECM with Country-Specific Time Trends

Because the combination of country fixed-effects and year fixed-effects in the long run relationship corresponds to country-specific time trends in the equation in first difference, we extend the specification of our ECM model (10) with country-specific time trends. The results confirm our baseline, even in the eventuality that the valid description of the data generating process is a long run relationship with this combination of fixed effects. The results are in Table XII. The sign and significance of our coefficients of interest confirm the baseline results.

(XIII) Ordinary Least Squares with Country-Averages

In Table XIII, we estimate ordinary least squares models with country-averages. The dependent variable is the mean growth rate of a country over the period. The explanatory variables are the means by country of the variables contained in $X_{i,t}$. In column 1, we use the full sample of observations from the panel and model the differential effect of inclusion with an interaction. The signs correspond but, because of the small sample size, we are not able to detect any significant effect. In columns 2 and 3, we differentiate the effect by reconstructing the means using subsamples of observations responding to the autocracy and democracy observations from the panel. The variable 'Mean Share of Included Groups' is positive and significant at the 10% level only in the democracy sample.

(XIV) ECM With Polity IV Index in Level

In Table XIV, we replicate the estimations of the Growth Error-Correction Model, with the Autocracy variable reconstructed using the level of Polity IV, instead of a binary indicator.

$$\text{Autocracy Level} = -\frac{\text{polity2} - 10}{20} \tag{16}$$

The new variable 'Autocracy Level' varies thus discretely between zero and one. A value of zero corresponds to a Polity IV Index of 10, and a value of one corresponds to a Polity IV Index of -10. We obtain similar signs and significance for our variables, but we still prefer our baseline for its interpretation.

Table V: **Supplementary Controls**

Dependent variable is Δ Log GDP per capita in t						
	(1)	(2)	(3)	(4)	(5)	(6)
	FE	DGMM	FE	DGMM	FE	DGMM
ΔShare of Included Groups$_t$	0.0797**	0.128***	0.0338	0.0743***	0.0440*	0.0712**
	(0.0320)	(0.0343)	(0.0212)	(0.0218)	(0.0259)	(0.0293)
ΔShare of Included Groups * Autocracy$_t$	-0.0674**	-0.110***	-0.0277	-0.0694***	-0.0439	-0.0810***
	(0.0313)	(0.0340)	(0.0233)	(0.0265)	(0.0284)	(0.0303)
ΔAutocracy$_t$	0.0306*	0.0624***	-0.00496	0.0171	0.00349	0.0212
	(0.0159)	(0.0224)	(0.0205)	(0.0189)	(0.0243)	(0.0235)
ΔInvestment over GDP$_t$	0.323**	0.376***	0.285***	0.213*	0.371***	0.336***
	(0.135)	(0.128)	(0.103)	(0.123)	(0.0802)	(0.0823)
ΔGovernment over GDP$_t$	-0.213	-0.233	-0.405**	-0.549**	-0.336***	-0.408***
	(0.198)	(0.242)	(0.169)	(0.218)	(0.0999)	(0.141)
Log GDP per capita$_{t-1}$	-0.113**	-0.367***	-0.100***	-0.336***	-0.0959***	-0.340***
	(0.0423)	(0.0458)	(0.0247)	(0.0719)	(0.0261)	(0.0856)
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	37	37	39	39	38	38
Observations	615	538	1,205	1,163	1,122	1,080
R^2	0.258		0.215		0.254	
AR(1)-p		<0.01		<0.001		<0.001
AR(2)-p		0.865		0.757		0.659
Sargan-p		0.0251		<1e-7		<1e-5
Hansen-p		1		1		1
Number of instruments		457		800		774

Note : *** p<0.01, ** p<0.05, * p<0.1. Growth Error-Correction Model Estimates with Additional Controls, listed in subsection 4.2.2.2. See equation (10) in the text. We control for life expectancy and secondary schooling (in 1 and 2), openness to trade (in 3 and 4) and official development aid (in 5 and 6); see section 4.2.2.3. Effect of the first difference of the Share of Included Groups interacted with Autocracy (polity2≤0) in Sub-Saharan African Countries. Fixed-Effects (in columns 1, 3 and 5) and Difference-GMM (in columns 2, 4 and 6) Estimations. Robust standard errors clustered at the country level in parentheses. All regressions have country and year fixed-effects.

Table VI: **Mundlak Estimations**

Dependent variable is Log GDP per capita in t			
	(1)	(2)	(3)
	RE	RE	RE
Log GDP per capita$_{t-1}$	0.905***	0.891***	0.888***
	(0.0246)	(0.0266)	(0.0286)
Share of Included Groups	0.0680***	0.0579***	0.0559***
	(0.0190)	(0.0190)	(0.0196)
Share of Included Groups * Autocracy	-0.0441***	-0.0493***	-0.0472***
	(0.0160)	(0.0161)	(0.0169)
Autocracy	0.0165	0.0175	0.0156
	(0.0121)	(0.0113)	(0.0122)
Investment over GDP	0.177***	0.187***	0.189***
	(0.0357)	(0.0363)	(0.0364)
Government over GDP	-0.199***	-0.207***	-0.205***
	(0.0719)	(0.0739)	(0.0751)
Additional Controls	No	Yes	Yes
Fixed-Country Characteristics	No	No	Yes
Number of countries	41	41	41
Observations	1,420	1,420	1,420

Note : *** p<0.01, ** p<0.05, * p<0.1. Random-Effects Estimations of the Baseline Dynamic Panel Data Growth Regression with the methodology of Mundlak (1978). See equation (14) in the text. Share of Included Groups interacted with Autocracy (polity2≤0) in Sub-Saharan African Countries. Yearly panel over the period from independence to 1999. Robust standard errors clustered at the country level in parentheses. All regressions have year fixed-effects. In columns 2 and 3, we control for the additional controls, listed in subsection 4.2.2.2. Undisplayed additional controls for fixed country characteristics are used in column 3. We control for imperial past, mountainous terrain, landlock, tropical region, export of oil and export of primary products. The sample comprises Sub-Saharan countries. All regressions have year fixed-effects.

Table VII: **Alternative Institutional Measures**

Dependent variable is Δ Log GDP per capita in t				
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
ΔShare of Included Groups$_t$	0.0551***	0.0416	0.0578**	0.0791**
	(0.0191)	(0.0271)	(0.0259)	(0.0356)
ΔShare of Included Groups * Autocracy$_t$	-0.0347	-0.00655	-0.0356	-0.023
	(0.0213)	(0.0292)	(0.0272)	(0.0336)
ΔAutocracy$_t$	0.00932	-0.00466	0.00592	-0.0232
	(0.0158)	(0.0154)	(0.0238)	(0.0241)
ΔInvestment over GDP$_t$	0.327***	0.218*	0.327***	0.223*
	(0.105)	(0.126)	(0.106)	(0.129)
ΔGovernment over GDP$_t$	-0.502***	-0.670***	-0.499***	-0.687***
	(0.133)	(0.177)	(0.136)	(0.183)
Number of countries	41	41	41	41
Observations	1,417	1,374	1,417	1,374
R^2	0.182		0.185	
AR(1)-p		$<$ 1e-4		$<$ 1e-4
AR(2)-p		0.571		0.584
Sargan-p		$<$ 1e-4		$<$ 1e-4
Hansen-p		1		1
Number of instruments		841		875

Note: *** p$<$0.01, ** p$<$0.05, * p$<$0.1. Other Institutional Measures: Constraints of the Executive (in 1 and 2) and Vanhanen's Democracy index (in 3 and 4). Baseline Growth Error-Correction Model Estimates. Share of Included Groups interacted with Autocracy constructed with the alternative measure, in Sub-Saharan African Countries. Yearly panel. Robust standard errors clustered at the country level in parentheses. Columns 1 and 3 display Fixed-effects estimates and columns 2 and 4 display Difference-GMM estimates. The sample comprises Sub-Saharan countries. All regressions have country and year fixed-effects.

Table VIII: **System-GMM Estimations**

Model	DPD		ECM	
	(1)	(2)	(3)	(4)
	SGMM	SGMM	SGMM	SGMM
Share of Included Groups	0.0251*	0.0211	0.0497***	0.0415**
	(0.0161)	(0.0180)	(0.0208)	(0.0221)
Share of Included Groups * Autocracy	-0.0177	-0.0156	-0.0397*	-0.0423*
	(0.0161)	(0.0180)	(0.0208)	(0.0221)
Autocracy	-0.00791	-0.0119	-0.00978	-0.00692
	(0.00993)	(0.0112)	(0.0187)	(0.0193)
Investment over GDP	0.107***	0.101***	0.313***	0.298***
	(0.0201)	(0.0232)	(0.102)	(0.0996)
Government over GDP	-0.00315	0.00654	-0.469***	-0.457***
	(0.0232)	(0.0238)	(0.135)	(0.132)
Additional Controls	No	Yes	No	Yes
Observations	1,420	1,420	1,417	1,417
Variables in	Level	Level	Δ	Δ
AR(1)-p	$<$0.001	$<$0.001	$<$0.001	$<$0.001
AR(2)-p	0.222	0.213	0.478	0.546
Sargan-p	0.043	0.039	$<$0.001	0.003
Hansen-p	1	1	1	1
Number of instruments	1,230	1,230	851	855

Note: *** p$<$0.01, ** p$<$0.05, * p$<$0.1. Baseline Dynamic Panel Data and Growth Error-Correction Model Estimates. Share of Included Groups interacted with Autocracy (polity2$\leq$0) in Sub-Saharan African Countries. System-GMM Estimations. Yearly panel. Robust standard errors clustered at the country level in parentheses. Columns 1 and 2 display System-GMM estimates of the DPD and columns 3 and 4 display System-GMM estimates of the ECM. All regressions have country and year fixed-effects.

Table IX: **Lag Structure in the Difference-GMM and System-GMM Estimations**

	Dependent variable is Δ Log GDP per capita in t					
	(1)	(2)	(3)	(4)	(5)	(6)
	DGMM	SGMM	DGMM	SGMM	DGMM	SGMM
ΔShare of Included Groups$_t$	0.0677***	0.0466**	0.0519**	0.0385*	0.0565***	0.0314
	(0.0212)	(0.0192)	(0.0227)	(0.0208)	(0.0194)	(0.0203)
ΔShare of Included Groups * Autocracy$_t$	-0.0250	-0.0359*	-0.0383*	-0.0383*	-0.0424*	-0.0293
	(0.0229)	(0.0204)	(0.0232)	(0.0214)	(0.0225)	(0.0199)
ΔAutocracy$_t$	-0.0171	-0.0123	-0.00649	-0.00960	-0.00654	-0.0155
	(0.0196)	(0.0183)	(0.0182)	(0.0187)	(0.0201)	(0.0173)
ΔInvestment over GDP$_t$	0.263**	0.320***	0.256**	0.305***	0.289***	0.317***
	(0.108)	(0.101)	(0.107)	(0.0986)	(0.0985)	(0.0965)
ΔGovernment over GDP$_t$	-0.585***	-0.477***	-0.564***	-0.463***	-0.496***	-0.484***
	(0.150)	(0.130)	(0.155)	(0.128)	(0.129)	(0.129)
Additional Controls	No	No	Yes	Yes	Yes	Yes
Lags	1-4	1-3	1-4	1-3	1-5	1-4
Number of countries	41	41	41	41	41	41
Observations	1,374	1,417	1,374	1,417	1,374	1,417
AR(1)-p	$<$0.001	$<$0.001	$<$0.001	$<$0.001	$<$0.001	$<$0.001
AR(2)-p	0.535	0.486	0.568	0.556	0.541	0.573
Sargan-p	$<$1e-4	0.014	$<$1e-4	0.032	0.078	0.267
Hansen-p	1	1	1	1	1	1
Number of instruments	1,072	1,078	1,072	1,078	1,262	1,291

Note : *** p$<$0.01, ** p$<$0.05, * p$<$0.1. Changes in the lag structure of the GMM instrumentation. Baseline Growth Error-Correction Model Estimates. Share of Included Groups interacted with Autocracy (polity2$\leq$0) in Sub-Saharan African Countries. Difference-GMM (in 1, 3 and 5) and System-GMM Estimations (in 2, 4 and 6). Yearly panel. Robust standard errors clustered at the country level in parentheses. All regressions have country and year fixed-effects.

Table X: **Share of Included Population Interacted with Autocracy (polity2$\leq$0)**

	Dependent variable is Δ Log GDP per capita in t			
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
ΔShare of Included Pop$_t$	0.0305	0.0315	0.0232	0.0244
	(0.0216)	(0.0227)	(0.0217)	(0.0235)
ΔShare of Included Pop * Autocracy$_t$	-0.0867**	-0.0892**	-0.0862**	-0.1001**
	(0.0324)	(0.0430)	(0.0336)	(0.0434)
ΔAutocracy$_t$	0.0349	0.0385	0.0364	0.0474
	(0.0240)	(0.0316)	(0.0270)	(0.0327)
ΔInvestment over GDP$_t$	0.3346***	0.2312*	0.3257***	0.2095*
	(0.1039)	(0.1293)	(0.1024)	(0.1228)
ΔGovernment over GDP$_t$	-0.5078***	-0.6644***	-0.4964***	-0.6417***
	(0.1336)	(0.1742)	(0.1329)	(0.1904)
Additional Controls	No	No	Yes	Yes
Number of countries	41	41	41	41
Observations	1,417	1,374	1,417	1,374

Note: *** p<0.01, ** p<0.05, * p<0.1. Baseline Growth Error-Correction Model Estimates. Share of Included Population interacted with Autocracy (polity2$\leq$0) in Sub-Saharan African Countries. Yearly panel. Robust standard errors clustered at the country level in parentheses. Columns 1 and 3 display Fixed-Effects estimates and columns 2 and 4 display Difference-GMM estimates. All regressions have country and year fixed-effects.

Table XI: **ECM with Samples Extended to 2010**

	Dependent variable is Δ Log GDP per capita in t			
	(1a)	(1b)	(2a)	(2b)
	FE	FE	DGMM	DGMM
Final Year	ΔShare of Included Pop$_t$	* Autocracy$_t$	ΔShare of Included Pop$_t$	* Autocracy$_t$
2000	0.042*	-0.023	0.068**	-0.035
	(0.0218)	(0.0223)	(0.0288)	(0.0240)
2001	0.041*	-0.021	0.069**	-0.035
	(0.0217)	(0.0223)	(0.0294)	(0.0242)
2002	0.038*	-0.019	0.067**	-0.035
	(0.0218)	(0.0226)	(0.0298)	(0.0247)
2003	0.053**	-0.046*	0.078***	-0.045**
	(0.0246)	(0.0258)	(0.0286)	(0.0224)
2004	0.049**	-0.043*	0.085***	-0.051**
	(0.0219)	(0.0243)	(0.0291)	(0.0227)
2005	0.047**	-0.040	0.083***	-0.050**
	(0.0216)	(0.0240)	(0.0291)	(0.0231)
2006	0.049**	-0.038	0.088***	-0.050**
	(0.0213)	(0.0236)	(0.0288)	(0.0232)
2007	0.052**	-0.036	0.084***	-0.046**
	(0.0216)	(0.0230)	(0.0287)	(0.0228)
2008	0.052**	-0.037	0.086***	-0.049**
	(0.0217)	(0.0227)	(0.0287)	(0.0222)
2009	0.049**	-0.034	0.082***	-0.044*
	(0.0224)	(0.0224)	(0.0284)	(0.0231)
2010	0.049**	-0.035	0.081***	-0.043*
	(0.0217)	(0.0223)	(0.0284)	(0.0237)
Additional Controls	No	No	No	No
Number of countries	41	41	41	41

Note: *** p<0.01, ** p<0.05, * p<0.1. Error Correction Model estimates with a sample extended to years from 2000 to 2010, with solely the baseline controls. Effect of the first difference of the Share of Included Groups interacted with Autocracy (polity2$\leq$0) in Sub-Saharan African Countries. Yearly panel. Robust standard errors clustered at the country level in parentheses. Columns 1a and 1b display Fixed-Effects estimates and columns 2a and 2b display Difference-GMM estimates. All regressions have country and year fixed-effects.

Table XII: **ECM with Country-Specific Time Trends**

Dependent variable is Δ Log GDP per capita in t				
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
ΔShare of Included Groups$_t$	0.060***	0.064**	0.047**	0.047*
	(0.020)	(0.026)	(0.023)	(0.027)
ΔShare of Included Groups * Autocracy$_t$	-0.042*	-0.029	-0.047*	-0.050*
	(0.023)	(0.024)	(0.024)	(0.027)
ΔInvestment over GDP$_t$	0.323***	0.238*	0.308***	0.233*
	(0.108)	(0.129)	(0.106)	(0.126)
ΔGovernment over GDP$_t$	-0.522***	-0.684***	-0.501***	-0.649***
	(0.147)	(0.189)	(0.146)	(0.204)
ΔAutocracy$_t$	-0.007	-0.017	-0.002	0.000
	(0.022)	(0.020)	(0.021)	(0.020)
Additional Controls	No	No	Yes	Yes
Number of countries	41	41	41	41
Observations	1,417	1,374	1,417	1,374

Note: *** p<0.01, ** p<0.05, * p<0.1. Baseline Growth Error-Correction Model Estimates, with country-specific time trends, beyond year fixed-effects. Effect of the first difference of the Share of Included Groups interacted with Autocracy (polity2≤0) in Sub-Saharan African Countries. Fixed-Effects (in columns 1 and 3) and Difference-GMM (in columns 2 and 4) Estimations. Yearly panel over the period from independence to 1999. Robust standard errors clustered at the country level in parentheses. All regressions have country fixed-effects. In columns 3 and 4, we control for the additional controls, listed in subsection 4.2.2.2.

Table XIII: **Ordinary Least Squares with Country-Averages**

Dependent variable is Mean Δ Log GDP per capita in country c			
	(1)	(2)	(3)
Sample	Full	Autoc	Democ
	OLS	OLS	OLS
Mean Share of Included Groups	0.014	0.007	0.048*
	(0.039)	(0.011)	(0.024)
Mean Share of Included Groups * Autocracy	-0.001		
	(0.044)		
Mean Autocracy	-0.014		
	(0.027)		
R^2	0.423	0.292	0.406
Observations	41	38	24

Note: *** p<0.01, ** p<0.05, * p<0.1. OLS estimates. The dependent variable is the mean growth rate over the period. The explanatory variables are the means by country of the Share of Included Groups, Investment, Government Expenditure, Autocracy, War, Oil per Capita, Diamond Production and Coup in all columns, plus the interaction Share of Included Groups times Autocracy and Autocracy itself, in Column 1. Column 1 contains the estimates with the means constructed with the full sample, Column 2 with the Autocracy sample, and Column 3 with the Democracy sample. Robust standard errors in parentheses.

Table XIV: **ECM With Polity IV Index in Level**

Dependent variable is Δ Log GDP per capita in t				
	(1)	(2)	(3)	(4)
	FE	DGMM	FE	DGMM
ΔShare of Included Groups$_t$	0.071**	0.081**	0.062**	0.060*
	(0.028)	(0.036)	(0.027)	(0.033)
ΔShare of Included Groups * Autocracy Level$_t$	-0.067	-0.085*	-0.073*	-0.108**
	(0.044)	(0.044)	(0.043)	(0.046)
ΔAutocracy Level$_t$	0.013	0.025	0.018	0.036
	(0.028)	(0.025)	(0.028)	(0.027)
Additional Controls	No	No	Yes	Yes
Number of countries	41	41	41	41
Observations	1,407	1,363	1,407	1,363

Note: *** p<0.01, ** p<0.05, * p<0.1. Growth Error-Correction Model Estimates. The Autocracy variable is constructed using the level of Polity IV, instead of an indicator. See equation (16) in the text. Effect of the first difference of the Share of Included Groups interacted with Autocracy in level in Sub-Saharan African Countries. Fixed-Effects (in columns 1 and 3) and Difference-GMM (in columns 2 and 4) Estimations. Yearly panel over the period from independence to 1999. Robust standard errors clustered at the country level in parentheses. All regressions have country and year fixed-effects. In columns 3 and 4, we control for the additional controls, listed in subsection 4.2.2.2.

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