Inequality, education and democracy in Africa

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Abstract

The question of the links between inequality and democracy is still the subject of an intense academic debate. In this paper, we revisit this issue by explicitly taking into account the interactions between education and inequality to measure their concomitant impact on democracy in Africa. Specifically, we estimate a linear model using the GMM technique in a dynamic panel on a sample of 30 African countries over the period 1990-2019. It turns out, in line with modernization theory, that the level of wealth of a country positively impacts democratization. Moreover, inequality negatively impacts the level of democracy. However, this impact is mitigated by the level of education: above a certain level of education, inequality positively impacts democratization. Similarly, education negatively impacts democratization. Nonetheless, the greater the inequality in a country, the more this effect will be attenuated until it becomes positive and thus education fosters democratization beyond a certain threshold of inequality.

1. Introduction

The beginning of the 1990's marked the advent of a new wave of democratic transitions in Africa. In most African countries, this process led to the implementation of amended constitutions, thus establishing some form of democracy. However, democracy is struggling to spread on the African continent. A multiparty system is now enshrined in most constitutions, and even the most rigid regimes are trying to give themselves a façade of political pluralism. However, despite significant progress in some countries, many obstacles persist and lead to sometimes extreme violence. More fundamentally, Africans aspire to a better standard of living and to escape from poverty. This raises the question of the links between economic performance and democracy. According to the modernization theory (Lipset, 1959), it is in countries that have reached a certain level of development (and therefore wealth) that democracy emerges. This question remains controversial even though it is reasonable to believe that there is a positive and significant relationship between these two variables (see, for example, Heide et al. (2012) for a study involving 150 countries between 1960 and 2000). However, the question of causality between these two variables is far from having reached a consensus even if according to Acemoglu et al. (2019) democracy causes growth. For example, Khodaverdian (2022) finds that in contrast to other countries, democracy in Sub Saharan Africa benefits neither GDP per capita nor total GDP. Overall, it appears that good governance is essential to ensure good performance in the long run. Nonetheless, when we take a closer look at the situation in Africa, it appears that countries with similar political regimes (democratic or autocratic) have not had the same economic performance. Among the variables used to explain this heterogeneity is the distribution of resources and its impact on economic and political efficiency. In development economics, it appears that poverty, growth, and inequality are fundamentally linked (see the PCI triangle of Bourguignon, 2004).

In this article, we draw on this triangle to analyze the relationship between growth and democracy by mobilizing inequality. The main questions that interest us are the following. To what extent does inequality affect democracy in Africa? To what extent does education mitigate or amplify this effect?

Our paper is organized as follows. In Section 2, we provide a brief review of the theoretical and empirical literature on the links between democracy and inequality and on the role of education in these links. In Section 3, we propose an econometric modeling of the relationship between inequality and democracy for a sample of 30 African countries over the period 1990-2019. Section 4 concludes.

2. Literature review

2.1 Inequality and democracy

Much of the economic literature has focused on the impact of democracy on inequality. The basic theoretical argument is that democracy has redistributive and equalizing effects among citizens of the same country, notably through social pressure for more redistribution.

Empirical results, however, do not reach a consensus and some heterogeneity across countries is observed (see, for example, Acemoglu et al., 2015 and Yi and Woo, 2015).

What interests us in this article is the impact of inequality on the democratization of countries. Here again, economic analysis has yielded sharply contrasting positions, which we summarize below. Theories on the relationship between inequality and regime change emphasize the role of inter-class inequality (owners of the means of production and workers). There are two types of redistributive theories of democracy. The first, put forward by Boix (2003), is based on the logic of the median voter theorem applied to the question of redistribution. It suggests that unequal democracies redistribute more. Thus, inequality reduces the willingness of dominant elites to democratize: economic inequality is therefore not conducive to democratization. Indeed, the elites have everything to lose from the redistributive policies that would result from democratization of the country, since the median voter belongs, in this case, to the poor class. Autocratic elites would thus be more inclined to democratize when low levels of redistribution are expected in the future. There would thus be a negative relationship between income inequality and democratization. Moreover, Boix (2003) argues that education promotes democracy and that inequality also indirectly harms the prospects for democracy by preventing education.

The second redistributive theory is proposed by Acemoglu and Robinson (2006) who developed a theoretical model to analyze the elite's incentives for democratization as a function of inequality knowing that the population may revolt and the elite may use force to repress it. Their main result is that the link between inequality and democratization has an inverted U-shape. At low levels of inequality, countries do not democratize because the potential for redistribution and gains from expropriation are small. On the other hand, for intermediate levels of inequality, the revolution becomes attractive to the population. The elite does not use repression because it is more costly than redistribution. The credible threat of revolution in this case encourages the elite to democratize the country. Finally, for high levels of inequality, the cost of redistribution exceeds that of repression. In this case, the elite represses the population and there is no democratization.

The question of the impact of inequality on democracy and the economic institutions of countries has also been the subject of numerous empirical studies. For example, Barro (1999) has shown that inequality has a negative impact on democracy. More generally, several case studies and empirical studies have shown that inequalities (economic and political) can prevent the emergence of efficient economic institutions and ultimately be detrimental to growth (see for example Savoia et al. (2010) for a review of the literature). The most important causal mechanisms that have been put forward are rent-seeking and redistributive conflicts (Rodrik, 2000). Ruling elites in highly unequal societies create economic institutions that perpetuate these inequalities. Once in place, these bad institutions persist because of the redistributive conflicts that might emerge if institutional change occurs.

Several studies have analyzed one particular economic institution, property rights. For Keefer and Knack (2002), inequality and political polarization reduce growth in part through their negative effects on the protection of property rights. However, caution should be exercised on

this issue for developing countries. Indeed, Amendola et al. (2013) show that property rights' protection significantly increases income inequality, suggesting that this institution tends to give undue advantages to a minority. However, this effect turns out to be weaker for higher levels of democracy.

Houle (2009) suggests that the relationship between inequality and democracy parallels that between wealth and democracy. According to this author, inequality is detrimental to consolidation, but has no clear effect on democratization. His study supports the existence of a U-shaped relationship between inequality and democracy. Moreover, inequality increases the probability of transition from democracy to dictatorship. Using the case of several poor countries, he shows that the main difference in their diverse democratic experiences is not the inability to establish democratic regimes, but rather the inability to maintain them. Inequality would thus play a fundamental role in the consolidation of democracy: egalitarian democracies are unlikely to collapse.

According to Houle (2016), the impact of inequality on the democratization of autocracies actually depends on their level of development. More precisely, inequality has no effect on the democratization of poor autocracies. It has a positive impact on the democratization of autocracies at the intermediate level of development and a negative impact on the democratization of rich autocracies.

2.2 Inequality, education and democracy

Social and political resources (socialization networks, friendships, contacts and the desire to defend one's interests and rights) as well as symbolic resources (knowledge, diplomas, distinctions, etc.) play an important role in the political representation of citizens. Because of the unequal distribution of these resources, certain categories of citizens have a greater ability to impose their will on others, to defend their interests and rights, and to influence, at least partially, the organization of the society. In South Africa, for example, it appears that inequalities in education are a determining factor in the distribution of earnings. According to Bhorat and Leibbrandt (2001), education affects the propensity of blacks to participate in the labor force, their likelihood of being employed, and their earnings, with particularly high returns to secondary education.

More generally, political and economic inequalities are mutually reinforcing. People in poverty and with fewer years of education have less influence on public policies and institutions. Voter turnout is lower among the unemployed, those working part-time or at home. In such a context, the challenge of education to reinvest a collective dimension appears essential. Thus, inequality could have an indirect effect on the democratization of a country, through its impact on the educational level of the population. The fight against inequality of opportunity in terms of access to education is, therefore, a major issue in a democracy. However, inequality evolves, in practice, slowly over time and appears to be highly resistant to political solutions.

Education may entail more democracy at least through three channels (Ahmadov and Holstege, 2022). First and according to the modernization theory, democracy is more likely to

emerge in countries with higher levels of education. Indeed, it is generally accepted that better education allows the development of a democratic culture and, because it induces greater prosperity, it would cause a development from a political point of view (Acemoglu et al., 2005). Second, education may enhance political competencies of broader population by increasing their information literacy and facilitating coherent information exchange (Helliwell and Putnam, 1999). Finally, schooling may strengthen pro-democratic attitudes through socializing people into openness to diversity and political tolerance (Glaeser et al., 2007).

At the same time, education systems can be entangled with ideology and politics. They may induce pro-democratic effects but they can also be driven by anti-democratic agendas and by reproduction of the privileges and power of the elites. This is why the introduction of the concept of citizenship education that teaches how to be a productive citizen could be necessary in order to avoid such threats. It is thus important to understand which level of schooling is involved in the education-democracy linkage. Castello-Climent (2008) indicates that an increase in the education attained by the majority of the population is what matters for the implementation and sustainability of democracy, rather than the average years of schooling. In Ahmadov and Holstege (2022), it is shown that the pro-democratic effect of education comes from primary education and not from tertiary education, as it is usually expected, comparatively to the general educational attainment in the population, such as the average years of schooling.

Despite several empirical studies arguing for this link (see for example Barro, 1999 and Glaeser et al., 2004), the question is far from being definitively settled. Acemoglu et al. (2005) argue that this result is mainly due to omitted variables. According to these authors, there is no evidence that a country that increases the education level of its population is more likely to become democratic. More recently, Apergis (2018), by adopting a causality methodology on a large panel of countries and over a long period, detects the presence of a democratic dividend driven by education. Conversely, Paglayan (2021) finds that, on average, democratization had no or little impact on primary school enrollment rates.

3. Empirical modeling: the case of African countries

3.1 Model and Database

Due to lack of data availability, we have limited our sample to 30 African countries: Algeria, Benin, Botswana, Burundi, Cameroon, Central African Republic, Côte d'Ivoire, Egypt, Gabon, Ghana, Guinea, Kenya, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Republic of Congo, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Tunisia, Uganda, and Zimbabwe. The study period is 1990-2019.

We use a two-dimensional linear model, temporal and individual, to analyze the direct and indirect effects of inequality on democracy. We build on the work of Heid et al. (2012) and mobilize dynamic GMM panel data system techniques (Arellano and Bover, 1995 and Blundell and Bond, 1998).

Our regressions are based on the following dynamic model:

$$DEMO_{it} = \alpha_0 + \alpha_1 DEMO_{it-1} + \beta_{INEQ}INEQ_{it} + \beta X_{it} + \beta_{INT}I_{it} + \mu_i + \lambda_t + \varepsilon_{it} \text{ (1)}$$

$$i = 1, \dots, N; \ t = 1, \dots, T.$$

The variable $DEMO_{it}$ represents the level of democracy in country i at date t. $DEMO_{it-1}$ is the level of democracy lagged one period. $INEQ_{it}$ is the level of inequality in country i at date t. X_{it} is the vector of control variables. I_{it} is an interaction variable that will allow us to analyze our research problem. Specifically, we consider the interaction between inequality and education (INEQ*EDUC). $\alpha_0, \alpha_1, \beta_{INEQ}, \beta$ and β_{INT} are parameters to be estimated. μ_i, λ_t and ε_{it} denote a country-specific effect, a time-specific effect and an error term, respectively.

The variables used

To measure democracy, Freedom House publishes two indices relating to civil liberties CL (freedom of expression and belief, rights of association, rule of law, personal autonomy and individual rights) and political liberties PR (electoral process, political pluralism and government functioning). We then define an index $FH = \frac{(CL+PR)}{2}$. To simplify the econometric interpretation of this index, we created a variable that varies between 0 and 1 and is equivalent to the score used by Freedom House. An index equal to 0 represents an autocracy while an index of 1 represents an advanced democracy. This indicator is notably used in Barro (1996) and Rodrik (2000). Many other democracy measures are used in practice. Some rely on observational data, others rely on judgement-based data (in-house coded indicators or expert surveys) while a third category combines information from indicators based on different types of data. All of them have advantages but also disadvantages and no type of data is a priori superior to others in all respects (Skaaning, 2018). In the appendix, we provide our estimation results while using the Polity5 variable instead of FH for the period 1990-2018.

As a human capital variable, we use the education index (EDUC), which is an average of two indices: average years of adult education and average expected years of child education. It is an index provided by the United Nations Development Programme (UNDP) and ranges from 0 to 1.

INEQ: to measure inequality in a country, we use the GINI index (ranging from 0 to 1) in terms of the distribution of income, or consumption expenditures, among individuals or households in the country. The source is the World Bank's World Inequality Database (WID).

As for the control variables, we use the variables that are standard in this type of literature and that we describe briefly below. In our estimates, all these variables are in logarithm.

GDP: this is a measure of GDP per capita at constant prices (constant 2010 US dollars). This variable is used in particular by Przeworski et al (2000). Source: World Bank.

OPEN: is the degree of trade openness of the economy. It is estimated by the volume of exports and imports as a percentage of GDP. Source: World Bank. Missing data from some countries were completed using the UNDP database.[1]

LIFEXP: is life expectancy at birth (in years). Source: UNDP.[2]

URBPOP: represents the urban population as a percentage of the total population. It is calculated using World Bank population estimates and the United Nations World Population Prospects urban reports. Source: World Bank.

3.2 Descriptive statistics and dependencies between variables

In what follows, we present some descriptive statistics of position, dispersion and shape in order to study the normality, fit and estimation quality of each component of our basic model. Table 1 summarizes these statistics for the 30 countries in our sample for the two extreme years of our study period (1990 and 2019).

Table 1. Descriptive Statistics

	Mean		Std		Min		Max	
	1990	**2019**	**1990**	**2019**	**1990**	**2019**	**1990**	**2019**
FH	.336	.444	.214	.258	.083	0	.916	.916
INEQ	.624	.593	.082	.074	.516	.460	.832	.738
EDUC	.297	.506	.132	.128	.081	.249	.532	.736
GDP	1846	2637	2268	2869	217	208	11160	10893
URBPOP	33.6	45.8	15.8	18.8	5.4	13.3	69.1	89.7
LIFEXP	54.5	64.9	8.9	6.0	33.4	53.3	69.4	76.9
OPEN	29.6	32.9	12.4	11.9	9.8	16.1	68.5	61.1

We note that the FH variable has, on average, improved between 1990 and 2019 even if the disparity between countries has increased. Similarly, there is an improvement in inequality and education. The average GDP per capita has increased from US$ 1846 to US$ 2637. The urban population has increased significantly, although it remains below that of developed countries. Life expectancy has increased by 10 years in 30 years. Finally, trade openness has increased little during the period.

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[1] http://hdr.undp.org/en/indicators/133206
[2] http://hdr.undp.org/en/indicators/69206

Table 2 shows the correlation matrix between the different variables used in our empirical study. Overall, the coefficients do not exceed the tolerance limit of 0.7. There is therefore no particular problem for the estimation of the selected models.

Table 2. Correlation matrix

Variable	FH	INEQ	EDUC	GDP	URBPOP	LIFEXP	OPEN
FH	1						
INEQ	0.1877	1					
EDUC	0.2426	0.0122	1				
GDP	0.2842	-0.0012	0.7653	1			
URBPOP	0.1607	-0.0405	0.5355	0.7476	1		
LIFEXP	0.1455	-0.3744	0.5863	0.6151	0.5215	1	
OPEN	0.2691	0.1339	0.4717	0.5674	0.5798	0.3761	1

3.3 The empirical results

The results of the different estimations by the GMM-System technique are reported in Table 3. From the results of the Arellano and Bond tests of the auto-correlation of the residuals, we accept the presence of an AR (1) effect for the residuals and the absence of an AR (2) effect, for all specifications. Furthermore, the Sargan test validates the choice of instruments for the different estimations. Specifically, we estimated eight models in line with the work of Barro (1999), Papaioannou and Siourounis (2008), and Houle (2009, 2016).

In the first regression, we excluded the inequality measure to determine only the effect of the selected control variables on the FH index. We find a positive and significant coefficient at the 1% level of the FH index lagged by one period. GDP per capita also has a positive and significant impact at the 5% level. Wealth would thus stimulate democracy, in accordance with the modernization theory (Lipset, 1959) as confirmed by Barro (1999): the improvement of the standard of living in terms of income causes an increase in the probability of a democratic transition. Ekomié and Kobou (2003), for their part, have shown a positive link between democracy and growth in Africa. We also find a negative and significant coefficient of life expectancy. The impact of the urban population variable on democracy is negative and significant at the 1% level. Thus, at first glance, the results for Africa are different from those found in other regions of the world (see Lipset, 1959 and Barro, 1999). Similarly, the impact of trade openness is negative and significant at the 5% level.

Table 3. The effect of inequality and education on democracy

Dependent variable: FH

	M.1	M.2	M.3	M.4	M.5	M.6	M.7	M.8
FH$_{(t-1)}$	.9748 (0.0) **	.9696 (0.000)***	.9502 (0.000)***	.9438 (0.000)***	.9437 (0.000)***	.9429 (0.000)***	.9458 (0.000)***	.9353 (0.000)***
GDP	.0332 (0.045)**	.0275 (0.044)**	.0676 (0.007)**	.0289 (0.322)	.0399 (0.193)	.0674 (0.000)***	.0418 (0.141)	.0855 (0.050)*
LIFEXP	-.1112 (0.000)***	-.1142 (0.000)***	-.2359 (0.002)**	-.2790 (0.002)**	-.3360 (0.000)***	-.3596 (0.000)***	-.3425 (0.000)***	.0070 (0.937)
URBPOP	-.0765 (0.087)*	-.0263 (0.535)	-.2006 (0.066)*	-.0823 (0.526)	-.1342 (0.271)	-.2343 (0.001)**	-.1305 (0.256)	-.0212 (0.769)
OPEN	-.0410 (0.002)**	-.0594 (0.000)***	-.0430 (0.006)**	-.0811 (0.000)***	-.0879 (0.000)***	-.0693 (0.000)***	-.0928 (0.001)**	-.1132 (0.000)***
INEQ		.6416 (0.004)**		.8857 (0.001)**	.4818 (0.187)			-1.4452 (0.000)***
EDUC			.2505 (0.218)	.3305 (0.179)			-.4550 (0.235)	-3.6243 (0.000)***
INEQ*EDUC					.7598 (0.017)**	.8959 (0.000)***	1.4828 (0.008)**	5.6474 (0.000)***
Obs.	870	870	870	870	870	870	870	870
Countries	30	30	30	30	30	30	30	30
Instruments	29	29	29	29	29	29	29	36
AR1	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.017
AR2	0.864	0.829	0.828	0.757	0.905	0.956	0.938	0.586
Sargan Test	0.289	0.255	0.247	0.222	0.243	0.287	0.248	0.976
Hansen Test	0.348	0.502	0.272	0.502	0.519	0.517	0.536	0.900

Note: *, ** and *** respectively designate significance at thresholds 10%, 5% and 1%. The values between brackets indicate the estimated p-values. AR1 designates Arellano and Bond test analysing the existence of first order auto-correlation in first differences. AR2 designates the Arellano and Bond analysing the existence of second order auto-correlation in first differences.

In the second regression, we added the inequality variable. We note a stability of the effects of the variables analyzed previously, in terms of significance and sign, except for the variable URBPOP which becomes insignificant. The INEQ variable has a positive and significant impact at the 5% threshold. Thus, for our sample of African countries and for the study period, there appears to be a positive and significant relationship between inequality and democratization. This result therefore rather supports the modernization theory on the positive association between the unequal distribution of income and the transition to democracy. It runs counter to the work of Acemoglu and Robinson (2006), who argue that extreme levels of inequality impede political transition.

In the third regression, we used only the EDUC variable in addition to the baseline control variables, without the INEQ variable. It appears that the EDUC variable has a positive but insignificant impact. The other variables have significant effects and maintain the same sign

as in the first regression. Education appears, at first glance, to have no significant impact on democracy in our study sample.

In the fourth regression, we jointly introduce the INEQ and EDUC variables. It appears that inequality has a positive and significant effect at the 5% level. However, the EDUC variable still has no significant impact on democracy. Similarly, GDP per capita still has a positive effect but it is no longer significant.

In order to better analyze the impact of these variables, we introduce in the regressions the interaction term between the INEQ and EDUC variables.

In the fifth regression, we combine the INEQ variable with the interaction term. The parameter of the interaction term is positive and significant at the 5% level. In contrast, the INEQ variable is not significant. Similarly, the variables GDP per capita and URBPOP are no longer significant.

In the sixth regression, we only include the interaction term in addition to the control variables. We notice that the GDP per capita and URBPOP variables become significant again and their impact is positive. Similarly, the interaction term is significant and positive at the 1% level.

In the seventh regression, we include the EDUC variable with the interaction term. The EDUC variable is not significant as are the GDP per capita and URBPOP variables. The other variables are significant and their effects are the same as those previously found.

In the eighth and final regression, we consider all the variables of interest (INEQ, EDUC and the interaction term). We find that the coefficient of the interaction term is positive and significant. Similarly, the EDUC variable has a negative and significant effect on democratization as does the INEQ variable. Finally, GDP per capita has a positive and significant effect in accordance with the modernization theory.

Roughly speaking, our estimates show that the case of African countries could be considered to some extent as particular concerning the effect of inequality and more noticeably that of education on democracy

Indeed, it clearly appears that the direct effect of education on democracy is negative ($\beta_{EDUC} < 0$). This could be considered at a first sight as unusual. Let us remark that contrary to mainstream views, Ahmadov and Holstege (2022) find that, while the overall education-political regime relationship is positive, it is small and contingent. This result can be explained by the fact that state-controlled primary schooling emerged early in Africa much before democracy. Governments can expand primary schooling for different goals such to fore a national identity, promote loyalty and domestic order or strengthen military power. This is what can be called the non-democratic roots of mass education (Paglayan, 2021). However, the total marginal effect is given by $\frac{\partial DEMO}{\partial EDUC} = \beta_{EDUC} + \beta_{INT} INEQ$. Since $\beta_{INT} > 0$, the total effect increases with the level of inequality in a country. Thus, when the level of inequality is relatively low the effect of education on democracy turns out to be negative for the African

countries of our sample: the anti-democratic impact prevails. As inequality increases, the effect increases and even becomes positive when the level of inequality exceeds 0.64: the pro-democratic impact prevails. In the countries in our sample with the lowest levels of inequality, the effect of education on democracy was negative. Conversely, for the most unequal countries, education had a positive effect on democracy. It thus appears that the interaction between inequality and education is important to understand to what extent education impacts democracy in Africa. Higher education levels combined with high levels of inequality are pro-democratic.

Similarly, the direct effect of inequality on democracy appears negative and significant ($\beta_{INEQ} < 0$). This is consistent with Boix (2003) and could be explained, for the African countries, by the rent-seeking and redistributive conflicts that are very common (Rodrik, 2000). However, the total marginal effect is given by $\frac{\partial DEMO}{\partial INEQ} = \beta_{INEQ} + \beta_{INT} EDUC$. Again, the negative effect of inequality on democracy is mitigated by the level of education. For low levels of education, the impact of inequality on democracy is negative and significant. As the level of education improves, the marginal effect of inequality increases until it becomes positive when the level of education exceeds 0.25. This is a very interesting result in the sense that an increase in inequality induces a positive effect on democracy when the level of education is sufficiently high. The interaction between these two variables turns to be crucial to explain the evolution of democracy in Africa during the period 1990-2019.

This gradual effect of inequality and education on democratization is important in explaining the diversity observed in Africa. It parallels the result of Houle (2016) according to which the impact of inequality on democracy depends on the level of development of the studied countries. As can be found in the appendix, the use of Polity5 variable instead of FH gives the same basic direct effects: education and inequality impact negatively democracy in Africa. However, the interaction effect is negative and significant, contrarily to what we found for the FH variable. It is worth noting that we are less confident in the use of Polity5 for two main reasons. First, the use of the different variables of the Polity Project gives estimates that are, in average, smaller than the ones found with FH (Ahmadov and Holstege, 2022). Second, our estimates provide a negative effect of GDP on democracy contrarily to the modernization theory. This negative relationship between income per capita and democracy for sub-Saharan Africa has also been shown by Chisadza and Bittencourt (2019) for the period 1960-2010. But contrarily to these authors who create a composite measure for economic development and thus obtain a positive and significant relationship, we do think that these different measures of democracy fundamentally differ. It seems quite probable that the estimates won't necessarily be similar. Overall, most studies dealing with this issue find, globally, a positive or at most a non-significant effect of wealth on democracy.

4. Conclusion

In this paper, we have proposed a model to test the relationship between democracy, inequality and education for a panel of 30 African countries over the period 1990-2019. The main results are the following. First, and in line with the modernization theory, the level of

wealth has a positive impact on the level of democracy in African countries. Furthermore, it turns out that the variables inequality and education have had a negative effect on democratization. However, we observe an interaction effect between the inequality and education variables that mitigates their direct negative effects. Thus, the impact of inequality on democratization becomes less and less negative as the level of education rises. For some countries with sufficiently high levels of education, this effect even becomes positive. The same type of result appears when we look at the impact of education on democratization. For countries with low levels of inequality, the effect of education is negative: the anti-democratic effect of schooling prevails. On the other hand, when the level of inequality is high enough, education has a positive impact on the democratization of African countries: the pro-democratic effect is dominant.

References

ACEMOGLU, D., S. JOHNSON, J. A ROBINSON, and P. YARED (2005). "From education to democracy? ". *American Economic Review*, Vol. 95 (2), p. 44-49.

ACEMOGLU., D., and J. A ROBINSON (2006). *Economic Origins of Dictatorship and Democracy*. Cambridge University Press.

ACEMOGLU, D., S. NAIDU, P. RESTREPO and J. A ROBINSON (2015). Democracy, Redistribution, and Inequality. Chapter 21, *Handbook of Income Distribution*, Atkinson, A. and Bourguignon, F. (eds), Volume 2B, p. 1885-1966.

ACEMOGLU, D., S. NAIDU, P. RESTREPO, and J. A ROBINSON (2019). "Democracy Does Cause Growth". *Journal of Political Economy*, Vol. 127 (1), p. 47-100.

AHMADOV, A., and F. HOLSTEGE (2022). "Does schooling promote democracy? A meta-analysis". *Democratization*, p. 1-21.

APERGIS, N. (2018). "Education and democracy: New evidence from 161 countries". *Economic Modelling*, 71. p. 59-67.

AMENDOLA, A., J. EASAW, and A. SAVOIA (2013). "Inequality in developing economies: the role of institutional development". *Public Choice*, 155, p. 43-60.

ARELLANO, M., and O. BOVER (1995). "Another Look at the Instrumental Variable Estimation of Error-Components Models". *Journal of Econometrics*, Vol. 68, p. 29–51.

BARRO, R, J., (1996). "Democracy and growth". *Journal of Economic Growth*, Vol. 1, p. 1-27.

BARRO, R, J., (1999). "Determinants of Democracy". *Journal of Political Economy*, Vol. 107 (S6), p. S158–S183.

BHORAT, H, and M. LEIBBRANDT (2001). "Correlates of Vulnerability in the South African Labour Market", in *Fighting Poverty: Labour Markets and Inequality in South Africa*, H. Bhorat, M. Leibbrandt, M. Maziya, S. Van der Berg and I. Woolard (eds). Cape Town: University of Cape Town Press.

BLUNDELL, R.S., and S. BOND (1998). "Initial conditions and moment restrictions in dynamic panel data models". *Journal of Econometrics*, Vol. 87 (1), p. 115-143.

BOIX, C., (2003). *Democracy and Redistribution*. Cambridge, UK: Cambridge University Press.

BOURGUIGNON, F., (2004). "Le Triangle Pauvreté-Croissance-Inégalités". *Afrique Contemporaine*. No 211, p. 29-56.

CASTELLO-CLIMENT, A., (2008). "On the distribution of education and democracy". *Journal of Development Economics*, 87, p. 179-190.

CHISADZA, C. and M. BITTENCOURT (2019). "Economic development and democracy: The modernization hypothesis in sub-Saharan Africa". *The Social Science Journal*, 56, p. 243-254.

EKOMIE, J., et G. KOBOU (2003). "Démocratie et Développement en Afrique". *Economie et Gestion*, Vol. 4 (1), p. 83-98.

GLAESER, E.L., R. LA PORTA, F. LOPEZ-DE-SILANES and A. SHLEIFER (2004). "Do institutions cause growth?". *Journal of Economic Growth*, Vol. 9 (3), p. 271-303.

GLAESER, E.L., G. PONZETTO and A. SHLEIFER (2007). Why does democracy need education? *Journal of Economic Growth*, Vol. 12 (2), p. 77-99.

HEID, B., J. LANGER, and M. LARCH (2012). "Income and Democracy: Evidence From System GMM Estimates". *Economics Letters* 116, p. 166–169.

HELLIWELL, J.F. and R. D. PUTNAM (1999). "Education and Social Capital". *NBER Working Paper*, N°7121, p. 1-25.

HOULE, C., (2009). "Inequality and Democracy: Why Inequality Harms Consolidation But Does Not Affect Democratization". *World Politics*, 61 (04), p. 589-622.

HOULE, C., (2016). "Inequality, Economic Development, and Democratization". *Studies in Comparative International Development*, Vol. 51 (4), p. 503-529.

KEEFER, P., and S. KNACK (2002). "Polarization, Politics and Property Rights: Links between Inequality and Growth". *Public Choice*, 111, p. 127–154.

KHODAVERDIAN, S., (2022). "The African tragedy: the effect of democracy on economic growth". *Empirical Economics*, 62, p. 1147-1175.

LIPSET, S., (1959). "Some Social Requisites of Democracy: Economic Development and Political Legitimacy". *The American Political Science Review*, Vol. 53 (1), p. 69-105.

PAGLAYAN, A. S., (2021). "The Non-Democratic Roots of Mass Education: Evidence from 200 Years". *American Political Science Review*, Vol. 115 (1), p. 179-198.

PAPAIOANNOU, E., and G. SIOUROUNIS (2008). "Economic and Social Factors Driving the third Wave of Democratization". *Journal of Comparative Economics*, Vol. 36, p. 365–387.

PRZEWORSKI, A., M. R. ALVAREZ, M.E. ALVAREZ, J. A. Cheibub, F. Limongi, and F. P. Neto (2000). *Democracy and development: Political institutions and well-being in the world, 1950-1990*. Cambridge University Press.

RODRIK, D., (2000). "Institutions for high-quality growth: what they are and how to acquire them". *Studies in comparative international development*, Vol. 35 (3), p. 3-31.

SAVOIA, A., J. EASAW, and A. MCKAY (2010). "Inequality, Democracy and Institutions: A critical Review of Recent Research". *World Development*, Vol. 38 (2), p. 142–154.

SKAANING, S-E., (2018). "Different Types of Data and the Validity of Democracy Measures". *Politics and Governance*, Vol. 6 (1), p. 105-116.

YI, D. J and J. H WOO (2015). "Democracy, policy, and inequality: Efforts and consequences in the developing world". *International Political Science Review*, Vol. 36 (5), p. 475-492.

Appendix

Table 4. Descriptive Statistics with the variable POLITY5

	Mean		Std		Min		Max	
	1990	2018	1990	2018	1990	2018	1990	2018
POLITY5	-9.9	3.333	21.786	4.505	-88	-4	10	10
INEQ	0.624	0.593	0.082	0.074	0.516	0.460	0.832	0.738
EDUC	0.297	0.502	0.132	0.126	0.081	0.247	0.532	0.733
GDP	1846	2617	2268	2842	217	210	11160	10577
URBPOP	33.6	45.4	15.8	18.8	5.4	13	69.1	89.4
LIFEXP	54.5	64.6	8.9	6.1	33.4	52.8	69.4	76.7
OPEN	29.6	33.8	12.4	12.6	9.8	16.1	68._6	63.6

Table 5. Correlation matrix with POLITY5

Variable	POLITY5	NEQ	EDUC	GDP	URBPOP	LIFEXP	OPEN
POLITY5	1						
INEQ	0.0710	1					
EDUC	0.1824	0.0130	1				
GDP	0.1318	-0.0000	0.7659	1			
URBPOP	0.0885	-0.0412	0.5341	0.7480	1		
LIFEXP	0.1531	-0.3760	0.5792	0.6173	0.5254	1	
OPEN	0.1503	0.1313	0.4814	0.5744	0.5834	0.3826	1

Table 6. The effect of inequality and education on democracy with POLITY5

Dependent variable POLITY5

	M.1	M.2	M.3	M.4	M.5	M.6	M.7	M.8
POLITY5 (t-1)	.6244 (0.000)***	.6232 (0.000)***	.6093 (0.000)***	.6110 (0.000)***	.6126 (0.000)***	.6133 (0.000)***	.5932 (0.000)***	.5888 (0.000)***
GDP	-1.4901 (0.000)***	-1.7470 (0.001)**	-5.3373 (0.003)**	-8.4291 (0.000)***	-6.3540 (0.002)**	-6.3214 (0.000)***	-8.9239 (0.000)***	-7.1362 (0.007)**
LIFEXP	12.1647 (0.000)***	12.7314 (0.000)***	26.8147 (0.000)***	23.7583 (0.001) **	23.1326 (0.000)***	21.7214 (0.000)***	28.8343 (0.000)***	22.2088 (0.004)**
URBPOP	3.7807 (0.001)**	3.0426 (0.002)**	30.7814 (0.000)***	27.2696 (0.000)***	15.0492 (0.000)***	15.1258 (0.000)***	22.7453 (0.000)***	21.4895 (0.000)***
OPEN	-.6031 (0.004)**	-.2903 (0.256)	2.0913 (0.001)**	2.2304 (0.021)**	1.7546 (0.009)**	1.3039 (0.003)**	3.4000 (0.000)***	3.3173 (0.019)**
INEQ		-2.7357 (0.082)*		-3.0694 (0.527)	6.8897 (0.077)*			-34.7035 (0.000)***
EDUC			-48.7649 (0.000)***	-39.4516 (0.000)***			-8.2766 (0.044)**	-18.3867 (0.055)*
INEQ*EDUC					-39.0759 (0.000)***	-38.5964 (0.000)***	-50.1327 (0.000)***	-34.4621 (0.000)***
Obs.	840	840	840	840	840	840	840	840
Countries	30	30	30	30	30	30	30	30
Instruments	84	84	84	84	84	84	112	112
AR 1	0.007	0.007	0.008	0.008	0.007	0.007	0.007	0.007
AR 2	0.794	0.798	0.826	0.827	0.746	0.738	0.747	0.769
Sargan test	0.985	0.981	0.988	0.986	0.981	0.984	0.971	0.969
Hansen test	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000