Journal of Government and Economics 13 (2024) 100099

Contents lists available at ScienceDirect

Journal of Government and Economics

journal homepage: www.journals.elsevier.com/journal-of-government-and-economics

Colonial origins and growth of financial markets in Africa: A comparative analysis based on institutions

Désiré Avom [a], Bruno Emmanuel Ongo Nkoa [a,*], Charles Christian Atangana Zambo [b], Ulrich Kevin Kamdoum Kamwa [c], Donald Ferdinand Okere Atanga [d]

[a] University of Yaoundé II, Cameroon
[b] University of Ngaoundéré, Cameroon
[c] International University of Libreville (UIL), Gabon
[d] University of Dschang, Cameroon

ARTICLE INFO

Keywords:
Africa
Colonization
Financials markets
Institutions
Interaction
OLS

ABSTRACT

This paper studies the effect of settlement and mortality on the growth of African financial markets using the mediation of institutions over the period 1996–2017. A comparative result is based on two types of data bases. Firstly, the Acemoglu et al.'s (2001) database and the Albouy's (2006) database. Two samples including 29 for the settler mortality rate and 33 for the settler rate have been chosen. Applying ordinary least squares (OLS) regression, we find that institutions exert a negative and significant influence on financial market growth in African countries where settler mortality rates were high while in countries where settlers settled, the interaction effect of settler sedentarization rate and institutions is positive and significant. These results remain robust to several tests conducted. As a key recommendation, we suggest that African governments put in place new institutional governance policies that take into account the current economic context to further improve the growth of their financial markets.

Introduction

The impact of European colonialism on the economic development and financial structure of African countries has been a subject of significant interest and debate among scholars. The historical roots of the differences between countries today can be traced back to the colonial period, during which powerful European nations exerted political, economic, social, and cultural control over less powerful nations (Acemoglu and Robinson, 2017; Garba, 2012). This period had a profound impact on the institutional and economic development of colonized nations, potentially setting the stage for the Industrial Revolution and shaping the financial markets that exist today.

According to Garba (2012), colonialism is when a powerful country takes political, economic, social, and cultural control of a less powerful country and governs it as a subordinate nation. Advocates of the doctrine of colonialism believed that they aimed to promote the welfare of the colonized nations. The effects of colonialism varied depending on the institutional differences within European countries, leading to differing legacies that had profound consequences for economic development and financial structure. For example, Spain experienced feudal institutions in Latin America, marked by centralized government for the benefit of the aristocracy, while countries like Great Britain, where an early struggle against monarchy had given parliament and society the advantage, colonization of indigenous peoples. led to increased empowerment of commercial and industrial groups, which were able to benefit from new economic opportunities (Chan, 2021; Zouache, 2018; Van Bavel, 2020; Rönnbäck and Broberg, 2019; Austin, 2015).

Recent empirical studies have shown that Africa's current underdevelopment can be linked to its colonial experiences, with the legal origins of colonized countries shaping their economic and financial structure. These studies focus on the link between countries' colonial experiences and current economic development (Grier, 1999; Englebert, 2000; Acemoglu et al., 2001; Bertocchi and Canova, 2002; Lange, 2004). However, the effect of colonization on finance begins with the work of La Porta et al. (1997, 1998, 1999) who empirically show how legal origins shaped the economic and financial structure of most colonized countries. Additionally, the type of institutions established during

* Corresponding author.
E-mail address: ongoema@yahoo.fr (B.E. Ongo Nkoa).

https://doi.org/10.1016/j.jge.2024.100099
Received 15 July 2023; Received in revised form 17 November 2023; Accepted 2 January 2024
Available online 3 January 2024

colonial expeditions is linked to the natural endowments of colonies, further influencing economic development and financial markets (Acemoglu and Robinson, 2012).

This research article aims to explore the complex and multifaceted relationship between colonization and the growth of financial markets in Africa, with a specific focus on the role of institutions. By examining the historical, institutional, and social factors that have shaped the financial markets in African countries, this research seeks to provide a comprehensive understanding of the lasting effects of colonialism on economic development and financial structure. Additionally, this article will explore the potential implications for policy and development strategies aimed at promoting sustainable economic growth and financial stability in African nations.

Thus, in this paper, we analyze the interaction effect of colonization and institutions on the growth of African financial markets. To do so, we use a panel of 29 countries for the settler mortality rate and another of 33 for the settler rate over the period 1996–2017. The choice of the latter is due to two main reasons: the first is related to the fact that most African financial markets were created around the 1990s, so it is impossible for us to obtain enough data on upstream financial indicators at that time to be able to extend our study; the second reason is related to some variables (including institutional variables) for which data are not available until 1996. We then apply Ordinary Least Squares regression. The choice of this method is related to the fact that several of the variables used have little or no variation over time. To our knowledge, this study is the first to use a channel approach to analyze the effect of historical variables on the development of financial markets in Africa.

Through a thorough analysis of historical and empirical data, this research article will contribute to the ongoing discourse on the impact of colonialism on economic development and financial markets in Africa. By shedding light on the role of institutions in shaping the financial landscape of African countries, this research aims to provide valuable insights for policymakers, economists, and scholars seeking to understand and address the challenges of economic development in post-colonial societies.

Using this new approach, we find that institutions have a negative influence on the growth of financial markets in African countries where settler mortality rates were high, because at these rates, settlers established institutions that hindered the growth of financial markets through policies that facilitated wealth extraction, land grabbing and disregard for the property rights of the local population and individual investors. On the other hand, in countries where settlers have settled, institutions appear to have granted more property rights to investors, hence the positive effect of the interaction between settler settlement rates and institutions on the growth of financial markets. These results remained robust and consistent after using alternative measures of settler mortality, but also after applying another estimation technique. In addition, other results reveal that the growth of financial markets in Africa is influenced by legal origins, the date of independence of countries, and economic growth.

The rest of the article is structured as follows: Section 2 presents some stylized facts. Section 3 reviews the theoretical literature on the link between history and finance. Section 4 presents the methodology of the study. Section 5 analyzes the results. Finally, Section 6 concludes the study and makes some policy recommendations.

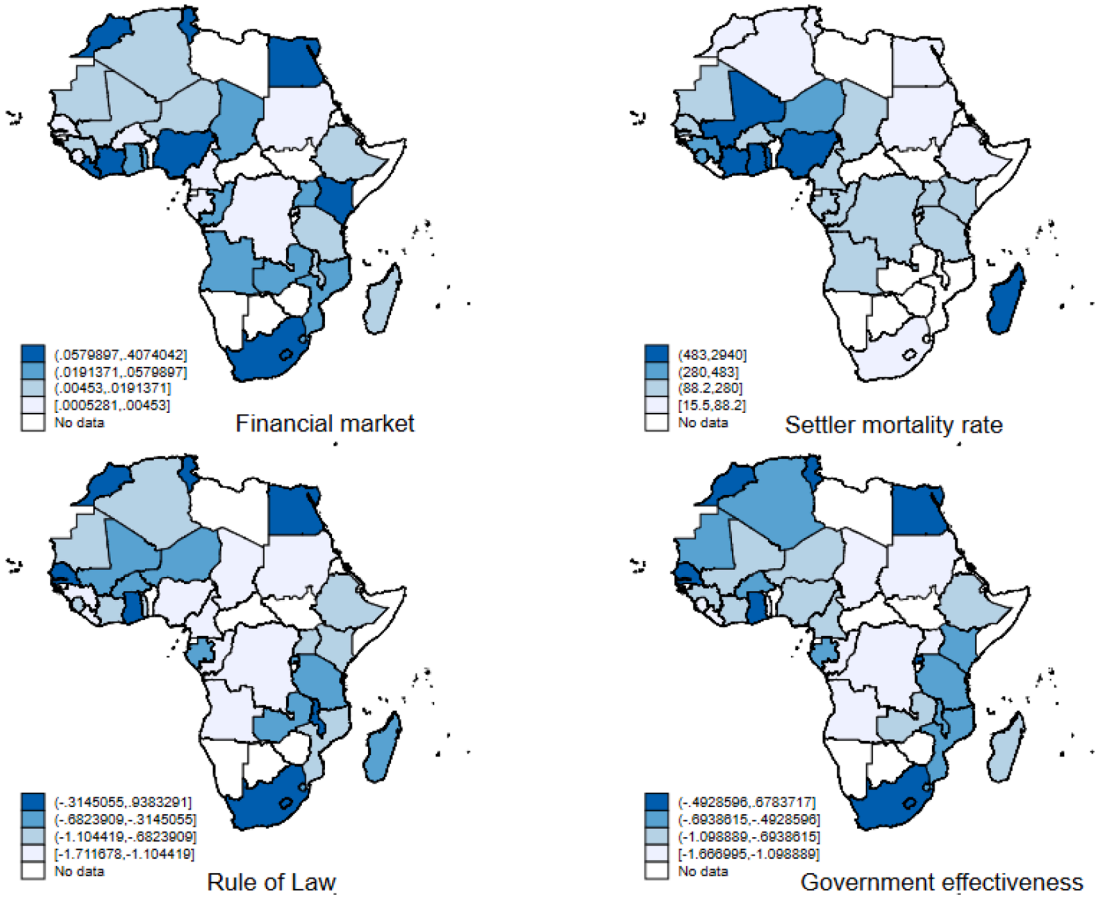

Fig. 1. Graphical representation of some of the variables in the study. Source: Authors based on International Monetary Fund (IMF), Acemoglu et al. (2001), and World Governance Indicators (WGI) data.

Mapping analysis and a correlation graph

The first card (from left to right) presents the mapping of the Financial Markets Index in Africa. According to the chart, countries with a financial market index in the range [0.058 to 0.407] are mostly located in North, West, Southern and East Africa. In North Africa, we find, among others, Egypt, Morocco and Tunisia; in West Africa we find Nigeria, Cote d'Ivoire and Ghana; in Southern Africa, we find South Africa. Finally, in East Africa, we have Mauritius.

The second map in Fig. 1 shows the mortality rate of settlers in Africa. As we can observe, the West African countries had the highest mortality rates during the colonial period. These countries are Mali, Nigeria, Ghana, Togo and Cote d'Ivoire with mortality rates of around 2940, 2004, 668 and 668 respectively. In this ranking, we also find Madagascar which recorded a mortality rate of 536.04 during the same period.

Finally, maps 4 and 5 of the same figure show the mapping of governance variables in Africa. With regard to the rule of law, we note that most of the countries with the best performance in terms of investor protection, i.e., those with values between [−0.3145, 0.9383] and [−0.682, 0.3145], are located in West, Southern and East Africa. Only Tunisia, Morocco and Egypt, the North African countries, stand out in terms of investor rights protection. The same observation can be made for the government effectiveness variable. Indeed, the same sub-regions and countries mentioned above are also those that perform best in terms of governance. However, some Central African countries, such as Gabon and to some extent Cameroon, also appear to be better ranked in terms of governance.

Fig. 2 shows the correlation between the financial market index and the settler mortality rate. This confirms the decreasing relationship between the settler mortality rate and the growth of financial markets in Africa.

Indeed, countries such as Togo, Mali, Madagascar that recorded the highest mortality rates in Africa (668, 2940, 536.04 respectively) are also those whose financial markets are among the lowest (with average indices of 0.024, 0.007, 0.006 respectively); while, South Africa, Mauritius, Morocco, which have high financial market indices (0.407, 0.273 and 0.225 respectively) are associated with low mortality rates (15.5; 30.5 and 78.2 respectively).

A brief literature review

The role of history in finance is to harness the natural experiments of the past as a means of directly explaining current economic and financial outcomes through the long-term persistence of economic and social phenomena. This approach focuses on historical facts and institutions to understand the present. But it is often difficult to evaluate the extent to which current and past contexts are related. Therefore, the History and Finance approach relies on exogenous shocks from the past, and their effects over time, to obtain variation in dimensions for which contemporary shocks are difficult to detect (D'Acunto, 2017).

Historical events and institutions are worth studying because they can inform us about current outcomes by analogy, based on some similarities and differences between historical and current contexts. In this section, we recount some economic theories of historical facts on finance that have contributed significantly to the advancement of the literature on the impact of history on economic growth and thus finance.

The role of legal traditions in finance

In the late 1990s, a large body of research developed around the question of what determines the functioning of financial systems. Much of this literature focused on the role that the legal system plays in explaining cross-country differences in financial development (Fowowe, 2014). Indeed, La Porta et al. (1998) traced the relationship between legal origins and financial development. The central premise of their study was that historically determined legal institutions help explain international differences in financial development (Levine et al., 2021; La Porta et al., 2008; Beck et al., 2003b, 2001).

The authors assume that there are two dominant legal traditions, namely common law (British-inspired) and civil law (derived from Roman law), which spread throughout the world during the conquests of European powers. Civil law is composed of four legal sub-traditions: French, German, Scandinavian and Socialist civil law (La Porta et al., 2008). The resulting laws reflect both the influence of these major families and the revisions specific to each country. According to their findings, economies with a common law tradition protect independent investors more effectively than economies with a civil law tradition, particularly economies with a French civil law tradition (Levine et al., 2021).

This view is later confirmed by Beck et al. (2001, 2003b) who reveal

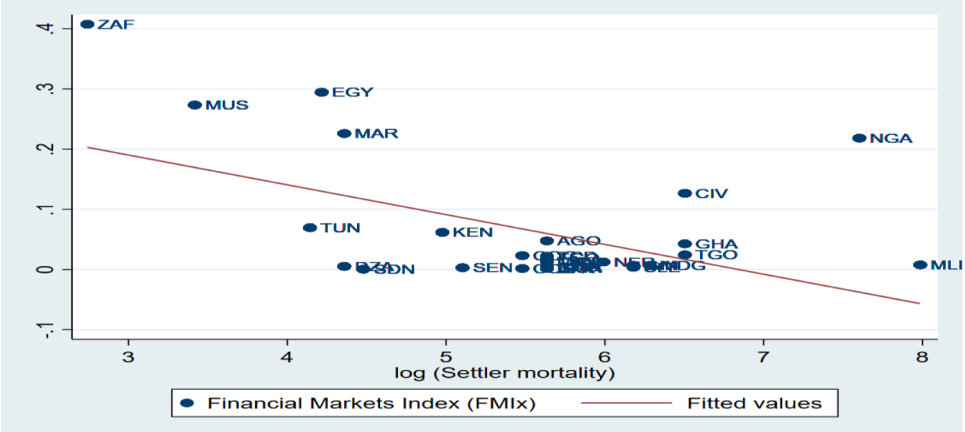

Fig. 2. Correlation between the financial market index and settler mortality. Source: authors using data from Acemoglu et al. (2001).

those legal theories influence finance through two interrelated channels. The first is the political channel. According to them, legal traditions differ in terms of the priority they give to private property rights over state rights. For example, English common law evolved to provide greater protection for private investors against wealthy proles. This protection facilitated transactions between parties, which had positive consequences for financial markets. In contrast, the French and German civil codes were constructed to reinforce the power of the central state, which over time led to the domination of the state over the judiciary (Assane and Malamud, 2010). In other words, civil law promotes the development of institutions that advance state power with negative implications for financial development (Cihák et al., 2012).

The second channel through which legal tradition influences financial development is the channel of legal adaptability. According to the latter, legal traditions differ in that some are more adaptable to economic fluctuations in order to minimize gaps between the needs of the economy and the ability of the legal system to effectively promote economic and financial growth. Of the legal traditions identified by La Porta et al. (1997, 1998, 1999), the common law appears to be the most dynamic and flexible, as judges respond to changes in commercial and financial transactions. In contrast, in the civil law system, the legislature has a monopoly on law-making and, as a result, the legal system is slower to adapt to economic conditions, creating gaps between financial needs and the ability of the legal system to meet those needs.

Settler mortality and financial market growth: the role of institutions

Also known as the settler mortality hypothesis, endowment theory was developed by Acemoglu, Johnson and Robinson (AJR) (2001). It highlights the role of colonization and its repercussions on financial development (Aluko and Ajayi, 2018). According to this theory, the financial structure of some economies is the result of the colonial legacy during expeditions and conquests. Drawing on the role of geography, Engerman et al. (2000) and Engerman and Sokoloff (2005) argue that initial factor endowments (such as climate, soil, and labor availability) influence the level of inequality early in a region's development. Severe inequality would result in growth-debilitating institutions that preserve the hegemony of the ruling elite, through narrow voting rights, reserved property rights, and poor access to education. Supporting this work, Acemoglu et al. (2001), in a pioneering contribution, postulate that the natural endowments that prevailed in the colonial era have influenced the current level of development of some countries and thus their financial markets.

The European powers would have adopted different colonization strategies during their expeditions, which led to the establishment of early and very different institutions. Acemoglu et al. (2001) use the mortality rate of settlers to explain the correlation between colonization, institutional quality and the growth of financial markets. According to the authors, in some colonies, Europeans established institutions that promoted private property and limited state control. These colonies prospered and currently have developed financial markets; while in others, they instead sought to exploit natural resources for as long as possible by setting up institutions that concentrated power in the hands of elites who used and exploited resources in disregard of the rest of the population (Emenalo et al., 2018; Acemoglu and Johnson, 2005). In these countries, financial markets have stagnated due to the lack of respect for property rights, which has not encouraged investors to invest in financial activities.

The style of institutions set up and the way they were governed were also a function of geographical endowments. Indeed, in areas where settlers faced high mortality rates due to diseases, they lacked immunity to, they were less likely to settle there. In these localities, respect for property rights was disregarded through weak institutions that instead advocated wealth extraction policies. In contrast, in an environment that was conducive to living conditions, i.e., in places where Europeans were less exposed to disease, they established institutions that were conducive to economic growth. These localities gave rise to settlements where settlers settled and attempted to reproduce institutions similar to those in their countries of origin, i.e. institutions that protected their rights from investors (Acemoglu and Johnson, 2005). This view is supported by Keneck-Massil and Nvuh-Njoya (2021), for whom the low mortality rate of settlers led to an improvement in local living conditions with the corollary of an improved institutional framework, investment in human capital and technological development. Today, the United States, Australia and New Zealand are examples of settlements, while extractive colonies were mainly limited to tropical countries in Africa (e.g. Congo, Ghana) and Latin America (e.g. Peru, Mexico), to name a few.

Strategic methodology

This section discusses the model and variables of the study and then the estimation technique.

Study model and variables

This study is based on the econometric model of Asngar et al. (2022). However, in addition to a number of variables used by the authors, we include interaction variables between settler mortality rate and institutional variables on the one hand and settler settlement rate and institutional variables on the other. In addition, although some of our variables are time invariant, we have chosen a panel model to take into account changes in the few variables that fluctuate over time. Taking into account these different aspects, we specify the following econometric model:

$$FMIx_{it} = \alpha_0 + \alpha_i Colonization_i + \delta_i Institutions_{it} + \gamma_i X_{it} + \varepsilon_{it} \quad (1)$$

With $\boldsymbol{FMIx_{it}}$, the financial market index of country i in period t. It varies from a scale of 0 (for low development) to 1 (for high development). The particularity of this index is that it takes into account the multidimensional character of financial development that would result from the diversity of financial systems that we observe across countries (Ekoula et al., 2022). Thus, building on the conceptual approach of Cihak et al. (2012), Svirydzenka (2016) aggregates several sub-indices that summarize both the level of development of financial institutions and financial markets in terms of depth, access and efficiency. Other authors (Ongo Nkoa et al., 2023; Asngar et al.,2022; Ekoula et al., 2022 and Ongo Nkoa, 2018) have recently used this index in their studies. $\boldsymbol{Colonization_i}$ is the variable that captures both the settler mortality rate **(ln (Mort))** and the settlement rate (Sdent). $\boldsymbol{Institutions_{it}}$ represents both institutional variables and interaction variables between the logarithm of the settler mortality rate, the settler sedentarization rate and the institutions variables. $\boldsymbol{X_{it}}$ is a matrix of control variables inspired by the literature; $\boldsymbol{\varepsilon_i}$ is the error term $\alpha,\ \delta$ *and* γ Coefficients of variables. Controlling for the individual effect of each of our two colonization variables (settler mortality and settler sedentarization), we decompose Model (1) into two specific equations as follows:

$$FMIx_{it} = \alpha_0 + \beta_i Colonization_i * Institution_{it} + \gamma_i X_{it} + \epsilon_{it} \quad (2)$$

- The Colonization variable represents the logarithm of the settler mortality rate and the settler sedentarization rate (i.e., the total European population in 1900 in ex-colonies).
- ***GE and RL*** represent respectively the efficiency of government and the rule of law. The values of these variables range from −2.5 to 2.5, where the lowest values correspond to the worst estimated performance in government effectiveness and rule of law.

Interaction terms include:

- ***ln(Death)*GE*** and **ln*(Death)*RL** which are the interaction variables between settler mortality rate, government efficiency and rule of law; ***Sdent*GE*** and ***Sdent* RL*** the interaction variables between settler settlement rates, government efficiency and rule of law.

The matrix of control variables includes,

- The logarithm of the per capita income level is denoted by **ln*(GDP)*.** According to the literature, high-income countries generally have more developed stock markets (Andrianaivo and Yartey, 2010; Cherif and Gazdar, 2010; Adjasi and Yartey, 2007; Naceur et al., 2007). Income is measured by real GDP per capita.
- ***English_law***[1] is the variable of legal origin. It takes the value 1 for English common law and 0 for other legal origins (civil law, Scandinavian, Germanic, or socialist law) which correspond to the large family of civil law. The interpretation of this variable will be made based on the common law. In other words, a positive value means that common law countries have, on average, more developed financial markets than civil law countries. A negative value means that common law countries have, on average, less developed capital markets than civil law countries. Other authors (Coulibaly and Omgba, 2021; Emenalo et al., 2018; Fowowe, 2014) used these variables in their studies.
- The date of independence is an important determinant of the growth of financial markets in Africa since post-independence development policies are not a function of the decisions taken by the European powers but of those of the local elites. ***Indp*** is the post-independence variable. It takes the value of 1 for countries that have gained independence since 1960 and 0 for countries that gained independence before 1960 (see Olsson (2009)). The interpretation of this variable will be based on the value 1 (independence since 1960). In other words, a positive value means that countries that have gained independence since 1960 have on average more developed financial markets than countries that gained independence before 1960 and a negative value would mean the opposite.

Table A2 in the appendices presents the complete list of variables, their full writing, their abbreviations, their description, and finally, their sources.

Estimation technique and procedure

We run panel data regressions using the Ordinary Least Squares (OLS) method on a sample of 29 countries for the settler mortality rate and 33 for the settlement rate over the period 1996–2017 based on data availability. The choice of this method is related to the fact that most of our variables vary little or not at all over time (including the capital market index, which varies little over our study period). Indeed, given the time-invariant nature of the variables used, which leaves little or no evidence of change in each country in the sample, the econometric strategy instead exploits cross-country variation in explanatory variables (Emenalo et al., 2018). In addition, the exogenous nature of the historical institutional variables should reduce problems of reverse causality between the financial market development variables and the historical variables. In addition, the use of control variables should also reduce problems of omitted variable bias in the model (Emenalo et al., 2018). Previous studies (Asngar et al., 2022; Keneck-Massil and Nvuh-Njoya, 2021; Keneck-Massil et al., 2021; Emenalo et al., 2018) have also used ordinary least squares.

The potentially conflicting effects of settler mortality (respectively sedentarization) and institutional variables result in a significant strategic interaction between the two types of variables. The literature (Herger et al., 2008; Acemoglu et al., 2001) points out that cross-country differences in the level of settler mortality (and sedentarization) affect capital market growth differently through institutions. The estimation procedure in our study is to empirically test the interaction effect of settler mortality (and settler sedentarization) and institutions on the financial market index. The principle is to test in each model, the effects of the logarithm of settler mortality, the institutional variables and finally the interaction between these two types of variables on the financial market index while controlling for several other variables. The same procedure is repeated for the settler settlement rate. This procedure builds on the work of Qi et al. (2010) and Lawal et al. (2018).

Data and sample

To empirically highlight the relationship between settlement and financial market growth in Africa through the institutional channel, we use panel data compiled on 29 African economies for settler mortality and 33 for settlement rate, over the period 1996–2017 (Table A3). The choice of countries in this study is justified by the availability and continuity of data on several variables used. Overall, the data used come from different sources. Financial variables are from the International Monetary Fund (IMF, 2022) ,[2] settler mortality data used are from Acemoglu et al. (2001), data on institutional variables were downloaded from World Governance Indicators (WGI, 2022) ,[3] gross domestic product per capita from the World Bank database (WDI, 2022) ,[4] legal origin from La Porta et al. (1999), date of independence from Olsson (2009).

Results and discussions

This section briefly presents the summary statistics of the study, the analysis and description of the results and finally the robustness of the study.

Descriptive statistics and correlation matrix of the study

Table 1 presents the descriptive statistics of the study. It can be seen that the average financial market index in Africa is 0.0202. The minimum of this index, which is zero, reveals that some African countries do not yet have financial markets or have underdeveloped markets to the extent that the values of their financial indicators tend to zero.

Table 1
Descriptive statistics.

Variables	(1) N	(2) Mean	(3) Standard deviation	(4) Minimum	(5) Maximum
FMIx	594	0.0202	0.0240	0	0.111
Depth	594	0.0422	0.0519	6.05e-11	0.246
Access	594	0.00219	0.00451	0	0.0236
Efficience	594	0.0119	0.0323	0	0.270
ln(Mort)	506	5.620	0.889	3.258	7.986
Sdent	572	0.00885	0.0178	0	0.0800
GE	594	−0.810	0.483	−1.885	0.644
RL	594	−0.782	0.493	−2.130	0.155
ln(GDP)	590	6.727	0.840	5.234	9.387
English_law	594	0.333	0.472	0	1
Indp	572	0.769	0.422	0	1

Source: author's.

[1] Our samples are made up entirely of countries that have adopted either Common Law or Civil Law.

[2] Financial Development - Story - IMF Data.

[3] Worldwide Governance Indicators | DataBank (worldbank.org).

[4] World Development Indicators | DataBank (worldbank.org).

Table 2
Correlation matrix.

	A	b	c	d	e	f	g	h	i	j	k
a=FMIx	1										
b=Depth	0.8708	1									
c=Access	0.6029	0.4439	1								
d=Efficience	0.7657	0.3556	0.4766	1							
e= ln(Mort)	−0.2890	−0.1088	−0.1770	−0.4118	1						
f=Sdent	0.5181	0.5714	0.4402	0.2172	−0.2377	1					
g=GE	0.3438	0.0950	0.1944	0.5382	−0.2494	−0.0189	1				
h=RL	0.1773	−0.0302	0.1499	0.3763	0.0790	−0.1989	0.7693	1			
i= ln(GDP)	0.2699	0.1741	0.2176	0.2801	−0.4072	0.4129	0.2795	0.1507	1		
j=English_law	0.1280	0.0565	−0.0618	0.1920	−0.1614	−0.1278	−0.0819	−0.0068	−0.1898	1	
k=Indp	−0.2382	−0.0914	−0.1073	−0.3429	0.2764	0.0270	−0.1185	0.1136	−0.1682	−0.1083	1

Source: author's.

Table 3
The interaction effect of settler mortality rate and institutions on the growth of African financial markets.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FMIx		Depth		Acces		Efficience	
ln(mort)	−0.045***	−0.047***	−0.062***	−0.056***	−0.043***	−0.058***	−0.026***	−0.024***
	(0.004)	(0.004)	(0.007)	(0.007)	(0.009)	(0.005)	(0.004)	(0.004)
GE	0.392***		0.449***		0.543***		0.156***	
	(0.025)		(0.036)		(0.052)		(0.025)	
ln(mort)*GE	−0.070***		−0.082***		−0.096***		−0.026***	
	(0.005)		(0.007)		(0.009)		(0.005)	
RL		0.450***		0.379***		0.801***		0.156***
		(0.022)		(0.044)		(0.037)		(0.025)
ln(mort)*RL		−0.079***		−0.069***		−0.141***		−0.025***
		(0.004)		(0.008)		(0.007)		(0.005)
GDP	0.027***	0.024***	0.022***	0.025***	0.047***	0.035***	0.012***	0.011***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.007)	(0.005)	(0.002)	(0.002)
English_law	0.029***	0.037***	0.036***	0.046***	0.027**	0.037***	0.023***	0.027***
	(0.006)	(0.006)	(0.008)	(0.010)	(0.012)	(0.010)	(0.007)	(0.007)
Indep	−0.052***	−0.061***	−0.049***	−0.054***	−0.036***	−0.056***	−0.072***	−0.075***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)	(0.012)	(0.010)	(0.010)
Constant	0.131***	0.176***	0.259***	0.214***	−0.031	0.155***	0.143***	0.150***
	(0.040)	(0.034)	(0.045)	(0.051)	(0.089)	(0.059)	(0.032)	(0.034)
Observations	638	638	638	638	638	638	638	638
R-squared	0.616	0.659	0.514	0.447	0.437	0.617	0.380	0.385

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ significant at 1 %, 5 % and 10 % respectively.
Source: authors' calculations.

Table 4
Interaction Effect of Settler Settlement Rate and Institutions on the Growth of African Financial Markets.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FMIx		Depth		Access		Efficience	
Sdent	0.312***	0.395***	0.852***	0.878***	−0.288***	−0.043	0.255***	0.244***
	(0.075)	(0.091)	(0.109)	(0.148)	(0.101)	(0.097)	(0.089)	(0.092)
GE	0.011*		−0.020***		0.045***		0.026***	
	(0.006)		(0.008)		(0.012)		(0.005)	
Sdent*GE	0.967***		1.609***		0.837***		0.198	
	(0.108)		(0.150)		(0.130)		(0.164)	
RL		0.007		−0.025***		0.033***		0.032***
		(0.007)		(0.008)		(0.013)		(0.007)
Sdent*RL		1.103***		1.535***		1.542***		0.107
		(0.125)		(0.205)		(0.180)		(0.200)
GDP	0.043***	0.048***	0.031***	0.038***	0.073***	0.077***	0.022***	0.022***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.010)	(0.003)	(0.003)
English_law	0.009	0.002	−0.003	−0.006	0.016	0.006	0.016***	0.014**
	(0.006)	(0.006)	(0.005)	(0.006)	(0.012)	(0.012)	(0.006)	(0.006)
Indep	−0.037***	−0.049***	−0.046***	−0.064***	−0.001	−0.010	−0.066***	−0.075***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.015)	(0.015)	(0.010)	(0.010)
Constant	−0.209***	−0.234***	−0.130***	−0.166***	−0.407***	−0.436***	−0.063***	−0.053**
	(0.038)	(0.041)	(0.035)	(0.040)	(0.071)	(0.078)	(0.023)	(0.026)
Observations	744	744	744	744	744	744	744	744
R-squared	0.497	0.472	0.501	0.400	0.344	0.379	0.261	0.263

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ significant at 1 %, 5 % and 10 % respectively.
Source: authors' calculations.

Table 2 presents the correlation matrix. We observe that all governance variables are positively correlated with the capital market index. The same is true for total population density in 1500 and GDP per capita. However, the opposite effect is observed for the settler mortality variables and period of independence. In addition, we also observe that the correlation between settler mortality and settler sedentarization is negative.

Presentation and analysis of the results

The basic results are presented in Table 3 for settler mortality and in Table 4 for settler settlement. In each of these respective tables, columns 1 and 2 present the results when the financial market index is used, while columns 3 to 8 report the results of the sub-indices of the main index, namely depth (columns 3 and 4), accessibility (columns 5 and 6) and, finally, efficiency (columns 7 and 8). With regard to Table 3, we observe that, with regard to the direct effect, the settler mortality rate is negative and statistically significant at the 1 % level in all models, whereas the institutional measures, i.e., government effectiveness and control of corruption, are all positive and statistically significant at the 1 % level. With regard to the indirect effect, on the other hand, we observe that the interaction between each of the institutional variables and the logarithm of settler mortality is strictly negative and statistically significant at the 1 % level in all the models.

The positive and significant results for government effectiveness and corruption control suggest that improving the quality of institutions promotes the growth of financial markets in Africa (Fig. A1). However, the negative and statistically significant effect of the interaction terms between settler mortality rate and institutional variables leads to the conclusion that institutions are negatively correlated with financial markets in African countries where settler mortality rate was high. In other words, these results reveal that institutions have a negative influence on the growth of financial markets in African countries where settler mortality rates were high, because at high rates, the colonisers put in place institutions that tended to weaken the growth of financial markets through policies that facilitated wealth extraction, land appropriation and disrespect for the property rights of local populations, which reduced any incentive to invest and therefore to develop financial markets. This result is consistent with that of Beck et al. (2003a) and at the same time confirms the theory developed by Acemoglu et al. (2001) and the point of view supported by Herger et al. (2008).

More often than not, in the former colonies, the high mortality rates of the colonists left a weak institutional legacy. Indeed, the institutions created during the colonial period were often ill-adapted to local needs and lacked legitimacy among the population. The financial institutions, legal systems and trade regimes put in place were often favorable to the interests of the colonialists and continued to perpetuate economic and social inequalities, hampering the development of financial markets in the former colonies.

With regard to the control variables, we observe that GDP per capita is positive and significant at the 1 % level in all models, which means that a 1 percentage point improvement in the level of income per capita will foster the growth of African financial markets in a substantive way thanks to a significant improvement in the demand for financial products by populations and companies. This result reflects the importance of per capita income for financial market growth. Indeed, growth in the real sector leads companies and the population to increase their demand for financial services and products, hence the positive impact on the financial market index. This result is consistent with Su et al. (2017) and Garcia and Liu (1999).

The legal origin (measured here by the variable English_law) is positivite and significant at the 1 % threshold in models 1, 2, 3, 4, 6, 7 and 8 and at the 5 % threshold in model 5, which means that countries that have adopted common law as their legal system have more developed financial markets on average than countries that have adopted the civil law system (French, Scandinavian, Germanic or socialist). These results are contrary to those of Fowowe (2014) who found no significant effect of this variable. We interpret this result as consistent with La Porta et al. (1999) theory that the civil law system privileges state rights over the rights of individual investors, which has a negative impact on financial contracts. In contrast, British common law places greater emphasis on the contractual rights of individual investors, which has a positive impact on the growth of financial markets. Common law is built up progressively through decisions made by judges, which are then recognised and adopted by Parliament. It is therefore considered to be more flexible and more adaptable to conflict than other forms of legal system. In the civil law system, the legislator is responsible for passing a law and the judge is then responsible for enforcing it (Keneck-Massil, 2016).

The Indp variable, which measures the post-independence period, is negative and statistically significant at the 1 % level in all regressions. This result shows that countries that gained independence after 1960 have, on average, less developed financial markets than countries that gained independence before 1960. This result is also similar to those of Asngar et al. (2022), who find that the maturity of a state and whether or not African leaders continue the policies implemented by the colonial powers play a major role in the growth of the financial markets of former colonies.

Table 4 presents the results when the settler establishment rate is used as an alternative variable to the settler mortality rate. We observe that the control variables have the expected signs and are consistent with the results obtained previously. However, the interaction term between the institutional variables and the settler establishment rate is positive and statistically significant in all the regressions performed. These results confirm Acemoglu et al. (2001) hypothesis that countries where colonial powers settled have relatively higher financial markets today. These countries have a priori benefited from inclusive institutions (although also serving the interests of the colonizers), i.e., economic and political institutions that promote private property, state control and access to resources (including education) for the largest number of indigenous populations.

Robustness of the study

The work of Acemoglu et al. (2001) established a link between settler mortality, the quality of institutions and economic growth in former colonies. However, this data has been the subject of much criticism, notably by Albouy (2008, 2012). According to the author, there are a number of reasons to doubt the reliability and comparability of Acemoglu et al.'s mortality data for European settlers, as well as the conclusions drawn from it (Albouy, 2008). Albouy (2012) points out that historical sources have been neglected, mixing different sources and different types of mortality, which distorts the estimate unevenly. To address this important criticism, we perform a robustness test using the alternative measures of settler mortality proposed by Albouy[5] . Unlike the AJR data, which gave us a total number of 29, the Abouy data covers a panel of 24 countries for the same study area.[6] The regressions are always performed using OLS, and the results obtained are presented in Table 5 below.

We find that all control variables have the expected sign and are

[5] We would like to thank an anonymous reviewer for his very pertinent comments, and also for suggesting this approach in order to make our results more robust.

[6] The data is available from the author and in the appendices of Auer (2007).

Table 5
Interaction Effect of settler mortality rate of Abouy data and Institutions on the Growth of African Financial Markets.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FMIx		Depth		Acces		Efficience	
Albouy_mort	−0.060***	−0.077***	−0.093***	−0.102***	−0.057***	−0.067***	−0.050***	−0.064***
	(0.005)	(0.004)	(0.007)	(0.008)	(0.004)	(0.004)	(0.006)	(0.006)
GE	0.347***		0.479***		0.248***		0.241***	
	(0.023)		(0.033)		(0.021)		(0.025)	
Albouy_mort*GE	−0.068***		−0.090***		−0.046***		−0.046***	
	(0.004)		(0.006)		(0.004)		(0.005)	
RL		0.434***		0.496***		0.315***		0.328***
		(0.020)		(0.035)		(0.018)		(0.026)
Albouy_ mort *RL		−0.082***		−0.090***		−0.052***		−0.059***
		(0.004)		(0.006)		(0.003)		(0.005)
GDP	0.028***	0.021***	0.023***	0.022***	0.002	−0.002	0.016***	0.009***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)
English_law	0.035***	0.056***	0.055***	0.080***	−0.051***	−0.032***	0.007	0.023***
	(0.009)	(0.008)	(0.010)	(0.011)	(0.011)	(0.011)	(0.010)	(0.008)
Indep	−0.059***	−0.045***	−0.025***	−0.011	−0.104***	−0.079***	−0.065***	−0.055***
	(0.010)	(0.009)	(0.008)	(0.008)	(0.016)	(0.013)	(0.012)	(0.009)
Constant	0.191***	0.330***	0.383***	0.438***	0.407***	0.502***	0.231***	0.361***
	(0.044)	(0.037)	(0.042)	(0.047)	(0.032)	(0.031)	(0.041)	(0.049)
Observations	506	506	506	506	506	506	506	506
R-squared	0.644	0.713	0.731	0.710	0.692	0.730	0.486	0.554

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ significant at 1 %, 5 % and 10 % respectively.
Source: authors' calculations.

consistent with previous results. Regarding the intentional variables and the new settler mortality measure, we observe that government effectiveness and rule of law are always positive and significant at the 1 % level in all models, while the settler mortality rate in Albouy remains negative and statistically significant for both the index and its sub-dimensions. As for the interaction terms between the mortality rate of the Albouy settlers and the institutional measures, we observe that the new results remain identical in all respects to the results obtained in Table 3 above. Indeed, the interaction terms are negative and statistically significant for both the financial market index and its sub-dimensions.

Another robustness test consisted in changing the estimation technique. In fact, our results may be biased due to an endogeneity problem caused by omitted variables or double causality between variables. To resolve these problems, we re-analyse our results using the Generalised method of Moments in system (GMM) proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The results obtained from this approach and presented in the attached Table A1 confirm all the results obtained previously.

Conclusion

Using an appropriate analytical and methodological framework, in this paper we assess the interaction effect of colonial and institutional variables on the growth of financial markets in Africa using the ordinary least squares (OLS) method. The data on colonization are taken from the pioneering work of Acemoglu et al. (2001), which allowed us to obtain a double sample of 29 countries for the settler mortality rate and 33 countries for the settlement rate. The regression results show that, on the one hand, good institutions improve the growth of financial markets in Africa. On the other hand, these results also confirm the dual hypothesis in the literature that capital market growth in Africa is negatively (positively) affected by institutions in countries where settler mortality rates (respectively establishment rates) were very high. Specifically, we find that settler mortality rates and settler settlement rates shaped the quality of current institutions in former colonies, negatively (respectively positively) influencing the current level of capital market growth in Africa. These results remain robust after using alternative measures of settler mortality proposed by Albouy (2008, 2012) but also after changing the estimation technique.

As institutions play a major role in the growth of financial markets, these results have major policy implications for African leaders. First, we propose the place of democratic political institutions to limit the power of political elites and mitigate their influence on credit allocation by reducing the risks of predatory, opportunistic and rent-seeking behaviour. Secondly, to ensure that the property rights of investors and shareholders are respected in order to broaden the scope and access to financial services provided by markets. Finally, maintain the political stability of governments to reduce uncertainty about future returns on securities, because a stable government restores investor confidence by encouraging them to carry out financial transactions (buying and selling securities) on the markets.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendices

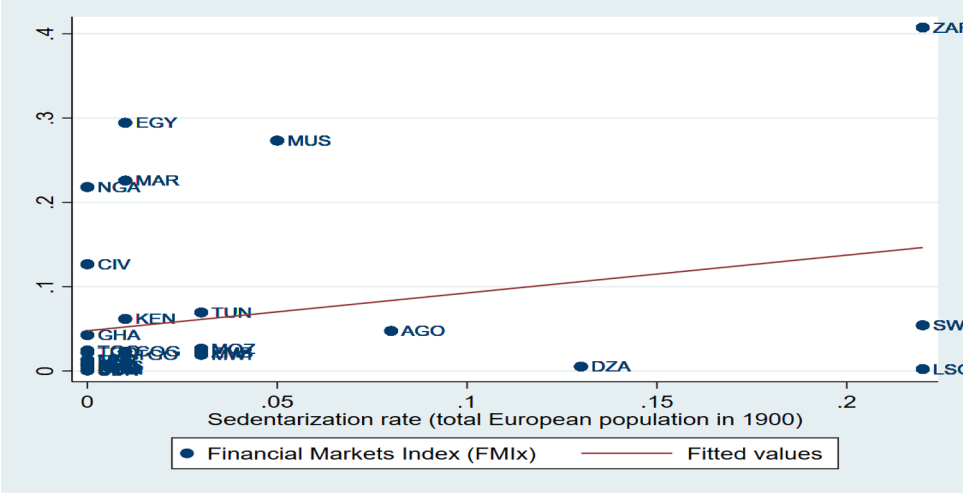

Fig. A1. Correlation between financial market index and Settler rate. Source: authors using data from Acemoglu et al. (2001).

Table A1
Effect of colonisation on financial market growth after application of GMMs.

Variables	(1)	(2)	(3)	(4)
	Dependent variable: Financial markets index (IFMx)			
	GE	GE	RL	RL
Lag FMIx	0.966***	0.907***	0.922***	0.991***
	(0.026)	(0.036)	(0.039)	(0.012)
GE	0.028**	−0.003		
	(0.013)	(0.005)		
RL			0.062**	−0.001
			(0.026)	(0.003)
ln(mort)	−0.004**		−0.007**	
	(0.002)		(0.003)	
ln(mort)*GE	−0.005**			
	(0.002)			
ln(mort)*RL			−0.011**	
			(0.004)	
Sdent		0.056**		0.037*
		(0.027)		(0.019)
Sdent*GE		0.187**		
		(0.074)		
Sdent*RL				0.096**
				(0.041)
GDP	0.000	0.004	0.001	0.001
	(0.001)	(0.004)	(0.001)	(0.002)
English_law	0.002	−0.001	0.005*	−0.002
	(0.001)	(0.002)	(0.002)	(0.001)
Indep	−0.002	−0.004	−0.004	0.000
	(0.003)	(0.006)	(0.003)	(0.002)
Constant	0.021*	−0.021	0.040*	−0.009
	(0.012)	(0.027)	(0.022)	(0.011)
Observations	520	600	520	630
Country	26	30	26	30
Instrument	16	17	16	25
AR1	0.0303	0.0191	0.0302	0.0201
AR2	0.956	0.469	0.887	0.486
Hansen	0.205	0.540	0.383	0.662

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ significant at 1 %, 5 % and 10 % respectively. Author's calculation.

Table A2
List of variables.

Variables	Abbreviation	Description	Source
		Dependent variable	
Financial Market Index	FMIx	It measures the depth, accessibility, and efficiency of financial markets	IMF
Financial Market Deph	Deph	It measures the size of financial markets	IMF
Financial Market Access	Access	It measures the ease with which companies can access the products provided by the financial markets	IMF
Financial Market Efficiency	Efficiency	It measures the level of liquidity of financial markets	IMF
		Variables of interest	
Settler mortality	ln(Mort)	Mortality rate of settlers of European populations in 1900	Acemoglu et al. (2001)
Sedentarization	Sdent	Total European population in 1900	Acemoglu et al. (2001)
Government effectiveness	GE	Its values range from −2.5 to 2.5. Higher values signifying more efficient government	WGI
Rule of law	RL	Its values range from about −2.5 to 2.5. Higher values signifying greater respect for property rights	WGI
		Control variables	
Gross domestic product per capita	ln(GDP)	Gross Domestic Product per capita (2010 constant US dollars)	WDI
Legal origin	English_law	Legal Origin of the Colonist (1 if country=England, 0 if country=France)	La Porta et al. (1999)
Independence date	Indp	It is a measure of the post-colonial period. It takes the value 1 for countries independent since 1960 and 0 for countries independent before 1960	Authors, from Olsson (2009)

Source: authors.

Table A3
List of countries.

List of countries with settler mortality rates	List of countries with sedentarization rates
Algeria	Algeria
Angola	Angola
Burkina Faso	Cameroon
Cameroon	Chad
Chad	Congo, Dem, Rep,
Congo, Dem, Rep,	Congo, Rep,
Congo, Rep,	Cote d'Ivoire
Cote d'Ivoire	Egypt
Egypt	Eswatini
Gabon	Gabon
Ghana	Ghana
Guinea	Guinea
Kenya	Kenya
Madagascar	Lesotho
Mali	Madagascar
Mauritania	Malawi
Mauritius	Mali
Morocco	Mauritania
Niger	Mauritius
Nigeria	Morocco
Rwanda	Mozambie
Senegal	Niger
Sierra Leone	Nigeria
South Africa	Rwanda
Sudan	Senegal
Tanzanisa	Sierra Leone
Togo	South Africa
Tunisia	Sudan
Uganda	Tanzania
	Togo
	Tunisia
	Uganda
	Zambia

Source: authors.

References

Acemoglu, D., Johnson, S., Robinson, J.A, 2001. The colonial origins of comparative development: an empirical investigation. Am. Econ. Rev. 91 (5), 1369–1401.

Acemoglu, D., Robinson, James A., 2012. Why Nations Fail. Crown, New York.

Acemoglu, D., Johnson, S, 2005. Unbundling institutions. J. Polit. Econ. 113 (5), 949–995.

Acemoglu, D., Robinson, J.A, 2017. The economic impact of colonialism. The long economic and political shadow of history *volume I*. Glob. View 81.

Adjasi, C.K., and Yartey, C.A. (2007). Stock market development in Sub-Saharan Africa: critical issues and challenges. Number 7-209. *International Monetary Fund*.

Albouy, D.Y. (2008). *The colonial origins of comparative development: an investigation of the settler mortality data* (No. w14130). National Bureau of Economic Research.

Albouy, D.Y., 2012. The colonial origins of comparative development: an empirical investigation: comment. Am. Econ. Rev. 102 (6), 3059–3076.

Aluko, O.A., Ajayi, M.A., 2018. Determinants of banking sector development: evidence from Sub-Saharan African countries. Borsa Istanbul Rev. 18 (2), 122–139.

Andrianaivo, M., Yartey, C.A., 2010. Understanding the growth of African financial markets. Afr. Dev. Rev. 22 (3), 394–418.

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. J. Econ. 68, 29–51.

Asngar, T.M., Nkoa, B.E.O., Zambo, C.C.A., 2022. Does colonisation explain the low level of growth in African financial markets? Econ. Syst. 46 (3), 101013.

Assane, D., Malamud, B., 2010. Financial development and growth in Sub-Saharan Africa: do legal origin and CFA membership matter? Appl. Econ. 42 (21), 2683–2697.

Auer, R.A. (2007). *The Colonial Origins of Comparative Development: Comment. A Solution to the Debate on Settler Mortality Rates* (No. 2007-09).

Austin, G. (2015). The economics of colonialism in Africa. In *The Oxford Handbook of Africa and Economics*.

Beck, T., Demirgüç-Kunt, A., Levine, R., 2001. Legal theories of financial development. Oxf. Rev. Econ. Policy 17 (4), 483–501.
Beck, T., Demirgüç-Kunt, A., Levine, R., 2003a. Law, endowments, and finance. J. Financ. Econ. 70 (2), 137–181.
Beck, T., Demirgüç-Kunt, A., Levine, R., 2003b. Law and finance: why does legal origin matter ? J. Comp. Econ. 31 (4), 653–675.
Bertocchi, G., Canova, F., 2002. Did colonization matter for growth?: an empirical exploration into the historical causes of Africa's underdevelopment. Eur. Econ. Rev. 46 (10), 1851–1871.
Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. J. Econ. 87, 115–143.
Chan, S., 2021. A multitude of decolonial metropoles–what navigation for commonality and unity? Third World Q. 1–10.
Cherif, M., Gazdar, K., 2010. Institutional and macroeconomic determinants of stock market development in Mena region: new results from a panel data analysis. Int. J. Bank. Finance 7 (1), 139–159.
Cihák¸M., Demirgüç-Kunt, A., Feyen, E., and Levine, R. (2012). Benchmarking financial systems around the world. *World Bank policy research working paper*, (6175).
Coulibaly, D., Omgba, L.D., 2021. Why are some African countries succeeding in their democratic transitions while others are failing ? Oxf. Econ. Pap. 73 (1), 151–177.
D'Acunto, F. (2017). From financial history to history & finance. *Available at SSRN 3216109*.
Ekoula, H.W.M.A., Kamguia, B., Ndoya, H., 2022. Do women hold the key to financial sector development in Africa? Int. Econ.
Emenalo, C.O., Gagliardi, F., Hodgson, G.M., 2018. Historical institutional determinants of financial system development in Africa. J. Inst. Econ. 14 (2), 345–372.
Englebert, P., 2000. Pre-colonial institutions, post-colonial states, and economic development in tropical Africa. Polit. Res. Q. 53, 7–36.
Engerman, S.L., Haber, S.H., Sokoloff, K.L., 2000. Inequality, institutions and differential paths of growth among New World economies. Inst., Contracts Organ. 108.
Engerman, Stanley E., and Kenneth L. Sokoloff, 2005. "Colonialism, inequality, and long-run paths of development," *NBER Working Paper 11057*.
Fowowe, B., 2014. Law and finance revisited: evidence from African countries. South Afr. J. Econ. 82 (2), 193–208.
Garba, S.J., 2012. The impact of colonialism on Nigerian education and the need for e-learning technique for sustainable development. J. Educ. Soc. Res. 2 (7), 53-53.
Garcia, V.F., Liu, L., 1999. Macroeconomic determinants of stock market development. J. Appl. Econ. 2, 29–59.
Grier, Robin M., 1999. Colonial legacies and economic growth. Public Choice 98, 317–335.
Herger, N., Hodler, R., Lobsiger, M., 2008. What determines financial development? Culture, institutions or trade. Rev. World Econ. 144 (3), 558–587.
Keneck-Massil, J., Nvuh-Njoya, Y., Kouotou, H.L., de Paul Mboutchouang, V., Nsoe, J.B., 2021. Diversification dans les ex-colonies: l'importance de l'histoire. Revue Économique 72 (3), 459–489.
Keneck-Massil, J., Nvuh-Njoya, Y., 2021. Did colonisation matter for comparative economic complexity? Econ. Lett. 203, 109851.
Keneck-Massil, J. (2016). Institutions, théories du changement institutionnel et déterminant de la qualité des institutions: les enseignements de la littérature économique (No. 2016-4). *University of Paris Nanterre, EconomiX*.
Lange, Matthew K., 2004. British colonial legacies and political development. World Dev. 32, 905–922.
La Porta, R., Lopez-de Silanes, F., Shleifer, A, 2008. The economic consequences of legal origins. J. Econ. Lit. 46 (2), 285–332.
La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R, 1999. The quality of government. J. Law, Econ., Organ. 15 (1), 222–279.
La Porta, R.L., Lopez-de Silanes, F., Shleifer, A., Vishny, R.W, 1998. Law and finance. J. Polit. Econ. 106 (6), 1113–1155.
La Porta, R., Lopez-de Silanes, F., Shleifer, A., Vishny, R.W, 1997. Legal determinants of external finance. J. Finance 52 (3), 1131–1150.
Lawal, A.I., Somoye, R.O., Babajide, A.A., Nwanji, T.I., 2018. The effect of fiscal and monetary policies interaction on stock market performance: evidence from Nigeria. Future Bus. J. 4 (1), 16–33.
Levine, R., Lin, C., Ma, C., Xu, Y., 2021. The legal origins of financial development: evidence from the Shanghai concessions (no. w28794). Natl. Bureau Econ. Res.
Naceur, S.B., Ghazouani, S., Omran, M., 2007. The determinants of stock market development in the Middle-Eastern and North *African Region*. Manager. Finance 33 (7), 477–489.
Olsson, O., 2009. On the democratic legacy of colonialism. J. Comp. Econ. 37 (4), 534–551.
Ongo Nkoa, B.E., 2018. Effets différenciés des IDE sur la croissance économique Africaine: le rôle de la finance. Revue d'economie du Developpement 26 (3), 33–63.
Ongo Nkoa, B.E., Thierry, M.A., Christian, A.Z.C., 2023. What drives financial market growth in Africa? Int. Rev. Financ. Anal., 102990
Qi, Y., Roth, L., Wald, J, 2010. Political rights and the cost of debt. J. Financ. Econ. 95 (2), 202–226.
Rönnbäck, K., Broberg, O., 2019. Capital and Colonialism: The Return on British Investments in Africa 1869–1969. Springer.
Su, D.T., Bui, T.M.H., Nguyen, V.B., 2017. Determinants of stock market development: the case of developing countries and Vietnam. J. Econ. Dev. 24 (1), 32–53.
Svirydzenka, K., 2016. Introducing a New Broad-Based Index of Financial Development. International Monetary Fund.
Van Bavel, B., et al., 2020. Market dominance and endogenous decline: the contribution of historical analysis. J. Inst. Econ. 17 (1), 177–183.
Zouache, A., 2018. Institutions and the colonisation of Africa: some lessons from French colonial economics. J. Inst. Econ. 14 (2), 373–391.