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Spatial Effect of Political Risk on Economic Growth in Africa

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Abstract

The purpose of this article is to highlight and quantify the spatial effects of political risk on economic growth among African countries. We design a spatial model of growth derived from the Mankiw-Romer-Weil model by introducing spatial interactions. Spatial spillover effects occur because political risk incurred by a country influences not only the country's economic growth, but also the economic growth of other geographically close countries through a spatial multiplier effect. The econometric estimates concern a sample of 34 African countries from 1985 to 2015. Results show that the economic performance of African countries is negatively interdependent, and the spatial interdependence passes through political risk. It is indicated that natural resources and religious tensions have direct negative effects on growth. On the other hand, democracy and governmental stability have positive direct effects on economic growth but impede the economic development of neighboring countries. However, external conflicts are not necessarily harmful to neighboring countries. These dynamics illustrate the complexity of conflicts and political instability in Africa.

Keywords

Economic Growth, Political Risk, Spatial Spillover Effects

1. Introduction

Since 2000, security and good governance have been the subjects of renewed interest in development economics. Indeed, the effectiveness of any economic policy is highly dependent on the institutional and political environment in which it is implemented [1]. In Africa, various political, religious, and ethnic conflicts have contributed to the weakening of states, as most African countries have faced economic, political, and sometimes institutional crises.

In the economic literature, it is generally accepted that political instability is detrimental to private investment and, consequently, to economic growth. Political instability is defined as the propensity for a government to collapse [2], which is how political risk shortens the temporal horizon of policy makers, thus leading to suboptimal macroeconomic policies. Such risk is also associated with frequent changes in economic policy and therefore volatility in economic growth rates [3].

Many empirical studies have focused on the impact of political instability on economic growth in Africa [4]. These works largely examined the direct effects of political instability on economic growth. However, the spread of the effects of political risk on the economic growth to neighboring countries has been ignored. Yet, the effects of political instability are not limited to one country; they extend to all neighboring countries. This multiplier effect spreads with less intensity as one moves further away from the instability center. The spatial effect of political risk is particularly noticeable in areas of significant foreign investment. This raises questions regarding the spatial effects of political risk on economic growth in Africa. What are the mechanisms through which the external effects of political risk spread?

This article examines the spatial effects of political risk on the economic growth of African economies. We use a spatial model of endogenous growth to jointly analyse the direct and indirect effects of political risk on economic growth of the countries under study. In this study, spatial effect refers to the presence of functional or geographical relationship between what happens at one point in space and what happens elsewhere. The political risk covers both political and social attributes to assess country's risk incurred. We assume that each country has a set of characteristics that determine its level of political risk and that these countries interact with each other according to geographic proximity.

The article is organised as follows. Section 2 presents the theoretical and empirical framework. Section 3 outlines the econometric model and the methodology used in the study. Subsequently, Section 4 presents the empirical results of the research, and the last section concludes and discusses the limitations of the study.

2. Literature Review on the Relationship between Political Risk and Economic Growth

In the economics literature, several sometimes-contradictory arguments have been put forward to describe the impact of political risk on economic growth. Nevertheless, there is a consensus that socio-political instabilities depress investment and reduce economic growth. Indeed, political instability weakens institutions, promotes corruption, and discourages investment of any kind [5]. In addition, socio-political instability engenders hesitation among potential investors, penalizes capital accumulation, and hampers economic growth. As a result, socio-political instability increases political-economic uncertainty, which leads to an increase in political risk and a reduction in investment [5]. In other words,

socio-political instability negatively influences economic growth by disrupting production and reducing the accumulation of physical and human capital [6]. Thus, conflicts negatively affect the mobilization of government revenues and destroy capital stocks. It is also a source of uncertainty over property rights that undermines private initiative and economic efficiency [7].

Some empirical studies have argued that the relationship between political stability and economic growth is unstable [8]. The claim is that country specificities, such as cultural values and ideological or religious beliefs, can influence the understanding of democracy and the degree of linkage between political stability and economic performance. Indeed, through a production function augmented by ten-year panel data covering the period 1975-2004 for 30 sub-Saharan African countries, Fosu [9] found that the indices of electoral competitiveness showed U-shaped relationships with GDP growth. These relationships reflect "intermediate" and "advanced" effects quite different from political reforms in Africa. In addition, in a sample of 30 African countries, Fosu [9] concluded that political instability penalizes exports, and is more of a threat to exports than the pace of economic growth. Thus, political instability is one of the internal factors that explains weak economic growth found in African countries.

Yet, political stability is a necessary condition for economic growth. Indeed, political stability and democracy favor private initiative and allow the population to form pressure groups [10]. This makes it possible to influence the action of public authorities in terms of governance. As a result, democratic transitions have helped to stimulate economic growth in most countries [11]. Therefore, higher democratic capital improves political stability so that the accumulation of physical and democratic capital becomes stronger thus promoting economic growth [8]. Collier and Hoeffler [12] and Acemoglu *et al.* [13] support this view.

Moreover, using a cross-sectional model Fosu [4] examined the effects of different events of elite instability on the economic growth of 31 countries in sub-Saharan Africa between 1960-1986. Fosu [4] found that failed coups, rather than successful coups, had a greater negative impact on economic growth, which is how military coups have seriously undermined the economic growth and human development in Africa [4]. Collier [14] analyzed the effects of political instability on growth to show that, on average, civil war causes the country to lose more than 2 percent of GDP per capita annually during the war.

Azam *et al.* [15] used a probit model to show that political risk, understood as the likelihood of political violence, has a negative effect on economic growth in Africa. Thus, African countries' economic growth is not directly affected by the impact of violent political events (demonstrations, riots, coups, etc.) as much as it is the climate of political risk, resulting from the economic and social policies implemented by the policy makers [15]. Gyimah-Brempong and Traynor [16] also analyzed the relationship between political instability and economic growth in sub-Saharan African countries by combining a model of simultaneous equations with a dynamic panel estimate. Like their earlier work, they found a negative and statistically significant relationship between the two variables. Beyond

the direct effect of volatility on growth, these researchers found that political instability indirectly decreases economic growth by decreasing capital accumulation in the long term.

The research discussed thus far has focused on the direct effects of political risk on economic growth. However, a country's political risk affects not only its own economic growth, but also the economic performance of neighboring countries. This gap in the literature will only be filled through advances in spatial econometrics, which considers the spatial effects of political risk by highlighting its indirect effects on the economic growth of neighboring countries. For example, Halla *et al.* [3] used a spatial growth model to demonstrate that institutions have spatial spillover effects on economic growth. Their sample of 58 developing countries between 1985-2008 showed that a lagged spatial model is appropriate for modeling spillover effects. This indicates that spatial externalities are not harmful but a substantive one. However, the spatial spillover effects of political risk have yet to receive sustained attention in studies on African countries.

For studies on African countries, De Groot [17] analyzed the impact of conflict on the economic growth of neighboring countries. De Groot claimed that the effects of conflicts in Africa spread to neighboring countries through capital, labor, trade, and the level of export risk. Such effects are manifested mainly by the destruction of infrastructure. In addition, political instabilities send negative signals to potential new investors [18], who are highly sensitive to risk, especially concerning return on investments or possible expropriation. Thus, risk leads investors—especially those already established—to flee from not only the country concerned, but also neighboring countries. Therefore, De Groot [17] refers to a "minimum distance" to capture the distance between a country in conflict from its neighbor, where the latter is right to fear being affected by the consequences of the conflict. By so doing, De Groot highlights the gradual nature and effects of spreading conflicts to neighboring countries.

Further, Dunne and Tian [18] also analyzed the economic effects of conflict for a panel of African countries, covering the period 1960-2010. In their modeling, they use an approach to calculate spillover effects that moves beyond geographical distance measures. Rather, they incorporated economic and political differences into their calculations. Dunne and Tian's empirical results suggest that while conflict has a strong negative spillover effect on directly contiguous countries' growth, no significant impacts were observed on non-contiguous countries. This result remains when economic and political factors are considered, although the spillover effect is smaller. Dunne and Tian [18] suggest, therefore, that additional factors need to be considered.

These two studies on the spillovers effects only concern the conflict that is particular aspect of political risk. Our study refines the measurement of spatial effects of political risk to neighboring countries while using several measurements of the political risk.

3. Econometric Estimation

3.1. Specification of the Econometric Model

We use as the starting point for our model Mankiw-Romer-Weil's [19] growth model onto which we added neighborhood effects in the form of spatial externalities. In our model, we assume that a country's level of economic growth depends not only on its political risk, but also on the political risk prevailing in neighboring countries. The resulting spatial model suggests that countries' institutional interdependence to account for the spatial multiplier effect and thus the effects of a country specific institutional risk spreading to neighboring countries. These spatial spillover effects are more important when countries are in closer geographical proximity.

The growth model of Mankiw-Romer-Weil [19] is given by:

$$Y_{it} = F\left(K_{it}, H_{it}, A_{it}, L_{it}\right) = K_{it}^{\alpha} H_{it}^{\beta} \left(A_{it} L_{it}\right)^{1-\alpha-\beta} \tag{1}$$

The notation is standard: y is output, k capital, L labor, A the level of technology, and H the stock of human capital.

After transformation, Mankiw *et al.* [19] show that the econometric specification of the model (1) is given by:

$$\ln\left(y\right) = \ln A_0 + gt + \alpha/\left(1-\alpha\right)\ln\left(s_k\right) - \alpha/\left(1-\alpha\right)\ln\left(n+g+\delta\right) + \beta/\left(1-\alpha\right)\ln\left(h^*\right) \tag{2}$$

where δ is the rate of depreciation, L and A are assumed to grow exogenously at rates n and g, s_k the fraction of income invested in physical capital, h^* the steady state of human capital where the economy converges, the A_0 term reflects, in contrast, not just technology but a range of categories, including resource endowments, climate, and institutions.

In cross section, Equation (2) can be rewritten in matrix form as follows:

$$y_{it} = X_{it}\beta + \varepsilon_{it} \tag{3}$$

In order to model the spatial effect of political risk on economic growth, we start from the endogenous and residual autocorrelation model of Kelejian and Prucha [20] specified as follows:

$$\begin{aligned} y_{it} &= \rho\sum_{j=1}^{N} w_{ij}^{1} y_{jt} + x_{it}\beta + \varepsilon_{it} \quad \Leftrightarrow \quad y = X\beta + \rho W_1 y + \varepsilon \\ \varepsilon_{it} &= \lambda\sum_{j=1}^{N} w_{ij}^{2} \varepsilon_{it} + \mu_{it} \quad \Leftrightarrow \quad \varepsilon = \lambda W_2 \varepsilon + \mu \\ \mu &\to iid\left(0, \sigma^2 I_n\right) \quad \Leftrightarrow \quad \mu \to iid\left(0, \sigma^2 I_n\right) \end{aligned} \tag{4}$$

When matrices $\left(I - \rho W_1\right)$ and $\left(I - \lambda W_2\right)$ are invertible, the reduced form of Equation (4) is as follows:

$$y = \left(I - \rho W_1\right)^{-1} X\beta + \left(I - \rho W_1\right)^{-1}\left(I - \lambda W_2\right)\mu \tag{5}$$

where y is the vector of the of the dependent variables; X is the matrix of explanatory variables, other than the lagged dependent variable, which contains variables that capture the importance of the country's political risk; β is the

vector of the coefficients of the explanatory variables; W_1 is a spatial dependence matrix of the exogenous variable and W_2 those of the errors, while assuming that the spatial interaction schemes at the level of variables and errors are not the same; ρ is the autoregressive spatial parameter indicating the intensity of the spatial interaction existing between the observations of y; λ reflects the intensity of the interdependence between the residues of the regression; and, μ is the error term.

Model (5) highlights the spatial multiplier effect on the explanatory variables and a spatial diffusion effect of the errors on the error terms. Regarding the explanatory variables, this expression means that at the level of each country *i*, *y* depends on the explanatory variables in a country and those associated with all other countries in the spatial system. Concerning the error process, this expression describes a spatial diffusion effect such that any exogenous shock from a given spatial unit *i* affects the dependent variable, but also extends to all spatial units. Both effects decrease as the neighborhood order increases.

The spatial parameters λ and ρ allow for assessment of the impact of interactions on economic growth of African countries. Such estimations make it possible to test the global nature of the spatial effects of political risks. The interaction scheme specified in matrix W shows that when the coefficients associated with the spatial parameters are significantly negative, the events of one country are negatively affected by the events occurring in neighboring countries.

3.2. Estimation Method

The growth model of the Equation (3) can be estimated by the ordinary least squares (OLS) technique in the absence of any spatial interdependence between countries. However, once a spatial interaction is introduced in the form of spatial autocorrelation, the OLS estimators are not efficient and it is then necessary to estimate the model by other methods, such as maximum likelihood. Considering the interaction patterns in the model leads to spatial econometric specifications whereby the consideration of spatial autocorrelation amounts to defining a specific form for spatial heterogeneity.

The specification (5) of the growth model indicates that the growth rate of a country is not only the result of a combination of attributes that are unique to it, but also each country's specific location can impact the economic performance of another country. One way to capture these types of effects is to introduce spatial regressors into the model. Nevertheless, even if such variables are considered, it is difficult to fully capture the effect of geographic location on growth. In this case, a residual effect would persist in the error term of the model, resulting in spatial dependence. Spatial autocorrelation tests will identify the most suitable specification for the data.

3.3. Data and Spatial Weighting Matrix

The political risk data comes from the International Country Risk Guide (ICRG) database. The ICRG measures political risk faced by each country through 12

components, covering both political and social attributes. In this article, political attributes are measured by the components related to external conflict and religious tension, while proxies for social attributes are government stability and democracy. Control variables are natural resources, measured by the ratio of natural resource rents over GDP, and human capital, measured by the gross primary school enrolment rate. These control variables are from the World Bank's World Development Indicators (WDI). Detailed definitions of the variables are provided in Table A1 in the appendix. The data concerns a sample of 34 countries over the period 1985-2015 are used to conduct empirical investigation. This choice is due to the availability of data. Detailed concerning countries of sample are provided in Table A2 in the appendix.

Modeling the interdependence of African economies requires first defining a matrix of spatial interactions through which spatial effects are spread. This interaction matrix describes countries' interdependence and the intensity of their interactions. The elements w_{ij} of the matrix W reflect the strength of the spatial link existing between two countries i and j. The elements w_{ij} take a non-zero positive value because the two countries are supposed to interact and this value is supposed to increase with the intensity of the connection. Interaction patterns are represented by a distance matrix based on the geographical distance separating the countries. From this perspective, the closer two countries are geographically, the higher the probability they will interact.

$W = \left(w_{ij}\right)$ is the contiguity matrix defined so that for any country i and all of its neighbors j, the weights w_{ij} of this matrix are written:

$$w_{ij} = 1 \quad \text{if} \quad j \in J;\ w_{ij} = 0 \quad \text{if} \quad j \notin J \quad \text{and} \quad w_{ij} = 0 \quad \forall i \tag{6}$$

The nature of the weights of the matrix W means that for neighboring countries the interaction weight is 1 and 0 for non-neighboring countries. For the same country the interaction is null. In other words, the diagonal terms are null and non-diagonal terms are higher, as the effect of observation j on observation i is important.

3.4. Model Specification Tests

The tests of spatial dependence, a series of stationarity and of cointegration were carried out in order to avoid the risk of fallacious regressions.

3.4.1. Pesaran Spatial Dependence Test

Spatial dependence in the series has been tested using Pesaran's [21] dependence tests $\left(CD-test\right)$. Pesaran's [21] CD statistic is based on the average of the correlation coefficients between different countries taken two by two for each period of time. The null hypothesis postulates independence in cross section. Under this null hypothesis, the statistic is asymptotically distributed according to a standard normal distribution $N\left(0,1\right)$. The average of the coefficients is indicated by mean ρ and the absolute value of the correlation coefficients by mean $abs\left(\rho\right)$. Table 1 displays the results of the spatial dependence between the observations.

Table 1. Spatial dependency test between variables.

VARIABLES	*CD*-test	p-value	mean ρ	mean $abs(\rho)$
government_stability	105.973	0.000	0.74	0.74
external_conflict	49.205	0.000	0.34	0.44
religious_tensions	2.682	0.007	0.02	0.27
democratic_accountability	13.81	0.000	0.10	0.41
natural_resource	20.128	0.000	0.14	0.32
education	39.506	0.000	0.27	0.58
gdp_per_cap	16.861	0.000	0.12	0.19

Source: Author.

The results of the Pesaran [21] spatial dependence test indicate that the p-value is less than 0.01 for all variables. There is, then, a strong presence of cross-sectional dependence for the countries in the sample under consideration and across all variables. However, the Pesaran test does not provide information on the structure of the detected spatial dependence. The joint Lagrange Multiplier test provides better discrimination.

3.4.2. LM_{lag} and LM_{err} Test of Spatial Autocorrelation

The Moran test is the most used test to detect the presence of spatial autocorrelation. However, Moran's I statistic gives no information on the nature of spatial autocorrelation (spatially offset dependent variables or spatial autocorrelation of errors). For Anselin and Florax [22], the adjusted Moran's I statistic tests are preferred in the search for the best specification of the model. That is why we use the tests of the Robust Lagrange Multiplier, developed by Anselin, and Rey [23]. These tests make it possible to check either or both for the presence or absence of a spatially lagged dependent variable or of a spatial autocorrelation of the errors. The results in **Table 2** suggest the presence of both types of spatial autocorrelation at the 0.05 threshold.

Spatial autocorrelation is strongly positive, implying that two contiguous countries are more similar than two non-contiguous countries. Thus, the phenomena of diffusion of growth trajectories exists and more specifically, political risk, which spreads in space step by step through a process of contagion. Based on the LM_{lag} and ML_{err} tests, the absence of spatial autocorrelation is rejected. However, selecting one model over another is difficult. Nonetheless, given the results of these tests, we favor the spatial autoregressive combined model (SAC), which combines both the endogenous interaction effects and the interaction effects contained in the error terms.

3.4.3. Unit Root Test

Two types of unit root tests are typically used to verify stationarity on panel data. These are first-generation tests based on the assumption of cross-sectional independence of observations. However, this assumption of inter-individual independence is particularly unrealistic in most macroeconomic applications of unit

Table 2. Moran's I test for spatial autocorrelation.

Test	Coefficients	P-value
Robust LM lag	4.299**	0.038
Robust LM err	4.520**	0.033

Notes: ***, **, * indicate significant at 1%, 5%, 10% respectively.

root tests [24]. Therefore, beyond the heterogeneity of the parameters of the model, it is also necessary to test the presence of possible correlations between the residues. This explains the use of second-generation tests that imply a dependence between observations. At this level, the Pesaran [25] test, or *CIPS* test, assumes heterogeneity in parameters, in addition to considering inter-individual dependence. Unlike most second-generation tests as Moon and Perron [26] and Phillips and Sul [24], the Pesaran [25] test is based on gross data corrected with the cross-section averages of lagged levels and first-differences of the individual series. The test is performed for the three cases of specification of the deterministic form of the model. A variable is then stationary whenever there is at least one case for which the statistic *CIPS* is lower than the critical value of the 0.05 threshold distribution. In the opposite case, there is a presence of unit root. The results of the Pesaran [25] test presented in **Table 3** show that all the variables are stationary at level except the variables of "education" and "democracy", which are integrated of order 1.

3.4.4. Cointegration Test

To avoid the risk of fallacious regression, the model's different variables must be cointegrated [27]. Since the stationarity test revealed the existence of variables integrated in order 1 and others that are stationary at level, one must then test the presence of a long-term relationship between the series. Pedroni's [28] test imposes an independence between the observations. For this, we use the cointegration test of Westerlund [29], which postulates a possible dependence between the observations. **Table 4** presents the results of cointegration between the variables of the model. The P values given in **Table 4** were calculated using the bootstrapping method and are robust in the presence of common factors (cross sectional dependence) in the time series.

The results in **Table 4** show that the non-cointegration hypothesis can only be rejected for the G_τ test where the robust p value is below the 0.05 threshold. But, the other three tests indicate the absence of cointegration between the variables of the model.

4. Results and Discussions

Table 5 presents the results of econometric estimates of the direct and indirect effects of political risk on a country's economic growth given the institutional environments in neighboring countries.

In analyzing the impact of political risk on economic growth, average effects, overflow effects, direct effects, indirect effects, and global effects should be

Table 3. Results of stationarity tests.

VARIABLES	Empirical critical values of t-CIPS at 5%			Integration order I()
	Case 1	Case 2	Case 3	
CIPS (34, 31)	Level stationarity			
	(−1.54)	(−2.11)	(−2.6)	
government_stability	−2.394	−2.606	−2.983	I(0)
external_conflict	−2.077	−2.582	−2.649	I(0)
religious_tensions	−1.732	−1.900	−1.973	I(0)
democratic_accountability	−1.417	−1.581	−1.724	I(≥1)
natural_resource	−1.904	−2.117	−2.361	I(0)
education	−1.217	−1.945	−1.968	I(≥1)
gdp_per_cap	−4.314	−4.755	−5.044	I(0)
	First difference			
CIPS (34, 30)	(−1.57)	(−2.16)	(−2.65)	
education	−1.975	−1.872	−2.268	I(1)
democratic_accountability	−2.138	−2.558	−2.627	I(1)

Notes: Critical values of CIPS at 5% level are in parentheses; Case 1: models without intercepts or trends; Case 2: models with individual-specific intercepts; Case 3: models with incidental linear trends.

Table 4. Results of Westerlund cointegration tests.

Panel statistics	Value	Z-value	P-value	Robust P-value
G_τ	−3.319	−0.930	0.176	0.007
G_α	−6.436	8.908	1.000	0.540
P_τ	−13.400	3.843	1.000	0.117
P_α	−6.465	6.829	1.000	0.200

Source: Author.

distinguished in a spatial model. In our spatial model, the impact of a factor on economic growth is given by the total effect. This total effect combines different spatial mechanisms. First, the effect of the spatial multiplier or spatial propagation is what depends on the spatial autocorrelation parameter ρ on the economic growth of neighboring countries. Then, the overall effect is relative to the characteristics of the country concerned and those observed in neighboring countries. Finally, the overall effect refers to how countries interact from exogenous shocks to both a country and neighboring countries.

The direct effect is the average effect of the variation of an explanatory variable on economic growth. The indirect effect reflects the spatial diffusion effect of the characteristics of neighboring countries on the economic growth of the country in question. The total effects consider both the direct effects and the spatial dependence effect between all countries through the spatial multiplier. Taking into account the effect of the spatial multiplier, the total effect reflects the effects of spillover between countries, particularly through the channel of political risk.

Table 5. Direct and indirect effects of the political risk on economic growth.

VARIABLES	Main effect	Spatial	Variance	Direct effect	Indirect effect	Total effect
natural_resource	–0.094***			–0.094***	0.036**	–0.058***
	(–3.39)			(–3.26)	(2.45)	(–3.00)
external_conflict	0.327**			0.327**	–0.124**	0.203**
	(2.42)			(2.46)	(–2.10)	(2.26)
government_stability	0.695***			0.725***	–0.278***	0.447***
	(4.83)			(5.10)	(–2.92)	(4.55)
religious_tensions	–0.696***			–0.712***	0.270**	–0.442***
	(–2.67)			(–2.79)	(2.22)	(–2.58)
democratic_accountability	0.677***			0.690***	–0.260***	0.430***
	(3.13)			(3.26)	(–2.60)	(2.77)
education	0.006			0.007	–0.003	0.004
	(0.53)			(0.58)	(–0.57)	(0.56)
rho		–0.606***				
		(–2.97)				
lambda		0.560***				
		(6.15)				
sigma2_e			37.138***			
			(21.35)			
Observations	1054	1054	1054	1054	1054	1054
Number of id	34	34	34	34	34	34
R2a	0.173	0.173	0.173	0.173	0.173	0.173

z-statistics in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

The results in Table 5 show that the parameters of spatial autocorrelation λ and ρ are all significant at the 0.01 threshold. This means that African countries are not isolated from each other. The hypothesis of spatial dependence between growth rates cannot therefore be rejected over the 1985–2015 period. Thus, a country's economic growth depends both on its own characteristics and on the economic growth of neighboring countries. This is a diffusion effect of growth.

The value of the parameter ρ is equal to –0.606, which reflects a nuisance autocorrelation. In fact, the country's GDP per capita growth rate decreases by 0.606 percent while the GDP per capita of neighboring countries increases by 1 percent. This effect is contrary to Baumont and Guillainest's [30] results on the growth of European cities. However, since the spatial autocorrelation parameter reflects a process of spatial propagation, its impact on economic growth passes through the various explanatory factors retained in the model, notably political risk. This is an eviction effect since any increase in political risk in a country de-

teriorates that country's economic growth while the consequent instability is beneficial to its neighbors through the relocation of activities. This might be explained by the leakage effects caused by the temporary relocation of firms from high political risk countries to those with low political risk. We are also witnessing a reorientation of certain transactions (exchanges) to neighboring countries.

Natural resource potential, as measured by natural resource revenue, has a direct negative effect on economic growth, although it also has a positive indirect effect. The abundance of natural resources is a source of economic underperformance for a country, yet stimulates economic growth in neighboring countries. For example, Burkina Faso profited from the export of coffee and cocoa of Côte d'Ivoire between 2002 and 2010. Indeed, during the Ivorian crisis, Burkina Faso became a back-country for the conveyance of Côte d'Ivoire's natural resources abroad. However, the total effect of natural resources on the level of development is negative. This result illustrates the phenomenon of the natural resources curse in non-democratic African countries: the abundance of natural resources favors rent-seeking behavior and, consequently, corruption. Furthermore, the struggles for the capture and distribution of rent increase political instability and the risk of armed conflict [31]. Hence, the existence of institutions favorable to predation activities contributes to transforming natural resources into a curse. Such an effect corroborates findings already highlighted by Leite and Weidmann [32]. In addition, countries rich in natural resources have a high risk of civil war [12].

A direct effect of government stability is to promote economic development. By reducing uncertainties and transaction costs, government stability increases the overall productivity of production factors. For example, government stability creates an incentive structure that dispels uncertainty and encourages investment, which promotes economic growth. In addition, it promotes per capita GDP growth since it gives governments a relatively long horizon, which favors the implementation of optimal structural economic policies. This result is like those of Collier and Hoeffler [12]. However, government stability of neighboring countries is not conducive to economic growth. This counterintuitive result can be explained not only by the weak integration of African economies, but also by the fact that government instabilities in a given country are often linked to interference by its neighbors. Overall, government stability is a catalyst for economic development in Africa. This result supports the work of Olson *et al.* [33], by revealing that productivity is higher in the best-governed countries.

External conflicts in neighboring countries have a direct positive effect on economic growth because external conflicts push border countries to increase their military spending, which may boost growth by providing security, jobs, infrastructure, and training, and research and development. Thus, military spending helps a country manage its internal and external threats, while also creating technology spillover effects. In addition, external conflicts tend to increase the level of uncertainty and risk in the economy, reducing the rate of return on investment. As a result, we witness capital flight and relocations of companies to

the benefit of stable countries, stimulating their economic growth.

Yet, the indirect effects of external conflicts are negative for the economic growth of neighboring countries. These spatial spillover effects are facilitated by the permeability and fragility of states in Africa. This is how conflicts spread through a contagion effect to neighboring countries with the latter unable to cope. The advent of an external conflict, then, leads to the destruction of infrastructure, to loss of confidence in institutions, and to capital flight [34]. Indeed, external conflicts are sources of insecurity and uncertainty for investors, especially foreign investors. In this context, the risk of expropriation increases while the possibility for the repatriation of capital decrease. This justifies the negative indirect effect of external conflicts on the level of development. Overall, external conflicts exert a depressive effect on the level of development of African countries. The indirect effects of external conflicts are like those detailed by De Groot [17] in the case of the impact of conflict on the economic growth of neighboring countries in sub-Saharan Africa.

Religious tensions have direct negative effects on economic growth. As with external conflicts, religious tensions in a country benefit its neighbors. Indeed, religious conflicts in one country most often cause population displacement to neighboring countries. Such displacements increase the level of domestic demand in the host country. Following a multiplier effect, the increase in domestic demand leads to an increase in investment and, consequently, an increase in GDP per capita. Moreover, given the effect of the spatial multiplier, the negative externalities of religious tensions are more important for countries contiguous to countries experiencing ethnic conflict. The effects of spatial spillovers are of varying amplitude depending on the extent of religious tensions, their duration, and the economic links the countries maintain. These results illustrate that, for a given country, being close to a country in conflict is not necessarily harmful to economic growth.

The direct effect of democracy is positive on economic growth in Africa because democratic countries are characterized by independent and stable political institutions. In addition, democratic processes encourage governments to promote economic freedom and private initiatives. Thus, democracy creates political circumstances conducive to investment and economic growth. This result confirms the work of Rodrik and Wicziarg [11] and Persson and Tabellini [8].

However, an increase in democracy in neighboring countries has negative effects on economic growth as democratic trends encourage the populations of neighboring countries to require more freedom and to exert enormous pressures to institute redistributive income policies that can hinder the accumulation of profit and consequently investment. The same result is supported by Alesina and Perotti [5]. Nevertheless, in African countries, the total effect of democracy is positive for economic growth.

5. Conclusions

The purpose of this article is to highlight and to quantify the spatial effects of

political risk on economic growth in African countries. The results support a spatially negative dependence between economic growth rates of the African countries in our study from 1985 to 2015. In particular, external conflicts, government stability, and democracy have positive direct effects on economic growth. The direct effect of external conflict shows that proximity to an area of conflict is not necessarily detrimental, although the indirect effects of conflict on growth are negative.

The results show that a country's natural resources and religious tensions exert directly negative effects on economic growth, while their effects on neighboring countries are positive. However, government stability and democracy maintain necessary conditions for laying the foundation for strong and sustainable economic growth in Africa.

In terms of implications for economic policies, the results call for the implementing of policies to encourage integration for African economies and the strengthening of democratization processes to counter the economic effects of spatial spillover of political risk. In addition, the stability of governments needs to be strengthened by building trust with neighboring countries, guaranteeing the preservation of state sovereignty.

This study just used geographical distance to specify spatial interaction. An innovative way to study political risk on economic growth is to introduce institutional and economic distance.

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Appendix

Table A1. Variables definition and sources.

Variable	Definition	Source
gdp_per_cap	Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population.	World Development Indicators (WDI, 2015)
natural_resource	otal natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.	World Development Indicators (WDI, 2015)
education	Net enrolment ratio of primary school is the ratio of children of official school age enrolled in school to the population of the corresponding official school age.	World Development Indicators (WDI, 2015)
government_stability	Measures the ability of the government to effectively manage its projects and programs and remain in place. The risk rating assigned is the sum of three subcomponents (government unity, legislative strength and popular support), each with a maximum score of four points and a minimum score of 0 points. The higher the score, the more effective and stable the government.	International Country Risk Guide (ICRG, 2015)
external_conflict	Assesses the risk of government pressure from outside, particularly in terms of diplomatic pressure or even border conflicts. The risk rating assigned is the sum of three subcomponents (war, cross-border conflict and foreign pressures), each with a maximum score of four points and a minimum score of 0 points. A high value corresponds to a low risk while a low rating indicates a high risk.	International Country Risk Guide (ICRG, 2015)
religious_tensions	Expresses the risk of religious tensions linked to the propensity of a single religious group seeking to replace civil law by religious law and excluding other religions from the political and/or social process. This indicator ranges from 0 to 6, which a high score means a very low risk, while a low score indicates a high very high risk.	International Country Risk Guide (ICRG, 2015)
democratic_accountability	Expresses the extent to which governments are responsive to the aspirations of the people, which reflects to a lesser extent the effectiveness of the governance system and its capacity to ensure a stable democratic regime. This indicator ranges from 0 to 6, that a high score corresponds to a low risk, and therefore a more effective democracy.	International Country Risk Guide (ICRG, 2015)

Table A2. List of countries in the sample.

Numbers	Countries	Numbers	Countries
1	Algeria	18	Malawi
2	Angola	19	Mali
3	Botswana	20	Morocco
4	Burkina Faso	21	Mozambique
5	Cameroon	22	Namibia
6	Congo, Rep.	23	Niger
7	Egypt, Arab Rep.	24	Nigeria
8	Ethiopia	25	Senegal
9	Gabon	26	Seychelles
10	Gambia, The	27	Sierra Leone
11	Ghana	28	South Africa
12	Guinea	29	Sudan
13	Guinea-Bissau	30	Togo
14	Kenya	31	Tunisia
15	Liberia	32	Uganda
16	Libya	33	Zambia
17	Madagascar	34	Zimbabwe