The impact of political stability on economic performance in Africa: Evidence from 40 African countries

L'impact de la stabilité politique sur la performance économique en Afrique : Évidence provenant de 40 pays africains

Zakaria CHTOUKI
PhD student, FSJES Souissi – Mohammed V University in Rabat
zakaria.chtouki@um5s.net.ma

Radouane RAOUF
Associate professor, FSJES Souissi- Mohammed V University in Rabat
r.raouf@um5s.net.ma

Date de soumission :
Date d'acceptation :

Résumé

L'économie, comme toutes les autres activités humaines, ne pourrait s'exercer correctement dans un lieu où règne une instabilité sociétale. En effet, les gouvernements placent le maintien de la stabilité politique au centre de leurs intérêts. Alors, quel est l'impact du maintien de cette stabilité sur la performance économique ? Pour apporter une réponse à cette question, nous avons étudié cette dynamique sur le continent le plus instable de la planète, l'Afrique. Ce papier tente de modéliser la relation entre ces deux composantes sous un modèle Macro-dynamique, à savoir le modèle ARDL, construit sur un panel de quarante pays africains sur une période de 20 ans qui va de 1997 à 2017. Les résultats empiriques du papier révèlent que la stabilité politique a un impact sur le PIB par habitant à travers l'investissement. De plus, la nature de cet impact peut dépendre de la localisation d'un pays africain dans l'échantillon. En effet, ce modèle nous permet de distinguer trois catégories de pays où l'impact de la stabilité sur la performance économique est soit positif, soit négatif, soit neutre. À court terme, la stabilité politique a un impact positif sur le PIB par habitant dans toute la région de l'Afrique australe, tandis que son impact est neutre pour les pays d'Afrique du Nord.

Mots-clés : Afrique, Stabilité politique, performance économique, Macro-dynamique, ARDL.

Abstract: The economy, like all other human activities, would not be properly exercised in a place where there is a societal unsteadiness. Indeed, governments place the maintenance of political stability at the center of their interests. So, what is the impact of maintaining this stability upon the economic performance? To provide an answer to this question, we have studied this dynamic on the most unstable continent on the planet, Africa. This paper attempts

to model the relationship between these two components under a macro-dynamic model, Autoregressive Delayed Model (ARDL), on a panel of forty African countries over a period of 20 years that goes from 1997 to 2017. The paper's empirical results reveal that political stability has an impact on GDP per capita through investment. Moreover, the nature of this impact may depend on the location of an African country in the sample. Indeed, this model allows us to distinguish three categories of countries where the impact of stability on economic performance is either positive, negative or neutral. In the short run, political stability has a positive impact on GDP per capita across the Southern African region, while its impact is neutral for North African countries.

JEL classification: C23, H56, O43, O55

Keywords: Africa, Political stability, Economic performance, Macro-dynamic, ARDL.

INTRODUCTION

Since the colonial era, during the times of armed conflicts in Sub-Saharan Africa, up to the recent Arab Spring, Africa is widely viewed as the most unstable area in the world. Emerging from the colonial system, peace and stability were two major challenges facing the leaders of the African governments. In fact, political insecurity is an enormous obstacle not only to human development (Francis, 2006), but also to the establishment of a viable system of administration (Goldsmith, 1987). Even though the levels of armed conflict have relatively subsided over the last two decades, Africa remains a turbulent region where its political situation affects its economic performance.

In the literature, there are many theoretical statements that confirm this negative impact. Some consider political instability as a cause of disruption in wealth creation (Fosu, 1992), while others stress that agents are less motivated to invest, given the concern that these disruptions will work against their interests (Holt & Turner, 1975) or risk damaging their private property (Azam & al., 1996). That said, most theorists are convinced that political stability has a decisive economic value (Goldsmith, 1987). However, the number of studies that can empirically qualify the economic value of this political magnitude, and at the same time explain the link between its determining factors and economic growth, remain limited.

The main concern of the present article is to study the relationship "Political stability/GDP per capita". In order to reach this objective, our study aims to define the effects of cointegration and causality that exist between the GDP per capita and the political variables that indicate the

level of political stability of a state (such as the index of absence of violence, the index of government efficiency, the law enforcement index). The choice of GDP per capita as indicator of economic performance is based on our will to target this concept as much as the level of distribution of national output over the population. Therefore, this paper will provide an econometric analysis of the evolution of these indicators on a panel of forty African countries over a 20-year period from 1997 to 2017.

Ignoring, implicitly or explicitly, the impact that any factor belonging to the political dimension may have in a purely economic approach can be a significant source of market failure and economic efficiency (Acemoglu & Robinson, 2013). It is in this interest that we consider that providing insight into the relationship that certain political variability, mainly political stability, can have on economic performance, while using relatively innovative econometric tools, will allow to feed more theoretical and empirical arguments on this subject.

By enlightening all readers about the effects that links policy index to economic indicators, the results we offer in our approach could provide a better visibility on the situation of the African countries studied in order to support decision making by both political actors and economic agents working on the African continent. Thus, in order to better illustrate the result, this paper goes beyond the purely numerical framework, to present the outcomes of our impact study under a map gathering all the territories studied in our panel, which are distinguished into three specific groups according to the nature of the impact exerted by political stability only on the short-term production where the impact is either positive, negative or neutral. For example, the model affirm that political stability has a positive impact on economic performance all countries in the South African region, while its impact is neutral for North African countries.

1. POLITICAL STABILITY AND ECONOMIC PERFORMANCE

In reviewing the literature on the subject, our objective is to present the various theoretical and empirical contributions to strengthen our argument on the impact that political stability can have on the development of economic performance.

1.1. Theoretical contributions

Political stability is an essential condition for economic development and growth. In a highly volatile politico-economic environment defined by wars, revolutions, state costs, riots and other

outbreaks of collective violence, the notion of "faith in the future" is suddenly weakened. Theoretically, a high frequency of shifts in political regimes or other manifestations of popular discontent is often associated with deficient growth and an inability of economic mechanisms to preserve a sustainable development (Campus & Nugent, 2002).

However, some theories question the role of political stability in promoting economic growth, especially when it comes to keeping up with an accelerated pace of economic growth (Olson, 1993). In the long term, a stable society with unchanged borders and an entrenched political regime is increasingly resistant to change. Therefore, in the face of political upheavals, such a society is relatively less able to recover from this type of shock. As all this implies that even if the situation was to stabilize, it would still be less and less able to adopt new technologies and reallocate resources in response to changing circumstances. Long-term stability is consistently seen as a beneficial goal for development and growth. While these theories are far from constituting a consensus within the community, scientists reject all forms of radical political instability. As a matter of fact, a destabilizing event can lead to a disastrous fall in growth. From this standpoint, the literature review shows that political instability affects growth. This effect can be transmitted through various channels, mainly: (i) The negative effects of this instability are transmitted via the private investment channel (Devereux & Wen, 1996). (ii) The intensification of socio-political disturbances tends to reduce economic productivity.

Overall, these disturbances are often caused by poor government management of the political affairs of their countries (refusal to participate in the popular vote, weakness in the formulation and application of laws, rise in corruption). As a result of these perturbations, policymakers find themselves obliged to engage in sub-optimal policies dictated by these political considerations because of the uncertainty they feel about staying in power (Munoz, 2009). Besides these direct channels, political instability is associated with other economic forces that have an impact on growth, namely: Central bank dependence (Cukierma & Webb, 1995 ; Cukierman & al., 1992), seigniorage (Cukierman & al., 1992), aggregate investment (Ozler & Rodrik, 1992), budget deficits (Roubini, 1991), external debt (Alesina & Tabellini, 1989; Ozler & Tabellini, 1991) and the exchange rate regime (Collins, 1996).

1.1. Empirical studies

Empirical research that addresses the relationship between political instability and economic performance seems to highlight the negative relationship between instability and GDP. At the same time, a minority of this empirical work has come to different conclusions, such as the absence of a direct link (Hibbs. 1973), or the presence of a leveraged effect (Fosu, 1992; Campos, Nugent & Robinson, 1999; Compos and Nugent, 2002). But Most of them still point the existence of a negative impact of policy variables on growth and investment (Barro, 1990 ; Devereux & Wen, 1996; Alesina & Perotti, 1996; Edward, 1998; Drazen, 2000 ; Younis & al., 2008). Several options have been initiated for the selection of variables that indicate political instability. Some are limited in using only explicit indicators such as the rise in violence and terrorism, democracy (access to voting) and government efficiency (Barro, 1991; Chen & Feng, 1996), while others focus more on the frequency of regime change (Persson and Tabellini, 1999). A more different approach has been undertaken in some other studies, in which political stability is compared with growth. The results of these studies show that political stability has a negative impact on long-term growth (Goldsmith, 1987; Ahmed & Pulok, 2013).

In terms of estimation methodology, most of models that have been developed are econometric models that study either a defined nation or a group of states. Among the country-specific works, we note as an example the study of the British economy using the GARCH-M model, which reveals the existence of a strong negative impact of instability on growth and a positive effect on growth uncertainty during the period 1961-1997 (Astteriou & Price, 2001). For the case of Venezuela, Munoz reveals that the estimation of the Political Instability/Growth ratio for the period (1983-2000) using an ARDL model confirms the theoretical statements by demonstrating the negative impact of political instability on growth via the investment channel (Munoz, 2009). Similarly, in Argentina, the study of the impact of formal and informal political instability on economic performance has been carried out using a P-ARCH model on a non-linear annual time series covering the entire 20th century (Campos & Karanasos, 2007). The results of this model conclude that informal instability has a direct negative impact in the short term, while formal instability (government transformation) has an indirect negative impact that extends over the long term. As for the case of Bangladesh, the estimation of a cointegrating relationship between political stability and economic growth was carried out using an ARDL

model. This study reveals the presence of a long-term negative relationship and a short-term positive one (Ahmed & Pulok, 2013).

Regarding research that studies a group of countries: (i) On a panel of 93 countries, one study notes the negative effect of political instability on growth and productivity over the period 1960-1990 (Edward, 1998). (ii) The study of this relationship on a panel of 4 countries confirms the presence of a negative link (Bildiric, 2004). (iii) Using the GMM estimator for linear dynamic panel data models, the analysis of this relationship in a panel of 169 countries for the period 1960-2004 shows that the rise of political instability is often associated with low growth (Aisen & Veiga, 2010).

2. METHODOLOGY

We will proceed by specifying the model. Then, we will define the variables, data sources, and the adopted modelling tool, that is the ARDL model on a panel of 40 African countries.

2.1. Model specification

Nowadays, the economy seems to need politics (Acemoglu & Robinson, 2013). Hence, political stability seems to be an indispensable component of economic emergence, which will certainly influence society. In the social domain, the utilitarian approach considers that when production is maximized, additional transfers will make it possible to redistribute utility among individuals. Consequently, this induces social cohesion and societal reinforcement that allows the sustainability of this political stability. To examine the role that political stability can play in maintaining output (or national income), it would be wise to apply the simplified neoclassical growth model as a theoretical reference (Abramovitz, 1956; Solow, 1957). Indeed, output Y is expressed by the factors of production, capital K and labor L, under a Cobb-Douglas-type production function, which is presented as follows:

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

To simplify this model, we will study average labor productivity (Stoleru, 1970) in the following way:

$$\frac{Y}{L} = \frac{AK^{\alpha} L^{1-\alpha}}{L} = A\left(\frac{K}{L}\right)^{\alpha}$$

If we consider that: $y = \frac{Y}{L}$; $k = \frac{K}{L}$ Then the equation will be formulated as follows:

$$y = Ak^{\alpha}$$

And in logarithmic form: $\log(y) = \log(A) + \alpha\log(k)$ [1]

In theory, the efficiency of a country's institutions makes it possible to determine its level of economic performance and the maintenance of its technical progress in the long term (North, 1990). Considering that political stability is one of the major objectives of government institutions, it is therefore capable of affecting output through the improvement of total factor productivity (Ahmed & Pulok, 2013). Consequently, the total factor productivity component "A" can be expressed through political variables such as political stability. This relationship is formulated as follows:

$$A(STB) = Ae^{\lambda_{STB}} \quad [2]$$

With: $A = A_0 e^{g_t}$

$\boldsymbol{A}$: Total Factor Productivity as defined by Hicks Neutral

$\boldsymbol{A(STB)}$: Total Productivity as a Function of Political Stability

$\boldsymbol{STB}$: Political Stability Index

$\boldsymbol{\lambda}$: Growth rate of the political stability index over time

$\boldsymbol{g_t}$: Growth rate of technical progress over time

Through a combination of the two previous equations [1] and [2], we will be able to establish a coefficient to measure the effects that political variables, namely political stability, have on output per capita. This can be expressed through this growth model:

$$\boldsymbol{y = Ae^{\lambda STB}k^{\alpha}}$$

And in a logarithmic form: $\boldsymbol{\log(y) = \log(A) + \lambda STB + \alpha\log(k)}$ [3]

With: $\log(A) = Log(A_0 e^{g_t}) = \log(A_0) + g_t = C$

The theoretical model chosen: $\mathbf{log}(\boldsymbol{y}) = \boldsymbol{C} + \boldsymbol{\lambda STB} + \boldsymbol{\alpha}\mathbf{log}\,(\boldsymbol{k})$ [4]

2.2. Data and sources

From the model equations developed above, we chose the data used to empirically design our model are summarized in the following (table 1). To trace the evolution of these variables in our model, we will use the annual time series of a panel of 40 African countries over the period 1996 and 2017. Although we hope to extend our analysis over the whole of the 1990s in order to capture all the political upheavals in the region, the choice of this period is conditioned by the availability of data, particularly political variables.

Table 1. Variable summaries

VARIABLES	DESCRIPTION	EXPECTED RESULTS
GDPH	Gross Domestic Product per capita expressed in USD, it represent the output per capita (y)	
GFCFH	Gross Fixed Capital Formation per capita expressed in USD: This variable represents the Physical Capital component (k)	+
STB	Index of political stability and absence of politically motivated violence (including terrorism)	+
GE	Government Effectiveness Index: Reflects the quality of service and public service and its degree of independence from political pressures.	+
RGL	Regulatory Quality Index: Indicates the government's ability to formulate and implement regulations that encourage development.	+
LOI	Index of confidence and compliance with laws and regulations by economic agents	+

The purely economic variables, GDPH and GFCFH, are expressed in current U.S. dollars and are obtained directly from the World Bank database. While the political type variables are obtained from the World Governance Indicators (WGI) database, 2018 edition. This database tracks six broad dimensions of governance, of which we will only consider four: Political stability and absence of violence/terrorism; Government effectiveness; Quality of existing regulations; and Rule of law. These indicators are aggregated from more than 30 underlying

data sources that reflect perceptions of governance across a wide range of survey respondents and experts around the world. Estimates of these policy variables range from (-2.5 for the lowest value to 2.5 for the highest value) to assess the governance performance of the state under study. Although, the selection of countries that make up the study panel is conditioned by the unavailability of certain political data or the discontinuity in the production of such data over the entire study period, namely the case of Libya after the events of 2011 relating to the destitution of the Khdhafi administration.

2.1. Modelling strategy

The estimation of the contribution of political stability to economic performance in Africa will be the subject of an autoregressive distributed lag (ARDL) model using time-series panel data. Unlike non-dynamic models whose instantaneous explanation only restores part of the variation of the variable to be explained, ARDL models have the particularity of taking into account time dynamics (adjustment lag, expectations, etc.) in the explanation of a variable, thus improving its predictions. This makes it possible to identify the short- and long -term equilibrium relationship between the variables studied in this model. In our approach, we will apply a cointegration test to the bounds (Persaran & al, 2001). This test consists of examining the cointegrating relationship between the variables in the ARDL model. Unlike the other cointegration tests proposed in the econometric review (Johansen-Juselius test, Engel and Granger test), the latter allows the cointegration test of time series that are integrated in different orders, namely order I(0) and I(1). In addition, this model is not sensitive to the values of the error parameters and provides unbiased long-term estimates with valid t-statistics, even when these cointegrated variables are endogenous (Amusa and al, 2009). The ARDL model is presented under the following structural formula:

$$\Delta \log(\boldsymbol{PIBH}_t) = \sum_{i=1}^{p} \boldsymbol{\beta}_{1i} \Delta \log(\boldsymbol{PIBH}_{t-1}) + \sum_{i=0}^{q} \boldsymbol{\beta}_{2i} \Delta \log(\boldsymbol{FBCFH}_{t-1}) + \sum_{i=0}^{q} \boldsymbol{\beta}_{3i} \Delta \boldsymbol{STB}_{t-1} + \sum_{i=0}^{q} \boldsymbol{\beta}_{4i} \Delta \boldsymbol{GE}_{t-1} + \sum_{i=0}^{q} \boldsymbol{\beta}_{5i} \Delta \boldsymbol{RGL}_{t-1} + \sum_{i=0}^{q} \boldsymbol{\beta}_{6i} \Delta \boldsymbol{LOI}_{t-1} + \boldsymbol{\gamma}_1 \log(\boldsymbol{y}_{t-1}) + \boldsymbol{\gamma}_2 \log(\boldsymbol{k}_{t-1}) + \boldsymbol{\gamma}_3 \boldsymbol{STB}_{t-1} + \boldsymbol{\gamma}_4 \boldsymbol{GE}_{t-1} + \boldsymbol{\gamma}_5 \boldsymbol{RGL}_{t-1} + \boldsymbol{\gamma}_6 \boldsymbol{LOI}_{t-1} + \boldsymbol{\beta}_0 + \boldsymbol{\varepsilon}_t \quad [5]$$

With Δ first difference operator; $\beta_{1i}\ to\ \beta_{6i}$ designates the coefficients of the short-term effect; $\gamma_1\ to\ \gamma_6$ designates the coefficients of the long-term effect; β_0 is the constant; $\varepsilon_t \sim (0, \sigma)$ is the white noise (error term).

This representation assumes the presence of a cointegrating relationship between the variables. As a result, the estimation of the short- and long-term coefficients of these variables is conceivable. The procedure of the terminal cointegration test is carried out in two steps:

- Step one: Determination of the optimal shift (p, q) through the information criteria (Akaike-AIC, Shwarz-SIC and Hannan-Quin) to determine the structure of the ARDL model to be retained.
- Step two: Use the ARDL bounds test with Fisher values to verify the significance of the model coefficients. If the Fisher's value is higher than the bounds of the Persaran and al. test, this confirms the hypothesis of the existence of a cointegrating relationship.

Therefore, it would be possible to estimate a long-term equation, otherwise only the short-term equation would be estimated. If the cointegrating relationship is validated, the model considers the error correction (ECM), the representation of the model can be written in a reduced form:

$$\Delta \log(PIBH_t) = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta \log(PIBH_{t-1}) + \sum_{i=0}^{q} \beta_{2i} \Delta \log(FBCFH_{t-1}) + \sum_{i=0}^{q} \beta_{3i} \Delta STB_{t-1} + \sum_{i=0}^{q} \beta_{4i} \Delta GE_{t-1} + \sum_{i=0}^{q} \beta_{5i} \Delta RGL_{t-1} + \sum_{i=0}^{q} \beta_{6i} \Delta LOI_{t-1} + \boldsymbol{\gamma ECM_{t-1}} + \varepsilon_t \quad [6]$$

With, $\boldsymbol{\gamma ECM_{t-1}} = \gamma_1 \log(PIBH_{t-1}) + \gamma_2 \log(FBCFH_{t-1}) + \gamma_3 STB_{t-1} + \gamma_4 GE_{t-1} + \gamma_5 RGL_{t-1} + \gamma_6 LOI_{t-1}$

Indeed, the ECM component represents the residuals produced by the long-term equation, if and only if there is a long-term relationship in our model. In the case where there is no long-term relationship, the ARDL model representation does not contain an ECM variable. The representation of the adopted model:

$$\boldsymbol{\Delta \log(y_t) = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta \log(y_{t-1}) + \sum_{i=0}^{q} \beta_{2i} \Delta \log(k_{t-1}) + \sum_{i=0}^{q} \beta_{3i} \Delta STB_{t-1} + \sum_{i=0}^{q} \beta_{4i} \Delta GE_{t-1} + \sum_{i=0}^{q} \beta_{5i} \Delta RGL_{t-1} + \sum_{i=0}^{q} \beta_{6i} \Delta LOI_{t-1} + \varepsilon_t} \quad [7]$$

3. EMPIRICAL RESULTS

It concerned the results from the ARDL modelling process, the causality analysis, and the study of short-term dynamics.

3.1. Stationarity of the series

In order not to fall into a spurious regression, the identification of the degree of integration of the time series is necessary. Several tests help to verify the stationary or non-stationary character of a series, we will retain three of them: Levin, Lin & Chu (LLC) test, Augmented

Dickey-Fuller (ADF) test, Phillippe-Perron (PP) test. The following table shows the results of the stationarity tests:

Table 2. Time series stationarity

Variables	Level			1st difference			Degree
	LLC	**ADF**	**PP**	**LC**	**DF**	**PP**	
LGDPH(1)	4,32* (1,00)	3,18** (1,00)	1,79** (1,00)	-8,66 (0,00)	184,28 (0,00)	353,93 (0,00)	I(1)
LGFCFH(1)	4,64** (1,00)	15,13** (1,00)	12,45** (1,00)	-8,33 (0,00)	180,41 (0,00)	333,25 (0,00)	I(1)
STB	-3,73* (0,00)	111,6* (0,01)	102,85** (0,04)	-	-	-	I(0)
GE	-3,27 (0,00)	115,08 (0,00)	155,18 (00,0)	-	-	-	I(0)
RGL	-2,28* (0,01)	-1,66* (0,04)	108,6* (0,01)	-	-	-	I(0)
LOI	-2,722* (0,00)	103,66 (0,03)	123,37** (0,00)	-	-	-	I(0)

(1)LGDPH =log(GDPH) ; LGFCFH=log(GFCFH)
* No trend, **No trend or constant

3.2. ARDL model validation test

The terminal cointegration test is applied by determining the optimal offset and then applying the Fisher test to examine the cointegration between the different series. In order to select the optimal, offset for our ARDL model, it would be preferable to use the Akaike Information Criterion (AIC) to examine and select the model that suggests more significant results with respect to the AIC graphical values. As shown in detail at the Appendix A1, the model we retain is that of ARDL (2,1,1,1) for the optimal (lowest) value it records with respect to the AIC criterion. Then, following the modelling procedure used to validate the robustness of the chosen model, we will proceed to tests that allow us to diagnose our ARDL model. For the ARDL(2,1,1,1) model with an unconstrained constant and no trend, the calculated test statistic, in the sense of Fisher's F-value, will be compared to the critical values (which form bounds) of the table provided by Persaran and al. (2001).

Table 3. Result of the cointegration test of Persaran and al. (2001)

Variables	**LGDPH, LGFCFH, STAB, GE, RGL, LOI**
F-Stat	2,36

Critical level	Borne <	Borne >
10%	3,17	4,14
5%	3,79	4,85
1%	4,48	5,52

As long as the critical value is below the critical threshold of the Persaran's test, it means that there is no cointegrating relationship between the dependent variable and the explanatory variables of the model. As a result of these results, it is inconceivable to estimate the long-term relationship (as well as the ECM component of the model). Therefore, we will estimate the short-term relationship only. But first, we will study the causal relationships between the variables of the selected model.

3.3. Correlation and causality between economic and political variables

One of the more frequently reported statistical methods involves correlation analysis where a correlation coefficient is reported representing the degree of linear association between two variables (Taylor, 1990). Based on the correlation results between the variables, the degree of association of growth with the other variables does not exceed (0.50), except for the compliance index and the GFCF per capita. The simple inter-variable correlation matrix does not present any information on the relationship that may exist between GDP per capita, as a dependent variable, and the policy variables. However, since the correlation threshold between certain variables was exceeded by (0.70), it is acceptable to note a probable multi-collinearity between GDP per capita and GDCF per capita (0.92), the absence of violence (0.71) and government efficiency and the quality of regulation and compliance with laws (0.85).

Table 4. Correlation and causality between variables

Correlation matrix						
	LGDPH	**LGFCFH**	**STB**	**GE**	**RGL**	**LOI**
LGDPH	1	0.9214	0.0483	0.0818	0.3950	0.5128
LGFCFH	0.9214	1	0.1218	0.1074	0.4281	0.5178
STB	0.0483	0.1218	1	0.7106	0.3998	0.3734
GE	0.0818	0.1074	0.7106	1	0.3421	0.3090
RGL	0.3950	0.4281	0.3998	0.3421	1	0.8569
LOI	0.5128	0.5178	0.3734	0.3090	0.8569	1
Results of Toda-Yamamoto Causality approach (probability)						

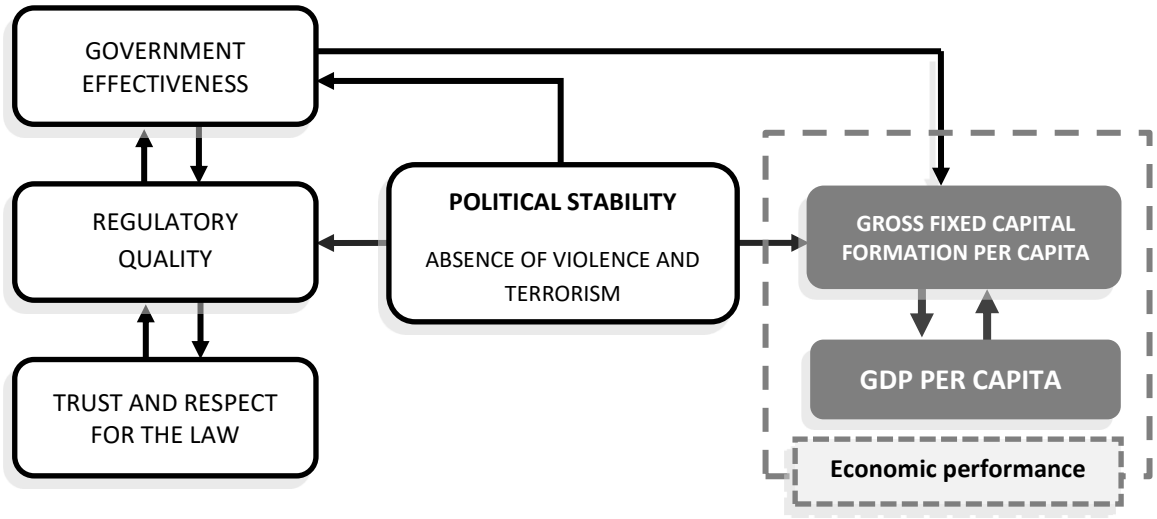
LGDPH	-	20,91* (0,00)	2,78 (0,24)	1,41 (0,49)	1,40 (0,49)	1,80 (0,40)
LGFCFH	50,79* (0,00)	-	6,94** (0,03)	6,12** (0,04)	3,25 (0,19)	1,14 (0,56)
STB	0,60 (0,74)	0,10 (0,95)	-	2,64 (0,26)	1,21 (0,54)	0,62 (0,73)
GE	1,66 (0,43)	3,03 (0,21)	17,28* (0,00)	-	8,52* (0,01)	4,09 (0,12)
RGL	2,39 (0,30)	0,12 (0,94)	8,17* (0,01)	6,82** (0,03)	-	24,55* (0,00)
LOI	0,03 (0,98)	1,03 (0,59)	2,96 (0,22)	0,47 (0,78)	13,87* (0,00)	-

* Significant at the 1% threshold,
** Significant at the 5% threshold

Using the results of the correlation between the variables studied, we can further explore the causal relationships to build a structural model that links them together. As long as the model is composed of variables that are integrated in a different order, the Granger causality test is no longer adopted. To remedy this, we will use Toda-Yamamoto's (1995) causality test based on Wald's statistic, which is distributed according to a chi-square distribution.

In this test, the null hypothesis stipulates the absence of causality between the variables (probability > 5%). Therefore, if the coefficient is statistically significant, it implies that the explanatory variable (column) is a causal variable in relation to the dependent variable (row). The test is applied with a maximum integration rate of I(1) and the optimal Lag number is equal to 2. The de Toda-Yamamoto test reveals two levels of causality:

Figure 1. Causality Diagram under the Toda-Yamamoto Test



> **Bidirectional causality:** The existence of a bidirectional causality relationship is first observed at the level of two economic magnitudes, namely GDP per capita and stock of capital per capita, with a causality coefficient of 50.79 of output per capita over Capital. Also, the results of the test show a similar relationship between government efficiency and regulatory quality. Similarly, the latter variable maintains a two-way causal relationship with the confidence and compliance index. This indicates that a government's level of performance is closely related to the regulations to which it is subject.

> **Unidirectional causality:** Political stability has a direct impact on investment, regulatory quality, and government efficiency. This implies that it has an indirect impact on economic performance. Apart from political stability, investment is also caused by government efficiency. This represents a form of political stability (Barro, 1991; Chen and Feng, 1996).

Political variables such as political stability (in the sense of absence of violence), government efficiency or even improved regulatory conditions have an impact on economic performance through the output supported by capital channel.

3.4. Short-term Dynamics

Despite the significance of the adjustment coefficient (recall force) in our model, the absence of cointegration for the bounds test implies that we can only estimate the short-term relationship of this model. As a result, the estimation results of the short-term model are presented in the following table. It is worth noting that although the coefficients associated with the variables (STB, GE, RGL) are shown to be insignificant even at the 10% threshold, we preserve these

results to keep the specification of the theoretical model adopted. Under short-term dynamics, all the variables studied show effects similar to the expected results, with the exception of the GE index, which shows a small negative impact, with a coefficient of -0.009 (0.47).

Table N°5: Result of Estimating Short-term Coefficients

Short-term equation

Dependent variable: D(LGDPH)

Variable	Coefficient	Std. Error	t statistic	Probability
$\Delta(LGDPH(-1))$	0,211	0,033	6,325	0,000
$\Delta(LGFCFH)$	0,039	0,005	7,729	0,000
$\Delta(STB)$	0,014	0,012	1,242	0,214
$\Delta(GE)$	-0,009	0,013	-0,707	0,479
$\Delta(RGL)$	0,019	0,012	1,515	0,130
$\Delta(LOI)$	0,038	0,015	-2,505	0,010
C	0,025	0,001	13, 309	0,000

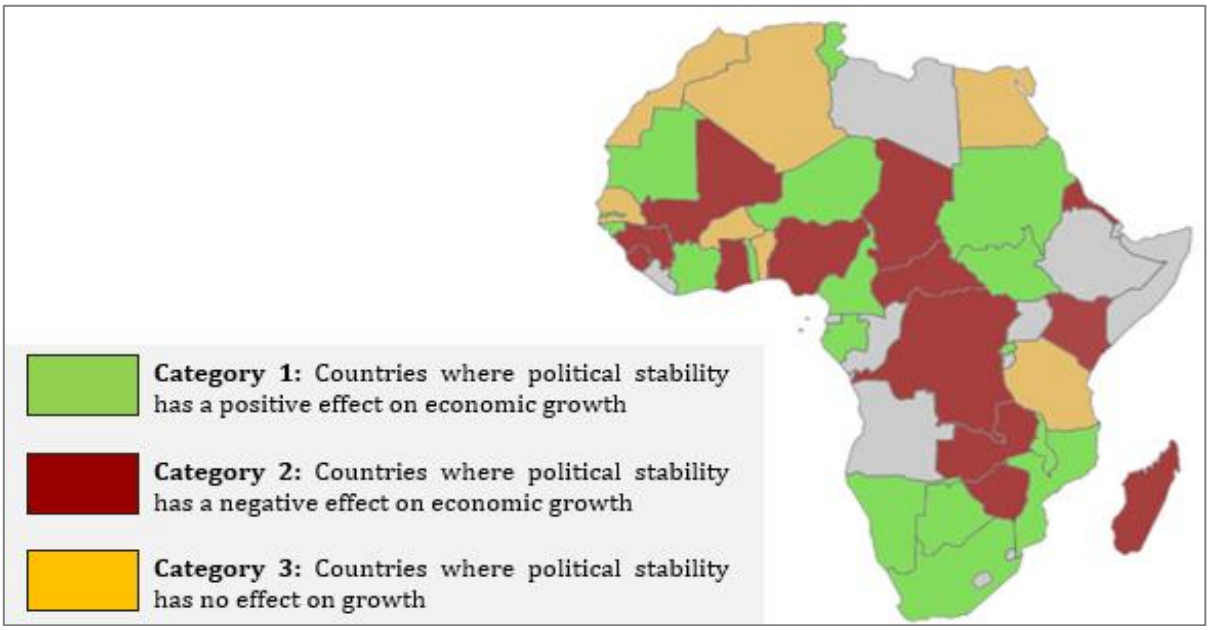
R-Squared	0,131	Sum squared of residual	1,398
Adjusted R-Squared	0,124	Log likelihood	1388,18
Sum of Dependents variables	0,034	S.D. of Dependent variables	0,04
Error Terms Regression	0,042	Akaike criteria (AIC)	-3,48
F-Statistic	19,823	Schwarz criteria (SC)	-3,44
Probability (F-Stat)	0,000	Hannan-Quinn criteria (HQ)	-3,46
		Durbin-Watson Statistic	2,053

Political stability has a positive effect on economic output over a short period of time. With an increase in the political stability index (in the sense of absence of violence and terrorism) of 1%, GDP per capita in African countries could grow by 0.014% in the short-term. The low rate of impact of political stability on growth can be linked to the absence of a direct link between these two components, and investment is therefore considered to be the bearer of the effects of political change towards economic growth.

Even if the impact of investment is only 0.039% in the short term, it is important not to neglect the time dimension. Indeed, returns on investment on growth require at least a year or more to manifest themselves. Therefore, a short-term equation can only indicate the evolution that

national output per capita can reach following the improvement of political indexes as well as the level of investment per capita.

Figure 2. Mapping the effects of political stability on short-term growth



Source: Author (Based on the model estimation results)

The analysis of the short-term dynamics of these sub-panel variables makes it possible to provide an estimate of these variables in relation to each African country. The short-term equations in relation to each country are presented in the table of results of the estimation of short-term coefficients by country (Appendix A2).

4. RESULTS AND DISCUSSION

In this section we will mainly discuss the results that emanate from the estimation of short-term coefficients by African country. In this sense, we will try to map these countries in relation to the coefficient of impact of political stability on GDP per capita in the short-term. To simplify, our map must distinguish three types of ratio category: a positive ratio between stability and growth, a negative ratio and another ratio that will be neutral between these two variables where the impact will be negligible (close to zero).

❖ **Category 1:** Includes 45% of the countries studied that show a positive effect of stability on GDP. These countries are located further to the extreme south of the continent as well as in East and West Africa. These results are in line with the majority of studies that have

demonstrated this (Barro, 1990; Edward and Tabellini, 1991, Devereux and Wen, 1996; Alesina and Perotti, 1996; Edward, 1998; Drazen, 2000; Bildirici, 2004; Yunis and Al, 2008). Indeed, the absence of violence is a telling indicator of a good business climate. This increases investor confidence and promotes economic growth. In terms of the obtained results, this scenario is associated with economies that, on average, display fairly high levels of political stability, such as Botswana (+0.92), Mozambique (+0.01) and Namibia (+0.63). This peaceful geopolitical climate is likely to influence even other neighboring countries that do not display a similar level of stability, as is the case of South Africa (-0.12) in the South African region.

❖ **Category 2:** Includes 35% of those African countries that show a negative effect. These countries are located more in the central region of Africa and in the West. The majority of these countries show fairly low levels of the political stability index due to the geopolitical turbulence experienced by the Central African region during the 20th century. It is likely that this category reflects the fact that stability is responsible for a slowdown in growth (Fosu, 1992; Campos, Nugent and Robinson, 1999; Compos and Nugent, 2002). On the other hand, we can consider that this negative impact ratio is only due to the decrease in mortality. At the same time, the increase in the size of the population will reduce the value of GDP per capita without this being relative to a decrease in growth.

❖ **Category 3:** Includes 20% of these African countries. On these countries, political stability has no effect on output. These countries are globally in the North of Africa (such as Morocco, Egypt, and Algeria) and are relatively stable on a continental scale. In addition to the effectiveness of control policies in this region, its historical rapprochement has meant that political stability is considered a *de facto* situation. Thus, the absence of violence has less impact on the economic behavior of these citizens, especially when it comes to investment.

CONCLUSION

In Africa, political stability is a necessary component of economic development. To verify this hypothesis, we have applied a dynamic macro-modelling, namely the ARDL model, on a panel of African countries covering a period of twenty years [1997-2017]. Although this idea has been widely supported by the scientific community, our research objective was to provide empirical analysis to identify the links that connect per capita growth to the variation of political variables. The obtained results reject the existence of a cointegrating relationship (long-term

dynamics). Thus, we have only estimated the short-term relationship that confirms that stability has a positive effect on economic growth. Also, the application of the causality test has shown that investment is the main channel through which the effects of policy variables on growth are transmitted. Estimating this dynamic by country makes it possible to visualize the nature of the effects that these variables can generate on growth.

By limiting itself to the analysis of political stability in its classical dimension (absence of violence within a territory), each country shows different results in relation to its geographical location. In the South African region, the strengthening of the absence of violence index has helped to reinforce its role in promoting growth. While in the central region, which has been experiencing instability since the last century, countries show growth that is favorable to the decline of this stability. On the other hand, in North Africa, stability has no effect on growth. Due to a political regime that has remained relatively stable since independence, the risk of political instability, in the radical sense, is under control. As a result, economic agents have not lost confidence in the economic climate of these countries, despite the upheavals that some have experienced during the last decade.

Nevertheless, the average level of the stability index in the panel of countries covered in our study is on average negative (0.67 as shown in Appendix Table 1). This indicates that the African continent is still not generally qualified as stable by the World Bank's standards.

REFERENCES

[1] **Abramovitz, M.** (1956). 'Resource and output trends in the United States since 1870'. In Resource and output trends in the United States since 1870 (pp. 1-23). NBER.

[2] **Acemoglu, D., & Robinson, J. A**. (2013). Economics versus politics: Pitfalls of policy advice. Journal of Economic perspectives, 27(2), 173-92.

[3] **Ahmed, M. U., & Pulok, M. H**. (2013). 'The role of political stability on economic performance: the case of Bangladesh'. Journal of Economic Cooperation & Development, 34(3), 61.

[4] **Aisen, A., & Veiga, F. J**. (2010). 'How does political instability affect economic growth?' SSRN Electronic Journal, 11‑16. https://doi.org/10.2139/ssrn.1560524

[5] **Alesina, A., & Perotti, R.** (1996). 'Income distribution, political instability, and investment' European Economic Review, 40(6), 1203‑1228. https://doi.org/10.1016/0014-2921(95)00030-5.

[6] **Alesina, A., Ozler, S., Roubini, N., & Swagel, P**. (1996). 'Political instability and economic growth.' Journal of Economic Growth, 1(2), 189‑211. https://doi.org/10.1007/bf00138862

[7] **Alesina, A., & Tabellini, G.** (1989). External debt, capital flight and political risk. Journal of international Economics, 27(3-4), 199-220.

[8] **Alexandrakis, C., & Livanis, G**. (2013). 'Economic Freedom and Economic Performance in Latin America: A Panel Data Analysis.' Review of Development Economics, 17(1), 34‑48. https://doi.org/10.1111/rode.12013

[9] **Asteriou, D., & Price, S**. (2001). 'Political Instability and Economic Growth: UK Time Series Evidence.' Scottish Journal of Political Economy, 48(4), 383‑399. https://doi.org/10.1111/1467-9485.00205

[10] **Azam, J. P., Berthélemy, J. C., & Calipel, S.** (1996). 'Risque politique et croissance en Afrique'. Revue économique, 819-829.

[11] **Barro, R. J.** (1990). 'Government spending in a simple model of endogeneous growth.' Journal of political economy, 98(5, Part 2), S103-S125.

[12] **Barro, R. J., Mankiw, N. G., & Sala-i-Martin, X.** (1995). 'Capital mobility in neoclassical models of growth.' The American Economic Review, 103-115.

[13] **Bildirici, M.** (2004). Political instability and growth: an econometric analysis of Turkey, Mexico, Argentina and Brazil, 1985-2004. Applied Econometrics and International Development, 4(4).

[14] **Campos, N. F., & Karanasos, M. G.** (2008). 'Growth, volatility and political instability: Non-linear time-series evidence for Argentina', 1896–2000. Economics Letters, 100(1), 135-137

[15] **Campos, N. F., & Nugent, J. B.** (2002). Who is afraid of political instability?. Journal of Development Economics, 67(1), 157-172.

[16] **Campos, N. F., Nugent, J. B., & Robinson, J. A.** (1999). 'Can Political Instability be Good for Growth? The Case of Meddle East and North Africa.' Department of Economics, University of Southern California, Los Angeles, California.

[17] **Choy, L. T.** (2013). 'A Study of Political Stability in Malaysia: A Study About National Civilian Perception.' IOSR Journal of Humanities and Social Science, 8(4), 92-146.

[18] **Collins, N. L.** (1996). 'Working models of attachment: Implications for explanation, emotion, and behavior.' Journal of personality and social psychology, 71(4), 810.

[19] **Cukierman, A., & Webb, S. B**. (1995). 'Political influence on the central bank: international evidence'. The World Bank Economic Review, 9(3), 397-423.

[20] **Cukierman, A., Web, S. B., & Neyapti, B.** (1992). 'Measuring the independence of central banks and its effect on policy outcomes.' The world bank economic review, 6(3), 353-398.

[21] **Devereux, M. B., & Wen, J. F.** (1998). 'Political instability, capital taxation, and growth.' European Economic Review, 42(9), 1635-1651.

[22] **Drazen, A.** (2000). 'Political economy in macroeconomics.' Princeton University Press.

[23] **Edwards, S.** (1998). Openness, productivity and growth: what do we really know?. The economic journal, 108(447), 383-398.

[24] **Engle, R. F., & Granger, C. W.** (1987). 'Co-integration and error correction: representation, estimation, and testing.' Econometrica: journal of the Econometric Society, 251-276.

[25] **Fosu, A. K.** (1992). 'Political instability and economic growth: evidence from Sub-Saharan Africa'. Economic Development and Cultural Change, 40(4), 829-841.

[26] **Fosu, A. K.** (2001). 'Political instability and economic growth in developing economies: some specification empirics.' Economics Letters, 70(2), 289-294.

[27] **Fosu, A. K.** (2003). 'Political instability and export performance in sub-Saharan Africa.' Journal of Development Studies, 39(4), 68-83.

[28] **Francis, D. J.** (2006).' Uniting Africa: Building regional peace and security systems'. Ashgate Publishing, Ltd.

[29] **Goldsmith, A. A.** (1987). 'Does political stability hinder economic development?' Mancur Olson's theory and the Third World. Comparative Politics, 19(4), 471-480.

[30] **Hibbs, D. A**. (1973). 'Mass political violence: A cross-national causal analysis' (Vol. 253). New York: Wiley.

[31] **Holt, R. T., & Turner, J. E.** (1975). 'Crises and sequences in collective theory development.' The American Political Science Review, 69(3), 979-994.

[32] **Jong-A-Pin, R.** (2009). 'On the measurement of political instability and its impact on economic growth.' European Journal of Political Economy, 25(1), 15-29.

[33] **Mankiw, N. G., Romer, D., & Weil, D. N.** (1992). 'A contribution to the empirics of economic growth.' The quarterly journal of economics, 107(2), 407-437.

[34] **Muñoz, R.** (2009). 'Political instability and economic growth: the case of Venezuela (1983-2000).' Documentos de Trabajo

[35] **Murdoch, J. C., & Sandler, T.** (2004). 'Civil wars and economic growth: Spatial dispersion.' American Journal of Political Science, 48(1), 138-151.

[36] **Norris, P.** (2006, July). 'Political protest in fragile states.' In International Political Science Association World Congress (pp. 1-31).

[37] **North, D. C.** (1990). Institutions, institutional change and economic performance. Cambridge university press

[38] **Olson, M.** (1993). 'Dictatorship, democracy, and development.' American political science review, 567-576.

[39] **Olson, M.** (2008). "The rise and decline of nations: Economic growth, stagflation, and social rigidities." Yale University Press.

[40] **Özler, Ş., & Rodrik, D.** (1992). "External shocks, politics and private investment: Some theory and empirical evidence." Journal of Development Economics, 39(1), 141-162.

[41] **Özler, S., & Tabellini, G.** (1991). 'External debt and political instability'. NBER Working Paper, (w3772)

[42] **Perotti, R.** (1996). 'Growth, income distribution, and democracy: What the data say. Journal of Economic growth', 1(2), 149-187.
[43] **Pesaran, M. H., & Shin, Y.** (1995). 'An autoregressive distributed lag modelling approach to cointegration analysis'.
[44] **Pesaran, M. H., Shin, Y., & Smith, R. J**. (1996). Testing for the 'Existence of a Long-run Relationship' (No. 9622). Faculty of Economics, University of Cambridge.
[45] **Pesaran, M. H., Shin, Y., & Smith, R. J.** (2001). 'Bounds testing approaches to the analysis of level relationships.' Journal of applied econometrics, 16(3), 289-326.
[46] **Ramey, G., & Ramey, V. A**. (1995). 'Cross-country evidence on the link between volatility and growth.' The American Economic Review, 1138-1151.
[47] **Roubini, N.** (1991). Economic and political determinants of budget deficits in developing countries. Journal of International money and Finance, 10, S49-S72.
[48] **Solow, R. M.** (1957). Technical change and the aggregate production function. The review of Economics and Statistics, 39(3), 312-320.
[49] **Taylor, R**. (1990). 'Interpretation of the Correlation Coefficient: A Basic Review.' Journal of Diagnostic Medical Sonography, 6(1), 35-39. https://doi.org/10.1177/875647939000600106
[50] **Toda, H. Y., & Yamamoto, T.** (1995). 'Statistical inference in vector auto regressions with possibly integrated processes.' Journal of econometrics, 66(1-2), 225-250.
[51] **Younis, M., Xu, X. L., Sharahili, Y. & Selvarathinam, S.** (2008). 'Political Stability and Economic Growth in Asia,' American Journal of Applied Sciences 5 (3): 203-208
[52] **Zablotsky, E. E**. (1996). 'Political stability and economic growth: a two-way relation' (No. 109). CEMA.

ANNEXES

Appendix A1: Descriptive data and result of stability Model test

Appendix Table 1: Variable descriptive statistics

	GDPH	GFCFH	STAB	GE	RGL	LOI
Mean	4101,65	435,48	-0,64	-0,73	-0,57	-0,61
Median	1976,76	155,02	-0,75	-0,74	-0,52	-0,64
Maximum	29327,57	5947,01	1,00	1,49	1,12	1,07
Minimum	0,00	0,00	-2,22	-2,55	-2,24	-1,85
Std. deviation	4780,59	733,26	0,71	0,64	0,58	0,61

Appendix Table 2: ARDL model estimation result

Dependent variable: Δ(LGDPH)
Method: ARDL (1998-2017); Information Criteria (AIC)
Model selected: ARDL(2,1,1,1,1)
Long-term Equation

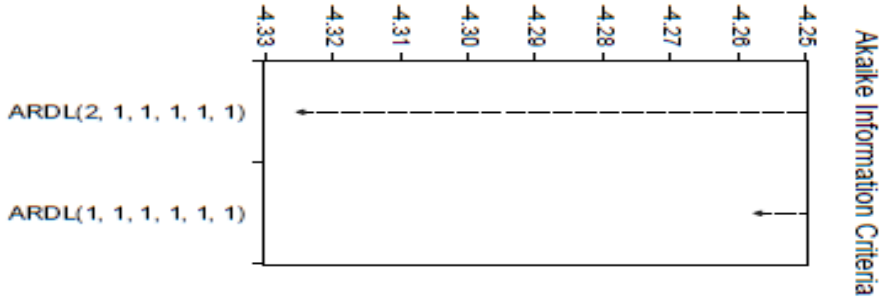
Variable	Coefficient	Std. Error	t statistic	Probability
LGFCFH	0,0815	0,0062	13,059	0,000
STB	-0,016	0,0086	-1,880	0,060
GE	0,060	0,0092	6,565	0,000
RGL	-0,036	0,0095	-3,830	0,000
LOI	0,057	0,0012	4,532	0,000

Short-term Equation

Variable	Coefficient	Std. Error	t statistic	Probability
CointeQ01	-0,508	0,060	-8,433	0,000
$\Delta(LGDPH(-1))$	0,213	0,038	5,559	0,000
$\Delta(LGFCFH)$	0,017	0,012	1,372	0,170
$\Delta(STB)$	-0,004	0,017	-0,237	0,812
$\Delta(GE)$	-0,020	0,012	-1,606	0,100
$\Delta(RGL)$	0,016	0,015	1,090	0,275
$\Delta(LOI)$	-0,035	0,020	-1,710	0,087
C	3,659	0,457	8,003	0,000

Mean dependent variables	0,034	S.D. of dependent variables	0,045
Error term regression	0,031	Akaike Criteria (AIC)	-4,116
Sum Squared of the residual	0,455	Schwarz Criterion (SC)	-2,046
Log of likelihood	2079,72	Hannan-Quinn Criterion (HQ)	-3,323

Appendix Figure 1: Information criterion values (AIC)



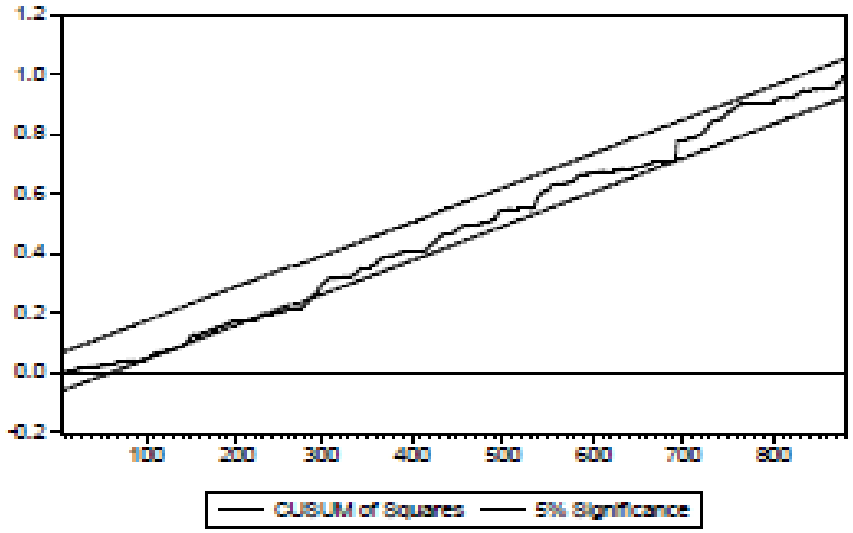
Appendix Table 3: Table of information criterion values (AIC)

	Logl	AIC	BIC	HQ	Model
ARDL(2, 1, 1, 1, 1)	2079,72	-4,324*	-2,1724	-3,4975	Accepted
ARDL(1, 1, 1, 1, 1)	2012,92	-4,257	-2,3407	-3,5205	Rejected

Appendix Table 4: Results of the diagnostic tests of the ARDL model

Test Hypothesis	Tests	Values (Probability)
Panel Independence	Breusch-Pagan Chi Square	883,88 (0,00)
	Pearson LM Normal	1,6175 (0,105)
	Friedman Chi-Square	49,99 (0,00)
Residue Normality	Skewness	-0,0141
	Kurtosis	9,05404
	Jarque-Bera	1211,05

Appendix Figure 2: Long-term model stabilization test



Appendix A2: Estimation's results of ARDL model (Panel representation)

	Cointeq	ΔLGDPH(−1)	ΔLGFCFH	ΔSTB	ΔGE	ΔRGL	ΔLOI
1 - Burundi	-0,24 (0,00)	0,01 (0,77)	-0,01 (0,00)	-0,07 (0,00)	-0,01 (0,00)	-0,01 (0,15)	0,13 (0,00)
2 - Benin	-0,37 (0,00)	0,33 (0,00)	0,01 (0,00)	0,00 (0,00)	0,01 (0,00)	0,03 (0,00)	0,05 (0,00)
3 – Burkina Faso	-0,46 (0,00)	0,05 (0,40)	0,00 (0,04)	0,00 (0,26)	-0,01 (0,00)	0,00 (0,10)	0,00 (0,40)
4 - Botswana	-1,06 (0,00)	0,22 (0,01)	-0,21 (0,00)	0,06 (0,11)	-0,03 (0,05)	-0,08 (0,01)	0,25 (0,01)
5 – Republic of Central Africa	-0,35 (0,00)	-0,02 (0,30)	0,23 (0,00)	-0,18 (0,00)	-0,03 (0,26)	0,40 (0,00)	0,11 (0,00)
6 – Côte d'Ivoire	0,08 (0,00)	0,41 (0,00)	0,06 (0,00)	0,27 (0,00)	-0,04 (0,00)	-0,02 (0,00)	-0,05 (0,00)
7 - Cameron	-0,07 (0,00)	0,37 (0,00)	0,00 (0,00)	0,07 (0,00)	0,05 (0,00)	0,00 (0,00)	-0,06 (0,00)
8 – Republic of the Congo	-1,25 (0,00)	0,42 (0,00)	-0,05 (0,00)	-0,03 (0,00)	-0,05 (0,00)	0,09 (0,00)	-0,10 (0,00)
9 - Comoros	-1,55 (0,00)	0,46 (0,00)	-0,08 (0,00)	0,02 (0,00)	-0,02 (0,00)	0,08 (0,00)	-0,03 (0,00)
10 – Algeria	-0,12 (0,00)	0,35 (0,00)	0,05 (0,00)	0,00 (0,00)	0,04 (0,00)	0,08 (0,00)	-0,05 (0,00)
11 - Egypt	-0,19 (0,00)	0,26 (0,00)	0,04 (0,00)	0,00 (0,00)	0,02 (0,00)	0,09 (0,00)	-0,07 (0,00)
12 - Eritrea	-0,90 (0,00)	0,18 (0,03)	0,00 (0,03)	-0,09 (0,04)	-0,17 (0,02)	0,14 (0,00)	-0,05 (0,05)
13 – Gabon	-0,12 (0,00)	-0,06 (0,00)	0,05 (0,00)	0,18 (0,00)	-0,08 (0,00)	0,10 (0,00)	-0,07 (0,00)
14 – Ghana	-0,27 (0,00)	0,20 (0,00)	0,01 (0,00)	-0,17 (0,00)	0,00 (0,15)	0,07 (0,00)	0,06 (0,00)
15 - Guinea	-1,22 (0,00)	0,26 (0,00)	-0,02 (0,00)	-0,02 (0,00)	-0,04 (0,00)	-0,13 (0,00)	0,03 (0,00)
16 - Gambia	-0,55 (0,00)	-0,24 (0,00)	0,00 (0,00)	0,02 (0,00)	-0,07 (0,00)	-0,08 (0,00)	-0,02 (0,00)
17 – Guinea Bissau	-0,71 (0,00)	-0,06 (0,00)	0,00 (0,00)	0,02 (0,00)	-0,01 (0,00)	0,07 (0,00)	-0,06 (0,00)
18 – Kenya	-0,44 (0,00)	-0,02 (0,47)	0,04 (0,00)	-0,03 (0,00)	0,09 (0,00)	-0,02 (0,00)	-0,04 (0,00)
19 - Morocco	-0,43 (0,00)	-0,01 (0,47)	0,02 (0,00)	0,00 (0,00)	-0,12 (0,00)	0,00 (0,40)	-0,09 (0,00)
20 – Madagascar	-0,60 (0,00)	0,06 (0,06)	0,07 (0,00)	-0,01 (0,00)	-0,01 (0,00)	0,08 (0,00)	0,03 (0,00)
21 - Mali	-0,50 (0,00)	-0,13 (0,02)	0,04 (0,00)	-0,02 (0,10)	-0,04 (0,01)	- 0,04(0,00)	0,05 (0,00)
22 - Mozambique	-0,08 (0,00)	-0,05 (0,48)	0,00 (0,00)	0,05 (0,00)	-0,05 (0,00)	0,00 (0,09)	0,00 (0,54)
23 - Mauritania	-0,60 (0,00)	0,42 (0,00)	-0,10 (0,00)	0,17 (0,00)	0,02 (0,00)	-0,03 (0,00)	-0,13 (0,00)
24 - Mauritius	-0,86 (0,00)	0,23 (0,01)	-0,02 (0,00)	-0,01 (0,00)	0,01 (0,00)	0,06 (0,00)	-0,15 (0,00)
25 - Malawi	-0,27 (0,00)	0,28 (0,00)	-0,02 (0,00)	0,01 (0,15)	-0,07 (0,00)	0,12 (0,00)	-0,02 (0,00)
26 – Namibia	-0,74 (0,00)	0,51 (0,00)	0,04 (0,00)	0,01 (0,00)	-0,07 (0,00)	0,05 (0,00)	0,00 (0,26)
27 - Niger	-0,19 (0,00)	-0,31 (0,00)	0,08 (0,00)	0,08 (0,00)	-0,04 (0,00)	0,00 (0,40)	-0,08 (0,00)
28 - Nigeria	-0,02 (0,00)	0,50 (0,00)	0,19 (0,00)	-0,15 (0,00)	-0,05 (0,00)	-0,01 (0,00)	-0,12 (0,00)
29 - Rwanda	-0,86 (0,00)	0,18 (0,00)	0,07 (0,00)	0,06 (0,00)	0,00 (0,75)	0,01 (0,00)	0,00 (0,18)
30 – Sudan	-0,58 (0,00)	0,56 (0,00)	-0,02 (0,00)	0,13 (0,00)	-0,06 (0,00)	-0,12 (0,00)	0,01 (0,02)
31 – Senegal	-0,62 (0,00)	0,09 (0,09)	-0,02 (0,00)	0,00 (0,00)	-0,04 (0,00)	-0,04 (0,00)	-0,07 (0,00)
32 – Sierra Leone	-0,80 (0,00)	0,13 (0,02)	-0,03 (0,00)	-0,10 (0,10)	-0,09 (0,00)	-0,17 (0,09)	-0,69 (0,00)
33 - Seychelles	-1,22 (0,00)	0,61 (0,00)	-0,05 (0,00)	0,05 (0,03)	0,06 (0,00)	0,01 (0,00)	-0,03 (0,00)
34 – Chad	-0,15 (0,01)	0,46 (0,00)	-0,02 (0,02)	-0,11 (0,03)	-0,16 (0,10)	-0,16 (0,00)	-0,03 (0,17)
35 – Togo	-0,18 (0,00)	-0,01 (0,23)	-0,03 (0,00)	0,02 (0,00)	0,01 (0,00)	0,04 (0,00)	-0,02 (0,00)
36 – Tunisia	-0,19 (0,00)	0,14 (0,02)	0,19 (0,00)	0,04 (0,00)	-0,04 (0,00)	0,01 (0,00)	0,03 (0,00)
37 - Tanzania	-0,42 (0,00)	0,68 (0,00)	0,00 (0,00)	0,00 (0,00)	0,00 (0,06)	0,01 (0,00)	-0,01 (0,00)
38 - Uganda	-0,29 (0,00)	0,07 (0,30)	0,11 (0,00)	-0,14 (0,00)	-0,02 (0,00)	0,06 (0,00)	0,09 (0,00)
39 – South Africa	-0,25 (0,00)	0,46 (0,00)	0,04 (0,00)	0,06 (0,00)	0,02 (0,00)	-0,02 (0,00)	-0,08 (0,00)
40 - Zimbabwe	-0,27 (0,00)	0,41 (0,00)	0,00 (0,00)	-0,37 (0,01)	0,33 (0,00)	-0,03 (0,14)	-0,06 (0,10)