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Institutional Quality and Economic Growth in Cameroon: An Application of the ARDL Approach

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Abstract: This paper conducts an analysis of the effects of institutional quality on economic growth in Cameroon through an ARDL model. Using data from the World Bank over the period 1996-2019, we find that in the short run, the econometric estimates show that the corruption control variable positively affects economic growth. Specifically, a one point increase in the level of corruption leads to a 0.57% increase in the economic growth rate. However, it was found that in the long run, corruption has a negative effect on economic growth. The results corroborate the idea that corruption undermines economic performance in the long run. As an economic policy measure, efforts should be made to fight corruption.

Keywords: Institutions; growth; ARDL model; corruption

JEL Classification: F43

1. Introduction

Since the beginning of the 1980s, the debate on the effects of institutional governance on economic growth has not ceased to generate reflection within the academic and professional world. For most developing countries, for example, improving the quality of institutions has become an imperative for obtaining financial support at the level of international financial institutions, given the fragility of their economies vis-à-vis the realities of globalization (Etsiba et al., 2018).

In the economic literature, several theoretical and empirical studies have been carried out to show that there really is a relationship between the quality of institutions and economic growth. The most widespread are those carried out by the World Bank, in particular Mauro (1995), Knack and Keefer (1995), Kaufman (1997), and Hall and Jones (1999). In addition to these works, there are also the studies carried out by Acemoglu, Johnson and Robinson (2001). In addition, these different researches have examined the extent to which institutional governance can explain the success or failure of economic policies in a Country.

Moreover, as Nguegang et al. (2019) point out, the role of institutional quality in the analysis of economic growth is only recently emerging in developing countries and in Africa. Nowadays, foreign investors want to operate in an environment characterized not only by profitability of investments but

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also and especially by reduced uncertainties and transaction costs. They seek clear and predictable economic policies that minimize the risk of unpleasant and costly surprises. The quality and quantity of foreign direct investment directed towards a country will depend on the level of risk, and even more so on the transaction costs associated with that risk in the country. One of the ways that has been developed in recent years to reduce the level of transaction costs associated with trade uncertainty is to take into account the quality of institutions.

In this respect, a contemporary pioneer author (North, 1990), analyses the role of institutions in the process of economic development. In particular, he shows that the existence of good private property rights institutions stimulates investment development and economic growth. It is therefore understandable that institutions need to be taken into account in today's economies.

Furthermore, studies by North (1981), Jones (1987) and Olson (1982) reveal that institutions are important for investment and long-term sustainable growth. Hall and Jones (1999) show that differences in institutions across the world cause huge variations in capital accumulation, education and growth rates. Similarly, Acemoglu, et al (2004) concluded that private property rights institutions are the main drivers of long-term economic growth, investment and financial development. These studies suggest that institutions are the fundamental determinants of long-term economic growth.

Therefore, we can ask the following question: What are the effects of institutional quality on economic growth in Cameroon? The objective of this paper is to analyze the effects of institutional governance on economic growth in Cameroon. The main contribution of this research work is to take into account the short term and long term dynamics in the analysis of the effects of governance indicators such as corruption control and political stability on economic growth.

In addition to this introductory section, the rest of the paper is structured as follows: (I) literature review, (II) methodological framework, (III) estimation procedure and finally (IV) empirical results.

2. Review of Literature

According to Etsiba et al (2018), the economic analysis of institutions was marked at the beginning of the 20th century by works generally classified as heterodox, such as those of Veblen, Mitchell and Commons (1970). Then, it was renewed under the impulse of new works that are nowadays grouped under the name of the New Institutional Economics (NIE), among which we can find those of North (1993) and Williamson (2000). Thus, this section aims to present a theoretical and empirical review of the role of institutions in the process of economic development of States.

2.1. Theoretical Foundations of Institutions

While sociologists are questioning the decline of institutions, institutions are in vogue among economists, as evidenced by the award of the 2009 Nobel Prize in Economics to Oliver E. Williamson and Elinor Ostrom for their work on economic governance. Developments highlighting the role of institutions in economic analysis are quite old. Institutionalism developed from a critique of marginalist economics in Germany and the United States, with the German Historical School and American Institutionalism respectively. Following the decline of these currents, economics ignored the role of

institutions until the 1970s, when standard economics tried to integrate this object into its analytical framework. Although there is a great diversity of institutionalist theories, we will limit ourselves here to a synthetic presentation of institutionalism and of the new institutional economics that dominates Anglo-Saxon research today.

American institutionalism is considered to be the first current to have established institutions as an important element in economic analysis. This concept is defined as an economic doctrine that emerged in the early 20th century in the United States as a reaction to neoclassical abstraction and that emphasizes the role played by institutions, whose behaviour is one of the determining factors in the evolution of economic activity. This school of thought was initiated by Veblen (1898) and Commons (1936) and has its origins in the radical transformations that the United States of America experienced in the twentieth century. The economic analysis of institutions was marked at the beginning of the twentieth century by work considered to be heterodox and basing institutionalism on the work of Veblen (1898) and Commons (1936), each of whom made an important but different contribution.

In contrast to the orthodox view of economics, the notion of institution is understood as a social construction of individual economic actions. In this view, Veblen (1898) calls an institution a specific mental habit, a particular way of thinking and acting in the economic field. Thus, the institution resides neither in individual autonomy nor in social heteronomy; it is the way in which an economic actor must, can, could or could not behave.

Commons (1936) considers collective action controlling individual action as an institution (Institutional Economics). For him, the transaction is more important than the market. His work did not have the popularity of Veblen's. However, he is certainly the one who had the most influence on a whole generation of young economists and on American economic policy. The development of his institutionalist theory is based on his experience. He begins his 1936 article "Institutional Economics" with the following sentence: "I attempt in this article to present a theory of institutional economics derived solely from the decisions of the United States Supreme Court. It is an essay in pure economics, as distinguished from its practical applications. The latter belong to individual cases. Indeed, the notion of "reasonable value" is at the heart of Commons' Institutional Economics (1936), linked to other important notions in his theory such as those of transaction, intangible value or futurity (Gislain, 2002).

The New Institutional Economics refers to a group of currents of thought that contributed to the renewal of the economic analysis of institutions in the 1970s. Neo-institutionalism was built on a return (which more often than not corresponds to a simple declaration of intent) to the work of the American institutionalists of the early 20th century (Thorstein Veblen, John R. Commons). The NIS is in fact a heterogeneous body of work that brings together a set of works that have in common the questioning of the role played by institutions (which can be defined generically as all the rules and norms that frame and regulate behaviour) in economic coordination.

2.2. Links between Economic Growth and Institutional Quality

Empirically, there is a large body of literature emphasizing the importance of institutional quality as a determinant of economic growth. In this regard, a large number of economic studies in recent years suggest that institutions are vital for development and economic growth. Using GDP per capita as a measure of economic development, economists generally find that international differences (annual per

capita incomes ranging from as little as $100 in some sub-Saharan regions to more than $40,000 in some advanced economies) are closely related to differences in institutional quality (Hali, 2003).

In the same vein, Acemoglu, Johnson and Robinson (2004) have shown that the economic growth gap between rich and poor countries is largely due to the difference in the guarantee of property rights in these countries, i.e. the quality of institutions. For their part, Sekkat and Méon (2004) also show in a similar way that the good quality of institutions (mainly the fight against corruption, the efficiency of the government and the rule of law) favours manufactured exports and FDI. For his part, Mauro (1995) based on work on three indices constructed by Business International (BI), namely: the corruption index, the bureaucratic quality index and the political stability index, finds that these three indicators are positively and significantly related to growth and investment.

In addition, empirical evidence from an IMF (2003) study on the relationship between institutional quality and economic growth has revealed the possibility of an inverse causal link between institutional quality and growth. For example, Anderson and Marcouiller (2002) and Dollar and Kraay (2002), based on the fact that poor institutions increase the cost and risk of foreign trade, find a positive relationship between institutional quality and international trade.

3. Methodological Framework

3.1 Theoretical Model: the AK Model

The first variant of the endogenous growth model, called AK theory, was presented by Frankel (1962); the famous articles by Romer (1986) and Lucas (1988) then gave the modern formulation of this long-neglected contribution. Essentially, the AK model treats knowledge as a particular type of capital: knowledge creation is a direct result of the accumulation of capital by individual firms, the basic idea being that capital accumulation contributes to the collective creation of new technological and organizational knowledge, through learning by doing and imitation. This knowledge creation will permanently offset the decline in the marginal productivity of capital and thus allow the economy to maintain a positive growth rate in the long run, subject to appropriate assumptions about the externalities of learning.

First introduced by Frankel (1962) to reconcile the hypothesis of diminishing returns to individual capital accumulation with the possibility of positive long-run growth as in the Harrod-Domar model, the AK model assumes a competitive economy with N firms. Each firm j ($1 < j > N$) produces its final output according to the Cobb-Douglas production function:

$$Y_r = AK^{\alpha}Lj^{1-\alpha} \quad (1)$$

where α is strictly less than 1, so that returns are diminishing relative to individual capital accumulation; A is a productivity parameter, reflecting the current state of knowledge; while the dynamic evolution of A, i.e., the creation of knowledge, which is taken as given in the neoclassical model discussed above, is rendered endogenous by the AK model, as it becomes the collective result of the accumulation of capital by all firms within the economy. More formally, the model assumes:

$$A = A_o(\frac{1}{N}\sum_{.} Kj)^n \quad (2)$$

Where n quantifies the externalities in on-the-job learning by the firm.

An unfortunate prediction of the AK model of endogenous growth, in which knowledge is considered only as capital, is that positive long-run growth is simply not compatible with possible convergence among various countries. Let us consider two countries or regions, each of them governed by the same type of dynamic equations as above. If these two countries (or regions) share the same fundamental characteristics (in terms of savings rate, depreciation rate, production technology, ...), then, from the beginning, these two economies will grow at the same rate $g = sA_o - \delta$; (g: long-run growth rate and δ the rate of depreciation of the capital factor) or, alternatively, these countries will have different characteristics, or perhaps be subject to stochastic shocks, in which case their growth paths will diverge over time.

On the contrary, the neoclassical model implies that, other things being equal, a rich country that has accumulated a considerable capital stock must grow more slowly than a poorer country with the same economic parameters but a smaller capital stock. In fact, there is strong evidence of a trend towards convergence in per capita income, not only in regions with different initial conditions but similar economic characteristics, such as some states in the United States, but also between industrialized countries and emerging market economies, especially in South-East Asia (see Barro and Sala-i-Martín, 1995). These observations on the evolution of income differentials across countries have, in turn, been used as a basis for criticism of the whole theory of endogenous growth. Mankiw, Romer and Weil (1992) led this attack head-on, arguing that the neoclassical model of growth with exogenous technical progress and diminishing returns to capital can explain most of the variation in output per person across countries.

While it seems to be willing to satisfy, to some extent, the first objective (i.e., explaining long-run growth), the AK approach cannot claim to meet the second objective (in particular, explaining convergence or divergence across countries). In fact, the AK model does not satisfy the first objective very well either. For example, it cannot account for the possibility of maintaining optimal positive growth in an economy where capital accumulation requires the use of a non-renewable resource. Indeed, the only way to counteract the depletion of natural resources and maintain long-run growth is through technical progress.

However, to the extent that capital accumulation remains the sole driver of new knowledge in this model, accelerating technical progress would lead to an increased depletion of the natural resource, which can only dim the prospects for long-term growth, in other words, exacerbate the problem that technical progress was intended to alleviate. More fundamentally, by focusing on the role of aggregate savings supply in the emergence of growth, the AK model neglects demand and, more specifically, the role of entrepreneurs, institutions and economic policies that can raise productivity by affecting the incentives of entrepreneurs to innovate.

3.2 Empirical Model

To determine the effects of institutional quality on economic growth in Cameroon, we use an augmented Solow model as in the work of Batila (2018), and Woo and Kumar (2015). This model proposed by Mankiw, Romer and Weils (1992) considers labor as a homogeneous factor, and physical capital as the only factor of production that can be accumulated. This function is as follows:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha} \quad (3)$$

Where Y_t, α, $1-\alpha$ and A_t refer to output, capital and labor compensation shares in GDP and the level of technology, respectively. Acemoglu et al (2001) incorporate the institution variable when studying the direction of causality between institutions and economic growth. The institution variable thus becomes an endogenous growth factor. Thus, the Solow model becomes:

$$Y_t = A_t inst_t^{\beta} K_t^{\alpha} L_t^{1-\alpha} \quad (4)$$

Where Y_t, α,$1-\alpha$, β and A_t denote output, capital and labour compensation shares in GDP and $in\ t$ „ institutional quality, respectively

Applying the logarithm, we obtain the following econometric model:

$$LogY_t = \beta_1 LogY_{t-1} + \beta_2 inst_t + \beta_3 Z_t + \varepsilon_t \quad (5)$$

Where Y_t is GDP per capita, $inst_t$ is the vector of institutional variables (corruption control and political stability), Z_t is the vector of control variables (gross fixed capital formation and trade openness), ε_t is the error term that follows a reduced centered normal distribution, and t is the period.

3.3 Estimation method: the ARDL approach

AutoRegressive Distributed Lag/ARDL models are dynamic models. These models have the particularity of taking into account the temporal dynamics (adjustment delay, anticipations, etc.) in the explanation of a variable (time series), thus improving the forecasts and effectiveness of policies (decisions, actions, etc.), contrary to the simple (non-dynamic) model whose instantaneous explanation (immediate effect or not spread over time) only restores a part of the variation of the variable to be explained. Within the family of dynamic models, there are three types of models.

Considering the dependent variable "Y_t" and the independent variable "X_t", we will note:

- Autoregressive (AR) models: these are dynamic models in which the lagged dependent variable (its past values) is found among the explanatory variables (X_t). In general, they are presented as follows (implicit form):

$Y_t = f(X_t, Y_{t-p})$ (6.a)

$LogY_t\ \beta_1 LogY_{t-1}+\beta_2 inst_t+\beta_3 Z_t+\ \varepsilon_t$ (5

The term „ autoregressive" refers to the regression of a variable on itself, i.e. on its own lagged values.

- The models with staggered delays or distributed lag (DL): it is dynamic models which have for explanatory variables: and its past or lagged values. In general, their form is:

$Y_t= f (X_t, X_{t-}q)$ (6.b)

The term „ staggered lags" shows that the short-term effects of X_t on Y_t are different from the long-term effects. From one time point to another, the scales of Y_t response to X_t change differ.

- Autoregressive lagged models (ARDL): these models combine the features of two previous ones; they include, among the explanatory variables (X), the lagged dependent variable (Y_{t-p}) and the past values of the independent variable ($X_{t-}q$). They have the following general form:

$Y_t= f (X_t, Y_{t-p}, X_{t-}q)$ (6.c)

These dynamic models generally suffer from error autocorrelation problems, with the presence of the lagged endogenous variable as an explanatory variable (AR and ARDL models), and multicollinearity (DL and ARDL models), which complicates the estimation of parameters by Ordinary Least Squares (OLS). Here, it is important to use robust estimation techniques (SUR method, etc.) to overcome these problems. Also, it should be noted that the variables considered in these models must be stationary to avoid spurious regressions. In its general (explicit) form, an ARDL model is written as follows:

$$Y_t = \varphi + \alpha^1 Y_t^{-1} + \cdots + \alpha_p Y_t^{-}{}_p + \beta_o X_t + \cdots + \beta q X_t^{-} q + \varepsilon_t \quad (6.d)$$

Ou encore :

$$Y_t = \varphi + \sum_{i=1}^{p} \alpha_i Y_t^{-}{}_i + \sum_{j=1}^{q} \beta j X_t^{-} j + \varepsilon_t \quad (6.e.)$$

With ε_t the error term following a reduced centered normal distribution, β_o reflects the short run effect of X_t on Y_t. If we consider the following long-run or equilibrium relationship:

$$Y_t = k + \theta X_t + u$$

The long-run effect of on (i.e., „ θ") can be calculated as follows: (6.f)

$$\theta = \frac{\sum \beta j}{(1 - \sum \alpha i)}$$

As for any dynamic model, the information criteria (AIC, SIC and HQ) will be used to determine the optimal lag (p* or q*); an optimal lag is the one whose estimated model offers the minimum value of one of the stated criteria. These criteria are: Akaike (AIC), Schwarz (SIC) and Hannan and Quinn (HQ).

All these dynamic models can help capture the short-term dynamics and long-term effects of one or more explanatory variables on a variable to be explained. This will only be possible if the time series under study are cointegrated, thus allowing the estimation of an error correction model (ECM).

The ARDL model, being part of the family of dynamic models, can be used to estimate short-term dynamics and long-term effects for cointegrated or even integrated series at different orders, as we shall see with the bounds testing approach of Pesaran et al.) However, one cannot apply an ARDL model for series integrated at orders greater than 1.

4. Data Sources and Presentation of Variables

4.1. The Data

The data considered in the estimation of the model come from different secondary sources. Thus, it is important to present the origin of the data and the sample. The unavailability of data is a problem that generally limits the number of variables that can correctly explain an economic phenomenon. This problem is still accentuated in countries south of the Sahara compared to developed countries; this is one explanation for the scanty literature on FDI in these countries (especially in sub-Saharan Africa). In the framework of this study, the data used come from a set of publications of the World Bank (WDI, 2020); the World Governance Indicators (WGI) and the World Economic Forum (WFE).

The sample size is 24 observations covering the period 1996-2019. The sample size can be explained by the fact that good governance data are only available for this period. Given that the number of observations is insufficient, and the sample size is small (n less than 30), we used Denton's data quartering method to circumvent this problem. This allowed us to extend our sample to 93 observations.

4.2 Study Variables

Any econometric research will start with the specification of the model, proceeding with the determination of the explanatory variables. Given the constraint of data availability, we consider for the case of this study as dependent variable, the gross domestic product in Cameroon. The independent variables considered are: the degree of trade openness, gross fixed capital formation, corruption and political stability.

In this section we will focus on the institutional variables of corruption control and political stability.

Corruption is a phenomenon that has existed in societies from the pre-colonial era through the colonial era and independence to the present day. However, it takes different forms depending on the time and country and remains one of the institutional indicators that arouse the interest of international organizations.

The Cameroonian government has undertaken a range of anti-corruption infrastructures, most of which are geared towards the repression of acts contrary to professional ethics within the administration (such as the recent creation of a special criminal court dedicated to the misappropriation of public funds). On 18 May 2004, Cameroon ratified the United Nations Convention on Corruption. In 2005, the government also decided to join the Extractive Industries Transparency Initiative (EITI) and is expected to publish revenue figures from oil exploitation (managed by the National Hydrocarbons Company, which depends on the presidency).

In 2006, Operation Sparrowhawk, the name given by the media to a vast judicial operation in the fight against corruption in Cameroon, was launched. The year 2006 was also marked by the creation of the National Anti-Corruption Commission (CONAC), whose role includes: evaluating the quality of public revenue and expenditure, preventing acts of corruption and communicating, detecting and punishing acts of corruption.

From time to time (each time the Transparency International ranking is published), the government issues a few anti-corruption press releases and makes a few arrests under Operation Sparrowhawk.

Despite these efforts, corruption remains endemic in Cameroon. The country has been reported twice as the first corrupt country respectively by (Transparency International, 1998 and 1999)[1]. In 2011, the corruption perception index was rated at 2.5. According to the annual Corruption Perception Index (CPI) report by the Cameroonian affiliate of the German body, Cameroon has not made any progress at all in the fight against corruption in 2020. The country remains among the most corrupt countries in the world. With a score of 25/100, it is ranked 149 out of 180 in the world.

Lack of stability can be a perception of the likelihood that the government could be destabilized, overthrown either by unconstitutional means or by violence (political violence or terrorism). Broadly speaking, socio-political instability takes three forms (Gupta, 1991): elite or executive instability, which includes coups d'état, changes and crises of government; mass instability, which corresponds to social movements such as strikes, demonstrations or riots; and armed or violent instability, which includes civil war and guerrilla warfare, and any violent political action.

Cameroon has a unique experience of political and social stability. For a long time, its concern was the negative impact on its own territory of the instability affecting some neighbouring states (Nigeria, Central African Republic) as well as the effects of insecurity in the Gulf of Guinea, which pushed the Cameroonian authorities to strengthen regional cooperation. However, the country has experienced some tensions. This is the case of the border conflict between Cameroon and Nigeria in the Bakassi peninsula since 1993, which led in 1996 to open clashes between troops concentrated there, followed by the loss of human life and prisoners of war on both sides.

The electoral years (1992, 1997 and 2002) were marked by various protests, including boycott calls, suspicions of fraud and challenges to the results, which also created uncertainty about political and economic stability. This is an issue that is part of Cameroon's complex relationship with Nigeria. The territorial dispute between the two countries over the status of the Bakassi peninsula was settled by an order of the International Court of Justice on 10 October 2002. However, it was not until 2006 and the "Green Tree" agreement that Nigeria complied. On August 14, 2008, Abuja ceded back the last part of the peninsula.

Closer to home, in 2013, the country experienced frequent incursions into its territory by the Nigerian terrorist group Boko Haram, which notably kidnapped several foreign nationals in the Far North region. From 2014, clashes between terrorists and Cameroonian armed forces turned into open warfare and the military posture in the North was reinforced. As a member of the Lake Chad Basin Commission, Cameroon participated in the Paris Security Summit in Nigeria, which took place on 17 May 2014. In response to the government's call for a comprehensive response to the terrorist threat. In January 2015, Chad committed 2500 troops to the Far North. The combined action of Cameroonian, Chadian, Nigerian and Nigerian forces, as well as the establishment of a mixed multinational force, have helped reduce the pressure exerted by Boko Haram, but the threat remains active. The group has reverted to a strategy of asymmetric actions: looting, targeted killings, and laying mines. Since July 12, 2015, 38 suicide attacks have hit the Far North in one year, not sparing Maroua, the regional capital (July 22 and 25). Relations are tending to improve: joint operations have been conducted on the border against Boko Haram.

Since 2016, political instability in the North-West and South-West regions has been affecting the Cameroonian economy. The socio-political crisis has gradually turned into insecurity and armed

[1] Transparency International (1998 & 1999), Corruption Perceptions Index 1998.

violence since 2017. The escalation of tension and the multiplication of outbreaks of hostility between armed groups and the defence and security forces have seriously affected the civilian population, contributing to the displacement of many people within the two regions, which have a population of nearly 4 million (16% of the total population).

Table 1 below gives the descriptive statistics of the variables used in the model:

Table 1. Descriptive Statistics of Variables used in the Model

Variable	Number of observations	Average	Standard deviation	Minimum	Maximum
PIB	93	4,089786	0,965185	1,931851	5,926965
OUV	93	42,22466	4,023049	37,06518	52,88642
CC	93	-1,078768	0,090723	-1,267401	-0,862481
SP	93	-0,718108	0,316373	-1,555283	-0,176223
FBCF	93	19,00411	2,527182	14,24026	23,04737

Source: Authors based on EVIEWS 10 software.

5. Empirical Results

Data processing is a prerequisite for model estimation. Knowing that OLS estimation represents the best of all possible worlds, we submit the model to the latter. This is done in order to verify the conditions of its application. We proceed to the preliminary tests in order to check if the OLS conditions are respected.

5.1. Test of Stationarity of the Variables

The analysis of the stationarity of the variables by means of the Augmented Dickey-Fuller (ADF) test allows us to determine the order of integration and the behaviour of the variables. Essentially, this test allows us to know when each variable is stationary and that there is a possible cointegrating relationship between the variables.

Table 2. Unit Root Test

VARIABLES	LEVEL TEST		TEST IN DIFFERENCE		I(d)	Number of delays
	Statistical value at 5%.	Critical value	Statistical value at 5%.	Critical value		
LOGPIB	-1,944574	-3,130363	/	/	I(0)	2
OUV	-3,474363	-3,808928	/	/	I(0)	2
FBCF	-3,464865	-2,878667	-1,944762	-2,085384	I(1)	1
CC	-3,45995	-3,687842	/	/	I(0)	2
SP	-3,462292	-0,957539	-1,944574	-1,972144	I(1)	4

Source: Authors based on EVIEWS 10.0 software.

After the Augmented Dickey-Fuller unit root test carried out for all the variables of the model (table 2), we realize that the variables do not have the same order of integration. The series are thus integrated at different orders, which makes the Engle and Granger (multivariate case) and Johansen cointegration tests ineffective, and makes the Pesaran et al.

5.2. Estimation Results of the ARDL Model (2, 2, 1, 2, 4)

Below are the estimation results of the selected optimal ARDL model. We will use the Akaike Information Criterion (AIC) to select the optimal ARDL model[1], the one that provides statistically significant results with the least parameters.

Table 3. ARDL Model Estimation Results (2, 2, 1, 2, 4)

Variable	Coefficient	t-Statistic	Signification
LOGPIB(-1)	1,582265	17,85293	0,0000
LOGPIB(-2)	-0,688421	-8,306351	0,0000
OUV	0,020909	4,101778	0,0001
OUV(-1)	-0,029483	-3,398617	0,0013
OUV(-2)	0,009205	1,735321	0,0885
FBCF	-0,010145	-0,811927	0,4205
FBCF(-1)	0,015376	1,272677	0,2087
CC	0,573898	2,455371	0,0174
CC(-1)	-0,926827	-2,247428	0,0288
CC(-2)	0,345719	1,439836	0,1558
SP	-0,698681	-4,430249	0,0000
SP(-1)	1,135123	3,577796	0,0008
SP(-2)	-0,527648	-1,703441	0,0943
SP(-3)	0,246827	0,862346	0,3924
SP(-4)	-0,287645	-1,809100	0,0761
C	-0,067642	-0,896356	0,3741
R-squared	**0,991795**		
Adjusted R-squared	**0,989473**		

Source: Authors based on EVIEWS 10.0 software.

In order to ensure the existence of a long term relationship between the variables, we will perform the Pesaran et al (2001) cointegration test.

5.3. Cointegration Test of Pesaran et al (2001)

The Pesaran et al. (2001) bounds cointegration test is adapted for series integrated at different orders. To apply this test, two steps are required:

[1]ARDL (AutoRegressive Distributed Lag) models are dynamic models. The latter have the particularity of taking into account the temporal dynamics (adjustment lag, expectations, etc.) in the explanation of a variable (time series), thus improving the forecasts and effectiveness of policies (decisions, actions, etc.), unlike the simple (non-dynamic) model whose instantaneous explanation (immediate effect or not spread over time) only restores part of the variation of the variable to be explained (Kibala, 2018).

- Determine the optimal offset using the Akaike or Schwarz criteria (AIC or SIC);

- Use Fisher's test to test for cointegration of series.

As can be seen, the ARDL (2, 2, 1, 2, 4) model is the most optimal among the 19 others presented, as it offers the smallest AIC value (see Appendix 8).

Table 4 below shows that the Fisher statistic (10.66305) is greater than the upper bound statistic at the 1% level (4.37). This makes it possible to reject the null hypothesis of no long-term relationship between the variables. Moreover, the adjustment coefficient or recall force (see Table 7) is statistically significant at the 1% threshold and negative, which guarantees the existence of a long-term relationship (cointegration) between variables.

Table 4. Results of the Pesaran et al (2001) cointegration test

Variables	LOGPIB, CC, SP, OUV, FBCF	
F-calculated	10,66	
Critical threshold	Lower terminal	Upper terminal
1%	3,29	4,37
5%	2,56	3,49
10%	2,2	3,09

Source: Authors based on EVIEWS 10.0 software.

It is important to carry out tests to judge the quality of the estimate and the reliability of the results. The various tests on the residuals will be preceded by the test of stability of the variables (Cusum test) and the Ramsey specification test.

5.4. Stability Test of the Model Coefficients (Cusum Test)

The estimation of a model requires some very important properties, one of which is that the estimate can remain valid for data other than that used in the estimation (Dinardo and Johnston, 1999). This property is the constancy of the parameters.

Thus, the stability of the coefficients in a model plays a fundamental role, especially in understanding economic mechanisms and in forecasting. Coefficient instability can reflect one-off phenomena over time. The Cusum test illustrates the graphical aspect of coefficient stability (see Appendix 7). This graph summarizing the stability test of the variables shows that the square recursive residuals are inscribed in the interval defined by two straight lines.

Moreover, the curve does not intersect the corridor at all: we therefore conclude that the coefficients of the model are stable.

5.5. The Ramsey Specification Test

Ramsey's test, also known as the RESET (Regression Error Specification Test), focuses on the adequacy of the functional form of the model such as the omission of relevant variables in the model.

Table 5. Result of the Ramsey Specification Test

Ramsey specification test		
	Value	Probability
F-statistic	1,527084	0,2221

Source: Authors based on EVIEWS 10.0 software.

The Ramsey test for the omission of at least one relevant variable reveals that no relevant variable has been omitted. This is justified by the probability value which is equal to 0.2221> 0.05 (see Appendix 7).

5.6. Results of the Residue Tests

The residuals recovered from the estimation are thus subjected to tests such as autocorrelation, heteroscedasticity and normality to assess the quality of the model.

Table 6. Results of the Tests on the Residuals of the Estimated ARDL Model

Test hypothesis	Tests	Probabilities
Autocorrélation	Breusch-Godfrey	0,0758
Heteroscedasticity	Breusch-Pagan-Godfrey	0,1580
Normality	Jarque-Bera	0,794572

Source: Authors from EVIEWS 10.0 software

The null hypothesis is accepted for all these tests. Our model is thus statistically validated. The estimated ARDL (2, 2, 1, 2, 4) model is globally good and explains 98% of the dynamics of GDP per capita in Cameroon from 1996 to 2019.

5.7. Estimation of Short-Term and Long-Term Models

Note that the short-term and long-term estimates are derived from the decomposition of the results obtained from the ARDL model.

a. Short-Term Dynamics

The estimation of the short-run coefficients suggests that the corruption control variable has a positive effect on economic growth. This result is not surprising if we know that corrupt decision-makers will accelerate the completion of investment projects especially blocked projects to benefit from misappropriations in the shortest time (Badry, 2016). This result moreover corroborates those of Verdier (1998), Acemoglu and Summers (1977), Huntington (1968) and Leff (1964) who suggest that corruption introduces efficiency in the economy and positively affects economic growth.

The political stability variable has a negative effect on short-term economic growth. Indeed, a one-point increase in the level of political stability leads to a 0.70% decrease in the economic growth rate.

The trade openness control variable has a positive effect on short-term economic growth in Cameroon.

Table 7. Estimation Results of TC Coefficients

Dependent variable LOG(PIB)			
Variable	Coefficient	t-Statistic	Meaning
D(LOGPIB(-1))	0,688421***	9,473614	0,0000
D(OUV)	0,020909***	4,902895	0,0000
D(OUV(-1))	-0,009205**	-2,006475	0,0499
D(FBCF)	-0,010145	-0,981357	0,3309
D(CC)	0,573898***	2,904419	0,0054
D(CC(-1))	-0,345719*	-1,787055	0,0796
D(SP)	-0,698681***	-5,150214	0,0000
D(SP(-1))	0,568466***	3,135392	0,0028
D(SP(-2))	0,040818	0,248409	0,8048
D(SP(-3))	0,287645**	2,062018	0,0441
CointEq(-1)*	-0,106156***	-5,046456	0,0000

N.B.: ***, ** and * represent the 1%, 5% and 10% significance levels respectively.
Source: Authors based on EVIEWS 10.0 software.

b. Long-term dynamics

Table 8 below provides the estimated coefficients of the long-run model.

Table 8. Estimation Results for LT Coefficients

Dependent variable LOG(PIB)			
Variable	Coefficient	t-Statistic	Meaning
OUV	0,005939	0,387377	0,7000
FBCF	0,049273*	1,700163	0,0950
CC	-0,648610***	5,464	0,005
SP	-1,243675***	-5,413896	0,0000
C	-0,637196	-0,975014	0,3340

N.B.: ***, ** and * represent the 1%, 5% and 10% significance levels respectively.
Source: Authors based on EVIEWS 10.0 software.

Contrary to the previous results, the variable control of corruption negatively affects long-term economic growth in Cameroon. Indeed, a one point increase in the level of corruption leads to a 0.65% decrease in the level of economic growth. The estimation of the long-run relationship from a reduced structural model shows that corruption has a negative effect on economic performance in the long run, this result can be explained by the fact that corrupt decision makers prefer large non-productive projects to productive investments. Indeed corrupt public officials divert public funds to unproductive activities especially to mega public infrastructure projects, allowing them to get larger gains at the expense of productive projects that generate significant social benefits in this way it negatively affects the efficiency of public investment, which results in the decline of economic growth in the long run (Badry, 2016).

This result corroborates Monte and Papagni (2001) and Murphy et al. (1993), who suggest that corruption is disadvantageous to firms and innovators, particularly those that lack the liquidity to finance them. Goldsmith (1987) adds to this idea by showing that the formation of interest groups slows down the ability to adopt new technologies in response to changing economic conditions, and thus reduces economic growth.

On the other hand, the political stability variable has a negative effect on economic growth in Cameroon in the long run. A one-point increase in the level of political stability leads to a 1.24% decrease in the growth rate in Cameroon. This result is partly explained by the instability in the Far North, North West and South West regions of the country in recent years. The control variable gross fixed capital formation has a positive effect on long-term economic growth in Cameroon.

6. Conclusion and Implications

In this paper, we have studied the effects of institutional quality on growth in Cameroon using quarterly data over the period 1996-2019. The cointegration technique of Pesaran et al (2001) allowed us to highlight the existence of a long-run relationship between the variables. The estimates obtained from an ARDL model suggest that in the short run, corruption positively affects economic growth. This surprising result is explained by the fact that corrupt decision makers will accelerate the implementation of investment projects, especially blocked projects, in order to benefit from the misappropriation of funds as soon as possible.

However, in the long run, corruption has a negative effect on economic growth. This result can be explained by the fact that corrupt decision-makers prefer large non-productive projects to productive investments.

Based on the results of this study, it is evident that efforts should be made to fight corruption at all levels. Laws to punish the corrupt should be strengthened and enforced. Anti-corruption bodies should be set up to punish corrupt decision makers.

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Appendix 1. List of Variables

Variables	**Code**	**Expected signs**	**Measures adopted and units**
Gross Domestic Product	**PIB**	Positif(+)	The annual growth rate of GDP
Commercial opening	**OUV**	Positif(+)	The sum of exports and imports relative to GDP
Gross fixed capital formation	**FBCF**	Positif(+)	Domestic investment
Corruption	**CC**	Négatif(-)	Control of corruption
Political stability	**SP**	Positif(+)	Political stability and absence of violence/terrorism

Source: Authors, based on economic theory.

Appendix 2. Unit root test

VARIABLES	LEVEL TEST		TEST IN DIFFERENCE		I(d)	Number of delays
	Statistical value at 5%.	Critical value	Statistical value at 5%.	Critical value		
LOGPIB	-1,944574	-3,130363	/	/	I(0)	2
OUV	-3,474363	-3,808928	/	/	I(0)	2
GFCF	-3,464865	-2,878667	-1,944762	-2,085384	I(1)	1
CC	-3,459950	-3,687842	/	/	I(0)	2
MS	-3,462292	-0,957539	-1,944574	-1,972144	I(1)	4

Appendix 3. Estimation Results

Dependent Variable: LOGPIB
Method: ARDL
Date: 02/14/21 Time: 13:15
Sample (adjusted): 1997Q1 2014Q1
Included observations: 69 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): OUV FBCF CC SP
Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(2, 2, 1, 2, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGPIB(-1)	1.582265	0.088628	17.85293	0.0000
LOGPIB(-2)	-0.688421	0.082879	-8.306351	0.0000
OUV	0.020909	0.005097	4.101778	0.0001
OUV(-1)	-0.029483	0.008675	-3.398617	0.0013
OUV(-2)	0.009205	0.005304	1.735321	0.0885
GFCF	-0.010145	0.012495	-0.811927	0.4205
GFCF(-1)	0.015376	0.012081	1.272677	0.2087
CC	0.573898	0.233732	2.455371	0.0174
CC(-1)	-0.926827	0.412395	-2.247428	0.0288
CC(-2)	0.345719	0.240110	1.439836	0.1558
MS	-0.698681	0.157707	-4.430249	0.0000
SP(-1)	1.135123	0.317269	3.577796	0.0008
SP(-2)	-0.527648	0.309754	-1.703441	0.0943
SP(-3)	0.246827	0.286228	0.862346	0.3924
SP(-4)	-0.287645	0.158999	-1.809100	0.0761
C	-0.067642	0.075464	-0.896356	0.3741

R-squared	0.991795	Mean dependent var	1.328614
Adjusted R-squared	0.989473	S.D. dependent var	0.266146
S.E. of regression	0.027307	Akaike info criterion	-4.163362
Sum squared resid	0.039522	Schwarz criterion	-3.645309
Log likelihood	159.6360	Hannan-Quinn criterion.	-3.957833
F-statistic	427.0894	Durbin-Watson stat	2.307263
Prob(F-statistic)	0.000000		

Note: p-values and any subsequent tests do not account for model selection.

Appendix 4. Results of the Short-Term Estimates

ARDL Error Correction Regression
Dependent Variable: D(LOGPIB)
Selected Model: ARDL(2, 2, 1, 2, 4)
Case 2: Restricted Constant and No Trend
Date: 02/14/21 Time: 13:16
Sample: 1996Q1 2019Q4
Included observations: 69

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGPIB(-1))	0.688421	0.072667	9.473614	0.0000
D(OUV)	0.020909	0.004265	4.902895	0.0000
D(OUV(-1))	-0.009205	0.004588	-2.006475	0.0499
D(GFCF)	-0.010145	0.010338	-0.981357	0.3309
D(CC)	0.573898	0.197595	2.904419	0.0054
D(CC(-1))	-0.345719	0.193457	-1.787055	0.0796
D(SP)	-0.698681	0.135661	-5.150214	0.0000
D(SP(-1))	0.568466	0.181306	3.135392	0.0028
D(SP(-2))	0.040818	0.164319	0.248409	0.8048
D(SP(-3))	0.287645	0.139497	2.062018	0.0441
CointEq(-1)*	-0.106156	0.021036	-5.046456	0.0000

R-squared	0.837459	Mean dependent var	0.001867
Adjusted R-squared	0.809434	S.D. dependent var	0.059797
S.E. of regression	0.026104	Akaike info criterion	-4.308290
Sum squared resid	0.039522	Schwarz criterion	-3.952128
Log likelihood	159.6360	Hannan-Quinn criterion.	-4.166989
Durbin-Watson stat	2.307263		

* p-value incompatible with t-Bounds distribution.

Appendix 5. Results of Long-Term Estimates

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LOGPIB)
Selected Model: ARDL(2, 2, 1, 2, 4)
Case 2: Restricted Constant and No Trend
Date: 02/14/21 Time: 13:17
Sample: 1996Q1 2019Q4
Included observations: 69

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.067642	0.075464	-0.896356	0.3741
LOGPIB(-1)*	-0.106156	0.026819	-3.958293	0.0002
OUV(-1)	0.000630	0.001679	0.375432	0.7088
GFCF(-1)	0.005231	0.002811	1.860724	0.0683
CC(-1)	-0.007211	0.063679	-0.113233	0.9103
SP(-1)	-0.132024	0.034703	-3.804378	0.0004
D(LOGPIB(-1))	0.688421	0.082879	8.306351	0.0000
D(OUV)	0.020909	0.005097	4.101778	0.0001
D(OUV(-1))	-0.009205	0.005304	-1.735321	0.0885
D(GFCF)	-0.010145	0.012495	-0.811927	0.4205
D(CC)	0.573898	0.233732	2.455371	0.0174
D(CC(-1))	-0.345719	0.240110	-1.439836	0.1558
D(SP)	-0.698681	0.157707	-4.430249	0.0000
D(SP(-1))	0.568466	0.193182	2.942647	0.0048
D(SP(-2))	0.040818	0.173175	0.235705	0.8146
D(SP(-3))	0.287645	0.158999	1.809100	0.0761

* p-value incompatible with t-Bounds distribution.

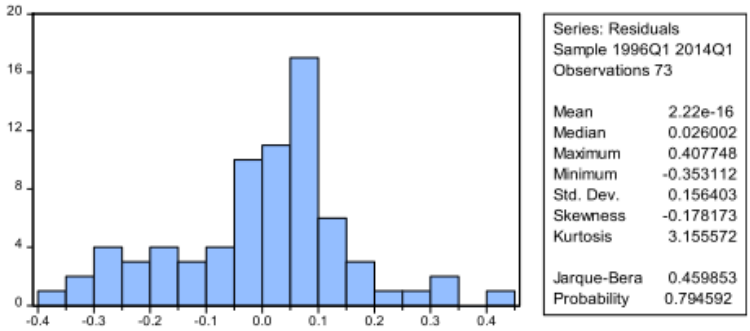
Appendix 6. Residue Tests

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.452720	Prob. F(15,53)	0.1580
Obs*R-squared	20.10361	Prob. Chi-Square(15)	0.1680
Scaled explained SS	21.63677	Prob. Chi-Square(15)	0.1177

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.061062	Prob. F(2,51)	0.1378
Obs*R-squared	5.159935	Prob. Chi-Square(2)	0.0758

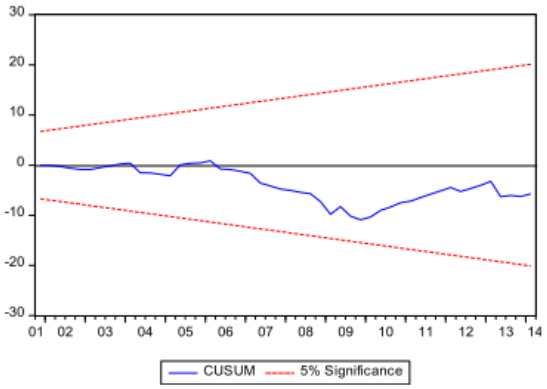


Appendix 7. Coefficient Stability Tests

Ramsey RESET Test
Equation: UNTITLED
Specification: LOGPIB LOGPIB(-1) LOGPIB(-2) OUV(-1) OUV(-2)
FBCF FBCF(-1) CC CC(-1) CC(-2) SP SP(-1) SP(-2) SP(-3) SP(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.235752	52	0.2221
F-statistic	1.527084	(1, 52)	0.2221

Model stability test



Appendix 8. Akaike's Information Criteria