ANALYSIS OF THE EFFECTS OF CONGOLESE TAXATION ON REAL ECONOMIC ACTIVITY

ANALYSE DES EFFETS DE LA FISCALITÉ CONGOLAISE SUR L’ACTIVITÉ ECONOMIQUE RÉELLE

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Abstract

This study presents the effect of taxation on the real economic growth of the Democratic Republic of Congo. Given that the economic action of taxation comes down to the effects that taxation can exert on the evolution of the economy, by extension, on that of development, with the aim of making it more buoyant and more profitable for the benefit of the country and its people. The ARDL cointegration econometric approach allowed to capture the effects of fiscal variables on economic growth, while distinguishing their short- and long-term dynamics, in order to draw conclusions. Indeed, the analysis of the effect of Congolese taxation on economic activity shows that indirect taxes have a positive effect on economic growth, while direct taxes harm economic growth.

Key words: Taxation, Economic, growth, real economy, Democratic Republic of Congo.

1. Introduction

Fiscal policy is currently at the heart of economic policies, however, their macroeconomic impacts are controversial. Thus, several questions are central to this policy: What would be the impact of an increase or decrease in tax on the economy? do these taxes have the same
impacts? It is true that the tax rate has an important role on growth because, when it increases, the scale of public capital increases, and therefore the growth rate follows the same rhythm while also increasing. However, beyond its optimal level, it negatively influences the growth rate since it discourages private activity.

However, Kibuey M. (2018), justifies the close relationship between development and taxation by its origin in economic action on taxation. In fact, the economic action of taxation comes down to the effects that taxation can have on the evolution of the economy, by extension, on that of development, with the aim of making it more buoyant and more beneficial to the country and its people.

This is how we are witnessing an economic debate on the taxation of productive activities. We find that in our developing countries, digitalization could make taxation a determining factor of competitiveness to influence growth. Conversely, taxation does not lead to growth, on the rhythm of exemptions, fraud, flows of foreign direct investment, etc. Indeed, taxation is one of the means available to underdeveloped countries to mobilize their own resources in the service of development.

Gregory De Paepe and Ben Dickinson (2014), believe that taxation contributes to the proper functioning of the State and to the strengthening of its social contract with citizens. It helps fuel the functions of an efficient state, by draining the resources necessary for the provision of essential public services. Moreover, the link that exists between taxation and economic growth is not to be demonstrated. It is abundantly fed in the theoretical and empirical literature (Keho Y., (2010); Salhi SE and Echaoui A, (2018); Amori M. and Zbair, E.-M. (2016)), but the effects of the variables taxes on economic activity remain differentiated. In addition, taxation makes it possible to create the conditions for economic growth.

Thus, the main concern for this study is to analyze the effects of taxation on Congolese economic activity. In other words, in this study, it is a question of answering the question: How does taxation act on the economic activity of the DRC?

This question will serve as a guiding thread for this study.

2. Study methodology
From the point of view of data collection and analysis, we used the following techniques: the documentary technique, observation and open interview, exploratory data analysis and the econometric approach. In effect,
- the documentary technique
- observation and free interview
- exploratory analysis of
- the ARDL cointegration econometric approach.

It is divided into five sections: (i) the first presents the data; (ii) the second focuses on econometric estimates and the interpretation of results; (iii) the third presents the results of the MCE; (iv) the fourth analyzes the implications of the results; and (v) the fifth tells us about the fiscal psychology of a people.

2.1. Presentation of data

In this work, we have used data or annual time series, including real GDP (GDP), tax revenues (RECFIS), taxes on foreign trade (IMPOCOM), income taxes (IMPOREV), taxes on goods and services (IMPOBS), public expenditure (DEPPUB), all in millions of CDF; inflation rate (TINFL) and domestic credit (CREDIT) as a percentage of GDP. All these variables are taken from the annual reports of the Central Bank of Congo, with the exception of domestic credit which is taken from the World Bank database (World Development Indicators 2018).

**Picture 1: Description of the variables of our analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Symbol</th>
<th>Sign/Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP (at 2005 prices)</td>
<td>Log(GDP)</td>
<td></td>
</tr>
<tr>
<td>Tax revenues</td>
<td>Log(RECFIS)</td>
<td>+</td>
</tr>
<tr>
<td>Foreign Trade Taxes</td>
<td>Log(IMPOCOM)</td>
<td>+</td>
</tr>
<tr>
<td>Income taxes</td>
<td>Log(IMPOREV)</td>
<td>-</td>
</tr>
<tr>
<td>Taxes on Goods and Services</td>
<td>Log(IMPOBS)</td>
<td>+</td>
</tr>
<tr>
<td>Public expenses</td>
<td>Log(DEPPUB)</td>
<td>+</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>Log(TINFL)</td>
<td>+/-</td>
</tr>
<tr>
<td>Domestic credit</td>
<td>Log(CREDIT)</td>
<td>+</td>
</tr>
</tbody>
</table>

Source: Elaborated by ourselves, based on the literature.
This study covers the time span from 1998 to 2018. The table above provides a brief description. It should be noted that the data are logarithmically transformed so that the estimated parameters can be interpreted as transmission elasticities of the effects of the explanatory variables on GDP, and that the variables are more in line with the assumptions of a regression model. Linear. The table also describes the expected sign of these explanatory variables. Real GDP is our dependent variable, which should be affected by explanatory variables. Indeed, taxation has a positive effect on economic growth through reasonable taxation. Thus, the expected effect of tax revenues would be positive. Indirect taxes, such as taxes on goods and services,

Public spending, like domestic credit, has a positive impact on activity. However, the effect of inflation on activity could be positive or negative, depending on whether it is moderate or high. However, there is no consensus on the optimal level of inflation in the economic literature, moderate inflation can activate the machine because inflation is also one of the determinants of corporate profit, but chronic inflation and hyperinflation must be fought because of their destabilizing effect on the economy. They affect agents' forecasts.

**Picture2: Correlations between total tax revenue with macroeconomic variables**

<table>
<thead>
<tr>
<th></th>
<th>Real GDP</th>
<th>Tax revenues</th>
<th>Public expenses</th>
<th>Inflation rate</th>
<th>Domestic credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>1</td>
<td>0.970</td>
<td>0.971</td>
<td>-0.325</td>
<td>0.905</td>
</tr>
<tr>
<td>Tax revenues</td>
<td>0.970</td>
<td>1</td>
<td>0.986</td>
<td>-0.296</td>
<td>0.849</td>
</tr>
<tr>
<td>Public expenses</td>
<td>0.971</td>
<td>0.986</td>
<td>1</td>
<td>-0.322</td>
<td>0.872</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-0.325</td>
<td>-0.296</td>
<td>-0.322</td>
<td>1</td>
<td>-0.341</td>
</tr>
<tr>
<td>Domestic credit</td>
<td>0.905</td>
<td>0.849</td>
<td>0.872</td>
<td>-0.341</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Elaborated by ourselves, based on BCC data.

After describing the data, we analyzed the existing link between them, and we split this analysis of the correlations into two sequences. In the first, we study the link between total tax revenue and all the other variables. From the simple correlation matrix point of view between these variables, it emerges the existence of a positive correlation between GDP, public expenditure, tax revenue and domestic credit. The correlation rates being respectively 97.0%, 98.6% and 84.9%. On the other hand, loans are negatively correlated with inflation, ie 34.1%.
Indeed, the degree of association exceeds 50% for the majority of the variables. This demonstrates, by presumption, a problem of multicollinearity between these variables, that is to say that there is a feedback effect between these variables. Besides,

The second analysis breaks down tax revenue into taxes on foreign trade, taxes on income, taxes on goods and services, and other tax revenue. Indeed, the correlations detected between these receipts and the other variables of our analysis remain strong and positive for the case of inflation. However, there is still a probable multicollinearity between these variables.

<table>
<thead>
<tr>
<th></th>
<th>Real GDP</th>
<th>Foreign trade taxes</th>
<th>Income taxes</th>
<th>Taxes on goods and services</th>
<th>Public expenses</th>
<th>Inflation rate</th>
<th>Domestic credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real GDP</strong></td>
<td>1</td>
<td>0.922</td>
<td>0.923</td>
<td>0.982</td>
<td>0.971</td>
<td>-0.325</td>
<td>0.905</td>
</tr>
<tr>
<td>Foreign trade taxes</td>
<td>0.922</td>
<td>1</td>
<td>0.839</td>
<td>0.947</td>
<td>0.930</td>
<td>-0.340</td>
<td>0.867</td>
</tr>
<tr>
<td>Income taxes</td>
<td>0.923</td>
<td>0.839</td>
<td>1</td>
<td>0.941</td>
<td>0.950</td>
<td>-0.229</td>
<td>0.747</td>
</tr>
<tr>
<td>Taxes on goods and services</td>
<td>0.982</td>
<td>0.947</td>
<td>0.941</td>
<td>1</td>
<td>0.988</td>
<td>-0.302</td>
<td>0.878</td>
</tr>
<tr>
<td>Public expenses</td>
<td>0.971</td>
<td>0.930</td>
<td>0.950</td>
<td>0.988</td>
<td>1</td>
<td>-0.322</td>
<td>0.872</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>-0.325</td>
<td>-0.340</td>
<td>-0.229</td>
<td>-0.302</td>
<td>-0.322</td>
<td>1</td>
<td>-0.341</td>
</tr>
<tr>
<td>Domestic credit</td>
<td>0.905</td>
<td>0.867</td>
<td>0.747</td>
<td>0.878</td>
<td>0.872</td>
<td>-0.341</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Elaborated by ourselves, based on BCC data.

Remember that the frame of reference for this study is the theory of endogenous growth, which interprets economic growth with the help of macroeconomic decisions and processes. Endogenous growth theory seeks the economic determinants that explain the pace of technical development, considered exogenous in Solow's founding model. In addition, the study is oriented according to the logic of Barro, who highlighted the role of public investment, that is to say to amass public capital, in economic growth.

Indeed, it has been pointed out that Barro (1990) has opened up a new line of research which highlights the impact of productive infrastructures, and more commonly public investments,
on long-term economic growth, and therefore makes infrastructures an element that acts directly in the process of growth. The accumulation of public capital through public infrastructure (public lighting, airports, water distribution network, roads, etc.) therefore stimulates the performance of private agents and consequently economic activity as a whole.

Public investments are expenses that should be covered. They are covered through taxation, i.e. the mobilization of taxes and levies. The latter constitute, according to Jeze G. (1936), a financial service without consideration, requested by individuals, by means of authority, definitively, and without consideration, with the intention of covering public charges (Matthieu Conan, 2013).

Taxation acts favorably on economic growth through reasonable taxation, and when there is economic growth, the State would collect more resources (taxes and duties), finance new infrastructures and other public expenditure. There is therefore a virtuous circle between public spending and growth.

2.2. Econometric estimates

Before presenting the results of this study, we will first proceed by specifying the models, verifying stationarity and cointegration.

2.2.1. Specification of models

To verify our hypotheses, we use ARDL modeling or autoregressive models with staggered delays. The models are dynamic models: their particularity is that they take into account the temporal dynamics in the explanation of the chronological series and are adapted to small sample sizes. These models combine both the characteristics of autoregressive models and those of distributed lag models. Autoregressive models are dynamic models in which there is, among the explanatory variables, the lagged endogenous variable. On the other hand, the models with distributed lags are dynamic models having among the explanatory variables, the lagged explanatory variables. So, ARDL models are models that include both the lags of the endogenous variable and those of the explanatory variables as regressors. ARDL models are usually denoted, where is the number of lags of the endogenous variable, is the number of lags of the first explanatory variable, and is the number of lags of the explanatory variable.
Formally, the general formulation of a model can be written as follows: ARDL (AR) (DL) ARDL \((p, q_1, \ldots, q_k)pq_1q_kk\) − ième ARDL \((p, q)\)

\[
y_t = \alpha + \sum_{i=1}^{p} y_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{q} X_{j,t-i} \beta_{j,i} + \epsilon_t (1)
\]

Where represents the endogenous variable, represents the lagged endogenous variable (the autoregressive part), and represents the lagged explanatory variables (the stepped lags part).

However, it should be pointed out that some explanatory variables may not have lag in the model, i.e. These variables are called static variables or fixed regressors, while explanatory variables with at least one lag are called dynamic regressors. With the existence of the lagged endogenous variable as explanatory (AR and ARDL models), and multi-collinearity (DL and ARDL models), dynamic models commonly suffer from autocorrelation error problems. This makes complex the estimation of parameters by Ordinary Least Squares.

Remember that we are checking in this study whether taxation would have an impact or effect on economic activity in the Democratic Republic of Congo (DRC). To do this, we propose to estimate dynamic models of the type having the following functional form: ARDL \((p, q)\)

\[
\log (PIB_t) = \beta_0 + \sum_{i=1}^{p} \beta_1 \log (PIB_{t-i}) + \sum_{i=0}^{q} \beta_2 \log (RECFIS_{t-i}) + \sum_{i=0}^{q_2} \beta_3 \log (IMPOCOM_{t-i}) + \sum_{i=0}^{q_3} \beta_4 \log (IMPORV_{t-i}) + \sum_{i=0}^{q_4} \beta_5 \log (IMPOBS_{t-i}) + \sum_{i=0}^{q_5} \beta_6 \log (TINFL_{t-i}) + \sum_{i=0}^{q} \beta_7 \log (DEPPUB_{t-i}) + \sum_{i=0}^{q} \beta_8 \log (CREDIT_{t-i}) + \epsilon_t (2)
\]

with \(\epsilon_t \sim iid (0, \sigma)\),\( \forall q_j = 1, \ldots, q \)

As we will see a little later, if there is cointegration of the series, a necessary hypothesis for the validity of model \((2)\), this model would make it possible to estimate the long-term relationship and the short-term relationship simultaneously. The variables estimated in these
models must be stationary to avoid misleading regressions. Remember that we want to capture in this model the impact of tax revenues, public expenditure, inflation and domestic bank credit on economic growth.

An important aspect in the specification of dynamic models of the ARDL type is the determination of the optimal offset. Given that the model (2) is dynamic, it is essential to use the information criteria to determine this optimal shift. Let us recall that an optimal lag is a lag whose model considered offers the minimum value of one of the stated criteria. The most used criteria are that of Akaike (AIC), that of Schwarz (SIC) and that of Hannan and Quinn (HQ). The values of these criteria are calculated as follows: 

\[ SIC(p) = \log |\hat{\Sigma}| + \frac{\log T}{T} n^2 p \]
\[ HQ = \log |\hat{\Sigma}| + \frac{2\log T}{T} n^2 p \]
\[ AIC(p) = \log |\hat{\Sigma}| + \frac{2}{T} n^2 p \]

Or

p: is the number of shifts or lag of the estimated model;
\( n \) :is the number of regressors;
\( T \) : is the number of observations;
\( \hat{\Sigma} \)is the variance-covariance matrix of the estimated residuals.

In practice, we will calculate the optimal lag by estimating an auxiliary model using the Eviews 10 software in the following sections.ARDL (p,q)

### 2.2.2. Verification of stationarity

Verifying data stationarity is one of the first steps in time series analysis. A time series whose mean and/or variance changes over time is said to be non-stationary. The non-stationarity of this one, in case it does not undergo the treatment (stationarization), it can lead to misleading regressions. On the other hand, a series is said to be stationary if its stochastic characteristics remain constant over time.

As stated, to avoid spurious regressions, the variables in model (2) must be stationary. There exist in the literature several traditional tests allowing to check the stationary character (absence of unit root) or not (existence of a unit root) of a temporal series.
However, it should be noted that the results of all these tests are not always conclusive. Thus, to test the stationarity of the series of this study, we use the ADF test (Augmented Dickey-Fuller) or augmented Dickey-Fuller test. From the conclusion point of view, a variable is said to be stationary if its ADF statistic is greater than Mackinnon's critical value (CV), in absolute value, at the 5% threshold. The table below summarizes the results obtained from the analysis of the stationarity of the various series studied.

**Picture 4: Stationarity test**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Variables in level</th>
<th>Variables in difference</th>
<th>Order¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>CV</td>
<td>Decision</td>
</tr>
<tr>
<td>Log(GDP)</td>
<td>-0.09</td>
<td>-3.04</td>
<td>NS</td>
</tr>
<tr>
<td>Log(RECFIS)</td>
<td>-6.89</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Log(IMPOCOM)</td>
<td>-6.01</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Log(IMPOREV)</td>
<td>-4.16</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Log(IMPOBS)</td>
<td>-7.58</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Log(TINFL)</td>
<td>-1.81</td>
<td>-3.02</td>
<td>NS</td>
</tr>
<tr>
<td>Log(DEPPUB)</td>
<td>-3.99</td>
<td>-3.02</td>
<td>S</td>
</tr>
<tr>
<td>Log(CREDIT)</td>
<td>-1.05</td>
<td>-3.04</td>
<td>NS</td>
</tr>
</tbody>
</table>

With S: stationary; NS: non-stationary; I(.): integration order.

**Source:** Elaborated by ourselves, based on Annex II.

It emerges from the results of the stationarity test that five variables of this analysis are stationary in level and three others are stationary in first difference. Indeed, tax revenues or log(RECFIS), taxes on foreign trade or log(IMPOCOM), taxes on income or log(IMPOREV), taxes on goods and services or log(IMPOBS) and expenditure public or log(DEPPUB) are stationary in level, ie without differentiation: they are therefore I(0). On the other hand, economic growth or log(GDP), inflation rate or log(TINFL) and domestic bank credit or

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³A series is said to be integrated of order d, that is to say ~, if it is necessary to differentiate it times for it to be stationary. It seems clear that the notion of integration is linked to that of stationarity. x, x₁, I(d)
log(CREDIT) are stationary after the first difference. They are therefore integrated of order 1 or I(1). As an observation, the series are thus integrated at different orders (Table 4.4). This renders the cointegration test of Engle and Granger (univariate) and that of Johansen (multivariate case) powerless, and makes the bounded cointegration test of Pesaran et al (2001) useful. The next section is devoted to verifying the cointegration of the data.

2.2.3. Verification of cointegration

To study the cointegration of series within the framework of ARDL models, we use the cointegration test at the limits of Pesaran et al (2001). The procedure for using this test is done in two steps. First, the optimal lag of the model should be determined, and second, Fisher's test should be used to test the cointegration of the data (JK Kuma, 2018).

2.2.3.1. Optimal offset

We used Akaike's Information Criterion (AIC) to identify the optimal lag of our ARDL model. Note that an optimal model is the one that offers statistically significant results with the fewest parameters. The summary of the output of the estimation of the optimal model is given in Table 5 below.

Picture5: Result of the estimation of the ARDL model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(GDP(-1))</td>
<td>0.846</td>
<td>26.406*</td>
<td>0.001</td>
</tr>
<tr>
<td>LOG(RECFIS)</td>
<td>-0.310</td>
<td>-4.419**</td>
<td>0.048</td>
</tr>
<tr>
<td>LOG(RECFIS(-1))</td>
<td>0.102</td>
<td>2,225</td>
<td>0.156</td>
</tr>
<tr>
<td>LOG(IMPOCOM)</td>
<td>0.161</td>
<td>3,577***</td>
<td>0.070</td>
</tr>
<tr>
<td>LOG(IMPOCOM(-1))</td>
<td>-0.071</td>
<td>-2.394</td>
<td>0.139</td>
</tr>
<tr>
<td>LOG(IMPOREV)</td>
<td>0.096</td>
<td>6.109**</td>
<td>0.026</td>
</tr>
<tr>
<td>LOG(IMPOREV(-1))</td>
<td>0.023</td>
<td>3,043***</td>
<td>0.093</td>
</tr>
<tr>
<td>LOG(IMPOBS)</td>
<td>0.088</td>
<td>4.311**</td>
<td>0.050</td>
</tr>
<tr>
<td>LOG(IMPOBS(-1))</td>
<td>-0.182</td>
<td>-5.444**</td>
<td>0.032</td>
</tr>
</tbody>
</table>
As we can see through these results, the Eviews 9 software evaluated 128 ARDL models, and among these models, only 20 were retained. Thus, the ARDL model (1,1,1,1,1,1,1,1) is the best among the other 20 presented, because it offers the smallest value of the AIC criterion (Figure 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Constant</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(TINFL)</td>
<td>0.006</td>
<td>1,704</td>
<td>0.230</td>
</tr>
<tr>
<td>LOG(TINFL(-1))</td>
<td>-0.021</td>
<td>-7.757**</td>
<td>0.016</td>
</tr>
<tr>
<td>LOG(DEPPUB)</td>
<td>0.115</td>
<td>8.178**</td>
<td>0.015</td>
</tr>
<tr>
<td>LOG(DEPPUB(-1))</td>
<td>0.128</td>
<td>6.262**</td>
<td>0.025</td>
</tr>
<tr>
<td>LOG(CREDIT)</td>
<td>-0.194</td>
<td>-7.385**</td>
<td>0.018</td>
</tr>
<tr>
<td>LOG(CREDIT(-1))</td>
<td>0.058</td>
<td>6.008**</td>
<td>0.027</td>
</tr>
</tbody>
</table>

**R-squared:** 0.999  
**Adjusted R-squared:** 0.999  
**F-statistic:** 11264.950  
**Prob. (F-statistic):** 0.000

* *significant at 1%, ** significant at 5%, *** significant at 10%*

Source: Elaborated by ourselves, based on Annex III.
From the diagnostic point of view of the estimated ARDL model, we note that the probability associated with F-statistic is less than 5%, which means that the model is globally well adjusted and that the estimated coefficients are not equal to zero. These coefficients have an explanatory power of almost 99.9% (Table 4). There is also presence of normality of errors according to the Jarque-Bera test (Prob. > 5%). There is no heteroscedasticity according to the Breusch-Pagan-Godfrey (BPG) test and that of Glejser (Prob. > 5%). Finally, the model is estimable specified, according to the Ramsey test (Prob. > 5%) according to the results given in table 4. Remember that at the 5% threshold, we accept the hypothesis of normality as soon as the value of the probability is greater than 5%. At the 5% threshold, we accept the hypothesis of homoscedasticity of the errors as soon as the value of the probability is greater than 5%. And at the 5% threshold, we accept the hypothesis of a good specification of the model when the value of the probability is greater than 5%.
Our ARDL model (1,1,1,1,1,1,1,1) retained on the basis of Akaike's information criterion being validated, we can move on to the cointegration test. The theory of cointegration allows the study of non-stationary series however a linear combination is stationary. It thus allows the specification of long-term stable links while jointly analyzing the short-term dynamics of the variables considered.

### 2.2.3.2. Terminal cointegration test

ARDL-type dynamic models consider temporal dynamics in the explanation of time series. These models help to obtain the short-term dynamics and the long-term effects which may have 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). In fact, two series are said to be “cointegrated” if they are integrated of the same order, and a series is said to be integrated of order d if it will have to be differentiated “d” times to make it stationary.

The bounded cointegration test of Pesaran et al. (2001) is done using the Fisher statistic (F-statistic). The calculated Fisher statistic (F-statistic) is compared to the critical values which form bounds. The result of this analysis is presented in Table 4.6. The decision-making procedure is as follows:
If Fisher > upper bound: there is cointegration
If Fisher < lower bound: there is no cointegration
If lower bound < Fisher < upper bound: there is no conclusion

**Picture 7: Result of the Cointegration Test**

<table>
<thead>
<tr>
<th>Statistic test</th>
<th>Value</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>37.10</td>
<td>7</td>
</tr>
</tbody>
</table>

**Critical Value Bounds**

<table>
<thead>
<tr>
<th>Significance</th>
<th>I0 Bound</th>
<th>I1 Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>2.03</td>
<td>3.13</td>
</tr>
<tr>
<td>5%</td>
<td>2.32</td>
<td>3.5</td>
</tr>
<tr>
<td>2.5%</td>
<td>2.6</td>
<td>3.84</td>
</tr>
<tr>
<td>1%</td>
<td>2.96</td>
<td>4.26</td>
</tr>
</tbody>
</table>

Source: Elaborated by ourselves.

The Fisher statistic testing the presence of a long-term link between the variables (cointegration of the variables) has a value of 37.10 > 3.5, which does not reject the cointegration hypothesis. In other words, these results therefore confirm the existence of cointegration between the series under examination. This allows us to estimate the different parameters of the error correction model (ECM), which is done in the next section.

**2.3. Presentation of MCE results**

The estimation results of the MCE are described in the table. It is noted that the adjustment coefficient or restoring force is statistically significant: it is negative and the reason for which is assimilated between zero and one in absolute value. This preserves an error correction mechanism, and hence the presence of a long-term relationship (cointegration) between variables. This coefficient indicates the speed of adjustment of real GDP in order to return to long-term equilibrium due to a shock.
### Table 8: Estimation results of the short coefficients and long term

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLOG(RECFIS)</td>
<td>-0.096</td>
<td>-1.370</td>
<td>0.304</td>
</tr>
<tr>
<td>DLOG(IMPOCOM)</td>
<td>0.007</td>
<td>0.166</td>
<td>0.884</td>
</tr>
<tr>
<td>DLOG(IMPOREV)</td>
<td>-0.081</td>
<td>-5.163**</td>
<td>0.036</td>
</tr>
<tr>
<td>DLOG(IMPOBS)</td>
<td>-0.016</td>
<td>-0.769</td>
<td>0.522</td>
</tr>
<tr>
<td>DLOG(TINFL)</td>
<td>0.057</td>
<td>16.403*</td>
<td>0.004</td>
</tr>
<tr>
<td>DLOG(DEPPUB)</td>
<td>0.044</td>
<td>3.174***</td>
<td>0.087</td>
</tr>
<tr>
<td>DLOG(CREDIT)</td>
<td>-1.676</td>
<td>-63.714*</td>
<td>0.000</td>
</tr>
<tr>
<td>CointEq(-1)</td>
<td>-0.202</td>
<td>-6.293**</td>
<td>0.024</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(RECFIS)</td>
<td>-0.051</td>
<td>-0.143</td>
<td>0.900</td>
</tr>
<tr>
<td>LOG(IMPOCOM)</td>
<td>0.179</td>
<td>0.746</td>
<td>0.534</td>
</tr>
<tr>
<td>LOG(IMPOREV)</td>
<td>-0.428</td>
<td>-4.357**</td>
<td>0.049</td>
</tr>
<tr>
<td>LOG(IMPOBS)</td>
<td>0.421</td>
<td>2.702</td>
<td>0.114</td>
</tr>
<tr>
<td>LOG(TINFL)</td>
<td>-0.287</td>
<td>-7.778**</td>
<td>0.016</td>
</tr>
<tr>
<td>LOG(DEPPUB)</td>
<td>9.525</td>
<td>6.145**</td>
<td>0.026</td>
</tr>
<tr>
<td>LOG(CREDIT)</td>
<td>-16.623</td>
<td>-6,200**</td>
<td>0.025</td>
</tr>
<tr>
<td>VS</td>
<td>-8.312</td>
<td>-2.237</td>
<td>0.155</td>
</tr>
</tbody>
</table>

*D: difference operator, * significant at 1%, ** significant at 5%, *** significant at 10%*

Source: Elaborated by ourselves, based on Annex VI.

#### 2.3.1. ATAnalysis of short-term coefficients

In the short term, the estimation of the model shows on the one hand, the presence of positive and statistically significant effects of the explanatory variables on economic growth, and in addition, the presence of opposite but statistically insignificant effects for certain variables. These effects are mostly less than proportional. This analysis is summarized as follows:
- income taxes negatively impact economic activity in the DRC in the short term. This is the effect we predicted. Indeed, a 1% increase in these taxes reduces growth by 0.06%. Their effect invalidates our hypothesis;

- the inflation rate has a positive effect on growth during the period. Remember that inflation, when it is not very high, activates the economic machine. Thus, a rise in the inflation rate of 1% increases growth by 0.05%;

- public spending has a positive effect on growth during the period under study. An increase in these expenses of 1% increases growth by 0.04%. The effect of public spending confirms our hypothesis;

- domestic bank credit is hurting growth in the DRC. This could have an explanation. Since the reform of the Congolese banking system in the early 2000s, Congolese banks no longer fulfill their mission of financing the economy. Indeed, the few loans they grant to individuals and businesses are often made at prohibitive interest rates, with the main argument being the presence of a high risk. The effect of credit invalidates our hypothesis.

Variables such as total tax revenue and taxes on goods and services hurt growth, but this effect is statistically insignificant. On the other hand, taxes on foreign trade show a positive effect but which is also statistically insignificant.

2.3.2. Analysis of long-term coefficients

In the long term, the results of the estimation do not completely contradict each other. Some variables may have different effects depending on the time horizon. Thereby,

- public spending has had a positive effect on both long-term and short-term growth. However, the long-term effect is more than proportional; the analysis shows that a 1% increase in spending increases growth by almost 9.5% in the long term. This effect confirms our hypothesis as in the short-term situation;

- in the long term, inflation harms the country's economic performance;
- income taxes have the same effect as in the short term, ie they harm growth. Their effect invalidates our hypothesis;

- the negative effect of domestic bank credit is more than proportional to that of the short term. The effect of credit invalidates our hypothesis.

- on the other hand, the effect of tax revenues is always negative and insignificant, while taxes on foreign trade and taxes on goods and services have a positive effect on long-term growth, but not significant.

2.4. Implications of the results

Taxation appears to be the natural source of financing the State budget, and the most capable of providing substantial and sustainable resources, unlike other modes of financing such as borrowing. The results of our analyzes have clearly shown that the Congolese tax weighs on activity in the short and long term, although its effects are statistically insignificant. Moreover, these results demonstrate that Congolese taxation is controversial. Let us first re-examine the structure of the tax burden before analyzing in a little more detail the implications of the results of Congolese taxation on activity, a tax qualified as controversial.

Recall that the tax burden is expressed as a ratio through tax revenue and gross domestic product. Just by observing the evolution of the rate of tax pressure, it seems to us that the Congolese system is not efficient. The controversy in question is primarily dependent on its ineffectiveness. According to Najib Akesbi, an effective tax system is measured through the progression of its profitability, and is materialized by its strength in producing the resources necessary to cover the expenses of the State, yet in measures capable of gradually eliminating the budget deficits and consequently reduce dependence on borrowed resources.

Since 1998, the Congolese tax pressure rate has been around 6.7% on average. It did not change, and remained practically contained within a range of between 2 and 12%. It is lower than the level of the countries of the region, mainly sub-Saharan Africa, and is much lower than that of the countries of the Organization for Economic Cooperation and Development (OECD). Developed countries record tax pressure rates of more than 40%, even 50%. On the other hand, the developing countries, especially those of Africa south of the Sahara, realize
rates of tax pressure which are around 20%. From the structural point of view of the rate of
tax pressure, on average during the period 1998-2018, the descriptive analysis showed that
taxes on trade, taxes on income, taxes on goods and services, and other tax revenues represent
2.43%, 1.95%, 2.05% and 0.29% respectively. Figure 4.2 presents their evolution during the
period under examination.

figure 2: Evolution of the tax burden by type of tax

![Figure 2: Evolution of the tax burden by type of tax](image)

Source: Elaborated by ourselves.

The efficiency of a tax system is not only estimated according to its levels of performance but
also to its structures (Figure 2). It should be noted that the tax levy depends on the fiscal
capacity or strategy of each country, and this capacity varies considerably from country to
country, depending on structural factors. The situation of the DRC is surprising, because it is
nevertheless paradoxical that a low rate of tax pressure seems to penalize economic activity.
Wouldn't the problem be at the level of supply (production), which is perhaps below its
potential level? Moreover, the tax resources mobilized by the DRC do not guarantee sufficient
financing of State expenditure.

There are certainly factors that contribute to the low mobilization of tax revenues in the DRC,
in particular tax fraud and evasion, corruption, the preponderance of the informal economy,
the inefficiency of the tax administration, the inadequacy tax policy, etc. The Congolese tax
system is also subject to tax expenditures, that is, revenue losses related to tax policy. A tax
expenditure is equivalent to a transfer of public resources is the effect of a reduction in tax obligations according to a standard, instead of a direct expenditure. The definition establishes two particularities in order to distinguish a tax expenditure: the reduction in State revenue, and the difference according to the tax standard that it agrees to define.

This notion of tax expenditure helps to estimate flows of tax revenue resulting from measures (decrees, agreements of establishment, law, sectoral codes, ordinances, etc.) which do not respect the common rule and which favor a taxpayer to reduce its tax burden. For example, for the year 2013, the World Bank gives a conservative and minimal estimate of the tax gap for major state taxes of CDF 1,553 billion, or 5.2% of GDP.

Indeed, taking into account the facts described above, we do not estimate that the rate of fiscal pressure of the DRC is beyond its optimal level according to the information of the Laffer curve. But given that taxation weighs on activity, appropriate measures are therefore needed to soften its effects. Thus, it is the reduction in the individual tax burden that should necessarily lead to the resumption of the encouragement of investment and savings, and thus, to that of economic growth, generating a reasonable increase in the taxable matter.

In other words, the increase in revenue should be based on the development of the tax base and the reduction of tax rates. In the future, to overcome this controversial tax problem, reforms should be implemented aimed at modifying the structure of the economy, because the low level of production greatly restricts the contributory force of taxpayers, and improving the functioning of the tax system. These reforms must, among other things, aim to:

- to simplify the tax system and harmonize its components, to limit the size of the unstructured or informal economy;
- limiting tax expenditures;
- the promotion of private initiative, which is still in its infancy;
- the promotion of tax policy capable of mobilizing the maximum of resources;
- improving the efficiency and performance of the tax system;
- achieving tax justice.

Certainly, for the Congolese tax policy to be effective, it is important that it be defined in relation to the chosen economic and social development policy or be based on a political will to increase activity. This tax policy must satisfy the missions of the State such as:
- the regulation of economic activity by shaping the level of compulsory levies;
- the implementation of tax incentives to influence the allocation of resources;

The tax system would not be a simple arrangement of taxation techniques, it would be primarily a political and moral fact and, in this respect, depends closely on the political orientation of the regime in place. While being formulated in relation to growth objectives and adapted to the socio-political environment of the country, the Congolese tax policy should be supported by a flexible, fair tax system, adapted to the needs of the community, and aim to achieve coherent objectives, clear, and precise. In short, four key words should characterize the Congolese tax system in the future: simplicity, effectiveness, efficiency and equity.

In view of these analyses, an awareness campaign appears vital in order for the population to have a patriotic spirit in the face of taxes.

2.4.1. The tax mentality of a population

This tax mentality attests to its general position with regard to taxation. It is both the basis of any specific tax opposition and the decisive factor in the degree of profitability of some taxes and some forms of tax (capital tax, income tax, turnover tax, etc.). It is important to analyze this fiscal mentality, making similar connections at the national, regional and international level. The tax mentality of Congolese in particular and Africans in general differs significantly from that of Western peoples, Americans especially Scandinavian countries.

The same is true for historical retrospect. The fiscal mentality of the Middle Ages, where it was above all a question of justifying taxation as such, differs radically from the fiscal mentality in the current "public good State" or in the great dictatorships of our time and above all in the countries of Black Africa.

2.4.2. mass education

Mass education is about transforming the mind and mentality of a people. It is true that the awareness of taxpayers is important in order to instill tax education in them. This awareness-raising action must be organized and structured in such a way as to reach a large segment of the target population. Nevertheless, this culture must be taught at all levels because educating
and informing individuals about taxation are preventive means likely to help the tax administration approach the taxpayer or taxable person.

CONCLUSION

Given the importance of taxation in developing countries such as the Democratic Republic of Congo, the mobilization of tax revenues remains a very crucial issue and is at the center of political and economic debates both within the country and with partners. However, it should be pointed out that the emphasis on moving domestic resources does not naturally reduce to the increase in revenue. It also involves the restoration of a tax system that allows inclusive growth, encourages good tax management, responds to the concerns created in public opinion by the disproportions of wealth.

Thus, the main concern in the context of this study is to analyze the effects of taxation on Congolese economic activity. In other words, it was a question of answering the concern how does taxation act on the economic activity of the DRC? However, the ARDL cointegration econometric approach allowed to capture the effects of fiscal variables on economic growth, while distinguishing their short- and long-term dynamics, in order to draw conclusions.

Indeed, the analysis of the effect of Congolese taxation on economic activity shows that indirect taxes have a positive effect on economic growth, while direct taxes harm economic growth.
References


