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Financial determinants of industrialisation in Cameroon

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Abstract: *This article assesses the financial determinants of industrialisation in Cameroon over the period 1960 to 2015. The theoretical foundation is based on the two gap model of financing economic development. The estimation technique is based on the Autoregressive Distributed Lag (ARDL)-bounds testing approach. The paper establishes a long-run relationship between manufacturing value added and oil taxes and air transport taxes. We find that oil taxes and air transport taxes have a positive and significant effect on manufacturing value added in Cameroon – both in the short run and in the long run. The study, therefore, recommends that, appropriate policies of taxes' collection and rational spending should be pursued in Cameroon, in order to foster financing of industrialization. But also, authorities should improve credit policies and external sources of finance such as foreign direct investments and foreign aid.*

Keywords: Industrialisation, financial determinants, oil taxes, air transport taxes, Autoregressive Distributed Lag, Cameroon.

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1 Introduction

After its independence, Cameroon implements a real industrialization policy. But, the economic crisis has reduced this policy. Indeed, the industrial policies adopted during the structural adjustment programs (1987 - 2006) did not achieve the expectations of the people and political leaders. The share of the industrial sector in the gross domestic product (GDP) has drastically decreased. In 1984, the share of industry in GDP was 37.47%. This share dropped to 29.57% in 2011. It has dropped by 7.9%. Despite recent efforts by the national authorities, setting incentives for investment by the law of 13 April 2013, the share of industry in GDP was 30.06% in 2014 (WDI, 2016). The causes of the de-industrialization in Cameroon are many. We can site the energy problem, low human capital, poor

infrastructures, poor governance, and lack of realistic industrial policy. But the fundamental problem is the financing of industrialization. The installation of plants has a high cost.

The objective of this paper is to assess the financial determinants of industrialization in Cameroon. As in all countries, industrial policy is a public policy primarily funded by the State budget. However, given the lack of internal resources such as in Cameroon, external funding is then sought . Thus the official development assistance, foreign direct investment and loans from donors can contribute to financing industrialisation. But the international financial crisis, political crisis, insecurity on the borders of countries and falling commodity prices have decreased the resources available to finance industry in Cameroon. In the context of a prospective analysis, it is then urgent to look for sources of innovative financing. Thus, in addition to analyzing the traditional sources of financing the industry in Cameroon, we will seek innovative sources which are more realistic and more stable. The goal is to reduce the high indebtedness under investment structuring projects. To our knowledge, such a study has not been conducted in Cameroon.

According to the literature review, two main results are obtained on the impact of oil taxes and air transport taxes on industrialization (Quinet, 2012). The dominant result shows that there is a negative and significant impact of oil taxes on financing economic development. This is based on a high level of corruption on oil rent and Dutch disease. The second effect justifies a positive and significant impact of oil taxes and air transport taxes on financing economic development. We can explain this result by objective and rational spending of taxes put in place by the authorities (Hausmann and Rodrik, 2005). Our objective is not to focus on the impact but also on the long run and short run relationship between manufacturing value added and oil taxes and air transport taxes. This orientation has not been treated.

After this introduction, section two briefly reviews the theoretical and empirical literature. Section three explains the methodological strategy. Section four presents and discusses the results. Section five concludes the paper with some economic recommendations..

2 Literature Review

2.1 Theoretical literature

The financing of industrialization has been rarely documented. Two sources are generally identified: an internal source and external source. Regarding internal sources, Quinet (2012) shows that public and private savings supported investment in the industrial sector of the developed countries. Industrialization is just like the infrastructure of public policy. They are financed by the state budget. As such, Broussolle (2012) states that the congestion charge is a stable source of funding. However, its management and the user's preferences forces the authorities to spend the funds on road maintenance (Robin, 2008). Also, in the case of developing countries (Larrain, 2006) and Cameroon (Touna Mama, 2008), the financial system has contributed to the accumulation of investment in the industry.

The ability of a country or region to mobilize domestic resources to implement development programmes and projects is determined by the size of economic activities that it generates, its economic growth performance, capacity to raise and manage tax revenues and the efficiency of its financial system (Ewetan and Ike, 2014). Economic activities are driven by public and private investments, which rely on savings mobilized by the financial system, and the size of the fiscal space created by the public sector, which is also determined by the economic growth performance (Larrain, 2006).

2.2 Empirical literature

The industrialisation of Cameroon has always been an economic development priority. For proof, the industry is considered as a long-term growth catalyst (UNIDO, 2009; Hausmann and Rodrik, 2005). Industrialisation is accompanied by a reduction of poverty (Cadot et al., 2015), a human capital development (Young, 2012), a strengthening of national and foreign private investment (Duarte and Restuccia, 2010). Several factors contributed to the industrialization of Africa[1]. The fundamental problem of industrialization today is that of funding.

[1] See McMillan et al. (2014) and Page (2012) for the development of these factors.

Increasingly, the financial sector's contribution is important to the economic development. McKinnon (1973) and Shaw (1973) established a significant impact of financial liberalization on economic growth. Indeed, by establishing a liberal interest rate regime, it creates a real motivation among investors and the increased growth of savings. Credit supply increases. We obtain a better resource allocation. Levine (2005) and Demirgüç-Kunt and Levine (2009) found that the development and deepening of the financial sector are associated with long-term economic growth as the best developed financial sectors alleviate external financing constraints that are subject to companies. This provision ensures long-term investments (Boillot and Lemoine, 1992). When credit is limited, it is usually by human failure to creditors or lack of information on the creditworthiness of borrowers (Gelbard et al., 2014). In addition, the low development financing through the banking system is also in the nature of the loans granted. Short-term credits (STC) represent nearly 66% of the appropriations. This strong STC volume is explained by the nature of the deposits which are mostly sight deposits (Beck and Cull, 2014). In general, there is a positive relationship between financial development and industrialization (Ewetan and Ike, 2014; Larrain, 2006; Da Rin and Hellmann, 2001).

Considering the external sources of industry funding, the contribution of foreign direct investment (FDI) has been extensively documented (Cipollina et al., 2012; Alfaro et al., 2009; Yeaple and Keller, 2009; Markusen and Venables, 1999). In fact, four major explanations justify why FDI increases the added value of the industry: (1) FDI brings a technological innovation that increases the economies of scale of domestic enterprises; (2) contributes to the accumulation of work; (3) multinational firms increase demand for goods and services produced locally and (4) they reinforce the accumulation of capital through long-term funding. On this last point, financial flows are important. This investment will not only break the constraints of domestic credit but does not relatively increase the external debt of countries. However, volatility does not always allow an assessment of long impact on local industry (Nunnemkamp and Spatz, 2004).

Considering the industrial policy as a public policy, funding comes from tax policy implemented by national authorities. Easterly and Rebelo (1993) show that there is a very significant relationship between the level of development and the tax structure: poor countries rely heavily on the international trade taxes while developed countries experience the best internal tax revenues that can boost the industry. The relationship between public spending and endogenous growth is still mixed. Barro (1991 and 1990) found a positive impact between public spending and economic growth in a sample of developed and developing countries. Barro (2003) shows, however, that when including the military and education spending, fiscal policy does not support the general public investment and industrialisation in particular. This result is indicative of the current situation in developing countries that are threatened by terrorism and civil wars. Koester and Kormendi (1989) concluded that when already in a position of low public savings rate (government revenue), it is difficult to endogenize growth and affect all sectors of the economy. Internal revenue, despite their size, would be a reliable source of industry funding. However, different contexts do not always create favorable conditions for this mechanism.

In view of the above, the literature focuses more on innovative sources of financing industrialisation. Current sources of funding based on the new South-South cooperation between emerging economies (Brazil, Russia, India, China, and South Africa) and African countries have been developed. On the multinational level, the United Nations system participates to financing the industrialization of Africa. The role of the African Development Bank in its Country Strategy reinforces technically but especially financial investment in the African continent industry (Maculen and Kedir, 2015). A general observation proves that these sources meet today low mobilization due to global economic conditions and multifaceted crises (ECA, 2015a). We need to improve this process.

Innovative financing can be defined as the mobilization of non-traditional means to raise funds for development (ECA, 2015b). A successful example is the tax on airline tickets to finance the health sector. This is a tax of a small amount (1 to 2 US dollars for example) added to the price of airfare paid by passengers to purchase their tickets, in addition to other airport charges applicable in the country of departure. It is imposed on all airlines and therefore has no impact on competition. Legally, the country that put this work in charge shall ensure that the income from this tax is used for development aid. So far, nine countries have adopted this tax on airline tickets and many others are negotiating to do same. It notes that many of these countries include Cameroon, Congo, Madagascar, Mali and Niger. This tax is a predictable and stable source of development finance. Other innovative sources include; a tax on a barrel of oil, a tax on financial transactions and another on the sports industry and finally, decreased illicit capital that deprive Africa of its financial resources (ECA, 2015b). These new sources require incentives and good governance to spur economic development in sub-Saharan Africa.

At the stage of our readings, there are few studies that have examined the financial determinants of industrialization in Cameroon. Our article completes this gap. Also, our project will contribute to establish a synthesis of studies on the problem and identify the main conclusions both on theoretical and empirical views.

3 Methodology

3.1 Empirical model

To estimate the financial determinants of industrialisation in Cameroon, we start from an endogenous growth model according to the approach of Rebelo (1991). The production of a country can be characterized by a Cobb-Douglas function of the form:

$$Y_t = AK_t^{\gamma}(HL)_t^{\theta} \qquad (1)$$

where Y is the production function; A is the technical progress which is a combination of the total factors of productivity (tpf) and manufacturing production or industrialisation (mi):
$A = tpf * mi$; K is the stock of physical capital; H is skills and experiences; L is the labor force; E is human capital function composed of H and L : $E^{\delta} = HL$. We divide the production function by human capital to capture the economic development. We obtain

$$\frac{Y}{E} = A\left(\frac{K^{\gamma}}{E^{1-\frac{\theta}{\gamma}}}\right) \quad \Longrightarrow \quad y = Ak^{\gamma} \qquad (2)$$

Here y is the real output per unit of human capital and k the stock of physical capital per unit of human capital. if $\gamma = 1 - \delta\theta$ in a situation of endogenous growth, $\gamma + \delta\theta \geq 1$.
The production function is then $y = Ak^{\gamma}$ with $= \frac{K}{E}$. We assume that the economy grows over time. So, $\dot{k}_t = \frac{K_t - K_{t-1}}{E}$ Where $K_t - K_{t-1} = I_t$. I_t is net investment function. So, with $\dot{k}_t = \frac{I}{E}$, the dependent production function of time becomes:

$$\dot{y}_t = A\dot{k}_t^{\gamma}. \qquad (3)$$

By replacing $\dot{k}$, we obtain $\dot{y}_t = A\left(\frac{I}{E}\right)^{\gamma}$ (4)
A logarithmic writing allows us to write $\ln y = \ln A + \gamma \ln I - \gamma \ln E$ (5)
Where $A = tpf * mi$ which then gives the following form:

$$\ln y = \ln tpf + \ln mi + \gamma \ln I - \gamma \ln E \qquad (6)$$

Manufacturing output can then be inferred by the expression:

$$\ln mi = \ln y - \ln tpf - \gamma \ln I + \gamma \ln E \qquad (7)$$

In general, there are two main sources of financing industrialisation. The first is internal which depends on national savings (bank deposit and government revenue). The second source is external. It depends on the bilateral and multilateral aid and private capital.

The investment function (I) is a combination of these two financing sources. The investment function can take the following formula:

$$I = (internal\ source) * (external\ source) \qquad (8)$$

Where $internal\ source$ is composed by public savings ($Saving$), credit to private sector ($Credit$); $external\ source$ is a combination of foreign direct investment inflows (FDI) and official development assistance (ODA). We introduce in the investment function innovative funding source based on the revenue from the tax on plane tickets ($Airtaxe$) and the revenue from the tax on oil production ($Oiltaxe$).

The complete formula of investment function is represented as follow:

$$I = (Saving * Creidt) * (FDI * ADO) * (Airtaxe * Oiltaxe) \qquad (9)$$

If we apply the logarithm expression on the investment function, we obtain:

$$lnI = \ln Saving + \ln Credit + lnFDI + lnADO + lnAirtaxe + lnOiltaxe \qquad (10)$$

We include equation 10 in equation 7. We obtain the following equation:

$$\ln mi = \ln y - \ln tpf - \gamma \ln Saving + \ln Credit + lnFDI + lnADO + lnAirtaxe + lnOiltaxe + \gamma \ln E \qquad (11)$$

To keep the financial determinants, we remove GDP, total productivity factor and human capital captured by education. We add political and institutional variable to capture political situation which can be interpreted as democracy. We use Polity IV Project of Marshall (2013). The Polity IV Project has rated the levels of both democracy and autocracy for the country and year using coded information on the general qualities of political institutions and processes, including executive recruitment, constraints on executive action, and political competition. These ratings have been combined into a single, scaled measure of regime governance: the Polity score, which ranges from –10, fully institutionalized autocracy, to 10, fully institutionalized democracy. In our study, Polity2 can measure economic freedom. Which is necessary to invest even in industrial sector.

Thus, the econometric model inspired by Ewetan and Ike (2014) is given as follow:

$$\ln mi_t = \beta_0 + \beta_1 \ln Oiltaxe_t + \beta_2 lnAirtaxe_t + \beta_3 \ln saving_t + \\ +\beta_4 \ln \text{Credit}_t + \beta_5 \ln FDI_t + \beta_6 \ln ADO_t + Polity2_t + \varepsilon_t \quad (12)$$

In equation 12 below, we keep the innovative founding source and we create a matrix X that include the other exploratory variables. This gives us equation 13:

$$\ln mi_t = \beta_0 + \beta_1 \ln Oiltaxe_t + \beta_2 lnAirtaxe_t + \beta_3 lnX_t + u_t \quad (13)$$

To investigate the presence of long-run relationships among the Oil taxes, Air taxes, and X where X is the other explanatory variables, the bound testing procedure under Pesaran et al. (2001) is used. The bound testing procedure is based on the F-test. The F-test is actually a test of the hypothesis of no cointegration among the variables against the existence or presence of cointegration among the variables, denoted as:

$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$

there is no cointegration among the variables.

$H_0 : \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$

there is cointegration among the variables.

The ARDL bound test is based on the Wald-test (F-statistic). The asymptotic distribution of the Wald-test is non-standard under the null hypothesis of no cointegration among the variables. Two critical values are given by Pesaran et al. (2001) for the cointegration test. The lower critical bound assumes that all the variables are I(0) meaning that there is no cointegration relationship between the examined variables. The upper bound assumes that all the variables are I(1) meaning that there is cointegration among the variables. When the computed F-statistic is greater than the upper bound critical value, then the H0 is rejected (the variables are cointegrated). If the F-statistic is below the lower bound critical value, then the H_1 cannot be rejected (there is no cointegration among the variables). When the computed F-statistics falls between the lower and upper bound, then the results are inconclusive.

The ARDL methodology is relieved of the burden of establishing the order of integration amongst the variables. Furthermore, it can distinguish dependent and explanatory variables, and allows to test for the existence of relationship between the variables. With the ARDL it is possible that exploratory variables have an optimal number of lags (Pesaran and Shin, 1999).

3.2 Estimation technique

The ARDL-bounds testing approach, based on the error-correction model (ECM) technique, involves two stages. The first stage is to estimate the ARDL model of interest by ordinary least squares (OLS), in order to test for the existence of a long-run relationship among the relevant variables. This is done by constructing ECM, and then testing whether the lagged levels of the variables in the equation are statistically significant or not. In other words, the null hypothesis of no long-term relationship is rejected or accepted. Once the long-run relationship or co-integration has been established, the second stage of the methodology is initiated. This involves the estimation of the long-run coefficients, and then estimating the associated error-correction model, in order to calculate the adjustment coefficients of the error correction term (Masih et al. 2008). The short-run effects, therefore, would be captured by the coefficients of the first differenced variables in the ECM model.

It is generally proved that the existence of a long-term relationship derived from the model does not necessarily imply that the estimated coefficients are robust. This suggests that there is a need to perform a series of diagnostic tests on the model established; and this means the testing of the residuals (i.e. homoscedasticity, non-serial

correlation, and so on) as well as stability tests to ensure that the estimated model is statistically robust. The unrestricted error correction model (ECM) of equation (13) can be expressed as follows:

$$\Delta \ln mi_t = c_0 + \beta_1 \ln Oiltaxe_t + \beta_2 lnAirtaxe_t + \beta_3 lnX_t + \sum_{i=1}^{p} \alpha_i \Delta lnmi_{t-i} + \sum_{i=0}^{q} \gamma_j \Delta lnOiltaxe_{t-j} + \sum_{i=0}^{q} \theta_k \Delta lnAirtaxe_{t-k} + \sum_{i=0}^{q} \delta_s \Delta lnX_{t-s} + u_t \quad (14)$$

where the terms with the Σ in the equation (14) stand for the error correction model (ECM) dynamics, and the coefficients β_i are the long-run multipliers, corresponding to the long-run relationship, while the coefficient c_0 is the drift, and u_t are the white noise errors. The general ECM model is tested downwards sequentially by dropping the statistically non-significant first differenced variables of the equation to arrive at a 'goodness-of-fit' model, using a general-to-specific strategy.

4 Results and discussion

In the first section we present and describe descriptive statistics and correlation matrix before analyse the different results.

4.1.1 Descriptive statistics and correlation matrix

4.1.1.1 Descriptive statistics

Here we present evolution of the different variables used in the empirical model. Data covers the period 1960 to 2015. The main sources are World Bank database (2015) and International monetary fund database IMF (2017) and national sources.

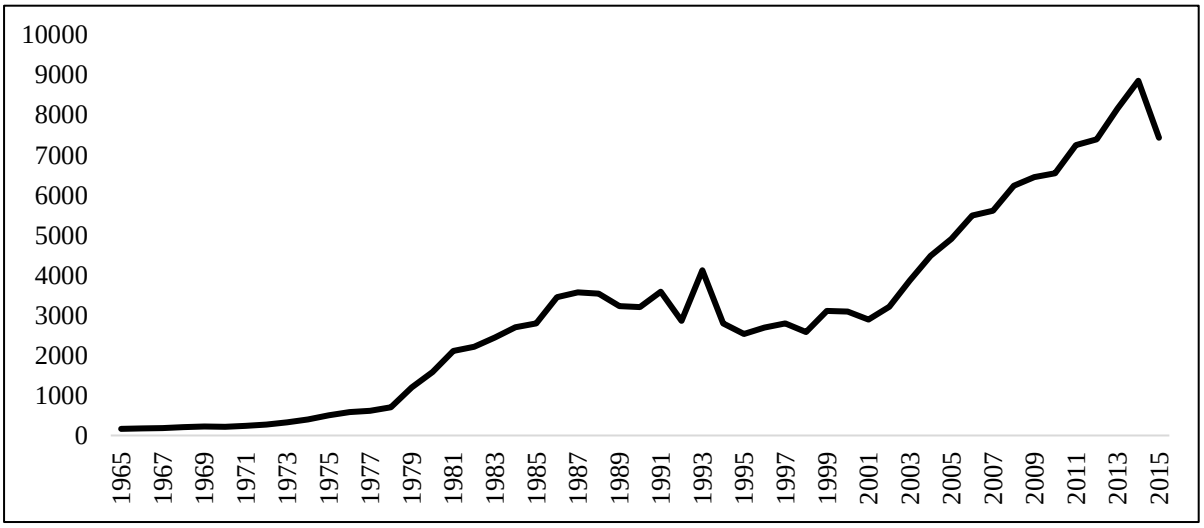

Figure 1. Evolution of Manufacturing Value added in Cameroon in millions of US dollars, Source: Author from WDI (2017

Since the period of takeoff in 1978 with the starting of production of oil in Cameroon, manufacturing value added increases. But between 1986 and 2002, we observe a decline of this variable. Two main explanations can be presented. Firstly, the economic crisis in 1980s reduced the potentiality to implement the industrial policy. Since 1998, manufacturing value added increases and reaches 8.8 million USD in 2014 before decline in 2015 and 2016.

Figure 2. Evolution of Gross Saving in Cameroon in millions of US dollars, Source: Author from WDI (2017)

The same observation is obtained with the evolution of gross saving in Cameroon. In 1964, the gross saving in Cameroon was 98 million US dollars. After the adoption of saving policy between 1970 and 1991, the gross saving reaches 2.7 billion US dollars. But banking restructuration and devaluation have contributed to reduce the high evolution of gross saving. After devaluation in 1994, gross saving started to grow. A new dynamics is observed since 2003, where the variable goes from 1.8 billion US dollars and reaches 3.6 billion US dollars in 2014 before drop to 2.8 billion US dollars in 2015.

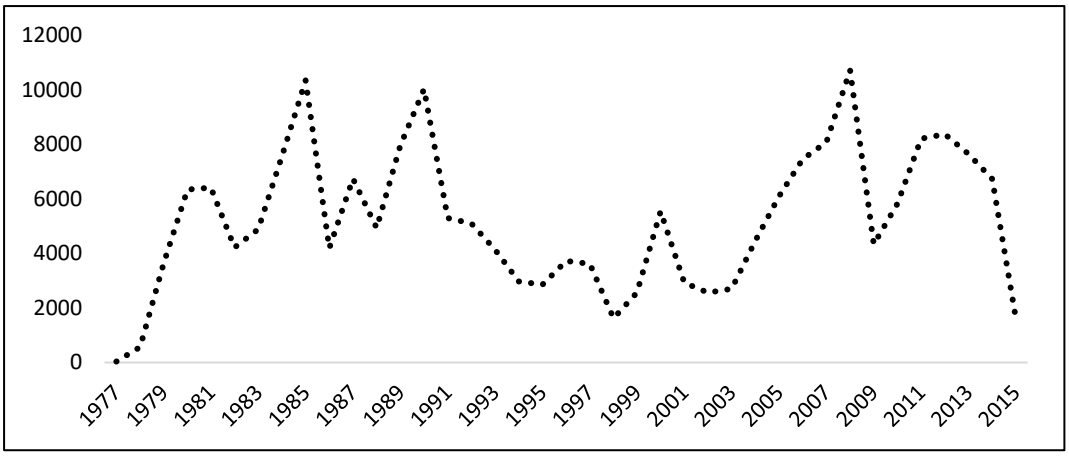

Figure 3. Evolution of Oil taxes in Cameroon in million US dollars, Source: Author from WDI (2017)

The evolution of Oil receipt is highly fluctuating. This means that the variable depends of oil production and the international price.

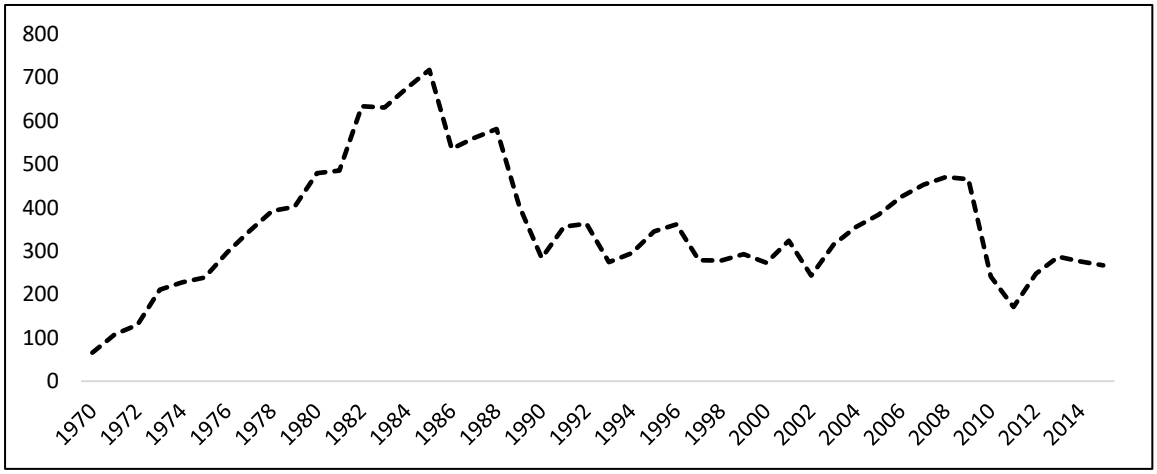

Figure 4. Evolution of Air transport taxes in Cameroon in million US dollars, Author from WDI (2017)

We can observe two main periods of the evolution of air taxation. The first period goes from 1969 to 1985 where the variable increases from 65,800 US dollars to 718,000 US dollars in 1985. During the economic crisis, we observe a high decline of air taxes. In 2002, lowest level was 243,122 US dollars. Starting to this period, a weak evolution is observed. In 2009, air taxes reach 466,050 US dollars. From this date we observe a high decline of the variable. This can be explained by international financial crisis in the world.

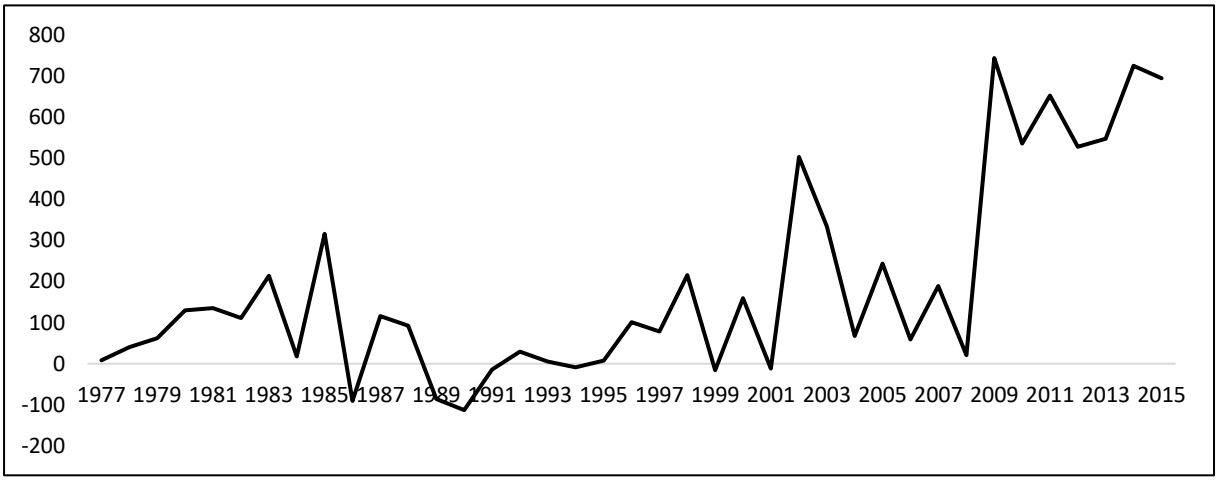

Figure 5. Evolution of FDI in Cameroon in million US dollars, Author from WDI (2017)

Foreign direct investment is considered as external financial contribution to the economy. The starting point of this variable is 1977 with 8.7 million US dollars. In 2009, it reaches 743.3 million dollars US. Two main reasons can be presented to justify its evolution. Firstly, the economic competitiveness of the country explains the new branches of production. Second, the diversification of the investment partners such as China, Brasilia, India, South Africa and Morocco, have increase their investment in the country. However, Cameroon is still a very low attractive country compare to the other developing countries in Africa.

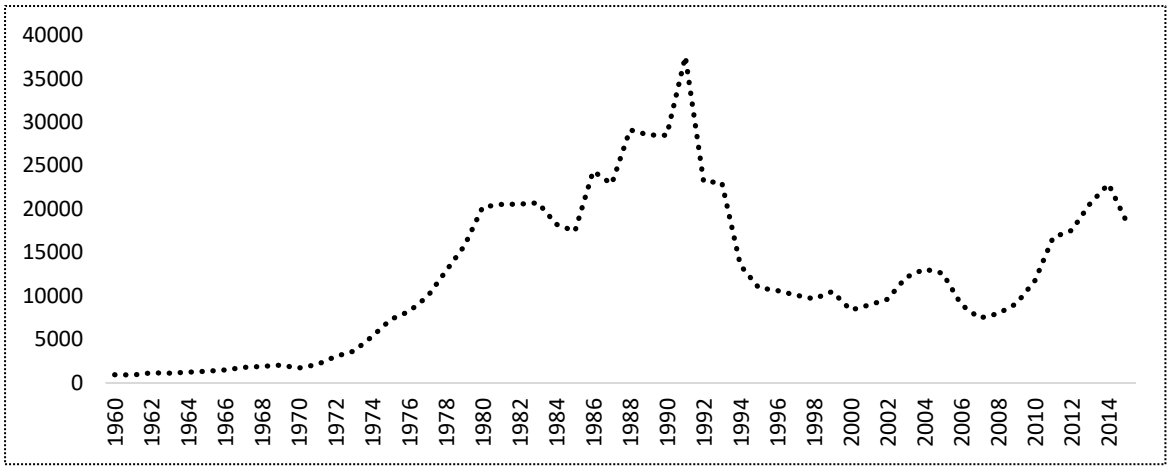

Figure 6. Evolution of domestic credit in thousand US Dollar in Cameroon, Author from WDI (2017)

Domestic credit plays a main role in the financing of development in the country. It can contribute to the diversification of the production. It finances the economic activities both in the formal and informal sector. Since 1960, the highest level of domestic credit is 37,558 US dollars. After dropped drastically, it increases since 2007 to 8, 4251 US dollars. It reaches 23, 014 US dollars.

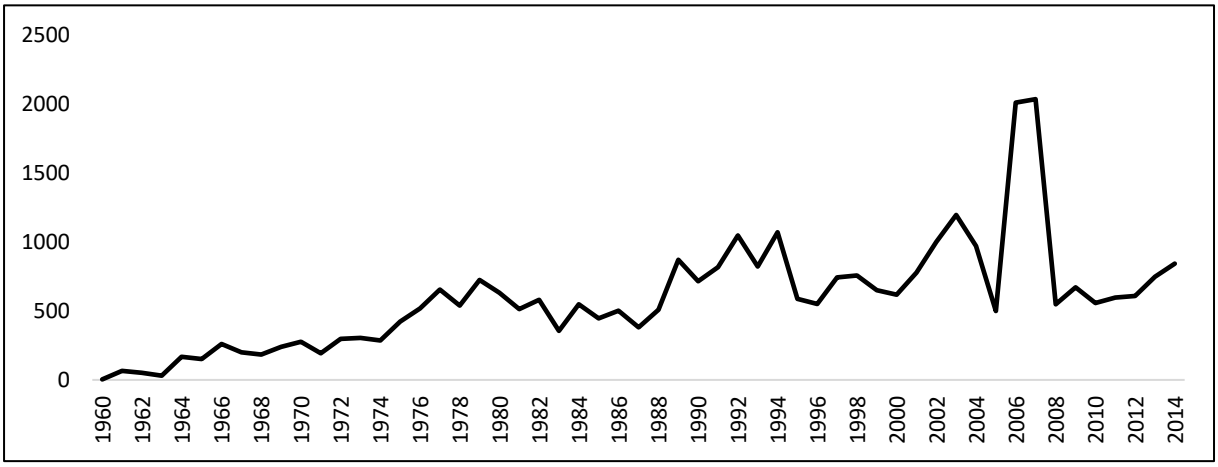

Figure 7. Evolution of official aid received in US dollars, Author from WDI (2017)

Foreign aid increases since 1960 form 364 000 US dollars and it reaches 2, 03 billion US dollars in 2007 before drop drastically to 547 million US dollars in 2008. This observation can be explained by international financial crisis where the financial partner reduced their contribution to economic development of different developing countries.

The simultaneous evolution of manufacturing value added and air transport taxation presents two types of analyses. The first analysis is before 2004 where air transport taxation was up to manufacturing value added and the second analysis is after 2004 where manufacturing value added pass air transport taxation. This can justify a good evolution of the two variables.

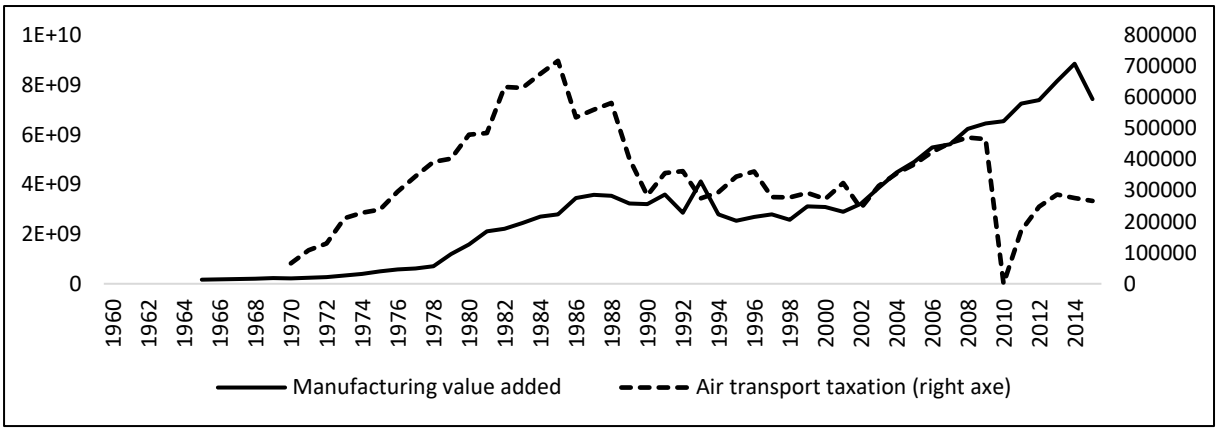

Figure 8. Simultaneous evolution of Manufacturing value added and Air transport taxation in US dollars, Author from WDI (2017)

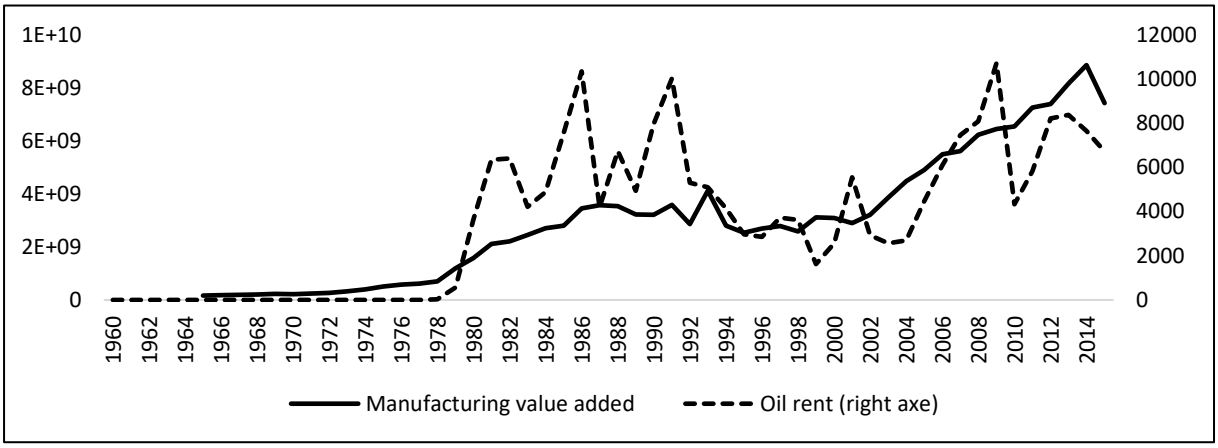

Figure 9. Simultaneous evolution of manufacturing value added and oil taxation in US dollars, Author from WDI (2017)

Before directly going to the econometric estimation, it is better to have a look at the descriptive statistics of the variables under consideration. This is vital because these statistics summarize the statistical proprieties of the series in the model such that some explanations about the behavior of the series can be offered at a glance (table 1).

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis
Manufacturing value added (Ln mi)	51	9.267	0.528	8.21	9.94	0.017	0.211
Ln Oil taxes	39	3.613	0.423	1.55	4.03	0.000	0.621
Ln Air taxes	46	5.396	0.837	0	5.85	0.000	0.000
Ln Saving	51	9.095	0.491	7.96	9.55	0.018	0.035
Ln credit	56	1.195	0.183	0.82	1.57	0.000	0.000
Ln FDI	39	6.630	3.189	0	8.87	0.000	0.224
Ln ADO	57	8.330	1.661	0	9.30	0.000	0.000

Source: Author

All the variables except foreign direct investment (FDI) and official assistance development (ADO) present a few variation according to their standard deviation. In fact, their values are 3.18 and 1.66 respectively.

4.1.1.2. Correlation matrix

The correlation matrix gives us the dependent relationship between the dependent variables and the independent variables.

Table 2. Correlation matrix

	Ln mi	Ln Oil taxes	Ln Air plane taxes	Ln Saving	Ln Credit	Ln FDI	Ln ADO
Ln mi	1						
Ln Oil taxes	0.627*	1					
Ln Air plane taxes	0.031	-0.032	1				
Ln Saving	0.970*	0.655*	0.036	1			
Ln Credit	0.088	-0.157	0.274	0.221	1		
Ln FDI	0.136	0.008	-0.096	0.128	-0.370*	1	
Ln ADO	-0.013	0.154	0.011	0.050	0.157	-0.124	1

Source: Author

We observe that Oil taxes and saving are positively correlated. The degree of the correlation between independent variables is high. This can justify the relative interdependence between these variables.

4.1.2. Unit-root tests for variables

The results of the Phillips and Peron (1988) unit-root tests for the relevant variables are reported in Tables 3 and 4. The PP truncation lag is selected automatically on the Newey-West bandwidth. As may be seen from Tables 3 and 4, all the variables are either I(0) or I(1), using both unit-root tests. The paper, therefore, rejects the null hypothesis that the variables have unit roots on the basis of the Newey-West bandwidth, as well as the serial correlation diagnostic tests from the stationarity regression results. Hence, the paper rejects the null hypothesis that the variables are non-stationary.

Table 3. PP unit-root tests for the variables in levels.

Variable	No Trend	Result	Trend	Result
Manufacturing value added (ln mi)	-2.391	N	-4.153**	S
Ln Oil taxes	0.577	N	-2.157	N
Ln Air taxes	-1.486	N	-1.432	N
Ln Saving	-1.730	N	-2.306	N
Ln credit	-1.015	N	-1.636	N
Ln FDI	0.256	N	-0.541	N
Ln ADO	1.425	N	0.361	N

Source: Author, Notes: *, ** and *** denote the rejection of the null hypothesis at 10%, 5% and 1% significant levels, respectively. S = Stationary and N = Non-stationary. ln is the natural log operator.

Table 4. PP unit-root tests for the variables in first differences.

Variable	No Trend	Result	Trend	Result
ΔLn mi	-22.080***	S	-25.736**	S
ΔLn Oil taxes	-6.066***	S	-6.224***	S
ΔLn Air taxes	-3.523*	S	-3.504**	S
ΔLn Saving	-2.356**	S	-1.584***	S
ΔLn credit	-0.864*	S	-0.825**	S
ΔLn FDI	1.796***	S	-0.756*	S
ΔLn ADO	2.045*	S	1.236**	S

Source: Author, Notes: S = Stationary and N = Non-stationary. Δ is the difference operator and ln is the natural log operator.
* indicates rejection of the null hypothesis at the 10% significance level.
** indicate rejection of the null hypothesis at the 5% significance level.
*** indicate rejection of the null hypothesis at the 1% significance level.

The Phillips-Peron unit root test shows that all the variables are stationary in the first difference. This implies that it is necessary to make a sort-term and long-term analysis. To achieve our objective, we base our methodology on the *Autoregressive Distributed Lag (ARDL)-bounds testing approach.*

4.2. Results

Table 5. Financial determinants of industrialization in Africa- results of ARDL (2, 3, 3, 0, 0) ECM model selected on AIC.

	Dependent variable : manufacturing value added			
	Model 1	Model 2	Model 3	Model 4
Ln Oil taxes	0.550***			0.382***
	(0.133)			(0.066)
Ln Air plane taxes	0.102***			0.016*
	(0.031)			(0.811)
Ln Saving		0.655***		1.421***
		(0.176)		(0.159)
Ln Credit		-0.238***		-0.078
		(0.078)		(0.114)
Ln FDI			0.007	-0.008
			(0.004)	(0.003)
Ln ADO			-0.023***	-0.020***
			(0.003)	(0.004)
Cons.	4.027***	4.149	-3.471**	9.46***
	(1.269)	(0.200)	(1.553)	(0.384)
R-Squared	0.7612	0.810	0.7912	0.621
Prob>F	0.0000	0.0000	0.0000	0.000
DW-statistic	1.778	1.769	1.801	1.792

Source: Author, note: robust standard errors are in parentheses;
* indicates rejection of the null hypothesis at the 10% significance level.
** indicate rejection of the null hypothesis at the 5% significance level.
*** indicate rejection of the null hypothesis at the 1% significance level.

In the long term, we observe that Oil taxes and Air taxes are statistically significant at 1% except Air plane taxes which is significant at 10% in model 4. They present the expected sign. This positive impact implies that, Oil taxes and Air taxes increase manufacturing value added in Cameroon. An increase of 1% of Oil taxes and Air taxes leads to about a 0.55% and 0.10% respectively in model 1.

The coefficient of saving is positive and significant at 1% in model 2 and in model 4. This implies that, saving increases manufacturing value added in Cameroon. If we consider model 2, savings increase manufacturing value added. Considering foreign direct investment (FDI) and official assistance development (ADO) we observe that their signs are negative. The coefficient of FDI is insignificant with expected sign in model 3 but with unexpected sign in model 4. This can justify that external financial resources cannot improve manufacturing value added in Cameroon.

Table 6. Financial determinants of industrialization in Africa- results of ARDL (2, 3, 3, 0, 0) ECM model selected on AIC.

	Dependent variable : manufacturing value added			
	Model 1	Model 2	Model 3	Model 4
ΔLn mi$_{-1}$	0.311***			0.124**
	(0.071)			(0.041)
ΔLn Oil taxes$_{-1}$	0.621			0.371**
	(0.235)			(0.034)
ΔLn Oil taxes$_{-2}$	0.180*			0.245*
	(0.261)			(0.084)
ΔLn Air taxes $_{-1}$	1.213**			0.568***
	(0.631)			(0.006)
ΔLn Air taxes $_{-2}$	0.361*			0.014
	(0.438)			(0.631)
ΔLn Saving $_{-1}$		1.73		1.085*
		(0.355)		(0.071)
ΔLn Saving $_{-2}$		0.191		0.634
		(0.234)		(0.122)
ΔLn Credit$_{-1}$		0.462*		0.542*
		(0.812)		(0.631)
ΔLn Credit$_{-2}$		-0.349*		-1.241
		(0.097)		(0.208)
ΔLn FDI $_{-1}$			0.739***	0.631*
			(0.002)	(0.091)
ΔLn FDI $_{-2}$			0.639***	-0.102
			(0.007)	(0.261)
ΔLn ADO$_{-1}$			0.754***	1.062
			(0.232)	(0.146)
ΔLn ADO$_{-2}$			-0.001**	-0.034*
			(0.011)	(0.081)
$ecn\ (-1)$	-0.997	-0.852**	-0.624**	-0.614**
	(0.063)	(0.045)	(0.013)	(0.046)
R-Squared	0.582	0.614	0.625	0.573
Prob>F	0.0000	0.0000	0.0000	0.000
DW-statistic	1.860	1.742	1.753	1.791

Source: Author, note: robust standard errors are in parentheses;
* indicates rejection of the null hypothesis at the 10% significance level.
** indicate rejection of the null hypothesis at the 5% significance level.
*** indicate rejection of the null hypothesis at the 1% significance level.

Table 6 shows that the coefficients of oil taxes and air taxes in Model 4 have a positive sign, as expected; and they are statistically significant. If we considered the first lag, we observe that, a 1% increase in the oil taxes and air taxes leads to about a 0.37% and 0.56% increase manufacturing value added respectively and it is significant at 5%. This could suggest that the effects of new types of financial resource or new financial determinants of manufacturing value added are positive. The Cameroonian government should adopt a law to increase these types of resources Quinet (2012).

The others internal financial resources (savings and credits), are not significant in the error correction model (ECM) dynamics. This implies that, in the short-term, saving and credit policies cannot play a major role to finance industrial transformation. This can be analysed by the fact that the level of credit and saving is too low and their nature in short-term cannot permit to realise structural investment. Our result is confirmed by Beck and Cull (2014). Foreign direct investment and official assistance of development are all significant in model 3 but in model 4, FDI plays a positive role on manufacturing value added in Cameroon. Young (2012) found the same result in appreciating the African growth miracle and its sustainability.

The coefficient of ECM (–1) is found to be statistically significant at the 1% level, with the expected negative sign. This confirms the existence of a long-run relationship between the variables. The coefficient of the ECM (–1) term is –0.99 in model 1, which suggests a relatively fast rate of the adjustment process. The magnitude of the coefficient of the ECM (–1) implies that the disequilibrium occurring, due to a shock, is totally corrected in about

1 year and 1 month, at a rate of 99% per annum. The result is supported by Page (2012). He explains the way of industrialization of Africa and the different constraints.

5 Conclusion and recommendations

The main objective of this paper was to examine empirically, and to investigate the impact of oil taxes and air transport taxes on sustainable economic growth in Cameroon. The paper employs the ARDL-bounds testing approach and the error-correction model (ECM) to co-integration analysis, as popularised by Pesaran, Shin, and Smith (2001) to establish the long-run relationship between the relevant time series variables. As demonstrated by Pesaran and Shin (1999), the ARDL approach has better properties in small sample sizes than traditional co-integration methods, which typically require a large sample size for the results to be valid. Our empirical results show that the impact of oil taxes and air transport taxes on manufacturing value added in Cameroon is positive and statistically significant – both in the long run, as well as in the short run. This suggests that the implementation of appropriate taxes' collection can spur manufacturing value added in Cameroon. This finding is consistent with those of some previous studies, which found a positive relationship between these variables. The study, therefore, recommends that to boost financing of industrialization in Cameroon, the authorities should adopt rational and objective public spending. In addition, the government should reduce the different constrains on loans.

List of abbreviations

Autoregressive Distributed Lag (ARDL); error-correction model (ECM); foreign direct investment (FDI); official assistance development (ADO); Phillips and Peron (PP); the total factors of productivity (tpf); Gross Domestic Product (GDP; World Development indicators (WDI).

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