The Effect of Private Investment on Real Interest Rate in CFA Franc Zone

Emmanuel Blaise Efon Ngouo[1*] and Luc Nembot Ndeffo[1]

[1]*University of Dschang, Cameroon.*

Authors' contributions

This work was carried out in collaboration between both authors. Author EBEN designed the study, managed the literature searches, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author LNN improved the statistical analysis and structured the study. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

This paper investigates the effect of private investment on real interest rate in CFA franc zone during the period 1980-2015. To attain this objective, the methodology adopted is the system Generalized Method of Moments (GMM). The result shows a negative and significant effect of private investment on real interest rate. In view of the result obtained, we suggest that African countries in the franc zone should vigorously pursue the establishment of favorable conditions for the development of private sector. Public policies for improving private investment should be promoted: improving the business climate, ameliorate political environment, fight against terrorism ravaging part of Africa including Mali.

1. INTRODUCTION

The interest rate is essential in the mobilization of savings for sound financing of economies.

Since the early 1980s, real interest rates have been rising worldwide, reaching unusually high levels. The causes and consequences of this phenomenon have too often been studied by

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*Corresponding author: E-mail: efon.emmanuel@yahoo.com;

means of analyzes which privileged the relation between investment and interest rate. However, a more general analysis taking into account not only the effects of an increase in the interest rate on the future supply of production (and therefore on the present demand for investment), but also its influence on production and current capital has been conducted. Changes in the interest rate and the wage share simultaneously affect supply and demand through complex mechanisms. Their effects are exerted in particular through changes in relative prices.

Thus, during the recession of the 1980s, the fall in investment demand resulted in almost all countries in a fall in the price of capital goods relative to that of consumer goods, even though the high level of interest rates affects production costs. In countries where the increase in the interest rate does not coincide with that in the expected return on investment, this double movement of supply and demand increases the recessionary effect on production and employment of economic policies. But the adaptations induced by the rise in real interest rates are faster, which gives the depression of the eighties its specificity [1]. For most of the 1980s, savings and investment were relatively low compared to levels seen today. At the same time, real interest rates have reached relatively high levels. The persistence of higher real interest rates is generally considered to have hampered investments that improve economic well-being. While many studies have focused on the perverse effect that a rise in real interest rates can have on investment; the effect of investment on real interest rates remains food for thought and few studies have focused on it. Bismut (1990), argue that the investment boom creates financing needs and pushes up real interest rates. Similarly, Desroches and Francis [2], point out that changes in investment demand are the main determinant of interest rates. For these authors, an increase in desired level of investment creates excess demand in the market and pushes up real interest rates. Interest rates therefore remain high due to the dynamism of investment demand. According to these authors, the low level of real interest rates seems rather attributable to the characteristic anemia which characterizes investment demand. The same result was found by Barro and Sala-i-Martin [3]. Mohamed et Fatma [4], confirm the presence of cointegration between private investment, public investment, real GDP per capita, government stability and the real interest rate. Mathis [5], evaluates the influence of the growth of public debt on a set of macroeconomic quantities, more particulary the interest rate. He finds that the increase in the public debt deteriorates the current account through the induced increase in income; the increased need for financing requires, to be satisfied, an increase in the interest rate. Most simulations focusing on the early 1980s suggest that the movements in real interest rates during this period were largely due to fiscal and monetary policy. Knight and Masson [6] attribute half of the rise in real interest rates in the United States to the expansionary nature of that country's fiscal policy. Indeed, institutions are essential in achieving economic performance as revealed in the literature. They are the main long-term drivers of investment and financial development [7]. Nizar (2011), finds that the most determining variable in the interest rate setting model is regulatory status, thus reflecting the importance of government involvement and the regulatory framework on interest rates. In this paper, therefore, it is a question of analyzing the impact of private investment on the real interest rate in the franc zone. This franc zone being made up of countries that have the same characteristics and share the same history. Fig. 1 shows the trend of private investment and the real interest rate over the period 1980-2015.
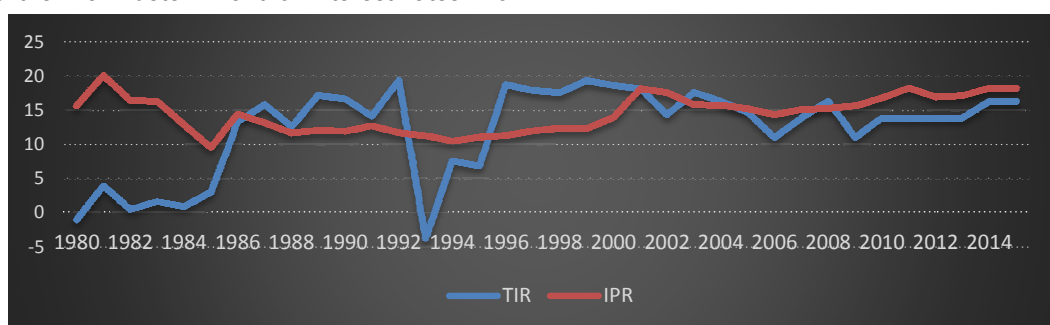

Fig. 1. Evolution of private investment and the real interest rate in the franc zone over the period 1980-2015
Source: Author's construction from Excel

The rest of the paper is structured as follows: the second section is devoted to the methodology and description of data, the third section to the results and discussions and the fourth section concludes the paper.

2. METHODOLOGY

2.1 Data

The data collected are quantitative, from secondary sources and come from the database of World Bank (World Development Indicators) and the Worldwide Governance Indicators (WGI). They are annual and cover a period of 36 years (1980-2015) for those from the World Bank database, and a period of 20 years (1996-2015) for those from Worldwide Governance Indicators. Our sample includes 15 developing countries including 6 from CEMAC, 8 from ECOWAS and Comoros. The descriptive statistic is presented in Table 1. Estimates are made using stata software.

2.2 Econometric Specification and Estimation Method

In order to assess the impact of private investment on real interest rate in the CFA franc zone, we formulate our model following Barro and Sala-i-Martin [3] and Mathis [5]. This basic model is specified as follows:

2.2.1 Basic model

$$TIR_{it} = \alpha_0 + \alpha_1 TIR_{it-1} + \alpha_2 IPR_{it} + \alpha_3 IPU_{it} + \alpha_4 DPU_{it} + \alpha5 MMO_{it} + \alpha_6 CRO_{it} + \varepsilon_{it}... \quad (1)$$

From this basic model, we derive two other models, one which integrates the variable "institution" and the other which integrates the cross variable "private investment*institution". These two models are as follows:

2.2.2 Model integrating the variable ''institution''

$$TIR_{it} = \alpha_0 + \alpha_1 TIR_{it-1} + \alpha_2 IPR_{it} + \alpha_3 IPU_{it} + \alpha_4 DPU_{it} + \alpha5 MMO_{it} + \alpha_6 CRO_{it} + \alpha_7 INST_{it} + \varepsilon_{it}.. \quad (1.a)$$

2.2.3 Model integrating the cross variable ''private investment*institution''

$$TIR_{it} = \alpha_0 + \alpha_1 TIR_{it-1} + \alpha_2 IPR_{it} + \alpha_3 IPU_{it} + \alpha_4 DPU_{it} + \alpha5 MMO_{it} + \alpha_6 CRO_{it} + \alpha_7 INST_{it} + \alpha_8 IPR*INST_{it} + \varepsilon_{it} \quad (1.b)$$

Where TIR represents the real interest rate. The variable of interest is private investment (IPR), the index '' i'' represents country, the index ''t'' represents time and ε_{it} is the error term. The description of the control variables and the expected signs of the variables of our models are presented in Table 2.

We estimate our equations using the system Generalized Method of Moments (GMM) of Blundell and Bond [8]. This method is important because it has three main advantages: (i) it corrects the endogeneity problem that appears in the estimation in panel data; (ii) it takes into account the biases that appear due to the specific effect of each country; (iii) it allows the formulation of dynamic models (Magnac, 2005). The GMM technique is declined in two versions: ''difference GMM'' and ''system GMM''. In the difference GMM estimator, the lagged levels of the endogenous variables are used as instruments (for exogenous variables, their first differences serve as their own instruments). The system GMM estimator employs simultaneously the equation in differences and the equation in levels by using lagged levels of the variables as instruments in the differenced equation and lagged differences of the variables as instruments in the level equation. Given sample-bias concerns associated with the difference

Table 1. Descriptive statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
TIR	540	11.29	12.25	-44.57	78.27
IPR	540	12.96	12.13	0.265	125.2
IPU	540	24.13	23.57	1.931	219.1
DPU	540	2.740e+09	3.490e+09	253.8	1.950e+10
MMO	540	21.59	9.376	1.617	72.37
CRO	540	1.109	9.215	-37.28	142.1
INST	300	11.25	8.16	3.42	112.3

Source: Authors from stata

Table 2. Description of variables

Variables	Description	Expected Signs and justifications
TIR	Real interest rate. It indicates the difference between the nominal interest rate and the inflation rate.	
TIR_{-1}	Lagged real interest rate.	+ [5]
IPR	Private investment. It is measured by gross private fixed capital formation as a percentage of GDP	+ [2]
IPU	Public investment. It is measured by the gross public fixed capital formation as a percentage of GDP.	+ [2]
DPU	Public debt. It designates the public debt as a percentage of GDP.	+ [6]
MMO	Money supply. It designates the quantity of money in circulation in an economy. It is represented by money and quasi money (M_2) as a percentage of GDP.	- [2]
CRO	Economic growth. It is measured by real GDP per capita.	+ [5]
INST	Institution. It is measured by government effectiveness.	+ [7]
IPR*INST	It is the cross variable.	+ [7]

Source: Authors from the literature review

GMM estimator, Bond et al. [9] have recommended that the system GMM estimator can dramatically improve efficiency and avoid the weak instruments problem in the first-difference GMM estimator. The robustness of the results obtained is based on two main tests: the absence of second order autocorrelation and the validation of the Sargan over identification test. This results in convergent and its coefficients are efficient (Roodman, 2009).The results of the estimates are presented in the following section.

3. RESULTS AND DISCUSSION

The Sargan test which makes it possible to analyse the over-identification of the model and the validity of the instruments used for the estimation gives us the value of chi-2 equal to 0.53 with a p-value equal to 0.768. This p-value is greater than the significance level of 5%, which allows us to affirm that the model is over-identified and that all the instruments used for the estimation are valid. Arrelano and Bond's first and second order autocorrelation test gives us values of Z respectively equal to -1.68 and –0.65 with respective p-value of 0.094 and 0.514.

These p-values are all greater than the significance level of 5%, which allows us to affirm that there is no autocorrelation of orders 1 and 2. The probability associated with the wald statistic (prob>chi2) is less than the threshold of 5%. This implies that the selected variables significantly explain the variations in the real interest rate in the franc zone. Table 3 shows the results of the effect of private investment on the real interest rate in the franc zone.

Based on the results presented in Table 3, the following comments are made regarding the model variables:

Column (1) shows that the lagged variable (TIR(-1)) has a positive and significant impact at 5% level of significance on the current year interest rate. This result corroborates our expectations. It is in line with that of Mathis [5]. An increase of one unit of the lagged interest rate results in an increase of 1.023 units of the real interest rate for the current year. Thus, the improvement in profitability could generate largely positive real interest rate.

Table 3. Effect of private investment on real interest rate in the franc zone

Variables	(1) TIR	(1.a) TIR	(1.b) TIR
$TIR_{(-1)}$	1.023**	0.0935	0.137**
	(0.408)	(0.0957)	(0.0571)
IPR	-2.476***	-5.215	-3.677*
	(0.732)	(4.100)	(2.198)
IPU	2.791***	0.229***	0.879***
	(0.811)	(0.0430)	(0.272)
DPU	23.249***	0.347	1.069**
	(8.443)	(0.387)	(0.504)
MMO	-1.568	-1.215	-3.169
	(1.303)	(3.128)	(2.125)
CRO	0.229*	0.0612***	0.0910***
	(0.138)	(0.0225)	(0.0254)
INST		7.106*	-2.489
		(4.147)	(2.928)
IPR*INST			0.805***
			(0.269)
Constant	-472.928	22.83**	-4.102
	(161.734)	(11.63)	(15.22)
Observations	525	299	299
Number of countries	15	15	15
Wald chi 2	20.85	270.84	320.43
prob>chi 2	0.002	0.0000	0.0000
P-value test AR1	0.09	0.068	0.045
p-value test AR2	0.51	0.205	0.152
P-value Sargan test	0.76	0.999	1.000

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Source: Authors from stata

Private investment (IPR) has a negative and significant influence at 1% threshold on the real interest rate. This result is contrary to our expectations. This result contradicts that of Desroches and Francis [2]. It could be attributed to a weak dynamism of private investment in the franc zone, or even to the anemia that characterizes investment demand [3]. In the franc zone, private investment remains low and this is due to the constraints faced by the private sector such as an unattractive business climate. However, Robinson (1965) argues that a low interest rate policy promotes investment and economic growth. From the same perspective, Chandavarkar (1971) argue that fixing interest rate at appropriate levels ensures the desired investment in volume and composition. According to him, the interest rate must be kept at low levels to stimulate investment. On the other hand, Mc Kinnon (1973) and Shaw [10] have shown that low interest rate levels do not promote capital accumulation and economic growth. For them, low interest rates can stimulate investment demand but, however, because of their low level, they cannot generate the savings necessary to meet this new demand created. This results in a decrease in investment. For these reasons, these authors advocate financial liberalization. By developing the theory of financial repression, they succeeded in showing that interest rates kept at low levels could have harmful effects on savings.

Public investment (IPU) influences positively and significantly at 1% threshold real interest rate. This result confirms our expectations. Thus, all other things being equal, an increase in public investment by one unit results in an increase in the real interest rate of 2.791 units. This result is in line with those of Knight and Masson [6], Desroches and Francis [2]. Thus, given the budget deficit faced by most African countries in the franc zone, their investment needs would push the real interest rate upwards and this, as other studies have shown, inhibits the private sector activities.

Public debt influences positively and significantly at 1% threshold real interest rate. This result confirms our expectations. This result is in line with the one of Mathis [5]. Thus, an increase in the public debt deteriorates the current account through the induced increase in income; the increased need for financing requires, to be satisfied, an increase in the interest rate.

The money supply has a negative but not significant effect on the real interest rate. The sign obtained confirms our expectations. The non-significance of the coefficient of this variable can be explained by the fact that the countries of the franc zone are poor and the money supply evolves slowly and therefore, it is unlikely that it will lead to significant variations in the interest rate in near future [2].

Economic growth exerts a positive and significant effect at 10% on real interest rate. This result confirms our expectations. It corroborates that of Mathis [5]. Thus, an increase in real GDP by one unit causes the real interest rate to increase by 0.229 units. Although economic growth remains weak in the majority of the countries of the franc zone, actions are being taken with a view to advancing it and in this momentum, interest rates could move upwards.

The institution as well as the private investment*institution cross variable have a positive and significant influence on the real interest rate respectively at 10% and 5% threshold. These results confirm our expectations. They corroborate those of Acemoglu and Linn [7] and Nizar (2011).

4. CONCLUSION

In this study, we were concerned with evaluating the effect of private investment on real interest rate in franc zone. To attain this objective, we used system Generalized Method of Moments (GMM). The results obtained show that private investment has a negative and significant influence on the real interest rate in the CFA franc zone. Furthermore, it appears that public investment has a positive and significant influence on real interest rate. Other variables having a positive and significant influence on the real interest rate are: the lagged real interest rate, public debt, economic growth, institution as well as a cross variable private investment *institution meanwhile money supply influences negatively the real interest rate but non-significantly.

In view of the results obtained, we suggest that the African countries of the franc zone vigorously pursue the establishment of conditions favorable to the development of the private sector. Public policies for improving private investment should be promoted: improving the business climate, ameliorate political environment, fight against terrorism ravaging part of Africa including Mali. Although it is necessary to intensify strategies for attracting foreign direct investment, it is above all

necessary to strengthen local private investment and boost its dynamism.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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