



Munich Personal RePEc Archive

# **External debts and real exchange rates in developing countries: evidence from Chad.**

Kouladoum, Jean-Claude

Université de Sarh

12 August 2018

Online at <https://mpra.ub.uni-muenchen.de/88440/>  
MPRA Paper No. 88440, posted 19 Aug 2018 02:32 UTC

# External debts and real exchange rates in developing countries: evidence from Chad

KOULADOUM Jean-Claude\*

*Department of Economics*

*University of Sarh, Chad*

**Abstract:** The objective of this work is to analyze the effect of external debt on the real exchange rate in Chad from 1975 to 2014. The generalized method of moment is used. Findings show that external debt positively and significantly affect the real exchange rate at 5% significant level. Moreover, debt servicing affects negatively and significantly real exchange rate. The main recommendation goes to Chadian government, it should adopt a budgetary policy, in such a way to reorient its debt towards economic sectors that is able to boost economic growth and reinforce the strategies contribute re-equilibrate industrial activities.

**Key words:** external debts, real exchange rate, debt servicing, economic growth.

**Classification JEL** – F3, 31

## 1. INTRODUCTION

External borrowing is a normal economic transaction which allows both domestic and foreign economies to proceed to mutual profitable exchanges; such opportunities cannot occur into closed economies. During the last two decades, most developed economies' history has been marked by the burden of indebtedness. Debt crises in developing countries have become that crucial as a major preoccupation for multi-lateral borrowers (PNUD, 2011) and during industrialized countries heads of states summits. In this light, most governments are facing with

---

\*Corresponding author. Email : [kouladoum@gmail.com](mailto:kouladoum@gmail.com)

The author is grateful to, Professor Babacar SENE and Dr Arsène Aurélien NJAMEN KENGDO for their comments and suggestions.

a hostile environment in the process of economic and social development such as huge external deficits, accumulations of arrears on previous debts and very low rates of economic growth.

This economic and financial weakness require a particular attention in an economy like Chadian one where natural resources represent government's major source of income since 2003 (Acheik, 2016). Since 2011, the price of petrol was continually going down over world market (as the price of petrol fell from 134 USD per barrel between 2008 and 2009 to 60 USD per barrel in 2015). The situation is devastating as we observe that during this same period when the government finds it difficult to maintain its budget equilibrium due to falling oil revenues, public expenditure is greatly increasing due to massive external military spending and humanitarian intervention in countries like Mali, Central African Republic, the Nigerian-Cameroonian frontier, as well as the massive arrival of refugees from Central Africa and Sudan.

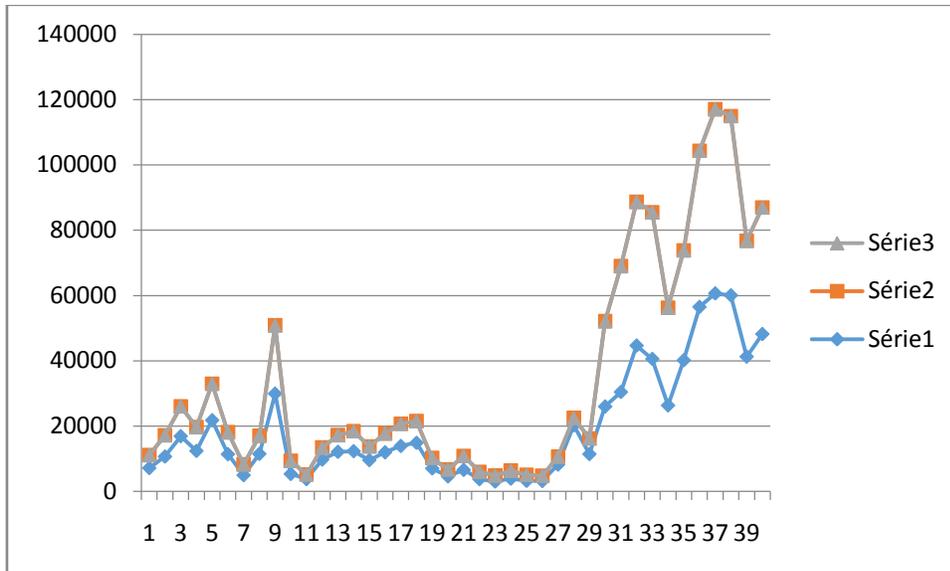
One of the major challenges of the Chadian government is to meet the nutritional needs of its growing population and assuring sustainability. The state's budget depends essentially on taxes payed by households and enterprises. In such a situation, *ceteris paribus* a monetary policy will inevitably lead to inflation both in the long run and short run (since the additional money created or supplied is not fitting, any demand in the economy). A fiscal policy on the other hand will deteriorate the economic situation as an increase in taxes will represent a danger for the economy (firms will reduce their investments while households will reduce their consumption, leading the economy into a total crisis). Mobilize national savings won't be a solution to the gloominess of the economy. In such a context, external borrowing may be best solution.

Therefore, external borrowings reach considerable proportions in Chad. Indeed debt-to-GDP ratio increased from 19.30% in 2011 to 20.52% of GDP in 2014. But these debts are contracted in foreign currencies whose exchange rates highly fluctuate. Moreover the real exchange rate for Chad moved from 5.6% in 2011 to 1.4% in 2014. In such a context, it's important to question the link between indebtedness and real exchange rates. Therefore; this study main question will be: is there a link between external debts and real exchange rates in Chad?

## **2. STYLISTED FACT**

Chad is one of the poorest economies in the world as it is ranked 194 out of 196 countries. According to the United Nations Development report, the Human Development Index (IDH) is

around at 0.37%. More than half of the country's population lives below the poverty threshold and life expectancy is 50 years hold. The bellow figure shows the evolution of external debt stocks and the debt servicing in US dollars for the Chadian economy.



Source: Author

### 3. LITERATURE REVIEW

Here, we are going to present both the theoretical and empirical works on external debts and real exchange rates.

#### 3.1 THEORITICAL LITERATURE REVIEW

The economic literature around this subject is shared between two schools of thought including Keynesian and classical school. According to the classical school of thought, an external debt is considered as a tax which can be detrimental to the economy in the long run. Citizens will see this indebtedness as a tax which is differed and will behave as if they were constraint to pay these taxes in the future no matter the intergenerational lag (Barro, 1990; Feldstein, 1982).

On the other hand, the Keynesians argue that external debt has neither short run nor long run negative effects on the economy; this is due to the new investments which are created through these debts.

Just like Keynesians, Neokeynesians support the necessity for public indebtedness to relaunch the economy. Following this school of thought, Alesina and Tabellini (1989) elaborates the idea of electoral strategies using debts. On the other side, Alesina and Drazen (1991) explain indebtedness through various fiscal regimes.

In the meantime, Leeper (1991) and Woodford (1995) argue that the general level of the price is the only variable which could adjust the real values of external debts and the future anticipated sum of actualized budget balances.

### **3.2 EMPIRICAL LITERATURE REVIEW**

The impact of external debts on real exchange rates is not a subject where literature is abundant, especially for developing countries. The majority of authors concerned in this matter support the view of existence of a positive effect of external debts on the real exchange rates. The other authors argue that the effect is negative, while some explain that those effects are insignificant.

Stein and Lim (1995) introduced the model which is appropriate to a small open economy. According to them, there exist two detrimental effects of real exchange rates. The medium-term effect (exchange rates and productivity) and the long run effect (capitalistic intensity and external debts). An increase in consumption rates on real equilibrium exchange rates (with a constant value of investments) constant will lead to a fall in national savings and an increase in interest rates. This situation attracts capital into the country which increases the real exchange rates and deteriorates the current balance of the country. Therefore the real exchange rate disequilibrium may in the long run which finally leads to a progressive increase in external debt.

In the same framework, these authors developed a second model where external debts enable to finance commercial deficits (Fabella, 1996). Using Taylor's procedure, Fabella finds out that in the presence of a commercial deficit financed by an external debt, the real exchange rates considering only current prices remains undervalued.

Some other authors introduced internal equilibrium in their analysis. This gives a best overview on the relation between external debts and real exchange rates (Mongardini, 1998), Sekkat and Varoudaki, 1998), Milesi-Ferreti and Lane, 2000)). They showed that the maladjustments of real exchange rates in sub-Saharan countries is due to the huge accumulation of the external debts. They introduced micro economic principles in a newly open macro economy and have shown

that the real exchange rates of creditor countries keep increase while the exchange rates of borrowing countries are depreciating.

In addition, Ajavi (2000) in the analysis of external debts in Nigeria using a macroeconomic approach examined the amount, source, type and composition of these debts. He derives in place indices allowing measuring the weights of these debts. He distinguishes between the internal and external factors which influences the accumulation of debts. The author also identifies the changes an the international environment order to reduce the debt burden. After analysing the economic structure and the political history of the Nigerian economy, his work concludes that the Nigerian debt crises is due to structural defiance inherent to the economy.

On the opposite way, Sene (2005) investigates the relationship between external indebtedness of developing countries and the equilibrium real exchange rates. Using an extension of Obstfeld and Rogoff (1995)'s model, the latter shows that the debt overhang tends to increase the long run equilibrium real exchange rate (see Krugman, 1979), Sargent and Wallace (1982). The relationship between indebtedness and real exchange rate equilibrium is got thru the internalization of the economy's growth rate.

#### **4. METHODOLOGY**

Here, the paper presents the techniques used for the analysis and the model to estimate.

##### **4.1 NATURE AND SOURCE OF DATA**

The study considers the Chadian economy. Data come from the World Bank's data base (world Development Indicators 2015) and the International Monetary Fund database (last update 2015). The study period is from 1975 to 2014.

##### **4.2 SPECIFICATION OF ECONOMETRIC MODEL**

This study empirical model is based on that of Amano and Norden (1993) and is presented as follows:

$$TCR_t = \beta_0 + \beta_1 Dext_t + \beta_2 G_t + \beta_3 Invest_t + \beta_4 M2_t + \beta_5 OUV_t + \beta_6 Sdt_t + \mu_t \quad (1)$$

Where:

The endogenous variable is real exchange rate ( $TCR_t$ ) and the explanatory variables include:

External debts ( $D_{ext}$ ), government spending's ( $G_t$ ), investments ( $Invest_t$ ), the money supply ( $M2_t$ ), degree of economy openness ( $Ouv_t$ ) and external debt servicing ( $Sdt$ ).

Few modifications have been made to the initial model. This is to meet up with the objective of the study and the data availability.

#### 4.3 THE GENERALISED METHOD OF THEMOMENTS

The study will use the generalized method of the moments (GMM) to estimate the effects of external debts on real exchange rates. This method is used when the explanatory variables are assumed to be exogenous (meaning that  $Cov(x_t, \varepsilon_t) = 0$ ) and the residual variance-covariance matrix is such that  $E(\varepsilon_t, \varepsilon_t^*) = \sigma^2 I$ .

The results are presented in the following section.

### 5. PRESENTATION OF RESULTS

The Augmented Dickey Fuller and Philips Perron test for stationarity shows that the variable TCR is significant at 1% variables, G, INVEST,  $M_2$  et OUVT have a 5% significance level while SDT is significant at a 10%. External debt is stationary at first difference with a significance level of 1%. The study also finds the absence of auto correlation and the residuals are homoscedastic.

#### Regression table using the generalized method of the moments

Method: Generalized Method of Moments	
Dependent Variable: TCRT	
Debt to GDP ratio	2.559301 (2.651967)
Gouvernement spending (G)	-2.055512 (-1.893831)
Investment to GDP ratio	-0.427782

		(-0.261372)
Money Supply	1.980920	
(M2)		(0.437307)
Deegree of	0.681393	
economy		(0.932721)
openess		
(OUVT)		
External debt	-0.000858	
servicing (SDT)		(0.3018)
J-statistic = 29.06965		
Prob(J-statistic) = 0.000631		
Instrument rank= 16		
Included observations: 37		

**Source: Authors' calculations using Eviews7**

The values in brackets represents the t student statistic standard deviation with \* significance at 10%, \*\* significance at 5% and \*\*\* significance at 1%.

We observe that:

External debt has a positive effect on real exchange rate with a 5% significance level. This is line with the works of Ioya (1999), Milesi *et al* (2000), Ajavi (2002), Patillo *et al* (2002) and Lawin (2008). Indeed, in the Chadian economy, a 1% variation in external debts, leads to 2.55% increase in real exchange rate.

Another interesting result that public spending. It has a negative effect on real exchange rate this relation is significant at 10%. This means that if government spending change by 1%, real interest rate will fall by 2.055% at a 10% significance level.

Domestic investment has a negative but insignificant effect on real exchange rates. This may be linked to the costly and lengthy procedure involved in the creation of enterprises.

On the order side money supply mass has a positive and insignificant effect on real exchange rate which is explained by the fact that commercial banks are facing over liquidity this into an environment of credit rationing.

The degree of economy openness has a positive but insignificant effect on real exchange rates. Such a result is linked to the restricted environment (due to its hemmed-in position) of the Chadian economy and the lack of diversification of trading partners as well as exports.

Debt servicing one its side has a negative and significant effect on real exchange rates. This is in line with the works of (Patillo *et al* 2002) and (Adoum, 2006). Meaning that if debt servicing increases by 1%, real exchange rate will fall by de 0,000858%.

## **6. CONCLUSION AND ECONOMIC IMPLICATIONS**

This study investigates the effects of external debts on real exchange rates. It used the Generalized Method of Moments estimation technique and the study period is from 1975 to 2014. The study main finding suggests that external debts positively and significantly affect real exchange rates.

Main recommendation goes to public authorities in charge of policies improvement. The study therefore recommends reducing debt stock levels when economic conjunctions become favorable while keeping an efficient debt management policy.

## **REFERENCE**

- ACHEIK, I. (2016) Tchad une économie malade. *Journal de l'économie Afrique-Asie*. Vol, 50.
- ADOUM, M. (2006) L'impact de l'endettement extérieur sur la croissance économique : analyse du cas de la cote d'ivoire, Mémoire pour l'obtention du Diplôme d'Etudes Approfondies (DEA) en Sciences Économiques, FSEG, Université CHEIKH ANTA DIOP de Dakar (UCAD), Sénégal.
- AJAVI SALON, I. (2002) Macroeconomic Approach to external Debt: The case of Nigeria. Washington, D.C., IMF n° 8

ALESINA, A DRAZEN, A. (1991) why are stabilizations delayed? *American Economic Review*, Volume 82, December.

AMANO, R. VAN NORDEN, S. (1993) *A forecasting equation for the Cana-UU dollar exchange rate*, Journal the exchange rate and the economy, volume 201. Pages 65.

BARRO, R. (1990) Government Spending in a Simple Model of Endogeneous Growth; *Journal of Political Economy* 98 (5) :103-125

BARRO, R. (1974) The Ricardian Approach to Budget Deficits, *The Journal of Economic Perspectives*, vol 3, pp.37-49.

BEKOLO, E. (1984) Les effets positifs et négatifs de l'endettement extérieur : cas de l'Afrique noire, séminaire DECTA III—TOME-V sur l'endettement et le développement, Université de Bordeaux I, pp 108-123.

BOURBONNAIS, R. (2009) *Econométrie : Manuel et exercices corrigés*, 7<sup>ème</sup> édition, Dunod, Paris, France.

FABELLA, R. (1996) The Debt Adjusted Real Exchange Rates, *Journal of International Money and Finance*, Volume 3 page 475-484.

IOYA ,M. (1999) External debt and Economic Growth in sub-Saharan African Countries: in econometric study, Nairobi AECR.

KASSE, M. (1992) *L'Afrique endettée*, Edition NEAS-CREA. Page133.

KONSO BOLA A. (2005) Les effets de la dette extérieure sur et les investissements dans les PPTÉ africains : une analyse par la méthode des moments généralisés (GMM), Mémoire présenté en vue de l'obtention de la Licence en Économie Mathématique, FESG, Université de Kinshasa, République démocratique du Congo.

KRUGMAN, P. OBSTFELD, M. (2009) *Economie internationale*, 8<sup>è</sup> édition, publié par Pearson Education. P.713.

LANE, P. MILESI, F. (2000), The Transfer problem revisited: net foreign assets and real exchange rates, *CEPR discussion Paper* N° 2511

LAWIN, K. (2008) Analyse des déterminants de l'endettement extérieur public des pays à faible revenu: cas du Benin, Mémoire présenté en vue de l'obtention du master en Économie Publique et Statistique appliquée, Institut de Recherche Empirique en Économie Politique (IREEP), République du Benin.

LUKUNDA, N. (2012) Dette publique extérieure, taux de change réel et croissance économique dans les PPTE africains. Mémoire présenté en vue de l'obtention de la licence en Économie Mathématique, FESG, Université de Kinshasa, République démocratique du Congo.

MALCOLM, G. DWIGHT, P. Michael, R. et SNODGRASS, D. (1998), *Economie du développement*, De Boeck, Bruxelles.539-540.p

MILETT, D. TOUSSAINT, E. (2002) *50 questions / 50 réponses sur la dette, le FMI et la Banque mondiale*, CADTM Bruxelles/Paris-Syllepse.

MILETT, D. TOUSSAINT, E. (2011) *65 questions / 65 réponses sur la dette, le FMI et la Banque mondiale*, CADTM Bruxelles/Paris-Syllepse.

MUKOKO, S. (2012) Les objectifs du millénaire pour le développement: portée, importance et perspectives, Contribution à la réalisation des objectifs du millénaire en République du Congo, Editions Universitaires Africaines, IRES, pp.32-43.

PARAPONARIS, S. (1996) *Dette publique et taux de change réel dans les pays du G7 sur les deux dernières décennies*, En Economie des taux de change, Persée, pp.67-96.

PATILLO, C. RICCI L, P. (2002) Dette extérieure et croissance, Finances et développement, *Publication du FMI*, juin.

PIRION, J. (2003) *Lexique des Sciences Economiques et Sociales*, Collection (Repères : 202), la découverte, 6<sup>ème</sup> Edition, Paris

PNUD (2011) Rapport mondial sur le développement humain.

SENE, B. (2005) Impact du fardeau virtuel de la dette sur le taux de change réel d'équilibre des pays en développement: un modèle théorique, *Cahiers de recherche EURISCO* Novembre 2005, numéro 29.

SIDIKI, T. (2005) L'analyse des déterminants de l'endettement extérieur public des pays en développement, Mémoire de Master en Macroéconomie appliquée, FSEG, Université de Ouagadougou, Burkina.

WDI (2015) *World Development Indicators Data*, [www.worldbank.org/data](http://www.worldbank.org/data)

YAMB, E. (2007) Mésalignements et Dynamique de Convergence du taux de change réel en zone CFA, Thèse de Doctorat en Sciences Economiques, FSEG, Université de Paris 1-Panthéon Sorbonne, France.

YAPO, L. (2002) Les déterminants de l'endettement extérieur des PPTTE : cas de la cote d'ivoire, World Institute for Development Economics Research, Discussion Paper n° 2002 /14.

## ANNEXES

### Unit root tests

Variables	ADF		
	A Niveau	Différence première	Degré d'intégration
Dette	-1.28	-4.67***	I(1)
G	-2.57**		I(0)
INVEST_PIB	-2.36**		I(0)
M2	-2.46**		I(0)
OUVT	-2.09**		I(0)
SDT	-1.86*		I(0)
TDE	-0.76	-10.22***	I(1)
TCR	-5.72***		I(0)

## Heteroskedasticity tests

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)		
Date: 05/10/16 Time: 06:44		
Sample: 1975 2014		
Included observations: 38		
Joint test:		
Chi-sqdf	Prob.	
482.8850	462	0.2423

Individual components:					
Dependent	R-squared	F(22,15)	Prob.	Chi-sq(22)	Prob.
res1*res1	0.417230	0.488143	0.9385	15.85473	0.8230
res2*res2	0.788668	2.544474	0.0335	29.96939	0.1192
res3*res3	0.684216	1.477311	0.2205	26.00021	0.2517
res4*res4	0.573296	0.916054	0.5844	21.78526	0.4728
res5*res5	0.709499	1.665223	0.1562	26.96096	0.2127
res6*res6	0.514178	0.721614	0.7628	19.53877	0.6119
res2*res1	0.562438	0.876401	0.6202	21.37263	0.4978
res3*res1	0.660608	1.327124	0.2900	25.10312	0.2922
res3*res2	0.543491	0.811731	0.6798	20.65267	0.5423
res4*res1	0.733770	1.879194	0.1058	27.88326	0.1796
res4*res2	0.738161	1.922140	0.0980	28.05011	0.1740
res4*res3	0.793088	2.613390	0.0300	30.13734	0.1152
res5*res1	0.661210	1.330690	0.2881	25.12597	0.2911
res5*res2	0.523641	0.749492	0.7373	19.89834	0.5894
res5*res3	0.676664	1.426880	0.2418	25.71323	0.2642
res5*res4	0.810747	2.920854	0.0184	30.80837	0.1001
res6*res1	0.698083	1.576482	0.1838	26.52717	0.2297
res6*res2	0.592963	0.993260	0.5176	22.53261	0.4285
res6*res3	0.810832	2.922489	0.0184	30.81163	0.1000

res6*res4	0.778193	2.392103	0.0432	29.57132	0.1293
res6*res5	0.768043	2.257596	0.0543	29.18563	0.1396

### VAR residual serial correlation LM tests

VAR Residual Serial Correlation LM Tests		
Null Hypothesis: no serial correlation at lag order h		
Date: 05/10/16 Time: 06:43		
Sample: 1975 2014Included observations: 38		
Lags	LM-Stat	Prob
1	28.99033	0.7901
2	33.74194	0.5764
3	48.15648	0.0847
4	26.20015	0.8849
5	31.47311	0.6837
6	62.45103	0.0041
7	38.01904	0.3775
8	33.20963	0.6020
9	49.73394	0.0636
10	26.68785	0.8706
11	35.61987	0.4865
12	39.32235	0.3234
Probs from chi-square with 36 df.		

## Generalized method of moments estimation

Dependent Variable: TCRT				
Method: Generalized Method of Moments				
Date: 05/17/16 Time: 10:48				
Sample (adjusted): 1978 2014				
Included observations: 37 after adjustments				
Estimation weighting matrix: Two-Stage Least Squares				
Standard errors & covariance computed using estimation weighting matrix				
Instrument specification: TCRT TCRT(-1) DETTE_PIB G INVEST_PIB				
LOG_SDT M2 OUVT TCRT(-2) DETTE_PIB (-1) G(-1) INVEST_PIB(-1)				
LOG_SDT(-1) M2(-1) TCRT(-3) OUVT(-1)				
Constant added to instrument list				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DETTE_PIB	2.559301	0.965058	2.651967	0.0127
G	-2.055512	1.085372	-1.893831	0.0679
INVEST_PIB	-0.427782	1.636678	-0.261372	0.7956
M2	1.980920	4.529812	0.437307	0.6650
OUVT	0.681393	0.730543	0.932721	0.3584
SDT	-0.000858	0.000393	-2.183113	0.0370
C	129.6522	123.3946	1.050712	0.3018
R-squared = 0.224846		Meandependent var = 26.30615		
Adjusted R-squared = 0.069815		S.D. dependent var = 54.95316		
S.E. of regression = 53.00018		Sumsquaredresid = 84270.57		
Durbin-Watson stat = 2.381057		J-statistic = 29.06965		
Instrument rank = 16		Prob(J-statistic) = 0.000631		