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External Debts and Real Exchange Rates in Developing Countries: Evidence from Chad

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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 moments is used. Findings show that external debt positively and significantly affect the real exchange rates 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 are able to boost economic growth; and reinforce strategies that contribute to re-equilibrate industrial activities.
Keywords: External debt; Real exchange rate; Debt servicing; Economic growth.

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 has become that crucial as it's a major preoccupation for multi-lateral borrowers (Pnud, 2011) and during industrialized countries heads of states summits . In this light, most governments are facing 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 requires a particular attention in an economy like Chadian one, where natural resources represent the government's major source of income since 2003 (Acheik Ibni, 2016). Since 2011, the price of petrol was continually going down over world market (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. 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 and short run (the additional money 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 crisis). Mobilise national savings won't be a solution du to the gloominess of the economy. In such a context, external borrowing may be the 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 theses 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 research question will be: is there a link between external debts and real exchange rates in Chad?

2. Stylised 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 old. The bellow figure shows the evolution of external debt and the debt servicing in US dollars for Chadian economy.

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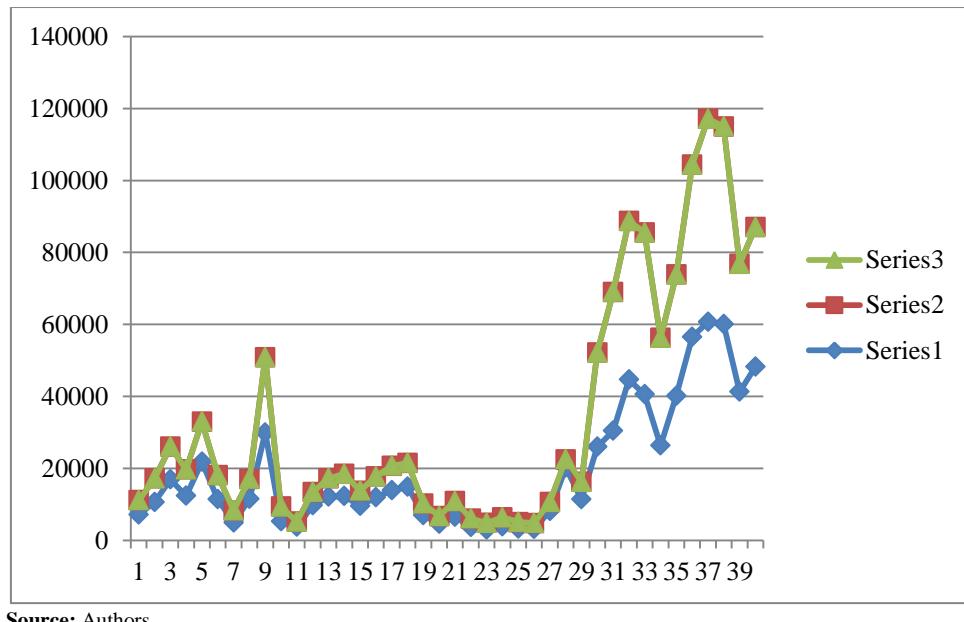
Source: Authors

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 inter-generation 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, Neo-Keynesians supports 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) explains indebtedness thru various fiscal regimes.

In the meantime, Leeper (1991) and Woodford (1995) argue that the general level of price is the only variable which could adjust the real values of external debts to 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 the existence of a positive effects of external debts on real exchange rates. The other authors argue that the effect is negative, while some explains that those effects are insignificants.

Stein and Lim (1995) introduced a model which is appropriate to a small open economies. 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) 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 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 external debt, real exchange rates considering only current prices remains under evaluated.

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 Varoudakis, 1998); (Lane and Milesi, 2000). They showed that the maladjustments of real exchange rates in sub-Saharan countries is due to huge accumulation of external debts. They introduced microeconomic principles in a newly open macro economy and have shown that the real exchange rates of creditor countries keeps increase while the exchange rates of borrowing countries is depreciated.

In addition, Ajavi (2002) in the analysis of external debts in Nigeria using a macroeconomic approach examined the amount, source, type and composition of these debts. He derives indices allowing to measure 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 required into an international environment in order to reduce the debt burden. After

analysing the economic structure and the political history of the Nigerian economy, its 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 RogoffK (1995)'s model, the latter shows that the debt overhang tends to increase the long run equilibrium of real exchange rate (Krugman, 1979; Sargent and Wallace, 1982). The relationship between indebtedness and real exchange rate equilibrium is got thru the internalisation 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 (WDI, 2015) and the International Monetary Fund database (last update 2015). The study period is from 1975 to 2014.

4.2. Specification of the Econometric Model

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

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

Where:

The endogenous variable is real exchange rate (TCR_t) and the explanatory variables include: external debts ($Dext$), government spending (G_t), investments ($Invest_t$), money supply ($M2_t$), degree of economy openness ($Ouvt_t$) 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 Moments

This study uses the generalized method of 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 $Cov(xt,\varepsilon t) \neq 0$) and the residual's variance-covariance matrix is such that $E(\varepsilon t , \varepsilon^*) \neq \sigma 2I$.

The results are presented in the following section.

5. Results

The Augmented Dickey Fuller and Philips Perron test for stationarity show that the variable TCR stationarity is significant at 1%. Variables: G, INVEST, M_2 and 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 find the absence of autocorrelation and the residuals are homoscedastic.

Table-1. Result of real exchange rate GMM's estimation

Method: Generalized Method of Moments Dependent Variable: TCR (Result of real exchange)	
Debt to GDP ratio	2.559301 (2.651967)
Government spending (G)	-2.055512* (-1.893831)
Investment to GDP ratio	-0.427782 (-0.261372)
Money Supply (M2)	1.980920 (0.437307)
Degree of economy openness (OUVT)	0.681393 (0.932721)
External debt servicing (SDT)	-0.000858** (0.3018)

J-statistic = 29.06965
Prob(J-statistic) = 0.000631
Instrument rank= 16
Included observations: 37
Source: authors' calculations using Eviews

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 in line with the works of Ioya (1999), Lane Philip and Milesi Ferreti (2000), Ajavi Salon (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 is that of 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 other side, money supply 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 on 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 increase 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 uses Generalized Method of Moments estimation technique; and the study period is from 1975 to 2014. The study main finding suggest that external debts positively and significantly affect real exchange rates.

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

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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)

Heteroscedasticity 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 of TCR

Dependent Variable: TCR				
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		