

Economic Restrictions and Currency Performance: Evidence of African Countries

Alex Adegboye (✉ adegboyea1@gmail.com)

Covenant University <https://orcid.org/0000-0003-1241-2224>

Ochei Ikpefan

Covenant University

Adebusola Oyegoke

Covenant University

Stephen OJEKA

Covenant University

Ibukunoluwa Adeyanju

Covenant University

Research

Keywords: Real exchange rate, currency performance, economic sanctions, quantile regression

Posted Date: March 18th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-316707/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

This study explores the impact of diverse economic restrictions on currency performance. We assess a panel dataset of 30 African countries for the period 1990–2010. Our empirical evidence is based on the fixed effect regression and the Quantile regression approach. We find that the United States, European Union, economic and intensity sanctions weaken the real exchange rates. However, we establish that the U.N. sanctions are insignificant. As for the policy implication, sanctioned countries should implement a policy that could mitigate the adverse consequences of economic restrictions on currency performance.

Introduction

Currency performance is mostly used interchangeably with the real effective exchange rate. Generally, the exchange rate system could either be fixed or floating. Under the fixed policy, the exchange rate movement is usually covered by the government, while the forces of demand and supply determine the equilibrium exchange rate under the floating system. The floating system implies that the higher demand currency appreciates while the high supply currency depreciates. Aside from the consumer price index that is the inflation rate, the exchange rate is mostly used to determine a country's economy's soundness. The exchange rate is considered a critical investment factor whose fluctuations could affect the economy's competitiveness in the global market, the economic stability, and even the prices of finished products (Antonakakis & Kizys, 2015). Similarly, regular currency swaps are dispersing in the cross-border investment and international trade, which underlines the importance of exchange rate stability.

Existing literature has identified diverse exchange rate movement determinants. It is argued that remittance affects the exchange rate, which results in currency fluctuations. The massive remittance inflows are never problematic to the broad economy since such inflows could be easily absorbed. However, the situation differs for the small economy, especially the developing countries whose massive remittance absorption is not compatible (Rana, Anik, & Biplob, 2019). Intuitively, the negative effect of the remittance on the exchange rate is evident when the foreign currency received in the home country exceeds the domestic currency, and the foreign currency is used for purchases of products and assets instead. The gross domestic product has been identified as one of the determinants of exchange rate movement. This implies that GDP stability strengthens the value of a currency (Ramasamy & Abar, 2015). Alternatively, high exchange rate volatility could disrupt investment decisions, which surge uncertainty in the economy. Oaikhen & Aigheyisi (2015) emphasize that such risk instigated by the volatility could negatively influence economic growth through dampening the international trade and capital inflows, investor assurance, productivity, and consumption. Notably, oil is measured as a leading determinant of exchange rate fluctuations (Turhan, Sensoy & Hacıhasanoglu, 2014). It is then evident that oil-producing country tends to experience domestic currency appreciation alongside increasing oil prices and vice-versa (Singhal, Choudhary & Biswal, 2019). Similarly, economic sanctions contribute to international oil shocks and foreign direct investment, influencing political policies (Dizaji, 2014; Wang, Wang, & Chang, 2019).

There remains limited literature exploring the outcomes of sanctions, especially in Africa. Africa has experienced more sanctions from the United Nations, the European Union, and the United States than other continents (United States Institute of Peace, 2016). Most restrictions are targeted towards resolving conflicts, disrupting democracy, or penalty for gross violations of human rights. Recently, the U.S. Department of State announced its imposition of travel restrictions on Nigerians that destabilize democracy in the February and March 2019 general elections. Again, following the 2015 outbreak of the violent crisis in Burundi, the European Union and the United States placed sanctions on the country. The outbreak was caused by the announcement of President Pierre Nkurunziza seeking the third term in office. Travelling bans and asset freezes were imposed by the E.U. and the U.S., respectively, on people obstructing the stability and peace of Burundi.

Similarly, the United Nations has imposed an arms embargo and freezing of assets on Somalians that deemed to have disrupted the stability of Somalia since 1992. In addition, the U.S. also imposed various sanctions to tackle the security deterioration in Somalia and asset freezes on Somalians associated with Al-Shabaab, the terrorist organization. Although Somalia held a general election in January 2013 in which the U.S. officially recognized the new government. However, the U.S. prolonged its measures on Somalia for a further year in April 2018.

In addition, these restrictions have been recently substituted with economic sanctions, which tend to harm the targeted countries. Economic sanctions are coercive procedures between political pressure or extreme military interference (Wang et al., 2019). The economic restrictions often entail the extraction of typical trade and financial dealings for security and financial policy purposes. The recent sanctions imposed on Venezuela and its economic reaction to such sanctions have surged the academic and policymakers' interest in how economic sanctions seemingly distress the target, sender, and the surrounding economies. However, little is known on how exchange rates react to economic restrictions in Sub-Saharan Africa, and this study leans towards filling the knowledge gap in the literature. Since the stable exchange rate influences the balance of payments and the macro-economy performance, accurately identifying the impact of economic sanctions on currency performance, especially in Sub-Saharan Africa, has essential policy implications.

The research closest to our study is Wang et al. (2019) that concludes that plurilateral sanctions, sanctions intensity, and the E.U. sanctions positively influence the exchange rate volatility for 23 target countries, while unilateral and the U.S. sanctions have no significant effect on the exchange rate volatility. We depart from Wang et al. (2019) in three ways. First, contrary to the use of exchange rate volatility and arguments surrounding the estimation of exchange rate volatility (Kilicarslan, 2018; Ofori, Obeng, & Armah, 2018), we use the real effective exchange rate index computed by the World Bank in which an increase represents an appreciation of the local currency and vice-versa. Second, instead of considering a country-specific or cross-regional study, we restrict the scope of this study to Africa that is faced with multifaceted challenges (Ojeka et al., 2019). Lastly, this study employs diverse estimation strategies, which include Fixed Effect Regression and Quantile Regression. The fixed effect controls the observed heterogeneity via fixed effects regression, while the Quantile regression approach is employed to consider

the initial levels of exchange rate movement. With Quantile regression, exchange rates are distinguished in terms of weak, static, and strong rates.

This study assesses the impact of diverse economic restrictions on currency performance. This study employs a panel dataset of 30 African countries for the period 1990-2010. The following findings are established. We find that the United States and European Union sanctions, respectively, weaken the real exchange rates, and the results disclose that the coefficients of the United States and European Union sanctions are significantly negative. This infers that with the increase of U.S. and E.U. sanctions on African countries, the target region's exchange rates weaken. In addition, we establish that the U.N. sanctions are insignificant. This infers that irrespective of the number of sanctions by the U.N., there remains frail effects on the exchange rate in the region. It is deduced that the estimate of economic sanction is negatively significant, which shows that economic sanction negatively impacts the real exchange rate of the target region. Sanction intensity is negatively significant, which infers that such intensity negatively impacts the real exchange rate of the target region.

The subsequent sections follow the identified pattern. Section 2 highlights the theoretical underpinning and review of empirical evidence. Section 3 undertakes data, while Section 4 deals with the methodology and empirical strategy. Section 5 presents empirical results and further analysis. Section 6 gives conclusions.

Theoretical Highlights And Empirical Evidence

There remain diverse reasons underpinning the imposition of sanctions. The reasons for the sanctions could be instigated for expressive or instrumental purposes, among others (Doxey, 1983). The expressionist theory avers sanctions represent channels used by the country that impose sanctions called the "sender" for communicating her displeasures on the activities of the target country (Kaempfer & Lowenberg, 1988; Lektzian & Souva, 2007). On the other hand, the theory of instrumentality suggests that restrictions are fiscal incentives intended to influence countries' decisions with an interesting aspect of deterrence and the ideology of "carrot-and-stick" (Kaempfer & Lowenberg, 1988; Drezner, 1999). In the word of Hufbauer (2007), the author asserts that "the imposition of sanctions conveys a triple signal: To the target country, it says the sender does not condone the target's actions; to allies, it says that words will be supported with deeds; and to domestic audiences, it says the sender government will act to safeguard the nation's vital interests." In this light, a strand of literature has explored the efficacy of sanctions in achieving economic and possibly political policies on the target country. These sanctions are often channelled towards influencing the target country's actions, which frequently result in a change in regimes for promoting democracy and human rights, alteration of strategic decision, counterterrorism, nonproliferation, conflict resolution, and many more (Smith, 2013). However, the direct and indirect consequences on the target country (i.e., adverse on foreign investment, economic pressure, inflation, and restrictions on trade dealings) are inherent in the sanction's imposition.

Nevertheless, the sanctions, especially economic sanctions imposed on target countries and their consequences on their currency performance, have considerably been established in the literature on finance and economics (Wang et al., 2019). There exists a bi-directional flow between sanctions and foreign exchange rate volatility. Theoretically, the model developed for the collective sanctions imposed on target countries proves that economic sanctions influence behavioural changes through economic pressure imposition (Pape, 1997). In accordance with Galtung (1967), economic sanctions could cause huge economic harm resulting in "political disintegration" of the target states, thereby forcing them to conform with the sender's requests. Intuitively, the "political disintegration" usually involves the disagreement within the country's leadership or between the leadership and the citizens as regards, which could cause economic instability. In the case of nationalism, the sanction could integrate the leadership and its citizens harmoniously to war against consequential adversity emanating from the sanctions (Galtung, 1967). Following Galtung's revised theory (i.e., "rally-round-the flag" effects), restrictions could initially encourage political integration and eventually result in political disintegration as economic restrictions surge.

From the empirical perspective, recent literature remains on the determinants of exchange rates alongside the consequential effect of sanctions (Hayakawa, Kim, & Yoshimi, 2017; Kilicarslan, 2018; Ofori et al., 2018; Rana et al., 2019; Wang et al., 2019). Interestingly, Hufbauer (2007) establishes the negative consequences of U.S. sanctions on target country foreign trade dealings. This result identifies that the decline in trade dealings is with the United States and the allies. Recent studies explore the behaviour of macroeconomic variables that are linked directly or indirectly to the target foreign direct investment (Lektzian & Biglaiser, 2013; Dizaji & van Bergeijk, 2013). It is traceable that sanctions could influence foreign direct investment or divestment. For instance, sanctions imposed on South Africa during the apartheid resulted in global divesture in the region that contributed to the apartheid extinction (Eyler, 2015).

However, little is known on how exchange rates react to economic restrictions in Africa, and this study leans towards bridging such a knowledge gap in the literature. This study broadens the literature on economic sanctions by exploring the consequential effect of diverse economic restrictions on the African experience's currency performance. Foreign exchange rate fluctuation as a macroeconomics measure specifically tends to influence the country's economic conditions rather than trade dealings or foreign direct investment (Dizaji & van Bergeijk, 2013). Based on Hufbauer (2007) study, it avers more comprehensive sanctions tend to influence international trade rather than financial or trade restrictions, we intuitively presume that if diverse comprehensive restrictions result in altering output, then a corresponding foreign exchange rate movement is expected.

Methodology

3.1 Data

The empirical estimation effectiveness is increased using panel data compared to time series or cross-sectional data because panel data tends to minimize the level of collinearity between independent variables and increase the degree of freedom (Imai, 2011). This study explores a panel dataset of 30 African countries extracted from the World Development Indicators of World Bank database and the German Institute of Global and Area Studies' Sanction Database (GIGA) for 1990-2010. The panel dataset of selected 30 Sub-Saharan Africa is based on the United States, the United Nations, and European Union sanctions. The adopted periodicity is based on the data relevance and constraint on the availability of data. Details on the variable definitions and the summary of descriptive statistics are presented in Table 1. Appendix 1 reveals the list of countries used.

3.2 Variables

3.2.1 Currency Performance

We adopt the real effective exchange rate index computed by the World Bank to capture the currency performance. The real effective exchange rate is the currency value against the weighted average of different foreign currencies. This is measured by the nominal effective exchange rate divided by a price deflator or index of cost. For Sub-Saharan Africa, the real effective exchange rate index is the nominal index adjusted for relative changes in consumer prices, while an increase represents an appreciation of the local currency and vice-versa.

3.2.2 Sanctions

There remain various forms of sanctions imposed, especially by developed economies on low-income and middle-income economies. We employ five specific sanctions, including sanctions imposed by the United States, European Union, United Nations, Economic sanctions and Intensity sanctions. The developed economies could employ measures (such as aid sanctions, financial sanctions; arms embargo; visa ban; military interruption; comprehensive trade embargo, diplomatic sanctions, commodity embargo, fight ban and freezing of financial assets) to initiate sanctions. In addition, we measure various sanctions imposed by the United States, European Union, and United Nations via dummy various or categorical variable (i.e., 0,1). First, we use 1 if the United States and 0 impose the sanction otherwise to capture U.S. sanctions. Second, we adopt 1 if European Union and 0 impose the sanction otherwise to capture E.U. sanction. Third, we input 1 if the United Nations and 0 impose the sanction otherwise to capture U.N. sanctions. Four, 1 is used to capture economic sanction if the sanctions imposed are designed to influence the target state's economy and 0 other. Lastly, sanction intensity measure ranges between 0 and 5, where 5 represents comprehensive trade embargo, 4 identifies commodity embargo and flight bans, 3 captures aid sanctions, 2 represents sanctions target towards the military, and 1 identifies sanctions target towards designated individuals and entities.[1]

3.2.3 Control Variables

We include a battery of control variables in order to account for omitted variables, namely, current account balance, lending rate, inflation and gross domestic savings. We expect that these variables tend to influence the level of the real effective exchange rate. Muller-Plantenberg (2010) asserts that the balance of payment discrepancies affects the claim for diverse currencies in the foreign exchange market, which influences the exchange rate. We anticipate that the current account balance, which is reflected by the balance of payment, will affect changes in the exchange rate. Inflation represents the average rate of price changes in the goods and services index. In accordance with the study of Ito & Sato (2008) in Indonesia avers when inflation increases, the domestic currency decline, which tend to change the trade structure while the exchange rate depreciates alongside. Existing literature has concluded that domestic saving is negatively associated with the exchange rate, signifying that domestic saving depreciates the exchange rate (Ito & Krugger, 2009). Thus, we employ domestic saving to evaluate the gross domestic saving effect on the real effective exchange rate.

[1] For more information on sanction measures, check this link
<https://data.gesis.org/sharing/#!Detail/10.7802/1346>

Model

This study employs the Fixed Effect Regression and Quantile Regression to explore economic sanctions on the real exchange rates in Africa. The fixed effect controls for the observed heterogeneity via fixed effects regression. This accounts for the possibility of cross-serial dependence together with the heteroscedasticity and serial correlation in the residuals, which is corrected by the standard errors (see Driscoll & Kraay 1998). Accordingly, we obtain our results by utilizing the fixed effects estimation strategy in the following model.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \gamma Z_i + \varepsilon_{it} \quad (1)$$

Where Y_{it} denotes the dependent variable of interest, that is, the real exchange rates. The variable X_{it} depicts the vector of explanatory variables, that is, the various sanctions imposed on the selected countries, whereas γZ_i denotes the country-level control variables and ε_{it} is the error term.

Subsequently, the Quantile regression approach is employed to consider the initial levels of exchange rate movement (i.e., the approach is used to describe the dependent variable distribution). Whereas the standard Ordinary Least Square shows the impact of the one or more independent variable on the conditional mean of a dependent variable, the quantile

model unveils the relationship between the independent variables and the condition quantiles of the dependent variable rather than the condition means of the dependent variable in the case of ordinary least square (OLS). In essence, this approach allows flexibility for data with heterogenous conditional distribution, and the regression is more robust than OLS for outliers. With Quantile regression via 0.25, 0.50, 0.75 & 0.90 quantile, our dependent variables (i.e., exchange rates) is distinguished in weak, static, and strong rates. Thus, in the Quantile regression, the initial level of real exchange rates is considered in the relationship between the various sanctions imposed on the selected countries.

Results

4.1 Summary Statistics

Table 1 indicates the descriptive statistics of variables used in the estimate analyses. Firstly, the real exchange rate movement (*logRate*) has a mean of 1.746 over the sampled period, which reveals the level of volatility with a minimum value of -2.61 and 9.828. Similarly, Table 1 reports the summary statistics of the underlying variables adopted for sanctions imposed by the United States, European Union, United Nations with economic sanctions, and the level of intensity with maximum and minimum values of 0 and 1 (refer to section 2.2.2). The mean and standard deviation of the sanctions imposed by the United States, European Union, United Nations with economic sanctions and intensity remain low, representing similar characteristics among the Sub-Saharan African countries.

Table 1: Descriptive Statistics

Variable	Description	N	Mean	Std.Dev.	Min	Max
<i>logRate</i>	The real effective exchange rate index is the nominal index adjusted for relative changes in consumer prices	627	1.746	1.291	-2.61	9.828
<i>US</i>	United States initiated economic sanctions	630	.273	.446	0	1
<i>E.U.</i>	European Union initiated economic sanctions	630	.211	.408	0	1
<i>U.N.</i>	United Nations initiated economic sanctions	630	.116	.32	0	1
<i>Economic</i>	Sanctions impact on the economy of the target economy	630	.376	.485	0	1
<i>Intensity</i>	The formal sanctions intensity	630	1.395	1.785	0	5
<i>Current</i>	Current account balance in % of GDP	435	-4.066	12.554	-147.997	42.227
<i>Lending</i>	The lending rate	367	27.236	74.462	4.737	1175
<i>Inflation</i>	Consumer price index	547	15.052	33.586	-16.117	448.5
<i>GDS</i>	Gross domestic saving in % of GDP	534	12.348	23.705	-141.974	83.287

In addition, Table 2 presents the correlation coefficients between variables. The table presents a low correlation between the variables. Thus, there exists no multicollinearity statistical problem in the models.

Table 2: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
ϑ	1									
	-0.275***	1								
	-0.340***	0.701***	1							
	-0.172*	0.244***	0.306***	1						
nic	-0.146*	0.787***	0.773***	0.506***	1					
ty	-0.202**	0.854***	0.723***	0.575***	0.932***	1				
t	-0.295***	0.0640	0.0136	0.174*	0.0397	0.0917	1			
g	0.156*	-0.0290	-0.0270	-0.293***	-0.129	-0.133	-0.261***	1		
n	0.0465	0.146*	0.0758	-0.194**	0.00596	0.0761	-0.122	0.441***	1	
	-0.124	0.116	0.197**	0.142*	0.132	0.179**	0.624***	-0.0888	0.0690	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Baseline findings

Table 3 discloses the main findings of this study using the fixed effect regression. The information criteria used for the validity of the step-wise fixed effect regression are the F-test and the coefficient of determination. The F-test reflects the combined significance of the models' coefficients, which is significant with a p-value of 0.0000. The R^2 shows the models' explanatory power with a minimum of 0.167. Based on the information criteria, the fixed effect regressions are devastatingly valid and reliable for empirical interference.

Table 3: Sanctions Imposed and Real Exchange Rate via Fixed Effect Regression

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Current</i>	0.00245 (0.00306)	-0.00115 (0.00324)	0.00396 (0.00323)	0.00197 (0.00318)	0.00142 (0.00315)
<i>Lending</i>	0.0154*** (0.00377)	0.0153*** (0.00371)	0.0159*** (0.00389)	0.0160*** (0.00381)	0.0159*** (0.00378)
<i>Inflation</i>	-0.00805*** (0.00190)	-0.00864*** (0.00184)	-0.00947*** (0.00194)	-0.00897*** (0.00189)	-0.00824*** (0.00189)
<i>GDS</i>	0.0000724 (0.00199)	-0.000148 (0.00196)	-0.000201 (0.00208)	0.00000674 (0.00201)	0.000168 (0.00199)
<i>U.S.</i>	-0.217*** (0.0625)				
<i>E.U.</i>		-0.337*** (0.0773)			
<i>U.N.</i>			-0.157 (0.169)		
<i>Economic</i>				-0.186*** (0.0650)	
<i>Intensity</i>					-0.0646*** (0.0187)
Constant	1.643*** (0.0742)	1.650*** (0.0730)	1.626*** (0.0767)	1.640*** (0.0750)	1.642*** (0.0742)
Observations	209	209	209	209	209
R-squared	0.214	0.241	0.167	0.198	0.213
RMSE	0.281	0.277	0.290	0.284	0.282
F-test	10.15	11.80	7.463	9.206	10.10
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

From Table 3, the dependent variable is proxied by real exchange rate movement, and the interesting explanatory variables include the United States sanctions, European Union sanctions, United Nations sanctions, the economic sanctions, and the level of sanctions intensity. Under Table 3, the model I & 2 show the extent to which the United States and European Union sanctions respectively weaken the real exchange rates, and the results disclose that the coefficients of the United States and European Union sanctions are significantly negative at 1% level of significance. This infers that with the increase of U.S. and E.U. sanctions on Africa, the target region's exchange rates weaken. The results are in accordance with the study of Wang, Wang, & Chang (2019), which asserts that the sanctions are more strenuous and short-term. In the short term, the target countries might not seek countermeasure to reduce the negative influence of the sanctions.

Moreover, Model 3 in Table 3 shows the estimate of U.N. sanctions. The result reports show that the coefficient of U.N. sanctions is insignificant. This infers that irrespective of the number of sanctions by the U.N., there remains frail effects on the exchange rate in the region. The insignificant impact of the U.N. sanctions could be traced to the fact that U.N. rarely imposes sanctions on the target region. The insignificance could be traced to the assertive sanctions imposed by the United Nations in the short-term period.

Under Table 3, Model 4 estimates the economic sanction. It is deduced that the estimate of economic sanction is negatively significant at a 5% level of significant, which shows that economic sanction negatively impacts the real exchange rate of the target region. This result conforms with the economic sanction definition, which implies that any method of sanctions that relate to the region's economy will influence the region's real exchange rate. This conforms with the perception that economic sanctions influence such a country's economy (Dylan, 2017). In addition, Model 5 shows the Sanction Intensity estimate. The coefficient of sanction intensity is negatively significant at a 1% level of significance. It infers that such intensity has a negative impact on the real exchange rate of the target region. This suggests that the real exchange rate is weakened with sanction intensity, which identifies a lesser relationship between two economies in finance, trade, and personal exchange.

In addition, a significant control variable (i.e., inflation) has the expected outcomes. From Table 3, we establish a significantly negative effect of the average rate of price changes in the goods and services index (i.e., inflation rate) on currency performance, which in agreement with the study of Ito & Sato (2008). This result implies that inflation increases the domestic currency decline, which tends to change the trade structure while the exchange rate depreciates alongside. However, the result for lending supports that there is a significantly positive effect on currency performance. Against the conventional agreement that asserts the effect of lending rate on currency depreciation, our result shows otherwise.

As identified in the earlier section, the Quantile regression approach is employed to consider the initial levels of the exchange rate movement. Quantile regression is useful to identify the conditional determinants of estimates. Hence, to investigate how the initial level of the real exchange rate plays out when developed economies impose various sanctions, we adopt Quantile Regression. With Quantile regression, exchange rates are distinguished in terms of weak, static, and strong rates. Table 4-7 show Quantile 0.25, 0.50, Quantile 0.75 and Quantile 0.90 respectively.

Table 4: Sanctions Imposed and Real Exchange Rate via Quantile Regression

Panel A: Quantile 0.25	Model 1	Model 2	Model 3	Model 4	Model 5
U.S.	-0.942*** (0.312)				
E.U.	-0.948*** (0.362)				
U.N.	-1.003 (0.619)				
Economic	-0.835** (0.335)				
Intensity	-0.237*** (0.0881)				
Control Variables	Yes	Yes	Yes	Yes	Yes
Constant	0.997*** (0.243)	0.992*** (0.247)	0.953*** (0.307)	0.979*** (0.284)	0.992*** (0.266)
Observations	209	209	209	209	209
Pseudo R-squared	0.257	0.251	0.212	0.226	0.242

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

While Table 4 (i.e., the sample that falls within the 25th percentile) reiterates the results of the baseline finding, the results in Table 5 show that U.S., E.U., U.N., Economic and Intensity sanctions are negative and significant at 1% level, which implies the effects of such sanctions contribute significantly on weakening real exchange rate for economies in the 50th percentile of the sample. This suggests that such economies lack the strategies to countermeasure the negative effect of the imposed sanctions.

Table 5: Sanctions Imposed and Real Exchange Rate via Quantile Regression

Panel A: Quantile 0.50	Model 1	Model 2	Model 3	Model 4	Model 5
U.S.	-0.979***				
	(0.202)				
E.U.	-1.156***				
	(0.234)				
U.N.	-1.658***				
	(0.426)				
Economic	-0.637***				
	(0.238)				
Intensity	-0.225***				
	(0.0633)				
Control Variables	Yes	Yes	Yes	Yes	Yes
Constant	2.240***	2.213***	1.956***	2.079***	2.163***
	(0.158)	(0.160)	(0.211)	(0.202)	(0.191)
Observations	209	209	209	209	209
Pseudo R-squared	0.459	0.448	0.356	0.367	0.389

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

In addition, results in Table 6 reveal that U.S. and E.U. sanctions are negative and significant at a 1% level, which indicates that such sanctions result in the weakened real exchange rate for countries in the 75th percentile of the sample. Finally, for countries in the 90th percentile of the sample, results in Table 7 show that only significant with the negative contribution to the weakened real exchange rate of the target region. The discrepancies in results could be traceable to the strategies implemented by the target country to counterfeit the impact of such sanctions on its economy. The reasons behind such significant influence of E.U. sanctions over other sanctions could be explained by the speculations highlighted by Wang, Wang, & Chang (2019) that compare U.S. and E.U. sanctions' relevance on exchange rate volatility. The authors emphasize that (1) the E.U. sanction tends to be more concentrated as it focuses on five specific instruments of sanction; (2) the approach of E.U. sanction is mostly short term and (3) the proximity of E.U. to the target countries tends to have the stronger influence of the target economy.

Table 6: Sanctions Imposed and Real Exchange Rate via Quantile Regression

Panel A: Quantile 0.75	Model 1	Model 2	Model 3	Model 4	Model 5
U.S.	-0.970***				
	(0.235)				
E.U.	-1.358***				
	(0.177)				
UN			0.188		
			(0.283)		
Economic				0.225	
				(0.163)	
Intensity					0.0331
					(0.0595)
Control Variables	Yes	Yes	Yes	Yes	Yes
Constant	2.475***	2.481***	2.432***	2.433***	2.477***
	(0.183)	(0.121)	(0.140)	(0.138)	(0.179)
Observations	209	209	209	209	209
Pseudo R-squared	0.341	0.514	0.464	0.465	0.359

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

Table 7: Sanctions Imposed and Real Exchange Rate via Quantile Regression

Panel A: Quantile 0.90	Model 1	Model 2	Model 3	Model 4	Model 5
US	0.202				
	(0.137)				
EU	-0.852***				
	(0.210)				
U.N.			-0.143		
			(0.266)		
Economic				0.145	
				(0.155)	
Intensity					0.0332
					(0.0398)
Control Variables	Yes	Yes	Yes	Yes	Yes
Constant	2.614***	2.596***	2.759***	2.506***	2.519***
	(0.107)	(0.143)	(0.132)	(0.131)	(0.120)
Observations	209	209	209	209	209
Pseudo R-squared	0.406	0.299	0.342	0.339	0.371

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Sanctions Imposed and Real Exchange Rate (excluding 2008-2010)

	Model 1	Model 2	Model 3	Model 4	Model 5
Current	0.00873** (0.00397)	0.00550 (0.00408)	0.0100** (0.00402)	0.00904** (0.00405)	0.00832** (0.00405)
Lending	0.0225*** (0.00443)	0.0206*** (0.00439)	0.0237*** (0.00443)	0.0229*** (0.00444)	0.0226*** (0.00442)
Inflation	-0.00765*** (0.00208)	-0.00758*** (0.00200)	-0.00856*** (0.00207)	-0.00818*** (0.00205)	-0.00772*** (0.00208)
GDS	-0.00269 (0.00289)	-0.00338 (0.00283)	-0.00304 (0.00294)	-0.00294 (0.00291)	-0.00270 (0.00289)
U.S.	-0.121* (0.0696)				
E.U.		-0.293*** (0.0940)			
U.N.			-0.0809 (0.173)		
Economic				-0.0907 (0.0760)	
Intensity					-0.0356* (0.0212)
Constant	1.402*** (0.0940)	1.455*** (0.0942)	1.372*** (0.0935)	1.395*** (0.0954)	1.403*** (0.0944)
Observations	163	163	163	163	163
R-squared	0.269	0.302	0.255	0.261	0.268
RMSE	0.285	0.279	0.288	0.287	0.285
F-test	10.40	12.20	9.651	9.974	10.35
Prob > F	1.66e-08	7.86e-10	6.08e-08	3.46e-08	1.81e-08

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

4.3 Robustness Analysis

To further estimate the resulting robustness, we eliminate the year 2008-2010. It is believed that the exchange rate of countries changed significantly after the year 2008 financial downturn, which could distort the results. Thus, the data eliminating the financial crisis tends to reflect the impact of sanctions on the exchange rate. From Table 8, we deduce that except for economic sanctions, other sanctions, together with other explanatory variables, are consistent with the result of the baseline results in Table 2. The result shows that U.S.,

E.U., and Intensity sanctions significantly contribute to the weakened real exchange rate in the target region during the sample period without a financial crisis. It can be inferred that the insignificance effect of the economic sanctions measure remains ineffective as the target countries could navigate through the strategy implemented to counter the impact of economic sanctions on their economy before the 2008 financial crisis.

Conclusion

This study explores the impact of diverse economic restrictions on currency performance. This study assesses a panel dataset of 30 African countries extracted from the World Development Indicators of World Bank database and the German Institute of Global and Area Studies' Sanction Database (GIGA) for 1990-2010. To capture the currency performance, we adopt the real effective exchange rate index computed by the World Bank, which an increase represents an appreciation of the local currency and vice-versa. We employ five specific sanctions, which include sanctions imposed by the United States, European Union, United Nations, Economic sanctions and Intensity sanctions. The empirical evidence is based on the fixed-effect controls for the observed heterogeneity via fixed effects regression, while the Quantile regression approach is employed to consider the initial levels of exchange rate movement subsequently. With Quantile regression, exchange rates are distinguished in terms of weak, static, and strong rates.

The following findings are established. We find that the United States and European Union sanctions, respectively, weaken the real exchange rates, and the results disclose that the coefficients of the United States and European Union sanctions are significantly negative. This infers that with the increase of U.S. and E.U. sanctions on African countries, the target region's exchange rates weaken. In addition, we establish that the U.N. sanctions are insignificant. This infers that irrespective of the number of sanctions by the U.N., there remains frail effects on the exchange rate in the region. It is deduced that the estimate of economic sanction is negatively significant, which shows that economic sanction negatively impacts the real exchange rate of the target region. Sanction intensity is negatively significant, which infers that such intensity negatively impacts the real exchange rate of the target region.

As for the policy implication, sanctioned countries should implement a policy that could mitigate the adverse consequences of economic restrictions on currency performance. We suggest that sanctioned countries could establish unaffected economic treaties with neighboring countries through various channels and ensure policy that promotes domestic demand for goods or services rather than foreign trade dependency.

References

Antonakakis, N., & Kizys, R. (2015). Dynamic spillovers between commodity and currency markets. *International Review of Financial Analysis*, 41, 303-319. <https://doi.org/10.1016/j.irfa.2015.01.016>

- Dizaji, S. F. (2014). The effects of oil shocks on government expenditures and government revenues nexus (with an application to Iran's sanctions). *Economic Modelling*, 40, 299–313. <https://doi.org/10.1016/j.econmod.2014.04.012>
- Dizaji, S. F., & van Bergeijk, P. A.G. (2013). Potential early phase success and ultimate failure of economic sanctions: A VAR approach with an application to Iran. *Journal of Peace Research*, 50(6), 721-726.
- Doxey, M. (1983). International Sanctions in Theory and Practice. *Case Western Reserve Journal of International Law*, 15(2).
- Drezner, W. (2011). "Sanctions Sometimes Smart: Targeted Sanctions in Theory and Practice." *International Studies Review*, 13 (1), 96-108.
- Eyler, Robert C (2012) Economic sanction efficacy and the exchange rate. Mimeo, Sonoma State University.
- Galtung, John, 'On the Effects of International Economic Sanctions: With Examples from the Case of Rhodesia', *World Politics*, Vol. 19, Issue 3, 1967
- Hayakawa, K., Kim, H. S., & Yoshimi, T. (2017). Exchange rate and utilization of free trade agreements: Focus on rules of origin. *Journal of International Money and Finance*, 75, 93–108. <https://doi.org/10.1016/j.jimonfin.2017.05.002>
- Hufbauer, G. (2007). *Economic Sanctions Reconsidered*. Washington: Peterson Institute for International Economics.
- Imai, K. (2011). Understanding and Improving Fixed Effects Regression Models for Causal Inference *.
- Kaempfer, W. H., & Lowenberg, A. D. (1988). The Theory of International Economic Sanctions: A Public Choice Approach. *The American Economic Review*, 78(4), 786–793.
- Kaempfer, H. & Anton D. (1988). "The Theory of International Economic Sanctions: A Public Choice Approach." *American Economic Review*, 78 (4), 786-793.
- Kilicarslan, Z. (2018). Determinants of exchange rate volatility: empirical evidence for Turkey. *Pressacademia*, 5(2), 204–213. <https://doi.org/10.17261/pressacademia.2018.825>
- Lektzian, D., & Souva, M. (2007). An Institutional Theory of Sanctions Onset and Success. *Journal of Conflict Resolution*, 51(6), 848–871.
- Lektzian, D, Biglaiser, G (2013) Investment, opportunity, and risk: Do U.S. sanctions deter or encourage global investment? *International Studies Quarterly* 57(4): 65–78.
- Ofori, I. K., Obeng, C. K., & Armah, M. K. (2018). Exchange rate volatility and tax revenue: Evidence from Ghana. *Cogent Economics & Finance*, 6(1), 1–17. <https://doi.org/10.1080/23322039.2018.1537822>

Ojeka, S., Adegboye, A., Adegboye, K., Umukoro, O., Dahunsi, O., & Ozordi, E. (2019). Corruption perception, institutional quality and performance of listed companies in Nigeria. *Heliyon*, 5(10), e02569. <https://doi.org/10.1016/j.heliyon.2019.e02569>

Pape, Robert A., 'Why Economic Sanctions Do Not Work', *International Security*, Vol. 22, No. 2, 1997

Rana, M. S., Anik, T. H., & Biplob, M. N. K. (2019). Factors Influencing Exchange Rate: An Empirical Evidence from Bangladesh. *Global Journal of Management And Business Research*, (October).

Smith, M. (2013). *What is the effect of U.S.-led sanctions on a target nation's foreign currency exchange rate?*

Wang, Y., Wang, K., & Chang, C.-P. (2019). The impacts of economic sanctions on exchange rate volatility. *Economic Modelling*, 82, 58–65.

United Institute of Peace. (2016). U.S. Sanctions Policy on Sub-Saharan Africa. Retrieved from: <https://www.usip.org/publications/2016/06/us-sanctions-policy-sub-saharan-africa>

Appendix 1

List of Countries adopted

Algeria, Burundi, Cameroon, Central African Republic, Comoros, Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Iraq, Iran, Islamic Rep., Jordan, Kenya, Liberia, Libya, Madagascar, Malawi, Mauritania, Niger, Nigeria, Rwanda, Sudan, Syrian Arab Republic, Togo, Yemen, Rep., Zimbabwe, Zambia