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Impact of Devaluation on Sudan's Current Account: An Econometric Approach

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Abstract

This paper attempt to assess the impact of the short and long run of devaluation on domestic currency on Sudan's current account over the period (1986 – 2020). With this objective, the autoregressive distributed lag (ARDL) cointegration test is employed to test the long run relationship hypothesis for the export and import demand functions, in addition to export price and import price functions. The cointegration test suggested that the variables in the construction of these functions are cointegrated in the long run. The associated error correction term was significant for all functions confirming the existence of long run relationship. The results indicate that devaluation, beside not improving the current account in both short and long run, in some cases, it even had a negative effect.

Keywords: *Devaluation, Current Account, Econometric approach, autoregressive distributed lag (ARDL), Short-run and Long-run.*

1. Introduction

Sudan’s current account was in deficit throughout the period 1980-2020, except for few years. During the period 1980-1985, the current account was in a deficit of 3.1 percent of GDP, and average of about 1.6 percent of GDP during the period 1986-1990. However, the current account deficit as a percentage of GDP increases to 7 percent during the

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period 1991-1995, this has remained approximately the same during the period 1996-2000. However, ~~the~~ table 1 shows that the deficits have been reduced by 5.5 as percentage of GDP during the period 2001-2005 after the country has started oil exportation. However, the current account deficit as a percentage of GDP increases to 7.1 percent during the period 2006-2010 and to 7.0 percent during the period 2011-2020, due to the global financial crisis 2008 and secession of South-Sudan, respectively.

Table 1: Current Account for the Sudan (1986-2020)

	86-90	91-95	96-00	01-06	07-10	11-14	2019-20
Current acc. to GDP	-3.1	-1.6	-6.9	-7.2	-5.5	-7.1	-7.0
Total exports to GDP	9.0	6.7	5.4	4.9	10.6	9.5	0.5
Total imports to GDP	20.5	8.7	11.7	8.4	15.2	14.1	0.9
Rate of exchange (SDG per US$1.00)	0.002	0.01	0.3	2.1	2.5	2.2	4.8

Source: Own calculations based on the data obtained from Central Bank of Sudan, Central Bureau of Statistics, and Ministry of Finance and National Economy.

Sudan's exports over the 1980s and 1990s showed a continuous decline relative to GDP. The share of export to GDP dropped from 9.0 percent during the period 1986-1985 to 6.7 percent over the period 1986-1990 and to 5.4 during the period 1991-1995 the deterioration continues to 4.9 percent during the period 1996-2000. The share of export to GDP has increased remarkable after the year 2000, about 10.6 percent of GDP in the period 2001-2005 and to 9.5 percent of GDP for the period 2006-2010. During the period 2011-2020 Sudan's exports has been heavily affected by the decline in oil production after the separation of South as a result the share of export to GDP decline to 0.5 percent of GDP.

Sudan's imports, on the other hand, fluctuated over the studied period. The share of import to GDP dropped from 20.5 percent in the period 1986-1985 to 8.7 percent in the period 1986-1990, increased to 11.7 percent during the period 1991-1995 and declined to 8.5 percent during the period 1996-2000. The average share of import to GDP stable at 15 percent for the period 2001-2010 and declined to 0.9 percent during the period 2011-2020.

The plan of the paper is as follows. Section 2 presents an overview of previous studies; section 3 outlines the model and methodology. Section 4 discusses the model results and policy simulation. The final section contains the main findings and concluding remarks.

2. Overview of Previous Studies:

Several theories developed to explain the behaviour of current account balance. One of these theories is "The elasticity approach". According to the elasticity approach, when a country devaluates its currency, there has two effects on the flow of trade – price effect and volume effect. The price effect implies that a currency depreciation will cause imports to be more expensive and exports to appear cheaper in the short run for the domestic buyers.

The balance of trade may deteriorate in the short run due to the time required for the exports and imports to adjust to the new exchange rate. However, cheaper exported goods may attract higher demand on domestic goods and the volume of production increase. Hence, the quantity effect may improve the trade balance in the long run. If the sum of the export and import elasticities are greater than one the impact will be positive. This condition known as Marshall-Lerner condition. The issue of possible relation between

exchange rate and balance of trade extensively studied by the researcher, economist, and policy makers.

However, part of empirical studies has reached to a different solution regarding the effectiveness of devaluation. Several researchers such as (Petrović and Gligorić, 2009; Hasan, M and khan, A, 1994; Asif, 2011; Salmasi, 2017) argued that devaluation significantly improved balance of trade. All of them concluded that devaluation would be helpful for the economy to gain benefit in balance of trade and reduce the deficit. In contrast numerous other researchers are against devaluation, through their respective empirical studies, are as follows: (Samuel et al., 2018; Costa Magna, 2018; Ogundipe et al., 2017; Vijayakumar, 2018). They empirically concluded that it would not be useful to solve the deficit in balance of trade by using devaluation. The objective of this paper is to explore the effects of devaluation on current account in case of the Sudan over the period of 1986-2020.

3. The Model and Methodology:

Goldstein and Khan (1985) divided models of trade into two basic groups – perfect and imperfect substitution models. Both have been considered as oppositional but should rather be treated as complements- one as framework for modelling trade of differentiated goods, the other for close (not perfect) substitutes.

There is a consensus in the literature on the empirical forms of the demand and supply functions for imports and exports (Khan and Knight, 1988). The standard approach to specify and estimate foreign trade equations for both developed and developing countries is the "imperfect substitutes" model, in which the key assumption is that neither imports nor exports are perfect substitutes for domestic goods. On the demand side, the consumer is assumed to maximize utility subject to a budget constraint. The resulting demand function for imports depends on income in the home country, the price of the imported good, and the price of the domestic substitute. The theoretical outline of the imperfect substitute's model indicates that the demand for exports and imports depends on the real income and relative price level.

Perfect substitute's model, on the other side, assumes perfect substitutability between domestic and foreign goods; this assumption implies that each country would be only an exporter or an importer of a traded good but not both. Therefore, the model predicts that a country will entirely export or import a particular good, with no domestic production if the good is imported. Moreover, the perfect substitute's hypothesis implies the law of one price, for which little confirmation has been found in empirical studies.

However, both domestic and imported goods can be found coexisting on markets, indicating that countries do not in fact specialize to such a high degree. If we were to analyse only trade of certain goods, the perfect substitutes model could be applied, such as in the case of some undiversified goods (for example, wheat or other agricultural products).

In practice most of econometric analyses concerning trade focus on the demand side of exports and imports. Largely this is a consequence of the fact that demand is the main factor influencing the trade volume over the short and medium term, while the adjustments on the supply side take place only in the long term.

The theoretical outline of the imperfect substitute's model indicates that the demand for exports and imports depends on the real income and relative price level.

The Current Account:

The current account balance NCABAL explained by identity describing the nominal current account balance derived as the difference between nominal exports NXGS and

nominal imports NMGS. To this point, services, income and transfers balance SITBAL is added. While the exports and imports of goods and services are derived stochastically in real terms, the services, income and transfers balance is determined exogenously.

$$NCABAL = NXGS - NMGS + SITBAL \quad (1)$$

Real Exports of Goods and Services:

In the long run specification, demand for real exports of goods and services RXGS is a function of the level of the world income WY and relative price of exports RELPX. There are 2 dummy variables that are intended to capture structural and global changes that might have had significant impacts on the economy.

$$LRXGS = \beta_0+\beta_1 LYW +\beta_2 LRELPX + \beta_3 D99 + \beta_4 D08 +\varepsilon \quad (2)$$

Where:

D99: The exploitation of oil

D08: The global financial crisis.

World income YW is determined exogenously.

Relative price of exports RELPX defined as the export price deflator XPDEF over world prices PW.

$$RELPX = \left(\frac{XPDEF}{PW}\right)*100 \quad (3)$$

The world prices PW is considered exogenous in this model.

The following relation links real exports of goods and services to the nominal exports of goods and services NXGS in the current account.

$$NXGS = \left(\frac{RXGS*XPDEF}{100}\right)*100 \quad (4)$$

Real Imports of Goods and Services:

Demand for real imports of goods and services RMGS is a function of real national income RNI and relative price of imports RELPM.

$$LRMGS = \beta_0+\beta_1 LRNI +\beta_2 LRELPM + \beta_3 D99 + \beta_4 D08 +\varepsilon \quad (5)$$

Real national income RNI is determined exogenously.

Relative price of imports RELPM defined as the import price deflator MPDEF over consumer price index CPI.

$$RELPM = \left(\frac{MPDEF}{CPI}\right)*100 \quad (6)$$

Consumer price index CPI is determined exogenously.

The following relation links real imports of goods and services to the nominal imports of goods and services in the current account.

$$NMGS = \left(\frac{RMGS*MPDEF}{100}\right) \quad (7)$$

Export Price Index:

The export price deflator XPDEF used as a proxy for the export price index, specified in the long run as a function of consumer price index CPI and the nominal exchange rate NEXR

$$LXPDEF = \beta_0+\beta_1 LCPI +\beta_2 LNEXCH + \beta_3 D08 +\varepsilon \quad (8)$$

The nominal exchange rate NEXR is considered exogenous in this model.

Import Prices Index:

The import price deflator MPDEF used as a proxy for the import price index, specified in the long run as a function of the world price and the nominal exchange rate.

$$LMPDEF = \beta_0+\beta_1 LPW +\beta_2 LNEXR + \beta_3 D08 +\varepsilon \quad (9)$$

Econometric Technique:

To test the stationarity of variables, Augmented Dickey Fuller (ADF, 1979) test is used. To find the long run and short run relationship between the variables, the econometrics technique which is Autoregressive Distributive lag Model (ARDL) has been used, as it is applicable, variables having stationary at level or at the first difference i.e. I (0) and I(1). According to Pesaran et al. (2001), the ARDL approach requires the following three steps. In the first step, the existence of any long run relationship among the variables of interest is determined using an F-test (bound test for cointegration). The second step of the analysis is to determine the Lag Length for the ARDL Model. To select the appropriate model of the long run, it is necessary to determine the optimum lag length (k) by using proper model order selection criteria. Selection of the order of the ARDL model for the computation of the long run coefficients is based on Akaike in-formation lag length selection criteria up to two lags. The third step of the analysis is to estimate the coefficients of the long run relationship and determine their values, followed by the estimation of the short-run elasticity of the variables with the error correction representation of the ARDL model. By applying the ECM version of ARDL, the speed of adjustment to equilibrium will be determined.

Data Sources:

The primary source of data is Central Bureau of Statistics. Other sources include the Central Bank of Sudan database, Annual Reports, and the IMF's International Financial Statistics.

4. The Model Results and Policy Simulation:

We begin by examining the time series properties of the respective variables using the augmented Dickey-Fuller unit root test. The null hypothesis is a unit root whereas the alternative hypothesis is stationarity in levels. The results of the ADF-tests for all variables used in the behavioral equations are reported in table (2) and table (3). The first column shows the list of all variables that are tested. The second column shows whether the equation that is estimated for the testing purpose involves a constant and a trend, or a constant only, or neither a constant nor trend. The third column shows the number of lags that are used for each model. The fourth column is the ADF t-statistic, called τ_τ for a constant and trend, τ_μ for only constant, and τ for neither constant nor trend. The last column is the F-test ϕ_1 (ϕ_2), testing whether the constant and trend (constant) is significant under the null hypothesis of no unit root.

From the result in table (2), most of the variables are non-stationary in level form. The results of the stationary tests in first difference form are presented in table (3) and this reveals that most of the variables that are used in the estimation of the individual behavioral equations are found to be integrated of the first order.

Table 2: Statistical Properties of the Variables in the Model-ADF tests for the Order of Integration of Variables in Levels, 1986-2020.

Series	Model	Lags	τ_τ, $\tau_{\mu,\tau}$	ϕ_1, ϕ_2
	Intercept and trend	1	-2.356000	38.32508***
LCPI	Intercept	1	-2.099340	52.96762***
	None	1	0.276666	

	Intercept and trend	0	-1.472136	1.216943
LMPDEF	Intercept	0	-0.837750	0.701825
	None	0	3.479762	
	Intercept and trend	1	-1.481342	3.645563
LNEXCH	Intercept	1	-2.173522	5.442439**
	None	1	-2.489767**	
	Intercept and trend	0	-4.395712***	10.74952***
LPW	Intercept	1	0.474224	1.414223
	None	1	3.217743	
	Intercept and trend	0	-1.472136	1.216943
LRELPM	Intercept	0	-0.837750	0.701825
	None	0	3.479762	
	Intercept and trend	0	-1.709324	1.671920
LRELPX	Intercept	0	-1.056326	1.115825
	None	0	2.650525	
	Intercept and trend	0	-1.299748	1.012766
LRMGS	Intercept	0	-1.198531	1.436477
	None	0	-1.242891	
	Intercept and trend	0	-4.181917**	9.632897***
LRNI	Intercept	0	0.679616	0.461878
	None	0	5.405673	
	Intercept and trend	0	-1.320532	1.236511
LRXGS	Intercept	0	-1.215742	1.478030
	None	0	-0.819175	
	Intercept and trend	0	-1.642408	1.413143
LXPDEF	Intercept	0	-0.675965	0.456929
	None	0	3.537844	
	Intercept and trend	0	-1.208236	1.548770
LYW	Intercept	0	-1.665151	2.772728
	None	0	2.129886	

Source: author’s estimation based on data in appendix (B) using the econometric software E-Views 9.

Note: Length of lags is selected based on Akaike Information Criterion (AIC).

- *** (**) [*] indicate significant at the 1 (5) [10] % level.
- At a 1 (5) [10] % significance level the MacKinnon critical values are -4.262735 (-3.552973) [-3.209642] when a constant and trend are included, -3.646342 (-2.954021) [-2.615817] when only a constant is included and -2.636901 (-1.951332) [-1.610747] when neither is included.

- b- At a 1 (5) [10] % significance level, the Dickey-Fuller critical values are 8.21 (5.68) [4.67] when a constant and trend are included, 7.88 (5.18) [4.12] when only a constant is included.

Table 3: Statistical Properties of the Variables in the Model-ADF tests for the Order of Integration of Variables in First Differenced Form, 1986-2020.

Series	Model	Lags	τ_τ, $\tau_{\mu,\tau}$	ϕ_1, ϕ_2
	Intercept and trend	0	-1.893659	1.906270
LCPI	Intercept	0	-1.458107	2.126076
	None	0	-2.173522**	
	Intercept and trend	0	-4.983591***	12.45003***
LMPDEF	Intercept	0	-5.015978***	25.16003***
	None	1	-2.110371**	
	Intercept and trend	0	-4.113359**	8.522545***
LNEXCH	Intercept	0	-3.702489***	13.70843***
	None	0	-3.091027***	
	Intercept and trend	0	-7.686558***	29.56715***
LPW	Intercept	0	-7.607911***	57.88031****
	None	0	-6.120646***	
	Intercept and trend	0	-4.983591***	12.45003***
LRELPM	Intercept	0	-5.015978***	25.16003***
	None	1	-2.110371**	
	Intercept and trend	0	-5.394328***	14.57000***
LRELPX	Intercept	0	-5.427853***	29.46159***
	None	2	-1.601944	
	Intercept and trend	0	-5.584222***	15.59940***
LRMGS	Intercept	0	-5.628709***	31.68236***
	None	0	-5.624589***	
	Intercept and trend	2	-6.397000***	19.95723***
LRNI	Intercept	2	-6.637423***	27.49230****
	None	1	-1.979583**	
	Intercept and trend	2	-2.359380	11.99438***
LRXGS	Intercept	2	-2.650525*	15.76048***
	None	2	-2.194789*	
	Intercept and trend	0	-5.292803***	14.04622****
LXPDEF	Intercept	0	-5.355606***	28.68252****
	None	2	-1.335018	
	Intercept and trend	0	-5.467535***	14.97642***
LYW	Intercept	0	-5.201171***	27.05218***

None	0	-4.420592***

Source: author's estimation based on data in appendix (B) using the econometric software E-Views 9.

Note: Length of lags is selected based on Akaike Information Criterion (AIC).

- *** (**) [*] indicate significant at the 1 (5) [10] % level.
- At a 1 (5) [10] % significance level the MacKinnon critical values are -4.262735 (-3.552973) [-3.209642] when a constant and trend are included, -3.646342 (-2.954021) [-2.615817] when only a constant is included and -2.639210 (-1.951687) [-1.610579] when neither is included.
- b- At a 1 (5) [10] % significance level, the Dickey-Fuller critical values are 8.21 (5.68) [4.67] when a constant and trend are included, 7.88 (5.18) [4.12] when only a constant is included.

Estimation Results of Individual Equations:

Real Exports of Goods and Services:

In the first step the bound test approach for real export of goods and services equation shows that, there exist long run relationship between variables. The calculated value of the F-statistics is 7.61, which is greater than upper bound critical value at the 1% level of significance, thus null hypothesis of no co-integration relationship is rejected. ARDL (1, 0, 0, 1, 2) selected based on Akaike information criterion with maximum lag length of two.

Long run Estimates:

The estimation results of the long run equation of real export are given below. Real export is positively and significantly cointegrated with the world income, while it is negatively and significantly cointegrated with the relative prices of exports.

LRXGS = -3.43+ 0.30LYW -0.34LRELPX + 1.74D99 + 2.36D08 (10)

(-5.52) (2.06) (-2.06) (6.69) (5.38)

Short-run Estimates:

Equation (11) reports the short-run error correction model for real exports. The estimated results show that the coefficients of all variables have the sign that confirm to the real export demand theory along with their statistical significance except for D99.

$$\Delta LRXGS=0.19\Delta LYW - 0.21\Delta LRELPX+0.45\Delta DUM99+1.70\Delta D08-0.90\Delta D08_{t-1} - 0.64e_{t-1} \quad (11)$$

(2.21) (-2.20) (1.45) (5.04) (-2.87) (-5.55)

Capturing the short-run dynamics of the real exports function, the coefficient of the lagged residuals from the long run is negative and significant at one percent, showing the dynamic adjustment towards the long run equilibrium path. About 64 percent of any disequilibrium is corrected for every year.

Real Import of Goods and Services:

The calculated F-statistic 29.91 and is greater than the upper bound critical value of 6.36 at the 1% level of significance. Therefore, we reject the null hypothesis of no long run relationship. Therefore, the conclusion is that there is cointegration or a long run

relationship between the variables in the import demand equation. ARDL (1, 0, 0, 1, 2) selected based on Akaike information criterion with maximum lag length of two.

Long run Estimates:

In the long-run, real import of goods and services are positively influenced by real national income, D99 and D08 while negatively affected by the relative prices of imports. The entire variables exhibit expected signs, magnitudes, and the coefficient of the variables are statistically significant.

LRMGS = -2.35+1.02LRNI - 0.49LRELPM + 0.67D99 + 2.16D08 (12)

(-1.26) (2.41) (-2.33) (1.95) (3.69)

Short-run Estimates:

The short-run error-correction model corresponding to the long run real import of goods and services relationship is given by equation (4.4). It can be observed that in the short run all variables have the expected signs and statistically significant except for D99

$\Delta LRMGS = -0.20\Delta LRMGS_{t-1} + 0.60\Delta LRNI - 0.29\Delta LRELPM - 0.03\Delta D99 + 1.28\Delta D08 - 0.59e_{t-1}$ (13)

(-2.14) (2.55) (-2.37) (-0.102) (3.64) (-8.65)

The results indicate that the error correction term has as expected a negative coefficient and significant showing the dynamic adjustment towards the long run equilibrium path are stationary. The speed of adjustment is about 59 percent of the disequilibria is corrected per year.

Export Price Index:

The calculated value of the F-statistics is 25.19, which is greater than upper bound critical value at the 1% level of significance, thus null hypothesis of no co-integration relationship is rejected. ARDL (1, 1, 0, 0) selected based on Akaike information criterion with maximum lag length of two.

Long run Estimates:

As expected, the sign of the CPI is positive, whereas the nominal exchange rate is negative. It is evident from these results the global financial crisis 2008 (D08) adversely affected export prices deflator.

LXPDEF = 1.19LCPI - 0.25LEXCH - 2.45D08 (14)

(85.80) (-6.32) (-12.94)

Short-run Estimates:

The estimation results of the error correction model for export price index are satisfactory in general. The entire variables exhibit expected signs, magnitudes, and the coefficient of the variables are statistically significant.

$\Delta LXPDEF = 0.38\Delta LCPI - 0.18\Delta LEXCH - 1.76\Delta D08 - 0.72e_{t-1}$ (15)

(1.72) (-4.66) (-6.60) (-6.78)

The error-correction term (e_{t-1}), is correctly signed and significant at one percent level of significance confirming the existence of long run relationship. This shows that about 72 percent of any disequilibrium is corrected for every year in the economy.

Import Price Index:

The F-statistic (9.23) exceeds the upper critical bound (6.36) at the 1% significance level showing that, there exist long run relationship between variables. ARDL (2, 0, 1, 2) selected based on Akaike information criterion with maximum lag length of two.

Long run Estimates:

Results of the cointegration equation for import prices are given below. As predicted by theory, import prices deflator are positively related to the world prices and nominal exchange rate. It is evident from these results the global financial crisis 2008 adversely affected import prices deflator.

LMPDEF = 15.27 + 0.02LPW + 1.07LEXCH -3.29D08 (16)

(5.95) (0.04) (12.93) (-8.75)

Short-run Estimates:

Based on that long run relationship, an error correction model has been estimated, which is given below. The short-run estimates present coefficients with theoretically acceptable signs and magnitudes.

$\Delta LMPDEF = 0.23\Delta MPDEF_{t-1} + 0.01\Delta LPW + 0.26\Delta LEXCH - 2.51\Delta D08 + 0.95\Delta D08_{t-1} - 0.44e_{t-1}$ (17)

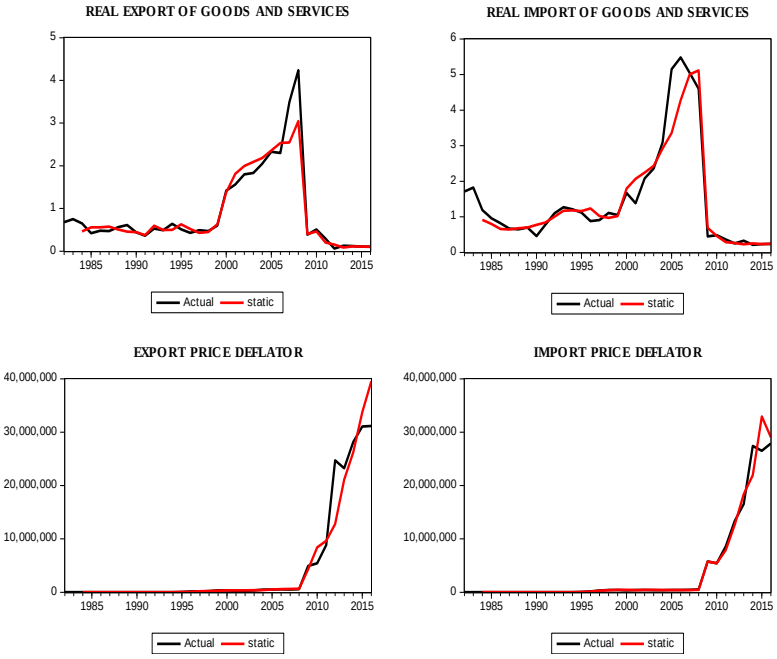
(1.80) (0.04) (2.79) (-10.83) (2.65) (-4.86)

. The negative estimated error-correction coefficient is significant at the one percent level, confirms that the error-correction mechanism is working correctly, i.e. deviations from the long run equilibrium will be corrected.

Tracking Performance of the Model:

The performance of the model in terms of tracking the actual development in the economy of Sudan is assessed in two ways. A graphical and figures presentations of the actual compared with those of the static and dynamic solutions of the model.

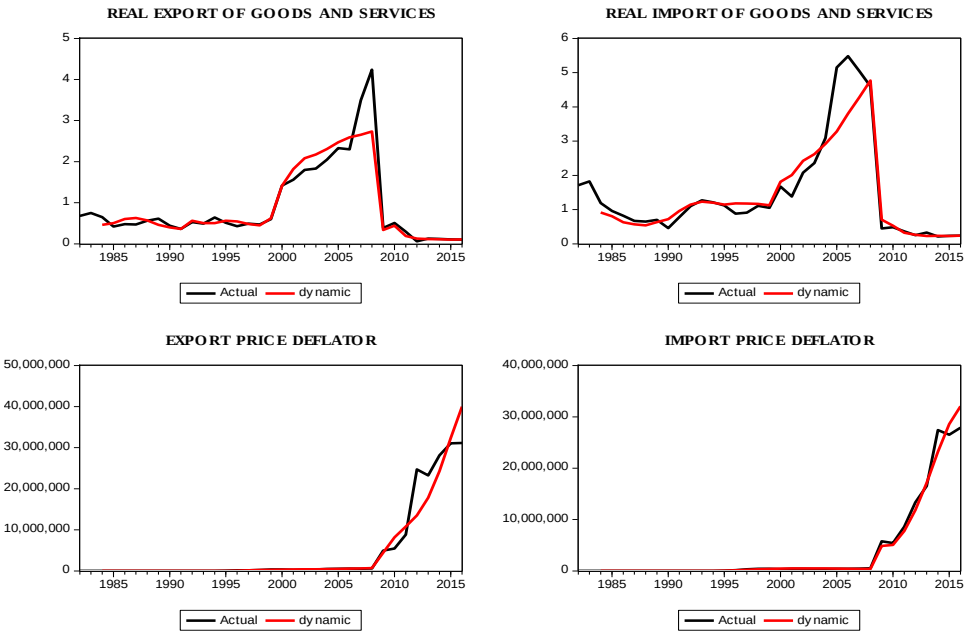
Solving the model in two different static and dynamic ways for the period 1983-2020, to assess its sample forecasting properties. The resulting paths for the static simulation depicted in Figure 1 with the actual series. It is clear from the Figure 1 that the simulation tracks the actual time paths for 4 endogenous variables determined stochastically in the model very well. The responses of each endogenous variable to the simulation are in line with the expected signs, the coefficients, and the assumed interrelationships between the series.



Source: author's construction based on the results of static solution using the econometric software E-Views 9.

Figure 1: Static Simulation Properties of the Model (1986-2020).

Since the result of the static sample forecast is quite satisfactory, the next step is the dynamic sample forecast. This dynamic forecast in the research displays no large differences, when compared to the static sample forecast. Figure 2 shows dynamic solution for 4 endogenous variables determined stochastically in the model to assess the within-sample tracking performance of the model.



Source: author's construction based on the results of dynamic solution using the econometric software E-Views 9.

Figure 2: Dynamic Simulation Properties of the Model (1986-2020).

The graphical representations show that the tracking performance of model within sample was relatively satisfactory in general terms, indicating a good fit.

The simulated results are compared against the actual, static and dynamic values in table 4 below for 4 stochastically determined endogenous variables. A comparison of the actual values of key macroeconomic variables with the static and dynamic solutions shows that these variables are close to the observed values for both the static and dynamic solutions. This indicates that the model tracks historical trends of these variables with a reasonable degree of accuracy.

Table 4: Comparison of the Actual Values of the Variables with the Static and Dynamic Solutions of the Model

Variable	Year	Actual	Static	Dynamic
	2016	0.06	0.15	0.13
	2017	0.13	0.09	0.12
RXGS	2018	0.12	0.11	0.11
	2019	0.11	0.11	0.10
	2020	0.10	0.11	0.10
	2016	0.25	0.26	0.26
	2017	0.33	0.23	0.23
RMGS	2018	0.21	0.25	0.23
	2019	0.23	0.23	0.23
	2020	0.24	0.24	0.24
	2016	24700000	12800000	13500000
	2017	23200000	21100000	17800000
XDEF	2018	28100000	26200000	24300000
	2019	31100000	33700000	32400000
	2020	31200000	39500000	40000000
	2016	13300000	12600000	11800000
	2017	16500000	18400000	17100000
MDEF	2018	27400000	21900000	23200000
	2019	26500000	32900000	28600000
	2020	27900000	29100000	32100000

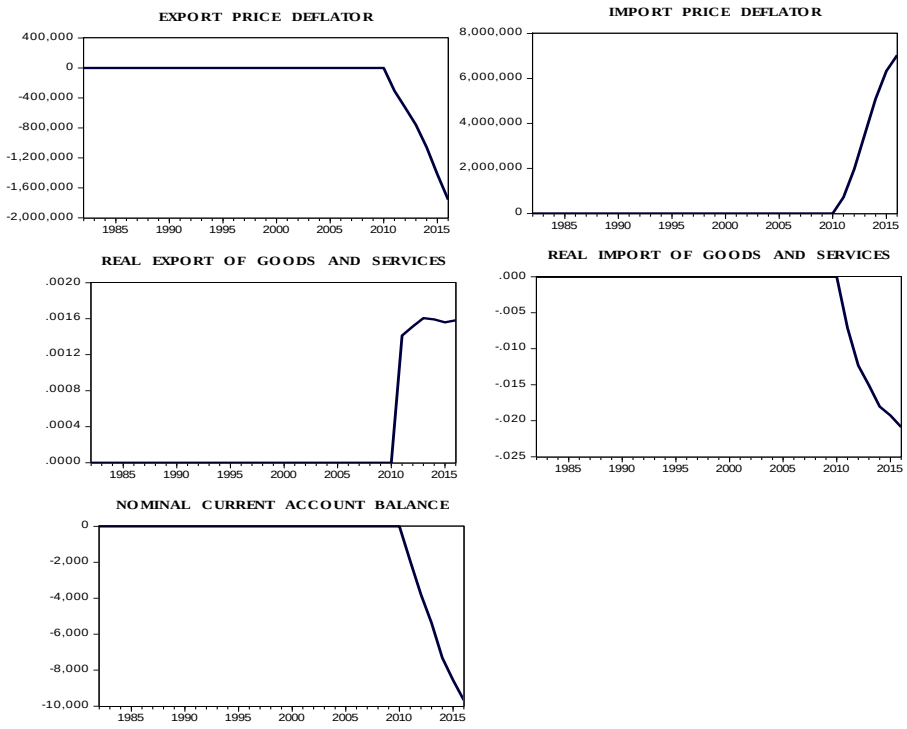
Source: author's calculation based on the results of dynamic and static solutions using the econometric software E-Views 9.

Policy Simulation Experiments and Impact Analysis:

The ultimate purpose of this paper is to explore the effects of devaluation on current account in case of the Sudan over the period of 1986-2020, for this purpose, we used the multiplier analysis. The multiplier is obtained by comparing every response variable's baseline simulation path with its shocked simulation path. A multiplier is defined as the change in the response variable relative to the absolute value of the shock applied. This section is dedicated to the presentation and analysis of the multiplier properties of the model external shocks.

A Currency Depreciation of 20 percent:

A nominal exchange rate is simulated by a depreciation of Sudanese pound against US dollar by 20 percent from 2011 to 2020. The results of this experiment are reported in figure 3.



Source: author's construction based on the results of dynamic solution using the econometric software E-Views 9.

Figure 3: Simulation Results of a Depreciation of the Currency by 20 Percent.

A depreciation of the currency by 20 percent appears to encourage real exports relative to real imports as expected. The improvement in the competitiveness of real exports is observed by way of a fall in export price deflator and subsequent rise in real exports. Correspondingly, the depreciation of currency makes real imports dearer, hence the rise in import price deflator and the fall in real imports. However, we observe from figure 3 that the increase in real exports and a fall in real imports is insufficient to curb the trend of deficits in the current account balance. As can be observed from table 5 the Marshall-Lerner condition (MLC) does not hold in this model in the short-run and long run i.e., the sum of the price elasticities for exports (η_{RXGS}) and imports (η_{RMGS}) is less than one. This suggests that a devaluation of the currency would obtains results, which are counterintuitive to the theory, i.e., would not improve the current account balance of the economy.

Table 5: Price Elasticities for Exports and Imports

	η_{RXGS}	η_{RMGS}	MLC
Short run	0.21	0.29	0.50
Long-run	0.34	0.49	0.83

Source: author's calculation based on the results of estimating the behavioural equations of the model using the econometric software E-Views 9.

6. Concluding Remarks.

The purpose of this paper has been to examine the impact of devaluation on the current account in the Sudan. The policy of devaluation has been criticised on the ground that it does not improve current account. We have examined this issue by specifying exports, imports, export price deflator, and import price deflator equations. By estimating these equations and solve these equations simultaneously we arrived at the conclusion that devaluation may not improve the current account in the Sudan. The Marshall Learner conditions have been tested and were found to be unsatisfying the conditions for devaluation to be successful in improving the current account. These results are important and may have crucial policy implications in terms of recent devaluation polices adopted by the government.

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