Modelling the Effect of Exchange Rate Liberalization on selected Macroeconomic Indicators: The Case of Egypt

نمذجة تأثير تحرير سعر الصرف على مؤشرات اقتصادية كلية مختارة: حالة مصر

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Abstract

This research aims to estimate the impact of the foreign exchange rate on the macroeconomic variables in Egypt. As we will analyze and measure the relationship between the exchange rate and the Macroeconomic variables (Inflation rate, Budget deficit, balance of payment (BOP), and the foreign direct investment(FDI)) in Egypt quantitatively during the time period (1990 – 2020), in the short and long term, using time series analysis tools through Application of the Autoregressive Distributed Lag Model (ARDL). The study found that there is a long-run impact of the exchange rate on the budget deficit this long-run impact is negative as well as the short-run impact it is also negative. While there is a short-run impact of the exchange rate on each of inflation (positive), and balance of payment (positive). Also there is no impact of exchange rate on foreign direct investment.

الملخص

يهدف هذا البحث إلى تقدير أثر سعر الصرف الأجنبي على متغيرات الاقتصادية الكلية في مصر ، حيث سنقوم بتحليل وقياس العلاقة بين سعر الصرف الاجنبى والمتغيرات الاقتصادية الكلية (معدل التضخم ، وعجز الميزانية ، وميزان المدفوعات ،والاستثمار الاجنبى المباشر) في مصر من الناحية الكمية خلال الفترة الزمنية (١٩٩٠-٢٠٢٠) ، على المدى القصير والطويل ، باستخدام أدوات تحليل السلاسل الزمنية من خلال تطبيق نموذج الانحدار الذاتي لفترات الابطاء الموزع (ARDL) . وجدت الدراسة أن هناك تأثيرًا طويل المدى لسعر الصرف على عجز الميزانية ، وهذا التأثير سليى على المدى الطويل بالإضافة إلى تأثيره على المدى القصير سلبيًا أيضًا. بينما هناك تأثير قصير المدى لسعر الصرف على كل من التضخم (الإيجابي) ، وميزان المدفوعات (الإيجابي). ولا يوجد تأثير لسعر الصرف على الاستثمار الأجنبي المباشر.

Introduction

There are several tools of the economic policy. Some of them are related to the fiscal policy which are government spending and taxes and others are related to the monetary policy found in the interest rate. There is another tool that lies between the two policies; that is the exchange rate.

The exchange rate is the most important economic variable in all countries. It's the relationship between domestic currency and foreign currencies. It is also an effective mechanism to protect national income from internal and external shocks. The effect of the exchange rate in the economy varies according to its stability. That is why we must give due care to the exchange rate and seek the possible means to control

it to give it some sort of stability because it plays a main role in daily economic life.

In addition to that the exchange rate has an evident effect on the overall equilibrium of the economy through its direct and indirect relationship with the overall economic variables, especially the inflation rate, growth rate, the balance of payment, the budget, and the flow of foreign direct investment. Also When the Egyptian Government announced on the 3thNov, 2016 the liberalization of the foreign exchange market many effects (positive and negative) are carried out. So that in this Study we would like to know what are the macroeconomic effects of this liberalization on the Egyptian economy.

The research divided into three main parts the previous studies, overview of the exchange rate in Egypt then the estimation of the relation between the exchange rate and the selected variables inflation rate, budget deficit, balance of payment, and foreign direct investment.

Previous Study:

There are various studies that investigate the foreign exchange rate, its history, theoretical framework, and the interaction between the exchange rate policy and the economic situation in the countries. Some studies examined the determinates of the exchange rate (Abdelgany, 2020) examined the determinate of the exchange rate in Egypt and found that in the long run exchange rate reserves have a positive impact on the exchange rate in both the short run and long run . While the broad money have a positive impact on the exchange rate in the long run and the trade openness affected positively the real exchange rate in the short run. (Kilicarslan, 2018) Found in that in

Turkey the rise in domestic investment, money supply and trade openness increases the real effective exchange rate volatility, while the rise in foreign direct investment, output and government expenditures also reduces the real effective exchange rate volatility.

Other Studies examined the direct and indirect impact of the exchange rate on some macroeconomics variables or the relationship between the exchange rate and the economic growth in the country. (Ezzat, 2018) Examined the relationship between the Exchange rate and the balance of payment and the result showed the negative impact of the depreciation of the pound against the US dollar was confirmed in the short term. Also it is not possible to rely only on devaluing the Egyptian pound to improve the long-term balance of trade. (Taileb, 2017) dealed with the effectiveness of the managed floating system in reducing the trade balance deficit in egypt and the paper found that the validity of the hypothesis was 85.7% of the changes in the dependent variable. There are two explanatory variables that have a significant effect on the Egyptian Balance of trade, money supply and foreign reserve.

(Abdelmoula, Emar, & Elsaye, 2017) The study concluded that fixed exchange rate regime significantly enhances economic growth in Egypt compared to manage floating. (Shokry, 2017) Suggested that the devaluation of the Egyptian pound is harmful for the Egyptian production at least in the short run. Also the private sectors are generally more responsive to the real exchange rate changes than the public sectors. (El-Ramly & Abdel-Haleim, 2008) Indicated that devaluations have an initial contractionary effect on output in Egypt and this effect lasts for four years before the expected positive effect of the devaluation starts to materialize.

As we show in the literature review they didn't address what this study tends to examine the macroeconomic effects of the foreign exchange market liberalization in the Egyptian economy by examining the different effects of liberalization on the inflation rate, balance of payment (BOP), government budget, and the inflow of foreign direct investment (FDI) in Egypt.

I. An overview of the Foreign exchange market in Egypt from 1990 to 2020:

If we look to the Egyptian economy and the enormous challenges facing it, we'll find that it faced several structural confusions found in the increasing deficit in the public budget of the country, the rise in the balance of payments, and the rise of inflation rates ….etc., all of which led to the increasing fall in the rate of the GDP growth.

The Egyptian authorities adapted a lot of economic reform programs through beginning with the 90s the comprehensive economic reform program, and in 2016 the second reform program between this to the country faces a lot of shocks some of them due to external factors and others internal. Also, it adopted several exchange rate regimes but the central bank of Egypt advertise the adoption of manage floating in 2003 and the liberalization in November 2016. Hence, these changes in the value of the Egyptian pound affected the overall Egyptian economic activities. Thus is this chapter we will analyze the impact of the exchange

rate on some macroeconomic variables through the theoretical analysis and empirical one according to the case of the Egyptian economy.

The analysis is divided into three stages, the stage of the economic adjustment reform program and structure adjustment, the stage of the managed float of the exchange rate at the beginning of the millennium, and the exchange rate between the political instability and the economic reform program 2016.

1- The first period from 1990 to 1999 :

During the 1990s the inflation rate in Egypt had witness the lowest levels tell it had reached their lowest level in 1999 with 3% from 20%.Exchange rate is quite stability through that period and it ranged between 3.3 LE/$ in 1991 and 3.39 LE/$ in 1999.These indicators were in the line with the CBE objectives during this period, as CBE has focused on achieving two main objectives price stability and exchange rate stability (Moursi, El Mossallamy, & Zakareya, 2007). We can say that changes in the inflation in that period were mainly driven from the changes from the exchange rate (El Baz, 2014).

The growth rate of exports during the period amounted to 14.3%, which is a very weak rate compared to the devaluation of the currency by almost 70%.Thus, it can be said that the policy of devaluation The currency during the nineties did not lead to positive results on the trade balance, and the surplus achieved in the balance of payments in most years of the period was largely due to the surplus achieved in the balance of financial and capital transactions.

The national budget recorded a deficit in all the period. During the period (1990-1995) the general budget recorded a deficit, as it reached in 1991 its highest amount (-3519) million dollars and its percentage of the GDP was (-8.4%), and that as a result of the increase in the public spending. And for the period from (1996-2000), it achieved a continuous deficit, but at low rates, as it reached the lowest deficit in 1997 by (-687) million dollars with a percentage of GDP was (-0.8). Which reflects the adoption of a restrictive spending policy, as well as the slowdown in economic reform measures.

The volume of foreign direct investments inflowing to Egypt recorded a rise in 1994/1993, amounting to about one billion and 256 million dollars, then decreased to reach about 890 m$ in 1997, and then increased again gradually in 1999 and 1998 to reach one billion and 235 m$ in 2000 (Haiba, 2019).

2- The second period from 2000 to 2010:

The exchange rate reached 3.472 pounds to the dollar in 2000, and the inflation rate stood at 2.68%. Then, it fell to 4.632 pounds to dollars in 2002, at a time when the inflation rate slightly increased to 2.74%. In 2003 following the adaption of the new regime, The Egyptian pound lost just over 25% of its value (Khodeir, 2012). According to that the inflation rate increased and reached 16.9% in 2004. However, the inflation rate quickly returned to 4.3% in 2005, against a slight decline in the exchange rate, which became 5.648 pounds to the dollar. Despite the increase in the value of the pound

against the dollar to 5.431 pounds, the inflation rate remained on its upward trajectory, recording 17% in 2008. In 2009, the exchange rate reached 5.542 pounds per dollar, and the inflation rate had fallen to 11.8%. In 2010, despite the slight decline in the exchange rate to EGP 5.622, the inflation rate returned to 11.1% (Selim, 2012).

As a result of the Luxor accident, the decline in tourism revenues, the collapse of oil prices, then the events of September 2001 in the United States of America, and the decline in Suez Canal revenues with the escalation of war in the Middle East, exports covered half of the imports, which had a clear impact on the overall balance of the balance of payments, as the deficit in the fiscal years 19 99/2000 and 2001/2000 amounted to about 3026.7, 871.4 million dollars. The balance of payments witnessed a surplus in the years 2004/2005, 2005/2006, 2006/2007 and2007/2008 by about 447, 325, 528, 542 million dollars, and in the year 2007 the global food crisis erupted, as the prices of essential goods. the period (2001-2005), the general budget recorded a continuous deficit, as it reached the highest amount (-8650) million dollars and a percentage of GDP (-10.4%) in 2002, as a result of the increase in government spending in the form of wages and salaries, as well as the decrease in government revenues, especially Tourism after the events of September. The period from (2007-2006) recorded a deficit of (-9574) million dollars and a percentage of GDP (-5.8%), a decrease in the percent of the deficit with an appreciation of the national currency, and a decrease in exchange rates as well. For the period (2008-2010), the deficit as a

percent of GDP reached (-7.5%), which was due to the 2008 global financial crisis.

The volume of foreign direct investments inflow to Egypt decreased again in the period 2000-2003, by more than 80%, from 1.298 million dollars to 222 million dollars. In 2004 there were efforts to improve the investment climate and encourage domestic and foreign investment, and this led to a rise in the net inflow of foreign direct investment during the period from 2004 to 2007, which amounted to about $11.578 billion in 2007, and then decreased till It reached 9.5 billion dollars in 2008, and it reached about 6.7 billion dollars in 2009 due to the global financial crisis in 2008, which led to a decline in demand for Egyptian exports, a decline in private investment, and a weakness in foreign direct investment (Central Bank of Egypt, Annual Report, annual Repots).

3- The Third period from 2011 to 2020:

On the 25th of January 2011, what happened in the exchange rate market was not far from what was going in the political scene The exchange rate increased by 5.933 LE/USD, while the inflation rate declined by 10.1%. The year 2012 brought a decline in the exchange rate to 6.056 pounds to the dollar and the inflation rate decreased to 7.1%. In the following years the exchange rate reached 7.693 pounds to the dollar, and the inflation rate increased to 10.4% in 2015. In 2016 the Egyptian monetary authorities announced the liberalization of the exchange rate .With the end of a full year of liberalization, the

value of the exchange rate fell to 17.793 pounds to the dollar, and the inflation rate escalated to its highest level during the period (2000-2020), where it recorded 29.5%.

In the following two years, with the stability of the exchange rate market, the exchange rate recorded 16.639 and 15.758 LE/USD in 2019 and 2020, respectively, and the inflation rate declined to 9.2 % and 5% in the same two years, respectively.

The BOP deficit increased from 2.7 billion dollars at the beginning of the period, to 3.9 billion dollars during 2014/2015. That is, an increase in the deficit amounted to 43%, despite the decrease in the value of the currency from 5.97 pound per dollar to 8.75 pound per dollar, meaning that the value of the currency decreased by almost 32%, on the contrary, the deficit increased by 43%. The BOP ran an overall surplus of US$ 13.7 billion (of which US$ 12.2 billion were recorded in the period of Nov. /June 2016/17 that followed the decision of exchange rate liberalization) against an overall deficit of US$ 2.8 billion a year earlier. Egypt's transactions in (2019/2020) with the external world unfolded an overall balance of payment deficit of US$ 8.6 billion (against US$ 102.5 million in the previous FY) (Central Bank of Egypt , Annual Report, 2016/2017).

The period (2010-2013) recorded a deficit in the budget that reached the highest amount in 2013 with (-37114) million dollars, with a percent of the GDP amounted to (-12.1%) that was due to the events of 25th January, while the period from (2014-2018) recorded rates reaching the highest amount in 2016 by (-45011) with a percent of

GDP (17.2%), then the deficit decreased during the two years 2018-2019 due to the restriction of government spending.

The Foreign direct investment inflows gradually decreased again to reach their lowest level in 2011 as a result of the political and economic developments that the country went through, reaching 2 billion And 798 million dollars in 2012.

Although the Egyptian economy began to regain the pace of activity during 2014, bringing the growth rate to 4.2%, which is much lower than the targeted rates, the inflows of foreign direct investments to Egypt increased from 3 billion dollars in 2012 to 4.2 billion dollars in 2013, Then $4.9 billion in 2014, then about $7 billion in 2015 and amounted to about $8.2 billion in 2016. This reflects the state's efforts to improve the investment environment and restore confidence among investors (Central Bank of Egypt, Annual Report, annual Repots).The inflow of foreign direct investments declined from 8.11 billion dollars to 7.4 billion dollars between 2016 and 2017. But it quickly reached $9.01 billion in 2019.

II. Methodology :

1. Data and Variables:

- **Data:**

The study uses annual macroeconomic data from 1990 to 2020.

The data were collected from the World Bank database (inflation rate, exchange rate, and foreign direct investment), Egyptian Central Bank (Balance of Payment), and Arab Monetary fund (Budget deficit).

- **Variables:**

This study depends on one independent variable (Exchange rate measured by the annual exchange rate of the Egyptian pound per US dollar), and four dependent variables (Inflation measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services, Balance of payment: measured the overall balance of payment deficit by million dollar, Foreign direct investment measured the inflow of the FDI by million dollar and Budget Deficit/Surplus (Fiscal Balance) measured the overall difference between the public revenue and the public expenditure by million dollar.

2. The Model :

The main aim is to investigate the long-run and short-run relationships between each of the dependent variables and exchange rate. This can be done using cointegration analysis and the error correction model. But Cointegration test and error correction model is used within the ARDL framework because the Johansen cointegration test cannot be applied directly if the variables of interest are not all. That is, it is not applicable for mixed order of integration for the variables of interest, or all of them are not non-stationary. So, an alternative method is needed if the variables are of mixed orders, or some of them are non-stationary, this method is the ARDL model.

An autoregressive distributed lag (ARDL) model is an ordinary least square (OLS) based model which that can be used if the models are

of mixed orders or some of them are non-stationary. This model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modeling framework.

Using a simple linear transformation, a dynamic error correction model (ECM) can be derived from ARDL. Also, the ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information and avoids problems such as spurious relationships resulting from non-stationary time series data.

To illustrate the ARDL modeling approach, the following simple model can be

Considered:

$$y_t = \propto + \beta x_t + \delta z_t + u_t$$

The error correction version of the ARDL model is given by

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \sum_{i=1}^{p} \delta_i \Delta x_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta z_{t-i} + \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + \lambda_3 z_{t-1} + u_t$$

The first part of the equation with β, δ, and δ represents the short-run dynamics of the model. The second part with $\lambda_s$represents a long-run relationship. The null hypothesis in the equation is $\lambda_1 + \lambda_2 + \lambda_3 = 0$, which means the non-existence of a long-run relationship.

However, before running the ARDL model, we will run the Granger causality test, to test if the relationship between the dependent variables and the independent variable.

3. Descriptive statistics

Descriptive statistics for dependent variables.

Table (1), and graph (1) presents the descriptive statistics like mean, median, maximum, minimum, and standard deviation for the variables of the study. Also, the Jarque-Bera test for normality is conducted, and the results show that all variables are not normally distributed, except for balance of payment and budget deficit, and FDI this with confident 95%, and this is because p-value are for all variables are less than 5%, except for these 3 of the variables, the associated p-values for these variables are greater than 5%. Also, from the graphs it is clear that the exchange rate is increasing over time, while budget deficit decreasing over time, while the other variables are fluctuating ups and downs throughout the study period.

	Exchange Rate (LE/USD)	Balance of Payment (BOP)	Budget Deficit/Surplus	Foreign Direct Investment (FDI)	Inflation Rate(CPI)
Mean	6.498333	871.5133	-13373.60	4003.058	10.18267

Median	5.500000	558.7000	-8618.000	2157.400	9.730000
Maximum	18.13000	13717.20	-687.0000	11578.10	29.51000
Minimum	2.000000	-11278.40	-40511.00	-483.0000	2.270000
Std. Dev.	4.590601	5315.150	12483.85	3698.871	6.000099
Skewness	1.773774	0.025671	-0.898731	0.457889	1.094587
Kurtosis	4.830794	4.119232	2.455940	1.748979	4.763696
Jarque-Bera	19.92113	1.569146	4.408586	3.104783	9.878882
Probability	0.000047	0.456315	0.110328	0.211741	0.007159

Table (1): Descriptive statistics of the variables in Egypt (1990–2020)

Source: researcher preperation using (E-views)depend on data on table(2)

Graph (1): Line plot for the variables.

4. Empirical results

4.1. Unit Root test:

As an initial step of the time series analysis, is to validate the stationarity assumption. Stationarity assumption is tested using the Augmented Dickey-Fuller (ADF) test, and PP test. These 2 tests are the most cited unit root tests in the literature and commonly used. Both tests are applied to determine whether the data series is stationary (has no unit root) or not, by calculating the respective statistics and p-values in the main level.

Table (3) displays the results of both tests. From the results it can be concluded that each of balance of payments, and inflation are stationary at their levels, this with confident 95%, as p-value for them at their level less than 5%, while other variables are not stationary at their level but become difference when taking the first difference this with confident 95%.

Table (3): Augmented Dickey-Fuller (ADF) test for unit root variable

Variable	*ADF*	*PP*
Balance of payments	-6.505206***	-3.188018**
Budget deficit.	-2.934103	-1.085033
Δ Budget deficit	-3.518925**	-4.861194***
Exchange rate	-0.526845	-0.556694
Δ Exchange rate	-5.340639***	-5.363177***
FDI	-1.588423	-1.539223
Δ FDI	-6.120257***	-6.09612***
Inflation	-2.9943**	-2.9128**

*10%, **5%, ***1% significance. ADF t-statistic reported.

Source: researcher preperation using (E-views)

Note: The ADF tests include an intercept and trend the appropriate lag lengths were selected according to the Schwartz Bayesian criterion, also p-value are calculated using MacKinnon (1996) one-sided p-values.

4.2. Granger causality tests

Linear Granger causality test is employed to investigate the dynamic relationship between exchange rate and all the dependent variables. The Linear Granger causality test asks whether exchange rate Granger-cause the dependent variables or whether dependent variables Granger-cause exchange rate. More specifically, the test estimates the following regression model for each commodity.

$$Y_t = \alpha_0 + \sum_{K=1}^{P} \beta_{1K} Y_{t-K} + \sum_{K=1}^{P} \beta_{2K} ER_{t-K} + \varepsilon_t \qquad (3)$$

The Granger causality F-statistic for the null hypothesis that the lagged coefficients of ER_t (Exchange rate) are equal to zero is used to test whether ER_t don't Granger-cause Y_t. Conversely, ER_t is the explained variable to test whether Y_t don't Granger-cause ER_t.

The following table (4) presents the results of the granger causality test and from it we can conclude that;

1- Exchange rate granger cause budget deficit and the vice versa, and this with confident 95%, as the p-value for both ways are less than 5%.

2- Exchange rate granger cause inflation rate but not vice versa, and this with confident 95%, as the p-value for only the way

from exchange rate to inflation rate are less than 5%.

3- Exchange rate doesn't granger cause balance of payment and the vice versa, and this with confident 95%, as the p-value for both ways are greater than 5%.

4- Exchange rate doesn't granger cause FDI and the vice versa, and this with confident 95%, as the p-value for both ways are greater than 5%.

Table (4): The Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
BUDGETL_DEFICIT_SURPLUS_ does not Granger Cause EXCHANGE_RATE__LE_USD__	28	6.66624	0.0052
EXCHANGE_RATE__LE_USD__ does not Granger Cause BUDGETL_DEFICIT_SURPLUS_		18.5091	2.E-05
BALANCE_OF_PAYMENT__BOP_ does not Granger Cause EXCHANGE_RATE__LE_USD__	28	0.42460	0.6591
EXCHANGE_RATE__LE_USD__ does not Granger Cause BALANCE_OF_PAYMENT__BOP_		2.05542	0.1509
FOREIGN_DIRECT_INVESTMEN does not Granger Cause EXCHANGE_RATE__LE_USD__	29	0.43565	0.6519
EXCHANGE_RATE__LE_USD__ does not Granger Cause FOREIGN_DIRECT_INVESTMEN		1.16349	0.3294
INFLATION_RATE____CPI_ does not Granger Cause EXCHANGE_RATE__LE_USD__	29	0.23957	0.7888
EXCHANGE_RATE__LE_USD__ does not Granger Cause INFLATION_RATE____CPI_		14.6892	7.E-05

Source: researcher preperation using (E-views).

Accordingly, the following models are estimated:

$$Budget\ deficit\ _t = \propto + \beta exchange\ rate_t + u_t$$

$$Exchange\ rate\ _t = \propto + \beta budget\ deficit_t + u_t$$

$$Inflation\ rate\ _t = \propto + \beta exchange\ rate_t + u_t$$

Also, to be sure and as sensitivity analysis for the results of the granger causality test, the following two models also will be estimated

$$FDI\ _t = \propto + \beta exchange\ rate_t + u_t$$

$$balance\ od\ payments_t = \propto + \beta\ exchange\ rate + u_t$$

5. The ARDL Model:

1. First Model

$$Budget\ deficit\ _t = \propto + \beta exchange\ rate_t + u_t$$

1.1. Cointegration Results

Results of the bounds test procedure for co-integration analysis between budget deficit and exchange rate are presented in the table below.

Table (5): Bounds Test for Cointegration Relationship

Test Statistic	Value	K
F-statistic	8.207116	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: researcher preperation using (E-views)

From the above table it is clear that, the f-calculated is greater than the upper limits of critical values for all significance levels. Which mean that at 95% confident level the null hypothesis " no long run relationship exist " is rejected, this means that there is a unique cointegration relationship (i.e. long run relation) exists between budget deficit and exchange rate as determinant for it, and that exchange rate can be treated as the "long-run forcing" variables for the explanation of budget deficit.

1.2. Results of the Long Run ARDL Model of budget deficit

Since real budget deficit and exchange rate are cointegrated, the long-run parameters of the ARDL model are estimated and the results presented in the table below. The long-run ARDL model was estimated based on the Akaike Information Criterion (AIC) using a lag of 1 given the yearly nature and lag 1 for regressors to avoid the relatively short sample properties of the data.

Table (6): Estimated Long-run coefficients of budget deficit (1990-2020) using the ARDL Approach

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCHANGE_RATE	-973.352297	145.1495744	-6.705857	0.0000
C	599.473275	105827.2320	0.566456	0.5759

Source: researcher preperation using (E-views)

From table (6) we can conclude the following, Exchange rate has a negative significant coefficient, at 5% significance level. This means that every increase in the exchange rate by 1 unit will decrease the exchange rate in the long-run by 973.352297.

1.3. Results of the short Run ARDL Model of budget deficit

Once the long-run cointegrating model has been estimated, the third step is to model the short-run dynamic parameters within the ARDL framework. Thus, the lagged values of all level variables (a linear combination is denoted by the error-correction term, ECM_{t-1}) is retained in the ARDL model. The table below presents the results of the estimated error-correction model of budget deficit using the ARDL technique. The model is selected based on the AIC.

Table (7): Estimated Short-Run Error Correction Model of budget deficit (1990-2020) using the ARDL Approach

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCHANGE_RATE__LE_USD__)	-312.008609	394.632412	-6.790631	0.0000
CointEq(-1)	-0.048554	0.00640718	-7.578055	0.000

Cointeq = BUDGETL_DEFICIT_SURPLUS_ - (-973.3523 *EXCHANGE_RATE__LE_USD__ + 599.4733)

Source: researcher preperation using (E-views)

From the above table, it is clear that

- Beginning with the results for the long-run, the coefficient on the

lagged error-correction term is significant at 1% level with the expected sign, which confirms the result of the bounds test for cointegration. Its value is estimated to -0.0485 which implies that the speed of adjustment to equilibrium after a shock is low. Approximately 4% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

- Exchange rate has a negative significant coefficient, at 5% significance level. This means that every increase in the exchange rate by 1 unit will decrease the budget deficit in the short-run by 312.0086 and this indicate that exchange rate has lower effect on the short run than long run term.

From the following tables (8-9) it is clear that there is no serial correlation as Durbin Watson value is near to 2, also from Q-statistics probabilities, it is clear that there is no serial correlation as p-value is greater than 0.05, also this supported by graph2 as the residuals is scattered randomly, in addition the fitted value are almost the same as the actual values. Also, from the value of R-square it can be concluded that the estimated Model explain around 92% in the variability of budget deficit.

Table (8): Model Criteria/Goodness of Fit

R-squared	0.925322	Mean dependent var	-14005.20
Adjusted R-squared	0.916706	S.D. dependent var	12415.40
S.E. of regression	3583.173	Akaike info criterion	19.32945
Sum squared resid	3.34E+08	Schwarz criterion	19.51628

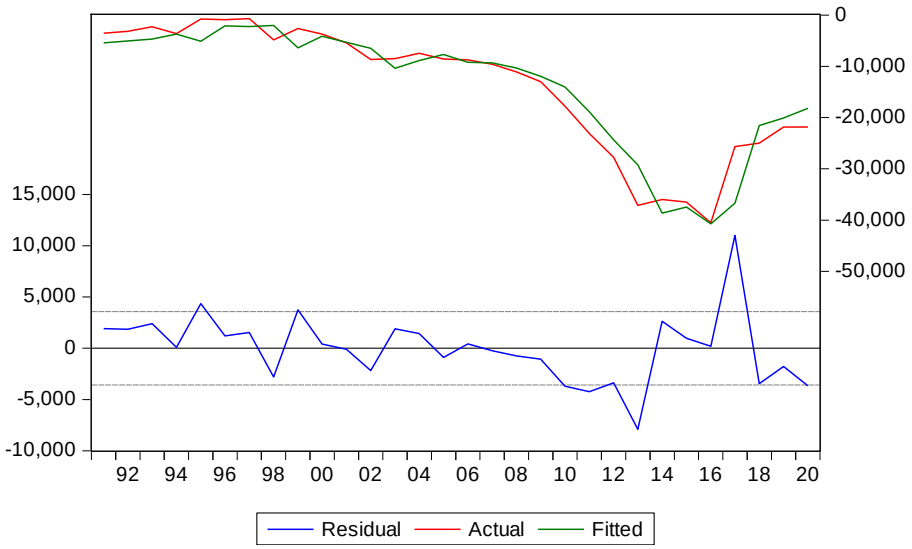
Log likelihood	-285.9418	Hannan-Quinn criter.	19.38922
F-statistic	107.3879	Durbin-Watson stat	1.829712
Prob(F-statistic)	0.000000		

Source: researcher preperation using (E-views)

Table (9): Q-statistic probabilities adjusted for 4 dynamic regressors

	AC	PAC	Q-Stat	Prob*
1	0.060	0.060	0.1175	0.732
2	0.173	0.170	1.1478	0.563
3	0.017	-0.002	1.1577	0.763
4	-0.179	-0.216	2.3373	0.674
5	-0.069	-0.056	2.5176	0.774
6	-0.109	-0.032	2.9913	0.810
7	-0.007	0.032	2.9934	0.886
8	0.113	0.115	3.5554	0.895
9	0.019	-0.016	3.5720	0.937
10	0.014	-0.071	3.5809	0.964
11	0.075	0.069	3.8640	0.974
12	-0.051	-0.009	4.0050	0.983
13	0.014	0.010	4.0167	0.991
14	-0.063	-0.049	4.2540	0.994
15	-0.076	-0.065	4.6225	0.995
16	-0.136	-0.149	5.8875	0.989

Source: researcher preperation using (E-views)



Graph (2): Actual, fitted, residual plot.

2- Second Model

$$exchange\ rate_t = \propto + \beta Budget\ deficit\ _t + u_t$$

2.1. Cointegration Results

Results of the bounds test procedure for co-integration analysis between exchange rate and budget deficit are presented in the table below.

Table (10): Bounds Test for Cointegration Relationship

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	8.004467	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78

5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: researcher preperation using (E-views)

From the above table it is clear that, the f-calculated is greater than the upper limits of critical values for all significance levels. Which mean that at 95% confident level the null hypothesis " no long run relationship exist " is rejected, this means that there is a unique cointegration relationship (i.e. long run relation) exists between exchange rate and budget deficit as determinant for it, and that budget deficit can be treated as the "long-run forcing" variables for the explanation of exchange rate.

2.2. Results of the Long Run ARDL Model of exchange rate.

Since real budget deficit and exchange rate are cointegrated, the long-run parameters of the ARDL model are estimated and the results presented in the table below. The long-run ARDL model was estimated based on the Akaike Information Criterion (AIC) using a lag of 1 given the yearly nature and lag 1 for regressors to avoid the relatively short sample properties of the data.

Table (11): Estimated Long-run coefficients of exchange rate (1990-2020) using the ARDL Approach

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	-0.000526	0.000207	-2.545599	0.0169

BUDGETL_DEFICIT_SURPLUS_				
C	1.659777	2.809716	0.590728	0.5596

Source: researcher preperation using (E-views)

From table (11) we can conclude the following, budget deficit has a negative significant coefficient, at 5% significance level. This means that every increase in the budget deficit by 1 unit will decrease the exchange rate in the long-run by 0.000526.

2.3. Results of the short Run ARDL Model of the exchange rate.

Table (12): Estimated Short-Run Error Correction Model the exchange rate (1990-2020) using the ARDL Approach.

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BUDGETL_DEFICIT_SURPLUS_)	-0.000095	0.000031	-3.105747	0.0044
CointEq(-1)	-0.181301	0.083043	-2.183227	0.0379

Cointeq = EXCHANGE_RATE__LE_USD__ - (-0.0005 *BUDGETL_DEFICIT_SURPLUS_ + 1.6598)

Source: researcher preperation using (E-views)

From the above table, it is clear that

- Beginning with the results for the long-run, the coefficient on the lagged error-correction term is significant at 5% level with the expected sign, which confirms the result of the bounds test for cointegration. Its value is estimated to −0.1813 which implies that the speed of adjustment to equilibrium after a shock is low. Approximately

18.13% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

- Budget deficit has a negative significant coefficient, at 5% significance level. This means that every increase in the budget deficit by 1 unit will decrease the exchange rate in the short-run by 0.000095 units and this indicate that budget deficit has lower effect on the short run than long run term.

From the following tables (13-14) it is clear that there is no serial correlation as Durbin Watson value is near to 2, also from Q-statistics probabilities, it is clear that there is no serial correlation as p-value is greater than 0.05, also this supported by graph2 as the residuals is scattered randomly, in addition the fitted value are almost the same as the actual values. Also, from the value of R-square it can be concluded that the estimated Model explain around 87% in the variability of exchange rate.

Table (13): Model Criteria/Goodness of Fit

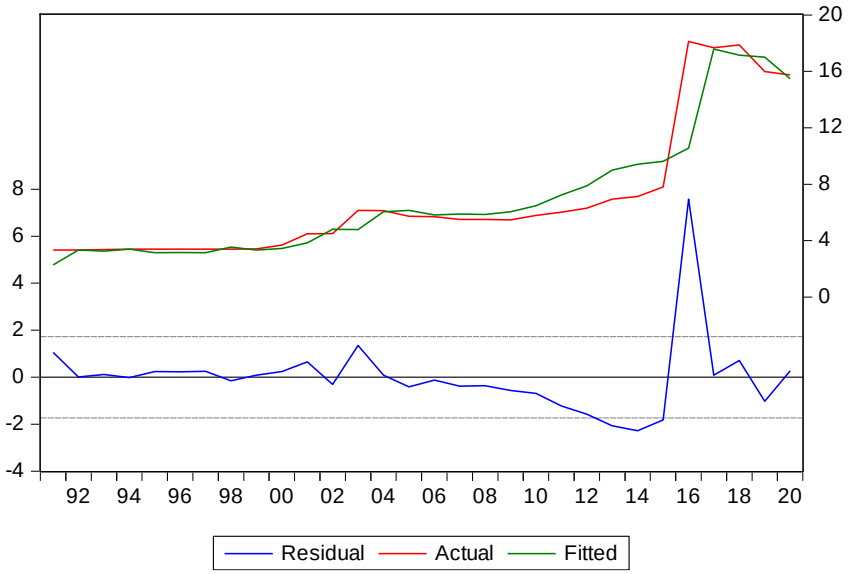
R-squared	0.879644	Mean dependent var	6.956667
Adjusted R-squared	0.870728	S.D. dependent var	4.807291
S.E. of regression	1.728431	Akaike info criterion	4.026945
Sum squared resid	80.66179	Schwarz criterion	4.167064
Log likelihood	-57.40417	Hannan-Quinn criter.	4.071770
F-statistic	98.66689	Durbin-Watson stat	1.952244
Prob(F-statistic)	0.000000		

Source: researcher preperation using (E-views)

Table (14): Q–statistic probabilities adjusted for 4 dynamic regressors

	AC	PAC	Q-Stat	Prob*
1	0.017	0.017	0.0090	0.924
2	0.010	0.010	0.0126	0.994
3	-0.196	-0.196	1.3750	0.711
4	-0.043	-0.038	1.4438	0.837
5	-0.064	-0.061	1.6009	0.901
6	-0.024	-0.063	1.6247	0.951
7	-0.034	-0.051	1.6733	0.976
8	-0.028	-0.057	1.7074	0.989
9	-0.052	-0.079	1.8293	0.994
10	-0.037	-0.067	1.8949	0.997
11	-0.094	-0.131	2.3381	0.997
12	-0.020	-0.069	2.3599	0.999
13	0.103	0.063	2.9602	0.998
14	-0.055	-0.135	3.1443	0.999
15	0.054	0.003	3.3292	0.999
16	-0.014	-0.019	3.3428	1.000

Source: researcher preperation using (E–views)



Graph (3): Actual, fitted, residual plot.

3. Third Model

$$inflation_t = \propto + \beta exchange\ rate_t + u_t$$

3.1. Cointegration Results

Results of the bounds test procedure for co-integration analysis between inflation and exchange rate are presented in the table below.

Table (15): Bounds Test for Cointegration Relationship

Test Statistic	Value	k
F-statistic	4.902352	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: researcher preperation using (E-views)

From the above table (15) it is clear that, the f-calculated is lower than the upper limits of critical values for all significance levels starting from 5%. Which mean that at 95% confident level the null hypothesis " no long run relationship exist " is accepted, this means that there no cointegration relationship exists between inflation and exchange rate.

3.1. Results of the short Run ARDL Model of the inflation:

The table (16) below presents the results of the short-run model of the inflation using the ARDL technique. The model is selected based on the AIC.

Table (17): Estimated Short-Run Error Correction Model of the inflation using the ARDL Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INFLATION_RATE____CPI_(-1)	0.447114	0.169211	2.642340	0.0135
EXCHANGE_RATE__LE_USD__	0.261956	0.036180	7.240341	0.0000
C	3.415512	2.025479	1.686273	0.1033

Source: researcher preperation using (E-views)

From the above table (17), it is clear that

- Exchange rate has a positive significant coefficient, at 5% significance level. This means that every increase in the exchange rate by 1 unit will increase the inflation in the short-run by 0.2619 units.

From the following tables (18-19) it is clear that there is no serial correlation as Durbin Watson value is near to 2, also from Q-statistics probabilities, it is clear that there is no serial correlation as p-value is greater than 0.05, also this supported by graph 4 as the residuals is scattered randomly, in addition the fitted value are almost the same as the actual values. Also, from the value of R-square it can be

concluded that the estimated Model explain around 30% in the variability of inflation.

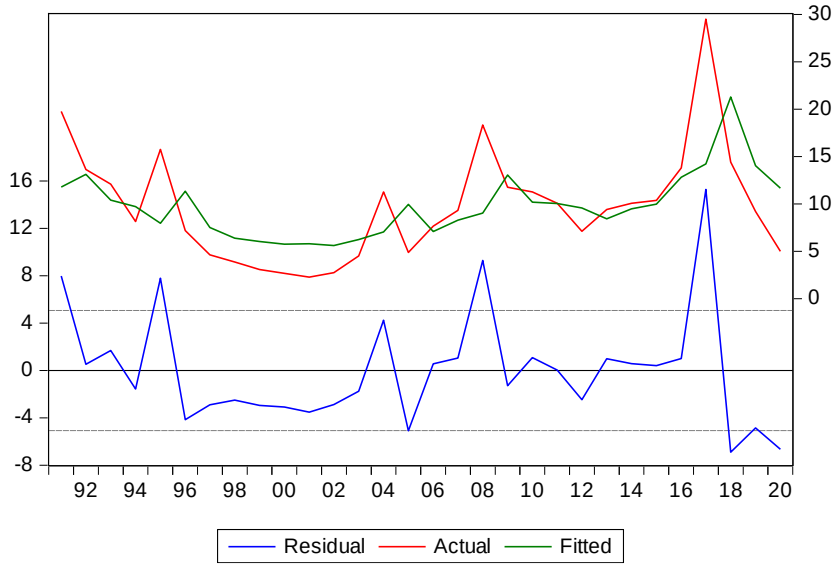
Table (18): Model Criteria/Goodness of Fit

R-squared	0.320221	Mean dependent var	9.790667
Adjusted R-squared	0.269867	S.D. dependent var	5.939417
S.E. of regression	5.075101	Akaike info criterion	6.181209
Sum squared resid	695.4295	Schwarz criterion	6.321329
Log likelihood	-89.71814	Hannan-Quinn criter.	6.226035
F-statistic	6.359405	Durbin-Watson stat	1.962115
Prob(F-statistic)	0.005457		

Source: researcher preperation using (E-views)

Table (19): Q-statistic probabilities adjusted for 4 dynamic regressors

	AC	PAC	Q-Stat	Prob*
1	-0.059	-0.059	0.1135	0.736
2	0.054	0.051	0.2128	0.899
3	-0.182	-0.177	1.3856	0.709
4	0.137	0.121	2.0834	0.720
5	-0.149	-0.129	2.9323	0.710
6	-0.060	-0.115	3.0755	0.799
7	-0.049	0.002	3.1738	0.868
8	-0.131	-0.208	3.9208	0.864
9	0.210	0.236	5.9425	0.746
10	-0.215	-0.260	8.1663	0.613
11	-0.100	-0.209	8.6707	0.652
12	-0.278	-0.199	12.787	0.385
13	0.279	0.093	17.196	0.191
14	-0.151	-0.132	18.570	0.182
15	0.015	-0.145	18.585	0.233
16	-0.061	-0.058	18.843	0.277



Graph (4): Actual, fitted, residual plot.

4. Forth Model

$$FDI_t = \propto + \beta exchange\ rate_t + u_t$$

4.1. Cointegration Results

Results of the bounds test procedure for co-integration analysis between FDI and exchange rate are presented in the table below.

Table (20): Bounds Test for Cointegration Relationship

Test Statistic	Value	K
F-statistic	2.413111	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: researcher preperation using (E-views)

From the above table (20) it is clear that, the f-calculated is lower than the upper limits of critical values for all significance levels starting from 5%. Which mean that at 95% confident level the null hypothesis " no long run relationship exist " is accepted, this means that there no cointegration relationship exists between FDI and exchange rate.

4.2. Results of the short Run ARDL Model of FDI

The table below presents the results of the short-run model of FDI using the ARDL technique. The model is selected based on the AIC.

Table (21): Estimated Short-Run Error Correction Model of the FDI using the ARDL Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FOREIGN_DIRECT_INVESTMEN(-1)	0.701399	0.136941	5.121909	0.0000
EXCHANGE_RATE__LE_USD__	154.3206	103.7307	1.487705	0.1484
C	347.7902	726.9557	0.478420	0.6362

Source: researcher preperation using (E-views)

From the above table (21), it is clear that

- Exchange rate has insignificant coefficient, at 5% significance level. This means exchange rate does not significantly affect FDI, and this result is consistent with granger causality test.

From the following tables (22-23) it is clear that there is no serial correlation as Durbin Watson value is near to 2, also from Q-statistics

probabilities, it is clear that there is no serial correlation as p–value is greater than 0.05, also this supported by graph 5 as the residuals is scattered randomly, in addition the fitted value are almost the same as the actual values. Also, from the value of R–square it can be concluded that the estimated Model explain around 64% in the variability of FDI.

Table (22): Model Criteria/Goodness of Fit

R-squared	0.670016	Mean dependent var	4112.027
Adjusted R-squared	0.645572	S.D. dependent var	3711.150
S.E. of regression	2209.390	Akaike info criterion	18.33346
Sum squared resid	1.32E+08	Schwarz criterion	18.47358
Log likelihood	-272.0019	Hannan-Quinn criter.	18.37829
F-statistic	27.41103	Durbin-Watson stat	2.063368
Prob(F-statistic)	0.000000		

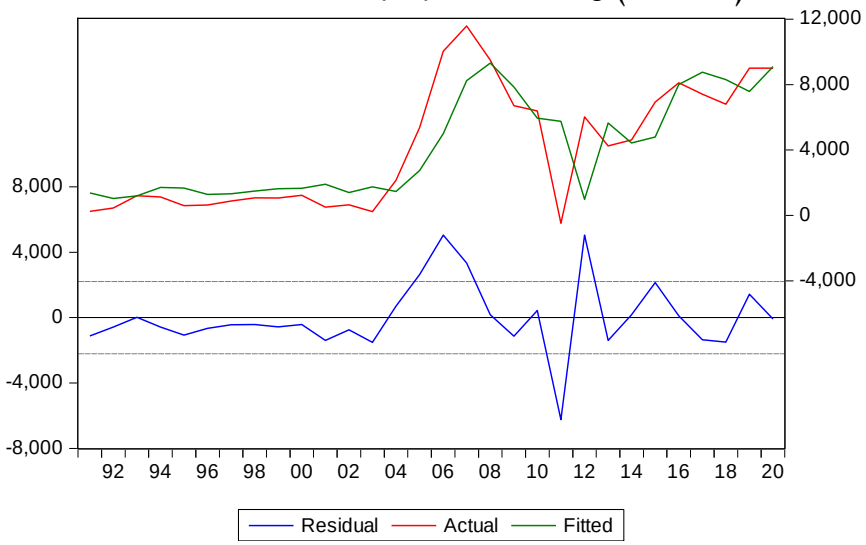
Source: researcher preperation using (E–views)

Table (23): Q–statistic probabilities adjusted for 4 dynamic regressors

	AC	PAC	Q-Stat	Prob*
1	-0.037	-0.037	0.0441	0.834
2	0.160	0.159	0.9243	0.630
3	-0.069	-0.059	1.0918	0.779
4	-0.269	-0.307	3.7616	0.439
5	-0.204	-0.228	5.3527	0.374
6	-0.017	0.064	5.3639	0.498
7	0.126	0.214	6.0222	0.537
8	0.056	-0.033	6.1605	0.629
9	0.047	-0.186	6.2633	0.713

10	0.010	-0.048	6.2677	0.792
11	-0.156	-0.023	7.4962	0.758
12	-0.086	-0.013	7.8946	0.793
13	-0.026	-0.023	7.9336	0.848
14	-0.019	-0.071	7.9546	0.892
15	-0.015	-0.123	7.9699	0.925
16	-0.005	-0.103	7.9716	0.950

Source: researcher preperation using (E-views)



Graph (5): Actual, fitted, residual plot

5. Fifth Model

$$balance\ of\ bayment\ _t = \propto + \beta exchange\ rate_t + u_t$$

5.1. Cointegration Results

Results of the bounds test procedure for co-integration analysis between balance of payments and exchange rate are presented in the table below.

Table (24): Bounds Test for Cointegration Relationship

Test Statistic	Value	k
F-statistic	4.044409	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: researcher preperation using (E-views)

From the above table (24) it is clear that, the f-calculated is lower than the upper limits of critical values for all significance levels starting from 5%. Which mean that at 95% confident level the null hypothesis " no long run relationship exist " is accepted, this means that there no cointegration relationship exists between balance of payments and exchange rate.

5.2. Results of the short Run ARDL Model of balance of payment

The table below presents the results of the short-run model of balance of payment using the ARDL technique. The model is selected based on the AIC.

Table (25): Estimated Short-Run Error Correction Model of the Balance of Payment (1990-2020) using the ARDL Approach

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
BALANCE_OF_PAYMENT__BOP_(-1)	0.529164	0.162326	3.259895	0.0031
EXCHANGE_RATE__LE_USD__	1487.113	427.4249	3.479238	0.0018
C	560.2455	1458.544	0.384113	0.7040

Source: researcher preperation using (E-views)

From the above (25) table, it is clear that

- Exchange rate has a positive significant coefficient, at 5% significance level. This means that every increase in the exchange rate by 1 unit will increase the balance of payment in the short-run by 1487.113 units. This result is contradicted with granger Causality test, so the result of ARDL is confirmed.

From the following tables (26-27) it is clear that there is no serial correlation as Durbin Watson value is near to 2, also from Q-statistics probabilities, it is clear that there is no serial correlation as p-value is greater than 0.05, also this supported by graph 6 as the residuals is scattered randomly, in addition the fitted value are almost the same as the actual values. Also, from the value of R-square it can be concluded that the estimated Model explain around 37% in the variability of balance of payments.

Table (26): *Model Criteria/Goodness of Fit*

R-squared	0.436310	Mean dependent var	596.5700
Adjusted R-squared	0.371269	S.D. dependent var	5586.338
S.E. of regression	4429.551	Akaike info criterion	19.75355
Sum squared resid	5.10E+08	Schwarz criterion	19.94038
Log likelihood	-292.3032	Hannan-Quinn criter.	19.81332
F-statistic	6.708214	Durbin-Watson stat	2.322967
Prob(F-statistic)	0.001675		

Source: researcher preperation using (E−views)

Table (27): Q−statistic probabilities adjusted for 4 dynamic regressors

	AC	PAC	Q-Stat	Prob*
1	-0.171	-0.171	0.9661	0.326
2	-0.153	-0.187	1.7635	0.414
3	0.035	-0.029	1.8082	0.613
4	-0.216	-0.259	3.5269	0.474
5	0.263	0.192	6.1810	0.289
6	-0.435	-0.522	13.742	0.033
7	-0.112	-0.202	14.263	0.047
8	0.260	-0.099	17.210	0.028
9	-0.092	-0.105	17.599	0.040
10	0.132	-0.203	18.436	0.048
11	0.026	0.131	18.470	0.071

12	0.073	-0.042	18.755	0.095
13	0.091	-0.079	19.228	0.116
14	-0.143	0.023	20.455	0.116
15	-0.036	-0.016	20.536	0.152
16	0.030	-0.002	20.597	0.195

Graph (6): Actual, fitted, residual plot.

Conclusion

In this research we estimated the different effects of liberalization of foreign exchange rate on the economic variables (inflation rate, balance of payment (BOP), government budget, and foreign direct investment (FDI) in the Egyptian economy during 1990-2020.

According to the above analysis, it was found that there is negative long run and short run impact of exchange rate on the budget deficit. It found that is a direct reciprocal relationship between the public budget deficit and exchange rates. That was clear through the analysis after the floating of the Egyptian pound in 2003 the Egyptian pound lost just over 25% of its value the budget the deficit decreases in the

period followed the floating and this deficit continue so that it affect the foreign and public debit increased as way to balance this deficit so that the country currency devaluated more than one time till the liberalization of the exchange rate in 2016. The budget the deficit decreases in the period following the liberalization.

While there is a positive short-run impact of exchange rate on each of inflation, and balance of payment. And the study investigated that there is no long run effect of the exchange rate on the two variables. From the value of R-square it can be concluded that the exchange rate explain only around 37% in the variability of balance of payments in the short-run. Thus, despite the series devaluation of the Egyptian pound, the trade balance Position did not improve. This is due to the rise in the foreign component of the domestic product and the heavy reliance on imports to meet domestic demand, which is what increases prices at home. In the Egyptian case, many factors weaken the ability of devaluation to improve the trade balance, even in the long term.

These restrictions are related to the nature of Egyptian exports and imports. As the nature of Egyptian exports, which are predominantly either primary products whose demand are derived demand from the demand for other products; or the low elasticity of demand for them for changes in their prices. Also, the nature of Egyptian imports which are dominated by food and investment goods.

The short run effect is evident that the exchange rate changes in 2003, during the managed floating, which led to a devaluation in the Egyptian pound were fully reflected in the rise in the rate of inflation. The same

thing happened following the liberalization of the exchange rate on 3rd November 2016, where the devaluation of the currency led to a rise in the annual inflation rate.

Also the study found that the relationship between fluctuations or changes in the exchange rate and foreign direct investment appears unstable and does not have the same effect, as it is governed by other factors and determinants related to the investment environment and its determinants, macroeconomic performance, and the nature of the structure of the economy itself.

The low flows of FDI in were mainly due to two factors, the lack of professionalism promotion of FDI in Egypt due to the absence of political and economic vision which cause a lack of a secure environment for FDI which led to a decrease in the flow of FDI to Egypt, especially with global competition to attract FDI. Plus shocks that faced the country such as 25th revolution, result in modest FDI flows.

Table (2): The Exchange rate, Foreign Direct Investment, Inflation rate, Budget Deficit and Balance of Payment in Egypt (1990–2020)

Year	Balance of Payment (BOP)(US$ MN)	Foreign Direct Investment (FDI)(US$ MN)	Inflation Rate % (CPI)	Budget Deficit/Surplus (Fiscal Balance) (US$ MN)	Exchange Rate (LE/USD)%
1990	-338.9	734	16.76	-2911	2
1991	4704.8	253	19.75	-3519	3.33
1992	3665.3	459	13.64	-3169	3.34
1993	2108	1206.5	12.09	-2272	3.37
1994	755.2	1133.4	8.15	-3623	3.39
1995	571.4	595.2	15.74	-749	3.39
1996	1915	636.4	7.19	-883	3.39
1997	135.1	886.9	4.63	-687	3.39
1998	-2120.9	1075.5	3.87	-4831	3.39
1999	-3026.7	1065.3	3.08	-2628	3.41
2000	-871.4	1235.4	2.68	-3725	3.69
2001	456.5	509.9	2.27	-5424	4.49
2002	546	646.9	2.74	-8650	4.5
2003	-158.3	237.4	4.51	-8481	6.15

2004	4477.7	2157.4	11.27	-7448	6.13
2005	3253.4	5375.6	4.87	-8586	5.73
2006	5282.3	10042.8	7.64	-8758	5.7
2007	5420.4	11578.1	9.32	-9574	5.5
2008	-3377.6	9494.6	18.32	-11089	5.5
2009	3355.7	6711.6	11.76	-12991	5.48
2010	-9753.9	6385.6	11.27	-17754	5.79
2011	-11278.4	-483	10.06	-23091	6.02
2012	237	6031	7.11	-27745	6.31
2013	1478.6	4256	9.4	-37114	6.94
2014	3724.9	4612	10.07	-35977	7.14
2015	-2813	6925.2	10.37	-36499	7.81
2016	13717.2	8106.8	13.81	-40511	18.13
2017	12787.7	7408.7	29.51	-25675	17.68
2018	-120.5	6797.6	14.4	-24985	17.87
2019	-8587.2	9010	9.2	-21859	15.99
2020	-8587.2	9010	5	-21859	15.75

Source: researcher preparations depend on World Bank (WB), Egyptian Central Bank (CBE), and Arab Monetary Fund (AMF) database.

References

Central Bank of Egypt. (annual Repots). *Annual Report.* cairo: CBE.

El-Ramly , H., & Abdel-Haleim, S. M. (2008). The Effect of Devaluation on Output in the Egyptian Economy: A Vector Autoregression Analysis. *International Research Journal of Finance and Economics*, 82-99.

Abdelgany, M. (2020, April). Determinants of Real Exchange Rate Evidence: from Egypt. *Faculty of Politics and Ecnomics Bani-Suef University, 7*(6), 1-60. doi:10.21608/jocu.2020.37917.1041

Abdelmoula, Y., Emar, H., & Elsaye, R. (2017). The Effects Of Exchange Rate Regimes On Economic. *3rd International Conference on Social Sciences Economics and Finance on* , (p. 26th). Montreal, Canada.

Ayodele, T. D. (2014). An Empirical Evaluation of the Impact of Exchange Rate on the Nigeria Economy. *Journal of Economics and Sustainable Development,, 5*(8), 25-28.

Central Bank of Egypt . (2016/2017). *Annual Report.* Cairo: CBE. Retrieved from https://www.cbe.org.eg/en/EconomicResearch/Publications/Pages/AnnualReport.aspx

El Baz, O. (2014, May 12). The Determinants of Inflation in Egypt :An Empirical Study (1991-2012). *The Egyptian Center for Economic Studies*, 1-14. Retrieved from https://mpra.ub.uni-muenchen.de/id/eprint/56978

El-Ghaly, A. H., & Thomas, H. A. (2018). The relationship between the foreign exchange rate and the public budget deficit case study of Egypt (1990-2014). *Journals eduction for girls*, 17-40.

Elsherif, M. A. (2016). Exchange Rate Volatility and Central Bank Actions in Egypt: Generalized Autoregressive Conditional Heteroscedasticity

Analysis. *international journal for economic and financial issues* , 1209-1216.

Ezzat, A. M. (2018). The effect of exchange rate movements on trade balance performance in Egypt: Is there a J-curve phenomenon? . *Scientific Journal for Economic& Commerce* , 659-.

Haiba, E. I. (2019, July 31). The effect of foreign direct investment on unemployment rates in Egypt during the period (1991-2016). *Journal of the Faculty of Economics and Political Science, 20*(3), 40-70. Retrieved from https://search.emarefa.net/detail/BIM-908180

Khodeir, A. N. (2012). TOWARDS INFLATION TARGETING IN EGYPT: THE RELATIONSHIP. *South African Journal of Economic and Management Sciences*, 325-332.

Moursi, T. A., El Mossallamy, M., & Zakareya, E. (2007, April). Effect of Some Recent Changes in Egyptian Monetary Policy:Measurement and Evaluation. *Egyptian Center for Ecnomic Studies*, 4.

Patel, D., & Mah, G. (2018, March 15). Relationship between Real Exchange Rate and Economic Growth: the case of South Africa. *Journal of Economics and Behavioral Studies , 10*(1), 146-158. doi:https://doi.org/10.22610/jebs.v10i1(J).2098

Selim, H. (2012, 1 1). Has Egypt's Exchange Rate Policy Changed after the Float? *{Middle East Development Journal}, 4*, 1250005-1-1250005-27. doi:10.1142/S1793812012500058

Shokry, N. (2017). The Impact of Exchange Rate Changes on Sectoral Activity:. *THE AMERICAN UNIVERSITY IN CAIRO*. Retrieved from http://dar.aucegypt.edu/bitstream/handle/10526/5124/final%20thesis%20final%20.pdf?sequence=1

Taileb, K. A. (2017). Effectiveness of managed float for foreign exchange in reducing the trade balance deficit Applied Study on the Egyptian Trade Balance during 2003 - 2016 .". 1-33.