Egypt, Currency Devaluation Effect on Small and Medium Enterprises Export Competitiveness

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Abstract

This research has reviewed the nature of interest rate and currency devaluation by focusing on types, systems and factors that affect the exchange rate. It studied how countries can have a control over their economies to achieve high level of economic stability.

This research has reviewed the nature of small and medium enterprises (SMEs) by focusing on some important aspects such as the definition and importance of SMEs.

It then explored the SMEs competitiveness that covered the Factors affecting competitiveness, Policies to improve SMEs' competitiveness and indicators/measurements, targeting to understand the nature of SMEs and its activities comprehensively and endwise perspective.

I. Introduction:

"Entrepreneurs are individuals with the capability to see an opportunity, to obtain the necessary capital, labor, and other inputs, and also to know in what manner to place together an operation successfully, and with the readiness to take the subjective venture of success or failure." (Koontz and Weihrich, 1990)

"The small business enterprise is often labelled as the actual bone of entrepreneurship; it provides the idyllic atmosphere supporting entrepreneurs to use their capacities to the full and to attain the goals and objectives they have set for themselves. In all successful economies, entrepreneurs are seen as essential for growth, job creation and social growth and the virtues of small business are by now almost entirely accepted." (Ben Vosloo, 1994).

Monetary policy, the most important areas of economic policy, as it clarifies the connection between cash and economic movement. The efficiency of monetary policy depends in specific on the capacity of the banking system to mobilize the prime rate of savings, deposits and stability of inflation.

Monetary policy is part of and a tool of macroeconomic policy. It is a set of procedures and policies that have to meet the required objectives through monetary or currency policy tools. Interpretation will involve money and the money supply, which is under the regulations of the central bank. (Hynková, 2014).

II. Research Objectives:

The research measures impact on small and medium enterprises exports' competitiveness before and after currency devaluation in Egypt.

1. Evaluating the effectiveness of changing the exchange rate system on the SMEs export value in Egypt during the period 2000-2019.

2. Studying the development of the small and medium enterprises' growth rates of exports and their importance in the Egyptian economy during the study period.

Research Questions:

1. How does the currency devaluation affect the small and medium enterprises' export competitiveness before and after the exchange rate volatility?
2. How does the currency devaluation affect the small and medium enterprises imports before and after the exchange rate volatility?

III. Literature Review

The monetary policy in developed economies acts as the function of steadiness and upholding proper equilibrium in the economic structure.

In underdeveloped countries, the monetary policy has to be more vigorous to meet the requirements of a growing economy. It is now widely acknowledged that monetary policy can be a commanding tool of economic alteration. Monetary authority should aim at neutrality of money in the economy. Any monetary variation is the root cause of all economic instabilities.

The objective of monetary policy varies from country to country and from time to time, (Mathai, 2009).

Exchange stability was the conventional objective of monetary specialist. This was the main impartial under Gold Standard among several countries. The main objective of monetary strategy is to preserve stability in the external equilibrium of the country. In other words, they should try to eliminate those adverse forces, which tend to bring instability in exchange rates (joackers & willeke, 2001)

Price stability is regarded as the most sweeping goal of monetary policy. Stable prices recline public confidence as cyclical fluctuations are totally eliminated (Bulletin, 2019).

In latest times, it is contended that the attainment of full employment repeatedly includes prices and exchange stability (Mishkin, 2015). It indicates an increase in the total substantial or real output, production of goods for the fulfilment of human needs (Hassan & Mabrouk, 2012):

Equilibrium in the balance of payments is a vital purpose of monetary policy (Beyer, Nicoletti & Papadopoulou, 2017).

The notion of monetary policy has been defined in an altered means according to different economists; R.P. Kent has defined the monetary policy as "The management of the expansion and contraction of the volume of money in circulation for the explicit purpose of attaining a specific objective such as full employment." (Carlberg, 2010)

Monetary Policy controls the flow of monetary resources in the economy to reach certain principles.

Monetary policy engages the effect on the intensity and structure of aggregate demand by the manipulation of interest rates and the availability of credit, (Temperton, 1986).

A broader description of monetary policy could include action designated to affect the constitution and mature outline of the state debt.

Open market operations (OMC) are geared to purchase short-term securities and seal of long-term bonds, as well as long-term government bonds. In the words of C.K. Johri, "It would comprise those decisions of the government and Reserve Bank of India which affect the volume and composition of money supply in the size and distribution of credit (including Co-operative Banks Credit) the level and structure of interest rates and the effect of these variables upon the factors determining output and prices." (Mishkin, 2015)

Monetary policy surges liquidity to create economic development and moderates liquidity to avoid inflation. The money supply includes forms of credit, cash, checks, and mutual funds. Central banks employ interest rates, bank reserve requirements, and the amount of government bonds that banks must maintain (Eldegwy, 2017).

Monetary policy controls the achievement of various economic goals, depending on a set of basic tools through which it can direct the movement of economic activity, and fix the various defects in a way that ensures attaining the general goals of achieving monetary stability and therefore economic stability.

A brief description of the same has been as follows: Monetary substantiate, reserve requirements, discount gap-lending, interest rates, and open market operation (Geanina, 2010, Mishkin, 2015, Eldegwy, 2017).

Monetary policy can be instigated by changing the magnitude of the monetary base. This directly changes the total amount of money circulating in the economy (Geanina, 2010).

The monetary authority applies guiding power over banks. Monetary policy can be realized by changing the percentage of total assets that banks must retain in reserve with the central bank (Mishkin, 2015).

It allows the corporations to change credit conditions by affecting the money supply. It is to mention that the Discount Window is the only channel, which the Central Banks do not have total control over. By influencing the money stream, it is hypothesized, that monetary policy can found series for inflation, unemployment, interest rates, and economic growth (Geanina, 2010).

The shortening of the monetary supply can be reached indirectly by rising the nominal interest rates. One cannot set separate targets for both the monetary ground and the interest rate. In other countries, the monetary regulatory may be able to mandate specific interest rates on loans, savings accounts or other assets (Eldegwy, 2017).

The central bank can also purchase or sell securities released by the government to affect the money supply. For example, central banks can purchase government bonds. As a result, banks will acquire more money to boost the lending in the market (willeke, 2001).

Monetary policy influences the real economy through different transmission channels. The main ones are the interest rate, the exchange rate, the asset price and the credit channel with the latter being split into the bank lending means and the balance sheet (Ireland, 2006).

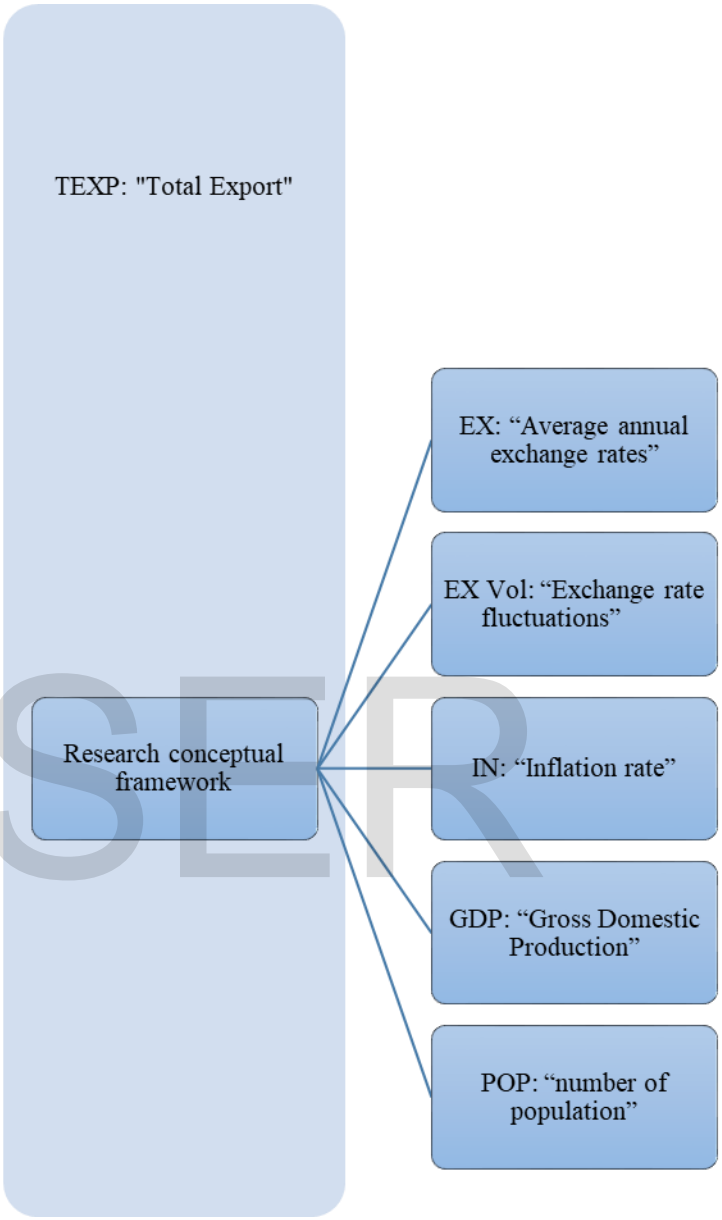
Economic strategy implies to the activities that governments seize in the economic grazing. It covers the systems for placing interest rates and government budget as well as the labor souk, national possession, and other areas of government intrusions into the economy (Geanina, 2010).

Governments and central banks are restrained in the number of targets they can achieve in the short period. There may be anxiety on the government to decrease inflation, reduce unemployment, and cut interest rates while sustaining currency stability. If all of these are chosen as short-term objects, then policy is likely to be incoherent (Ireland, 2006).

Monetary policy disturbs accomplishments in the real economy, the rate of default amid firms, credit losses on loans, asset values, and balance sheets. Financial policy effects the operation of financial markets and thus the monetary policy diffusion mechanism, via risk premiums (for credit, liquidity), it also adjusts financial environments. Financial policy and monetary policy are conceptually different, with diverse objectives and instruments. They are also apparent policies when the same authority, is in charge of both. Lessons from the crisis must be learned by the regulators of monetary and financial policy (Ireland, 2006).

The equilibrium linking of monetary and fiscal policy is a non-cooperative Nash equilibrium rather than a coordinated equilibrium. Under normal conditions, financial stability is best run by financial policy, not by monetary policy. In a crisis, monetary policy would only be used as a last track of defence, only when the financial policy instruments are lacking or insufficient (Geanina, 2010).

IV. Research conceptual framework and Hypotheses



The research structure shows the plan that has been undertaken to test the hypothesis, answer the research questions and achieve the aim and objectives, literature review followed by the conceptual format and hypothesis, currency devaluation and efficiency and competitiveness of small and medium enterprises, research Methodology and Finally, conclusion and Recommendation.

This paper, introduced the research background to demonstrate the association between the currency devaluation and small & medium enterprises’ export competitiveness to define the research aim and objectives and arrive at a set of questions and hypotheses that try to answer the research problem. In addition, the paper presented the research

methodology and processes by which research uses quantitative analytical research to search for the previous wandering relation.

Also by using some standard models, economic policies can be tested by predicting the behavior of the economic variables under study, in addition to the impact of shocks that may occur on those variables in future periods.

In addition, the paper determine the time limits for current study to cover the period from 2000-2019, as that period covered many important internal and external economic and political events in Egypt. Finally, the outline of the research structure and design was presented.

The Main Hypothesis of this paper is to find relationship between the currency devaluation and small & medium enterprises export competitiveness. These hypotheses were presented as following:

1. There is a significant relationship between the currency devaluation and small & medium enterprises export competitiveness before and after the exchange rate volatility.
2. There is a significant relationship between the currency devaluation and small & medium enterprises imports before and after the exchange rate volatility.

V. Research Methodology:

Some standard models can explain the behavior of economic variables and how they affect each other. Using these models, economic policies can be tested by predicting the behavior of the economic variables under study, as well as the impact of shocks that may occur on those variables in future periods.

One of these models is the ARDL (Autoregressive Distributed Lag), with the aim of testing the most important independent variables that influence the most on the small & medium enterprises export competitiveness, in addition to the exchange rate devaluation during the period under study.

Moreover, by application to the Egyptian economy. In addition to relying on the Granger causality test to study the causal relationship between the variables under study.

VI. Testing the research hypothesis

It is noticeable that the previous studies differ in the methodology used to test the relationship between the variables under the current study, but this study will depend on a methodology somehow different from those studies to ensure the validity of the study hypotheses.

Research variables & Data sources:

- **Research variables:**

  In light of what has been reviewed from previous studies that dealt with studying the variables under the current study, those variables were chosen to form the model of the current study, and the logarithmic conversion of

the variables will be done in order to mitigate the influence of outliers (statistically) and in order to gain elasticities. Thus, the long-term relationship model is formulated as follows:

- **The study model:**

$$\boldsymbol{ln\ (TEXP)SMEs} = \boldsymbol{\beta_0 + \beta_1 . \ln EX + \beta_2 . \ln EX_{Vol} + \beta_3 . \ln POP + \beta_4 . \ln GDP + \beta_5 . \ln IN + \epsilon_t} \qquad (1)$$

As:

- **Ln**: refer to "the natural logarithm".
- **TEXP:** "the total Export of plastic or Rubber**".**
- **EX:** refer to "Average annual exchange rates".
- **EX Vol :**refer to "Exchange rate fluctuations" (Volatility) measured by the standard deviation. that is calculated according to the following formulas:

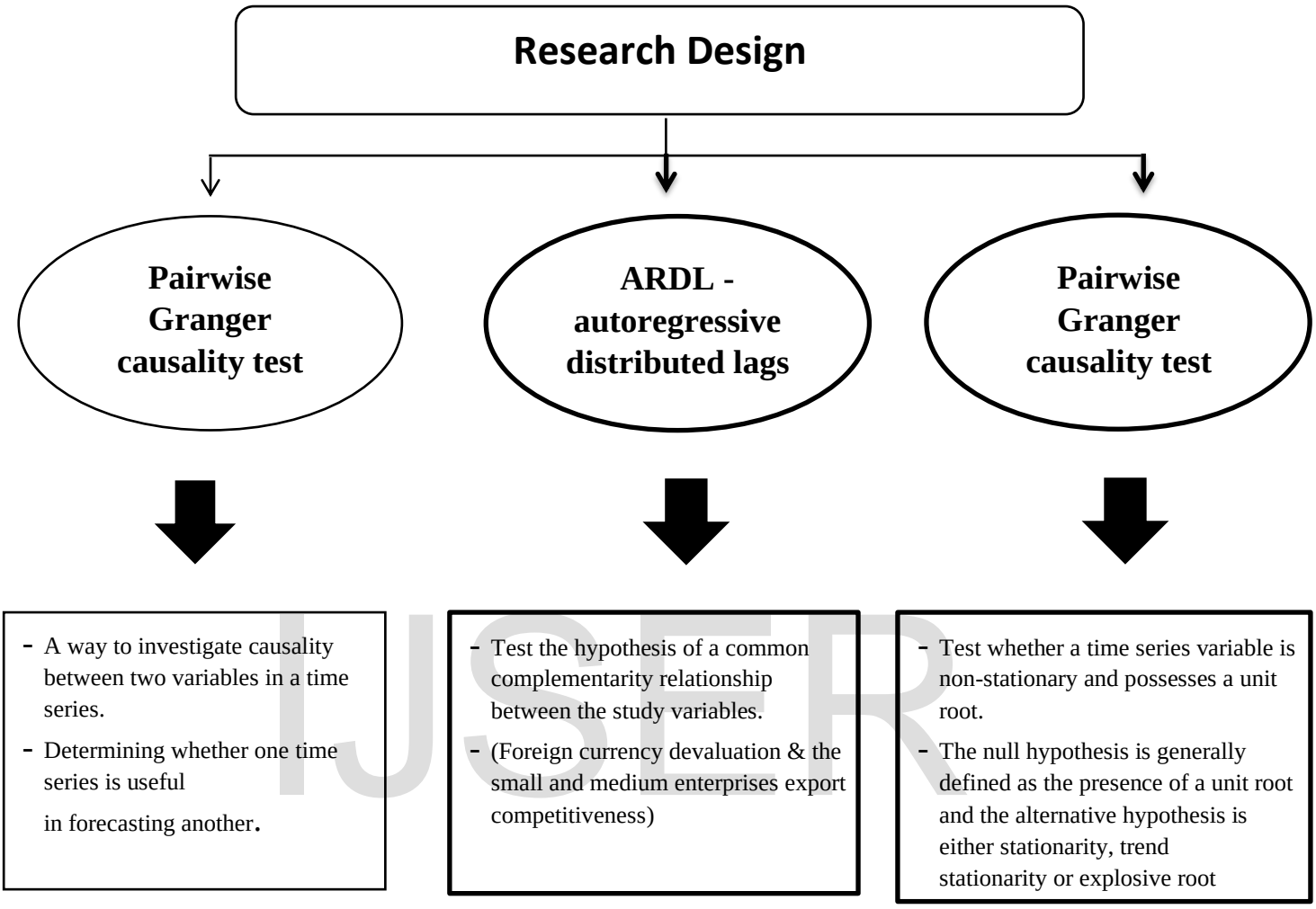
$$\sqrt{\frac{1}{m}\sum_{i=1}^{m}(\,EX_t - EX_{t-1})^2}$$

- **IN**: "Inflation rate".
- **GDP:** "Gross Domestic Production".
- **POP:** "number of population".
- $\boldsymbol{\beta_0}$**:** ": Fixed limit".
- $\boldsymbol{\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,}$ **:** "Regression coefficients for the independent variables".
- $\boldsymbol{\epsilon_t}$**:** "Random error".

- **Data sources:**

As for data sources, secondary data will be relied upon during the period (2000-2019), and data on exchange rates, exports and imports of small and medium enterprises, inflation index, number of population, were obtained from the Central Bank of Egypt, annual report, annual economic journal various issues, and World Bank database

Research Philosophy, design, approach and strategy:



Pairwise Granger causality test:

Granger causality is a mode to investigate causality between two variables in a time series. The method is a probabilistic account of causality; it uses empirical data sets to find patterns of correlation.

Causality is closely related to the idea of cause-and-effect, although it is not exactly the same. A variable X is causal to variable Y if X is the cause of Y or Y is the cause of X. However, with Granger causality, we are not testing a true cause-and-effect relationship; but in-order to know is if a particular variable comes before another in the time series.

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another, first proposed in1969. Ordinarily, regressions reflect "mere" correlations, but Clive Granger argued that causality in economics might be verified for by measuring the ability to forecast the future values of a time series using prior values of another time series.

Since the question of "true causality" is extremely philosophical, and because of the post hoc ergo propter hoc fallacy of supposing that one thing preceding another can be used as a proof of causation, econometricians assert that the Granger test retrieves only "predictive causality". Using the term "causality" alone is a incongruity, as Granger-causality is better described as "precedence", or, as Granger himself later claimed in 1977, "temporally related", rather than testing whether Y causes X, the Granger causality tests whether Y forecasts X.

A time series X is said to Granger-cause Y if it can be illustrated, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

Granger also emphasized that some studies using "Granger causality" testing in fields outside economics reached "ridiculous" conclusions. "Of course, many ridiculous papers appeared", he said in his Nobel lecture. However, it leftovers a common method for causality analysis in time series due to its computational ease. The fundamental definition of Granger causality does not reason for latent confounding effects and does not annex instantaneous and non-linear causal relationships, yet several additions have been proposed to address these matters. (Granger, 2004).

Steps for the F-Test

Make sure your time series is stationary before proceeding. Data should be transformed to eliminate the possibility of autocorrelation. You should also make sure your model does not have any unit roots, as these will skew the test results.
The essential steps for running the test are:

1. State the null hypothesis and alternate hypothesis. For example, y(t) does not Granger-cause x(t).
2. Choose the lags. This typically rely on how much data you have accessible. One approach to choose lags i and j is to run a model order test (i.e. use a model order selection method). It may be simpler just to choose several values and run the Granger test several times to see if the results are the same for different lag levels. The results should not be sensitive to lags.
3. Find the f-value. Two equations can be used to find if $\beta j = 0$ for all lags.

The Pairwise Granger causality tests will be relied upon to find out the relationship direction, or what is known as causation.

Notice that the Granger causality depends on the expected change of a variable if it occurs before the other variable. If one variable precedes the other, we are not sure that the first causes the other, but we can say that the other cannot cause the first. For example, if an event occurs, let "X", after "Y", then "X" cannot cause "Y". (Gujarati, 2009)

Granger's causality is not in the traditional meaning. However, here it means precedence, "that is, all we seek to prove is that a variable temporarily precedes another variable". It is said that variable "X" will be a cause in variable "Y" if the current values of variable "Y" cannot be better predicted using the previous values of variable "X" than if it is based on "Y" values only. This indicates that changes in "X_t" precede changes in "Y_t". In order to measure the causality between the rates of the variables under investigation in the current study according to the Granger causality methodology, as follows:

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-1} + \sum_{j=1}^{n} \beta_j Y_{t-j} + U_t \qquad \textbf{(1)}$$

The null hypothesis came as follows: "X does not Granger Cause Y" Ho : $\beta_j = 0$

ARDL - Autoregressive Distributed Lags:

The regression may include lagged values of the dependent variable and current and lagged values of one or more explanatory variables. This model allows us to determine what the effects are of a change in a policy variable.

1- A simple model:

The ADL (1,1) model

$y_t = m + \alpha_1 y_{t-1} + \beta_0 x_t + \beta_1 x_{t-1} + u_t$,

Where "y_t" and "x_t" are stationary variables and "u_t" is a white noise.

The White-noise process: A sequence $\{u_t\}$ is a white-noise process if each value in the sequence has a mean of zero, a constant variance, and is serially uncorrelated.

The sequence $\{u_t\}$ is a white-noise process if for each period t,

$E(u_t) = E(u_{t-1}) = \cdots = 0$

$E(u_{2t}) = E(u_{2t-1}) = \cdots = \sigma 2$

$E(u_t u_{t-s}) = E(u_{t-j} u_{t-j-s}) = 0$, for all u.

2- Estimation:

If the values of "x_t" are treated as given, as being uncorrelated with "u_t". OLS would be consistent. However, if "x_t" is simultaneously determined with "y_t" and $E(x_t u_t) \_= 0$, OLS would be inconsistent.

As long as it can be assumed that the error term u_t is a white noise process, or more generally-is stationary and Independent of $x_t, x_{t-1}, \cdots$ and $y_t, y_{t-1}, \cdots$, the ADL models can be estimated consistently by ordinary least squares.

3- Interpretation of the dynamic effect:

We can invert the model as the lag polynomial in y as

$yt = (1+\alpha 1 + \alpha 21 + \cdots)m + (1 + \alpha 1L + \alpha 21L2 + \cdots)(\beta 0 x_t + \beta 1 x_{t-1} + u_t)$.

The current value of y depends on the current and all previous values of x and u.

4- Re-parameterization:

Substitute y_t and xt with $y_{t-1} + \Delta y_t$ and $x_{t-1} + \Delta x_t$.

$\Delta y_t = m + \beta_0 \Delta x_t - (1 - \alpha 1) y_{t-1} + (\beta_0 + \beta_1) x_{t-1} + u_t$,

This is called the error correction model (ECM).

The current change in y is the sum of two components. The first is proportional to the current change in x. The second is a partial correction for the extent to which y_{t-1} deviated from the equilibrium value corresponding to x_{t-1} (the Equilibrium error).

5- Generalizations:

The ADL(p, q) model:

$A(L)y_t = m + B(L)x_t + u_t$,

With

$A(L) = 1 - \alpha 1L - \alpha 2L2 - \cdots - \alpha pLp$,

$B(L) = \beta_0 + \beta_1 L + \beta_2 L2 + \cdots + \beta qLq$.

The general ADL(p, q1, q2, · · · , qk) model:

$A(L)y_t = m + B1(L)x1t + B2(L)x2t + \cdots + Bk(L)x_{kt} + u_t$,

If A(L) = 1, the model does not contain any lags of y_t. It is called the distributed lag model.

This study will rely on the "ARDL model" in order to test the hypothesis of a common complementarity relationship between the study variables (foreign currency devaluation & the small and medium enterprises export competitiveness)

The "ARDL" model detects short-term and long-term effects in one equation, and its most important features are:

- It does not necessarily need long time series compared to the method of joint integration according to (Johansen, Engel and Granger).
- Its flexibility in using the integral variables of order I (0) i.e. stable at the level (0) or stable at the first difference I (1) or a combination of both. While the stable variables are not taken into account at the second difference I (2). (Lai and Cheung, 1993).

In practice, when using the ARDL model, one must know the stability rank of the variables used in the study model. There are several tests for unit root and time-series stability, the most important of which are: the Extended Dickey-Fuller test (ADF), the Phillips-Peyron test (PP) and the (KPSS) test.

Regarding the general form of the ARDL model showing the relationship between the dependent variable "Y" and the independent (explained) variable "X", it takes the following form:

$$\Delta y_t = \alpha - \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + \sum_{j=1}^{p-1} a_j \Delta y_{(t-j)} + \sum_{j=0}^{q-1} \pi_j \Delta x_{t-j} + \varepsilon_t \qquad \textbf{(2)}$$

Where the parameters of the long-term variables with single slowdown periods are from which the long-term integration function is derived, the dependent variable parameter λ_1 represents the error correction parameter, and the π_j parameters refer to the short-term estimates, and p and q refer to the number of slowdown periods that are estimated depending on one of some criteria such as the AIC information standard (AIC), or the Sischwartz standard (SC), whether for the dependent variable or the independent variable; The slowdown period, which gives the lowest value for AIC and SC, is chosen.

Also it should be noted that it is important that the sign of the parameter $\lambda_1$be negative so that we can say that there is a possibility to override the short-term errors in order to return to equilibrium, and the long-term parameter of the co-integration function of the variable X is calculated according to the equation:

$$\beta = -\frac{\lambda_2}{\lambda_1} \qquad \textbf{(3)}$$

The existence of an integration relationship is tested using the **"Wald test"**and the **"F"** statistic; where the null hypothesis of "there is no co-complementarity relationship between the variables under study in the long term" is tested:

$$H_0: \lambda_1 = \lambda_2 = \cdots = \lambda_n = 0 \qquad \textbf{(4)}$$

The significance is tested by comparing the calculated "F" value with the tabular values suggested by (Pesaran et al, 2001), and not the usual (F) values. If the calculated value of "F" exceeds the value of the upper limit, the null hypothesis is rejected, and the alternative hypothesis is accepted without the need to know the degree of integration, while if it is less than the lower limit, then the null hypothesis is accepted. In case of the value of "F" is found between the lower and upper limits, then a critical decision cannot be made, and then it is necessary to examine the properties of the time series to know the degree of integration before making a decision, and the F test here depends on the number of explanatory variables, And whether the (ARDL) model includes a constant and a direction, and to check whether there is a single equation that achieves the common integration between the variables of the model.

Unit roots test:

In statistics, a unit root test tests whether a time series variable is non-stationary and possesses a unit root.

The null hypothesis is normally defined as the existence of a unit root and the alternative hypothesis is either stationarity, trend stationarity or explosive root depending on the test used.

A commonly used test that is valid in large samples is the augmented (Dickey,Fuller,1979) test. The optimal finite sample tests for a unit root in autoregressive models were developed by Denis Sargan and Alok Bhargava, by extending the work by John von Neumann, and James Durbin and Geoffrey Watson. In the observed time series cases, for example, Sargan–Bhargava statistics test the unit root null hypothesis in first order autoregressive models against one-sided alternatives, i.e., if the process is stationary or explosive under the alternative hypothesis.

Other popular tests include:

- Phillips–Perron test
- KPSS test (in which the null hypothesis is trend stationarity rather than the presence of a unit root)
- ADF-GLS test
- Zivot–Andrews test

Unit root tests are closely linked to serial correlation tests. However, though all processes with a unit root will exhibit serial correlation, not all serially correlated time series will have a unit root.

Popular serial correlation tests include:

- Breusch–Godfrey test
- Ljung–Box test
- Durbin–Watson test

This test aims to know the stability or serenity of the time series used in the study and to avoid false results due to their instability. This test is the first step when performing any of the integration tests, and the most important and popular test that reveals the presence of the unit roots or not is the test of (ADF) Augmented Dickey-Fuller, Phillips-Perron (PP) & Kwiatkowski, Phillips, Schmidt, Shin (KPSS).

ADF is most used for empirical assessment; however, if the series is correlated at higher order lags, the hypothesis of white noise turbulences is disrupted.

The PP test suggests a technique by which to operate for higher order serial correlation in a series than is assumed in the equation. The test compels a nonparametric correction to the t-test statistic. The test is strong with regard to unspecified autocorrelation and heteroscedasticity in the disturbance process of the test equation.

Finally, KPSS time series is stationary around a deterministic trend. This test differs from those in collective use in that they have a null hypothesis of stationarity. The test may be run under the null of either trend stationarity or non-trend stationarity. Extrapolation from this test is corresponding to that resulting from those based on the ADF. This test is often engaged with ADF to examine the possibility that a series is fractionally integrate.

Applying the Unit Root Test, Augmented Dickey Fuller, takes the form of the following equation:

$$\Delta Y_t = \beta_1 + \partial y_{t-1} + \upsilon_t \qquad \textbf{(5)}$$

Where (Δ) refers to the first difference of the time series (y_t), and the hypothesis for the unit root test is as follows:

$$H_0: \partial = o$$

(The series is not static "there is a unit root in the time series")

This test can be done in three alternative cases, as follows:

- The equation contains only one constant (Intercept).
- The equation contains a constant term and a time general trend (Trend & Intercept).
- The equation does not contain a constant or a general time trend (None).

The decision regarding the static of the time series is taken, either by comparing the "calculated t-" with the "table t-" value at the specified level of significance, or by comparing the value of Sig with the value of α "1%, 5% & 10%", and the decision is made in the case of if The "computed t-" was greater than the "tabular t-" or (the value of Sig less than the value of α), which is the rejection of the null hypothesis that there is a unit root in the series, meaning that the "series is static."

In addition, vice versa, in the case of accepting the null hypothesis; That is, the series is "non- static ", so the solution is to re-test again after taking the first differences. That is:

$$\Delta Y_t = Y_t - Y_{t-1} \qquad \textbf{(6)}$$

In case of retesting after the first difference of the series and the null hypothesis is rejected, the series will be static and complementary of the first degree. However, in the case of accepting the null hypothesis again, the solution is to re-test a third time, but after taking the second difference of the series, and if the null hypothesis is rejected, the series in this case will be static and an integrated second degree.

VII. Conclusion

The aim of the study is to examine the effect of exchange rate movements on firm-level exports in Egypt during the period 2000 until 2019. In this respect, the study uses transaction level data from the General Organization for Export and Import Control of Egypt (GOEIC), an affiliated agency to the Egyptian Ministry of Trade and Industry.

The data contains monthly information on firms, the value and quantity of exported products in both USD and EGP classified in the Harmonized System (HS) of classification at the 4-digit level of disaggregation, as well as, their destination countries.

The raw data set contains around 1.7 million transactions for the period January 2000 until October 2019. To generate a manageable sample, export transactions of products that belong to product groups accounting for less than one percent of their respective sector's export value and those of firms which export less than one percent of the export value during the whole sample period while having low relative comparative advantage (RCA), were excluded from the study.

Transactions to only 85 countries out of 220 were included in the sample either due to required data for the explanatory variables being unavailable for the whole sample period for some of the destinations or the export value to those destinations combined accounted for less than one percent of export value.

Moreover, other observations have been dropped automatically during estimation due to severely unbalanced panels or insufficient data for certain products during certain months in the 19-year period. This final sample captures around 70 percent of Egypt's exports value of the whole dataset. The sample also provides a diverse sample of export markets including developed as well as developing countries.

In panel data, researchers usually deal with two dimensions, for instance firms and time, rather than only firm or time as in cross-sectional and time-series analysis, respectively. However, in our study, there are even more than two dimensions, namely firms, products, destination markets and time dimensions, meaning that observations in each individual panel do not begin and end at the same dates and some have missing data in between.

This is the case because in a sample period that spans for 12 years, the continuity of more than 13,000 firms to export the same product to the same destination is not realistic.

Some firms might go bankrupt or merge with other firms, decide to export to other destinations, shift their production to a different product category or start their activity after the sample begins. Having an unbalanced sample is not a major problem by itself because the regression used in this study can accommodate unbalanced data. Nonetheless, based on (Cameron and Trivedi, 2005) and (Wooldridge, 2013), an issue arises when attrition is non-random, which means firms leave the sample for reasons correlated with the errors of the dependent variable.

However, one cannot easily drop all firms that do not start and end with the sample because a survivorship bias will occur (Yang, 2017) which can be considered a form of selection preference. Fortunately, the fixed effects model allows attrition to be correlated with the unobserved effects that are controlled for in the estimation (Wooldridge, 2013).

The overall results of the effect of real exchange rate on the intensive margin (value) and quantity of Egyptian export trade using different combinations of fixed effects and interaction terms. To control for unobservable effects on the intensive margin, include different time, firm, product and destination fixed effects, using time trends that yield inconsistent coefficients for the real exchange rate variable.

The reason for this inconsistency is that exchange rate is already adjusted for inflation, which is one of the macroeconomic influences to be controlled by the time dummies. Therefore, time trends are not suitable for this regression.

The consistency of the positive and statistically significant coefficients for the real exchange variable and the other explanatory variables using different fixed effects is an indication of the estimate stability. As the dummies, included control for most of the potentially omitted variables is used as the baseline regression for all estimations of the heterogeneity analysis.

Thus, a 10 percent currency depreciation is associated with a 1.5 percent increase in the USD value of exports, which is small compared to the 5.1 percent increase in the EGP value of exports. The 3.2 percent positive effect on export quantity associated with a 10 percent currency depreciation is theoretically intuitive because of short-run price stickiness.

In fact, (Froot and Klemperer, 1989) and (Knetter, 1989) argue that exporting firms with a market share objective do not increase the profit margin in order to increase export volume.

Two studies that have similar research questions to this paper but use different methodologies can be used as benchmarks for our results. In the first study, (Zaki et al., 2017) find that a 10 percent currency depreciation is associated with around 2 percent positive effect on the export value in USD, which is a slightly larger estimate compared to ours, while the 2 percent positive effect of the EGP value is smaller than ours is.

They also find the effect on export quantity to be statistically insignificant. In addition, gravity model specific explanatory variables were used rather than the product-destination specific variables used in our model.

The second study conducted by (Ali, 2017) uses a more similar approach to ours with a similar Pakistani dataset, however, the study was only limited to the exports of the agricultural sector. He finds that a 10 percent depreciation is associated with a 1.4 percent increase in agricultural exports, which is a very similar estimate to ours, and 0.4 percent increase in quantity using transaction level exchange rates. He also finds that his estimates are smaller than the estimates of other studies examining product or firm-level exports of more developed countries.

The coefficients of the control variables all have the expected sign except for the tariff variable and are all highly significant. The foreign demand variable has a small but positive effect on export value and a larger effect on export quantity asserting that the higher the destination's demand for a certain product, the higher are their exports from Egypt for that product.

Similarly, the positive significant effect of the competitiveness effect on both the and quantity of exports emphasizes that when either the Egyptian market share for a certain product in the destination market increases or the market share of the destination in the world market increases, the Egyptian exports for this product increases.

The negative significant effect of the NTMs such as SPS measure is expected as the stricter the non-tariff measures get of the destination market on the Egyptian products, the higher the quality of the product should be, and exclusions occur.

However, the positive significant effect of tariff rates on export value and quantity is not aligned with the conceptual theory suggesting the existence of a negative relationship between tariff rates and export value. In the heterogeneity analysis, we seek to find an understanding for this contradiction. It is noteworthy that the correlation coefficient between the tariff rates and the value of exports in USD over the sample period is 0.014.

It is evident from the high significance of the control variables that the exchange rate is not the only determining factor when evaluating the intensive margin of exports. To examine the relative importance of the real exchange rate to changes in exports value compared to changes in other factors such as competitiveness and foreign demand, we tried adding control variables gradually in order to track the effects of each variable on the value of exports.

Results show that the control variables are significant even though we are not controlling for the exchange rate at the same time. This means that for a devaluation to work in affecting the intensive margin, several prerequisites are necessary with relevance to competitiveness and foreign demand need to be high and NTMs such SPS measures need to be decreased.

It reassures our argument that real exchange rate depreciation is not the only factor affecting Egyptian exports and there are other factors that are also important with relevance to boosting exports.

The results show that the competitiveness effect has a significant positive effect on the impact of exchange rate on export value.

Thus, the competitiveness effect plays a considerable role in export trade as well as in the relationship between export trade and changes in real exchange rate. It is also clear that real depreciation is more effective when it is coupled with higher competitiveness.

An important remark drawn from these results is that the positive effect of depreciation on exports might be offset by a decline in the competitiveness effect.

In the heterogeneity analysis in the following section, we show how disaggregation can give a more accurate picture of export responses to all of the factors mentioned above that should be more relevant for policy implications.

VIII. Recommendations and suggestion for future research

Based on the findings of the current study, the researcher reached a set of recommendations as follows:

1. It is preferable for the Egyptian government to work to curb the structural imbalance in the productive sector, by diversifying exports, providing tax exemptions and grants aimed at attracting foreign investment.
2. Issuing a set of laws stimulating local investment, and stimulating the private sector to take a leading role in the Egyptian economy.
3. The necessity of limiting the rise in the prices level (inflation), in order to reduce the burden on the consumer by raising interest rates.
4. The Egyptian government should continue to managed liberalize the exchange rate of the Egyptian pound because of its strong and positive impact on stimulating exports and limiting imports.
5. Expanding the production base in the country to meet both the domestic and foreign demand for the product.
6. Work to limit active government interventions and the necessity of compatibility of monetary and fiscal policy with the open economy policy.
7. Opening new markets for Egyptian labor abroad, while providing them with full protection.
8. Stimulating the process of attracting foreign exchange from abroad by providing facilities to Egyptians working abroad and reducing the financial costs of bank transfers.
9. Reconsidering the public spending policy so that wages are linked to the level of prices of goods and services, to reflect positively on aggregate demand, and to avoid economic recession.
10. Restructuring the educational system in line with the productive sectors, moving towards technical and vocational education, and investing in human development as it is an important factor in economic development in Egypt.
11. Focusing on local production by reducing dependence on imported intermediate materials, and urging local producers to produce these materials locally, with high efficiency and quality.
12. The necessity of improving the quality of the domestic product to be able to compete in foreign markets in conjunction with the liberalization the exchange rate of the Egyptian pound and its great impact on increasing exports.

Despite the usage of a disaggregated data set that is both rich and rare, some limitations were evident before and during the conduct of this study that might be possible to deal with in future research.

One obvious limitation of this study is the sample period, which ends before the start of the currency floatation in October 2016 due to shortage of data for the period following this date. A comparison between the exports performances in a fixed regime vs. a floating regime could be further examined in future research when more times and data are available for the floating regime period.

Another limitation would be the lack of data on some of the useful characteristics of firms included in the study, which could have been used as additional control variables or used for the heterogeneity analysis.

Examples of such variables would be the number of employees of each firm that could be used to compute firm productivity, the location of firms inside Egypt, the number of experience years in international trade, the type of firm ownership or whether the firm is a domestic, foreign, private or public investment.

The dataset also lacks information about the fuel sector that constitutes the largest part of Egyptian exports, which gives room to a stand-alone study of the fuel sector upon availability of firm level monthly data.

Further research may focus on the factors affecting labor and material costs in the textiles and apparel industry. It is reasonable to think that cheaper labor and material costs are major keys that affect overall import and export businesses.

Finally, the large size and the unbalanced feature of the panel data used in this study posed great limitations in implementing a dynamic model, such as the generalized method of moments (GMM) or the continuous and comprehensive evaluation model CCE.

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