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IS THE RELATIONSHIP BETWEEN GOVERNMENT SPENDING AND PRIVATE CONSUMPTION IN EGYPT SYMMETRIC

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ABSTRACT: *The aim of this study is to explore the relationship between the government spending and private consumption spending, and to know whether the relationship between the two is symmetric or not, by using Egypt data during the period from 1970 to 2016. The study uses the Autoregressive Distributed Lag (ARDL) approach for exploring a cointegration relationship between the two variables and the Nonlinear Autoregressive Distributed Lag (NARDL) approach for testing the hypothesis of a symmetric relationship between the two variables. By applying the ARDL approach, the study concluded that the effect of government spending on the consumption spending is not significant in the long run. While, it concluded, by applying the NARDL approach, that the hypothesis of presence of a symmetric relationship is not accepted and that there is a crowding out relationship in the positive shocks of the government spending and the substitutability coefficient between the two types of spending is 0.8699.*

KEYWORDS: Government Spending, Private Consumption, Egypt Economy, crowding out relationship, symmetric relationship.

INTRODUCTION

Research in consumption behavior is important in context of identifying the remaining economic – social behaviors in any country. The consumption spending represents the most important rate of the total spending which exceeds, in the developing countries' economies, about 90 % of the total national income and falls back to about 60 % in the rich countries' economies. The big economic theories, especially the classical school and the Keynesian school, have different opinions as for studying the relationship between the governmental spending and private consumption spending. The applied studies didn't have the final word as for the nature of this relationship as well.

While the new classical theory as well as the Real Business Cycle (RBC) Theory confirmed the inverse relationship (crowding out) between the two variables, the Keynesian theory adopts the opinion that the relationship is a direct (integrating) one (Baxter and King, 1993). The hypothesis of crowding out relationship between the two types of spending is based upon that the governmental spending is covered or financed by the taxes which are deducted from the personal income. Accordingly, much government spending means that the increase of taxes is needed and thus the disposal income (personal income – taxes + governmental financial transfers) decreases. In the developing countries specially, where the marginal propensity to consume is high, it is

expected that increase of taxes will be at the expense of the provision of consumption spending from the disposable income. This means that the government spending will crowd out the consumption spending. In another case, when the government turns to finance its spending through increasing the note issue (Deficit Financing), the inflation pressures resulting from that will affect negatively the consumption spending of the individuals (Khan et al., 2015).

As for the other hypothesis (hypothesis of the integration relationship between the two types of spending) suggested by supporters of the Keynesian theory, it is a supplement to the defense rendered by Keynesy about the role of the government in the positive effect in the effective total demand and activating the economic cycle. In this case, the government increases the number of employees in its institutions and increases transfers of people to the unemployed persons and increases spending on the infrastructure which results in derivative demand on the workforce and increase in the salaries paid by the government directly or through contractors. All these procedures increase the national income and improve the level of income of individuals so they transfer their acquired incomes to consumption spending in light of increase of the marginal propensity to consume for a wide section of individuals.

In general, the two models (Keynesian model and the new classical model) support the idea that the government spending has a double effect on the outcome. The efficiency of this effect is based upon the size of multiplier which in turn is affected by the marginal propensity to consume and that size of multiplier is based on mechanism of response of the private consumption spending to the changes of the government spending. At this point, the Keynesian model predicts that the effect of the government spending is direct while the RBC model predicts that it has a negative effect.

Other economists, like Bailey (1971) and Barro (1981), think that a direct effect of the government spending on the private consumption spending may happen. Purchasing the goods and services by the government will affect the total benefit of all consumers. In this case, response of the private consumption to the government spending is affected by the substitutability coefficient or complementarity coefficient between the two variables.

This study tries to research the effect of changes in government spending on the consumption function behavior in the long run and the short run. Specifically, the effect of government spending on the consumption spending will be discussed, and accordingly the nature of this effect will be tested at the positive changes of the government spending and the negative changes of that spending. This procedure is technically referred to as the test of symmetric relationship between the two variables. The study hypothesizes that the relationship between the two variables is an integration relationship in which the increase in the government spending leads to increase in the private consumption spending in the long run.

The study also hypothesizes that there is a direct relationship between the government spending and the private consumption spending based on using data from the Egyptian economy and that this relationship is asymmetric. This means that the positive changes

in the government spending is not necessarily equal to the negative changes as for their effect on the consumption spending. The effect of the positive shock on the government spending is different from the effect of the negative shock of that spending in the private consumption spending.

This study is important as it tests a hypothesis not tested before in the world economic literature (as the best knowledge of the researcher and by reviewing the scientific research engines on the internet) although the economic literature has so many researches about the relationship between the two types of spending specifically in Egypt. So, this study is a preliminary contribution for testing this hypothesis in the world economic literature.

This study is also important as it provides information about the behavior of consumption function and effect of changes in the governmental spending in Egypt. This information may form a basis which helps the political and economic decision takers as for the financial policy of the country and prediction of the behavior of the consumers in the local market resulting from changes in this policy in addition to the ability of controlling the paths of this behavior in accordance with the Egyptian future development plans.

For this purpose, the study uses the Nonlinear Autoregressive Distributed Lag (NARDL) in which the hypothesis of the symmetric relationship between the consumption spending and the government spending will be tested.
Guided by the scientific method adopted in this type of studies, the study in addition to the introduction will be divided into the theoretical framework and the previous studies, study method, study data, estimation method which will be adopted in exploring the hypothesis, the applied framework, which in turn includes identifying the exploration of the statistical characteristics of the study data and the model estimation, and the discussion of the results in the last part of the study.

THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

Through a huge quantity of the previous studies, the relationship between the consumption spending and government spending did not have a specific trend. Many studies stated that the relationship is reversal (crowd out) while other results confirmed that the relationship between the two is direct.One of the oldest studies which tested the relationship between the public spending and private spending was the study done by Bailey (1971) which concluded that there is a crowd out relationship between the two and didn't accept the Keynesian hypothesis in respect of this relationship.

One of the studies which concluded that there is a reversal relationship directing from the government spending to the private consumption spending was the study done by Ho (2001). The study discusses the crowd out and integration relationship between the government spending and the private consumption spending. The study concluded that the results enhance the empirical literature by using the standard approaches of the Panel Data. In this regard, the study used the cointegration approach concerning this type of data. Results taken from 24 economies from The Organization for Economic

Co-operation and Development (OECD) countries mentioned that there is a crowd out relationship to a great degree between the government spending and the private consumption spending when using the available real income and not the permanent income. The study has a conclusion that the Keynesian hypothesis is not accepted and considers it non convincing.

Bouakez and Rebei (2007) also concluded a similar result by using data from the United States for the period from 1952 Q1 to 2001 Q4. The two researchers developed a small economic cycle model for following up the effect of the government spending on the private consumption spending. They reached to a conclusion of not accepting the Keynesian hypothesis which says that the relationship between the two types of spending is an integration relationship, but they confirmed that the relationship may be integrative in case of using the total governmental spending and not the items of spending.

Kwan (2006) also concluded, by using Panel Data from the East Asia Countries, that there is a crowd out relationship between the two types of spending. The researcher used data for the period 1960- 2002. Empirical analysis results state that the substitutability elasticity coefficient in China, Japan, Hong Kong and Korea was mild while it was high in Malaysia and Thailand and zero in Philippine. On the other hand, many studies found out that the relationship between the two types of spending is direct. For example, Evans and Karras (1996) is considered one of the first studies which drew the attention to that the relationship between the two variables (the government spending and private consumption spending) is an integration relationship (and not a crowd out relationship). The study tested its hypothesis by using annual data for 52 countries.

Coenen and Straub (2005) tried to reconsider the effect of the government spending shocks on the private consumption spending in the Euro Region. The study concluded that there is to some extent a small opportunity for gathering the governmental shocks in consumption mainly because the estimative share of the families is relatively low but also because of the big negative effect of the wealth resulting from the nature of the governmental spending shocks.

Hafedh and Nooman (2007) used data from the United States of America for testing the relationship between the governmental spending and the private consumption spending. The study concluded that there is a strong relationship between the two variables. The study also states that the private consumption response to the governmental spending shocks is positive by using the Impulse Response Function generated by the VAR model.

Bernardini and Peersman (2018) tried to prove that the relationship between the governmental spending as an explanative variable and the private consumption spending as a dependent variable is an integration relationship in China. For this purpose, the researchers used the ARDL approach on data of the period 1985- 2013. The study concluded that the governmental spending affects directly the private consumption spending.

Samadi and Sayedi (2012) concluded that there is a direct relationship coming from the governmental spending to the private consumption spending in Iran. The study used the mathematical frame submitted by D'Alessandro (2010) and the study tested its hypothesis by using the ARDL approach and data for the period 1959- 2007.

Durkaya (2012) submitted evidence which supports the Keynesian approach. The study concluded that the relationship between the governmental spending and private consumption spending is a direct relationship in the long run and the short run in Turkey during the period 1980 – 2010. The study used the cointegration approach and error correction and stated that the Elasticity Coefficient in this relationship is 0.52.

Ercolani and Pavoni (2012) built a unique database which connect the private living consumption of the family to the governmental consumption of the region in which the family live in Italy. The study used the regional fluctuations of the governmental consumption and measured its effect on the individual consumption of different categories of governmental spending. The study concluded two main results:

Living spending of the families increases as long as the consumption spending varies.

a) The public health care affects negatively on variation in the living spending of the families.

b) The study done by Khan et al. (2015) supported the existence of direct relationship between the two types of spending in the Chinese case as for the annual data from 1985 to 2013. The study used the ARDL approach. It considered that the governmental spending is so important tool for enhancing the economy and encouraging the total demand in China during the stagnation period.

By reviewing a variety of previous studies above, it is clear that the trend of the relationship between the two types of spending is not decided. So, this justifies exploration of this relationship specially that the studies about Arab countries are rare. I also didn't know that any of the previous studies used the NARDL approach for testing the hypothesis of presence a symmetric relationship between the two types of spending. This study tries to fill this gap by testing the relationship between the governmental spending and the private consumption spending either in the Arab countries and by using an approach different from the approaches used in the previous studies, i.e. NARDL approach.

Study model, study data, estimation method study model

Taking into consideration the theory, research hypothesis and previous studies, it is possible to form the study model as the following:

$$lC_t = a + \beta lG_t + \mu_t \quad (1)$$

Where LC_t is the share of the individual in the private consumption spending at the fixed prices in 2010 in the year (*t*) taken by the natural logarithm, and LG_t is the share of the individual from the government spending at the fixed prices of 2010 in the year *(t)* taken by the natural logarithm also and μ_t is the error limit. The estimation by using the logarithm is important for getting the relationship elasticity, elasticity of the consumption spending to the government spending.

By commenting on the previous model, Graham (1993) mentioned that adding the real disposable income will affect the strength of the effect of the government spending on

the private consumption spending and that excluding it will weaken the strength of that relationship. So, it is proper to test the previous relationship after adding the natural logarithm to the share of the individual from the real disposable income Y^d so that the second model which will be estimated becomes as the following:

$$lC_t = a + \beta lG_t + \lambda lY_t^d + \nu_t \quad (2)$$

Some studies, such as Shaikh (2018), added other variables such as wealth variable, real rate of interest or discount rate and unemployment rate. In this study, quasi money was used as proxy for the wealth of the national sector while the unemployment rate was used as proxy for the uncertain income. Taking into consideration that the data related to the rates of interest or discount rate and unemployment rate are not available, the wealth variable represented by the natural logarithm will be added to the individual share from the Quasi Money LW. The third model of the study, which will be estimated, will be as the following equation:

$$lC_t = a + \beta lG_t + \lambda lY_t^d + lW_t + \epsilon_t \quad (3)$$

The positive sign of β means that the Keynesian hypothesis was accepted, while the negative sign of this parameter means refusal of that hypothesis and acceptance of the classical hypothesis.

Estimation approach

The study is based on using the modern econometrics approaches for estimating the study model. The researcher uses the Non-linear Autoregressive Distributed Lags (NARDL) developed by Shin et al. (2014). It is a development of the Autoregressive Distributed Lags (ARDL) which supposes that the relationship between the variables are linear relationship and this hypothesis is a random hypothesis not based upon the facts and the different empirical evidences by using other standard approaches especially the cointegration approach.

In the beginning, we will use ARDL Bound testing approach to try to explore the relationship between the two variables in the long run and the short run, cointegration relationship between the two. The priori tests, especially the unit roots tests of the time series and test of proper lags number, will be done, and then the diagnosis tests, especially the cointegration tests in the long run (Wald Test) and stability of the estimated models and change of variance of the error limit and the autocorrelation of the errors.

Using the ARDL Bound testing approach is important because it provides information about the effect of the independent variables on the dependent variable in the long run and the short run in addition to the other statistical characteristics especially that it is able to depend on less information than the other approaches especially the ECM method.

By using this approach, the study model will become as the following equation:

$$\begin{aligned}\Delta LGDP = a + \lambda_0 LGDP_{t-1} + \lambda_1 LCPTL_{t-1} + \lambda_2\, LPOPL_{t-1} + \lambda_3\, Lgov_{t-1} \\ + \lambda_4 LCPI_{t-1} + \lambda_5 Lopn_{t-1} + \lambda_6 LTR_{t-1} + \sum_{i=1}^{\rho_0} \varpi_{0i} \Delta LGDP_{t-i} \\ + \sum_{i=0}^{\rho_1} \varpi_{1i} \Delta LCPTL_{t-i} + \sum_{i=0}^{\rho_2} \varpi_{2i} \Delta LPOPL_{t-i} \\ + \sum_{i=0}^{\rho_3} \varpi_{3i} \Delta Lgov_{t-i} + \sum_{i=0}^{\rho_4} \varpi_{4i} \Delta LCPI_{t-1} \\ + \sum_{i=0}^{\rho_5} \varpi_{5i} \Delta Lopn_{t-1} \sum_{i=0}^{\rho_6} \varpi_{6i} \Delta LTR_{t-1} + \nu_t\end{aligned} \quad (4)$$

Whereas λ_0 is the Error Correction Term (ECT) supposed to be significant statistically and with negative sign to reflect the presence of cointegration relationship and ability of correcting the short run errors for returning to the long run balanced position. $\lambda_{1\ to\ 6}$ also refers to long run information through which the long run function parameters can be derived in accordance with the equation $\beta_n = -\frac{\lambda_n}{\lambda_0}$. ϖ_i also refers to the short run parameters or error correction function parameters. As for ν_t, it is the error limit during the time *t*.

According to the opinion adopted by Pesaran et al. (2001), it is necessary that the time series are stable in the first difference and/ or level but not in the second difference. This means that some time series in the model may be stable in the level and some of them are stable in the first difference. This is what distinguishes this approach from the cointegration model and error correction model which states as a condition that the series are stable from the same level.

The NARDL approach is also used for the purpose of testing the presence of symmetric relationship or asymmetric relationship. This approach is interested in exploring the nature of the effect of the positive shocks in the explaining variable and effect of the negative shocks of the same variable in the dependent variable.

The NARDL approach is a generalization for the ARDL approach by transferring from the supposed linear case to the nonlinear. As the case in ARDL approach, the NARDL approach explores the short run and the long run effects in one equation and doesn't necessarily need long time series compared to the nonlinear cointegration approach (TAR or MTAR) in addition to its elasticity in using the integrated variables. This means that this approach can be used for the order of integration is either I(0) or I(1), but not I(2). This approach enables us also to explore what is called by Granger and Yoon (2002) the hidden cointegration. This means that it avoids deleting the intangible relationships between the phenomenon and its explaining factors by the random hypothesis of the linearity of the relationship between them. Therefore, the NARDL approach enables us to test complex hypothesis whether the relationship between the two studied variables is a linear or nonlinear cointegration relationship or whether there is no cointegration relationship between them.

For the purpose of using the NARDL, the independent variable X will be divided into negative and positive values, so that we have:

$$X_t = X_0 + X_t^+ + X_t^- \quad (5)$$

Thus, the cointegration function for the relationship between Y and X is as the following:

$$Y_t = a + \beta^+ X_t^+ + \beta^- X_t^- + u_t \quad (6)$$

Where u_t represents the error limit in this equation by mean value zero and fixed variance while both β^-&β^+ represent the associated asymmetric long-run parameters. X_t^+& X_t^- are calculated as in the following two equations:

$$X_t^+ = \sum_{j=1}^{t} \Delta X_j^+ = \sum_{j=1}^{t} \max(\Delta X_j, 0) \quad (7)$$

$$X_t^- = \sum_{j=1}^{t} \Delta X_j^- = \sum_{j=1}^{t} \min(\Delta X_j, 0) \quad (8)$$

Based on that dividing of the explaining variable, inserting both $X_t^+ \; and \; X_t^-$ instead of X_t in ARDL model, we will have NARDL model as the following:

$$\Delta y_t = \mu - \rho y_{t-1} + \theta^+ x_{t-1}^+ + \theta^- x_{t-1}^- + \sum_{j=1}^{\rho-1} a_j \Delta y_{(t-j)} + \sum_{j=0}^{q-1} (\pi_j^+ \Delta x_{t-j}^+ + \pi_j^- \Delta x_{t-j}^-) + \varepsilon_t \quad (9)$$

As in the previous model presented in the equation (1), θ^+& θ^- represents the long run information of the asymmetric relationship in the model and π_j^+& π_j^- represents the asymmetric parameters in the long run.

Diagnostic tests of the NARDL model are similar to that of ARDL model, where the cointegration is tested as in the following equation:

$$\mu = \rho = \theta^+ = \theta^- = 0 \quad (10)$$

In addition to the normality distribution test of the error limit and model stability by using the cumulative sum test and CUSUM of squares test in addition to the heteroscedasticity test and error limit independence.

The advantage of the NARDL approach is presence of an additional test, the symmetry test in the long run, where the following null hypothesis is tested by using the standard Wald test:

$$(\beta^+ = -\frac{\theta^+}{\rho}) = (\beta^- = -\frac{\theta^-}{\rho}) \quad (11)$$

Opposite the alternative hypothesis which provides for the asymmetry of the relationship between the two variables of the study as the following:

$$(\beta^{+} = -\frac{\theta^{+}}{\rho}) \neq (\beta^{-} = -\frac{\theta^{-}}{\rho}) \quad (12)$$

Accepting the null hypothesis and considering that the relationship is symmetric means that the relationship between the two variables is a linear relationship. Refusing the null hypothesis means accepting that the relationship between the two variables is nonlinear. Linearity in the long run is tested by using the standard Wald test as the following:

$$\sum_{j=0}^{q-1} \pi_j^{+} = \sum_{j=0}^{q-1} \pi_j^{-} \quad (13)$$

Study Data

The Egyptian economy is an economy which belongs to the lower- middle income category, where the Average of Individual Share from the gross domestic product is 2645 Dollars at the fixed prices during the period 2010 – 2017. The Egyptian economy suffers from the problem of increase of the internal debt and the external debt. The central bank of Egypt estimated that the internal debt was 91 % of the gross domestic product in the financial year 2016- 2017 and decreased to 83 % (3.1 trillion pounds) in the financial year 2017 – 2018. On the other hand, the Egyptian economy realizes good economic growth rates during the years 2010- 2017. In accordance with the data provided by the world bank, the average of growth rate of real GDP per capita is 3.3 % during the period 2008 – 2017. Consumption is one of the most important drivers of the economic growth in Egypt. The rate of the consumption spending to the gross domestic product was (74.6 %) in 2010 and grew to 82.4 % in 2015 then to 88.1 % in 2017. Accordingly, the changes in this spending will reflect strongly on GDP. The consumption spending depends on many sources, and the most important ones are the incomes of the workers in the economic sectors and money transfers by the Egyptian workers abroad especially from the Arab Gulf countries. Total remittances were 9.8 billion dollars in 2010 which increased to 19.3 billion in 2015. Relatively, these transfers developed from 4.5 % of the GDP to 5.8 % between 2010 and 2015 respectively (Helmy et al., 2017).

In general, it can be said that the Egyptian economy with its characteristics forms well the group of the developing economies or the lower- middle income economies.In this study, the World Bank data set was used for the purpose of testing its main hypothesis for the period from 1970 to 2017. The data of the governmental spending and the consumption spending were obtained at the constant prices of 2010 and in US Dollars; as for the national income in the constant prices also, which was considered as a variable representing the disposable income because its data is not available, and the Consumer Price Index (CPI) (2010=100). As for the wealth variable, it is expressed by the Broad money supply M2 as proxy of the wealth.

Table 1 presents the statistical characteristics of the data in the level. The results clarify that the mean consumption spending is 96586 million dollars in the Constant prices. The mean governmental spending was 14983 million dollars in the Constant prices. On the other hand, the mean national income was 105785 million dollars in the Constant prices and its mean wealth (measured by M2) is 440262 million dollars in the Constant prices.

	Mean	Std. Dev.	Observations
CONSR	96586.450	54358.800	48.00
GOVR	14983.690	8266.847	48.00
CPI	45.969	53.025	48.00
INCMR	105785.800	65168.400	48.00
M2	440262.000	699826.600	48.00

Table 1. statistical characteristics of the study data

Figure 1 also shows progress of all these variables during the study period after taking them in the natural logarithms.

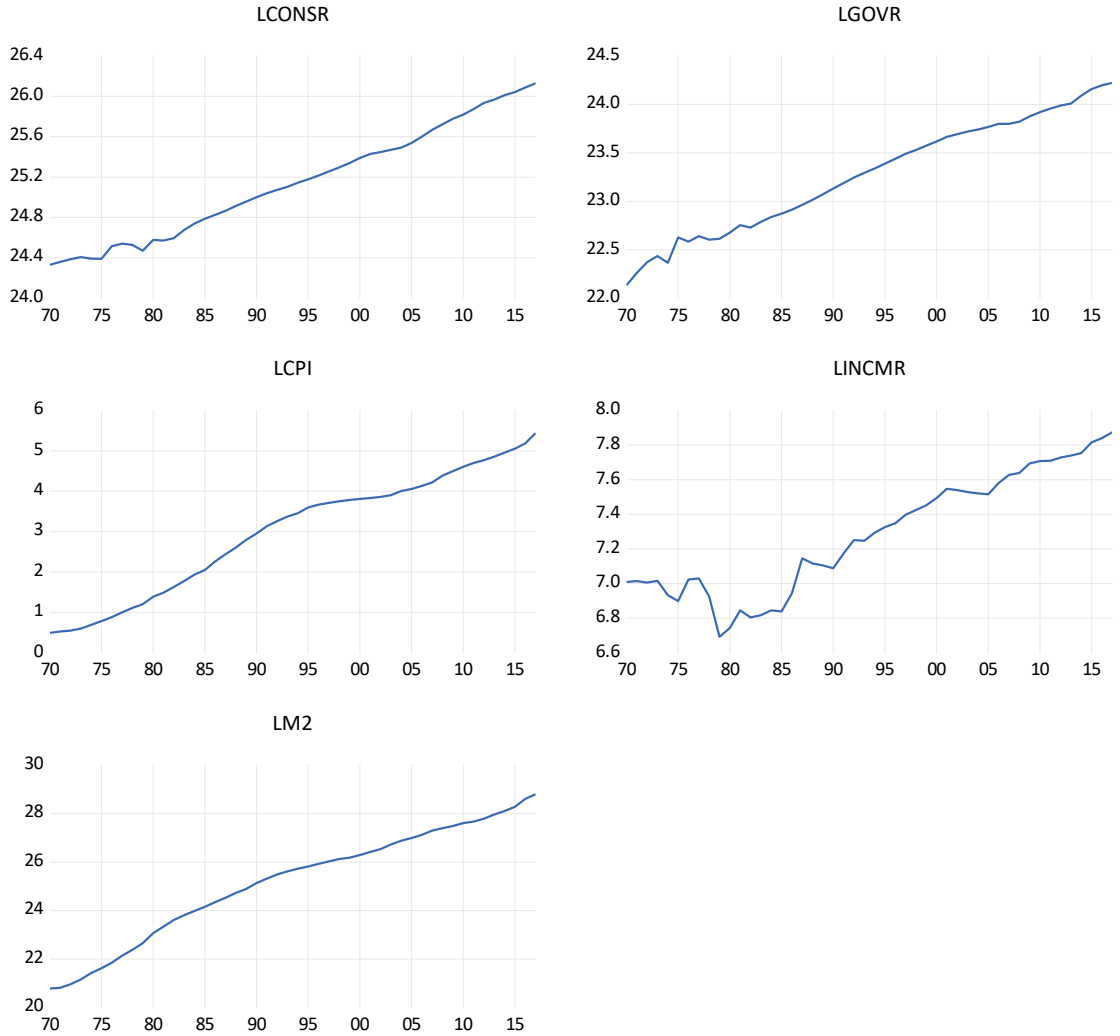

Figure 1. Progress of the study variables during the period 1970 – 2017

APPLIED RESULTS

Unit root test results

Unit root test is done for exploring more statistical characteristics of the time series and for identifying the proper method of estimation the study model. There are many tests which can be used in this context. The test used in the study is the Augmented Dicky-Fuller (ADF) test.

Table (2) includes results of the unit root test for the model data by using the ADF test. The results show that all variables are not Stationary at the level except LCPI, while the other variables has become Stationary at the first difference. This means that all of them (except CPI) have a unit root and integrated of order I(1).

Table 2. results of unit root test by using ADF

		At Level				
			LCONSR	LGOVR	LCPI	LINCMR	LM2
With Constant		t-Statistic	1.3818	-0.8597	-0.1569	0.3312	-2.6539
		Prob.	0.9987	0.7906	0.9365	0.9776	0.0899
			n0	n0	n0	n0	*
With Constant & Trend		t-Statistic	-2.6787	-3.1201	-4.3918	-2.5398	-2.5844
		Prob.	0.2498	0.1160	0.0065	0.3086	0.2889
			n0	n0	***	n0	n0
Without Constant & Trend		t-Statistic	5.6790	1.7696	1.1133	2.2852	2.7141
		Prob.	1.0000	0.9796	0.9287	0.9939	0.9980
			n0	n0	n0	n0	n0
		At First Difference					
With Constant		t-Statistic	-3.6534	-3.3302	-2.4856	-6.1672	-3.4495
		Prob.	0.0086	0.0200	0.1255	0.0000	0.0141
			***	**	n0	***	**
With Constant & Trend		t-Statistic	-3.6981	-3.3957	-1.7254	-6.4467	-4.1598
		Prob.	0.0335	0.0663	0.7234	0.0000	0.0103
			**	*	n0	***	**
Without Constant & Trend		t-Statistic	-1.2793	0.2715	0.1786	-5.2422	-0.4606
		Prob.	0.1821	0.7596	0.7334	0.0000	0.5101
			n0	n0	n0	***	n0

*** significant at 0.01 and ** significant at 0.05 and * significant at 0.10

On the other hand, stationarity of the time series was tested by hypothesizing that there are structural Break-Point points by using the Zivot and Andrews (1992) test. Table 3 shows results of this test. These results show that the dependent variable (natural logarithm of the governmental spending, $Lconr$) had a structural transform in 2003 while that transform happened in 2009 as for $Lgov$ and happened in 2005 as for the CPI and in 2010 as for the LM2**.**

Table 3. unit root test results by using the Zivot and Andrews (1992)

Variables	break in:	t-stat.	Prob.	Break Point
LCONSR	trend	-2.5123	0.0000	2003
LGOVR	intercept	-0.8636	0.007	2009
LCPI	intercept and trend	-0.5721	0.003	2010
LINCMR	trend	-1.8212	0.0026	2005
LM3	trend	-2.6894	0.0002	2010

Difference in Order of stationary of the variables drives us to use the ARDL approach for exploring the presence of cointegration relationship between them and estimating the long run relationship. Accordingly, using the NARDL approach for testing the hypothesis of the (a)symmetric relationship between the consumption spending and the governmental spending in Egypt in the long run and in the short run. Presence of structural Break-Point in the dependent variable makes it proper to consider that when estimating the study model.

Empirical results of the ARDL for bound testing model

The table 4 shows the results of estimating the study model by using the ARDL approach, where the equation no (4) was estimated. When taking into consideration the results of Zivot and Andrews (1992) test which shows that there is a structural Break-Point in the dependent variable in 2003, the estimated equation was included a dummy variable (D_{03}) where the variable is zero for the period 1970- 2003 and one for the period 2004- 2017.

The presented results shows that the error correction term is – 1.0897, and it is significant at 1 % by using the Critical value of t-bound test from Pesaran et al. (2001) (see the appendix no (1)). This result means that the model corrects the short run errors towards the long run within about one year. It also means that there is a cointegration Critical value of t-bound test from Pesaran et al. (2001).

The results also shows that F- bound test is bigger than the value of upper bound I(1) at significance level of 1% that suggested by Narayan and Popp (2010) for 45 observations which equal 6.696 and 7.092 for 40 observations. This result means that the model reflects a cointegration relationship coming from the explaining variables to the dependent variable and enhance the result which we concluded by using t-bound test.
Table 5 shows results of estimating the long run parameters calculated in accordance with the equation $\beta_n = -\frac{\lambda_n}{\lambda_0}$. Results of significance of these parameters show that all parameters are not significant except the parameter of the variable LM3 at 1%. In the other hand, this parameter is negative. This results means that increase of the wealth identified by M3 leads to decrease of consumption. This can be explained by that M3 increase, including different forms of savings, was at the expense of the consumption spending in Egypt, whereas the increase of M3 by 1% will reduce the consumption spending at 0.11 %. The results also shows that the government spending does not affect significantly on the consumption spending in Egypt.

Table 4. Results of estimating the study model

Variable	Coefficient	t-Statistic	
C	29.4363	4.9033	***
@TREND	0.0627	5.6570	***
LCONSR(-1)*	-1.0897	-6.4997	***
LGOVR(-1)	-0.0327	-0.2460	
LINCMR(-1)	0.0345	0.5548	
LM2(-1)	-0.1273	-3.2596	***
LCPI(-1)	0.0317	0.6723	
D(LCONSR(-1))	0.3910	2.7948	***
D(LGOVR)	0.1475	1.6398	
D(LGOVR(-1))	0.3499	3.4852	***
D(LGOVR(-2))	0.1673	1.5962	
D(LGOVR(-3))	0.1976	2.4085	**
D(LM2)	0.0190	0.3362	
D(LM2(-1))	-0.2089	-3.5450	***
D(LCPI)	0.3046	3.4973	***
D(LCPI(-1))	0.1026	0.9771	
D(LCPI(-2))	0.0326	0.3851	
D(LCPI(-3))	0.2052	2.4800	**
D_{03}	-0.0303	-1.8829	*
Included observations: 44			
F-Bounds Test(k=4): 11.6233			

***,**,* refers to significance of the 1; 5and 10% respectively.

Table 5. long run estimators for the ARDL model

Levels Equation

Variable	Coefficient	t-Statistic
LGOVR	-0.0300	-0.2479
LINCMR	0.0316	0.5459
LM2	-0.1168	-4.8189***
LCPI	0.0291	0.7123

*** refers to the significance at 1%.

From the diagnostic aspect, the table (6) presents the results of the diagnostic tests for the estimated model. As the results show that the model does not have econometric problems. The residuals are normally distributed (by using Jarque-Bera test) and they dos not also suffer from the serial autocorrelation problem (by using the LM test) and does not suffer from the problem of Heteroskedasticity (by using the Breusch-Pagan-Godfrey test). The results show that the model is proper as for the functional form (by

using the Ramsey RESET Test). The figure 2 presents Structural stability in the model, either at the level of the constant, depending on the CUSUM test; or at the level of the other parameters, depending on the CUSUMQ test, whereas the critical bounds implying that regressions are stable at the 5 percent significance level.

Table 6. Results of the diagnostic tests for the ARDL model

	Jarqu-Pera (JB)	LM tets (F)	Heteroskedasticity (F)	Ramsey RESET Test (F)
stat	2.077	1.4567	0.8803	0.671
prob.	0.354	0.2392	0.6038	0.421

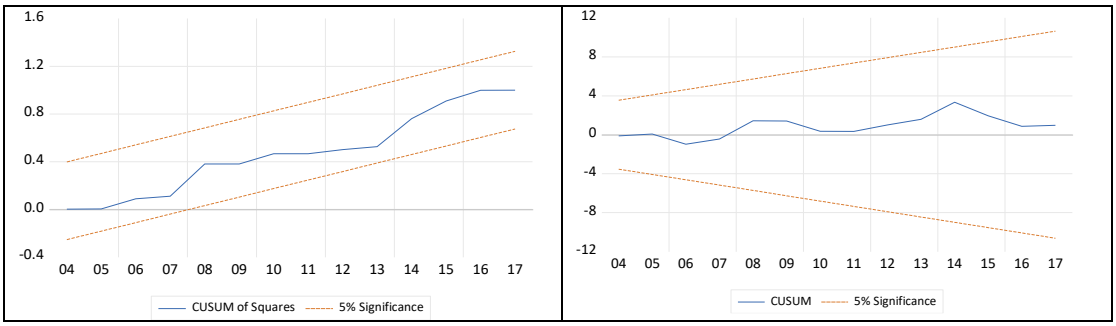

Figure 2. Structural stability test for the ARDL model

Empirical results of the NARDL model

Table 7 presents results of estimating the NARDL model. The most important point revealed by these results is that the error correction term (ECT) is significant at less than 1% by using the t test and by using the t- bound test. The critical value of the t-bound test, based on Pesaran et al. (2001), is - 5.13 at the significance level less than 1% for five explanatory variables (k= 5) (see appendix 2). On the other hand, the result means, where $\lambda = -1.47$, that any shock will be overstepped after less than one year, specifically within 8.16 months (about eight months and five days). Results of this table show that Dummy Variable (D_{03}) parameter was significant at 1%. This proves again that the year 2003 had structural Break-Point in the consumption spending in Egypt. As for the time parameter (Trend), it was also significant and with positive sign. This result show that there is an increasing time trend in the Egyptian consumption spending.

One of the most important results, that the bound-test of cointegration (using the F-bound test). The results indicate a rejection the null hypothesis and acceptance of the alternative hypothesis, that there is a cointegration relationship and that the long-run parameters differ from zero.

Table 8 contains the results of the diagnostic tests of the model which mention that the model dose not has the problems of the residual of the regression equation. The results show that the residual are normally distributed based on JB test and that the model does not suffered form the autocorrelation problem based on LM test. The results also show that we accept the null hypothesis which says that the variance of the error-term is Homoscedasticity (H_0: $Homoscedasticity$) based on the Breusch-Pagan-Godfrey test.

The model is also correctly specified in general accordance to Ramsy RESET Test. Probability values show that null hypotheses are accepted (H0: model is correctly specified). The figure 3 shows that the model is stable structurally either for constant, using CUSUM test, or for constancy of the coefficients in a model reflected by the CUSUM OF Sqaures test, whereas the plot which represent the two tests are falls within critical bound of 5%.

Table 7. Results of estimating the study model NARDL

Variable	Coefficient	t-Statistic	
C	33.0605	6.6601	***
@TREND	0.0953	7.1983	***
LCONSR(-1)	-1.4699	-7.1863	***
LGOVR_POS(-1)	-1.2787	-5.3288	***
LGOVR_NEG(-1)	-0.1864	-0.4184	
LINCMR(-1)	0.2752	3.5166	***
LM2(-1)	0.0355	0.8513	
LCPI(-1)	0.0785	2.3211	**
D(LCONSR(-1))	0.2921	2.7425	**
D(LCONSR(-2))	0.3772	3.6142	***
D(LCONSR(-3))	0.2789	3.5908	***
D(LGOVR_POS)	-0.1989	-1.6257	
D(LGOVR_POS(-1))	0.8285	3.8101	***
D(LGOVR_POS(-2))	0.8231	9.8166	***
D(LGOVR_POS(-3))	0.4795	3.0298	***
D(LGOVR_NEG)	1.3330	2.0642	*
D(LGOVR_NEG(-1))	1.4144	3.6114	***
D(LGOVR_NEG(-2))	-1.6244	-4.9605	***
D(LGOVR_NEG(-3))	-1.4661	-2.3457	**
D(LINCMR)	0.1674	3.0688	***
D(LINCMR(-1))	-0.1341	-2.7858	**
D(LM2)	0.1047	2.6821	**
D(LCPI)	-0.0680	-1.1588	
D(LCPI(-1))	-0.1337	-1.9977	*
D(LCPI(-2))	-0.1004	-1.8859	*
D(LCPI(-3))	-0.1306	-2.2114	**
D_{03}	-0.0306	-3.4375	***

Included observations: 43
F-Bounds Test(k=4): 11.4342

Table 8. Results of the diagnostic test for the NARDL model

	Jarqu-Pera (JB)	LM tets (F)	Heteroskedasticity (F)	Ramsey RESET Test (F)
stat	0.1788	0.0142	1.0377	2.3459
prob.	0.9145	0.9066	0.4819	0.1464

The results in the table 9, related to the Symmetry test reveal that the calculated of test statistics based on the equation no 11 concerning the long run is bigger than the critical

value and that the probability value is less than 5 %. This means that we reject the null hypothesis and accept the alternative hypothesis which says that long run parameter are not equal. In other words, the relationship coming from the governmental spending to the consumption spending is asymmetric relationship. Presence of the asymmetric relationship means that the effect of the positive values of the governmental expenditure differs from the effect of negative value. In other words, the effect of increase of government expenditure on consumer spending differs from the impact of decrease government spending on consumer spending. When returning to the table 10, the results refer that the positive values parameter is significant at the less than 1 % while the negative values parameter is not significant. The results in Table 10 show that a 1% increase in government spending will result in a reduction of consumer spending by 0.8699%. This result reveals that the relationship between the two types of spending is crowd out. As increased government spending requires more taxes to come at the expense of consumer spending, which accounts for the bulk of national income. It is almost to the average propensity to consume (APC) of the majority of the Egypt population equal to (1). Based on the study database, the average propensity during the period 1970- 2017 equals 0.9596. Accordingly, the tax deductions will be at the expense of the consumption spending. The results of the table10 contain that the effect of the national income is direct in the consumption spending and significant at elasticity coefficient 0.18. there is also direct relationship coming from the consumer price index (CPI) to the consumption spending at the significance level 5 % and at elasticity coefficient 0.0534 %.

Table 9. Results of symmetry tests in the long run and short run

(a)symmetric Test

	Long Run	Short Run
F-statistic	6.4610	3.1421
Prob.	0.0218	0.0953

Table 10. The long run coefficients for the NARDL model

Variable	Coefficient	t-Statistic	
LGOVR_POS	-0.8699	-6.7166	***
LGOVR_NEG	-0.1268	-0.4251	
LINCMR	0.1872	4.0873	***
LM2	0.0242	0.8286	
LCPI	0.0534	2.6992	**

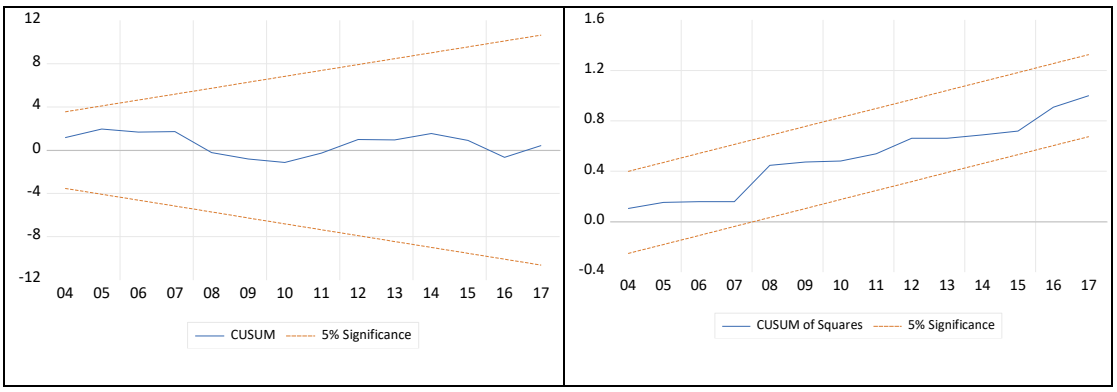

Figure 3. Structural stability test for the NARDL model

RESULTS

The aim of this paper is to test the presence of symmetric relationship directing from the governmental spending to the consumption spending in Egypt. The study used data covers the period from 1970 to 2017, were This data was obtained from the World Bank Data Set published on the Internet. As for the applied aspect, the study run two tests, the cointegration test in the consumption function by using the ARDL approach, which ensures many explanatory variables including the governmental spending. The results revealed that t-bound test and F-bound test refer to the presence of long run relationship or cointegration relationship. However, exploring the effect of the governmental spendingin growth revealed that no long run effect turns from governmental spending to the consumption. As for the second test, it was run for completing the research in the nature of the relationship after dividing the effect of the governmental spending between positive and negative values. This test was run by using the NARDL approach. The results revealed that the relationship is asymmetric between the governmental spending and consumption. Consequently, there are different effects for the positive governmental shocks and the negative governmental shocks. This result provides an applied evidence of the research hypothesis which says that the relationship between the two variables are not linear. The research results provide an empirical evidence that the relationship between the governmental spending and consumption spending is crowd out relationship at least for the developing countries represented by the Egyptian economy well. This result is in agreement with studies of Bailey (1971); Ho (2001); Bouakez and Rebei (2007) and (Kwan, 2006). Substitutability coefficient was – 0.8699 in case of the positive shocks of the governmental spending.

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Appendix No. (1)

Table vaues of the t-bound test for explaining variables 4 and 5 and in case of the model bound by the time and constant (case no 5).

Signif.	k=4		k=5	
	I(0)	I(1)	I(0)	I(1)
10%	-3.13	-4.04	-3.13	-4.21
5%	-3.41	-4.36	-3.41	-4.52
2.50%	-3.65	-4.62	-3.65	-4.79
1%	-3.96	-4.96	-3.96	-5.13

Source: based on Pesaran et al. (2001)

Appendix No. (2)

Table values of the F-bound test for explaining variables 4 and 5 and in case of the model bound by the time and constant (case no 5).

Signif.		k=4		k=5	
		I(0)	I(1)	I(0)	I(1)
Asymptotic: n=1000	10%	3.03	4.06	2.75	3.79
	5%	3.47	4.57	3.12	4.25
	2.50%	3.89	5.07	3.49	4.67
	1%	4.4	5.72	3.93	5.23
Finite Sample:n=45	10%	3.298	4.378	3.012	4.147
	5.00%	3.89	5.104	3.532	4.8
	1%	5.224	6.696	4.715	6.293
Finite Sample:n=40	10%	3.334	4.438	3.032	4.213
	5%	3.958	5.226	3.577	4.923
	1%	5.376	7.092	4.885	6.55

Source: as for the table values approximate to the sample from 1000 observations from Pesaran et al. (2001). As for the table values for number of observations 40 and 45 observations from Narayan and Popp (2010)