The Impact of Real Interest Rate, Net Domestic Credit, Government Expenditure on Economic Growth in Egypt from 1976 to 2018

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Abstract: The objective of this research is to study the impact of real interest rate, Net domestic credit and government expenditure changes on the Egyptian economy. Using the Ordinary Least Squares (OLS) method, the results showed that the expansion of domestic debt in Egypt in the period under study (1976-2018) has a positive and significant impact on economic growth. The study recommends that the government should encourage Net Domestic Credit, provided that the funds are used in productive economic means. Net Domestic credit plays an important role in the growth of developed and emerging market economies.

Key words: Real interest rate, Net domestic credit, government expenditure, Egypt.

أثر سعر الفائدة الحقيقى، صافى الائتمان المحلى، والإنفاق الحكومى على النمو الاقتصادى فى مصر فى الفترة من 1976-2018

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ملخص البحث: يهدف البحث إلى دراسة تأثير كلٍ من سعر الفائدة الحقيقي وصافي الائتمان المحلي وتغيرات الإنفاق الحكومي على الاقتصاد المصري. باستخدام طريقة المربعات الصغرى العادية (OLS). وأظهرت النتائج أن توسع الدين المحلي في مصر من 1976 إلى 2018 قيد الدراسة له تأثير إيجابي وهام على النمو الاقتصادي. وتوصي الدراسة بضرورة تشجيع الحكومة للائتمان المحلي الصافي، شريطة أن تستخدم هذه الأموال في وسائل اقتصادية منتجة. كما يلعب صافي الائتمان المحلي دورًا مهمًا في نمو اقتصادات السوق المتقدمة والصاعدة.

كلمات دالة:

سعر الفائدة الحقيقى، صافى الائتمان المحلى، الإنفاق الحكومى، مصر.

Introduction

The economic growth rate (measured in terms of Gross Domestic Product "GDP") is dependent on multiple factors among which are real interest rates, net domestic credit and government expenditure. Moreover, the economic growth rate can influence the Net domestic credit which is nowadays considered as a political tool for promoting Egypt's economic growth. The objective of this study is to investigate the impact of the real interest rate and Net domestic credit changes on the growth rate of the Egyptian economy.

I. Literature Review

Singh (1999) studied the relationship between domestic debt and economic growth in India through the application of the technique of co-integration and the causation test in Granger for the period 1959-1995, and concluded that domestic debt and economic growth are not mutually exclusive. The study supported the hypothesis of the Ricardian parity between domestic debt and economic growth in India. As Johnson (2001) explained, there are three reasons for the high domestic debt in Nigeria; financing the budget deficit, the implementation of monetary policy, and the development of the financial sector. According to the World Bank and the International Monetary Fund (2001), excessive use of domestic borrowing has bad effects on the economy, and can

consume a large part of government revenues, as domestic interest rates are higher than foreign interest rates. Accordingly, the interest cost of domestic borrowing increases rapidly with the increase in the outstanding balance of debt, where an interest rate increase could be more pronounced with a weakened investor base mandating diversification of investors and development of tools. Rapu (2003) studied the sustainability of the level of domestic debt stock against the gross domestic product of Nigeria, using the budget constraint model.

The study found that the local government debt is not sustainable in the case of a current fiscal deficit which might lead to a catastrophic economic situation, due to the low primary government surplus and ineffective debt management. Christensen (2004) studied the role of the domestic debt market in twenty-seven sub-Saharan African countries (including Nigeria), and found that the domestic debt market is generally short-term and the investor base is weak. The study recommended dispensing with private investment in public sector projects. Schclarek's (2004) elucidated the relationship between total government debt and GDP per capital in developed countries. The results showed that there was no statistically significant relationship between total government debt and the growth of GDP per capital. Asogwa, (2005) explained that Nigeria's local government debt continued to suffering from a confidence crisis

which triggered a market demand for long-term debt instruments for the government. According to Hunt's (2007), domestic debt might have positive and negative effects on economic growth from the traditional viewpoint. In developing countries such as Nigeria, elevated debt levels cause an imbalance between debt and equity, with a significant increase in the debt ratio at multiple rates. Maana, Owino, Mutai. (2008), analyzed the economic impact of domestic debt on the Kenyan economy. They found that local debt did not compete with lending to the private sector in Kenya, and documented positive impact on the increase in domestic debt with no clear impact on economic growth. Therefore the study recommended broader governmental reforms to boost investment in treasury bonds and encourage institutional investors.

Muhdi and Sasaki (2009) showed a positive impact of the increase in foreign debt on both investment and economic growth leading to a decline in the local currency.

Sheikh, Faridi, and Tariq (2010) found positive impact of domestic debt on economic growth in Pakistan, confirming partial use of money raised from local sector borrowing to finance government expenditures thereby contributing to the growth of the GDP. Subsequently, they highlighted a potential problem if the proportion is greater than the public debt, since most of the revenues from the state’s exports are considered an important part

of its foreign assets to the private sector. On the other hand, they warned from serious implications for the local debt since it accounts for a large part of government revenues, and hence the government might have fewer resources to spend on development projects, and possible increase in interest would be attributed to large amounts of debt in short instruments.

Checherita and Rother (2010) found non-linear effect of debt on growth exceeds the ratio of government debt to GDP ratio. From a political perspective, their results illustrate the necessity of debt reduction to support long-term economic growth prospects. Reinhart and Rogoff (2010) analyzed data for forty-four countries over a period of two hundred years and found that there was a weak relationship between domestic debt and real GDP growth. Ajay (2010) explained that the collapse of world oil prices in 1981 was the cause of the Nigerian problem arising from gradual reduction credit facilities. Abbas and Christensen (2010) applied the Granger model of regressive causation and showed the extent of the impact of domestic debt on economic growth. They concluded significant positive non-linear impact on economic growth, and demonstrated moderate levels of domestic debt from GDP. However, debt levels exceeding five Thirty percent of total bank deposits had a negative impact on economic growth. Asogwa (2010) investigated the positive relation between domestic debt, growth and inflation, causing elevated efficiency

of private investment. The study stated that moderate levels of non-inflationary domestic debt positively affect economic growth, which maximizes private savings and financial intermediation.

Adofu and Abula (2010) revealed that domestic debt had negative effect on economic growth, and elucidated multiple factors contributing to high levels of domestic debt in Nigeria; high budget deficit, low level of production, increased government spending, high inflation rate, and narrow revenue base. They recommended the necessity of discouraging the government's domestic borrowing and encouraging an increase in its revenue base through tax reforms. Amasuma (2011) applied the joint complementarity test, which resulted in the absence of common complementarity between domestic debt and economic growth. With regard to external debt, the existence of joint complementarity with economic growth was indicated. Moss et al. (2011) revealed the importance of domestic debt as an important component of the growth of developed and emerging market economies. Thereby relying on domestic debt to reduce problems of external borrowing which might be of positive influence when targeting growth in the productive base of the economy.

Egbetunde (2012) found a two-way causal relationship between public debt and economic growth in Nigeria and concluded that

debt was positively correlated with economic growth. It is worth mentioning that the role of debt in economic growth is more controversial than in theoretical studies. The analysis conducted by Malik and Ateeq (2012) showed that there was an inverse relationship of statistical significance, for both domestic and foreign debt in growth. Although they had a significant impact on growth, the external debt recorded greater slowdown in growth compared to the domestic debt.

Charles (2012) recommended the need to keep the ratio of interbank deposits to less than 35%, to increase its use of tax revenues for financing development projects and eliminating all projects that the private sector can deal with, providing a suitable environment for private investors and most importantly improving infrastructure facilities. Debt curve theory supports a non-linear relationship between debt and economic growth.

Likewise, Umaru, Hamidu, and Musa (2013) focused on studying the relationship between external debt, domestic debt, and economic growth. They also studied the effect of these variables on economic growth. The study used regular least squares regression analysis (OLS) to study the effect of public debt on economic growth in Nigeria. The OLS approach had a negative impact of external debt on GDP and a positive effect of domestic debt on economic growth. The results did not indicate a causal relationship between external and domestic debt. Thus, they

concluded that the growth per capital can be attributed to the level of domestic debt versus external debt.

Takashima, Kato and Ogibayash (2014) also pointed out that domestic debt is a strategy for fixed financing, although it is more applicable through the stock market than through bank financing. Babu et al., (2015) showed that domestic debt had a significant positive effect on the growth rate of GDP per capita in East Africa. When assessing the domestic debt stock in Nigeria, Anochie, Ude and Osuji, (2015) found that the domestic debt leads to a 43% reduction in economic growth in Nigeria. The reasons for these negative effects were identified in their study as follows: large budget deficits, high inflation rates, low production, narrow revenue base, and increased government expenditures. The researchers recommended governmental revenue increase through; tax reforms, debt repayment, and using borrowed funds. Titus et al., (2016) concluded that domestic debt raised the growth of the economy while spending on domestic debt service by the government and interest rates on lending by banks led to lower investments and limitations. Thus, the results of the diagnostic analysis provided reliable statistical evidence of domestic debt, as the potential to stimulate sustainable growth and ultimately economic development in the long term. Subsequently, it might be concluded that domestic debt has both short and long-term growth potential. Thus, an adequate

distribution of domestic debt has been recommended in key sectors of the economy to achieve short-term sustainable growth that can be translated into long-term growth. Okereke (2017) indicated that the domestic debt owed had a significant relationship between GDP, and that there was a significant relationship between interest rate and debt service to GDP. Lotto and Mmari (2018) investigated the effect of domestic debt on economic growth in Tanzania. The study found that there was an inverse relationship between domestic debt and economic growth measured by the annual gross domestic product. The goal of the central government should be to use the funds for more development-oriented projects that yield positive returns for economic development. The government should also create a suitable investment environment and policies to attract investment from domestic and foreign sources but also be careful about the type of investments that foreign investors are making. Ayuba and Khan (2019) evaluated the underlying mechanisms of how the outcome negatively affects the domestic debt situation on economic growth, even though government savings showed little positive effect on economic growth. In a study of the causal relationship between public debt and economic growth in India, Manik (2019) found that there was no relationship between to domestic debt and economic growth. Didia and Ayokunle (2020) confirmed that domestic debt had a positive effect, a statistical

indicator of economic growth, while external debt with a negative coefficient was not statistically significant.

Consequently, it might be inferred from reviewing the above literature that many researchers concluded that the domestic debt exceeds the external debt (Amasuma (2011) and Malik and Ateeq (2012), in terms of the general impact on economic growth (Likewise, Umaru, Hamidu, and Musa (2013) and Didia and Ayokunle (2020)) and development, and that the accumulation of local debt adds significantly to the development process in the country.

These studies revealed that increased domestic debt leads to increases in government spending with cascading effects on aggregate demand, output, and employment (Rapu (2003), Sheikh, Faridi, and Tariq (2010) and Titus et al., (2016)).

Thus, a motivation was triggered for the researchers to conduct the current study to investigate the impact of real interest rate, Net domestic credit and government expenditure changes on the Egyptian economy by application on Egypt in the period from 1976 to 2018.

II. ***Model***

$$Y=a+a_1x_1+a_2x_2+a_3x_3+UI \quad (1)$$

where … Y= economic growth.

X1= Net domestic credit.

X2= government expenditure.

X3 = exchange rate.

a, a1, a2, a3 = The parameters.

UI = Random variables.

EViews 9 statistical program was used to estimate and select the appropriate model.

A. Data of Study — the study consists of one dependent variable "GDP" and three independent variables: net domestic credit "X_1", government expenditure "X_2", and real interest rate "X_3":

Variable	Definition	Data Source	Variable type
y	Gross domestic product	World bank	dependent
X_1	Net domestic credit	World bank	independent
X_2	government expenditure[1]	World bank	independent
X_3	Real interest rate	World bank	independent

Source: World Bank data[1]

[1] Final expenditures for general government consumption + Total capital formation

B. Unit Root test: Unit root tests are tests for stationarity of a time series occurring whenever a shift in time doesn't cause a change in the shape of the distribution; unit roots are one of the causes of non-stationarity.

Time-series of variable y was not stable at the level. The results indicated that time-series were stable at level 1, this means that the time-series y is stable; which is considered a good indicator to complete a form estimate, look at the next table:

		Augmented Dickey-Fuller				Variable
Level2		Level1		level		
Prob	T-statistic	Prob	T-statistic	Prob	T-statistic	
		0.01	-3.5	0.92	-0.22	y

EViews 9

Time-series of variable x_1, it was not stable at the level, the results indicated that time-series were stable at level 1, this means the time-series y is stable; it is a good indicator to complete a form estimate, look at the next table:

		Augmented Dickey-Fuller				Variable
Level2		Level1		level		
Prob	T-statistic	Prob	T-statistic	Prob	T-statistic	
		0.00	91	1.00	6.7	X_1

EViews 9

Time-series of variable x_2, it was not stable at the level, the results indicated that time-series were stable at level 1, this means the time-series y is stable; it is a good indicator to complete a form estimate, look at the next table:

		Augmented Dickey-Fuller				Variable
Level2		Level1		level		
Prob	T-statistic	Prob	T-statistic	Prob	T-statistic	
		0.000	-5.6	0.85	-0.61	X_2

EViews 9

C. Integration Analysis:

Johansson test

No. of CE(s)	Eigenvalue	Statistic Trace	Critical Value 0.05	Prob.
None	0.833402	104.8669	47.85613	0.0000
At most 1	0.364365	31.38779	29.79707	0.0325
At most 2	0.265084	12.80940	15.49471	0.1220
At most 3	0.004416	0.181459	3.841466	0.6701

Eviews9

That is three vectors of the common integration between the time series at most: this is a good indicator to proceed with the estimation of the model.

Granger Causality Tests

Hypothesis:	**Null Obs**	**F-Statistic**	**Prob.**
X1 does not Granger Cause Y	41	60.1266	3.E-12
Y does not Granger Cause X1		3.29632	0.0485

Relationship between y, x1 two side, form y to x1 and from x1 to y

III. Results:

Using the OLS method is the most common estimation method for linear models—and that's true for a good reason; as long as your model satisfies the OLS assumptions for linear regression, you infer getting the best possible estimates) to estimate the parameters of the standard model used by Eviews9, the results were as follows, look at the next table:

Variable	coefficient	S.E	T - statistics	P-value
C	-1.5	2. 80	-5.38	0.0000
X1	0.01	0.0025	4.81	0.0000
X2	3.56	0.10	35.20	0.0000
X3	1.3	2.78	0. 464	0.6451
R-squared = 0.99, Adj R-squared = 0.99, DW = 0.532.				

Eviews9

Y = -15066805089.2 + 0.0123X1 + 3.561X2 + 129X3

The results of the multiple linear regression model estimate for time series variables indicate that R-squared = 0.99 means that independent variables show 99% of the change in the dependent variable.

The high R-squared value might indicate results are false and misleading, however, the value of F-Statistic= 1433 and F-Statistic Prop= 0.000 Denies it. Indicating a significant relationship between the dependent variable and independent

variables in general, DW = 0.532 indicates that the model is free from self-correlation, which also indicates the quality of the model, as well as the validity of the relationship between the economic variables to be estimated.

(i) The results show that there is a positive correlation between Net domestic credit and economic growth in Egypt, the increase in Net domestic credit affects Egypt's GDP.

(ii) There is also a positive correlation between government expenditure and Egypt's GDP, the increase in Exports of goods and services leads to an increase in GDP.

(iii) There is a positive correlation between the Real interest rate and Egypt's GDP.

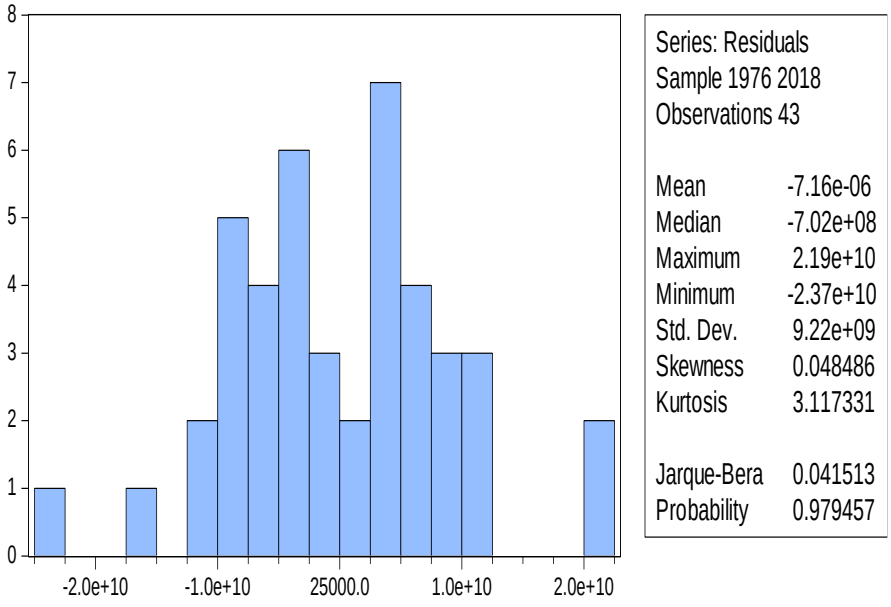
In light of the estimation of the standard model of the study on the method of the lower squares, there are some tests necessary to verify the validity and quality of the estimated model, in order to rely on the results of the assessment is:

- Normal distribution condition for random error: Using the Jarque-Bera test, The Jarque-Bera Test,a type of Lagrange multiplier test, is a test for normality. Normality is one of the assumptions for many statistical tests, like the t test or F test; the Jarque-Bera test is usually run before one of these tests to confirm normality. It is usually

used for large data sets, because other normality tests are not reliable when n is large.

- The value of the test (J= 0.041 was estimated at (p-value = 0.97), this result indicates the acceptance of the nihilistic assumption, that random error follows normal distribution.

Jarque-Bera test



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- Variance of the error boundary is constant: using the white test, as shown in the following table:

The test value (N * R-squared =16.6 with a probability of (p-value= 0.05) and (F-statistic = 2.3), which means acceptance of the nihilistic hypothesis that consistently assumes variance of the error boundary constant.

(White Test)			
F-statistic	2.309486	Prob. F (9,19)	0.0386
Obs(R-squared)	16.61737	Prob. Chi-Square (9)	0.0551
Scaled explained SS	14.47149	Prob. Chi-Square (9)	0.1065

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- No self-association: Previously, the estimated DW value of the model was 0.532 which means the absence of the model of the problem of self-association, Using the LM test (the value of the test (N R-squared = 25.9) (was p-value=0.0000) and (F-statistic=28.2), which confirms the hypothesis of no self-correlation in the estimated model locks.

Lm test

LM Test			
F-statistic	28.5	Prob. F(2,23)	0.0000
Obs(R-squared)	25.9	Prob. Chi-Square(2)	0.0001

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- No linear duplication: variance inflation factors (VIF), it was found that all the values of the inflation coefficients for the study variables ranged between 1and 3.7 indicating no linear duplication in this model.

Variance Inflation Factors

	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	7.83	3.68	NA
X1	6.55	4.045	2.858
X2	0.010	7.732	2.80
X3	7.75	1.35	1.04

Eviews9

The previous results of the statistical tests conducted on the research model confirms that the quality of the model and its safety from any standard defect, Therefore, the results of the model can use in the measurement .

IV. Conclusion:

This study aimed at investigating the relationship between net domestic credit and GDP growth. The results showed a positive correlation between Net domestic credit and economic growth in Egypt, the increase in Net domestic credit affects Egypt's. This result was confirmed by Babu et al., (2015). This contradicts with the Reinhart and Rogoff (2010)

There is also a positive correlation between government expenditure and Egypt's GDP; the increase in exports of goods and services leads to an increase in Gross domestic product, this is consistent with economic theory, which shows the increase in government expenditure increases the demand for domestic products, thus, domestic production increases, this increases GDP and increases economic growth. This result was confirmed by Lotto and Mmari (2018). This contradicts with the Ayuba and Khan (2019)

There is a positive correlation between Real interest rate and Egypt's GDP, the increase in Investment leads to increase in GDP, this is consistent with economic theory, which shows the increase in Real interest rate increases the, domestic production, which increases GDP and increases economic growth. This result was confirmed by/in line with Okereke (2017).

The results showed that the expansion of domestic debt in Egypt for the period under study has a positive and significant impact on economic growth. The study recommends that the government should encourage domestic borrowing, provided that the funds are used in productive economic means. Domestic debt plays an important role in the growth of developed and emerging market economies, and it is beneficial if it aims to achieve growth in the productive base of the economy. This result was confirmed by/in line with Sheikh, Faridi, and Tariq (2010), Abbas and

Christensen (2010), Asogwa (2010), Likewise, Umaru, Hamidu, and Musa (2013) and Didia and Ayokunle (2020) . This contradicts with the Maana, Owino, Mutai. (2008), Adofu and Abula (2010), Amasuma (2011), Ayuba and Khan (2019) and Manik (2019).

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