Estimate the Impact of Financial Inclusiveness on Economic Growth in Egypt
Econometric Study

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I. Abstract:

Financial inclusion allows each member of the community to easily access all financial services by channeling savings (Deposits Channel) to good investment opportunities through formal channels (Loans or credit channel), and helps to establish projects and create more jobs.

This study aims to assess the impact of financial inclusion on economic growth in Egypt during the period 1980-2019. This is done using the standard model analytical method [ARDL and ECM] using time series, and financial inclusion indicators (loans-deposits) were used as independent variables and (GDP) as dependent variable.

The results of the standard study, using ARDL models, have demonstrated the moral and positive implications of financial inclusion for Egypt’s economic growth.

Key words: Financial inclusion, Economic growth, Social growth and Sustainable Development, ARDL and ECM models
II. Introduction:

The World Bank defines financial inclusion in its 2014 report, entitled the Global financial development report as "the proportion of people who use financial services"

Financial inclusion refers, according to the Arab Monetary Fund's common report and the indicative Group for helping the poor was published in January 2017 under the heading "measuring Financial inclusion in the Arab World" to support individuals, including low-income people, companies, Including the smallest, with effective access and benefit (for reasonable prices) from a wide range of high quality official financial services (payments, transfers, savings, credit, insurance, ... Etc.), they are provided in a responsible and sustainable manner by a variety of financial service providers operating in a legal and regulatory environment suitable". (Han and Melecky, 2013)

The spreading of financial services is a key foundation for the development of the Bank Group's objectives to end poverty by 2030. The World Bank has called to generalization financial services for all in 2020, and this means that access is necessary on the core servers provided by the formal financial system of all through discount cards or mobile phones. This can be achieved through the development of ambitious goals and reforms that countries lead technology, innovation and data for transformation fundamental to business models, and engorging public-private initiatives. The aim is to rapidly expand access to financial services, which includes savings, credit, and insurance services, in addition to transactions and payment services. (Pearce, 2011)

In this regard, the Bank Group is currently expanding its scope of services financial, knowledge, advisory and technical support to reach one billion new customers. It also serves with partners such as development institutions, donors, government counterparts and sector companies special to accelerate progress in the dissemination of financial services.

In order to verify the assessment of financial inclusion impact on GDP, the hypothesis that there is a positive relationship
between total loans and GDP must be tested as well as the validity of the impact must be tested through the hypothesis that there is a negative and statistically non-significant relationship between total deposits and GDP. (Camara and Tuesta, 2014).

III. Literature Review

For a long time, several studies illustrate the financial inclusion as a financial sector development and its positive impact relationship such as capital accumulation, Investment, savings, and financial technology innovation led to affect the development of the economic growth. (e.g., Romer, 1986; King & Levine. 1993; Akinboade, 1998; Arestis, P., et al., 2000; Erlando et al., 2020;).

Most studies have confirmed the importance, positive relationship and impact between financial inclusion and economic growth. Moreover findings show that financial inclusion leads to more extended and effective impact on macroeconomic sectors. In other words grow saving and balanced base of retail deposits; lead to increase Economic Growth. (Vo et al., 2020).

The global policy community in a few past years reveals that financial inclusion is embraced and considered as an objective for the financial sector and Economic Development. G.20 first agreed on the agenda of financial inclusion in 2008, and in 2010 the agenda had established. The alliance Financial Inclusion (AFI) was founded as an institution as a peer exchange body for regulators from developing countries. In AFI all policies, developed strategies, and specific national Financial Inclusion of governments was investigated by AFI. Arun and Kamath (2015).

In Beck, Kunt and Levine (2000), the importance of financial development on GDP was examined by introducing a new database that measures the financial development that include indicators of the size, activity, efficiency of banks, non-banks institutions and markets to comprise financial structure and financial development. The statistical results assure that there is
an impact of these indicators on financial sector and on Economic Growth for 175 countries over time period 1960 to 1997. Odhiambo (2004).

Investigate the relationship between financial development that expressed by the ratio of broad money (M2) to gross domestic product (GDP), Currency ratio (M1) that's represent the sum of currency and demand deposits, and the ratio of bank claims on private sector to nominal GDP and the economic growth that expressed by GDP. The relation examined by estimated the direction of causality between variables using time series data of south Africa against real GDP per capita and a proxy for economic growth. The study uses Johansen-Juselius cointegration technique and vector error correction mechanism (ECM). The results explain that’s there is a appositive impact of the demand side of financial development on economic growth.

The review in Arena (2008) introduced insurance market activity as a proxy of financial inclusion and its contribution as a financial intermediary and as a protection instrument that indemnification the households and firms from risk transfer by using the amount of saving effectively; that lead to achieve dynamics effect on Economic Growth. Using the Generalized Method of Moments (GMM) for dynamic models of panel data for 55 countries for the period 1976 - 2004, the results asserts that both life and nonlife insurance have a positive and significant causal effect on economic growth.

Later, Arora (2012) suggests a new approach to examine the relationship between Financial Inclusion and Development in Asia using human capital that influence on the efficiency of financial inclusion and increasing the utilization of financial services. In his article three stages of methodologies were used, the first methodology implements the multidimensional indicators to build a Financial Development Index (FDI) and Education Development Index (EDI) for sample of 21 countries of developing Asia for the period 2000-2010. Then, in the second methodology he conducting the Principal Components Analysis (PCA) to shortlist variables, finally in the third one he examined
the relationship between financial inclusion and human capital using Ordinary Least Squares (OLS). Results assert that there are different ranks between countries in educational development and financial development, moreover a strong positive relationship between physical access to banks and expected years of schooling and mean years of schooling was proved, and a negative significant between (FDI) and (EDI).

Kunt and Klapper (2013), investigates the indicators that measure the financial inclusion like countries save, borrow, make payments, and manage in 148 countries, using the data that represents the share of population which uses formal financial services and examined the significant country and individual variation level in how adults use financial formal and informal accounts. Results find a formal account in banks have a lot of benefits (e.g., encourage saving, open access to credit, make transfer wages easier, remittances, government payments), furthermore, broad based penetrate is accessible and affordable. As well as the increasing formal account considered financial inclusion; encourage the achieving of income quality and higher Economic Growth.

Zulfiqar, Chaudhary and Aslam (2016), introduced the empirical evidence that, financial inclusion in Pakistan that led to access to credit will have been increasing gradually the share of employment of females; which increase the productive power in their economics, also is allowed to reduce the poverty alleviation and income inequality. Finally, the financial inclusion has increased the sharing of women’s employment and their productivity which affect positively the Economic growth in the long run in Pakistan.

Chauvet and Jacolin (2017), Turning to firms in developing in 79 emerging countries to illustrate the impact of financial inclusion and the consist of concentration on the performance of 55,596 firms, results assert Primarily, there’s a positive effect with less concentration in banking system. Secondly, the competitive banks favor the firms that have less financial inclusion, because it will have achieved more growth. Finally, the
Financial Inclusion as a banking system led to develop the quality and performance of firms, if there are limited Deeping financial in these countries.

After global financial crises, the Financial Inclusion became most important for public policy to follow. Ahmed and Mallick (2019), examined A sample of 2635 banks in 86 countries up to 2004 to 2012; they found that higher level of financial inclusion contributes to achieve greater bank stability. Furthermore, Neaime and Gaysset (2018), investigate with empirical evidence that create the Financial Inclusion for 8 MENA countries at the period from 2002 to 2015 using Econometric Models: Generalized Method Moments (GMM) and Generalized Least Square (GLS); have firstly, a positive impact in reducing inequality income; Although the inflation and the size of population led to increasing income inequality. Secondly, there’s no impact of Financial Inclusion on Poverty though there’s an impact of inflation, size of population and trade openness had an increase to poverty. Finally, by using Financial Integration as a factor to Financial Instability in MENA countries; the results found that Financial Inclusion affect positively on achieve Financial Stability.

If the Researcher analyze the factors that implied affecting on Financial Inclusion in developing economies of 43 countries as Kabakova and Plaksenkov (2018), considered as three factors [high socio-demographic factors like social welfare using (social health), Technological (Digital) Factors like use digital methods: electronic payments, mobile banking. Dekoker and Jentzsch (2013), and economic factors like Economic growth or economic development.

Ander and Kapoor (2010), find that mobile banking as a technological factor as a financial inclusion don’t allow to develop economies without asset a good quality of info-structure like high quality mobile network in place.

Bolbol, Fatheadin and Omran (2005), illustrates in their article the relationship between Financial Structure and total factor productivity (TFP) in Egypt. For the period from 1974 to 2002.
Results asserts that the widening in securities market as a financial sector will have achieved benefits to TFP and develop the Economic Growth in Egypt.

Abu-Bader and Abu-Qarn (2008), measures the financial development in Egypt using four variables: the ratio of money stock (M2Y), M2 to nominal GDP(M2/GDP), the ratio of bank credit to the private sector to nominal GDP(PRIVY), and the ratio of credit issued to non-financial private firms to total domestic credit (excluding credit to banks) (PRIVATE), and examined the significant effect for these variables as an independent on economic growth as a dependent variable up to the period 1960-2001 with utilizing VAR and Granger causality tests using the cointegration and vector error-correction (VEC) methodology. The results explain that a bi-directional Granger causality between economic growth and financial development in Egypt.

Whereas, Sayed, Abbas and Touny (2020), analyzes the impact of financial inclusion on Economic Growth in Egypt, utilize Descriptive analysis and secondary data for the Number of ATMs and the Deposits in various financial institutions as independent variables and its impact on GDP as dependent variable using fully modified least square (FMOLS) method up to the period 2007 to 2018. The Results of this article revealed to there were a positive correlation between GDP and the number of ATMs also, there’s a negative relationship between GDP and total deposits.

From the Literature review, it is observable that the existing studies concentrated on the various economically and econometrically ways used to analyze, investigate and examined the impact of financial development, financial inclusion with different Indicators on economic growth in different countries. Consequently, its necessary to introduce this study that seeks to fill the gap by determining the Impact of Financial Inclusion on GDP in Egypt.
IV. The basic conditions proposed to be met in the financial inclusion indicators

There are six basic conditions should be checked to determine financial inclusion indicators (Kunt and Klapper, 2012). (Beck, Kunt and Honohan, 2008), (Alber, 2019), these conditions are summarized as:

**Benefit and relevance**: Selection of indicators that help to develop national fiscal-inclusiveness policies.

**Consistency**: Ensuring consistency of measurement and comparability in time and place.

**Balance**: Dealing with the financial coverage of the supply (access to financial services) and demand (utilization of these services).

**Pragmatism**: Relying as much as possible on available data to reduce cost and effort.

**Resilience**: Achieving financial inclusion is undoubtedly linked to the economic, geographic, social, and cultural context the state, circumstances and resources differ among States. Therefore, the basic conditions proposed in calculating the financial inclusion Index enables countries to have sufficient flexibility in the selection of tariffs and/or use alternate indicators.

**Determination**: Measuring financial inclusion accurately, additional efforts and resources may be required to meet the prerequisites as well. However, in terms of flexibility and pragmatism, alternative indicators can be adopted if the basic indicators can’t be obtained.
V. Dimensions of financial inclusion according to the World Bank methodology

The most important five components of financial inclusion according to the World Bank methodology are as follows:

**The use of bank accounts**
The proportion of adults with a financial account in official institutions such as banks, post offices, and finance institutions minor. (Singh, 2017).
The purpose of the accounts (personal or commercial).
The number of amalgamation (deposit and withdrawal).
Access to bank accounts (such as ATMs, branches of the bank)

**Saving**
The percentage of adults who have propped up for the past 12 months using official financial institutions (e.g., banks, post offices, etc.).
The percentage of adults who have saved in the past 12 months using an informal savings institution or anyone outside the family.
The percentage of adults who save otherwise (for example, at home) within 12 months Past. (Amidzic, Massara and Mialou, 2014).

**Insurance**
The percentage of adults securing themselves.
The percentage of adults working in agriculture, forestry, or fishing and securing their activities (Their crops and livestock) against natural disasters (precipitation and storms). (CGAP and Arab Monetary Fund, 2017).

**Payments**
The percentage of adults who have used an official account to receive government wages or payments in 12 months past.
The percentage of adults who have used an official account to receive or send money to family members who live elsewhere in the past 12 months. (Global partnership for Financial Inclusion, 2011).
The percentage of adults who used the mobile phone to pay bills, send, or receive money in 12 months past.

**Borrowing**
The percentage of adults who have borrowed in the past 12 months from an official financial institution.
The percentage of adults who have borrowed in the past 12 months from traditional informal sources (including those who have borrowed from traditional sources) including borrowing from the family and friends. (Leyshon and Thrift, 1993).

**VI. The reality of financial inclusion**
According to the World Bank's Global Financial Services Dissemination Index (FINDEX), about 38 percent of the total world’s adult population has access to official financial services. (Hannig and Jansen, 2010). Some detailed data was provided for the Arab countries and Egypt as below:

**For the Arab countries:**
Less than a quarter of adults with accounts at financial and banking institutions have savings accounts. 72% of adults have access to formal financial services. Only 5% of adults, without regard to the Gulf Cooperation Council (GCC) countries, borrow from official channels. (Sethi and Sethy, 2019).

**For Egypt:**
40% of adults have Account ownership at a financial institution or with a mobile-money-service provider at 2017. (World Development Indicators, 2020).
Automated teller machines (ATMs). (per 100,000 adults) is 20.07017591 at 2019. (World Development Indicators, 2020).
Depositors with commercial bank. (Per 1,000 adults) is 541.6274885 at 2019. (World Development Indicators, 2020).
VII. Research methodology

Estimate the impact of financial inclusion by total deposits (d) and total loans (l) on gross domestic product (GDP) in Egypt by ARDL bound test for the period (1980 to 2019) to test the existence of a relationship between variables in levels regardless the underlying regressors are purely I (0), purely I (1) or mutually cointegrated (e.g., Pesaran, M. H., Chin, Y. & Smith, R. J., 2001). This methodology used Wald or F-statistic in a generalized Dicky–Fuller type to test the significance of lagged levels of the variables under consideration in a conditional unrestricted equilibrium-correction model (ECM).

1. Data set

In this research the Egyptian annual data from 1980 to 2019 has been used. The sample period, which shown in Table (1), is determined by the availability of the following variables, Gross Domestic Product (GDP), total Deposits (d), total loans (l), interest deposits (di), interest lending (li), money measures (m2) which also can represent liquidity and wealth (financial assets), inflation (INF), real exchange rate (RER). All variables are natural logarithm of real values. However, both interest rates and inflation are nominal variables. While Table (2) shows the descriptive analysis for all variables, and when take variance inflation factor test to independent variables (VIF). In Table (3) the results provides that there isn’t relationship between independent variables at 10% significant level. So, there’s no multicollinearity between independent variables and its validity to test.
Table (1): Variables, definitions and sources

<table>
<thead>
<tr>
<th>Variables</th>
<th>Symbol</th>
<th>Definitions</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>d</td>
<td>Total deposits.</td>
<td><a href="https://fred.stlouisfed.org/series/BOGZ1FA794100005A">https://fred.stlouisfed.org/series/BOGZ1FA794100005A</a></td>
</tr>
</tbody>
</table>

Source: by authors
The GDP can be represented as a function of the other variables as follows:

\[ \text{GDP} = f (d, l, di, li, m, inf, rer) \]  

Equation (1)

By taking the first difference to all variables, the results provides that all variables are stationarity, so it provides the validity of use test.

Source: for table 2 and 3 - Output of E-Views.
Estimate The Impact of Financial

Table (4) Unit root test

<table>
<thead>
<tr>
<th>variables</th>
<th>ADF - test</th>
<th>PP - test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Difference</td>
</tr>
<tr>
<td>GDP</td>
<td>-2.56887</td>
<td>2 T</td>
</tr>
<tr>
<td>d</td>
<td>-1.61956</td>
<td>0 C</td>
</tr>
<tr>
<td>l</td>
<td>-1.12665</td>
<td>2 C</td>
</tr>
<tr>
<td>di</td>
<td>-1.29683</td>
<td>2 C</td>
</tr>
<tr>
<td>li</td>
<td>-2.68509</td>
<td>1 T</td>
</tr>
<tr>
<td>M2</td>
<td>-0.87127</td>
<td>1 C</td>
</tr>
<tr>
<td>INF</td>
<td>-3.29031</td>
<td>1 C</td>
</tr>
<tr>
<td>RER</td>
<td>-3.30089</td>
<td>1 C</td>
</tr>
</tbody>
</table>

Source: Output of E-Views.

Note: (*), (**), and (***), mean that the variable is stationary at 1%, 5%, and 10%, respectively. The numbers beside the critical values represent the number of lags, while t, c, and the critical values represent the variant of the series trend and constant, constant, and no constant or trend, respectively.

By conducting the Unit Root Tests on Table (4), the time series are stable, at level I (0) or in the first difference I (1), depending on the ADF - Test and PP - Test, and then it was made sure that there are stable variants above the first difference which enable completion of the remaining steps of the ARDL model. (Tung, 2015).
2. ARDL model

\[ \Delta y_t = \beta_0 + c_0 t + \sum_{i=1}^{q} \xi_i \Delta y_{t-i} + \sum_{j=0}^{p} \omega_j \Delta x_{t-j} + \gamma_1 y_{t-1} + \gamma_2 x_{t-1} + \varepsilon_t \]

(Haq and Larsson, 2016).

GDP = 0.22 gdp_{t-1} + 1.06 gdp_{t-2} - 0.42 gdp_{t-3} - 
\[ 0.006 l_t + 0.13 l_{t-1} + 0.09 l_{t-2} - 0.15 l_{t-3} \]
\[ [-0.23] [2.25] [0.72] [-1.02] \]
\[ 0.21 l_{t-4} - 0.003 d_t + 0.014 d_{t-1} - 0.003 d_{t-2} \]
\[ [-2.71] [-0.34] [1.87] [-0.48] \]
\[ -0.019 d_{t-3} - 0.022 d_{t-4} + 0.17 m_t - 0.08 m_{t-1} \]
\[ [-3.09] [-2.68] [0.93] [-0.32] \]
\[ + 0.20 m_{t-2} + 0.32 m_{t-3} - 1.04 M_{t-4} - 1.61 inf_t \]
\[ [0.90] [0.36] [-2.36] [-0.88] \]
\[ - 1.08 inf_{t-1} - 4.88 inf_{t-2} - 1.18 inf_{t-3} \]
\[ [-0.48] [-2.03] [-0.11] \]
\[ + 1.77 inf_{t-4} - 0.45 rer_t - 0.34 rer_{t-1} \]
\[ [2.31] [-2.13] [-1.31] \]
\[ - 0.63 rer_{t-2} + 0.60 rer_{t-3} + 0.39 rer_{t-4}. \]

Equation (2)

\[ \sigma = 0.46 \quad RSS = 0.0010 \quad R^2 = 0.99 \quad F = 1692.893 \quad R^2adj = 0.99 \]
Table (5): ARDL Test

Dependent Variable: LN_GDP
Sample (adjusted): 1984 2019
Included observations: 36 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LN_L LN_D LN_M2 INF RER
Fixed regressors: C
Selected Model: ARDL(3, 4, 4, 4, 4, 4)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln GDP(-1)</td>
<td>0.215804</td>
<td>0.566352</td>
<td>0.381043</td>
<td>0.7145</td>
</tr>
<tr>
<td>ln GDP(-2)</td>
<td>1.061788</td>
<td>0.547888</td>
<td>1.937964</td>
<td>0.0938</td>
</tr>
<tr>
<td>ln GDP(-3)</td>
<td>-0.41806</td>
<td>0.249228</td>
<td>-1.677412</td>
<td>0.1374</td>
</tr>
<tr>
<td>ln l(-1)</td>
<td>-0.0061</td>
<td>0.026344</td>
<td>-0.231502</td>
<td>0.8235</td>
</tr>
<tr>
<td>ln l(-2)</td>
<td>0.130714</td>
<td>0.058092</td>
<td>2.25011</td>
<td>0.0592</td>
</tr>
<tr>
<td>ln l(-3)</td>
<td>-0.14729</td>
<td>0.144732</td>
<td>-1.017664</td>
<td>0.3427</td>
</tr>
<tr>
<td>ln l(-4)</td>
<td>-0.2141</td>
<td>0.07888</td>
<td>-2.714206</td>
<td>0.03</td>
</tr>
<tr>
<td>ln D</td>
<td>-0.00322</td>
<td>0.009356</td>
<td>-0.344285</td>
<td>0.7407</td>
</tr>
<tr>
<td>ln D(-1)</td>
<td>0.01436</td>
<td>0.007669</td>
<td>1.872418</td>
<td>0.1033</td>
</tr>
<tr>
<td>ln D(-2)</td>
<td>-0.00302</td>
<td>0.006349</td>
<td>-0.475925</td>
<td>0.6486</td>
</tr>
<tr>
<td>ln D(-3)</td>
<td>-0.01932</td>
<td>0.006246</td>
<td>-3.093153</td>
<td>0.0175</td>
</tr>
<tr>
<td>ln D(-4)</td>
<td>-0.02205</td>
<td>0.008236</td>
<td>-2.677399</td>
<td>0.0317</td>
</tr>
<tr>
<td>ln M2</td>
<td>0.167682</td>
<td>0.179725</td>
<td>0.932988</td>
<td>0.3819</td>
</tr>
<tr>
<td>ln M2(-1)</td>
<td>-0.07534</td>
<td>0.231856</td>
<td>-0.324935</td>
<td>0.7547</td>
</tr>
<tr>
<td>ln M2(-2)</td>
<td>0.204996</td>
<td>0.228765</td>
<td>0.8961</td>
<td>0.4</td>
</tr>
<tr>
<td>ln M2(-3)</td>
<td>0.31817</td>
<td>0.882535</td>
<td>0.360518</td>
<td>0.7291</td>
</tr>
<tr>
<td>ln M2(-4)</td>
<td>-1.04427</td>
<td>0.441752</td>
<td>-2.363938</td>
<td>0.0501</td>
</tr>
<tr>
<td>INF</td>
<td>-1.6E-09</td>
<td>1.83E-09</td>
<td>-0.877537</td>
<td>0.4093</td>
</tr>
<tr>
<td>INF(-1)</td>
<td>-1.1E-09</td>
<td>2.25E-09</td>
<td>-0.480369</td>
<td>0.6456</td>
</tr>
</tbody>
</table>
source: Output of E-Views.

The results of the model;
In Table (5), all variable total loans, total deposits, broad money, inflation and real exchange rate explain the model by 99% for the change of gross domestic product. In addition, we can notice that: There is a positive statistical significance relation between gross domestic product with two lags and gross domestic product at 5% significance, so, when the lagged gross domestic product...
increased by 100% there is an excess in gross domestic product by 106%.

There is a positive statistical significance relation between total loans with one lag and gross domestic product at 5% significance, so, when the lagged total loans increased by 100% there is an excess in gross domestic product by 13%.

There is a positive statistical significance relation between total deposits with one lag and gross domestic product at 10% significance, so, when the lagged total deposits increased by 100% there is an excess in gross domestic product by 1%.

There is a negative statistical significance relation between broad money as a wealth with four lags and gross domestic product at 5% significance, so, when the lagged broad money increased by 100% there is decreased in gross domestic product by 104%.

There is a positive statistical significance relation between inflation with four lags and gross domestic product at 5% significance, so, when the lagged inflation increased by 100% there is an excess in gross domestic product by 177%.

There is a negative statistical significance relation between real exchange rate and gross domestic product at 5% significance, so, when the real exchange rate increased by 100% there is decreased in gross domestic product by 45%.

3. ARDL Long Run Form and Bounds Test

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>Signif.</th>
<th>I(0)</th>
<th>I(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>4.54747</td>
<td>10%</td>
<td>2.08</td>
<td>3</td>
</tr>
<tr>
<td>K</td>
<td>5</td>
<td>5%</td>
<td>2.39</td>
<td>3.38</td>
</tr>
<tr>
<td></td>
<td>2.5%</td>
<td></td>
<td>2.7</td>
<td>3.73</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td></td>
<td>3.06</td>
<td>4.15</td>
</tr>
</tbody>
</table>

source: Output of E-Views.
The results of F-Bounds Test, Table (6): illustrate the value of F = 4.55; its greater than upper pound I (1) at 1% significance that = 4.15 %. that’s assert there is long-run equilibrium relation between gross domestic product and determinants of financial inclusion (total loans, total deposits). (Abdelkader, 2013).

4. Error Correction Form. (Haq and Larson, 2016)

\[
\Delta \text{Gdp} = -0.64 \text{gdpt}_{-1} + 0.42 \text{gdpt}_{-2} \Delta 0.01 l + 0.27 l_{t-1} + \\
0.36 l_{t-2} + 0.21 l_{t-3} \Delta 0.01d +0.04d_{t-1} + 0.04d_{t-2} \\
0.02d_{t-3} + \Delta 0.17 m + 0.52 m_{t-1} + 0.73m_{t-2} + \\
1.04 m_{t-3} \Delta 1.62 inf_{t-1} 1.16inf_{t-2} 1.65 inf_{t-2} _{ \Delta 1.77inf_{t-3} \\
[5.29] -1.70 [-7.07] [-7.84] [-5.08] \\
\Delta 0.45rer \Delta 0.36rer_{t-1} \Delta 0.98rer_{t-2} - 0.39 rer_{t-3} \\
- 0.14ECM_{t-1}. \text{Equation (3)}
\]

\[
\sigma = 0.01 \quad \text{RSS} = 0.0010 \quad \text{R2} = 0.91 \quad \text{R2adj} = 0.77
\]
Table (7): Error Correction Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(LN_GDP(-1))</td>
<td>-0.643731</td>
<td>0.188375</td>
<td>-3.417283</td>
<td>0.0112</td>
</tr>
<tr>
<td>D(LN_GDP(-2))</td>
<td>0.418057</td>
<td>0.107357</td>
<td>3.894104</td>
<td>0.0059</td>
</tr>
<tr>
<td>D(LN_L)</td>
<td>-0.006099</td>
<td>0.006493</td>
<td>-0.939232</td>
<td>0.3789</td>
</tr>
<tr>
<td>D(LN_L(-1))</td>
<td>0.267483</td>
<td>0.041732</td>
<td>6.409484</td>
<td>0.0004</td>
</tr>
<tr>
<td>D(LN_L(-2))</td>
<td>0.361385</td>
<td>0.069941</td>
<td>5.166982</td>
<td>0.0013</td>
</tr>
<tr>
<td>D(LN_L(-3))</td>
<td>0.214096</td>
<td>0.050887</td>
<td>4.207304</td>
<td>0.004</td>
</tr>
<tr>
<td>D(LN_D)</td>
<td>-0.003221</td>
<td>0.002859</td>
<td>-1.126661</td>
<td>0.297</td>
</tr>
<tr>
<td>D(LN_D(-1))</td>
<td>0.044394</td>
<td>0.006774</td>
<td>6.553484</td>
<td>0.0003</td>
</tr>
<tr>
<td>D(LN_D(-2))</td>
<td>0.041372</td>
<td>0.006221</td>
<td>6.650254</td>
<td>0.0003</td>
</tr>
<tr>
<td>D(LN_D(-3))</td>
<td>0.022052</td>
<td>0.004462</td>
<td>4.941555</td>
<td>0.0017</td>
</tr>
<tr>
<td>D(LN_M2)</td>
<td>0.167682</td>
<td>0.092821</td>
<td>1.806511</td>
<td>0.1138</td>
</tr>
<tr>
<td>D(LN_M2(-1))</td>
<td>0.521108</td>
<td>0.120649</td>
<td>4.319224</td>
<td>0.0035</td>
</tr>
<tr>
<td>D(LN_M2(-2))</td>
<td>0.726104</td>
<td>0.12239</td>
<td>5.932686</td>
<td>0.0006</td>
</tr>
<tr>
<td>D(LN_M2(-3))</td>
<td>1.044274</td>
<td>0.197444</td>
<td>5.288972</td>
<td>0.0011</td>
</tr>
<tr>
<td>D(INF)</td>
<td>-1.61E-09</td>
<td>9.45E-10</td>
<td>-1.699312</td>
<td>0.1331</td>
</tr>
<tr>
<td>D(INF(-1))</td>
<td>-1.16E-08</td>
<td>1.65E-09</td>
<td>-7.066347</td>
<td>0.0002</td>
</tr>
<tr>
<td>D(INF(-2))</td>
<td>-1.65E-08</td>
<td>2.11E-09</td>
<td>-7.835204</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(INF(-3))</td>
<td>-1.77E-08</td>
<td>3.49E-09</td>
<td>-5.076034</td>
<td>0.0014</td>
</tr>
<tr>
<td>D(RER)</td>
<td>-0.453364</td>
<td>0.093942</td>
<td>-4.826015</td>
<td>0.0019</td>
</tr>
<tr>
<td>D(RER(-1))</td>
<td>-0.358446</td>
<td>0.093024</td>
<td>-3.853289</td>
<td>0.0063</td>
</tr>
<tr>
<td>D (RER (-2))</td>
<td>-0.983572</td>
<td>0.155864</td>
<td>-6.310439</td>
<td>0.0004</td>
</tr>
<tr>
<td>D (RER (-3))</td>
<td>-0.387681</td>
<td>0.119293</td>
<td>-3.249828</td>
<td>0.0141</td>
</tr>
<tr>
<td>Coint Eq (-1) *</td>
<td>-0.140465</td>
<td>0.018268</td>
<td>-7.688999</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
The results from table (7) and equation (3); explain that the coefficient of error correction model $ECM_{t-1}$ is negative value, and significant and we can correct mistakes in the first year by 14% and correct the rest 86% in the future 6 years. (Abdelkader, 2015; Nkoro and Uko, 2016).

5. Residual tests

The ARDL model passed the Residual tests at four lags periods with a significant level of 5%, so it passed the Serial Correlation LM test, so there is no serial correlation (LM test) between the variables. As the statistical significance is greater than 0.05; It was 0.17. The illustration is shown in Table (8) as follows:

<table>
<thead>
<tr>
<th>Table (8): Breusch-Godfrey Serial Correlation LM Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
</tr>
<tr>
<td>Obs*R-squared</td>
</tr>
</tbody>
</table>

In addition, the model passed the Normality test, so the distribution probability of Jarque-Bera was 0.14, which is greater than the significance level 0.05; this indicates that the Residual of
the model are subject to a normal distribution. (Alimi, 2014). The illustration is shown in Figure (1) as follows:

**Figure (1): Normality Test**

<table>
<thead>
<tr>
<th>Series: Residuals</th>
<th>Sample 1984 2019</th>
<th>Observations 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-2.57e-15</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>-0.000222</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>0.016847</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.010884</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.005576</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>0.649799</td>
<td></td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.947474</td>
<td></td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>3.879992</td>
<td>0.143705</td>
</tr>
</tbody>
</table>

The model also passed the Heteroscedasticity test, as its probability was greater than 0.05, amounted to 0.63. (Alimi, 2014). The illustration is shown in Table (9) as follows:

**Table (9): Heteroskedasticity Test: Breusch-Pagan-Godfrey**

<table>
<thead>
<tr>
<th></th>
<th>F-statistic</th>
<th>Prob. F (28,7)</th>
<th>0.6278</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>28.06298</td>
<td>Prob. Chi-Square (28)</td>
<td>0.4611</td>
</tr>
<tr>
<td>Scaled explained SS</td>
<td>1.563669</td>
<td>Prob. Chi-Square (28)</td>
<td>1</td>
</tr>
</tbody>
</table>

source: Output of E-Views.

6. **stability test**

The data that used of the ARDL model haven’t any structural changes to confirm the validity and accuracy of the model results, by using (CUSUM test) and (CUSUM of square test), and if the curve for each of the two tests is within the range of critical bounds at the level of significance 5%; The null hypothesis that the variables are static will be accepted.
It is evident from the figure that each of the two graphical tests is within the range of critical bounds, and therefore these tests demonstrate the stationarity of the short and long-term parameters of the ARDL model. (Haq and Larson, 2016).

VIII. Conclusions

1. The first hypothesis has been validated, there is a positive and moral relationship between total loans and GDP. In agreement with the theory if the total loans increases by 100%, the higher the GDP by 36%.

2. The second hypothesis was proved incorrect, there is a positive and moral relationship between total deposits and GDP. In contrary with the theory if the total deposits increase by 100%, the higher the GDP by 4%.

3. The long-term equilibrium state of the model and the quality of its predictability can be reached after 6 years; by correcting mistakes in the first year by 14% and the other 86% should by corrected in the next 6 years.

IX. Recommendations:

1. Increasing the number of branches and financial services provided to different locations will increase the total volume of deposits which increases the volume of loans provided, consequently both the GDP and economic growth will increase.
2. The need to strengthen the basic pillars of financial inclusion, especially with regard to the financial infrastructure to support outreach geography of banks, financial institutions and systems of means for payment and settlement.

3. Integrating financial education between the public and private sectors, and spreading the financial awareness to enhance financial inclusion.

4. Creating modern tools at low cost to deliver banking services to all segments of society including women and youth who contribute to achieving financial inclusion.

5. The Union of Arab Banks should increase efforts to encourage innovation and creativity, designing financial products that fit the needs of all individuals, and innovate financial tools and services to meet the needs of low-income categories and women.

X. References:


ملخص:

يتيح الشمول المالي لكل فرد من أفراد المجتمع إمكانية الحصول على جميع الخدمات المالية بسهولة من خلال توجية المدخرات نحو الفرص الاستثمارية الجيدة من خلال قنوات رسمية، كما أنه يساعد على تأسيس المشروعات وخلق المزيد من فرص العمل.


وفقد أظهرت نتائج الدراسة القياسية من خلال استخدام نموذج ARDL معنوية إيجابية مؤشرات الشمول المالي على النمو الاقتصادي في مصر.

كلمات مفتاحية: الشمول المالي، النمو الاقتصادي، النمو الاجتماعي والتنمية المستدامة، نماذج ARDL ونماذج ECM.