

-RESEARCH ARTICLE-

## FINANCIAL INCLUSION AND ECONOMIC GROWTH IN SAUDI ARABIA: AN EMPIRICAL ANALYSIS

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### —Abstract—

Inclusive development has as of late ended up a curious issue to be considered more profoundly, particularly within the financial sector as outlined within the concept of money related consideration. The role of the financial sector is fundamental as it is thought of as the essential area in improving economic activities. The purpose of this research was to analyze the determinant variables affecting financial inclusion and their

Citation (APA): Elmonshid, L. B. E., Yousif, G. M. A., Sarabdeen, M., Bilal, A.O. A. (2022). Financial Inclusion and Economic Growth in Saudi Arabia: An Empirical Analysis. *International Journal of Economics and Finance Studies*, 14 (1), 218-238. doi: 10.34109/ijefs. 202220009

short- term and long-term impact on Saudi Arabia economy using secondary data for the period of 2004 to 2018. ARDL the Auto Regressive Distributed Lag for co-combination strategy and the Pairwise VAR Granger causality Wald tests were utilized to break down the targets of the study. The study reveals that an expansion in the broad money, domestic credit to the private area by banks and loan-to-deposit proportion in commercial banks lead to a huge impact on the monetary development over the long haul. An expansion in GDP per capita, money supply and internet usage lead to significant impact in the financial inclusion the long run. The Pairwise VAR Granger causality Wald tests indicator affirms the significant relationship between the different components of GDP and financial inclusion and show a unidirectional causes and effects between broad money, loan-to-deposit proportion in banks, domestic credit to private area by banks and GDP. Likewise, a unidirectional causality was found between cash flexibility and financial inclusion. Increasing the attention of financial literacy, expanding the access of accessible financial services, advancing the online clients, and increment in the number of adults with bank accounts would improve the financial inclusion in Saudi Arabia.

**Keywords:** Domestic credit, Economic growth, Financial inclusive, Loan-to-deposit rate.

## 1. INTRODUCTION

Financial inclusion assumes an essential part to alleviate poverty and improve economic growth. Financial inclusion allows financially excluded people to benefit from financial services and institutions, this leads to their empowerment, social security and economic growth. Findings of existing literature characterize by the absence of an agreement with respect to the meaning of financial inclusion, it varies because of changes in social, economic and financial levels over the world.

Thus, there is no one commonly accepted definition for the term financial inclusion. Therefore, academicians and policy makers characterize it in agreement with their area of study in examination destinations. Some financial inclusion definitions exist and they concentrate on the individual's involvement in banking activities. Chakraborty and (Chakravarty et al., 2013) defined financial inclusion as “the process of ensuring access to appropriate financial products and services needed by vulnerable groups such as weaker societal sections and low-income groups at an affordable cost in a fair and transparent manner by mainstream institutional players”. The association for economic co-operation and advancement characterizes the financial inclusion as “the process of promoting affordable, timely and adequate access to a wide range of regulated financial products and services and broadening their use by all segments of society, through the implementation of tailored existing and innovative approaches, including financial awareness and education with a view to promote financial well-being as well as economic and social inclusion” (Atkinson et al., 2013). On the other hand, (Lenka et al.,

2018) introduced a meaning of financial inclusion to explain the involvement of offering different financial products of savings, payments, credit, internet banking to low income citizens at an affordable cost as a means for connecting financially excluded groups to the scope of financial services (Briard et al., 2020).

Financial inclusion promotes economic advance over value formation of private company with positive overflow consequences on human improvement indicators such as wellbeing, learning and drop of imbalance and destitution (Nanda et al., 2016). Attainment of financial inclusion has become a primacy for many countries across the world, since it is linked to stronger and more sustainable financial development and improvement (Duke et al., 2020).

As per (Ortega, 2012), four elements are considered to be main drivers for effective financial inclusion environment. First, the establishments of stable financial foundations represented by sound regulatory bodies. Secondly accessibility and effectiveness of admittance to finance for various people and firms regardless of the income groups (Gudalov et al., 2020). Thirdly, the drawn-out manageability of the diverse financial intermediaries, and finally, the progressing rivalry among those financial mediators regarding offering premium financial products that coordinate various groups (Habanabakize, 2020).

According to financial inclusion theory, financial inclusion outcomes sacrifice the existing subsystems on which financial inclusion depends (eg economic, social and financial systems), and consequently higher financial inclusion provides positive benefits to those subsystems. depend on the economic theory of public services has several advantages. First, the theory is that the government should be responsible for financial inclusion. Governments also control the financial systems, economic and social structures of a country that can be used to achieve the goal of financial integration. For example, governments can set up state-owned banks in the most remote areas of the country to access vulnerable areas in those areas. In addition, public confidence increases when governments take full responsibility for accessing financial services through public institutions. The general public is confident that when governments take full responsibility for financial inclusion, financial inclusion programs will work for everyone's benefit. The importance of financial inclusion with regards to accelerating the social and economic progression of a country is the principal undertaking of this investigation. The impact of financial inclusive on economy has been given priority by the policy makers. However, there are deficiency in empirical studies on financial inclusion. Therefore, this research will try to contribute to the knowledge in this area and add value to the literature. The target of this exploration is to test the financial inclusion on financial development and their short and long-haul effect. In addition, this investigation has taken GDP Per capita, Money supply as a rate from of GDP and individual's internet usage as a percentage from population as independent variables to investigate determinants of financial inclusion and what is the short and long-run sway

on financial inclusions and financial development on Saudi Arabia over the time of 2004-2018.

The sections of the paper are organized as follows: a review of the previous studies is presented in the section 2. Section 3 outlines the financial inclusion in Saudi Arabia. Then, section 4 describes the methodology and results and interpretation are examined in section 5 followed by the conclusion in section 6.

## 2. LITERATURE REVIEW

According to (Aghion et al., 1997) and (Banerjee et al., 1993), if individual access to financial services, they can make choices and adjust the creation and occupation and accordingly can help relieve from neediness. Although, a greater access to financial institutions will help in great economic development through manifold impact and changes per capita GDP and has been identified as a basic motor of financial development and in accomplishing the economic development (Kikulwe et al., 2020). A study by Schumpeter 1911 has been confirmed that finance boosts the economic growth. This approach emphasizes that the monetary segment through its administrations do not offer assistance for the capital formation but moreover does empower the advancement, effectiveness and speculation which in turn development yield. In line with developing the economy, managing an account segment gives off an impression of being more indicated and practical because it makes capital aggregation and attracts market competition between banks bringing as a whole more speculation and growth (Matthews et al., 2020).

Well-organized structure of the financial framework could impact positively on economics development similar with the studies of (Andrianaivo et al., 2011); (Agnello et al., 2012); (Hariharan et al., 2012); (Wong, 2015); (Yorulmaz, 2013); (Inoue et al., 2016); (Blancher et al., 2019); (J.-H. Kim, 2016); and (D.-W. Kim et al., 2018). These studies were intended to investigate the connection between monetary aggregates, financial area advancement and financial development. Literature reveals some examples which used branch, credit and deposit penetrations as significant indicators of financial inclusion. However, the findings of (A. N. Mehrotra et al., 2015); (Barajas et al., 2013); and (Ortega, 2012), confirmed that financial inclusion did not lead to a positive finance–growth relationship in the economy in South Africa, financial inclusion still faces several complications so that its’ role does not yet have a major contribution to increasing economic growth especially for rural communities (Oji, 2015). The finding of (Naceur et al., 2007) shows that the economic development was affected negatively for MENA nations by bank and credit to private are advancement; the factors of bank development index. Similar to the findings of (Galetzka et al., 2015), the financial growth in MENA region has been significantly affected by recent crisis and lack of planned economic systems (Valencia, 2020).

It is claimed that, frail monetary framework, improper arrangement, and poor money related instrument obstacles to guarantee the critical impact on financial development. (Ortega, 2012) argued that there is a noteworthy development in efficiency and effectiveness, however failure of the financial framework to reach the larger part of the population counting poor, woman, senior citizens, and other disadvantaged groups could be a major reason behind this contention (Wallenius et al., 2020). In addition, the availability of smaller financial goods would not yield a higher financial return compared to the cost of proving the operational financing as reported by (Moore et al., 2003). Also, (Sharma, 2016) highlighted the existence of unidirectional and bidirectional effect among the number of deposits, loan accounts and per capita GDP and bi-directional causality between geographic outreach and economic development. Furthermore, Lenk and (Sharma, 2016) conducted a study to show the unidirectional causality between financial inclusion and economic growth over a period of 1980-2014. Furthermore, (J.-H. Kim, 2016) found that with economic development, financial inclusion has a widespread board causality effect. In 15 OECD and 50 non-OECD countries, (Apergis et al., 2007) established bi-directional causalities between financial deepening and growth.

(Sethi et al., 2018) evaluated the energetic effect of financial inclusion on financial development for a huge number of developed and developing nations over the period of 2004-2010. The experimental findings uncovered that there is a long-run positive relationship between the economic development and financial inclusion over 31 nations (Yoon et al., 2020). Besides, it is obvious from the causality test that the financial inclusion and economic growth causing a bidirectional on each other. Hence, it is confirmed that one of the driving forces of the economic development is the financial inclusion.

(Ullah et al., 2018) empirically estimated inclusive growth for Pakistan and determines the impact of macroeconomic stability, financial deepening and structural changes on inclusive growth from 1987 to 2016, applying standard unit root tests and autoregressive distributed lag model (ARDL) approach of Conintegration. The results show that macroeconomic stability and structural changes are fundamentals for attaining inclusive growth. In addition to, the role of external sector could also be positive with terms of trade fostering greater inclusiveness, while financial deepening has also prominent implications on inclusive growth. Financial development can lead to encourage more inclusiveness in the country. (Suidarma, 2019) analyzed the long-term relationship of financial inclusion on growth among ASEAN countries for the period of 2008-2015. The result reveals that financial inclusion positively associated with economic growth in ASEAN. (Dell'Anno et al., 2018) examined the impact of financial inclusion on economic growth using panel data of 25 Sub-Saharan African countries, from 2009 to 2014. The results show that there is a positive impact of financial inclusion on economic growth. (Okpebru, 2020) examined the effects of financial inclusion on economic growth in Nigeria using data from 2000 to 2018. The finding of the study reveals that in

Nigeria, rural bank deposits and loan to SMEs are significantly affecting economic growth in long run.

The accompanying diagram depicts a conceptual explanation of the relationship between financial inclusion and economic growth. Financial inclusion can contribute to economic growth in two ways, as shown in Figures below. First, providing disadvantaged people with low-cost financial services lessens their susceptibility By improving living standards (Gupte et al., 2012). The logic follows these steps: Low-cost loans provided to the poor and vulnerable will start coordinated production in rural areas, leading to increased production. This regional added value helps to stimulate state and national manufacturing growth, resulting in strong macroeconomic growth. As a result, the living standards of these vulnerable groups increase as their income levels rise (Dinabandu, Devashi, 2018)

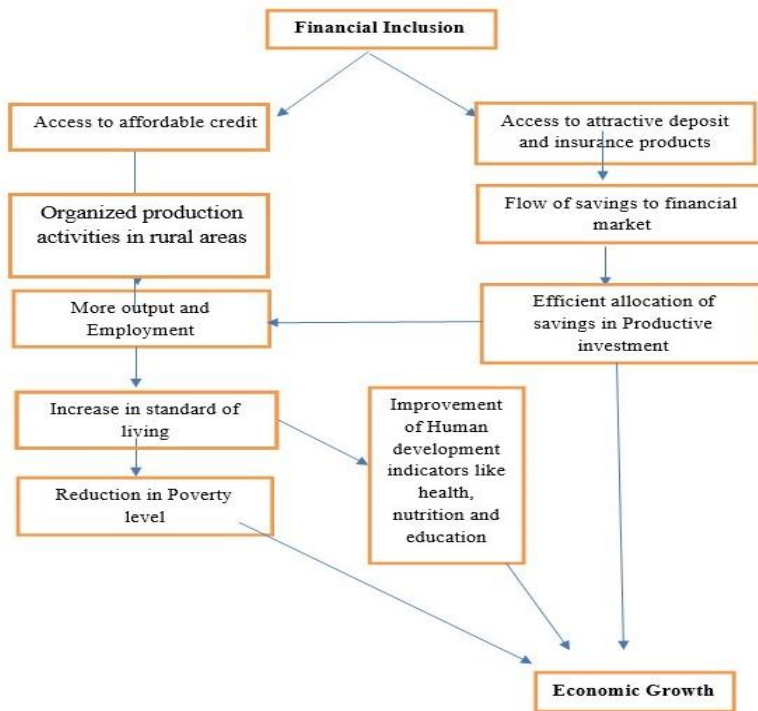


Figure Financial inclusion- economic growth linkage (source Dinabandu, Debashis, 2018)

## Financial Inclusion in Saudi Arabia

The Nurunnabi (2017) with aspiring strategic and restructuring policies highlights in upgrading of financial area to become an expanded and effective sector, which will upkeep the development of the domestic economy, through boosting savings, financing,



contributing, and augmenting the effectiveness of financial sectors to flood resources, enlarge its recipients, and identifying difficulties. Hence, the Council of Economic and Development Affairs dispatched a project called “Financial Sector Development Program 2020”, the foremost and exclusive program to fulfill [Nurunnabi \(2017\)](#) objectives promoting and enabling financial planning, known these as financial inclusion policies. The aim of these arrangements is to incorporate unbanked portions of the populace.

The United Nations Sustainable Development Goals, 2030 focus on the advancement, consistent and exhaustive economic growth in all the sections of the population. Any of the program's implementation plans include promoting an equitable framework for the financial services industry, as well as making substantial changes in financial inclusion. In two cases, this can be realized. The first, the amount of having bank account ownership among Saudi adults will rise from 74% in 2016 to 80% in 2020 (Targeting 94 percent to reach rates equal to high-income countries). Second, asset promotion, such as rising lending to small and medium-sized companies and mortgages. Third, fortifying financial access and increment of accessing of bank account that females have, from 58% to 75%, a rate to be able to compare with the high-income nations. Fourth, bringing up the unbanked rate with regards to stateless people from 11% to 22% ([Odhiambo, 2004](#)).

Furthermore, the Financial Sector Development Program 2020 addresses four goals to be achieved: encouraging and inspiring sustainable demand for savings patterns, driving market expansion of savings products and channels, refining and establishing savings ecosystems, and increasing financial literacy. Confronting troubles in getting to the services and products of finance is the significant worldwide trends and the Kingdom is also in line with since portions to integrate women, individuals outside the workforce, low-pay groups, and low literate people. As the bank proprietorship rates affirm that there is 79% among the adult in rural of Saudi Arabia (The Global Findex Database), it is evident that individuals who live in country zones in the Kingdom don't experience the financial exclusion. When it comes to the global scale, the number of unbanked adults aged 15+ worldwide are roughly 1.8 billion; around 6.9 million of them are in the Kingdom, representing 28% of the grown-up populace. It is significant because in 2017, the rate of bank account holding, which was 51 percent in 2011, hit 69 percent worldwide. In the Kingdom, however, the bank account transaction volume is 72% of the adult population. ([Lenka et al., 2018](#)) Governance Creation and Lobbying Initiative unveils that the reasons for the 28 percent of unbanked populace are due to the absence of money for 66 percent of them, religious reason with 7%, lack of trust that people have over the financial organization with 8%, a long way to the financial institution from where they live (13%,) not having the identification proof (22%) and perceptions that financial services are excessively costly.

The government institutions' endeavors and commitments reveal that their main focus in the subject area is to expand the scope of financial inclusion and enabling the less privileged areas to get financial, savings, and services and products to raise awareness, apart from, the continuous upgrades in the customer assurance domain and relieving the financial distress that negatively impacts individuals. Therefore, this study aims to investigate the factors influencing on financial inclusive and its' short term and long-term impact on economic growth. The outcome of this study would expect to help to contribute to the policy making.

### 3. METHODS

The study investigates short and long- run impact of financial inclusion on Saudi economic growth. Moreover, it examines the interrelationship between variables using time series data of Saudi Arabia covering the period of 2004-2018 using secondary data, which is collected from the World Bank and International Monetary Fund Organization. The study uses the ARDL the Auto Regressive Distributed Lag for co-integration to represent the impact of financial inclusion. Hence, given the scope of this study and the objective to be achieved, the study adopted two models to test two hypotheses. First model to investigate the impact of financial inclusion on economic growth are adopted from the work of (Galetzka et al., 2015), and the second sought to ascertain the determinants of financial inclusion in line with existing studies (Evans, 2016); (N. Mehrotra et al., 2009); (Naceur et al., 2007); (Sarma, 2012) ; (Laha et al., 2011) to propose the determinants of financial inclusion.

#### 3.1 Unit-root Test

To examine the integrating level of variables, in most literature, (Phillips et al., 1988) (Phillips et al., 1988) tests have been used extensively to determine the order of integration. In this research, the Augmented Dickey-Fuller (ADF) has being used. The null hypothesis is the variable contains a unit root, and the alternative hypothesis is a stationary process generated the variable.

#### 3.2 The ARDL Model for Co-integration

The ARDL deals with single co-integration. Unlike the Johansen system, the ARDL method does not demand that all variables to be I (1). If we have I (0) and I (1) variables in our package, it is still important. An appropriate amount of time lag is needed for the ARDL model to capture the best data set from the general frame model. It gives the best results for parameters in the long -term and the diagnostic tests which are highly reliable. Moreover, it enables to estimate parameters of independent variables in the short and long term. They are more consistent than those in other methods such as Granger Causality or Block Erogeneity Wald test. To determine the length of the distributed lag period (n), Schwarz Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) were used. The length of the period is chosen to reduce the value of (SC) and (AIC).



Generally, ARDL method includes several steps. The Bound measure, which preserves the calculation of the unregulated error correction model (UECM), is used first, followed by a test to see whether there is a long-term equilibrium relationship of the explanatory and response variables. According to the variables of this research, the (UECM) is as follow:

Model (1):

$$\begin{aligned} \Delta \log GDP_t = & \beta_0 + \beta_1 \log GDP_{t-1} + \beta_2 \log PR_{t-1} + \beta_3 \log DO_{t-1} + \beta_4 \log LS_{t-1} \\ & \sum_{i=0}^{k-1} \alpha_1 \Delta \log PR_{t-1} + \sum_{i=0}^{k-1} \alpha_2 \Delta \log DO_{t-1} + \sum_{i=0}^{k-1} \alpha_3 \Delta \log LS_{t-1} \\ & + \sum_{i=0}^{k-1} \alpha_4 \Delta \log GDPP_{t-1} + U_t \end{aligned}$$

Model (2):

$$\Delta \log FIN_t = \beta_0 + \beta_1 \log FIN_{t-1} + \beta_2 \log GDPP_{t-1} + \beta_3 \log PR_{t-1} + \beta_4 \log INT_{t-1}$$

$$\begin{aligned} & \sum_{i=0}^{k-1} \alpha_1 \Delta \log PR_{t-1} + \sum_{i=0}^{k-1} \alpha_2 \Delta \log GDPP_{t-1} + \sum_{i=0}^{k-1} \alpha_3 \Delta \log INT_{t-1} \\ & + \sum_{i=0}^{k-1} \alpha_4 \Delta \log FIN_{t-1} + U_t \end{aligned}$$

Where

$\Delta \log (GDP), \Delta \log (PR), \Delta \log (DO), \Delta \log (LS), \Delta \log (FIN), \Delta \log (GDPP)$

and  $\Delta \log (int)$  are the first differences in the logarithms of the respective variables.

$\beta_1, \beta_2, \beta_3$  and  $\beta_4$  are parameters.

$\alpha_1, \alpha_2, \alpha_3$  and  $\alpha_4$  are short sprint parameters,

GDP represents real growth domestic product,

PR: Broad money (% of GDP),

DO: Domestic credit to private sector by banks (% of GDP)

LS: loan-to-deposit ratio in commercial banks

FIN: Number of depositors with commercial banks per 1,000 adults (financial inclusion).

GDPP: GDP Per capita.

PR: Money supply (% of GDP).

INT: Individual's internet usage (% of population).

and  $U_t$ : random variable.

The F-statistic is used to measure the Bound test, which is used to test the nature of a long-run incorporation interaction by evaluating its following hypotheses:

$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$  (null hypothesis, the long-run relationship does not exist)

$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$  (Alternative hypothesis, the long-run relationship exists)

The results depend on the comparison of F- statistic with critical values developed by (Koop et al., 1996) and (Pesaran et al., 2001). If the measured F-statistic is greater than the standard particular value,  $H_0$  is denied, implying that the variables are co-integrated. On the other hand,  $H_0$  cannot be rejected if the F-statistic is below the lower bound critical value, there is no co-integration among the variables. If the computed F- statistic falls between the upper and lower bound therefore, the result of the inference is inconclusive. After finding out that the long-run relationship between the underlying variables, the appropriate lag length for the ARDL model was selected using selection criteria such as the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) or Hannan-Quinn Criterion (HQC) as shown below.

Model (1)

$$\Delta \log GDPP_t = \beta_0 + \beta_1 \log GDP_{t-1} + \beta_2 \log PR_{t-1} + \beta_3 \log DO_{t-1} + \beta_4 \log LS_{t-1}$$

$$\begin{aligned} & \sum_{i=0}^q \alpha_1 \Delta \log PR_{t-1} + \sum_{i=0}^q \alpha_2 \Delta \log DO_{t-1} \\ & + \sum_{i=0}^q \alpha_4 \Delta \log LS_{t-1} \sum_{i=0}^q \alpha_6 \Delta \log GDP_{t-1} + U_t \end{aligned}$$

Model (2)

$$\Delta \log FIN_t = \beta_0 + \beta_1 \log FIN_{t-1} + \beta_2 \log PR_{t-1} + \beta_3 \log GDPP_{t-1} + \beta_4 \log INT_{t-1}$$

$$\begin{aligned} & \sum_{i=0}^q \alpha_1 \Delta \log PR_{t-1} + \sum_{i=0}^q \alpha_2 \Delta \log GDPP_{t-1} \\ & + \sum_{i=0}^q \alpha_4 \Delta \log INT_{t-1} \sum_{i=0}^q \alpha_6 \Delta \log FIN_{t-1} + U_t \end{aligned}$$

Where  $q$  is the optimal lag period for variables. The above equation with ARDL model will estimate the long and short-term transaction estimates. Then, to make sure that the model is not a serial correlation, Breusch-Godfrey serial correlation LM test is used. According to the economic theory, it is expected that economic growth will be associated positively with the dependent variable with no serial correlation.

### 3.3 Granger Causality/ Block Exogeneity Wald Test

The VAR Granger Cause and effect Variance Decomposition Logit model was used in this analysis to examine the further causal relationships between the variables. Mostly on slowed conditional variance, it determines the Chi-square computed value. The theory is that the stagnated independent variables do not cause the dependent variable to Granger cause in this test.

### 3.4 Empirical Evidences

#### 3.4.1 Unit-root Test

From the Table 4.1, the number of listed variables is stationary in the level and thus integrated from the zero grade, so the ARDL for co-integration is the most suitable method for this study.

**Table 4.1 ADF Unit Root Tests for Stationarity of Variables**

Variable	Prob.*	Calculated ADF statistic		Order of integration I(d)
		With intercept	Ist difference Trend and intercept Prob.**	
LGDP	0.0219	-3.604077	2.992028 0.1705	1(0)
LPR	0.0125	-3.926792	-3.995203 0.0389	1(1)
LDO	0.0432	-3.206487	-3.110560 0.1440	1(1)
LLS	0.0000	-7.474022	-7.240172 0.0004	1(1)
LFIN	0.0173	-3.789644	-4.047178 0.0430	1(0)
LGDP	0.0494	-3.127221	-3.456943 0.0873	1(1)
LINT	0.0205	-3.687427	-3.552518 0.0795	1(1)

Source: Authors' calculations

**Table 4.2 Selection of Optimal Lag Length**

Lag length	Selection of optimal lag length			
	HQ	FPE	SC	AIC
0	58.02399	1.93e+20	58.23355	58.05972
1	53.82701	3.95e+18	54.87481	54.00566
2	38.27477*	2.45e+12*	40.16082*	38.59634*

Source: Authors' calculations, \* indicates optimum lag chosen through standard, where AIC: information criterion Akaike. FPE: final prediction error. SC: data criterion Schwarz. HQ: information criterion Hannan-Quinn.

### 3.5 A Bound Test for Co-integration

Two lag periods were examined as an optimal size for estimating the (ECM) according to the HQ, FPE, SC, AIC standards

**Table 4.3 Co-integration ARDL Bounds Test Model (1)**

<i>F</i> -statistic	<i>Bounds of the F-statistics- Critical values</i>			
		<i>10% level</i>	<i>1% level</i>	
	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>
535499.5	2.72	3.77	4.29	5.61

**Source:** Author's calculations.

Model (1) with the deep association among the variables investigated how financial inclusion affected economic development. Model (2) looked at the variables that affect financial inclusion. Tables (4.3) and (4.4) show that at a significance level of 1%, the estimated F-statistic is greater than the equivalent upper critical limit value, while the computed F-statistic is higher than the upper and lower limits. As a result, the null hypothesis is discarded in all simulations, and a long run relationship arises

**Table 4.4 Co-integration ARDL Bounds Test Model (2)**

<i>F</i> -statistic	<i>Bounds of the F-statistics- Critical values</i>			
		<i>10% level</i>	<i>1% level</i>	
	<i>I(0)</i>	<i>I(1)</i>	<i>I(0)</i>	<i>I(1)</i>
392.5974	2.72	3.77	4.29	5.61

**Source:** Author's calculations

### 3.6 Estimated Coefficient (elasticity) in the Long Run and Short Run

The Model (2, 2, 2, 2) was selected using HQ, SC, and AIC for the model (1) to measure the effect of financial inclusion on economic development, and the model (2) included elements of financial inclusion in Saudi Arabia to estimate the long and short-term statistical correlation. The results are as follows.

**Table 4.5 The Long-Run Coefficients Using the ARDL for LOGGDP Model (1)**

<i>Regressors</i>	<i>Coefficient</i>	<i>t-ratio</i>	<i>Significance level</i>	Adjusted R2	<i>Prb. F-statistic</i>
GDP (-1)	0.461973	595.7211	0.0011	0.99	0.000124
GDP (-2)	0.443581	506.0121	0.0013		
PR	6.35E+09	404.4989	0.0016		
PR (-1)	2.23E+09	226.6355	0.0028		
PR (-2)	6.01E+09	407.7553	0.0016		
DO	-8.18E+09	-393.1379	0.0016		
DO (-1)	-3.38E+09	-253.6110	0.0025		
DO (-2)	-5.42E+09	-271.4172	0.0023		
LS	5.17E+11	518.7388	0.0012		
LS (-1)	-2.94E+11	-607.1039	0.0010		
LS (-2)	7.87E+10	93.65159	0.0068		

**Source:** Authors' calculations

**Table 4.5.1 The Short-run Estimation Coefficient (elasticities) using the ARDL Model (1)**

Regressors	Coefficient	t-ratio	Significance level
CointEq (-1)	-0.094445	-472.285	0.0013

**Source:** Authors' calculation

The above [Tables 4.5](#) show broad money and loan-to-deposit ratio are positively affect the GDP in the long term greater than the short term. The result is consistent with the economic theory. Increase in broad money and loan-to-deposit ratio in banks will significantly affect the GDP in the long run ([Claessens et al., 2007](#)), [N. Mehrotra et al. \(2009\)](#), [Ghosh \(2011\)](#), and [Ganti et al. \(2017\)](#). The coefficient of determination ( $R^2$ ) is equal to 0.99, which shows that about 99% of the variation in GDP is caused by variations in the explanatory variables. Increases in large money of one percent result in a 6.35 percent increase in economic overall growth. Furthermore, a 1% rise in the loan-to-deposit ratio resulted in a 5.17 percentage increase in economic growth over time. However, increase in domestic credit to the private sector by one percent lead to decrease in the economic growth over time by -8.18 percentage. Although, it is reported that DO increase more than 54% in 2017, it does not significantly affect the GDP.

**Table 4.6 the Long-run Estimation Coefficients Using the ARDL for LOGFIN Model (2)**

<i>Regressors</i>	<i>Coefficient</i>	<i>t-ratio</i>	<i>Significance level</i>	Adjusted R2	<i>Prob.F-statistic</i>
FIN (-1)	1.318834	29.35510	0.0217	0.99	0.012468
FIN (-2)	0.799993	11.75526	0.0540		
GDPP	0.061652	15.80265	0.0402		
GDPP (-1)	0.038836	11.68186	0.0544		
GDPP (-2)	-0.039810	-8.364034	0.0758		
PR	6.798380	14.20593	0.0447		
PR (-1)	9.566347	18.20315	0.0349		
PR (-2)	7.376958	28.76524	0.0221		
INT	-11.49515	-11.26173	0.0564		
INT (-1)	-4.033578	-4.259835	0.1468		
INT (-2)	14.97822	17.19538	0.0370		

**Table 4.6.1 the short-run Estimation coefficient (elasticities) using the ARDL-Model (2)**

<i>Regressors</i>	<i>Coefficient</i>	<i>t-ratio</i>	Significance level
CointEq (-1)	1.118827	13.59521	0.0467

**Source:** Authors' calculations

It could be argued that DO is not utilized in economic activities. Results of the short-run dynamic reveal that the value of the Coint Eq (-1) coefficient is negative (-0.094445). In the short term, the effects of short-run estimation indicate that the affected factors have a favorable and important impact on economic development. In the long term, this improves the consistency and relevance of the equilibrium relationship and indicates that the model (1) has an error correcting function and adjusted in the first year by 0.09%. It shows that if GDP is 1 percent out of equilibrium, a 9 percent adjustment towards equilibrium will take place within the first year.

In Model (2) increase in GDP per capita, money supply and individual's usage of internet will lead to significant affect in the financial inclusion in the long run as supported by the literature [Okpebru \(2020\)](#); [Sethi et al. \(2018\)](#). The coefficient of determination ( $R^2$ ) is 0.99, which shows that about 99% of the variation in financial inclusions is caused by variations in the explanatory financial inclusion variables. Then, increase in the GDP per capita by one percent lead to an increase in the financial inclusion over the time by 0.06 percentage. In addition, increase in the money supply by one percent lead to increase the economic growth over the time by 6.79 percentage. However, increase in individual's usage of internet by one percent lead to decrease in the financial inclusion over time by



-11.4 percentage while in lag2 the effect become positive 14.9. Results of the short-run dynamic reveal that the value of the CointEq (-1) coefficient is 1.11. The results of short-run estimation show that affected factors have both a positive and negative substantial impact on financial inclusion in the short run. This improves the consistency and validity of the observed relationships in the long term and indicates that the model (2) has an error correcting function and is adjusted in the first year by 1.11%. It shows that if FIN is 1 percent out of equilibrium, a 1.11 percent adjustment towards equilibrium will take place within the first year.

### CUSUM Tests

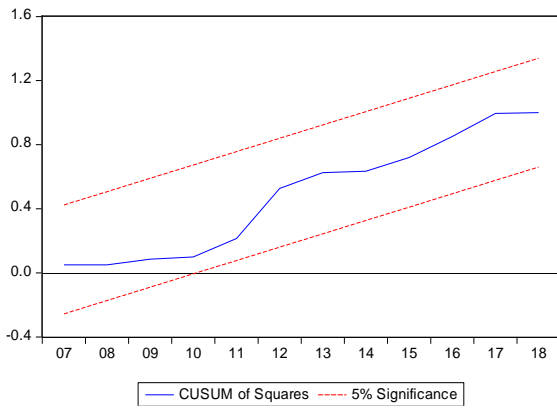


Figure 4.1 CUSUM test Model (1)

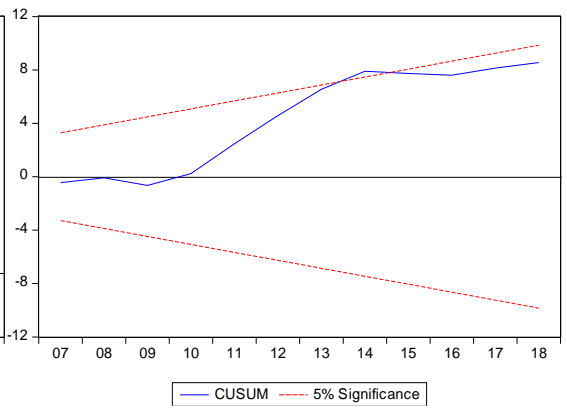


Figure 4.2 CUSUM test Model (2)

Figure (4.1, 4.2) illustrates that the estimated coefficients are stable because the plot of CUSUM statistics are between the two red lines at a 5% significance level.

### 3.7 VAR Granger Causality/Block Exogeneity Wald Tests Result

The findings of the VAR Granger causality Wald two model are applied experiments for model (1) chi-square test statistic of 9.90 for PR with reference to GDP represents the hypothesis that lagged coefficients of PR in the regression is equal to 0.0071 that means PR is Granger cause GDP where the null hypothesis is accepted. Similarly, the lagged coefficients of DO and LS as well as all coefficients in the regression are equal to 8.752159 and 6.024785 respectively. Thus, DO and LS have cause GDP at 0.0126 and 0.0492 levels of significance, respectively. In addition, the result shows a Bi-directional causality observed only with GDP and DO. However, the test results for PR and LS indicate that null hypothesis cannot be rejected. This suggest that PR and LS are not influenced by these three explanatory variables. The model (1) concludes that wide capital, domestic bank credit to the private sector, and the loan-to-deposit ratio in Saudi Arabia have all contributed to the country's real GDP growth which is supported by the study of [Lenka et al. \(2017\)](#).

For model (2) chi-square test statistic is 6.517 for PR with reference to FIN. Which represents the hypothesis that lagged coefficients of PR is equal to 0.0385. It shows PR Granger cause FIN where the null hypothesis is accepted and variables are not influenced by the explanatory variable.

#### 4. CONCLUSION

This study aims to assess the impact of financial inclusion on economic growth and explore some of the determinants of financial inclusion. of Saudi Arabia over the period of 2004 to 2018. In this study, ARDL the Auto Regressive Distributed Lag for co-integration technique and the Wald experiments were utilized in order to expose the effect between financial inclusion and economic opportunities using the Pairwise VAR Granger causality.

The main finding of the estimation shows that in short and long-term, the factors have a major impact on Saudi Arabia's economic development and financial inclusion. The value of the CointEq (-1) coefficient increases as the large money and loan-to-deposit ratio in banks rises over time, according to the effects of the short-run dynamic. The findings of the short-run estimate indicate that such factors have a positive and important impact on economic development in the short run. However, increase in domestic credit to the private sector by one percent lead to decrease in the economic growth over time. Consequently, small and medium entrepreneurs (SMEs) should be encouraged to utilize DUE to economic activities. Internet usage is insignificantly impact on financial inclusive in Saudi Arabia therefore, to enhance financial inclusive, it is noteworthy to increase the number of adults with bank account.

In addition, an increase in the financial inclusion will be observed over time by an expansion of a unit in GDP per capita and money supply. The results are reasonable due to the essence of the financial system is primarily based on the intermediation of funds by banking institutions in Saudi Arabia. Subsequently, providing the population with adequate banking services in the form of financial integration in terms of society's access to official banking services is necessary to achieve overall economic growth of the country. The regression outcomes affirm that there is a substantial relationship between the different elements of financial inclusion and GDP. However, increase in individual's usage of internet by one percent lead to decrease in the financial inclusion over time.

In addition to that, Granger investigation discloses a unidirectional correlation between broad money, loan-to-deposit ratio in banks and domestic lending by banks and GDP to the private sector. Likewise, a unidirectional causality was found between money supply and financial inclusion. The political and structural consequences of this analysis are that the key factors of an economy are found to be financial inclusion and its distinct determinants. The empirical findings and the debate reveal that the factors contributing to higher economic development are the banking penetration, the affordability of banking facilities and the utilization of deposit-based banking services. Therefore, policy

concerns need to be tackled by government and policymakers in order to promote economic development through financial inclusion and to expand accessibility for all financial resources available, such as individuals and SMEs. This is an important and comprehensive contribution to the existing literature that could help policymakers and academics design future research and policy decisions to make Saudi Arabia's growth inclusive.

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