



The Impact of Financial Deepening on Economic Growth: Empirical Evidence from Yemen (1994-2018)

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEMT/2022/v28i830431

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/79039>

Original Research Article

Received 12 February 2022

Accepted 07 April 2022

Published 15 July 2022

ABSTRACT

This study attempted to investigate the impact of financial deepening on economic growth in Yemeni, using time series based on the use and application of an Autoregressive Distributed Lag Model (ARDL), where data is collected from the World Bank, Yemen's central bank, and the central statistical organization for 1994-2018. The importance of the study lies in knowing the role of financial and economic policies by measuring and analyzing the impact of financial deepening on the Yemeni economy. The study used the independent variable of financial deepening captured by credit to the private sector, grants, Remittances, money supply, banks assets, and foreign direct investment, while the dependent variable gross domestic product is used to measure the economic growth. The results revealed a significant impact of financial deepening on Yemen's economic growth and found the existence of co-integration between the variables and long run relationship. The study recommended that policies that encourage credit borrowing for the private sector should be encouraged.

Keywords: *Financial deepening; economic growth; (ARDL); Yemen.*

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JEL Classification: O11,O47,G21,E01.

1. INTRODUCTION

Financial deepening is one of the most prominent topics that have attracted the attention of researchers, policymakers, and decision-makers, because of its unclear impact on the various aspects of economic and social life, At a time when most researchers disagreed on a specific explanation of the phenomenon, many tried Various theories and interpretations are given in this regard. While Financial deepening can be defined as the level of development and innovation of traditional and non-traditional financial services, Valverde et al. [1]. So increased financial services and improved access to different socioeconomic groups. Which can impact the economic conditions of both individuals and communities includes processes that ensure high-income rates for individuals and enterprises by relying on the economic impact of supply and demand in the local market, resulting in an increase in income and improving the level of income of individuals. Provide all basic needs to suit all people's economic capacity and reduce the deficit ratios in the financial budget. It can have the effect of increasing liquidity. Since the war of Yemeni unity in 1994, The unstable economic and political conditions followed by high unemployment and inflation, till the 2011 revolution , and Finally, the Yemeni crisis and the latest civil war are going on now. On the other hand, the world is concerned with economic and financial changes and the role of financial deepening in improving economic performance, represented by the banking sector and the management of domestic and foreign funding sources. Therefore, this paper deals with the impact of foreign financing represented by Credit to the private sector, foreign direct investment, foreign financial aid, money supply, banks assets, and remittances on economic growth..

1.1 Problem Statement

Dominated the Yemeni economy during the previous period several factors as Inflation, unemployment, budget deficit, declining foreign reserves, scarcity of economic resources and low non-oil sector productivity, an almost complete halt of the oil sector in the current period, according to the Ministry of Planning and International Cooperation in the international indicators and reports position in Yemen 2020. Based on a difference in the results of previous studies in different countries on the effect of

financial deepening, that leads to unclear results of investigating the impact of financial deepening on economic growth. So this study seeks to investigate the impact of financial deepening on economic growth in Yemen.

1.2 Research Objective

To determine the impact of financial deepening on economic growth in Yemen And build a measurement model that can measure the effect of financial deepening on the economic, using Time series based on the use and application of an Autoregressive Distributed Lag (ARDL) model.

1.3 Research Hypotheses

There is a significant impact of financial deepening on economic growth in Yemen.

2. METHODOLOGY

To find the connectivity of financial deepening (private sector, grants, Remittances, money supply, banks assets, and foreign direct investment), and economic growth (gross domestic product), the study adopted annual data for the period of 1994 - 2018 collected from Central Bank of Yemen's reports, the Central Statistical Organization, the Ministry of Planning, International Cooperation of Yemen, and the World Bank data.

The study used time series based on the use and application of an Autoregressive Distributed Lag Model (ARDL). the software used is E-views 12 with using the pier and post estimation test as unit root test for stationary of time series, Serial Correlation LM and Heteroskedasticity test for quality and goodness of model, the general form of (ARDL) used is

$$GDP_t = F(FD_t)$$

GDP= Gross Domestic Product
FD_t= Financial Deepening
FD_t= (MS,R,G,CPS,FDI AND BA)

2.1 Study Variables

Digital indicators are accurate economic growth measures and financial deepening, so the measurement has been done through the following measures in this study.

2.1.1 Dependent variable

Economic growth: this study used the most important indicator of economic health is the real GDP which is the more accurate figure of economic growth considering the changes in the price level of the market value of all goods and services produced in the country in a particular period.

2.1.2 Independent variable

- 1- Credit to the private sector: credit granted to the private sector by the banking sector, excluding credit granted to the government and independent government institutions. This is evidence of the significant role banks play in the process of economic growth.
- 2- Foreign direct investment: The market value of net foreign capital flows destined to own assets Productivity in the local economy. Direct investment refers to equity flows of direct investment in the reporting economy. It is the sum of equity capital, earnings reinvestment, and other capital. Direct investment is a type of cross-border investment in which a resident of one economy has control or a significant degree of influence over the management of a resident of another economy.
- 3- Grants. Excluding technical cooperation (balance of payments, at current US dollar rates), Grants are defined as legally binding commitments that impose a specific value on funds available for disbursement without repayment requirements. Data are expressed in current US dollars.
- 4- Remittances: Workers' remittances, According to the International Monetary Fund on the basis that they are current remittances they comprise goods and financial assets from migrants and workers residing outside the country for one year or more to person.
- 5- **Money supply:** Money supply in its broad sense. It represents the amount of money circulating in the economy, whether from currency outside banks or deposits under demand, time deposits, savings deposits, foreign currency deposits, earmarked deposits pension fund deposits. The increase means the accumulation of a variety of financial assets in general and savings deposits in particular. So that

indicates the evolution of the size of financial intermediation.

- 6- **Banks assets:** Ratio of total Islamic and commercial bank assets to total Islamic and commercial bank assets and Central bank assets.

3. REVIEW OF LITERATURE

Carr and Pentecost [2] investigated the link between financial and economic development in Turkey. The VECM methodology and applied Granger's causality tests. The selection of financial development agents affects the causal relationship between financial development and economic growth. However, using bank deposits, private credit, and domestic credit ratios to express financial development revealed growth as the driver. As determined by Ndebbio [3], the FD was represented by two variables: degree of financial intermediation/development (M2/Y) and growth rate per capita with delicate cash balances (GPRMB). Both variables used the broad currency (M2). Money can be increased balances. If undertaken, financial intermediation/development can boost output growth. Using plate integration techniques and a dynamic heterogeneous board of 15 OECD and 50 non-OECD countries, Apergis et al. [4] examined the long-term relationship between financial development and economic growth from 1975 to 2000. A long-term equilibrium relationship was found between financial deepening, economic growth, and control variables. The evidence also shows a causal link between financial deepening and growth. Ang [5] The long-term contribution of financial development in Malaysia was studied from 1996 to 2003, and the results showed that total output and its determinants are complementary. The results also showed that financial development, private capital stocks, and labor force growth positively affect economic development, while public capital accumulation appears to slow it down. Nzuta & Okerek [6]. They studied Nigerian financial and economic development for 22 years. The analysis used a two-stage least squares framework. The study used trend analysis. The study found that Nigeria's financial deepening index has been low. The nine explanatory variables were also valid and statistically related to financial deepening. There was a significant relationship between lending rates, financial savings ratio, checks/GDP ratio, and bank deposit/GDP ratio. Karahan Wilgur [7]. They read about the link between financial and economic growth. Based on the theory of

financial deepening in Turkey from 1980 to 2010. The results showed a two-way relationship between financial deepening and Turkish economic growth. In Cameroon, Johannes et al. [8] examined the link between financial development and economic growth using 1970-2005 data. According to Johansen, financial development positively affects long-term economic growth through effective collection and allocation of financial resources. They discovered a long-term causal link between financial development and economic growth. Onwumere, et al. [9] as for indicators of financial deepening, they looked at broad money velocity, diversification of money stocks, economic volatility, market capitalization, liquidity, and GDP growth rates for the period 1992-2008. Broad monetary speed and market liquidity boosted growth. In Nigeria, stock diversification, economic volatility, and market capitalization were not studied. Torruam, et al. [10] examined the link between financial deepening and economic growth in Nigeria. From 1990 to 2011, the long-term relationship between variables was tested using the Johansen approach. The results revealed a one-way causal relationship extending from economic growth to financial deepening. The study found that financial deepening affects Nigerian economic growth. Bekhet, H. A., & Matar, A. [11]. Short- and long-term equilibrium relationships between the SPI and macroeconomic variables were studied in Jordan. Annual data from 1978 to 2010 were used for industrial production, money supply, exchange rate, and discount rate (DR). They used the ADF tests, Associated Test Approach, CUSUM, and CUSUMQ tests for invariant and co-integration. The findings revealed a long-term equilibrium between SPI and macroeconomic variables (IP, M2, EX, and DR). Quixina, Y., & Almeida, A. [12] he studied Angola's financial and economic growth from 1995 to 2012, using the Granger causal relationship between three variables: oil revenue, non-oil GDP, and financial development. A Granger relationship was found between oil revenues and the other two variables, but neither caused oil revenues. However, financial development appears to have little impact on Angola's economic growth: it does not cause oil revenues or non-oil GDP, despite being caused by both. Akomolafe, K. J. [13] Nigerian financial deepening and economic growth from 1980 to 2010. These were M2 quoted money supply and total commercial bank loans. The long-run relationship between variables was analyzed using Johansen Co's integration, and the short-run relationship was

analyzed using Vector Error Correction Mechanism (VECM). The Granger causality test was also used to test the variables' causality. The variables have a positive long-term and short-term relationship. Pakang [14] from 2000 to 2013, it looked into the effects of financial deepening on Egyptian economic growth in Kenya. The results show that positive effects are private-sector liabilities and liquid credits, Central Commercial Bank assets, and commercial bank deposits. And significant to GDP. Best et al. [15] answer Do domestic credit to private sector ratios as a percentage of GDP promote financial deepening and thus economic growth in Jamaica? Using multivariate Granger causality. Cointegration looks at the model's short- and long-term relationships. Accounting innovations examine financial deepening and economic growth (impulse response function and variance decomposition). Three financial deepening indicators and annual data from 1980 to 2014 are used. There is evidence of a 'supplying-leading' relationship. Accounting for innovation confirms this (impulse response function and the variance decomposition). Our findings suggest that Jamaica should first focus on growing its financial sector. Sehwat, M., & Giri, A. K. [16] on poverty in India from 1970 to 2015, the ARDL is used. Long-term financial development, economic growth, inequality, and poverty are linked. Contrary to popular belief, income inequality and inflation exacerbates poverty in India. The Granger-causality test shows one-way causality from wealth to poverty. Inequality causes poverty. The current study shows how specific financial sector policies and interventions can improve economic growth and income distribution. The study suggests policies to reduce poverty and inequality in India.

Gezer [17] the results showed that countries could be classified according to the following supply and demand leadership approach, with evidence of a two-way causal relationship in some countries. Adeleye, & et al. [18], Using annual data from 1980 to 2016, this study examines the impact of financial reforms on credit growth. Based on data analysis and boundary testing, we find evidence that higher actual interest rates increase financial intermediation, as evidenced by credit growth. In addition to the Fiscal Reform Index, long-run financial system deposits, inflation, and per capita GDP are weak predictors of credit growth and actual interest rates. We find long-run co-integration between domestic credit, other covariates, and regression factors. Kavya, T. B.,

& Shijin, S. [19] this study examines the impact of economic and financial development on income inequality using unbalanced dynamic panel GMM estimation models. The study found no evidence that economic and financial growth will reduce income inequality. Rich countries do not benefit from financial growth Ndubuisi, P. [20] Using an integrative Autoregressive Distributed Lag (ARDL) research method, this paper examined the causal effect of financial deepening on the contribution of the wholesale, retail, service, and construction sectors to long-term economic growth in Nigeria. Long term and short term for the three NDUBUISI, P. [20] the financial sector's deepening and impact on business creation and economic growth were studied. Regionally, financial deepening as measured by the ratio of term deposits to GDP and commercial bank loans to GDP is positively related to business creation. When we examine the impact of financial deepening on industrial sector enterprise creation, these findings hold. Finally, creating a new regional enterprise is linked to regional economic growth. Adeleye & et al. [21] used annual data from 1980 to 2015 and an error-correction approach to study the effects of fiscal deepening on income inequality in Nigeria. The main findings are: Interestingly, financial deepening exacerbates inequality in the short run, and the break-even effects of these variables are vital for the selection of financial deepening variables, various structural breaking points, and model specifications. They suggest that a lack of control over structural discontinuities may lead to erroneous conclusions about reducing income inequality in Nigeria. Benczúr, P., & Kvedaras, V. [22] private bank credit expansion and income inequality in developed economies are studied. Mixed results found in the empirical literature on the relationship between financial deepening and income inequality are likely to be non-linearity

(an interaction between financial deepening and rgrg). Alshubiri, F. [23] the current study examined income inequality using GDP and money supply proxies. From 2002 to 2018, 32 OECD and ASIAN nations were studied. It was tested for heterogeneity and endogeneity. Pooled OLS, pooled OLS group, and GMM estimators found that less formal and informal financial sectors impacted income inequality positively in OECD and ASIAN countries. A significant proxy for formal sector money supply was ASIAN financial deepening. Other financial sectors impacted income inequality differently than the formal financial sector over-expansion in Asia. For all major indicators, the semi-formal financial sector outperformed the informal sector. As a result, the informal and semi-formal financial sectors grew. Deregulation is gradually decreasing inequality in the OECD and ASIAN countries. Rachmawati et al. [24] Indonesian financial deepening and income inequality were studied. They examined the relationship of financial deepening indicators to income inequality using time series data. Data from 2000 to 2016 are used. Higher money supply to GDP ratios increases income inequality [25,26]. A better financial market increases income inequality in the short run but reduces it in the long run by benefiting all economic levels short-term effects of private sector credit to GDP on the Gini ratio. In their study [27,28],

4. RESULTS AND DISCUSSION

4.1 Unit Root Test

The non-stationary of time series data is due to unit root, which leads to obtaining a spurious regression and thus to problems in the standard analysis, so examining the unit root is essential to know the stationary of the time series. In this study, Dickey Fuller will be used.

Table 1. Unit rot

Variable Porb.	Level		1 st different	
	C Prob	C & T Prob	C Prob	C & T Prob
BA	0.368	0.568	0.000	0.000
CPS	0.823	0.565	0.001	0.009
FDI	0.067	0.225	0.010	0.031
DG	0.999	0.996	0.000	0.042
DGDP	0.999	0.999	0.000	0.001
DMS	0.941	0.034	0.003	0.028
R	0.997	0.961	0.000	0.000

Source: E-views output

Augmented Dickey Fuller test of unit root reveals reject the null hypothesis for all the variables in the 1st differences where was the variables are non-stationary on a level with intercept and trend and intercept where the p-value is larger than 5%, so the unit root is excited. In 1st difference with intercept and trend and intercept, the p-value is less than 5% means that the time series is stationary.

4.2 Autoregressive Distributed Lag Model (ARDL)

Autoregressive Distributed Lag Model (ARDL) using economic growth as dependent variable

and the financial deepening proxies is the explanatory variable, so its important to test the quality of model where the datae reveals in the model is fitness where the R² 0.812399 and the value of f- statistic is 6.495714 with p value 0.002169.

The result the f- statistics value 6.422532 larger than the value of 1(1) with different level of significant Therefore, we will reject the null hypothesis that there is no co-integration between the variables of the study, and we accept the alternative hypothesis that indicates the existence of co-integration between the variables of the study.

Table 2. Dependent Variable: DGDP

Method: ARDL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DGDP(-1)	-0.381767	0.488546	-0.781435	0.4497
CPS	205756.1	113668.4	1.810143	0.0954
CPS(-1)	-262356.9	77606.29	-3.380614	0.0055
BA	2.27E+11	2.12E+11	1.070582	0.3054
DMS	-1788.323	61111.09	-0.029263	0.9771
FDI	-1.098242	8.247556	-0.133160	0.8963
G	-40.02641	13.93897	-2.871546	0.0140
R	-4.012051	6.961808	-0.576294	0.5751
C	-5.44E+10	6.31E+10	-0.862160	0.4055
R-squared	0.812399	Mean dependent var		2.99E+09
Adjusted R-squared	0.687332	S.D. dependent var		2.32E+10
S.E. of regression	1.30E+10	Akaike info criterion		49.70737
Sum squared resid	2.02E+21	Schwarz criterion		50.15502
Log likelihood	-512.9274	Hannan-Quinn criter.		49.80452
F-statistic	6.495714	Durbin-Watson stat		2.078624
Prob(F-statistic)	0.002169			

Source: E-views output

ARDL Error Correction Regression
ECM Regression

Table 3. Restricted constant and no trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPS)	205756.1	42740.40	4.814090	0.0004
CointEq(-1)*	-1.381767	0.153197	-9.019538	0.0000

* p-value incompatible with t-Bounds distribution.

Source: E-views output

From the table of error correction model the equation is negative and the p value is significant indicate equilibrium in the system

Table 4. Bonds test

F-Bounds test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.422532	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

4.3 Post Estimation Test

Table 5. Breusch-Godfrey serial correlation LM test

F-statistic	0.067146	Prob. F(1,11)	0.8003
Obs*R-squared	0.127409	Prob. Chi-Square(1)	0.7211

Table 6. Heteroskedasticity test: Breusch-Pagan-Godfrey

F-statistic	3.290478	Prob. F(8,12)	0.0313
Obs*R-squared	14.42446	Prob. Chi-Square(8)	0.0714
Scaled explained SS	8.375596	Prob. Chi-Square(8)	0.3977

Source: E-views output

Using Breusch-Godfrey Serial Correlation LM Test: and Heteroskedasticity Test: Breusch-Pagan-Godfrey tests

5. CONCLUSION

The study sought to verify the impact of financial deepening measured by *credit to the private sector, grants, Remittances, money supply, banks assets, foreign direct investment*, and economic growth, as measured by *gross domestic product*. from 1994 to 2018, using an *Autoregressive Distributed Lag Model (ARDL)* so the result of unit root revealed that all the variables in the first differences are with intercept and trend and intercept, the p-value is less than 5%, Where the result of (ARDL) estimation R2 0.812399 and the value of f- statistic is 6.495714 with p-value 0.002169. , error correction model revealed the equation is negative, and the p-value is significant to indicate equilibrium in the system, Bounds test the existence of co-integration between the variables of the study, and post estimation test found that serial correlation is non-existent and disturbances variables are homoscedastic, consistent with the study of Sehrawat, M., & Giri, A. K. [16]. best et al. [15] Gezer [17], Karahan Wilgur [7]. Johannes et al. [8] and Apergis et al. [4]. at all the study concluded that financial deepening affects economic growth in Yemen, where the study was consistent with the previous study such as Torruam et al. [10]. Where Onwumere et al. [9] found Diversification in their result Nzuta & Okerek [6] the study suggested Policies that encourage private-sector credit borrowing should be encouraged. The Central Bank of Yemen should have control over the money supply circulating in the economy, as well as a review of the balance of foreign investments.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/79039>