

The Impact of Financial Inclusion on Financial stability in Arab Countries

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Received:30/09/2022Accepted:05/11/2022Published:31/12/2022

Abstract:

This paper intends to explore the relationship between financial inclusion and financial stability under the scope of Arab economies. The linkage will be thoroughly investigated with z-score index and financial inclusion. Inclusive financial system is assessed by two dimensions: usage of financial services and access to the financial system. Using panel data of 2004-2020, this study empirically investigated whether financial inclusion contribution to country's financial stability measured by z-score. We apply fixed effects regression and random effects regression to capture the impacts of financial inclusion upon financial stability. To enhance the robustness of the model, the Feasible Generalized Least Squares (FGLS) regression is therefore adopted as the solution for the random effects regression. Robust results obtained from FGLS model show that financial inclusion variables measured by number of ATM's, CBB, DAC and LAC have mixed-effects on financial stability. GDP, M2 and OP are introduced to the model as control variables. The findings exhibit an overall weak positive/ negative influence of financial inclusion on financial stability in Arab countries.

Keywords: Financial Inclusion; Financial Stability; Z-score; Panel Regression; Arab Countries.

JEL Classification : G21 ; G 32 ; C 23

Introduction

Financial inclusion has become one of the most important goals that economic policies seek to realize in order to achieve financial stability and economic well-being. Since the early 2000s, the concept of financial inclusion has taken on great importance to governments and central banks around the world for its contribution to the goal of economic and financial development. Since 2009, International Monetary Fund (IMF) has been issuing results of the financial inclusion survey services (FAS), as a result more than 150 indices to enable governments to measure and monitor financial inclusion has been identified. (IMF, 2009)

Despite evidence on the social and economic importance of financial inclusion, knowledge about its impact on financial stability, particularly bank stability are limited (Cull, Demircuc-Kunt, & Asli Lyman, 2012) & (Ahamed & Mallick, 2019) & (Rui & Hang, 2022). As an indispensable part of financial institutions, banks play an essential role in allocating scarce financial resources between borrowers and lenders, thus promoting economic growth. (Rose & Hudgins, 2018) As explained by (Babar, Latief, Ashraf, & Nawaz, 2019, pp. 1-2) financial stability is achieved when the financial system functions efficiently and effectively without interruption and the financial risks are measured and sufficiently controlled to minimize the impact of systemic crises. In addition, economies worldwide contend to increase financial inclusion as part of their strategy to develop economic and financial sectors by providing access to financial services. (Morgan & Pontines, 2018, p. 113)

Seriousness of the international communities in implementing the program of financial inclusion can be seen from increasing of formal services products, Appendices n° 1 and n°2 below shows number of ATM's and number of bank branches per 100.000 adults in Arab countries from 2011 to 2019.

In this study, after considering many other potential bank stability determinants, we examine how financial inclusion influences the financial stability by focusing on Arab countries.

The problem in this study is: **what is the impact of financial inclusion on the stability of financial system in the Arab countries for the period 2004-2020?**

Our main hypothesis is that the financial inclusion is proxied by access and usage of financial services strength the financial stability. The purpose of this research is to analyze the impact of financial inclusion on financial stability. We organized our paper as follows:

The next section describes the indicators for financial inclusion and financial stability. The second section reviews the work completed by

authors on financial stability. The third section details the sample selection, data collection and the data analysis technique employed. The fourth section provides an empirical analysis of the study. The last section concludes the paper.

1-Financial stability and financial inclusion:

This section provides some definitions of financial stability and financial inclusion, and discusses the channels by which increase in financial inclusion might affect financial stability.

1-1- Financial stability

Financial stability is a multifaceted concept which relies on the interaction of the major components of the financial system and necessitates stability of the major organizations and markets. More formally (Mishkin, 1990, p. 4) defined financial stability as an efficient allocation of resources to run the financial system without significant disruption, and (Schinasi, 2004, p. 2) defined financial stability as a way which economic processes are enhanced, risks are minimized, and shocks are absorbed.

(Anatolyvena & Ramilevna, 2013, p. 585) conceptualized financial stability as a situation in which a financial system, which consists of financial markets, financial intermediaries and market infrastructures, is able to resist financial shocks which are adequate to notably mess up the distribution of savings to lucrative investment alternatives. This definition implies that financial stability is strongly allied to the risk's diminution to minimum intensity and resistance to shocks. The concept of financial stability could differ from developed economies to developing economies. In developed economies with well-developed financial system, financial stability is essentially concluded by the state non-banking financial institutions such as retirement funds, brokerage houses, and investment funds. In contrast to developed economies, developing economies consist of the underdeveloped stock market, insurance companies and investments in those countries mostly depend on bank loans. As such in these developing economies, banks are considered as the key pillar of financial stability and gateway to economic stability. (Siddik & Kabiraj, 2018, p. 35)

The European central bank (ECB) on his 2013 report defines financial stability as "A condition which the financial system consisting of financial intermediary markets and market infrastructures is capable of withstanding shocks, thereby reducing the likelihood of disruptions in the financial intermediation process which are serving enough to significantly impair the allocation of savings to profitable investment opportunities. (Morgan & Pontines, 2014, p. 3)

1-2- Financial inclusion:

These are various definitions of financial inclusion from some researchers and institutions:

Table number (1): definition of financial inclusion

Authors	Definition
(World Bank, 2020)	Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way. Financial inclusion has been identified as an enabler for 7 of the 17 Sustainable Development Goals.
(Mandira, 2012)	Financial inclusion is a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy.
(Khan, 2011)	The process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost.
(Hannig & Jansen, 2010)	Financial inclusion aims at drawing the “unbanked” population in the formal financial system so that they have the opportunity to access financial services ranging from savings payments, and transfers to credit and insurance.

Source: Authors collection

For developing countries tend to see a large portion of their population and firms not having access to formal financial services for a number of reasons, including limited branch networks of banks and other financial institutions, limited availability of ATM's, the relatively high costs of servicing small deposits and loan, limitations on satisfactory personal identification and limitations on collateralized assets and credit information.(Morgan & Pontines, 2018, p. 5)

2-Literature Review

The literature examining the impact of financial inclusion on the risks, and the stability of the financial system does not employ a consistent set of variables that can be used as a proxy for financial inclusion. While some studies make use a number of the financial inclusion services access survey (FAS) indicators as a measure of the financial inclusion. Two FAS indicators: (a): ATMs per 100.000 adults and (b): Numbers of commercial bank branches per 100.000 adults have been adopted to monitor Sustainable Development Goals SDG target by 2030 which aims at strengthening the capacity of domestic financial institutions to expand access to banking and financial services. (IMF, 2009)&(Aljouini & Guendouz, 2021, p. 14)

Regarding the link between financial inclusion and financial stability, few studies have been conducted, as the World Bank admits and Arab

Monetary Fund. One of the reasons for this claim is the scarcity and inconsistency of time-series data on financial inclusion across countries. (Morgan & Pontines, 2018, p. 115)& (Rui & Hang, 2022, p. 3),there are limited empirical works exploring the relation between financial inclusion and financial stability with different results. (Cull, Demirguc-Kunt, & Asli Lyman, 2012)& (Neaime & Gayasset, 2018, p. 238)Some studies about the impact of financial inclusion on financial stability which, show positive impact was conducted by (Morgan & Pontines, 2018), (Ahamed & Mallick, 2019), (Cull, Demirguc-Kunt, & Asli Lyman, 2012), (Duc, Nhan, & Loan, 2021).The second strand of papers with findings supports the view that further financial inclusion will destabilize the banking sector undertaking by (Dupas, Green, Keats, & Robinson, 2012), (Khan, 2011), (Azka & Lukytawati, 2018).

More recent findings generally agree with the positive effects of the impact of financial inclusion on financial stability. For example (Neaime & Gayasset, 2018) highlight that the positive effect of financial inclusion on financial stability mainly results from its role in reducing deposit volatility, which is particularly important during financial crises, by investigating MENA countries during 2002-2015.Using a sample of 189 economies from 2004 to 2017 (Morgan & Pontines, 2018), provide evidence that countries with a high level of financial inclusion have a lower probability of being affected if borrowing and lending significantly decline. (Ahamed & Mallick, 2019) Analyze the nexus between financial inclusion and bank stability using 2635 banks worldwide from 2004 to 2012 and conclude that more financial inclusion helps improve bank stability. They conduct an index for financial inclusion by combining several financial access usages and outreach measures from the IMF several financial access survey, they further find that the correlation of variables is more noticeable in banks with a larger share of customer deposits and lower operational costs. (Duc, Nhan, & Loan, 2021)Examine the linkage between financial inclusion and financial market stability using dataset of 3071 banks in the Asian region over the period from 2008 to 2017.Findings indicate that higher level of financial inclusion providing access to banking facilities contributes positively and significantly to stability in the banking sector.(Pham & Doan, 2020)Investigate the linkage between financial inclusion and financial stability by country-level and bank-level data of 42 countries in the three separate years 2011, 2014 and 2017. The empirical findings exhibit an overall weak positive influence of financial stability on financial inclusion.

In contrast, (Cihak, Mare, & Melecky, 2016) find a negative correlation on average, between financial inclusion and financial stability,

particularly for inclusion measures pertaining to individuals compared to firms. (Sahay, et al., 2015) Rely on panel regression methods and also find a trade-off for credit access measures increasing access to credit increase the risk of bank default and also increase economic growth volatility in the country.(Dupas, Green, Keats, & Robinson, 2012)With an experimental research in the western province of Kenya, which is a low-income country, has found out that increasing in availability of banking services did not lead to increasing in financial stability.

3-Data and empirical method

3-1- Data

The data used is an annual data with a balanced panel data structure. The panel data consist of a cross-section data of 10 selected Arab countries (Algeria, Morocco, Tunisia, Egypt, Jordan, Oman, Libya, Qatar, Saudi Arabia, Yemen and Kuwait) and time series from 2004 to 2020. Other Arab countries are not chosen because all data are not available. The data were collected from high reliability sources, mainly from Global Financial Development Database (GFDD) of the World Bank (WB); International Monetary Fund database (IMF); Federal Reserve Economic Data (FRED), National Office of Algerian Statistics (ONS), and balance sheets and income statements for bank's branches in the selected countries. This research was conducted with software such as EVIEWS, Microsoft EXCEL and XLSTAT.

3-2-Financial Stability Index

The research aims to clarify the impact of financial inclusion on financial stability; therefore, financial stability is regarded as the dependent variable. This study employed data for resilience measurements, proxied by Bank Z-score, having been extensively used by many researchers as an indicator of financial stability, including (Morgan & Pontines, 2018), (Ahamed & Mallick, 2019), (Duc, Nhan, & Loan, 2021) and others. The bank Z - score is measured by $(ROA + (\text{equity}/\text{assets})) / \text{standard deviation of ROA}$. ROA, equity, and assets are country-level calculated from underlying bank-by-bank unconsolidated data from FRED database.

3-3-Financial Inclusion Measurement

To proxy financial inclusion, four indicators are used, and they are divided into two dimensions of the FAS survey (IMF) which are (a): usage of financial services, and (b): access to the financial system. The study follows the approach from the World Bank UN SGD & (Aljouini & Guendouz, 2021, p. 15) & (Pham & Doan, 2020, p. 50). Usage of financial services ranges from (1): the number of ATMs per 100.000 adults, which is the number of automated teller machines; (2): the number of commercial bank branches per 100.000 adults. Access to the financial system has been

represented by (1): the number of deposit accounts with commercial banks per 1.000 adults; (2): the number of loan accounts with commercial banks per 1.000 adults.

3-4-Control variables

To apprehend a more precise effect of financial inclusion on financial stability, the study used a series of macroeconomic control variables that specify country characteristics conditions. Firstly, GDP per capita is added in the model with an expected positive effect on financial stability.(Morgan & Pontines, 2018) Secondly, domestic credit to the private sector can also influence the stability of the financial system; a higher concentration of financial resources provided by the financial sector (% of GDP) variable is assigned and expected to a negative sign. (Pham & Doan, 2020, p. 51) Another control variable that is incorporated in the model is the size of the financial sector, measured by the broad of money (M2) to GDP ratios, this indicator has been widely used by many scholars in the studies of financial development and economic growth to measure the size of the financial system and is found to have a positive impact on financial stability. Lastly, the findings of (Siddik & Kabiraj, 2018, p. 43), (Morgan & Pontines, 2018, p. 13)&(Azka & Lukytawati, 2018, p. 435) observed that financial openness is greatly associated with financial inclusion via financial development which leads to greater stability of the financial system. Thus, we incorporate financial openness variable in the study. (Cihak, Mare, & Melecky, 2016)

3- 5-Model specification

We begin our regression by setting the model, which illustrates a relationship between financial inclusion and financial stability. We estimate the following static-panel equation:

$$\begin{aligned} z - score_{it} = & \alpha + \beta_1 ATM_{it} + \beta_2 CBB_{it} + \beta_3 DAC_{it} + \beta_4 LAC_{it} \\ & + \beta_5 DCP_{it} + \beta_6 GDP_{it} + \beta_7 M2_{it} + \beta_8 OP_{it} + \varepsilon_{it} \\ & i = 1, \dots, N \text{ and } t = 1, \dots, T \end{aligned}$$

Where Z-score_{it} is the dependent variable which reflects the level of financial stability. The independent variables include ATM_{it} which refer to the automated teller machines per 100.000 adults; CBB_{it} is the number of commercial bank branches per 100.000 adults and DAC_{it} is the number of deposit accounts with commercial banks per 1.000 adults, so LAC_{it} refer to the number of loan accounts with commercial banks per 1.000 adults. Control variables, including GDP_{it} which is the gross domestic product per capita, DCP_{it} represents the domestic credit to the private sector and M2_{it} is the broad money/ GDP. Lastly OP_{it} refer to the financial openness index. The associated β represents a list of nuisance parameters; ε_{it} is the error

term; $i = 1, \dots, N$ correspond to the country; and $t = 1, \dots, T$ reflects the time. Legend and sources of data are provided in Table n° 2.

Table number (2): Summary of the specification and data sources of employed variables

Variable	Measurement	Legend	Sources
Financial stability	Bank Z-score	Z-score	FRED
Financial inclusion (usage and access)	Number of ATMs per 100.000 adults	ATM	FAS
	Number of commercial bank branches per 100.000 adults	CBB	FAS
	Number of deposit accounts with commercial banks per 1.000 adults	DAC	FAS
	Number of loan accounts with commercial banks per 1.000 adults	LAC	FAS
Control variables	Domestic credit to private sector (% of GDP)	DCP	WB
	Gross domestic product	GDP	WB
	Broad money (% of GDP)	M2	WB
	Financial openness	OP	WB

Source: Authors collection

4- Result and Analysis

4-1- Descriptive statistics:

Tables' n° 3 and n° 4 report the descriptive statistics and the correlations respectively, of the variables used in the empirical analysis. The descriptive statistics provide some insights about variables applied in this research. In case of our study dependent variable Z-score we found a mean of (3.15) with a maximum of (4.26) and minimum of (2.12). ATM mean is (7.15). The maximum of CBB is (3.10) and minimum of (0.78). DAC mean is (14.43) and LAC mean is about (13.88), they are proximate parameters. The DCP maximum is (4.93) and minimum is (1.53). Observations are 170, which refer to the 10 countries and 17 years.

Table number (3): Descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Z_SCORE	3.150442	3.023486	4.262243	2.129855	0.435959	170
ATM	7.159446	7.202661	9.845964	3.014555	1.619595	170
CBB	1.946436	2.375212	3.105409	0.789020	1.090899	170
DAC	14.43114	14.98090	17.78973	6.396930	2.991797	170
LAC	13.88916	13.80785	16.70522	7.884953	1.727342	170
DCP	3.524765	3.685849	4.933451	1.535878	0.868410	170
GDP	9.719942	9.363413	11.86101	8.111930	1.017922	170
M2	4.201388	4.226535	5.143057	3.168670	0.447392	170
OP	4.337705	4.420574	4.989839	3.229881	0.326221	170

Source: Eviews10 Outputs

4-2-Correlation statistics:

As shown in the table n° 4, we observed very low correlation among the variables used in the right-hand side the model. This implies that there is very low level of multicollinearity, and such multicollinearity is not an issue in our empirical analysis.

Table number (4): correlation of the variables

Variables	Z_Score	ATM	CBB	DAC	LAC	DCP	GDP	M2	OP
Z_Score	1								
ATM	0.268942	1							
CBB	0.404604	-0.021011	1						
DAC	0.058876	0.366450	-0.387284	1					
LAC	0.074613	0.560451	0.002801	0.551811	1				
DCP	0.566469	0.545167	0.599742	-0.066797	0.311164	1			
GDP	-0.185184	-0.020741	0.398752	0.008786	-0.169460	0.192029	1		
M2	0.566852	0.279284	0.157532	0.236588	0.312149	0.601633	-0.175571	1	
OP	0.325471	-0.182013	0.602107	-0.377719	-0.187278	0.454021	0.369218	0.040026	1

Source: Eviews 10 Outputs

4-3-Empirical results:

The table n° 6 shows the regression results obtained from, Fixed Effect Model (FEM) and Random Effect Model (REM) technique to estimate the influences of financial inclusion on financial stability in Arab countries. The model selection criterion is based on the Hausman test statistics. If P-value is less than 5%, this implies that the null hypothesis can be rejected and alternative (random effect model) is accepted.

-Hausman test for Model Specification

The Hausman specification test was used in the study to select the best regression model between a random effects and fixed effects regression model. The null hypothesis in Hausman test states that the difference between the coefficients is not consistent implying that a random model is the best.

Table number (5): Hausman test for the model specification results

Test Summary	Chi-Sq Statistic	Chi-Sqd.f	Probability
Cross-section random	7.599217	8	0.3693

Source: EvIEWS 10 outputs

Results in the table above indicate a $\text{prob} > \chi^2$ value of 0.3693 which is more than the critical P value at 5% level of significance which implies that the null hypothesis that a random effect model is the best was accepted. The study hence used a random effect regression model.

After conducting model specification tests, it can be concluded that the REM contains multicollinearity and heteroskedasticity issues that prevent the precise estimation of the standard errors. Consequently, cause incorrect hypothesis tests about the significance of estimated coefficients. To estimate these errors and enhance the robustness of the model, the Feasible Generalized Least Squares (FGLS) regression is therefore adopted as the solution for the REM.

Table n° 6 shows also the regression results of FGLS estimation approach. In general, the model is more significant in the circumstance of the Z-score dependent variable. The variables include ATM, CBB, DAC, LAC, DCP, GDP, M2, OP is significant at 1% and 5% levels

Table number (6): The impact of financial inclusion on financial stability in Arab countries

	Bank Z-score		
	FEM	REM	FGLS
ATM	.01475*** (3.8154)	0.1033*** (6.5296)	0.1284*** (4.9442)
CBB	.02286** (2.2982)	0.2462*** (11.7857)	0.2770*** (4.3806)

DAC	-0.0095** (-2.6055)	0.0744*** (10.3545)	-0.0316 (-1.2548)
LAC	0.0001 (0.0029)	-0.1379*** (-11.9758)	-0.0297 (-1.0755)
DCP	-0.0925 (-0.9437)	-0.0224 (-0.5114)	-0.1201* (-1.6999)
GDP	-1.1431 (-0.9437)	-0.2477*** (-14.4388)	-1.1804** (-2.1065)
M2	0.0643 (0.5808)	0.3159*** (6.1673)	-0.0051 (-0.253)
OP	-0.0310 (-0.3625)	0.0398 (7.1673)	-0.1086 (-1.9082)
Con_	4.6113*** (3.0422)	1.9868*** (4.8930)	5.2573*** (5.7536)
Number of obs	170	170	170
F-statistic	56.0060	50.9245	95.7609
(P_value)	0.0000	0.0000	0.0000
R-square	0.8623	0.9167	0.8583

***, **, * are significant levels at 1%, 5%, and 10%, respectively.

T-statistics are in parentheses.

Source: EvIEWS 10 outputs

4-4-Discussion

An R-squared of 0.8583 implies that the financial inclusion variables (bank accessibility, bank usage) had high explanatory power on financial stability measured by z-score. The F-statistics value was 95.7609 with a P-value of 0.000 which is less than 0.05. This indicates that financial inclusion had significant effects on the stability of commercial banks in the Arab countries.

Based on the analysis in the Table above, ATM has a significant value at 1% level and influence financial stability positively by (0.1284%). The CBB has also a positive impact on the financial stability by (0.2770%) and the result is significant at 0.01 level. So, we can conclude that the expansion of financial services as infrastructure and service offers reinforce the financial system, and that increase the financial stability. Several studies have confirmed our findings.

Financial inclusion has no significant results through the usability of financial services (DAC and LAC) to the stability of the financial system. Results are not significant, so many findings as (Khan, 2011), (Azka & Lukytawati, 2018) has same results which due to many factors such as the low value of capital in the financial markets; and having low concentrations of the banking sector; having a high level of inflation and so on in the most Arab countries.

DCP is significant at 0.1 level, but influence financial stability negatively by (-0.1201). Many findings result that an expansion in domestic credit can be the most robust predictor of financial crises in both developed and developing countries, our findings are similar to many studies.

GDP has a significant coefficient at 0.05 level, by (-1.1804). An increase in gross domestic product means a real economic growth and that robustly the financial system. In our case the coefficient is negative, that can aim to the weaknesses of the financial system in Arab countries.

M2 refer to the broad money to GDP has no significant result in the model; financial openness index in Arab countries has also no influence on the financial stability. These two control variables were incorporated into the model to proxy for the size of the financial sector, but the characteristics of the financial system in Arab countries might reverse results. Arab countries have many difficulties in the last years, mainly wars and destabilization in the political systems, it might influence the results.

Conclusion

We studied the impact of financial inclusion on financial stability by using data from 10 Arab economies from 2004 to 2020. Robust evidence shows that bank stability is strengthened when financial inclusion is enhanced, but this nexus tends to change under several conditions; specification, a strong economy and well-developed policy are beneficial strengthening the effect of financial inclusion on financial stability.

This paper also examines the possible channels through which financial inclusion works on financial stability. The results have significant positive and negative effects on financial stability. The mixed effect of financial services and usages, reflected by opposite signs of financial stability (z_score), show that the linkage between these variables is not simply straight-linear, but more non-linear. Up to a certain level, an increase in ATM's and credit bank branches can boost financial stability. However, if the credit share exceeds that level, the influences on stability will turn negative. Study hypothesis has been improved.

The main challenge of this study was the scarcity of data, specifically data on financial inclusion variables (excepting the FAS survey) as stock market volatility, growth or drops in bank deposit, financial crisis etc., would be available, one could employ these to observe a comprehensive impact of financial inclusion on financial stability.

Research suggestions

1. Government and policy makers in Arab countries should encourage sub-index of financial inclusion by encouraging capital flow in financial markets and enhancing domestic credit.

2. For further research, it's better to devise Arab countries into groups; low-income, middle-income and high-income countries if all data are available.

3. Arab countries are of the most dynamic economic regions in the world, underserved segments of the populations, such as poverty, people living in remote areas, and small businesses, should be targeted to ensure that sufficient financial products and services are available, so more specific indicator must be enhanced financial stability.

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