

Does Financial Inclusion Affect Banks Profitability? Empirical Evidence from The MENA Region

هل يؤثر الشمول المالي على ربحية البنوك؟ دليل تجريبي من منطقة الشرق الأوسط وشمال إفريقيا

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Abstract:

This study seeks to examine the influence of financial inclusion on the banks' profitability in the MENA region. Using an econometric analysis, namely (GMM), using 79 banks as a sample, covering the period (2011-2021). We assessed financial inclusion by utilizing three indicators: the number of ATMs, the number of bank branches, and the number of bank depositors. Additionally, we evaluated the bank's profitability by considering two indicators: return on average assets and return on average equity. The findings indicate a noteworthy and favorable influence of ATMs and BRAN on the banks' profitability as measured by ROAA- ROAE. However, there is no discernible impact of DEPO on the banks' profitability, thus verifying our hypothesis 1-2. The results validate the notion that improving financial inclusion has the potential to boost the bank's profitability in MENA countries.

Keywords: Financial inclusion, profitability of banks, GMM Method, MENA region.

JEL Classification : G32, G21, C51

ملخص:

تهدف هذه الدراسة إلى البحث في تأثير الشمول المالي على ربحية البنوك في دول الشرق الأوسط وشمال إفريقيا، باستخدام دراسة قياسية تعتمد على طريقة العزوم المعممة (GMM)، لعينة مكونة من 79 بنكا خلال الفترة (2011-2021)، قمنا بقياس الشمول المالي باستخدام ثلاثة مؤشرات: عدد أجهزة الصراف الآلي (ATMS)، عدد فروع البنوك (BRAN)، عدد المودعين في البنوك (DEPO)، وقمنا بقياس ربحية البنوك، باستخدام مؤشرين: العائد على متوسط الأصول (ROAA) والعائد على متوسط حقوق الملكية (ROAE). تظهر النتائج وجود تأثير معنوي موجب لـ ATMS و BRAN على ROAA-ROAE، بينما لا يوجد تأثير لـ DEPO على ربحية البنوك، ما يؤكد فرضياتنا 1-2. تؤكد النتائج أن تعزيز الشمول المالي يمكن أن يعزز ربحية البنوك في دول الشرق الأوسط وشمال إفريقيا.

الكلمات المفتاحية: الشمول المالي، ربحية البنوك، طريقة العزوم المعممة، منطقة الشرق الأوسط وشمال إفريقيا.

تصنيفات جيل: G32, G21, C51

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1. INTRODUCTION

Financial inclusion (FI) is the percentage of the populace and business sector that has access to formal financial services. When all people of working age have easy, responsible access to affordable, sustainable financial services like loans, payments, savings, and insurance offered by official institutions, this is known as universal financial inclusion (FI). (Klapper & Miller, 2021). The G20 leaders committed to expanding access to financial services for low-income people at the Pittsburgh summit in September 2009. With the support of the World Bank Group, they formed a Financial Inclusion Experts Group as part of this commitment. (Pearce, 2011).

Global account ownership stands at 76 percent, with individuals in developing economies accounting for 71 percent. As of 2021, the global adult population has a bank or regulated institution account, including credit unions, mobile money service providers, or microfinance institutions, with a prevalence rate of 76%. From 2011 to 2021, the number of accounts held by individuals around the world increased by 50%. The percentage of adults in developing economies who have bank accounts increased by 8 percentage points, going from 63% in 2017 to 71% in 2021, and the percentage of adults using payments increased from 35% in 2014 to 57 in 2021. In high-income economies, the proportion of adults engaging in digital payments is nearly universal, reaching 95%. The results of the Global Findex 2021 survey emphasize the potential for improving financial inclusion by increasing the number of unbanked individuals who hold accounts and increasing the use of financial services by those with accounts, particularly through the adoption of digital payments. The majority of MENA countries have demonstrated a strong dedication to promoting financial inclusion as a key component of their forward-thinking agenda (A Demirgüç-Kunt, Klapper, Singer, & Ansar, 2021). While financial inclusion is considered a policy goal in various countries in the MENA region, it is not currently the foremost concern for financial regulators and ministries of finance in MENA. Currently, there are financial inclusion policies in five MENA nations, with three of them being implemented since 2006 (Pearce, 2011). A number of the 2030 agenda goals and targets for sustainable development address access to financial services as being crucial to development. The imperative to reduce remittance transaction costs is also acknowledged in the Sustainable Development Goals (SDGs) agenda. Financial inclusion has become a priority in many countries' policy agendas due to its ability to contribute to poverty alleviation. Financial inclusion is essential for enhancing the competitiveness of the Middle East and North Africa (MENA) area, promoting job creation, increasing incomes, and alleviating poverty. The bulk of enterprises in the MENA region are microenterprises, which also serve as significant employers, representing 92.5 percent of enterprises in Egypt and 63.6 percent of private employment. Financial inclusion benefits individuals and households by providing them with a safe avenue for savings, convenient and cost-effective means of accessing remittances and other payments, loans or insurance payments to cover healthcare or education expenses, and pensions for retirement (Pearce, 2011). The MENA area possesses significant capacity to encompass millions of individuals and enterprises by means of suitable financial services, hence fostering sustainable economic advancement.

Together with the Arab Monetary Fund (AMF), the German International Cooperation Agency (GIZ), and the Alliance for Financial Inclusion (AFI), with backing from the World Bank, the FI in the Arab Region Initiative (FIARI) was launched in 2017.

The network comprises 22 Arab central banks and additional monetary and regulatory entities. This initiative aims to enhance the development of policies that promote FI, with the aim of fostering sustainable long-term growth and equitable prosperity in the region, in accordance with the United Nations Sustainable Development Goals (SDGs). The Euro-Mediterranean Guarantee Network (EMGN) serves as a regional platform for collaboration between EU guarantee programs and countries in the Southern and Eastern Mediterranean region. The objective is to enhance the creditworthiness of small and medium-sized enterprises (SMEs) by providing loan guarantees, stimulating their economic growth, and consequently benefiting the region as a whole.

Three groups youth, women, and small and medium-sized businesses are most likely to need help and support in order to improve financial inclusion through digital banking services, which is necessary to meet the aim of reaching the financially excluded, other vulnerable populations, such as those with lower incomes, less education, unemployment, and those residing in rural and isolated places, lack access to the newest digital financial services. As a result, the difficulties associated with inadequate access to financial services a problem that impacts a significant portion of the global population determine the research subject for this study.

However, the nature of these challenges differs greatly between developed and developing countries, as well as between different groups of the population in the same country and region. Therefore, the significance of this study lies in the importance of financial inclusion, which can ensure broader access to financial services, which is an essential topic at all levels, and the banking industry, as the backbone of any economy and one of the industries that provides financial products and services to the populace, is significant.

As a result, the primary goal of this study was to determine whether the implementation of financial inclusion dimensions had a significant impact on the profitability of banks in the Middle East and North Africa countries. This was done in order to explore the previous literature on the banking industry, show how these variables interact, and develop recommendations that will help to increase the positives and avoid the negatives in the banking industry. To achieve this goal, the study aims to answer the following question:

How does the profitability of banks operating in the Middle East and North Africa get affected by financial inclusion?

Several variables exert an impact on the correlation between banking competition and financial inclusion. The enhancement of banking infrastructure, the establishment of comprehensive credit information systems, and the progress of business environments all contributed to the augmentation of the correlation between banking competitiveness and financial inclusion in Bahrain, Saudi Arabia, Kuwait, and the UAE (AMF, 2020).

The most of research on financial inclusion has primarily concentrated on its definition (Hunter, dela Cruz, & Dole, 2016; Patwardhan, 2018), its reterminants identification (Allen, Demirguc-Kunt, Klapper, & Peria, 2016), its measure (Demirguc-Kunt, Klapper, Singer, & Ansar, 2018; Asli Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess, 2020), while only a few studies have studied its impact on banks' performance.

In order to alleviate poverty and boost economic prosperity in developing and emerging countries, financial inclusion is a crucial and realistic strategy, according to the World Bank. The scholarly literature, especially in emerging nations, has generally overlooked the significant advantages of financial inclusion on bank performance (Vo & Nguyen, 2021), such as MEANA region. Therefore, our research aims to fill the vacuum and insufficiency in this area by investigating the correlation between financial inclusion and the performance of banks in the MENA region.

The paper will be given in the following manner: The initial segment provides an overview of the existing literature and formulates hypotheses; the subsequent segment presents the data and technique employed; the following segment presents the findings and facilitates debate; and the final component presents the conclusive remarks of our study.

2. PREVIOUS STUDIES

Although there has been little research on the relationship between bank profitability and financial inclusion, the Global Partnership for Financial Inclusion (GPII) 2016 report on G20 financial inclusion indicators proposed that financial inclusion has three dimensions: the quality of product and service delivery, the accessibility of financial services, and the use of financial services.

One way to gauge the utilisation of financial services is to look at the percentage of individuals who have bank accounts and those who have recently taken out loans. Conversely, the availability of banking services can be measured by the number of branches and ATMs for per 100,000 adults. Some important factors to consider include the availability of emergency cash, the state of the economy, and the percentage of small and medium-sized businesses that are asked to put up collateral for bank loans. As multiple researchers utilised diverse financial inclusion metrics (Kumar, Thrikawala, & Acharya, 2021). The impact of financial inclusion on bank profitability is a subject of extensive debate. FI has the capacity to reduce poverty and simultaneously enhance bank profitability. Expanding services to a larger customer base can enhance both deposits and loans, as well as overall profitability. Jegede (2014) Utilised original data obtained from Nigerian banks to investigate the potential positive impact of ATMs on the banking industry. The study examined the responses of employees who completed 100 questionnaires and concluded that ATMs had a significant impact on Nigerian banks, leading to improved bank growth. Akhisar, Tunay, and Tunay (2015) Analysed the impact of electronic banking services as innovative tools on the performance of banks in 23 countries between 2005 and 2013. The study utilised ROA and ROE as performance metrics. The study utilised dynamic panel data models to examine the impact of various factors on bank performance. Credit, debit, and other forms of cards, as well as ATMs and branch locations, positively affect bank performance, according to the research. Internet banking and point-of-sale systems, on the other hand, were determined to negatively affect. Musa, Kurfi, and Hassan (2015), During the inquiry, the objective was to examine the impact of expanding financial services through the Internet on the performance of banks in Nigeria. The sample size consisted of 21 institutions. A study revealed that banks experienced a notable and favourable effect on their performance after implementing online financial services compared to the period prior to implementation. During the post-adoption phase, banks effectively utilised information technology to enhance their business operations and expand their global reach in providing financial services via the Internet. Examining

the correlation between the growth of mobile phone-based financial services and the financial success of a selection of commercial banks in Kenya from 2009 to 2013. Kisaka, Ndi, Muriki, and Muio (2015) Using a mobile phone for financial services was associated with a favourable, but not statistically significant, return on assets, which is a measure of financial performance. However, both the number of customers reached annually through mobile financial services and the size of transactions conducted via mobile phones have a significant and positive impact on financial performance. Iqbal and Sami (2017), Examined the influence of financial inclusion on the economic expansion in India over a span of seven years. Financial institutions' branch counts and credit deposit percentages as a proportion of GDP were shown to be positively and statistically significantly correlated, according to the authors. However, they found no impact of ATM growth on the dependent variable. Additional research has demonstrated a correlation between financial inclusion and advancements in both societal progress and economic growth. Chauvet and Jacolin (2017), The study, which examined 55,596 enterprises in 79 developing and emerging nations during the period of 2006-2014, learned that firms have a boost in growth when they are financially included, which involves the provision of financial services. Less concentration in the banking business, a sign of higher competition among banks, amplifies the positive influence. Additionally, their findings indicate that higher level competitiveness banks assist to support the businesses growth, but this effect is only significant when financial inclusion is at a high level. On the other hand, bank concentration is particularly beneficial for foreign and state-owned firms, and it promotes company growth when FI is low. Owen and Pereira (2018), Conducted a study on the correlation between the composition of the banking sector and the level of financial inclusion, utilising data from an imbalanced panel of 83 countries spanning the period from 2004 to 2013. Their findings indicate that increased consolidation within the banking system is linked to improved accessibility to deposit accounts and loans, under the condition that banks' market dominance is restricted. Additionally, they discovered data indicating It has been observed that countries with more liberal banking regulations tend to have more financially inclusive economies. F. H. Shihadeh, Hannon, Guan, Ul Haq, and Wang (2018) Examining the relationship between financial inclusion and banks' performance in Jordanian banks, researchers discovered that an increase in the number of ATMs and credit cards resulted in higher bank profits. Conversely, a decrease in the number of ATM services and small and medium-sized enterprises (SMEs) deposits led to a decline in profits. The study has determined that the inclusion of financial services has a beneficial effect on the performance of banks in Jordan. Chen, Feng, and Wang (2018) compared non-performing loans to FI in commercial banks of China between 2005 and 2016. According to their findings, non-performing loans are worsened by financial inclusion. The banking sector expansion and regional spending can improve FI, whereas unemployment and government intervention can decrease it. F. Shihadeh and Liu (2019), provided worldwide evidence demonstrating that improving financial inclusion will enhance banks' performance and decrease their risk. The researchers analysed data from 701 institutions across 189 countries from 2011 to 2014 to investigate the correlation between FI and banks risks and performance. The findings indicate that improving financial inclusion through the expansion of bank branches will have a favourable impact on both the performance and risk of banks. Vitenu-Sackey and Hongli (2019) investigated the impact of FI on the bank's performance in West African countries from 2004 to 2015. The study found that factors such as the

number of commercial banks, the number of commercial bank branches per 1000 kilometres, and the number of ATMs do not have a beneficial impact on the performance of commercial banks in West Africa. However, the mobilisation of deposits and the purchase of loans have a large favourable influence on commercial banks in the long term. The findings indicate that banks' performance is positively impacted by FI. The banks do better when more people have access to financial services in countries with low GDP per person. This suggests that banks should expand their presence and offer services in these nations. F. Shihadeh (2020), Examined the relationship between FI characteristics and the MENAP countries' banks' performance and risk. Utilised a representative subset of 271 financial institutions located in the MENA region, including Afghanistan and Pakistan, across the time span of 2011 to 2014. He discovered that enhancing the financial inclusion degree can bolster the banks performance in this region and mitigate their risks. Additionally, it was disclosed that the level of banking penetration has a substantial impact on the return on property rights. However, there is no notable correlation between banking penetration and the return on assets. Rwi wang hang (2021), discovered the impact of financial inclusion on bank stability in 36 developing countries by analyzing bank-level data from over 1500 commercial banks spanning the years 2004 to 2018. It has been discovered that the progress in financial inclusion leads to an enhancement in the stability of banks. Furthermore, the relationship between financial inclusion and bank stability is also contingent upon the business cycle, financial conditions, government intervention, and regulatory frameworks. Ahamed, Ho, Mallick, and Matousek (2021), Examined the potential impact of inclusive banking on the performance of banks by analyzing a global dataset of 1,740 institutions from 2004 to 2015. A notable correlation has been discovered between bank efficiency and FI and bank, indicating a strong positive relationship. improved FI helps banks in decreasing the instability of their deposit-funding portion by offering more secure long-term funds, while also alleviating the negative impacts of their return volatility. Vo and Nguyen (2021), Based on an analysis of 1507 banks in emerging economies in Asia from 2008 to 2017, it is found that financial inclusion has a favourable and significant impact on bank performance in the Asian area, as shown in different scenarios. Furthermore, a greater proximity to bank insolvency and increased national economic expansion will bolster bank performance. Kumar et al. (2021) explored the influence of FI on the augmentation of banks' profitability by analysing a dataset of 122 Japanese banks over the span of 2004 to 2018. They claimed branch count increased bank profitability, although there is no evidence. Bank profitability is affected by ATMs and Number of loan accounts.

The findings from multiple studies demonstrate that various metrics of financial inclusion yield divergent outcomes. The impacts of financial inclusion on banks' performance have not been definitively proven, according to both theoretical and empirical study. Furthermore, there is limited empirical research specifically focused on emerging markets, such as the MENA Countries. Thus, the study basically posits that:

Hypothesis 1. Bank profits are positively correlated with the quantity of automated teller machines (ATMs) in circulation.

Hypothesis 2. A bank's bottom line is positively impacted by the number of branches it has.

Hypothesis 3. The profitability of a bank is positively correlated with the number of depositors.

3. DATA AND METHODOLOGY

This study aims to analyze, clarify, and draw conclusions about how FI could impact commercial banks' profitability. It will cover the following topics:

3.1. Sample Selection and Data Collection

In order to analyze the correlation between financial inclusion and bank profitability, this analysis excluded nations where data on financial inclusion was not available. Lastly, the research covers the years 2011–2021, and it includes full data from 79 banks in just 10 MENA countries: Saudi Arabia, Egypt, Qatar, Tunisia, Sudan, Turkey, Lebanon, and Yemen. As a result, we have 869 bank years of data for our regression study, derived from a final sample of 79 banks covering 11 years. Here is Table 1:

Multiple sources provided the data used in this investigation. The World Bank database was queried for information on financial inclusion first². As a second point, the Bankscope and Thomson Reuters Eikon databases were used to derive statistics on the profitability of banks. Thirdly, the World Bank database was used to download the GDP of the countries.

Table 1. Characteristics of sample

Country	Banks	Banks Obs	Percentage
Kuwait	09	99	11,39%
Saudi Arabia	11	121	13,92%
UAE	13	143	16,46%
Qatar	06	66	7,60%
Tunisia	07	77	8,86%
Sudan	07	77	8,86%
Turkey	09	99	11,39%
Lebanon	06	66	7,60%
Egypt	11	121	13,92%
TOTAL	79	869	100%

Source: Authors

²<https://databank.worldbank.org/source/global-financial-inclusion>

3.2 Variable Definitions and Measurement

Profitability variables, financial inclusion variables, and control variables are the three major categories that are utilised to classify the variables that were used for the research. Return on average equity (ROAE) and return on average assets (ROAA), are statistical measures that are used to quantify dependent variables. These variables are proxied by profitability variables. Using the following financial inclusion variables as proxies for independent variables: ATMs count, BRAN count, and DEPO count, we can see how widespread financial inclusion is. Potential impacts on profitability can be managed with the use of the control variables. See Table 2 for details.

Table 2. Variable Definition

Variable	Acronym	Measure
Dependent variable		
Return on average assets	ROAA	Net income /average total assets (%)
Return on average equity	ROAE	Net income /average equity (%)
Independent variables		
Number of ATMs	ATMS	Number of ATMs per 100,000 adults
Number of branches	BRAN	Number of commercial bank branches per 100,000 adults
Number of depositors	DEPO	Number of depositors with commercial banks per 1,000 adults
Control variable		
Bank size	LTA	Natural logarithm of total assets
Gross domestic product	GDP	Yearly GDP growth rate (%)

Source: Authors

3.3. Model Specifications

This research looks at panel data from 79 MENA banks over the course of 11 years, from 2011–2021. We use the Generalized Method of Moments (GMM), more precisely the two-step difference GMM approach, in conjunction with the STATA 16 software in order to determine how financial inclusion impacts the profitability of banks in the MENA region. Endogeneity, autocorrelation, and heteroskedasticity issues are handled with the GMM estimator. This approach is suitable, When the number of cross-sectional units (N) is larger than the duration (T) (Roodman, 2009).

In order to accomplish the goals of the study, the following regression models are created:

$$Y_{i,t} = \beta_0 + \delta Y_{i,t-1} + \beta_1 ATMS_{i,t} + \beta_2 BRAN_{i,t} + \beta_3 DEPO_{i,t} + \beta_4 LTA_{i,t} + \beta_5 GDP_{i,t} + \varepsilon_{it}$$

Where:

$Y_{i,t}$ = The profitability ratios of bank $i(1, \dots, 79)$ at year $t(1, \dots, 11)$ as expressed by ROAA and ROAE .

β_0 = the constant parameter.

δ = the speed of adjustment to equilibrium.

Y_{it-1} = the one-period lagged profitability as expressed by ROAA and ROAE.

$\beta_1-\beta_5$ = the coefficient parameters of the model.

ε_{it} = the model error term.

4. RESULTS AND ANALYSIS

4.1 Descriptive statistic

Table 2 presents the descriptive statistics, including: Mean, Standard deviation, Minimum and Maximum values, for each variable. The variables: ROAA and ROAE are considered as dependent variables, while the remaining factors are classed as independent variables. These independent variables can be further categorized into FI variables and control variables.

The mean Return on Average Assets (ROAA) for our sample is 1.68%. The sample exhibits a range of ROAA values, with the minimum being -9.5% and the largest being 28.06%. These values are equivalent to the ROAA of banks in India (Gafoor, Mariappan, & Thiagarajan, 2018). The mean return on average equity (ROAE) is 12.48%. The smallest percentage is -89.57% and the maximum percentage is 91.99%. The average number of ATMs per 100,000 adults is 48, with a minimum of 9 and a maximum of 83. In the same manner, there are 12 bank branches per 100,000 adults, ranging from a minimum of 4 to a high of 25. The average number of depositors is 854 per 1,000 adults, with a minimum of 351 and a maximum of 1872. This model makes use of two control variables, LTA and GDP, with mean values of 11.36 and 1.44, correspondingly.

Table3. Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
ROAA	869	1.679143	2.422255	-9.505285	28.05697
ROAE	869	12.66956	11.59558	-89.57127	91.99732
ATMS	869	48.64337	23.21896	9.223155	83.94673
BRAN	869	12.17786	5.810918	4.561477	25.99577
DEPO	869	854.8059	355.7008	351.8498	1872.585
LTA	869	11.36578	2.01347	10,4609	24,3529
GDP	869	1.444877	5.203764	-21.46427	13.4

Source: Authors

4.2- Correlation Matrix

One tool used in econometrics to look at the pattern of relationships between variables is the correlation matrix. It indicates whether or not multicollinearity is present and provides a measure of the statistical significance of the association between the study's variables (Al-ahdal, Alsamhi, Tabash, & Farhan, 2020).

The results of the correlation matrix for each of the study's variables are shown in table 4, such as: ROAA has a significant positive association with BRAN, and significant negative association with ATMS and DEPO. ROAE has a significant positive association with BRAN, and significant negative association with ATMS, DEPO. The results show that the highest correlation coefficient between the independent variables was between ATMS and DEPO: 0.78, which is less than 0.8, which proves no multicollinearity between the independent variables.

Table4. Correlation Matrix

	ROAA	ROAE	ATMS	BRAN	DEPO	LTA	AGE
ROAA	1						
ROAE	0.7134***	1					
ATMS	-0.2194***	-0.2793***	1				
BRAN	0.2148***	0.0747	-0.3163***	1			
DEPO	-0.2743***	-0.3347***	0.7840***	0.3999***	1		
LTA	0.1280***	0.2246***	-0.1792***	-0.2354***	-0.2528***	1	
GDP	0.0753**	0.1857***	0.1014***	-0.0504	-0.0229	0.1315**	1

*P-value < 0.1; ** p-value < 0.05; *** p-value < 0.01 **Source:** Autors

4.3 Regression Analysis

Bank profitability in MENA nations is examined through the lens of FI using the GMM method .The potential issues with GMM estimation are identified in this study by use of two conventional diagnostic tests, which the autocorrelation of residuals is measured by the AR1- AR2 tests, and the validity of instruments is measured by the sargan test. In order to ensure that the instruments utilised are legitimate, Sargant is employed. That the tools utilised are external is the premise around which this test is based. Therefore, a high p-value is necessary. The autocorrelation at levels 1-2 can be detected by the Arellano and Bond autocorrelation tests (AR1-AR2). This test's null hypothesis states that, at levels 1 and 2, there is no serial correlation between the error terms. To accept the null hypothesis, p-value for AR1-AR2 tests must be greater. Table 5 shows the two additional GMM assumptions that were tested and validated in this research.

According to Table 5, the results shoes that sargan, and AR1-AR2 tests are not statistically significant, confirming the validity of GMM models (1) and (2).

Consistent with earlier research, the empirical findings demonstrate that the quantity of ATMS (ATMS) significantly affects ROAA and ROAE in a positive way (P< 0.05). (Holden & El-Bannany, 2004; Jegede, 2014; F. H. Shihadeh et al., 2018), who proposed that Customers are more likely to open bank accounts when more automated teller machines (ATMs) are available, given that these offer as digital avenues for service provision in areas where banks are unable to build physical branches owing to heavy customer demand or other constraints. Banks can lessen information

asymmetry and agency issues between borrowers in a more inclusive financial sector that has more widespread ATMs and more individuals using financial services. In contrast (Kondo, 2010; Kumar et al., 2021; Vitenu-Sackey & Hongli, 2019) discovered that automated teller machine profits are unaffected by this trend in Japan. Our first hypothesis was confirmed by the results: Bank's profitability is positively impacted by number of ATMs.

Branch network size (BRAN) positively and significantly affects bank profitability in MENA countries, according to the research. Both the ROAA and ROAE profitability indices support this finding ($P < 0.05$). Profitability of MENA banks is impacted by the decrease of branch networks. The results are consistent with (Chen et al., 2018; Kumar et al., 2021; F. Shihadeh, 2020; F. Shihadeh & Liu, 2019; Vo & Nguyen, 2021), who hypothesised that more branches mean more clients, which means more deposits, a broader lending portfolio, and less risk overall. For low-income communities, bank branches are a lifeline; when branches close, fewer loans are available to small businesses. Our research shows that a bank's bottom line could benefit from expanding its branch network in order to reach more people in need of financial services. Therefore, we may conclude that our second hypothesis is correct: the bank's profitability is positively correlated with the number of its branches. It is confirmed that the profitability of MENA banks is unaffected by the number of depositors (DEPO), as the results demonstrate a minor impact in both models (ROAA-ROAE). This variable's effect on banks' profitability is poorly understood. However (Han & Melecky, 2013), hypothesised that during times of financial strain, an uptick in client deposits would reduce the likelihood of withdrawals from such accounts. So, our null hypothesis that the bank's profitability is positively affected by the number of depositors is rejected.

The current study concluded that bank size (LTA) does not impact the profitability of MENA banks because it did not show a statistically significant association with either ROA or ROE in any of the models examining control variables. Consistent with prior research, we showed that the country-level control variable (GDP) had a noteworthy beneficial effect on bank profitability as measured only by RAOE (Athanasoglou, Brissimis, & Delis, 2008; Mirzaei, Moore, & Liu, 2013)

Table5. GMM regression results of financial inclusion on banks profitability

VARIABLE	Model1(ROAA)			Model2(ROAE)		
	Coef	Std.err	p-value	Coef	Std.err	p-value
ATMS	0.0183548**	0.0090814	0.043	0.1324234	0.0629575**	0.035
BRAN	0.1131534**	0.0456325	0.013	0.7842374	0.3466066**	0.024
DEPO	-0.0004995	0.0004084	0.221	-0.0023137	0.0032018	0.470
LTA	0.1307761	0.081279	0.108	-0.3073785	0.3247632	0.344
GDP	-0.0000458	0.0077002	0.995	0.1965784	0.0824849**	0.017
ROAA t-1	0.4594699	0.0145289	0.000	--	--	--
ROAE t-1	--	--	--	.4130793	.0214454	0.000
N of Obs		690			690	
Wald chi2		2197.19			795.14	
Prob> chi2		0.0000			0.0000	
AR1 test (p-value)		0.1067			0.1832	
AR2 test (p-value)		0.9016			0.5189	
Sargan test (p-value)		0.1076			0.1043	
N of instrument		21			21	
N of groups		79			79	

Source: Authors

*p < 10%; **p < 5%; ***p < 1%.

Two tests, AR (1) and AR (2), check if the first-differenced residuals show first-order or second-order serial correlation, respectively, with the null hypothesis that there is no serial correlation. Running the Sargan test of over-identification with the assumption that all instruments are valid is the null hypothesis.

5. CONCLUSION

In order to further human development, financial inclusion is often seen as a crucial strategy that promotes inclusive growth, economic development, and financial deepening. Because of its potential to aid in poverty reduction, financial inclusion has become a key policy priority for many countries. Everybody knows that the economy and society both benefit from financial inclusion.

However, it seems that the scholarly literature has paid little attention to the direct positive effects of financial inclusion on bank performance, especially for developing economies in the MENA region.

The paper delves into how financial inclusion affects the profitability of banks in the MENA area. From 2011 through 2021, 79 MENA banks collected their data from various online sources for this study. Return on average assets (ROAA) and return on average equity (ROAE) were used to determine a bank's profitability. Access to banking services was evaluated by counting automated teller machines (ATMS), branch locations (BRAN), and depositors (DEPO). An established dynamic GMM estimate method for panel data was utilized to guarantee the result's robustness.

The results of the regression analysis supported hypotheses 1-2, showing that the quantity of ATMs and branches significantly affected bank profitability. Nevertheless, the number of depositors did not appear to have a substantial effect on the profitability of banks. Regarding the control factors, our results show that the size of the bank does not affect the profitability of MENA banks, but GDP significantly increases ROAE. Results suggest that expanding access to banking services, such as opening more branches and installing more ATMs, can boost a bank's bottom line. It is clear from the results that financial inclusion affects bank profitability; this frees up capital for banks to reinvest in their distribution networks and technology. This finding suggests that banks will benefit financially from lending to government financial inclusion programs since this will enhance their bottom line. Different indicators of financial inclusion produce different outcomes, as demonstrated by the data. Therefore, in order to provide a more accurate assessment of the financial inclusion level, the study suggests that financial inclusion be measured using a number of different indicators. Further research on the relationship between FI and bank efficiency, stability, and risk may be necessary in the future. The results could be applicable to similar nations and regions.

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