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Financial Inclusion and Bank Profitability: Evidence from Island Banking Sector

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Abstract

Purpose: The main aim of this study is to investigate the effects of financial inclusion on bank profitability in island banking sectors. For this purpose, 19 banks from North Cyprus Banking Sector has been choosen which operates between 2007 and 2020.

Design/methodology/approach: The dynamic panel of System Generalized Method of Moments (GMM) estimation technique was utilized in the research to account for probable endogeneity. The research utilized Pooled Mean Group (PMG) and Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) methods.

Findings: The findings reveal that the financial inclusion and bank profitability in the islands have a positive association. In other words, financial inclusion is a major factor in island banks' profitability. Mainly, the results prove that the deposit ratio is correlated to the bank's size in a beneficial way. The study's findings are consistent with the findings of capital structure principles, particularly the hierarchical and balance theories.

Practical implications: The study's policy implications include that in order for banks on islands to boost their profitability and get the optimum capital structure from funding, policies supporting financial inclusion must be developed. Banks should also make an effort to make establishing bank accounts considerably simpler for the most disadvantaged and marginalized members of society by easing customer identification criteria in certain cases when they may obstruct financial inclusion objectives and efforts.

Originality/value: All the findings are original, and this is the first study that analyses the effect of financial inclusion on bank profitability in Northern Cyprus.

Keywords*:* Financial inclusion, Bank Profitability, Pooled Mean Group (PMG), Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL).

JEL classification: G18; G21; G28; F65

1. Introduction

Financial inclusion, or financial access, is the degree to which individuals benefit from financial services (Sukumaran, 2015). Many studies show that access to financial services is closely related to financial development and economic development (Mwangi & Cheluget, 2018; Pambudianti et al., 2020; Sarma & Pais, 2008). In addition, it has been determined that financial access and depth have the effects of reducing poverty and improving income distribution (Erlando, Riyanto, & Masakazu, 2020; Ratnawati, 2020; Williams, Adegoke, & Dare, 2017). In many advanced nations, the rate of access to financial services is around 90 percent. The number of individuals who do not have a bank account is minimal. These countries are trying to develop new programs and new financial techniques aiming to bring even those "furthest away" of society into the system. In fact, in some developed countries, it is debated whether a person can adequately meet their basic needs such as housing, food, education, work, health, and social security without access to certain financial services (Dahiya & Kumar, 2020; World Bank, 2020). On the other hand, it is noteworthy that in several advanced nations, more than half of the society in general, and even 95% in some regions, are out of the financial system (World Bank, 2020).

For sustainable socio-economic development, sound and effective financial institutions and markets have always been important. The financial sector has a key role in achieving this goal (Ma'ruf & Aryani, 2019). A developed financial system causes economic development at the country level and in the firm and industrial sectors (Sahoo, et al, 2021). The financial system encourages advancement in several manners and ensures that the funds required for advancement are found and pooled (Kaya, 2020). Thus, the financial system mediates the implementation of more crucial but value-producing projects. In addition, it shows a significant part in allocating these funds, ensuring the effective use of funds (Demirgüç-Kunt et al., 2020). Hence, the financial system helps select more economically efficient projects and offers a significant social benefit by monitoring if the sources are utilized according to their purposes after they are allocated (Argimon et al., 2019; Pho, et al 2021). On the contrary, the financial system helps protect economic resources with its services to manage the risks encountered during project goals (Abbas, et al., 2022; Korniyenko et al., 2018). Countries with a developed financial system led to economic development (Beck & Levine, 2008; Demirgüç-Kunt & Maksimovic, 1998; Levine et al., 2000). Beck and Levin (2004) revealed that financial inclusion has a poverty-reducing contribution (Beck & Levine, 2004). According to these studies, poverty becomes permanent as income and wealth are concentrated only in a particular group.

In Northern Cyprus, the financial sector is greatly important to the economy. In the financial sector, the most important financial institutions are commercial banks. The most significant share in the financial industry belongs to the banking industry with 90%. Twenty-one banks operate in the banking sector. As of the end of 2020, the banks' total assets are approximately $9 billion. Total deposits are around 6 billion USD, and loans are around 4 billion USD. The total number of ATMs is 511. The total assets of the banks are approximately 2.8 times the national income. The value-added created by banks to national income are 6.8%. The development rate of the banking industry is above the development rate of national income. The banking sector provides nearly 5% of the total employment in the country. Approximately 71% of the deposits

invested in the banking sector are directed to the economy as loans (North Cyprus Central Bank, 2020).

Empirical evidence of banks' financial performance in the research utilizes parameters that fundamentally consist of three major groups: (1) Variables unique to each bank (2) macroeconomic variables, as well as (3) banking sector/industry-specific elements. (Athanasoglou, Brissimis, & Delis, 2008). It is important to note that most of the investigated studies had discussed Financial Inclusion with limited components. However, in this particular study, we used all the Financial Inclusion components at the same time

The study contributes to the existing literature review in two folds. The initial contribution is that it is the first study that analyses the effect of financial inclusion on bank profitability in Northern Cyprus. The second contribution is to explore the financial inclusion index by employing the factor analysis principal component technique.

2. Literature Review

The banking sector shows a significant part in economic growth by offering crucial financial services to individuals and companies. The core of effective banking is the assurance to customers via robust, long-term, and dedicated partnerships. Banks also serve as market intermediaries between suppliers and financial consumers. While performing such operations, banks have to profit to survive (Fama, 1980). The financial success of banks is the most important condition for the healthy economic situation of the real sector (Abbas, et al, 2021). Therefore, the country examining bank failure primarily enhances regulators' potential to anticipate possible crises and enables banks to efficiently administer, coordinate, and supervise banks (Acemoglu, 2009). In addition, the early distinction between financially successful and unsuccessful banks enables suitable steps to be considered to avoid significant failures whose impact will be felt in other sectors and to protect the healthy ones. As the direct capital costs and restructuring of the problematic sector can be very costly (Hirtle, Kovner & Plosser, 2020). Finally, the bank failure accompanied by the credit crisis leads to under-utilization and improper distribution of funds, hampering economic growth. Thus, banking strongly influences both industrial prosperity and stability (Beck, Demirguc-Kunt & Levine, 2003).

The listed important part of the banks clarifies their importance. In the literature, many metrics give information about the bank's financial performance. Financial ratios used in bank performance measurements are the most straightforward and reliable tools that can be used to evaluate banks' financial performance (Delis & Staikouras, 2011). Banking profitability is a key metric for assessing banking activities as well as managerial scheduling and planning. It's because banks promote economic success, and if the bank operates properly, the overall economy will benefit. As a result, several researches on the variables that determine bank profitability have been conducted in recent years (Fonseca & González, 2010; Trang, et al, 2022).

Many important indicators assess the degree of access to finance in the banking industry. These indicators have been used together or individually in many different studies, and various conclusions have been reached. In this context, many studies have been done for calculating the Financial Inclusion and Performance variables in the past. To do that, the relation between financial advancement and economic development has been frequently analyzed in the literature and is still being analyzed.

Schumpeter (1934) claims that banking activities are the engine of economic growth. However, Robinson (1979) states that financial advancement only follows economic development, and the key factor is the initiatives put into operation. In addition, Lucas (1988) thinks that the part of the financial industry is overstated. The first empirical study in this area belongs to Goldsmith (1969) and states that there is a strong relationship between per capita income and financial advancement. Demetrádes & Hussein (1996) argued that there is a bidirectional causality relation between economic development, both supply-pull and demand-pull. Lucas (1988), in his study, highlights the absence of any causal relation between financial advancement and economic development. In their study in Financial Depth, Cole & Shaw (1974) argued that economic growth occurs by providing financial deepening with financial development. According to Levine (1996), financial development refers to improving financial intermediaries, markets, products, and services. Čiháket al. (2013) argued that the financial development level of markets with unstable practices and disruptions could not reach the desired level. Beck et al. (2005) developed eight indicators that calculate the prevalence of use of financial services, which is the first research that measures financial inclusion. On the other side, Sarma & Paris (2008) developed a single comprehensive financial inclusion index, unlike Beck et al. (2005). Developed with a multidimensional approach; the financial access index has filled the gap in this area in the literature. Calculations were made using three dimensions: the prevalence, accessibility of banking services, and the use of the banking system (Sarma & Paris, 2008).

On the other side, World Bank started to create a Global Financial Inclusion Index database, and it is the first database in the world that includes indicators measuring individuals' use of financial products. This database shows how adults save, borrow, pay, and risk. In addition, it contains a comprehensive data set on its management (World Bank, 2020).

Equity to assets ratio (EAR) and Return on Assets (ROA) are widely employed to determine the performances of the banks, and it has been widely used in many studies to show, if any exist, a relationship with ROA as a performance measurement. From that respect, studies revealed that the Equity to assets ratio (EAR) has a substantial positive impact on ROA (Rumler & Waschiczek, 2016; Al-Jafari & Alchami, 2014; Ozili, 2017; Căpraru & Ihnatov, 2014). On the other hand, Căpraru & Ihnatov (2014) and Halim et al. (2018) found that the EAR has a substantial negative effect on ROA.

At the same time, the cost variable is another variable that gives signals about the bank's performance. For that respect, Marginal Cost is used in some studies. According to Yuanita (2019) in order to penetrate the market, lowering the price of products is essential, and to do that, Banks have to lower their marginal cost (Yuanita, 2019). Cihangir (2016) concluded that bank mergers

increase bank performance by reducing their marginal cost. Million et al. (2015) and Olson & Zoubi (2011) emphasized the significance of reducing costs for financial stability and having positive bank performance.

Also, Bank Size is another variable used by the researchers to determine the bank performance and used by many researchers. Bank Size has been used as an indicator in measuring ROA, among them, Căpraru & Ihnatov, 2014 and Ozili (2017) studies found that bank size has a significant positive effect on ROA. On the contrary, however, Rumler & Waschiczek (2016) and Al-Jafari & Alchami (2014) studies found that bank size has a substantial negative impact on ROA.

Furthermore, Non-Performing Loans (NPLs) is another performance indicator of the banks used by the researchers. The NPLs is an important measurement of bank performance, and it has been used in studies by Jouini et al. (2013), Kirui (2014), Dimitrios et al. (2016), Akter & Roy (2017), Stephen Kingu et al. (2018), Petkovski et al., (2018), Psalia et al., (2019) and all found that (ROA) negatively impacted by NPL.

Besides all, the Interest Rate Spread also has been widely used in performance analysis. In their studies, Garr & Kyereboah-Coleman (2013) found that bank-specific variables significantly influence interest rate spread. Also, Raharjo et al. (2014) used the return on assets ratio to gauge bank profitability and found a favorable correlation with net interest margin profit. Similarly, Owusu-Antwi et al. (2017) found a favorable association between ROA and interest rate dispersions in their analysis.

Finally, Financial Stability is another indicator used by the researchers to assess the bank's performance. Financial Stability can be measured through many indicators, and it is an important measurement that clarifies the strongest level of any bank. The profit rate that a bank can create with its assets is one of the most significant indicators of its financially strongest and stability level (Pointer & Khoi, 2019; Rusdiyanto & Narsa, 2020; Aor, et al, 2021). The second indicator of stability is the competition rate calculated by measuring the cost that a bank has to bear to create each unit of profit is an indicator of financial stability that determines the sector's competitiveness level (Bellón, 2014; Silva et al., 2015). The third indicator of stability is the spread of the income-generating interest rate and the interest expense that causes expenses Xu et al., (2019).

In the light of the above information the impacts of financial access on bank performance indicators were analyzed in the context of dependent and independent parameters chosen for this research. According to our hypothesis, the financial performance indicators of banks improve depending on the extent to which these banks provide access to finance to their customers. Bank-specific performance indicators of banks that have made a breakthrough in financial access are also increasing, so bank-specific performances support each other like a vicious circle (Trang, et al, 2021). In this context, we hypothesize that the banks in Northern Cyprus will increase their access to finance, which will also enhance the financial behavior of these banks.

3. Data and Method

As of 2020, twenty-one banks with one public bank, five branch banks with foreign capital, and 15 local statuses operate in Northern Cyprus banking sector (North Cyprus Central Bank, 2020a). Total 19 banks have been chosen which are operating till 2007 to 2020 continuously and two merged banks excluded from the sample because they were not acting continuously between 2007 and 2020. Therefore, the study covers the period from 2007 Q1 to 2019 Q4 with nineteen banks operating in North Cyprus at that time period (North Cyprus Central Bank, 2020a).

The research employed panel data set spanning from 2007 to 2019 of 19 banks in Northern Cyprus. To solve the economic concerns of endogeneity and unknown country-specific impacts that are frequent in panel estimates of this kind, the research used the system GMM estimation technique. Table 1 represents the definitions and resources of the parameters.

In this research, the impact of banks' internal factors on their financial behavior is examined. In this context, as the internal factors of banks, the variables efficacy cost ratio (EC), ROAA, and NIM are utilized as dependent parameters. In addition, bank-specific variables are used as independent variables. These variables are Bank Size (Size), financial inclusion (FI), equity to assets ratio (EA), marginal cost (MC), non-performing loan (NPL), spread (SP), and financial stability (FS).

Table 1: Summary and Measurement of the Financial Criteria and Sub-criteria

Variable		Acronym	Ratio (sub-criteria)	Source
Dependent Variables / Bank Specific Variables	Return on Average Asset	ROAA	Net income/average total assets	(North Cyprus Central Bank, 2020b) / (Căpraru & Ihnatov, 2014).
	Equity to Assets Ratio	EA	Equity/total assets	(North Cyprus Central Bank, 2020b) /(Mansur, Zangeneh, & Zitz, 2006)
	Net Interest Margin	NIM	Net interest income/total assets	(North Cyprus Central Bank, 2020b) / (Garcia & Guerreiro, 2016)
Independent Variables / Bank Specific Variables	Financial Inclusion	FI	- Branch distribution by region (geographical): 1,000 km2 per branch number - Branch breakdown per capita (demographic): Branch per 100,000 people number	(North Cyprus Central Bank, 2020b) /(Sarma & Pais, 2008)

		- ATM distribution by region (geographic): 1,000 km2 ATM per head number - ATM distribution per person (demographic): per 100,000 people Number of ATMs - Number of credits per capita (prevalence): - Number of credits per 1,000 people - Number of deposits per capita (prevalence): deposits per 1,000 capita number	
Marginal Cost	MC	Change in cost/change in quantity	North Cyprus Central Bank, 2020b) / (Yuanita, 2019)
Bank Size	Size	Size Logarithm of total assets (log)	(North Cyprus Central Bank, 2020b) / (Banna et al., 2018).
Non-performing Loans	NPL	Bank non-performing loans / gross loans	(North Cyprus Central Bank, 2020b) / (Garcia & Guerreiro, 2016)
Spread	SP	The difference between the rate of interest, a bank charges a borrower and the rate of interest it offers a depositor	(North Cyprus Central Bank, 2020b) /(Bodla & Verma, 2006)
Financial Stability	FS	(Return on assets +(Equity/Assets))/sdROA	(North Cyprus Central Bank, 2020b) / (Xu, Hu, & Das, 2019)

Using the GMM estimator, a two-phase method would predict bank efficiency and financial inclusion (Broll, et al, 2015). We used GMM differences from Arellano and Bond (1991) to solve a potential endogenous problem. This GMM method differs initially from using laggard regressors as instruments to exclude the observed country-specific fixed effects to improve the coherence of the estimates. The unobserved bank-specific fixed effect could often be critical, but the model may be mistakenly identified due to its removal by differentiation, and our instruments may be inaccurate while weakening the asymptotic properties of the difference estimator. Arellano and Bover (1995), Method GMM, suggested by Blundell and Bond (1998), increases the GMM disparity by addressing the problem in a weak instrument by adding the two-equation structures, differentiated equation, and level equation. As the parameters in the level equation are measured

with their initial variations, it is possible to obtain additional instruments which increase performance. Equation efficiency underestimation is increased when conditions of its level type are combined with the different forms (Khan et al, 2022; Roodman, 2009). The GMM scheme assumes strongly that the first differentiated instruments used for variable amounts must not be associated with fixed results of the unattended banks. The GMM framework is equipped with the following defined additional instant conditions:

$$Y_{i,t} = c + Y_{i,t-1} + \sum_{s=1}^{s} \beta_s X_{it}^{s} + \sum_{f=1}^{f} \beta_f X_{it}^{f} + \varepsilon_{i,t}, \varepsilon_{it} = v_{it} + u_{it} \quad (1)$$

Here $Y_{i,t}$ ROA, NIM and EC of bank i at year t, X_{it}^{s} indicates internal determinants of the firm "*firm-specific*", financial inclusion, X_{it}^{f} denotes external variables, $\varepsilon_{i,t}$ indicates stochastic error term-associated effect, which shall possibly impact a firm's profitability. It is a one-way component regression framework, in which $v_{it} \sim N(0, \sigma_v^2)$ and independent of $u_{it} \sim (0, \sigma_u^2)$. And frameworks will express as follow:

$$Y_{i,t} = Y_{i,t-1} + \beta_1 FINC1_{i,t-1} + \beta_2 EA_{i,t} + \beta_3 Ln\ MC_{i,t} + \beta_4 Ln\ Size_{I,t} + \beta_5 Ln\ NPL_{It} + \beta_6 SP_{It} + \beta_7 FS_{it} + \varepsilon_{it} \quad (2)$$

There is a serial autocorrelation between the lagged dependent variable. We test a null hypothesis with no serial correlation to predict consistent estimates of the instruments with further deficiencies of the dependent variable. We oppose Arellano and Bond AR (1) with 1% importance at first differences. On the other hand, we do not at first deny the fact that Arellano and Bond AR (2) do not have autocorrelation. In addition, the Hansen test was stated to detect over-identification constraints. The null assumption of this test is that the Instruments are exogenous as a group. We may not deny the null hypothesis of the absence of over- Restrictions for instruments in the model.

Table 2: Factor Analysis Outcomes, Financial Inclusion Index Parameters.

KMO and Bartlett's Test			
Kaiser-Meyer-Olkin	0.824	Chi^2= 1928.29	P-value 0.001
Principal component technique "Extraction"			
Parameters	Factor loading	Component	
	"Extraction"	1	2
BRANCH	0.985	**0.844**	0.119
ATM	0.993	**0.836**	0.035
BBPHTA	0.989	**0.802**	0.196
ATMsPTA	0.985	**0.844**	0.059
DWCBPTA	0.674	-0.301	**0.764**
BFCBPTA	0.705	-0.132	**0.814**
Overall Variance Described			

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.810	70.262	70.262
2	1.150	28.743	99.004

The KMO score of 0.533 is appropriate and useful for more investigation, as shown in Table 2, hence the null hypothesis of Bartlett's test is that the correlation matrix is an identity matrix [65,66]. Nevertheless, the null hypothesis is rejected since Bartlett's test is statically important at the 1% range. This suggests that the dataset's variability is unequal. Furthermore, the extraction findings show that all parameters have acceptable factor loading of higher than 0.50. Moreover, the findings show that the parameters were separated into two groups: Component "1" comprises BRANCH, ATM, BBPATA, and ATMs PTA and has a variation described of 70.62 percent, whereas component "2" includes DWCBPTA and BFCPTA and has a variance explained of 28.74 percent and 99 percent, respectively. As a result, in this research, we classified the FI as follows: FI1 = f [BRANCH, ATM, BBPATA, ATMs PTA] and FI2 = f [DWCBPTA, BFCPTA].

Table 3: Descriptive Statistics

STATS	EC	ROA	NIM	FI	EA	MC	Size	NPL	SP	FS
Mean	0.323	0.017	0.045	6.538	0.141	3.233	5.563	4.129	0.076	0.0002
SD	1.728	0.030	0.034	4.709	0.162	0.563	0.563	0.776	0.047	0.001
Min	-17.63	-0.011	-0.014	0.25	-0.325	1.462	3.526	1.845	0.003	-0.0005
Max	7.953	0.219	0.326	24.31	0.959	4.368	6.905	5.377	0.394	0.009

Table 3 unveils the descriptive statistics outcomes and it can be seen that the FI mean value is the highest which is followed by Bank size, Non-Performing Loans, Marginal Cost, Efficiency Cost, Equity to Asset, Spread, NIM and ROA. The standard deviation demonstrates how concentrated the data are around the mean; the smaller the standard deviation, the more concentrated the data are. Based on this logic, FS is more concentrated around its mean which is followed by ROA, NIM, Spread, Equity to Asset, Marginal Cost, Non-Performing Loans, Efficiency Cost and FI.

Table 4: Correlation Matrix

	EC	ROA	NIM	FI	EA	MC	Size	NPL	SP	FS
EC	1									
ROA	-0.075	1								
NIM	-0.322	0.017	1							
FI	0.028	0.615	-0.209	1						
EA	-0.226	-0.079	0.625	-0.332	1					
MC	-0.055	0.426	-0.176	0.593	-0.358	1				
Size	-0.069	0.537	-0.252	0.752	-0.489	0.769	1			

NPL	-0.132	0.303	0.058	0.398	-0.327	0.581	0.689	1		
SP	0.034	-0.168	0.520	-0.249	0.336	-0.303	-0.443	-0.073	1	
FS	0.154	-0.088	0.106	-0.202	0.634	-0.326	-0.455	-0.387	0.343	1

As presented in Table 4, the results show that correlation between "marginal cost" and "bank size" is 0.769; "bank size" and "non-performing loans" is 0.689; "spread" and "financial stability" is 0.343 which indicates that they're strongly positively correlated. On the other hand, the findings confirms a negative relationship between "equity to asset ratio" and "marginal cost" (0.358) and "financial inclusion" and "equity to asset ratio" (0.332) .

Table 5: Dynamic Panel-Data Estimation, Two-Step System GMM

Parameters	**Model 1** **ROA**	**Model 2** **NIM**	**Model 3** **EC**
C	0.020 [0.09]	0.009 [0.04]	19.266 [0.76]
$\boldsymbol{\pi_{t-1}}$	0.684 [3.89]**	0.008 [0.07]	-0.207 [-2.03]*
FI	0.0087 [3.13]**	-0.0007 [-4.11]**	0.562 [2.63]*
EA	0.038 [0.76]*	0.2145 [3.80]**	-9.374 [-2.25]*
Ln MC	-0.012 [-3.45]*	0.006 [3.01]*	0.413 [1.42]
Ln Size	-0.0033 [-2.06]*	0.003 [2.14]*	-5.353 [-1.75]
Ln NPL	-0.0037 [-3.20]*	-0.009 [-3.28]**	1.847 [3.06]*
SP	0.093 [2.69]*	0.215 [2.65]*	-5.302 [-3.37]**
FS	-5.876 [-2.74]*	-24.821 [-2.20]*	7.809 [1.93]
Sargan test^a	$\boldsymbol{x^2}$ (22)= 141.76	$\boldsymbol{x^2}$ (26)= 96.67	$\boldsymbol{x^2}$ (22)= 271.47
	P-v= 0.135	P-v= 0.149	P-v= 0.274
Hansen test^b	$\boldsymbol{x^2}$ (22)= 8.48	$\boldsymbol{x^2}$ (26)= 13.14	$\boldsymbol{x^2}$ (22)= 12.16
	P-v= 0.296	P-v= 0.803	P-v= 0.459
	Z= -1.36	Z= -0.83	Z= 1.17
AR $(\mathbf{1})^c$	P-v= 0.175	P-v= 0.406	P-v= 0.243
	Z= 0.08	Z= 0.11	Z= -0.68
AR $(\mathbf{2})^c$	P-v=0.939	P-v=0.913	P-v=0.499
Diagnostics for Exogeneity of Instruments			
GMM instruments for levels			
Hansen (excluding group):	$\boldsymbol{x^2}$= 10.12; P-v=0.282	$\boldsymbol{x^2}$= 13.11; P-v=0.286	$\boldsymbol{x^2}$= 5.90; P-v=0.552
Difference (null H= exogenous):	$\boldsymbol{x^2}$= -1.64; P-v=0.319	$\boldsymbol{x^2}$= 0.04; P-v=0.451	$\boldsymbol{x^2}$= 6.26; P-v=0.675
GMM Lag orders			
Hansen (excluding group):	$\boldsymbol{x^2}$= 1.65; P-v=0.439	$\boldsymbol{x^2}$= 4.71; P-v=0.581	$\boldsymbol{x^2}$= 2.88; P-v=0.238
Difference (null H= exogenous):	$\boldsymbol{x^2}$= 6.83; P-v=0.297	$\boldsymbol{x^2}$= 8.43; P-v=0.489	$\boldsymbol{x^2}$= 9.29; P-v=0.579
GMM instruments, collapse.			
Hansen (excluding group):	$\boldsymbol{x^2}$= 6.47; P-v=0.390	$\boldsymbol{x^2}$= 9.93; P-v=0.623	$\boldsymbol{x^2}$= 10.91; P-v=0.537
Difference (null H= exogenous):	$\boldsymbol{x^2}$= 2.00; P-v=0.496	$\boldsymbol{x^2}$= 3.22; P-v=0.599	$\boldsymbol{x^2}$= 1.25; P-v=0.481

*, and ** indicates substantial levels at 5% and 1%, correspondingly. Z-statistics in []

a The analysis for over-identifying limitations in GMM dynamic model estimator.

b Hansen test of overid. Restrictions for instruments.

c Arellano-Bond test that average auto-covariance in residuals of order 1, and 2 is 0

4. Findings and Discussion

According to the findings in table 5, Financial Inclusion, Equity to Assets Ratio (EA), Non-Performing Loans (NPLs), and Spread (SP) have a substantial effect over the ROA Model-1, NIM Model-2 and Efficacy Cost Ratio (EC) Model-3.

On the other side, Marginal Cost (MC), Size (Total Assets), and Financial Stability (FS) have a substantial impact on the ROA Model-1 and NIM Model-2, but there is no significant effect over the Efficacy Cost Ratio (EC) Model-3. Our study findings contain similar findings with few previous investigations in the literature like the Equity to assets ratio (EAR), which has a substantial positive effect on ROA as like the findings of the (Rumler & Waschiczek, 2016; Al-Jafari & Alchami, 2014; Ozili, 2017; Esmaeil, et al, 2020), Căpraru & Ihnatov, 2014. Also, our findings of the cost issue are consistent with the findings of Yuanita (2019). Yuanita (2019), Cihangir (2016), Million et al. (2015), Olson & Zoubi (2011) Adebayo, et al, 2022) emphasized the importance of reducing costs for financial stability and positive bank performance. At the same time, our findings of the bank size and the performance are harmonized with the Căpraru & Ihnatov (2014) and Ozili (2017) studies whose found that size of the bank has a substantial stronger effect on ROA.

Besides all, as expected and found by the Jouini et al. (2013), Kirui (2014), Dimitrios et al. (2016), Akter & Roy (2017), Stephen Kingu et al. (2018), Petkovski et al. (2018), Psalia et al. (2019) ROA is negatively impacted by NPLs, which is in line with our study findings.

Furthermore, our findings are consistent with the Garr & Kyereboah-Coleman (2013), Raharjo et al. (2014) and (Owusu-Antwi, Banerjee, & Antwi, 2017), who found that bank-specific variables significantly influence interest rate spread, bank profitability, ROA ratio and achieved a positive relation with NIM income.

In addition, the findings of our study are consistent with the Pointer & Khoi (2019), Rusdiyanto & Narsa (2020), Bellón (2014), Silva et al. (2015), Xu et al. (2019) findings of the competition rate, competitiveness level, and the interest spread have a positive effect over financial stability respectively. Financial inclusion, bank performance, and economic growth are highly related and this relationship has been discussed since Schumpeter. In his book, Schumpeter (1932) stated that "financial intermediaries contribute to economic growth through their savings accumulation, project evaluation, and risk management functions". According to the Schumpeterian view, the advancement of financial intermediaries positively affects technical variation and productivity development, which directly affects growth. Since the claim that an advanced financial system causes economic development is supported by many researchers and

many different econometric techniques, the relationship in question and is widely accepted in political circles. Moreover, there are findings showing that the existence of this strong “causality” relationship is valid not only at the degree of countries but also at the degree of industrial sectors, firms, and households (Johari, et al, 2022; Rajan and Zingales, 2001 and 2003; Levine, 2005; Caprio and Honohan, 2001).

Findings of a particular study showed that access to finance plays a substantial role in improving the financial behavioral indicators of the Northern Cyprus Banking Sector. As it has been revealed in many countries in the literature, this improvement is more permanent and effective with the intermediary role of the Banking Sector, as access to finance triggers economic development, employment, and growth. In this context, it is of great importance to expand and improve access to finance in order to increase the financial performance in Northern Cyprus.

5. Conclusion, Implication and Recommendation

Financial inclusion and its implications for bank profitability are discussed in this article. Financial inclusion benefits banking in developing and progressed economies and the convenience that financial inclusion offers to people with lower and varying income is frequently more valuable to them than the higher cost of obtaining such services from traditional regulated banks.

The major results prove that the deposit ratio is correlated to the bank's size in a beneficial way. The study's policy implications include that in order for banks on islands to boost their profitability and get the optimum capital structure from funding, policies supporting financial inclusion must be developed. Banks should also make an effort to make establishing bank accounts considerably simpler for the most disadvantaged and marginalized members of society by easing customer identification criteria in certain cases when they may obstruct financial inclusion objectives and efforts. Since similar studies have not been carried out in different island economies, there has not been a chance to compare the similar and different aspects of the findings obtained. Future study might look at the link between financial inclusion and the banking industry to see whether funding contributes to the spread of financial shocks during a crisis. A future research might look at if the optimal financial framework of the banks' features in the industry varies from nation to nation as a result of the model used in this study.

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