"The impact of bank performance and economic growth on bank profitability: CAMEL model application in middle-income countries"

| AUTHORS | Zakia Abdelmoneim [iD]
Mai Yasser [iD] |

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
56	1	8

Zakia Abdelmoneim, Ph.D., Lecturer, Faculty of Management Sciences, Department of Accounting, October University for Modern Sciences and Arts (MSA), Egypt. (Corresponding author)

Mai Yasser, Ph.D., Lecturer, Faculty of Management sciences, Department of Economics, October University for Modern Sciences and Arts (MSA), Egypt.

Zakia Abdelmoneim (Egypt), Mai Yasser (Egypt)

THE IMPACT OF BANK PERFORMANCE AND ECONOMIC GROWTH ON BANK PROFITABILITY: CAMEL MODEL APPLICATION IN MIDDLE-INCOME COUNTRIES

Abstract

This paper aims to study the impact of both bank performance and economic growth on bank profitability in 8 middle-income countries from the Middle East and North Africa (MENA) region and MINT countries using the Generalized Method of Moments (GMM) model. Bank profitability is measured by return on assets (ROA) and return on equity (ROE), net interest margin (NIM) is measured by CAMEL model, and economic growth is measured by gross domestic product (GDP) growth. The sample period ranges from 2000 to 2020, and data are extracted from the World Bank financial indicators and database. This paper is supported by the financial intermediation theory. By comparing both MINT and MENA regions, the results show that in the MINT region, ROA is affected most by both asset management and capital adequacy ratio (CAR), while NIM is affected by asset management, liquidity, and management. Regarding the MENA region, ROA and NIM are affected by CAR only. No relationship was found between ROE and any of the CAMEL determinants in both regions. The results show superior performance for MINT than MENA; strong and active capital, increment in assets, credits, and deposits, and enhancement in bank profitability that is reflected in economic growth progress. Both MENA and MINT regions' profitability (ROA and ROE) is affected by GDP, so their economies are restructuring very well and their banking industries are expected to grow rapidly.

Keywords	MENA, MINT, Generalized Method of Moments (GMM) model, CAMEL, GDP growth
JEL Classification	O11, M41, G21

INTRODUCTION

The banking sector is the backbone of any country's health (Zhongming et al., 2019; Rabaa & Younes, 2016) and is the engine of growth for any country's economy (Nimalathasan, 2008). Most businesses depend most on the financial support and facilities provided by banks. Banking sectors are the safeguard for any economic instability a country faces, they work on minimizing the financial, market, and systematic risks any society might face. The performance of the banking sector is an indicator of the health of the whole country and is crucial for its financial system (Trung, 2021; Zhongming et al., 2019). High supervision and performance evaluation are important to help the banking sector to perform its job. Recently and according to the different market environmental circumstances, the banking sector faces huge pressure to cope up with the extensive changes and the instability (Sufian & Habibullah, 2010).

As most of the studies apparently ignored middle-income countries, this paper studies the bank performance in emerging Mexico, Indonesia, Nigeria, and Turkey (MINT) countries and the Middle East

and North Africa (MENA) region. The MENA region is known for its oil-rich economy, especially the ones in the Gulf Cooperation Council (GCC), but they lately started to transform their economies to a more market-based economy to avoid the negative impacts of the 2008 global crisis. MINT countries, which have a considerably stable economy due to vast reserves of petroleum, oil, and natural gas, are among the regions that attracted the authors' attention to study as no one explored them in previous studies. In addition, according to the researchers' knowledge, there have been no previous studies on bank performance and economic growth that compare bank profitability across three indicators (NIM, ROE and ROA).

1. LITERATURE REVIEW

Recently, the literature has focused on two basic pillars for any country to develop, namely bank performance and economic growth (Abduh & Omar, 2012), especially in developing countries. It is important to understand the causal relationship between these two pillars of a country; most studies stated that there is a supportive relationship between them (Bikker & Hu, 2002; Demirgüç-Kunt & Huizinga, 1999; Ledhem & Mekidiche, 2020). Abduh and Omar (2012) stated that according to the literature, there are three types of causal relationships between them, which are supply-leading, demand-following, and bi-directional causal relationships.

This research paper is basically supported by the financial intermediation theory, which assumes that the intermediary role a bank plays is essential in balancing the economy between lenders and borrowers (Yuksel et al., 2018). Based on the financial intermediation theory, banking institutions assume an intermediary role as they match savers and borrowers in the economy. Banks are considered a catalyst to develop the economy as they move funds from surplus spending units (SSUs) to deficit spending units (DSUs), and bank profitability is the difference in their interests. The paper also follows the Endogenous growth theory established by Romer in the 1980s and it assumes that when finance and bank performance enhance investments, this would lead to increased economic growth (Ledhem & Mekidiche, 2020).

The 2008 global financial crisis had a massive impact on the banking sector that originated from other factors, including assets, risks, capital, management, and financial leverage (Claessens & Horen, 2014). The literature had to dig for the financial crisis and measure the banks' performance considering different banking problems

and risks such as non-performing loans (NPLs), credit risks, and systematic risks. Souissi-Kachouri (2022) proved that NPLs significantly affect the economic growth in six MENA countries during the period 2000–2016. Jreisat and Bawazir (2021) who studied the determinants of bank profitability for the MENA region found that non-interest income (NII) had a significant positive impact on profitability; on the contrary, they found a negative impact on credit risk represented by NLP or low-quality loans on bank financial performance.

Jaouad and Lahsen (2018) clarified most factors according to the literature that affects bank performance positively are asset quality, liquidity, inflation, capital adequacy ratio (CAR), the efficiency of the management, and bank size. On the contrary, Kolapo et al. (2016) and Anarfi et al. (2016) found an insignificant relationship between bank size and its profitability.

Supply and demand sides of most banks have changed to reflect international challenges. The supply has changed to reflect government deregulations and technology, while customers have increased their demands' sophistication due to the technology rage, increased number of competitors, globalization, and price sensitivity (Chowdhury & Rasid, 2016). These rapid changes had a tremendous impact on the banking sector performance, and the methods used to measure it, however, profitability and solvency are the basic indicators for strong bank performance (Zhongming et al., 2019; Ledhem &Mekidiche, 2020). Accordingly, the indicators of bank performance are crucial for any economy and financial stability, where the performance of any bank is the main driver of its profitability from its operations (Trung, 2021).

The most common measures for bank profitability are the financial ratios, which are the quantitative

metrics used to interpret historical accounting values including return on assets (ROA) and return on equity (ROE) (Trung, 2021) to measure internal activities. One of the drawbacks of financial ratios is latency due to ignoring the market values of financial performance. Investors would prefer market-based performance measures such as firm value Tobin's Q (Nguyen et al., 2015).

The CAR required by Basel tries to reduce the risks associated with NPLs by ensuring that the bank has enough capital to operate and absorb any financial failures (Fatima, 2014). Banks' failures may lead to fractured loan relationships, frozen customer deposits, and shrinking credit lines in the company (Trung, 2021); to avoid these failures, the government and the central banks are highly supervising the performance of banks through strict policies and rules.

Bank performance is measured and evaluated by some measures such as CAMEL, PATROL, and ORAP. The PATROL model consists of five measures such as capital adequacy, profitability, credit quality, organization, and liquidity. PATROL concept is derived from the first three letters of the Italian word "Patrimonio", which means capital adequacy, and the first letter of each of "Rischioita" and "Redditivita", which mean profitability and credit risk, as well as the first letter of the word "Organizzazione", which means the organization, and the word "LIQUIDITA", which means liquidity (Al-Nuaimi, 2017). Another model, the Operational Risk Assessment. Process (ORAP), identifies the current level of operational risk in a bank.

CAMEL model has been used in the USA since 1979 (Roman & Sargu, 2013; Christopoulos et al., 2011) to measure financial performance and to predict failure, and then banks efficiently evaluate their operations and investment decisions (Ledhem & Mekidiche, 2020). CAMEL is an acronym for five major financial system parameters; capital adequacy (C), asset quality (A), management efficiency (M), earnings (E), and liquidity (L) (Wanke et al., 2016). CAMEL was initially adopted in 1979 by the Federal Financial Institution Examination Council; then in the USA in 1987 by the National Credit Union Administration. CAMEL is then extended to CAMELS to include a sixth parameter, which is the sensitivity to the market risk (S)

(Roman & Sargu, 2013) such as interest rate, inflation risk, and foreign exchange (Karim et al., 2018; Gasbarro et al., 2002). It is recommended by the World Bank and the International Monetary Fund (IMF) to use CAMELS in measuring financial system stability (Ledhem & Mekidiche, 2020).

There is a rich literature on bank performance measurement that takes into consideration internal and external factors (Jaouad & Lahsen, 2018). Internal variables are operating variables affecting a bank from the inside, while external variables are the external and macroeconomic factors that affect banks' performance and operation. Jaouad and Lahsen (2018) indicated that financial market concentration is from the external factors affecting performance, while real gross domestic product (GDP) growth and inflation are from the macroeconomic conditions. On the other side, Souissi-Kachouri (2022) who studied the impact of corruption on bank performance and economic growth, could prove that corruption affects economic growth.

In the next section, the research digs in the literature that studied the relationship between macroeconomic factors and bank performance; this relationship has always been an issue of debate. There are enormous studies that indicated the factors and determinants of the bank performance, and they used different measures developed over past decades.

Some studies investigated this relation from both sides, impact of financial and banking sector performance on economic growth, and vice versa. The attention was to the developed or developing countries, with no evidence for the middle-income counties, however, there is plenty of literature that examined this relationship in MENA region, but there is shortage regarding MINT region.

MENA region is a bridge between Asia and Europe, and it consists of 28 countries (Jreisat & Bawazir, 2021), including Algeria, Egypt, Bahrain, Jordan, Kuwait, Iran, Iraq, Morocco, Libya, Lebanon, Syria, Oman, Qatar, Saudi Arabia, Yemen, Tunisia, and the United Arab Emirates. The MENA region is developing very fast, and its economy is significantly increasing with GDP jumped from 4% to 6% in the late 14 years due to the global oil prices increase. This higher GDP led to higher profitabil-

ity for banks across the MENA region (Jreisat & Bawazir, 2021).

Some of the MENA region countries have major economic reforms for financial liberty such as Egypt, Tunisia, Jordan, and Morocco (Naceur & Omran, 2011). Although Egypt is one of the MENA region countries and has undergone a lot of financial reforms, it appears to have the least economic and financial development when compared to GCC countries (Omran, 2007). Naceur et al. (2009) refer to the nature of the banking industry in Egypt which commonly consists of both state-controlled specialized banks and family-owned banks.

The Jordanian government has faced some difficulties as well since the 1988–1989 currency depreciation crisis. The Jordan government started a stabilization program for financial restructuring, and the banking law 2000 was enacted. Jordan has removed the foreign investment limits and enabled banks to provide financial consolation and investment portfolio services (Jreisat & Bawazir, 2021).

Morocco is one of the MENA region countries in which the literature has paid much attention to its bank performance. Jaouad and Lahsen (2018) summarized the determinants behind bank profitability and performance in Morocco are the volume of loans distributed, bank size capitalization, financing costs, operational efficiency, credit quality, short-term, long-term, and funding liquidity, deposits, and foreign direct investments, macro-financial conditions such as capital market development and banking industry concentration, macroeconomic conditions such as GDP per capita growth and inflation.

The MINT term was announced in 2014 for the 4 countries that were selected by Fidelity Investments in 2011 due to their expected strong economic growth and investment returns in the next decades. The authors could recognize only one study in MINT region; Morakinyo and Sibanda (2016) who examined bank performance determinants and their relationship with economic growth using the Generalized Method of Moments (GMM) model with both of its two effects – fixed and random. Morakinyo and Sibanda (2016) found a positive impact of corruption, CAR, liquidity ratio,

total bank credit, and ROA on the banks' performance, and they found a negative relationship between GDP growth rate and ROA.

Most of the literature relied on ROA and ROE as proxies for the profitability of banks (Tabash & Dhankar, 2014; Ledhem & Mekidiche, 2020). NIM is used to measure the effectiveness of investments to debt in the banking sector. From studies that examined the relationship between bank profitability and economic growth in MENA region is Naceur and Ghazouani (2007) who examined the relationship in 11 MENA region countries using a dynamic panel model with GMM estimators over the period of 1979–2003. Naceur and Ghazouani found a negative relationship and they related these results to the MENA region's underdeveloped financial systems. Naceur and Ghazouani recommended for more improvement in the MENA financial system functioning and institutional economics. In the same line, F. Ceylan and I. Ceylan (2020) found that bank profitability in 4 countries out of the 8 selected samples (Russia, Turkey, Chile, and Poland) enhances economic growth. They studied eight countries which are Argentina, Turkey Chile, India, Russia, Brazil, Croatia, and Poland using a Panel causality in the period of 2009–2018.

Moreover, Bolbol et al. (2005) studied the impact of the banking sector on economic growth for Egypt's financial system as one of the MENA region countries during the period from 1974 to 2002. The results showed that there is a negative relation between them.

Among the studies that examined the impact of macroeconomic factors on bank performance is Jaouad and Lahsen's (2018) study that investigated the financial statement of 6 Moroccan banks from 2010–2016 to clarify the impact of macroeconomic conditions, the structure of the financial market, bank characteristics, and bank governance on the bank performance (ROA and ROE) using panel data method. They concluded that operating management efficiency is negatively related to a bank's performance, and bank size is positively related.

Another study that examined the impact of economic growth measured by GDP per capita on the bank performance and on ROA and ROE in

15 West African countries using panel data from the period 1996 to 2017 is Zhongming et al. (2019) study. They found that economic growth and all the control variable – inflation, interest rate, government effectiveness, and corruption – affect performance significantly. In the same line was Obiora et al. (2022) who investigated 23 Sub-Saharan Africa (SSA) countries and 14 developed countries between 1981 and 2018 using general least squares. Obiora et al. found that SSA countries face some issues regarding the deposit rate declines and real interest rates increase rather than developed countries and that economic development has a positive impact on commercial bank lending, lending rates, domestic credit amounts to the private sector (DCPS), and decreased NPLs.

Among the studies that used the GMM approach to reveal the effect of economic factors on bank performance is Al-Jafari and Alchami (2014) who found that there is an effect for the inflation rate (INF) on bank profitability in Syrian banks. Another study is Yuksel et al. (2018) who found a positive relationship between profitability measured by NII and economic growth in 13 post-Soviet countries from 1996 to 2016. Ledhem and Mekidiche (2020) used GMM and CAMELS method to assess the relationship between the financial performance of Islamic finance and GDP in all Islamic banks in 5 countries (Brunei, Turkey, Malaysia, Indonesia, and Saudi Arabia) from 2014 to 2018. They found that profitability (ROE) affects economic growth significantly. Kassim (2015) assessed and proved the relationship between Islamic banks and the industrial production index (IPI) as a proxy for the economic growth of all Islamic banks in Malaysia from 1998 to 2013. Besides, Boukhatem and Moussa (2018) proved the relationship between the Islamic financial system and GDP in the MENA region using panel analysis from 2000–2014. The bank performance was measured by loans by Islamic banks/GDP. They used other variables such as government consumption/GDP, domestic credits to the private sector/GDP, rule of law, education, trade openness, inflation, and regulatory quality.

There are tremendous studies that examined bank performance through CAMEL approach. Altan et al. (2014) compared between 3 State-Owned and 12 Private-Owned Turkish banks from the period 2005 to 2012 using CAMEL 23 ratios, and they found that there is a significant difference between performance of the two types in Turkish banking system. Another study is Trung (2021) who used the CAMEL model and the System Generalized Method of Moments (SGMM) to study the bank performance in Vietnamese commercial banks from 2009 to 2020. Trung found a relationship between bank performance and ownership structure. Some studies used CAMEL to compare Islamic and conventional banks (Rashid & Jabeen, 2016; Rashid et al. 2015; Karim et al., 2018; Rozzani & Rahman, 2013), while other studies compared between pre- and post-financial crisis using CAMELS to measure the bank performance development (Rodica-Oana, 2014).

Most literature adopted Autoregressive distributed lag (ARDL) (Yazdan & Sadr, 2012; Kassim, 2015; Trianto et al., 2021) to study the impact of financial development of banks using CAMEL on economic growth through the macroeconomic level of the countries. ARDL is the most reliable model, but it cannot be controlled (Easterly & Levine, 2001).

This paper aims to study the impact of both bank performance and economic growth on bank profitability in 8 middle-income countries from MENA region and MINT countries using the GMM model where bank performance is measured by the CAMEL model and economic growth is measured by GDP growth. According to the previous literature review and the paper aim, the following hypotheses are to be tested:

H1:   There is a positive relationship between Bank performance and Bank profitability in middle-income countries.

H1a: There is a positive relationship between CAMEL rating indicators and ROA in middle-income countries.

H1b: There is a positive relationship between CAMEL rating indicators and ROE in middle-income countries.

H1c: There is a positive relationship between CAMEL rating indicators and NIM in middle-income countries.

H2: There is a positive relationship between Economic Growth and Bank profitability in middle-income countries.

H2a: There is a positive relationship between GDP growth rate and ROA in middle-income countries.

H2b: There is a positive relationship between GDP growth rate and ROE in middle-income countries.

H2c: There is a positive relationship between GDP growth rate and NIM in middle-income countries.

2. METHOD

CAMEL model is used to measure a bank's performance and efficiency. As shown in Figure1; CAMEL model is used to measure performance in many works of literature. CAMEL ratios used are CAR (C), Asset quality (A), Cost to income management (M), and Liquidity asset ratio (L), while the Earnings (E) variable is missing in the World Bank financial indicators and is excluded from the model. Regarding studying the economic indicators and according to most literature; GDP growth rate is used rather than GDP per capita. ROA, NIM, and ROE are used to measure banks' profitability. The control variables – inflation rate (INF) and gross capital formation (GCF) – are used to link the financial development

of banks to economic growth by depending on gross capital formation and inflation rate to avoid price instability (Kassim, 2015).

MINT and MENA regions' countries are selected for their World Bank classification as emerging economies ranging from lower to higher middle-income countries. In these two regions, eight countries are considered middle-income countries and are expected to reach high growth rates in all fields according to the World Bank. Four countries from MENA region are selected such as Egypt, Algeria, Jordan, and Morocco because they have embarked on major financial reforms, and their banking development experience is remarkable to be investigated to other developing countries in the same stage of financial development. The all four MINT countries which are Mexico, Indonesia, Nigeria, and Turkey are taken in the paper. Countries that lack information due to political and war conditions are ignored in this paper.

The sample period ranges from 2000 to 2020, and the data were extracted from the World Bank financial indicators and the World Bank database. Table 1 illustrates the variables and their measures. All the variables used are logged due to the difference between them as some are expressed in percentages such as inflation, GDP growth rate, and gross capital formation as a percentage of GDP.

To determine the model that will be adopted to examine the integration between economic growth and bank performance, static GMM method is used
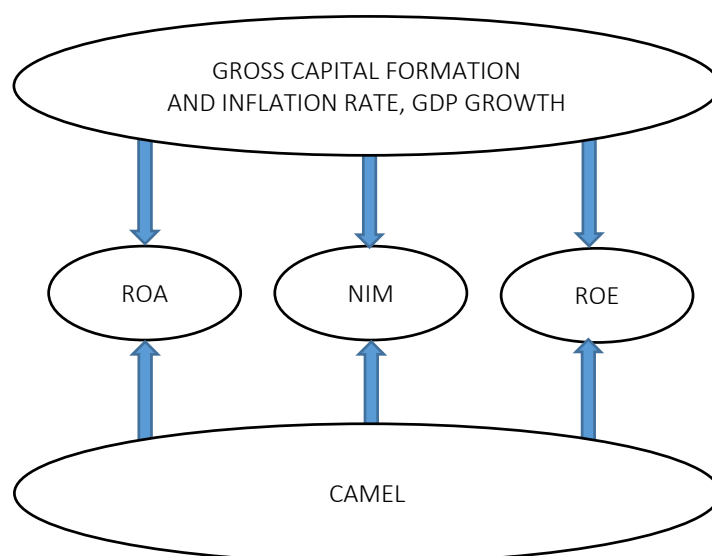

Figure 1. Proposed model

Table 1. Variables and measures

Variable			Symbol	Formula	Source
Dependent variables					
Y_1	Bank profitability	Return on assets	ROA	Net income after taxes/Total assets	World Bank financial indicators
Y_2		Return on equity	ROE	Net income after taxes/(Total equity)	
Y_3		Net interest margin	NIM	Net interest income/(Total assets)	
Independent variables					
X_1	Economic growth	GDP growth rate	GDP	the rate of change in GDP = (Real GDP new − Real GDP old)/(Real GDP old)	World Bank Database
X_3	CAMEL Model	C: Capital Adequacy Ratio	CAR	Total regulatory capital/(Risk-weighted assets)	World Bank financial indicators
X_4		A: Asset Quality	Asset	Gross non-performing financing/(Total financing)	
X_2		M: Cost to income management	MNG	Operating cost/(Gross income)	
X_5		L: Liquidity Asset Ratio	LIQ	Liquid assets/(Total assets)	
Control variables					
X_6	Macroeconomic indicators	Inflation rate	INFL	Inflation rate using the consumer price index = (CPInew − CPIold)/CPIold	World Bank Data
X_7		Gross capital formation	GCF	Fixed assets + (Change in inventories)	

according to literature (Tabash & Dhankar, 2014; Chowdhury & Rasid, 2016; Banto & Monsia, 2021) as elaborated from Figure 1. Thus, this can be explained by depending on the following models 1, 2, and 3:

Model 1:

$$\ln ROA = a_0 + a_1 \ln GDP + a_2 \ln CAR + {}\\ + a_3 \ln ASSET + a_4 \ln MNG + a_5 \ln LIQ + {}\\ + a_6 \ln INFL + a_7 \ln GCF + \varepsilon_t, \quad (1)$$

Model 2:

$$\ln ROE = a_0 + a_1 \ln GDP + a_2 \ln CAR + {}\\ + a_3 \ln ASSET + a_4 \ln MNG + a_5 \ln LIQ + {}\\ + a_6 \ln INFL + a_7 \ln GCF + \varepsilon_t, \quad (2)$$

Model 3

$$lnNIM = a_0 + a_1 lnGDP + a_2 lnCAR + {}\\ + a_3 lnASSET + a_4 lnMNG + a_5 lnLIQ + {}\\ + a_6 lnINFL + a_7 lnGCF + \varepsilon_t. \quad (3)$$

To test the relationship between bank profitability and economic growth in middle-income countries, the GMM test is used after applying the unit root test depending on R-4.3.1 statistical software. GMM helps in using lagged variables in dependent and independent variables (Ledhem & Mekidiche, 2020) and it controls the unobserved heterogene-

ity in different effects- whether fixed or random (Arellano & Bover, 1995).

The unit root test depends on Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) as illustrated in Appendix A to examine GMM. Therefore, equations 3 and 4 can be developed to adopt GMM in equations 3, 4, and 5.

$$\ln ROA = a_0 + \sum_{i-0}^{p} a_1 \Delta \ln GDP + {}\\ + \sum_{i-1}^{q1} a_2 \Delta \ln CAR + \sum_{i-1}^{q2} a_3 \Delta \ln ASSET + {}\\ + \sum_{i-1}^{q3} a_4 \Delta \ln MNG + \sum_{i-1}^{q4} a_5 \Delta \ln LIQ + {}\\ + \sum_{i-1}^{q5} a_6 \Delta \ln INFL + \sum_{i-1}^{q6} a_7 \Delta \ln \ln GCF + \varepsilon_t, \quad (3)$$

$$\ln ROE = a_0 + \sum_{i-0}^{p} a_1 \Delta \ln GDP + {}\\ + \sum_{i-1}^{q1} a_2 \Delta \ln CAR + \sum_{i-1}^{q2} a_3 \Delta \ln ASSET + {}\\ + \sum_{i-1}^{q3} a_4 \Delta \ln MNG + \sum_{i-1}^{q4} a_5 \Delta \ln LIQ + {}\\ + \sum_{i-1}^{q5} a_6 \Delta \ln INFL + \sum_{i-1}^{q6} a_7 \Delta \ln \ln GCF + \varepsilon_t, \quad (4)$$

$$\ln NIM = a_0 + \sum_{i-0}^{p} a_1 \Delta \ln GDP + {}\\ + \sum_{i-1}^{q1} a_2 \Delta \ln CAR + \sum_{i-1}^{q2} a_3 \Delta \ln ASSET + {}\\ + \sum_{i-1}^{q3} a_4 \Delta \ln MNG + \sum_{i-1}^{q4} a_5 \Delta \ln LIQ + {}\\ + \sum_{i-1}^{q5} a_6 \Delta \ln INFL + \sum_{i-1}^{q6} a_7 \Delta \ln \ln GCF + \varepsilon_t. \quad (5)$$

3. RESULTS

Descriptive data are used to study the main features of the variables as shown in Table 2. On average, the highest mean was experienced in cost-to-income management with 53.88 and a positive mean for all variables. Also, the maximum of them was experienced in cost to income management at 202.04 and the minimum at ROE with –37.47.

Moreover, the correlation between the variables is tested in the two models as depicted in Table 3 using the KAO integration test. Whether the ROA (model 1) or ROE (model 2) or NIM (model 3) was significant implying the lack of multicollinearity between the variables. Model 1 depends on ROA as a dependent variable, while model 2 depends on ROE as a dependent variable, and NIM is the dependent variable in model 3.

The results of unit root tests were conducted by ADF and PP tests. Appendix A shows the correlation at all levels whether I (0) or I (1) except LIQ, and GCF are significant at the first level only. Appendix B conducts the results of GMM tests depending on fixed, random, and with no effects for the proposed three models. In model 1 where ROA is the dependent variable, there are strong relationships with GDP growth rate, CAR, MNG, and inflation rate. The Inflation rate was not significant except in random effect at 10%. Significant relationships were observed between ROA and MNG at 1%, ROA and CAR at 5%, and ROA and inflation rate (INFL) at 1%. This implies that the GDP growth rate, CAR, MNG, and inflation rate are the main determi-

nants of bank performance when using ROA as a proxy for performance.

While in model 2, there is a significant relationship between ROE, GDP growth rate, CAR, and inflation rate at 1%. Also, significant relationships were found between ROE and asset management at 5%. These results are consistent with Bourke (1989) and Tabash (2019) who found that banks with high profitability (ROE) experience high growth rates.

Finally, in model 3 depending on NIM as profitability indicator, all variables were significant except the GDP growth rate in both effects whether fixed or random. All variables – except GDP growth rate – have a significant positive relationship at 5% or 1%, except the inflation rate and CAR have negative impact. These results support the notion that higher inflation rates lead to lower NIM and match Dietrich and Wanzenried (2013) results.

Moreover, GMM was conducted on a regional level for the three models in Table 4 to compare between MINT and MENA countries on regional levels. By applying ROA (model 1) as a proxy for bank performance, GDP growth rate, and CAR, and asset quality are positively significant in the MINT region, while inflation rate and MNG are significantly negative. For MENA region, GDP growth rates, and CAR are positively significant, while asset quality, MNG and liquidity are significantly negative.

But by applying ROE (model2), the GDP growth rate is the only positively significant variable and

Table 2. Descriptive data

Descriptive Analysis	ROA	LIQ	GDP	CAP	AST	GCF	INF	NIM	MNG	ROE
Mean	1.123	40.648	4.301	16.63	12.547	26.303	7.584	18.807	53.88	12.632
Median	1.1873	33.533	4.42	16.575	6.7	25.015	5.372	20.685	51.513	11.811
Max	3.8	145.3076	15.329	30.9	65.306	50.780	54.915	65.30	202.04	34.09
Min	−23.25	9.3175	−5.75	1.75	1.5	13.643	−8.76	1.253	26.649	−37.47
N	150	150	150	150	150	150	150	150	150	150

Table 3. KAO Co-integration results

KAO Co-integration test	All variables	Model 1	Model 2	Model 3
t-statistics	−4.027702***	−3.939496***	−3.135482***	−3.833955***

Note: ***significant at 1%, ** significant at 5%, * significant at 10%.

Table 4. Regional GMM results

Variable	MINT			MENA		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
GDP	0.1373***	1.1565**	−0.0311	0.0344**	0.2948	0.0130
CAR	0.0724**	0.19725	−0.2978	0.0294***	−0.2458**	0.0782***
ASSET	0.02001*	0.1030	0.1905***	−0.0251***	−0.0585	−0.0444***
MNG	−0.07563**	−0.0456	0.1278***	−0.0176***	−0.2597***	−0.00123
LIQ	0.00753	−0.0519	0.1915***	−0.00524**	0.0628	−0.0449***
GCF	−0.0497	0.06106	0.0111	0.0044	0.01651	0.0122
INFL	−0.0437***	−0.346***	−0.2407***	−0.00093	0.1189***	0.0198
C	4.906**	10.2363	20.88***	1.6532***	24.710***	3.4873***

Note: ***significant at 1%, ** significant at 5%, * significant at 10%.

inflation rate is significantly negative in MINT but in MENA, CAR and MNG are significantly negative, and INF is positively significant. Finally, by using NIM (model 3), asset management, liquidity, and MNG are significantly positive, and inflation rate is negatively significant in MINT. While asset management, liquidity, and asset ratio are significantly negative, and CAR is the only positively significant in the MENA region. The results showed that GCF is not significant in middle-income countries in both regions.

The results strongly link bank profitability to macroeconomic changes and GDP changes when ROA, ROE, and NIM are used as proxies for measuring profitability. The results from conducting GMM found that there is a significant relationship between profitability and the independent variables, bank performance, GDP growth rates, and inflation rates, in middle-income countries of MINT and MENA regions. By applying a two-step GMM panel test, NIM was insignificant – in many variables – compared to ROA and ROE. Table 5 illustrates the results and connects them to the research paper hypotheses and literature.

Taking the middle-income countries in the MENA and MINT regions as a whole using GMM model, the results support the financial intermediation theory regarding model 1 results that show a positive significant impact for GDP growth rate, and CAR that comes with the findings of Rahman et al. (2015) and Trung (2021), and a negative impact for MNG. Model 2 shows a significant impact for GDP growth rate, CAR, and inflation rate only. The coefficients of inflation rate in both models are negative, which shows a negative or inverse significant relationship with both ROA and ROE. In model 2,

the GDP growth rate has a positive significant relationship with ROE that is consistent with Sufian and Habibullah (2009). NIM in model 3 has an insignificant relationship with all variables except CAR, and LIQ, and a negative impact for MNG.

In terms of economic growth, there is a significant relationship between economic growth with ROA in MENA and MINT, and with ROE in MINT countries only. The relationship between economic growth and ROE is insignificant in MENA countries. NIM has no relationship with economic growth.

The effect of the CAMEL indicators is not significant with ROA and ROE except for CAR. CAR was significant at 5% in the middle-income countries in the MENA and MINT regions. For the macroeconomic indicators control variables, INFL is significant with both ROE and ROA at 5% in most effects, but GCF is not significant with all variables. In comparing between MINT and MENA regions, the determinants that affect profitability the most is GDP growth rate. Accordingly, *H1a*, *H1b*, and *H1c*, are partially accepted. *H2a* and *H2b* are accepted, and *H2c* is rejected.

Regarding MINT region, by applying ROA as a proxy for bank profitability, GDP growth rates, inflation rate, asset, and CAR are the main determinants of bank performance, and by applying ROE (model 2), GDP growth rate, and inflation rate are the only determinants. Finally, by using NIM (model 3), asset management, MNG, liquidity, and GDP are the main determinants. Accordingly, *H1a* and *H1c* are partially accepted. *H2a* and *H2b* are accepted, and *H1b* and *H2c* are rejected.

Table 5. Summary of the hypotheses and results from the model

Hypotheses	Results from GMM tests depend on fixed, random, and with no effects for the proposed three models	Results from the Model GMM conducted on a regional level in MINT	Results from the Model GMM conducted on a regional level in MENA	Consistency with previous studies
H1: There is a positive relationship between Bank performance and Bank profitability				
H1$_a$: There is a positive relationship between CAMEL rating indicators and ROA in middle-income countries	There are significant positive relationships between ROA and CAR	There are significant positive relationships between ROA and CAR and asset	There are significant positive relationships between ROA and CAR	Ledhem and Mekidiche (2020), Zagherd and Barghi (2017)
	H1a **is partially ACCEPTED**			
H1b: There is a positive relationship between CAMEL rating indicators and ROE in middle-income countries	there is a significant positive relationship between ROE and CAR	there is no significant positive relationship between ROE and *CAMEL rating indicators*	There is no significant positive relationship between ROE and *CAMEL rating indicators*	Trung (2021), Ledhem and Mekidiche (2020)
	H1b **is partially ACCEPTED**	*H1b* **is REJECTED**		
H1c: There is a positive relationship between CAMEL rating indicators and NIM in middle-income countries	There are significant positive relationships between NIM and CAR, MNG, and liquidity	There are significant positive relationships between NIM, and asset management, MNG, and liquidity	There are significant positive relationships between NIM and CAR	Samhan and Al-Khatib (2015)
	H1c **is partially ACCEPTED**			
H2: There is a positive relationship between Economic Growth and Bank profitability				
H2$_a$: There is a positive relationship between GDP growth rate and ROA in middle-income countries	There is a significant positive relationship between ROA and GDP growth rate.	There is a significant positive relationship between ROA and GDP growth rate	There is a significant positive relationship between ROA and GDP growth rate	Yazdan and Sadr (2012), Khediri and Ben-Khedhiri (2009)
	H2a **is ACCEPTED**			
H2$_b$: There is a positive relationship between GDP growth rate and ROE in middle-income countries	There is a significant positive relationship between GDP growth rate and ROE	There is a significant positive relationship between GDP growth rate and ROE	There is no significant positive relationship between GDP growth rate and ROE	Yazdan and Sadr (2012), Yuksel et al. (2018), Souissi-Kachouri (2020)
	H2b **is ACCEPTED**	*H2b* **is Rejected**		
H2$_c$: There is a positive relationship between GDP growth rate and NIM in middle-income countries	There is insignificant relationship between GDP growth rate and NIM	There is insignificant relationship between GDP growth rate and NIM	There is insignificant relationship between GDP growth rate and NIM	Morakinyo and Sibanda (2016), Talbi and Bougatef (2018)
	H2c **is REJECTED**			

Regarding MENA region, it is found that when ROA is taken in model 1, GDP growth rates, and CAR are the main significant determinants. By applying ROE (model 2), there is no relationship with any of CAMEL variables as well as GDP, the INF was significantly positive to Bank Profitability. For NIM (model 3), CAR was the only determinant. Accordingly, *H1a* and *H1c* are partially accepted. *H2a* is accepted, and *H1b*, *H2b*, and *H2c* are rejected.

CONCLUSION

This paper aims to examine the impact of both bank performance and economic growth on bank profitability (measured by ROA or ROE or NIM) in middle-income countries in MENA and MINT regions during the period 2000 to 2020. Bank performance is measured by CAMEL indicators, and economic growth is measured by GDP growth.

Regarding CAMEL model, for MINT region, ROA is affected most by both asset management and CAR assets, while NIM is affected by asset management, liquidity, and MNG. There is no relationship found between ROE and bank performance in MINT. Results show that in MENA region, both ROA and NIM are affected most by CAR, and negatively related to asset management, MNG, and liquidity asset ratio while ROE is affected negatively by MNG and CAR.

Regarding the CAMEL accounting method for middle-income countries, these results show that the MENA and MINT banks have sufficient capital (CAR) at all levels. MINT countries show higher asset quality (ratio of non-performing financing to total financing), stronger income management (cost to income management ratio), and much more enough liquidity (liquidity ratio) to face different risks that might affect the whole industry profitability through years 2000 to 2020 with ignoring the impact of COVID-19 on the banking industry. The effectiveness of investments to debt in the banking sector (NIM) is significantly related to most CAMEL determinants. The results show strong and active capital, increment in assets, credits, and deposits, and enhancement in bank profitability is reflected in economic growth progress.

Regarding the economic results, economic growth affects the banking industry profitability (ROA and ROE) in both MINT and MENA regions. Thus, MENA and MINT regions are restructuring very well and are supposed to develop within the next few years as expected. It is predictable for their economy and banking industry to grow quickly. Inflation has a significant negative impact in MINT, and in contrast, has no significance in MENA region. It is recommended for their banks to decrease their credit, increase their investments, and increase their net interest income, and net non-interest income. No relationship was found between investment effectiveness (NIM) and economic growth. The increase in bank profitability (using ROA, ROE, and NIM) is an indicator for how healthy development the MENA and MINT banks are showing. These results enhance banks to increase their performance to cope with economic growth as explained by Yazdan and Sadr (2012).

The results imply some implications. Firstly, regarding the important role of the banking industry and investment in economic prosperous in middle-income countries, the governments should encourage the role of banks and provide them with more flexible policies to enhance the economy. Secondly, according to the fifth industrial revolution, it is recommended for banks to use technology beside human capital resources to increase the access of financial services and to decrease the problem of unemployment.

The generalization of this paper results is limited to the use of ICT and bank profitability although financial inclusion is adopted in many countries and especially the middle-income ones. The paper did not consider the impact of either COVID-19 or technology on the banking industry. The research ignored the impact of earnings on profitability due to missing data, and it is recommended to be considered further. Different bank classifications are not taken either. It is recommended for further studies to deeply dig into the impact of the Islamic factor on the performance and economic factors and to compare between privately held and publicly held banks. For further studies, it is beneficial to compare between small and large banks' performance and how this would affect economic growth taking into consideration external determinants of bank performance.

AUTHOR CONTRIBUTIONS

Conceptualization: Zakia Abdelmoneim, Mai Yasse.
Data curation: Mai Yasse.
Formal analysis: Zakia Abdelmoneim, Mai Yasse.
Funding acquisition: Zakia Abdelmoneim, Mai Yasse.
Investigation: Zakia Abdelmoneim, Mai Yasse.
Methodology: Zakia Abdelmoneim, Mai Yasse.
Project administration: Zakia Abdelmoneim, Mai Yasse.
Resources: Zakia Abdelmoneim, Mai Yasse.
Software: Zakia Abdelmoneim, Mai Yasse.
Supervision: Zakia Abdelmoneim, Mai Yasse.
Validation: Zakia Abdelmoneim, Mai Yasse.
Visualization: Zakia Abdelmoneim, Mai Yasse.
Writing – original draft: Zakia Abdelmoneim, Mai Yasse.
Writing – reviewing & editing: Zakia Abdelmoneim.

REFERENCES

1. Abduh, M., & Omar, M. A. (2012). Islamic Banking and Economic Growth: The Indonesian Experience. *International Journal of Islamic and Middle Eastern Finance and Management, 5*(1), 35-47. https://doi.org/10.1108/17538391211216811

2. Al-Jafari, M. K., & Alchami, M. (2014). Determinants of Bank Profitability: Evidence from Syria. *Journal of Applied Finance and Banking, 4*(1), 17. Retrieved from http://www.scienpress.com/Upload/JAFB%2FVol%204_1_2.pdf

3. Al-Nuaimi, Saad Allah M.O. (2017). Evaluating the Performance of Banks Using the PATROL Model, An Analytical Study of a Sample of Iraqi Private Banks. *Tikrit Journal of Administrative and Economic Sciences, 13*(39), 319-351. Retrieved from https://www.iasj.net/iasj/download/af4233e-5b3a4b99e

4. Altan, M., Yusufazari, H., and Bedük, A. (2014). Performance Analysis of Banks in Turkey Using Camel Approach Introduction. *Proceedings 14th International Academic Conference.* Malta. Retrieved from https://ideas.repec.org/p/sek/iacpro/0902916.html

5. Anarfi, D., Abakah, E. J. A., & Boateng, E. (2016). Determinants of Bank Profitability in Ghana: New Evidence. *Asian Journal of Finance & Accounting, 8*(2), 194-204. https://doi.org/10.5296/ajfa.v8i2.10274

6. Arellano, M., & Bover, O. (1995). Another Look at The Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics, 68*(1), 29-51. https://doi.org/10.1016/0304-4076(94)01642-d

7. Banto, J., & Monsia, A. (2021). Microfinance Institutions, Banking, Growth and Transmission Channel: A GMM Panel Data Analysis from Developing Countries. *Quarterly Review of Economics and Finance, 79,* 126-150. https://doi.org/10.1016/j.qref.2020.06.004

8. Bikker, J. A., & Hu, H. (2002). Cyclical Patterns in Profits, Provisioning and Lending of Banks and Procyclicality of the New Basel Capital Requirements. *PSL Quarterly Review*, 55(221), 143-175. Retrieved from https://rosa.uniroma1.it/rosa04/psl_quarterly_review/article/view/9907

9. Bolbol, A., Fatheldin, A., & Omran, M. (2005). Financial Development, Structure, And Economic Growth: The Case of Egypt, 1974–2002. *Research in International Business and Finance, 19*(1), 171-194. https://doi.org/10.1016/j.ribaf.2004.10.008

10. Boukhatem, J., & Moussa, F. B. (2018). The effect of Islamic banks on GDP growth: Some evidence from selected MENA countries. *Borsa Istanbul Review, 18*(3), 231-247. https://doi.org/10.1016/j.bir.2017.11.004

11. Bourke, P. (1989). Concentration and Other Determinants of Bank Profitability in Europe, North America, and Australia. *Journal of Banking & Finance, 13*(1), 65-79, https://doi.org/10.1016/0378-4266(89)90020-4

12. Ceylan, F., & Ceylan, I. (2020). Does Bank Profitability Promote Economic Growth and Vice Versa? Panel Causality Evidence from The Selected Countries. *Proceedings of The Third Economics, Business and Organization Research (Ebor) Conference* (pp. 105-115). Rome, Italy. Retrieved from https://dergipark.org.tr/tr/download/article-file/1468727

13. Chowdhury, M. A. F., & Rasid, M. E. S. M. (2016), Determinants of Performance of Islamic Banks in GCC Countries: Dynamic GMM Approach. In D. S. Mutum, M. M. Butt, and M. Rashid (Ed.), *Advances in Islamic Finance, Marketing, And Management* (pp. 49-80). Bingley: Emerald Group Publishing Limited. https://doi.org/10.1108/978-1-78635-899-820161005

14. Christopoulos, A. G., Mylonakis, J., & Diktapanidis, P. (2011). Could Lehman Brothers' Collapse Be Anticipated? An Examination Using CAMELS Rating System. *International Business Research, 4*(2), 11-19. https://doi.org/10.5539/ibr.v4n2p11

15. Claessens, S., & Horen, N. V. (2015). The Impact of the Global Financial Crisis on Banking Globalization. *IMF Economic Review, 63*(4), 868-918. Retrieved from http://www.jstor.org/stable/24738127

16. Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence. *World Bank Economic Review, 13*(2), 379-408. http://dx.doi.org/10.1093/wber/13.2.379

17. Dietrich, A., & Wanzenried, G. (2013). The Determinants of Commercial Banking Profitability in Low-, Middle-, and High-Income Countries. *The Quarterly Review of Economics and Finance, 54*(33), 337-354. https://doi.org/10.1016/j.qref.2014.03.001

18. Easterly, W., & Levine, R. (2001). What Have We Learned from A Decade of Empirical Research on Growth? It's Not Factor Accumulation: Stylized Facts and Growth Models. *The World Bank Economic Review, 15*(2), 177-219. https://doi.org/10.1093/wber/15.2.177

19. Fatima, N. (2014). Capital Adequacy: A Financial Soundness Indicator for Banks. *Global Journal of Finance and Management, 6*(8), 771-776. Retrieved from www.ripublication.com/gjfm-spl/gjfmv6n8_12.pdf

20. Gasbarro, D., Sadguna, I. G. M., & Zumwalt, J. K. (2002). The Changing Relationship Between CAMEL Ratings and Bank Soundness During the Indonesian Banking Crisis. *Review of Quantitative Finance and Accounting, 19*(3), 247-260. https://doi.org/10.1023/A:1020724907031

21. Jaouad, E., & Lahsen, O. (2018). Factors Affecting Bank Performance: Empirical Evidence from Morocco. *European Scientific*

Journal, 14(34), 255-267. https://doi.org/10.19044/esj.2018.v14n34p255

22. Jreisat, A., & Bawazir, H. (2021). Determinants of Banks Profitability in The Middle East and North Africa Region. *The Journal of Asian Finance, Economics, and Business, 8*(6), 701-711. https://doi.org/10.13106/jafeb.2021.vol8.no6.0701

23. Karim, N. A., Alhabshi, S. M. S. J., Kassim, S., & Haron, R. (2018). Measuring Bank Stability: A Comparative Analysis Between Islamic and Conventional Banks in Malaysia. *Proceedings of The 2nd Advances in Business Research International Conference* (Pp. 169-177). Springer. https://doi.org/10.1007/978-981-10-6053-3_16

24. Kassim, S. (2015). Islamic Finance and Economic Growth: The Malaysian Experience. *Global Finance Journal, 30,* 66-76. https://doi.org/10.1016/j.gfj.2015.11.007

25. Khediri, K. B., & Ben-Khedhiri, H. (2009). Determinants of Islamic bank profitability in the MENA region. *International Journal of Monetary Economics and Finance, 2*(3/4), 409-426. https://doi.org/10.1504/ijmef.2009.029072

26. Kolapo, F., Ajayi, L., & Aluko, O. (2016). How Is Size Related to Profitability? Post-Consolidation Evidence from Selected Banks in Nigeria. *International Journal of Finance & Banking Studies, 5*(4), 30-38. https://doi.org/10.20525/ijfbs.v5i4.592

27. Ledhem, M. A., & Mekidiche, M. (2020). Economic Growth and Financial Performance of Islamic Banks: A CAMELS Approach. *Islamic Economic Studies, 28*(1), 47-62. https://doi.org/10.1108/ies-05-2020-0016

28. Morakinyo, A. E., & Sibanda, M. (2016). The Determinants Of Non-Performing Loans In The MINT Economies. *Journal of Economics and Behavioral Studies, 8*(5), 39-55. https://doi.org/10.22610/jebs.v8i5(j).1430

29. Naceur, S. B., & Ghazouani, S. (2007). Stock Markets, Banks, and Economic Growth: Empirical Evidence from The MENA Region. *Research in International Business and Finance, 21*(2), 297-315. https://doi.org/10.1016/j.ribaf.2006.05.002

30. Naceur, S. B., & Omran, M. (2011). The Effects of Bank Regulations, Competition, and Financial Reforms on Banks' Performance. *Emerging Markets Review, 12*(1), 1-20. https://doi.org/10.1016/j.ememar.2010.08.002

31. Naceur, S. B., Ben-Khedhiri, H., & Casu, B. (2009). *What Drives the Efficiency of Selected MENA Banks? A Meta-Frontier Analysis* (Working Papers No. 499). Economic Research Forum. Retrieved from https://www.academia.edu/4863343/WHAT_DRIVES_THE_EF-FICIENCY_OF_SELECTED_MENA_BANKS_A_META_FRONTIER_ANALYSIS

32. Nguyen, T., Locke, S., & Reddy, K. (2015). Does Boardroom Gender Diversity Matter? Evidence from A Transitional Economy. *International Review of Economics and Finance, 37,* 184-202. https://doi.org/10.1016/j.iref.2014.11.022

33. Nimalathasan, B. (2008). A Comparative Study of Financial Performance of Banking Sector in Bangladesh – An Application of CAMELS Rating System. *Economic and Administrative Series, 2,* 141-152. Retrieved from https://www.proquest.com/docview/1672865684

34. Obiora, S., Zeng, Y., Li, Q., Liu, H., Adjei, P., & Csordas, T. (2022). The Effect of Economic Growth on Banking System Performance: An Interregional and Comparative Study of Sub-Saharan Africa and Developed Economies. *Economic Systems, 46*(1), 100939. https://doi.org/10.1016/j.ecosys.2022.100939

35. Omran, M. (2007). Privatization, State Ownership, And Bank Performance in Egypt. *World Development, 35*(4), 714-733. https://doi.org/10.1016/j.worlddev.2006.07.002

36. Rabaa, B., & Younes, B. (2016). The Impact of the Islamic Banks' Performances on Economic Growth: Using Panel Data. *International Journal of Economics and Finance Studies, 8*(1), 101-111. Retrieved from https://dergipark.org.tr/en/pub/ijefs/issue/26144/275325

37. Rahman, M. M., Hamid, M., & Khan, M. (2015). Determinants of Bank Profitability: Empirical Evidence from Bangladesh. *International Journal of Business and Management, 10*(8), 135-149. https://doi.org/10.5539/ijbm.v10n8p135

38. Rashid, A., & Jabeen, S. (2016). Analyzing performance determinants: Conventional versus Islamic Banks in Pakistan. *Borsa Istanbul Review, 16*(2), 92-107, https://doi.org/10.1016/j.bir.2016.03.002

39. Rashid, A., Khaleequzzaman, M., & Jabeen, S. (2015). Analyzing the Performance of Banks in Pakistan: Conventional Versus Islamic Banks. *Journal of Islamic Business and Management, 5*(2), 17-42. Retrieved from https://jibm.org/wp-content/uploads/2018/05/Analyzing-Performance-of-Banks-in-Pakistan.pdf

40. Rodica-Oana, I. (2014). The Evolution of Romania's Financial and Banking System. *Procedia Economics and Finance, 15,* 760-768. https://doi.org/10.1016/S2212-5671(14)00467-5

41. Roman, A., & Sargu, A. C. (2013). Analysing The Financial Soundness of the Commercial Banks in Romania: An Approach Based on The Camels' Framework. *Procedia Economics and Finance, 6,* 703-712. https://doi.org/10.1016/s2212-5671(13)00192-5

42. Rozzani, N., & Rahman, R.A. (2013). CAMELS and Performance Evaluation of Banks in Malaysia: Conventional Versus Islamic. *Journal of Islamic Finance and Business Research, 2*(1), 36-45. Retrieved from https://www.academia.edu/30047375/Camels_and_performance_evaluation_of_banks_in_Malaysia_conventional_versus_Islamic

43. Samhan, H., & Al-Khatib, A. (2015). Determinants of Financial Performance of Jordan Islamic

Bank. *Research Journal of Finance and Accounting, 6*(8), 37-47. Retrieved from https://iiste.org/Journals/index.php/RJFA/article/viewFile/21972/22412

44. Souissi-Kachouri, N. (2020). *Corruption in The Banking Sector and Economic Growth in MENA Countries* (ERF Working Paper No. 1432). The Economic Research Forum. Retrieved from https://erf.org.eg/app/uploads/2020/1-2/1608626206_326_435084_1432.pdf

45. Sufian, F., & Habibullah, M. (2010). Assessing the Impact of the Financial Crisis on Bank Performance Empirical Evidence from Indonesia. *ASEAN Economic Bulletin, 27*(3), 245-262. https://doi.org/10.1355/ae27-3a

46. Sufian, F., & Habibullah, M. S. (2009). Bank specific and macroeconomic determinants of bank profitability: Empirical evidence from the China banking sector. *Frontiers of Economics in China, 4*(2), 274-291. https://doi.org/10.1007/s11459-009-0016-1

47. Tabash, M. I. (2019). Banking Sector Performance and Economic Growth: An Empirical Evidence of UAE Islamic Banks. In M. Mateev, and P. Poutziouris (Eds), *Creative Business and Social Innovations for A Sustainable Future* (pp. 39-45). Cham: Springer. https://doi.org/10.1007/978-3-030-01662-3_6

48. Tabash, M., & Dhankar, R. (2014). The Impact of Global Financial Crisis on The Stability of Islamic Banks: An Empirical Evidence. *Journal of Islamic Banking and Finance, 2*(1), 367-388. Retrieved from https://www.isfin.net/sites/isfin.com/files/the_impact_of_global_financial_crisis_on_the_stability_of_islamic_banks-_an_empirical_evidence_.pdf

49. Talbi, D., & Bougatef, T. (2018). The internal and external determinants of the intermediation margin of banks across MENA countries. *EuroMed Journal of Business, 13*(3), 280-290. https://doi.org/10.1108/EMJB-02-2018-0013

50. Trianto, B., Masrizal, & Sabiu, T. (2021). Can Islamic Finance Drives Economic Growth? Evidence from Indonesia. *Journal Ilmu Manajemen Dan Bisnis Islam, 7*(2), 141-157. https://doi.org/10.24952/tijaroh.v7i2.4593

51. Trung, N. (2021). Determinants of Bank Performance in Vietnamese Commercial Banks: An Application of the Camels Model. *Cogent Business & Management, 8*(1), 1979443. https://doi.org/10.1080/23311975.2021.1979443

52. Wanke, P., Azad, Md. A. K., & Barros, C. P. (2016). Financial Distress and The Malaysian Dual Baking System: A Dynamic Slacks Approach. *Journal of Banking and Finance, 66,* 1-18. https://doi.org/10.1016/j.jbankfin.2016.01.006

53. Yazdan, G. F., & Sadr, S. (2012). Analysis of Islamic Bank's Financing and Economic Growth: Case Study Iran and Indonesia. *Journal of Economic Cooperation and Development, 33*(4), 1-24. Retrieved from https://tarjomefa.com/wp-content/uploads/2018/01/8553-English-TarjomeFa.pdf

54. Yuksel, S., Mukhtarov, S., Mammadov, E., & Özsarı, M. (2018). Determinants of Profitability in The Banking Sector: An Analysis of Post-Soviet Countries. *Economies, 6*(3), 41. https://doi.org/10.3390/economies6030041

55. Zagherd, M., & Barghi, M. (2017). Performance Evaluation of Iranian Banking Industry Through CAMELS Framework. *Journal of Accounting and Marketing, 6*(2), 1-7. Retrieved from https://www.hilarispublisher.com/open-access/performance-evaluation-of-iranian-banking-industry-through-camelsframe-work-2168-9601-1000228.pdf

56. Zhongming, T., Akpemah Bathuure, I., & Guoping, D. (2019). Banks Performance And Economic Growth: Evidence From West Africa. *International Journal of Management Sciences and Business Research, 8*(10), 168-174. https://doi.org/10.5281/zenodo.3614745

APPENDIX A

Table A1. Unit root test results

Variable	ADF				PP			
	Level		1st diff		Level		1st diff	
	No trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend
ROA	42.2356***	33.6364***	68.9429***	46.3161***	49.5456***	37.0890***	628.940***	108.117***
NIM	18.5143	21.2374	78.6863***	58.2226***	52.2374***	54.1023***	375.145***	112.701***
ROE	36.2116***	39.8085***	72.6056***	49.2306***	38.6677***	38.1247***	369.354***	130.628***
GCF	17.9015	8.27244	43.2478***	40.2468***	15.9827	7.92692	81.8230***	112.345***
INFL	47.2140***	37.6297***	78.8832***	57.8946***	105.820***	76.4993***	522.021***	142.039***
GDP	26.0730*	31.7991**	92.9090***	63.1521***	54.6851***	58.2880***	454.676***	132.044***
LIQ	11.7824	13.1440	49.4157***	41.0215***	10.9301	12.1440	80.9198***	86.0551***
MNG	35.1126***	27.7985**	90.3371***	71.0120***	36.8568***	31.3722**	198.353***	155.356***
CAP	32.8621***	32.2589***	70.7002***	51.0943***	28.4822**	16.4595	109.629***	90.4512***
AST	192.046***	57.1546***	42.6168***	27.3184***	57.9768***	29.5387**	79.2003***	53.1127***

Note: *** significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX B

Table B1. GMM panel estimation

Variable	Model 1			Model 2			Model 3		
	No effect	Fixed	Random	No effect	Fixed	Random	No effect	Fixed	Random
GDP	0.1075*	0.114*	0.108*	1.1479***	1.0101***	1.1420***	−0.1600	−0.1427	−0.1382
CAR	0.9006**	0.08775	0.089**	0.243*	0.2155	0.2489*	1.0126***	−0.0829	0.9298***
AST	0.00938	0.0106	0.0096	0.062	0.1859**	0.0532	0.02532	0.1343*	−0.0114
MNG	−0.0565***	−0.0725***	−0.0584***	−0.045	−0.00149	−0.0436	0.5283***	0.15296***	0.4891***
LIQ	0.0059	0.00102	0.0056	−0.029	−0.00051	−0.0301	0.2532***	0.1551***	0.2176***
GCF	−0.0241	−0.0256	−0.0267	−0.0198	−0.0869	−0.0223	−0.0693	0.13853	−0.0945*
INFL	−00326	−0.0380	−0.033*	−0.1667**	−0.284***	−0.180***	0.1696	−0.2681***	0.1103**
C	2.7356**	3.8713**	2.9179**	8.310**	11.423*	8.4498**	−34.03***	2.9558	−29.535***

Note: *** significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX C

Table C1. List of abbreviations

Asset quality	In Asset
Augmented Dickey-Fuller	ADF
CAMEL includes a sixth parameter which is the sensitivity to the market risk (S)	CAMELS
CAMEL: Acronym of five major financial system parameters; capital adequacy (C), asset quality (A), management efficiency (M), earnings (E), and liquidity (L)	CAMEL
Capital adequacy ratio	CAR
Cost to income management	MNG
Deficit spending units	DSU
Domestic credit amounts to the private sector	DCPS
Gross capital formation	GCF
Inflation rate	INFL
Liquidity asset ratio	LIQ
Mexico, Indonesia, Nigeria, and Turkey countries.	MINT
Non-interest income	NII
Non-performing loans	NPLs
Phillips-Perron	PP
Return on assets	ROA
Return on equity	ROE
Sub-Saharan Africa	SSA
Surplus spending units	SSUs
The concept is derived from the first three letters of the Italian word (patrimonio), which means capital adequacy, and the first letter of each of (rischioita) and (redditivita) which mean profitability and credit risk, and the first letter of the word (organizzazione), which means organization, and the word (LIQUIDITA) which means liquidity	PATROL
The Generalised Method of Moments model	GMM
The gross domestic product	GDP
The Gulf Cooperation Council	GCC
The inflation rate	INF
The Middle East and North Africa region	MENA
The Operational Risk Assessment. Process Model identifies the current level of operational risk within the bank	ORAP