JORDAN'S BANKS' PROFITABILITY: A CLOSER LOOK AT FOREIGN AND DOMESTIC BANKS

Rasha Istaiteyeh[1,*] and Maysa'a Munir Milhem[2]

Abstract

This paper examines the influence of bank-specific and macroeconomic variables on the profitability of banks in Jordan, focusing on the differences between domestic and foreign banks. The hypothesis of whether higher profits are associated with different bank types operating in the country is tested. Return on Assets (ROA) and Return on Equity (ROE) are utilized as proxies for bank profitability, regressed on both macroeconomic variables and bank-specific variables, in a multiple regression setting for both foreign and domestic banks in Jordan, during the period 2001 - 2015. Ten domestic and six foreign banks operating in Jordan were included in the chosen sample. Results prove that credit risk, funding cost, management efficiency, and GDP, are essential factors for the profitability of Jordan's domestic banks. High domestic bank profitability is associated with lower funding costs, lower credit risk, and management efficiency. The other key finding indicates that bank size, liquidity, and GDP, are essential determinants for the profitability of foreign banks. Domestic banks must focus on upgrading their human capital, investing more in advanced technology, taking advantage of economies of scale through mergers, improving cost management efficiency, and monitoring credit risks.

Keywords: Profitability, Macroeconomics, Domestic Banks, Foreign Banks, Jordan.

[1,*]Dr. Rasha Istaiteyeh is currently working as an Associate Professor in Economics in the Department of Economics, Faculty of Economics and Administrative Sciences, The Hashemite University in Zarqa, Jordan. She holds a Ph.D. in Economics from Kassel University, Germany and obtained her master's degree in economics from the University of Jordan in Amman. Dr. Istaiteyeh is an "Affiliate Researcher" at Georgetown University, USA. Email: ristaiteyeh@hu.edu.jo

[2]Dr. Maysa'a Munir Milhem is currently working as an Associate Professor in the Department of Islamic Economics and Banking, Yarmouk University, Jordan. She obtained her Ph.D. in Islamic Economics and Banking from Yarmouk University, Irbid, Jordan.

1.INTRODUCTION

Evaluating the financial performance of commercial banks has been of great concern in academic research since the Great Depression of 1929-1933 (Ongore and Kusa, 2013). Banks influence and facilitate integration of economic performance to reduce poverty and increase production and public finance (Azam and Siddiqui, 2012). It has been said that they create needed income to cover operational costs. Therefore, banks must be able to generate profits. Banks' financial performance has proved to be critical in successful economic growth in many countries. Fair financial performance payoffs for the investments of shareholders encourages continued investment and leads to economic growth. However, poor banking performance can spillover to bank failure and has a consequent negative reflection on economic growth.

For banks to compete in the market, they must have good performance. Profitability is an important mechanism for economic growth. Therefore, given the relationship between the well-being of the banking sector and the country's economic growth, there are several questions which are important to answer; it is necessary to understand the main factors playing a part in banks' profitability, as this is of great value for bank management and for important stakeholders such as the central banks, policymakers, and financial authorities (Pasiouras and Kosmidou, 2007). Barajas et al. (2000) offered an explanatory example pointing out that the high profitability of a bank leads to augmenting bank capitalization levels and generates an additional buffer against negative macroeconomic shocks. Rajan and Zingales (1998), Levine (1998), and Levine and Zervos (1998), among others, have suggested that a prosperous banking sector is correlated with economic growth in a positive way (Sufian, 2012).

Growth in the banking sector has evolved, with licensed banks consolidated balance sheets more than trebling in size, rising from JD 14.15 billion in assets in 2000 to JD 37.69 billion at the end of 2011, and JD 45.2 billion in 2015. With a population of 8 million and 26 banks with a combined total of 695 branches across the Hashemite Kingdom of Jordan, the market is arguably crowded (Jordinvest, 2012; CBJ, 2015). At the end of 2015, there were 16 Jordanian banks and 10 non-Jordanian banks. Out of these 26 banks, 4 were Islamic banks, 14 domestic commercial banks and 8 foreign commercial banks. Their activities are regulated by the Central Bank of Jordan (CBJ). The banking sector in Jordan constituted around 19% of total GDP until mid-2015. Therefore, it can be said that it is one of Jordan's biggest economic sectors (Oxford Business Group, 2020). The different structures and characteristics between foreign and domestic banks as well as various external factors can influence the performance of these banks (Azam and Siddiqui, 2012).

The objective of this study was to

shed light on the various factors affecting the profitability of both foreign and domestic banks in Jordan, and whether differences in their performance exist during the period from 2001 to 2015. To achieve this purpose, a Generalized Least Square (GLS) method was employed to analyze how differences in bank specific variables such as bank size, credit risk, and capitalization, affected their profitability. Although there has been a notable amount of literature examining the profitability of banks in developed and western countries, empirical work on the variables influencing banks' performance in developing economies is relatively scarce. To our knowledge, this is the only study that focuses on the determinants of bank profitability in Jordan in a comparison setting between both domestic and foreign banks.

Following the introduction, a review of the related literature on the determinants of banking profitability is given in section 2, followed by a description of the methodological approach. Section 4 presents the empirical results and discussion, finally ending in section 5 with the conclusion and further recommendations.

2. LITRATURE REVIEW

There is an immense body of the literature focused on the identification of determinants for the financial performance of banks. However, the comparison between the performance of domestic and foreign banks is scarce (Azam and Siddiqui, 2012). Commercial banks, through their role as intermediaries, play a crucial role in the economic growth of their respective countries through the reallocation of resources into productive activities. A sound and profitable banking sector is able to bear up against negative shocks and accelerate financial system stability (Sufian, 2012). The following sections offer a discussion of the various studies focusing on the determinants of profitability for banks, and those which compare the profitability of domestic and foreign banks.

Part I: Studies on Banks Profitability Determinants

Previous reviews of Malaysian banks revealed that differences do exist between the profitability of domestic and foreign banks. Tahir et al. (2010) studied the Malaysian banking sector over the period 2000-2006, concluding that domestic commercial banks were relatively more efficient than foreign banks; they suggested that profit ratios were slightly higher for foreign banks relative to domestic ones. It is of great importance if a comparison can be held to focus more on the factors affecting the profitability of domestic versus foreign banks. Ramadan et al., (2011) for example, studied the association between the profitability of Jordanian banks and the status of various internal and external factors during the period from 2001 to 2010. The study found that the

characteristics of the Jordanian banks could explain a significant percentage of the variation in the banks' profitability.

Khrawish and Seiam (2002) focused on the factors influencing the profitability of commercial banks in Jordan over the period 1991-2000. The study found a positive significant relationship between commercial banks' profitability and liquidity, owner's equity, cash surplus, and debt ratio, as well as advertising expenses. In addition, no significant association was found between the profitability and total assets of the commercial banks in relation to the age of the bank, while a significant negative relationship was identified between the profitability and total assets of the commercial banks.

Jaber and Al-khawaldeh (2014) focused on the determinants of the profitability of commercial banks in Jordan over the period 2007 - 2012. Results indicated that the internal factors of capital adequacy, liquidity ratio, and size, were significant determinants, as were the external factors of macroeconomic and financial structure. Al-Qudah and Jaradat (2013) explored the effects of macroeconomic variables and bank characteristics on the profitability of Jordanian Islamic banks during 2000–2011. Findings revealed that capital adequacy and bank size had a positive and significant impact on the return on assets ROA and return on equity ROE, and the leverage measure had a negative and significant effect on both ROA and ROE, while liquidity was found to have an insignificant effect on ROA, but a significant negative effect on ROE. The study also found that the Amman stock exchange index, construction licensed value in square meters, and the growth of money supply were crucial variables for the profitability of Islamic banks.

According to Al-Amarneh (2014), who examined thirteen listed banks in Jordan between 2000 and 2012, ownership concentration has a significant and positive effect on bank profitability, while foreign ownership positively affects bank performance. Moreover, this study affirmed that whenever board size increases, bank profitability increases. Khrawish and Al-Sa'di (2011) focused on the influence of the e-banking services provided by domestic banks in Jordan on their profitability for the period 2000-2009, utilizing ratio analysis. The authors concluded that e-banking services showed no significant effect of on the profitability of the banks (measured by ROA and ROE) that adopted e-banking.

In addition to the above studies, Kosmidou, et al. (2004) noted that many researchers differentiate between the efficiency of domestic and foreign banks. However, a large number of these studies have concentrated on foreign banks operating in the US, while only more recently have a few studies examined Australia and Europe.

Part II: Studies on Domestic and Foreign Banks Profitability Determinants

A considerable number of studies

have compared the efficiency between foreign and domestic banks. Kosmidou et al. (2004) focused on the performance of domestic and foreign banks in the UK, using UTADIS, a multi criteria methodology, during the period 1998 to 2001. The study revealed higher performance of domestic banks compared to foreign banks. Additionally, interest revenue against total assets earnings, and profit before taxes against loans plus securities, were higher in domestic banks, and are also among the most important distinctive performance factors between the two types of banks.

Muda et al. (2013) thoroughly explored the determinants of both domestic and foreign Islamic banks in Malaysia during the period 2007 – 2010, utilizing the Generalized Least Square (GLS) analysis. The authors pointed out that profitability determinants for domestic banks differ from those of foreign ones. Azam and Siddiqui (2012) implemented regression analysis to compare the profitability of domestic and foreign banks in Pakistan. Their results suggest that variables which are decisive in shaping domestic banks' profitability are not necessary of great importance for foreign banks and vice versa. The effect of macro-economic factors is witnessed more through domestic banks, although foreign banks have higher profit margins. Among some EU countries, Kosmidou et al. (2004) reported that the profitability of domestic and foreign banks was influenced by each bank's specific characteristics as well as by the financial market structure and macroeconomic conditions.

This study adds to the existing literature by providing new empirical evidence on the factors that influence the profitability of domestic and foreign banks operating in Jordan (a developing country) during the period 2001-2015. According to Sufian (2009) there is considerable literature examining the profitability of financial sector businesses in developed countries; nevertheless, empirical works on the factors that influence the performance of banks in developing economies are still rare. Accordingly, this type of research is totally missing in the literature concerning the financial sector in Jordan.

Part III: Studies on the Relationship Between Each Selected Independent Variable and the Dependent Variables (ROE & ROA).

Havrylchyk and Olena, (2006) observed a positive effect of capitalization, inflation, GDP growth, market concentration, and banking sector reform, on ROA, while a negative impact was observed for loan growth and capital market capitalization. The equity to assets ratio (EAR) had a significant positive effect on the ROA. Meanwhile, bank size has been shown to have an insignificant effect on the ROA as mentioned in Prabowo et al. (2018).

Kwadwo (2018) determined that the cost to income ratio, credit risk, and market concentration, all had a

negative impact on various measures of profitability while bank liquidity influenced only the ROAE and NIM. Funding cost was used to measure the impact of the efficiency of bank management on bank profitability. A bank with excellent managerial efficiency will be able to collect low-cost funds via competitive but unstructured savings of the depositors providing sound bank profitability. A statistically significant negative relationship was predicted by Islam and Nishiyama (2016).

According to Havrylchyk and Olen (2006), greenfield banks managed to increase their profitability when GDP growth slowed down in Central and Eastern European countries, enhancing stability of the banking sector. In Vietnam, Dinh (2013) found a strong positive influence of GDP on the profitability of domestic banks, suggesting that domestic banks took the opportunity to offer more loans in good times while customers were simultaneously able to repay their debts given the favorable economic environment. However, the study indicated no significant relationship between GDP and the profitability of foreign banks.

Pasiouras and Kosmidou (2007) confirmed that the profitability of both domestic and foreign banks is affected not only by the specific characteristics of the bank, but also by financial market structure and macroeconomic conditions. The banking environment affected the profitability of commercial domestic and foreign banks operating in 15 EU countries over the period 1995–2001. Yong and Christos (2012) declared a positive relationship between bank profitability, cost efficiency, banking sector development, stock market development, and inflation, in China. Essentially, GDP has a positive effect on local banks as revealed by Jreisat and Bawazir (2021). While focusing on microeconomic and macroeconomic factors affecting the performance of foreign banks in Malaysia, Ling et al. (2013) found that of 7 variables, bank size, cost-to-income ratio, and real GDP, had a statistically significant effect on the return on assets.

Capital strength, represented by the equity to assets ratio was the main contributing factor of UK banks' profits, giving impetus to the case that well capitalized banks face lower costs of external financing, reducing their overall costs, and enhancing profits, as mentioned by Marandu and Sibindi, (2016). Additionally, Prabowo et al. (2018) showed that the equity to assets ratio (EAR) had a significant positive effect on the ROA and NIM (net interest margin).

Gaber (2018) found that leverage (total deposits to total assets) has a negative effect on bank profits (ROE). Kwadwo (2018) found a significant negative relationship between the cost to income ratio and ROA; each unit increase in cost reduced profitability by 30.6%. According to Xu et al. (2019), a number of studies found that efficiency, typically measured by the cost-to-income ratio, is an important driver of bank profitability. Moving to the ratio of interest expenses to total deposits, Roman and Dănuleţiu

(2013) noted that this ratio declined; on the one hand this is because banks failed to attract sufficient liquidity through depositors, and on the other hand as a result of the central bank's monetary policy, which is reflected in a progressive lowering of the monetary policy rate.

3.THE MATERIALS

3.1 Data

This study employed annual data from financial statements including both income statements and balance sheets belonging to domestic and foreign banks in Jordan covering the period 2001-2015. In 2013, the Central bank of Jordan (CBJ) established the Financial Stability Department (FSD) as an independent department to follow up on developments in the financial conditions of the banking system and other financial institutions at the macro level; this encompassed linkages, suitability to economic conditions, and developments. For data points after the action date of CBJ, the full range of data needed for the study is not easily accessible from some banks in Jordan, as some of these banks have refused to keep such data after 2015. Therefore, the study period only runs until 2015. Bank specific data were obtained from financial and annual reports related to each bank in the study sample, while macroeconomic variables were taken from the Central Bank of Jordan and the Jordan databases of the Department of Statistics, on an annual basis. This study focuses on the differences in the determinants of profitability between domestic and foreign banks in Jordan. Therefore, the sample consisted of two categories: domestic banks and foreign banks. If any bank has more shares held by foreign owners (Arabs and foreigners) than domestic owners (Jordanian) then this bank will be identified as a foreign bank; the converse is true for the banks identified as domestic banks. According to this classification, there are six foreign banks and ten domestic banks included in the analyses for the study.

Profitability can be defined as a measure of the amount by which a company's revenue exceeds its expenses. For a company or organization, profitability is the capability to make profits from their combined business activities. It reflects how efficiently the management can make profits by using the resources available in the market relevant to expenses (Sandhar and Janglani, 2013). In this regard, a surviving bank must earn a profit to survive longer and grow over a long period. Bank profitability can be measured by various factors. This study utilizes return on equity ROE and return on assets ROA as proxy measures for bank profitability; these are defined in the following section. The reason for choosing to compare the difference between domestic and foreign banks lies in aiming to determine if foreign banks enjoy a competitive edge in the Jordanian banking market or if they are

disadvantaged vis-à-vis domestic banks. The issue is important, since on the one hand, these banks face the challenges the liability of foreignness brings, but at the same time, they have bank-specific advantages. The central focus of this study is aimed at addressing the deeper question of "What factors determine the profitability of those banks and identifying factors that explain why such differences exist. One feature of this study is that foreign bank efficiency estimates will be drawn from a comparison of domestic banks with foreign banks in Jordan, thus enabling the study to determine the factors which influence differences in efficiency for banks operating multi-nationally.

3.2 Variables

Return on Assets ROA is an indicator for managerial efficiency; it indicates competence of banking management in converting banking assets into net profitable earnings (Chantapong, 2005). ROA brings about the management's ability to utilize the banks' financial and real investment resources to generate profits (Octaviani, 2014). The return on assets is a measure usually used to evaluate a bank's performance (Jaber and Al-khawaldeh, 2014). ROA is preferred as the proxy for bank performance as it shows the efficiency of bank management in managing its capital to acquire assets and generate earnings from it (Abdul Jamal et al., 2012). Return on assets is commonly utilized as a measurement for bank profitability (Helhel, 2015; Osuagwu, 2014; Octaviani, 2014; Dinh, 2013; Doğan, 2013; Azam and Siddiqui, 2012; Ramadan et al., 2011; Havrylchyk and Jurzyk, 2006; Kosmidou et al., 2004; and Sufian and Habibullah 2009). A higher ROA reflects better financial performance due to the greater rate of returns (Octaviani, 2014). Dividing net income after tax by total assets results with the ROA.

Today return on equity ROE is an index for profitability, calculated by dividing net income after tax by total equity. This ratio conveys how efficient a bank is in generating profits from the money invested by shareholders. Return on equity is acquired through the ratio of the profits generated to the total investment capital provided by the owners of the company. Hence, return on equity reflects the profitability with which the owner's money was managed (Waqas and Rehman, 2014). ROE measures the return to shareholders on their equity (Ramadan et al., 2011). ROE is one of the bank profitability criteria used in multiple other studies (e.g. Helhel, 2015; Osuagwu, 2014; Kiruri, 2013, Doğan, 2013; Azam and Siddiqui, 2012; Ramadan et al., 2011; Kosmidou et al., 2004; Sufian and Habibullah, 2009).

3.3 Banks Profitability Determinants

Factors that determine the profitability of banks are structured into two main groups, internal and

external determinants. The internal variables are those which determine a bank's management decisions, specifically affecting policy goals such as bank size, liquidity risk, credit risk, financial leverage, and expense management (Osuagwu, 2014). The external determinants usually reflect factors that do not relate to bank management practices (Octaviani, 2014), but rather reflect the macroeconomic situation in the respective country such as inflation rate and Gross Domestic Product (GDP).

3.3.1 Internal Determinants

In this study, the following proxies are used as the internal bank-specific determinants:

Equity-to-Assets Ratio (EAR) is the ratio of total equity to total assets; it is used as an indicator for capital adequacy. The EAR reflects a bank's risk management strategy and its ability to earn profits (Dinh, 2013). It is the ability of the bank to absorb losses and handle risk exposure with shareholders. High ratios of capital assets are presumed to be representative of low leverage and therefore lower risk (Jaber and Al-khawaldeh, 2014; and Sufian and Habibullah, 2009). This ratio shows the ability of bank capital in accommodating the possibility of business development and of losses resulting from the operations of the bank (Octaviani, 2014). The equity to assets ratio has been widely used in previous empirical research as the key capital ratio (e.g. Athanasoglou et al., 2006; Dinh, 2013; Doğan; 2013; Azam and Siddiqui, 2012; Ramadan et al., 2011; and Roman and Tomuleasa, 2013). The capital adequacy ratio is also employed to detect the effect of capital requirements on banks' profitability **(**Azam and Siddiqui, 2012).

Total Deposits to Total Assets (TDTA) is the ratio of a bank's total deposits to the bank's total assets. The ratio indicates the level of liquidity as well as the responsibility towards deposit holders (Doğan, 2013). Leverage is measured by TDTA (Al-Qudah and Jaradat, 2013). Deposits are the main source of bank funding; hence, this value affects a bank's profitability (Muda et al., 2013). TDTA shows the share of deposits compared to total assets (Ben Moussa, 2015; Al-Qudah and Jaradat, 2013; and Doğan, 2013).

Cost to Income Ratio (CIR) reflects the capacity of a bank to cover its operating expenses from the income it generates; it is obtained by dividing the operating costs over total income. Therefore, a negative relationship is expected between the cost to income ratio and a bank's profitability (Roman and Tomuleasa, 2013). This ratio also reflects management quality, providing information on the efficiency of management regarding the bank's expenses relative to the revenue used, where a high ratio indicates less efficient management (Jaber and Al-khawaldeh, 2014). The smaller the bank's CIR the greater the bank's efficiency in carrying out its business activities (Octaviani, 2014), with the most profitable banks having the

lowest efficiency ratios (Trujillo-Ponce, 2012). In this study, the cost to income ratio is used as an indicator of efficiency for bank management following previous studies by Opoku-Agyemang (2015), Octaviani (2014), Jaber and Al-khawaldeh (2014), Kosmidou et al. (2004), and Azam and Siddiqui (2012).

Total Loans to Total Assets (TLTA) is the ratio of a bank's total loans to its total assets, which can be used as a proxy variable for liquidity risk (Opoku-Agyemang, 2015; Roman and Tomuleasa, 2013; Athanasoglou et al., 2006; and Sufian and Habibullah, 2009). If this rate is very high, then liquidity is reduced, leading to an increase in the number of marginal borrowers that default (Roman and Tomuleasa, 2013). This ratio also measures credit risk (Osuagwu, 2014). TLTA was also used by Muda et al. (2013), Doğan (2013), Dinh (2013), Ramadan et al. (2011), and Chantapong (2005), as an internal determinant of bank profitability. Higher values of TLTA indicate that the bank has lower liquidity, but also confirms higher profitability.

Loan to Deposit Ratio (LDR) indicates the bank's ability to repay the withdrawal of funds by depositors relying only on loans as the source of liquidity. The liquidity of a bank is often mirrored by LDR. A higher LDR is an indication of low ability to repay a withdrawal and therefore lower liquidity (Octaviani, 2014). Liquidity is measured by total loans to total deposits (Al-Qudah and Jaradat, 2013). This ratio indicates the conversion of collected deposits to loans (Doğan, 2013); hence, a lower loan deposit ratio is always favorable to a higher loan deposit ratio.

Loan-Loss Provisions to Loans (LLPL) is the effect of asset quality on profitability and is defined as the loan-loss provisions over the sum of a bank's loans. It is a proxy for capital risk and credit risk (Gyamerah and Amoah, 2015; Dinh, 2013; and Azam and Siddiqui, 2012). Ramadan et al. (2011), Athanasoglou et al. (2006), and Staikouras and Wood (2004), applied LLPL as a measurement for credit risk. Credit risk is regarded as a potential loss of all or part of the interest owed, the origin loan, or both (Ramadan et al., 2011). If the coefficient of LLPL is negative, it will reduce profitability as bad loans are expected to reduce profitability (Sufian and Habibullah, 2009).

Logarithm of Total Assets (LOTA). Following Jaber and Al-khawaldeh (2014), Muda et al. (2013), Doğan (2013), Ramadan et al. (2011), Athanasoglou et al. (2006), and Staikouras and Wood (2004), bank size is measured by the natural logarithm of the accounting value of the bank's total assets. Industrial economic theory suggests that if an industry is subject to economies of scale, then large institutions will be more efficient and more able to produce services at a lower cost. Therefore, according to Muda et al. (2013) larger size is expected to have a positive effect on a bank's profitability.

Total Deposit to Total Loans (TDTL) measures a bank's credit risk

and shows a negative relationship to bank profitability (Osuagwu, 2014).

Interest Expenses to Deposits (IED) is a measure of a bank's interest expenses compared to its customer deposits. According to Opoku-Agyemang (2015) interest expenses over average total deposits provides a measure of funding costs. This rate reflects the ability of a bank to attract deposits at a lower cost. Thus, when the level of this indicator is low, it has a positive effect on bank profitability (Roman and Tomuleasa, 2013; Firtescu and Roman, 2015).

Interest Income to Total Assets (ITA) is the ratio of net interest income to total assets. This ratio reflects the bank's management competency and efficiency (Doğan, 2013).

3.3.2 External (Macroeconomic) Determinants

The effect of macroeconomic changes can be witnessed through changes in the interest rates of banks in the relevant economy (Octaviani, 2014). The external (macroeconomic) variables of bank profitability used in this study include:

Gross Domestic Product (GDP) is among the most commonly used macroeconomic indicators, as it is also a measure of total economic activity within an economy (Vejzagic and Zarafat, 2014; and Sufian and Habibullah, 2009). A good economic situation will positively affect the demand and supply of banking services but will have either positive or negative influences on bank profitability levels (Sufian and Habibullah, 2009). GDP is anticipated to affect banking profitability positively. Real GDP, or the inflation-adjusted GDP is used in this study.

Inflation (INF) is expressed by the annual inflation rate (consumer price index CPI). It is defined as a sustained general rise in the prices of an economy, as a high inflation rate is correlated with both higher costs and higher incomes (Octaviani, 2014; Muda et al., 2013). INF denotes the purchasing power per unit of money. If a bank's income rises more rapidly than its costs, then inflation is expected to yield a positive effect on profitability. In contrast, a negative coefficient is expected when the bank's costs increase faster than its income (Azam and Siddiqui, 2012).

4. METHODOLOGY

4.1. The Data

The study variables (Table 1) for this study included

- Dependent variables: ROA and ROE
- Independent variables: EAR, LOTA, TDTA, CIR, TDTL, TLTA, LLPL, ITA, LDR, and IED
- Control variables: INF and GDP.

The dependent and independent variables were measured for 16 banks (6 foreign banks and 10 domestic banks) over a period of 15 years (2001-2015). The control variables were measured over a period of 15 years. There were no missing values. Over the study period, ROA averaged

Table 1 Descriptive Statistics

	Domestic (N = 150)		Foreign (N = 90)	
Variable	M	SD	M	SD
ROA	1.29	1.15	1.56	2.03
ROE	8.96	6.65	11.44	5.31
EAR	0.16	0.14	0.13	0.08
LOTA	8.91	0.35	8.76	0.82
TDTA	0.67	0.27	0.71	0.64
CIR	-51.59	791.89	1.82	2.28
TDTL	1.60	0.78	1.60	0.75
TLTA	0.46	0.13	0.48	0.48
LLPL	0.01	0.02	0.01	0.01
ITA	0.05	0.02	0.05	0.04
LDR	0.93	0.84	0.75	0.38
IED	0.06	0.06	0.04	0.02
INF	3.98	3.60	3.98	3.60
GDP	5.14	2.35	5.14	2.35

Note. For INF and GDP, N = 15 (as there were 15 years)

about 1.29 with individual yearly figures differing around 1.15 for domestic banks, and averaged about 1.59 with individual yearly figures differing around 2.03 for foreign banks. ROE averaged about 8.96 with individual yearly figures differing around 6.65 for the domestic banks, and averaged about 11.44 with individual yearly figures differing around 5.31 for foreign banks. The much higher standard deviations for ROE for both domestic and foreign banks indicated that there was wider variation for ROE than ROA for both types of banks.

4.2 Analysis Methods

The purpose of this study was, for each type of banks (domestic vs. foreign), to determine the relationship between the dependent variables and the independent variables after controlling for the control variables. As the data consist of repeated measurements on cross sections (banks) over a period of time (2001-2015), they were considered panel data. The SAS procedure PANEL was used to fit the panel data models proposed by Greene (2012), including the pooled regression models, the fixed effects models, and the random effects models.

Using the same formulation as Greene (2012), for both domestic and foreign banks, the pooled regression model for ROA and ROE can be written as

$$ROA_{it}\ (or\ ROE_{it}) = \alpha + \beta_1 EAR + \beta_2 LOTA + \beta_3 TDTA + \beta_4 TDTA + \beta_5 CIR + \beta_6 TDTL + \beta_7 TLTA + \beta_8 LLPL + \beta_9 ITA + \beta_{10} LDR + \beta_{11} IED + \beta_{12} INF + \beta_{13} GDP + \varepsilon_{it},$$

where $i = 1, \ldots, n$ and $t = 1, \ldots, T$, with n being the number of subjects and T

being the number of time periods (n = 16) as there were 16 banks and T= 15 as there were 15 time periods (2001-2015). α was the intercept and β's were the regression coefficients. The error term ε_{it} is the random disturbance with mean equal to 0 and variance equal to σ_{ε}^2 and the errors are independent and identically distributed.

The one-way fixed group effects model with time as a regressor for ROA and ROE can be written as

$$ROA_{it}(or\ ROE_{it}) = \alpha + \alpha_1^g + \alpha_2^g + \cdots + \alpha_k^g + \beta_1 EAR + \beta_2 LOTA + \beta_3 TDTA + \beta_4 TDTA + \beta_5 CIR + \beta_6 TDTL + \beta_7 TLTA + \beta_8 LLPL + \beta_9 ITA + \beta_{10} LDR + \beta_{11} IED + \beta_{12} INF + \beta_{13} GDP + \varepsilon_{it}$$

, where $\alpha_1^g to\ \alpha_k^g$ denoted the group specific constant term (k dummy variables were created for the group effect. k = 5 for foreign banks and k = 9 for domestic banks).

The one-way random group effects model for ROA and ROE can be written as

$$ROA_{it}(or\ ROE_{it}) = \alpha + \beta_1 EAR + \beta_2 LOTA + \beta_3 TDTA + \beta_4 TDTA + \beta_5 CIR + \beta_6 TDTL + \beta_7 TLTA + \beta_8 LLPL + \beta_9 ITA + \beta_{10} LDR + \beta_{11} IED + \beta_{12} INF + \beta_{13} GDP + \mu_i + \varepsilon_{it}.$$

The F-test (Hill & Lim, 2012) ($p < 0.05$ indicates the fixed effects model is preferred over the pooled regression model), the Hausman statistic (Hausman, 1978) ($p > 0.05$ indicates the random effects model is preferred over the fixed effects model), and the Breusch and Pagan Lagrange multiplier (LM) test (Breusch & Pagan, 1980) ($p < 0.05$ indicates random effects model is preferred over the pooled regression model) were used to aid in model specification. Heteroscedasticity of the errors was examined using the Breusch-Pagan heteroscedasticity test (Breusch & Pagan, 1979) and the robust standard error formulated in Wooldridge (2002, p. 152) with the heteroskedasticity adjustment was implemented if necessary ($p < 0.05$ for the Breusch-Pagan heteroscedasticity test). Normality of the errors was examined via the Quantile-quantile plots and was achieved for all panel regression models. Variance inflation factor (VIF) was used to assess multicollinearity, with VIF > 10 being a concern of multicollinearity (Chatterjee & Hadi, 2006). There was no multicollinearity observed (VIF ranged from 1.0250 to 7.4000 for domestic banks; VIF ranged from 1.1124 to 7.2192 for foreign banks). The generalized R-squared (R^2) (Buse, 1973) was used to measure the proportion of the transformed sum of squares of the dependent variable that is attributable to the influence of the independent variables.

4.3 Analysis of Results

For both domestic and foreign banks, based on the results of the F-tests ($F(9, 128) = 2.99$, $p = 0.0029$ for domestic banks; $F(5, 72) = 4.28$, $p = 0.0018$ for foreign banks), the Breusch-Pagan LM tests ($\chi^2(1) = 5.14$, $p = 0.0234$ for domestic banks; $\chi^2(1) = 7.47$, $p = 0.0063$ for foreign banks), and the Hausman tests ($\chi^2(12) = 7.57$,

$p = 0.8179$ for domestic banks; $\chi^2(12) = 2.60$, $p = 0.9978$ for foreign banks), the random effects model was used to determine the relationship between ROA and the independent variables after controlling for INF and GDP (Table 2).

For domestic banks, there was a statistically significantly negative relationship between ROA and, TDTA ($\beta = -3.7465$, $t(137) = -5.24$, $p < 0.0001$), LLPL ($\beta = -15.6341$, $t(137) = -3.01$, $p = 0.0032$), and IED ($\beta = -7.2645$, $t(137) = -3.63$, $p = 0.0004$). There was a statistically significantly positive relationship between ROA and, ITA ($\beta = 28.8674$, $t(137) = 4.20$, $p < 0.0001$) and GDP ($\beta = 0.1474$, $t(137) = 3.92$, $p = 0.0001$). There was no statistically significant relationship between ROA and all the other variables.

For foreign banks, there was a statistically significantly negative relationship between ROA and IED ($\beta = -9.5839$, $t(77) = -2.31$, $p = 0.0238$). There was a statistically significantly positive relationship between ROA and, LOTA ($\beta = 0.3293$, $t(77) = 3.10$, $p = 0.0027$), TDTL ($\beta = 0.2606$, $t(77) = 2.69$, $p = 0.0087$), TLTA ($\beta = 2.7948$, $t(77) = 2.65$, $p = 0.0099$), and GDP ($\beta = 0.0934$, $t(77) = 4.60$, $p < 0.0001$). There was no statistically significant relationship between ROA and all the other variables.

For both domestic and foreign banks, based on the results of the F-tests ($F(9, 128) = 2.72$, $p = 0.0062$ for domestic banks; $F(5, 72) = 3.80$, $p = 0.0042$ for foreign banks), the Breusch-Pagan LM tests ($\chi^2(1) = 7.21$, $p = 0.0072$ for domestic banks; $\chi^2(1) = 4.94$, $p = 0.0262$ for foreign banks), and the Hausman tests ($\chi^2(12) = 4.51$, $p = 0.9725$ for domestic banks; $\chi^2(12) = 4.46$, $p = 0.9737$ for foreign banks), the random effects model should be used to determine the relationship between ROE and the independent variables after controlling for INF and GDP (Table 3).

For domestic banks, there was a statistically significantly negative relationship between ROE and, EAR ($\beta = -10.5224$, $t(137) = -2.59$, $p = 0.0107$), TDTA ($\beta = -11.9364$, $t(137) = -2.65$, $p = 0.0091$), LLPL ($\beta = -129.6750$, $t(137) = -3.96$, $p = 0.0001$), and IED ($\beta = -28.4669$, $t(137) = -2.26$, $p = 0.0256$). There was a statistically significantly positive relationship between ROE and GDP ($\beta = 0.8696$, $t(137) = 3.67$, $p = 0.0003$). There was no statistically significant relationship between ROE and all the other variables.

For foreign banks, there was a statistically significantly negative relationship between ROE and, EAR ($\beta = -59.4007$, $t(77) = -3.42$, $p = 0.0010$) and IED ($\beta = -101.6730$, $t(77) = -2.45$, $p = 0.0167$). There was a statistically significantly positive relationship between ROE and GDP ($\beta = 0.6513$, $t(77) = 3.22$, $p = 0.0019$). There was no statistically significant relationship between ROE and all the other variables.

Detailed regression results for panel data models can be found in supplemental materials.

Table 2 Summary of Regression Results (Dependent Variable = ROA)

	Domestic banks (β (SE))			Foreign banks (β (SE))		
Variable	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects
Intercept	-1.2181 (4.0192)	-3.1821 (4.3898)	-0.9670 (3.1993)	-3.3691 (0.9631)**	-4.4890 (1.8405)*	-4.1948 (1.1580)**
EAR	0.1930 (1.1180)	-0.0237 (0.6742)	0.1251 (0.6447)	-0.1787 (2.1055)	3.4603 (1.7975)	2.7783 (1.7368)
LOTA	0.1569 (0.3911)	0.3523 (0.4461)	0.1634 (0.3267)	0.2979 (0.0759)**	0.3613 (0.2446)	0.3293 (0.1062)**
TDTA	-3.9938 (1.0114)**	-3.5536 (1.6227)*	-3.7465 (0.7144)**	-0.0438 (1.5761)	0.6636 (1.0713)*	0.4439 (0.7712)
CIR	-0.00000338 (0.0012)	-0.00004 (0.0001)	-0.00003 (0.0001)	0.0102 (0.1370)	0.0036 (0.0997)	0.0045 (0.0200)
TDTL	0.6231 (0.3130)*	0.3996 (0.3155)	0.4728 (0.2593)	0.2363 (0.3939)	0.2515 (0.1253)	0.2606 (0.0968)**
TLTA	1.8229 (1.5014)	2.9593 (1.4684)*	2.3749 (1.3019)	3.8838 (2.1389)	2.3628 (1.5199)	2.7948 (1.0560)**
LLPL	-15.8437 (8.5682)	-15.5832 (8.3904)	-15.6341 (5.2015)**	-4.4250 (9.6131)	-4.8315 (8.8809)	-5.3255 (5.9682)
ITA	36.3546 (9.9035)**	22.7817 (13.1427)	28.8674 (6.8807)**	3.7229 (10.6108)	3.9428 (14.6963)	3.4239 (7.0338)
LDR	0.0884 (0.2368)	-0.3630 (0.5004)	-0.0923 (0.2571)	-0.1463 (0.5282)	0.2601 (0.5558)	0.1923 (0.4847)
IED	-7.6504 (3.7171)*	-6.3532 (4.4803)	-7.2645 (2.0033)**	-9.7529 (17.6302)	-9.9919 (14.3195)	-9.5839 (4.1556)*
INF	-0.0146 (0.0262)	-0.0167 (0.0260)	-0.0154 (0.0225)	0.0203 (0.0176)	0.0142 (0.0105)	0.0149 (0.0118)
GDP	0.1378 (0.0462)**	0.1629 (0.0496)**	0.1474 (0.0376)**	0.0767 (0.0268)**	0.0997 (0.0355)**	0.0934 (0.0203)**
Observations	150	150	150	90	90	90
F for fixed group effect		F(9, 128) = 2.99, p = 0.0029			F(5, 72) = 4.28, p = 0.0018	
Hausman			$\chi^2(12) = 7.57$, p = 0.8179			$\chi^2(12) = 2.60$, p = 0.9978
Breusch-Pagan LM			$\chi^2(1) = 5.14$, p = 0.0234			$\chi^2(1) = 7.47$, p = 0.0063
Breusch-Pagan Het	$\chi^2(6) = 25.96$, p = 0.0002			$\chi^2(6) = 20.10$, p = 0.0027		
R^2	0.4449	0.5413	0.4302	0.9697	0.9766	0.9724

Note: * indicates $p < 0.05$; ** indicates $p < 0.01$.

Table 3 Summary of Regression Results (Dependent Variable = ROE)

	Domestic banks (β (SE))			Foreign banks (β (SE))		
Variable	Pooled OLS	Fixed effects	Random effects	Pooled OLS	Fixed effects	Random effects
Intercept	-26.4550 (20.2356)	-14.2406 (27.0579)	-17.6195 (19.9840)	1.4367 (14.1312)	-11.0184 (24.0650)	-7.2732 (11.2071)
EAR	-11.2987 (3.5892)**	-10.4845 (2.3055)**	-10.5224 (4.0685)*	-86.7716 (24.8419)**	-50.6837 (22.6564)*	-59.4007 (17.3461)**
LOTA	3.9850 (1.9635)*	2.4051 (2.8220)	3.1098 (2.0396)	1.6463 (0.9703)	1.3839 (3.7247)	1.6498 (1.0232)
TDTA	-12.8176 (3.5856)**	-11.8331 (10.2425)	-11.9364 (4.5109)**	-6.2071 (14.1222)	5.8007 (12.5660)	1.2452 (7.6601)
CIR	0.0005 (0.0140)	0.0003 (0.0012)	0.0003 (0.0006)	-0.2134 (1.6408)	-0.3479 (1.3016)	-0.2984 (0.2006)
TDTL	2.3141 (1.4472)	1.6869 (1.7176)	1.9694 (1.6330)	0.8943 (1.2900)	2.6285 (1.5706)	1.8033 (0.9577)
TLTA	0.7029 (7.7990)	6.4459 (7.7784)	3.6516 (8.2055)	14.7731 (21.7658)	0.1147 (18.4472)	4.0070 (10.5105)
LLPL	-123.1760 (54.6547)*	-133.1270 (52.3197)*	-129.6750 (32.7416)**	-52.8397 (87.9464)	-85.3613 (87.7448)	-72.3433 (59.7124)
ITA	97.6726 (42.0644)*	31.7407 (50.3748)	60.6965 (43.1623)	108.1223 (141.4000)	21.7954 (170.9000)	65.6954 (70.0445)
LDR	0.1368 (1.2597)	-1.2720 (1.9981)	-0.5730 (1.6083)	-0.7421 (7.1159)	9.9375 (8.6374)	5.5188 (4.7952)
IED	-31.4325 (16.9541)	-25.3757 (15.3472)	-28.4669 (12.6122)*	-115.6040 (215.6000)	-86.6502 (180.3000)	-101.6730 (41.5418)*
INF	0.0270 (0.1316)	0.0356 (0.1310)	0.0330 (0.1420)	0.2469 (0.2017)	0.2185 (0.1375)	0.2149 (0.1183)
GDP	0.8954 (0.2474)**	0.8534 (0.2587)**	0.8696 (0.2370)**	0.5007 (0.2593)	0.6931 (0.3716)	0.6513 (0.2024)**
Observations	150	150	150	90	90	90
F for fixed group effect		F(9, 128) = 2.72, p = 0.0062			F(5, 72) = 3.80, p = 0.0042	
Hausman			$\chi^2(12) = 4.51$, p = 0.9725			$\chi^2(12) = 4.46$, p = 0.9737
Breusch-Pagan LM			$\chi^2(1) = 7.21$, p = 0.0072			$\chi^2(1) = 4.94$, p = 0.0262
Breusch-Pagan Het	$\chi^2(6) = 12.20$, p = 0.0577			$\chi^2(6) = 39.48$, p < 0.0001		
R^2	0.3354	0.4421	0.3172	0.5720	0.6613	0.4897

Note: * indicates $p < 0.05$; ** indicates $p < 0.01$.

4.4 Supplemental Materials

Table 4 Detailed Regression Results for Pooled OLS (Dependent Variable = ROA)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Intercept	-1.2181	4.0192	-0.30	137	0.7623	-3.3691	0.9631	-3.50	77	0.0008
EAR	0.1930	1.1180	0.17	137	0.8632	-0.1787	2.1055	-0.08	77	0.9326
LOTA	0.1569	0.3911	0.40	137	0.6889	0.2979	0.0759	3.92	77	0.0002
TDTA	-3.9938	1.0114	-3.95	137	0.0001	-0.0438	1.5761	-0.03	77	0.9779
CIR	-0.00000338	0.0012	0.00	137	0.9978	0.0102	0.1370	0.07	77	0.9409
TDTL	0.6231	0.3130	1.99	137	0.0485	0.2363	0.3939	0.60	77	0.5503
TLTA	1.8229	1.5014	1.21	137	0.2268	3.8838	2.1389	1.82	77	0.0733
LLPL	-15.8437	8.5682	-1.85	137	0.0666	-4.4250	9.6131	-0.46	77	0.6466
ITA	36.3546	9.9035	3.67	137	0.0003	3.7229	10.6108	0.35	77	0.7267
LDR	0.0884	0.2368	0.37	137	0.7094	-0.1463	0.5282	-0.28	77	0.7826
IED	-7.6504	3.7171	-2.06	137	0.0415	-9.7529	17.6302	-0.55	77	0.5817
INF	-0.0146	0.0262	-0.56	137	0.5779	0.0203	0.0176	1.15	77	0.2522
GDP	0.1378	0.0462	2.98	137	0.0034	0.0767	0.0268	2.86	77	0.0054

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

Table 5 Detailed Regression Results for Fixed Effects Model (Dependent Variable = ROA)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Cross section effect 1	0.1500	0.3788	0.40	128	0.6928	0.0202	0.4182	0.05	72	0.9617
Cross section effect 2	0.2360	0.4073	0.58	128	0.5633	0.1397	0.3833	0.36	72	0.7165
Cross section effect 3	0.8327	0.3593	2.32	128	0.0221	-0.4189	0.4391	-0.95	72	0.3433
Cross section effect 4	0.5531	0.3769	1.47	128	0.1447	0.0139	0.3140	0.04	72	0.9649
Cross section effect 5	0.9598	0.3281	2.93	128	0.0041	-0.3799	0.2415	-1.57	72	0.1201
Cross section effect 6	1.0690	0.3226	3.31	128	0.0012					
Cross section effect 7	0.6148	0.3235	1.90	128	0.0596					
Cross section effect 8	1.7475	0.6163	2.84	128	0.0053					
Cross section effect 9	0.9418	0.3869	2.43	128	0.0163					
Intercept	-3.1821	4.3898	-0.72	128	0.4698	-4.4890	1.8405	-2.44	72	0.0172
EAR	-0.0237	0.6742	-0.04	128	0.9720	3.4603	1.7975	1.93	72	0.0582
LOTA	0.3523	0.4461	0.79	128	0.4312	0.3613	0.2446	1.48	72	0.1439
TDTA	-3.5536	1.6227	-2.19	128	0.0303	0.6636	1.0713	0.62	72	0.5376
CIR	0.0000	0.0001	-0.36	128	0.7215	0.0036	0.0997	0.04	72	0.9710
TDTL	0.3996	0.3155	1.27	128	0.2076	0.2515	0.1253	2.01	72	0.0485
TLTA	2.9593	1.4684	2.02	128	0.0460	2.3628	1.5199	1.55	72	0.1244
LLPL	-15.5832	8.3904	-1.86	128	0.0656	-4.8315	8.8809	-0.54	72	0.5881
ITA	22.7817	13.1427	1.73	128	0.0854	3.9428	14.6963	0.27	72	0.7892
LDR	-0.3630	0.5004	-0.73	128	0.4695	0.2601	0.5558	0.47	72	0.6412
IED	-6.3532	4.4803	-1.42	128	0.1586	-9.9919	14.3195	-0.70	72	0.4876
INF	-0.0167	0.0260	-0.64	128	0.5206	0.0142	0.0105	1.35	72	0.1814
GDP	0.1629	0.0496	3.28	128	0.0013	0.0997	0.0355	2.81	72	0.0065

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

Table 6 Detailed Regression Results for Random Effects Model (Dependent Variable = ROA)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Intercept	-0.9670	3.1993	-0.30	137	0.7629	-4.1948	1.1580	-3.62	77	0.0005
EAR	0.1251	0.6447	0.19	137	0.8464	2.7783	1.7368	1.60	77	0.1138
LOTA	0.1634	0.3267	0.50	137	0.6179	0.3293	0.1062	3.10	77	0.0027
TDTA	-3.7465	0.7144	-5.24	137	<0.0001	0.4439	0.7712	0.58	77	0.5666
CIR	-0.00003	0.0001	-0.33	137	0.7452	0.0045	0.0200	0.23	77	0.8216
TDTL	0.4728	0.2593	1.82	137	0.0704	0.2606	0.0968	2.69	77	0.0087
TLTA	2.3749	1.3019	1.82	137	0.0703	2.7948	1.0560	2.65	77	0.0099
LLPL	-15.6341	5.2015	-3.01	137	0.0032	-5.3255	5.9682	-0.89	77	0.3750
ITA	28.8674	6.8807	4.20	137	<0.0001	3.4239	7.0338	0.49	77	0.6278
LDR	-0.0923	0.2571	-0.36	137	0.7202	0.1923	0.4847	0.40	77	0.6926
IED	-7.2645	2.0033	-3.63	137	0.0004	-9.5839	4.1556	-2.31	77	0.0238
INF	-0.0154	0.0225	-0.68	137	0.4953	0.0149	0.0118	1.26	77	0.2102
GDP	0.1474	0.0376	3.92	137	0.0001	0.0934	0.0203	4.60	77	<0.0001

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

Table 7 Detailed Regression Results for Pooled OLS (Dependent Variable = ROE)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Intercept	-26.4550	20.2356	-1.31	137	0.1933	1.4367	14.1312	0.10	77	0.9193
EAR	-11.2987	3.5892	-3.15	137	0.0020	-86.7716	24.8419	-3.49	77	0.0008
LOTA	3.9850	1.9635	2.03	137	0.0443	1.6463	0.9703	1.70	77	0.0938
TDTA	-12.8176	3.5856	-3.57	137	0.0005	-6.2071	14.1222	-0.44	77	0.6615
CIR	0.0005	0.0140	0.03	137	0.9726	-0.2134	1.6408	-0.13	77	0.8968
TDTL	2.3141	1.4472	1.60	137	0.1121	0.8943	1.2900	0.69	77	0.4902
TLTA	0.7029	7.7990	0.09	137	0.9283	14.7731	21.7658	0.68	77	0.4993
LLPL	-123.1760	54.6547	-2.25	137	0.0258	-52.8397	87.9464	-0.60	77	0.5497
ITA	97.6726	42.0644	2.32	137	0.0217	108.1223	141.4000	0.76	77	0.4468
LDR	0.1368	1.2597	0.11	137	0.9137	-0.7421	7.1159	-0.10	77	0.9172
IED	-31.4325	16.9541	-1.85	137	0.0659	-115.6040	215.6000	-0.54	77	0.5934
INF	0.0270	0.1316	0.21	137	0.8378	0.2469	0.2017	1.22	77	0.2247
GDP	0.8954	0.2474	3.62	137	0.0004	0.5007	0.2593	1.93	77	0.0572

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

Table 8 Detailed Regression Results for Fixed Effects Model (Dependent Variable = ROE)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Cross section effect 1	0.9112	2.4103	0.38	128	0.7060	-2.6733	4.1658	-0.64	72	0.5231
Cross section effect 2	2.3153	2.5918	0.89	128	0.3734	4.4321	3.8184	1.16	72	0.2496
Cross section effect 3	8.0594	2.2861	3.53	128	0.0006	-0.6685	4.3748	-0.15	72	0.8790
Cross section effect 4	4.3000	2.3980	1.79	128	0.0753	3.1199	3.1281	1.00	72	0.3219
Cross section effect 5	5.7291	2.0878	2.74	128	0.0069	-1.2330	2.4058	-0.51	72	0.6099
Cross section effect 6	6.4892	2.0528	3.16	128	0.0020					
Cross section effect 7	3.4545	2.0582	1.68	128	0.0957					
Cross section effect 8	5.0882	3.9216	1.30	128	0.1968					
Cross section effect 9	4.2158	2.4617	1.71	128	0.0892					
Intercept	-14.2406	27.0579	-0.53	128	0.5996	-11.0184	24.0650	-0.46	72	0.6484
EAR	-10.4845	2.3055	-4.55	128	<.0001	-50.6837	22.6564	-2.24	72	0.0284
LOTA	2.4051	2.8220	0.85	128	0.3956	1.3839	3.7247	0.37	72	0.7113
TDTA	-11.8331	10.2425	-1.16	128	0.2501	5.8007	12.5660	0.46	72	0.6457
CIR	0.0003	0.0012	0.21	128	0.8330	-0.3479	1.3016	-0.27	72	0.7900
TDTL	1.6869	1.7176	0.98	128	0.3279	2.6285	1.5706	1.67	72	0.0986
TLTA	6.4459	7.7784	0.83	128	0.4088	0.1147	18.4472	0.01	72	0.9951
LLPL	-133.1270	52.3197	-2.54	128	0.0121	-85.3613	87.7448	-0.97	72	0.3339
ITA	31.7407	50.3748	0.63	128	0.5298	21.7954	170.9000	0.13	72	0.8989
LDR	-1.2720	1.9981	-0.64	128	0.5255	9.9375	8.6374	1.15	72	0.2537
IED	-25.3757	15.3472	-1.65	128	0.1007	-86.6502	180.3000	-0.48	72	0.6322
INF	0.0356	0.1310	0.27	128	0.7862	0.2185	0.1375	1.59	72	0.1163
GDP	0.8534	0.2587	3.30	128	0.0013	0.6931	0.3716	1.87	72	0.0663

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

Table 9 Detailed Regression Results for Random Effects Model (Dependent Variable = ROE)

	Domestic banks					Foreign banks				
Variable	β	SE	t	DF	p	β	SE	t	DF	p
Intercept	-17.6195	19.9840	-0.88	137	0.3795	-7.2732	11.2071	-0.65	77	0.5183
EAR	-10.5224	4.0685	-2.59	137	0.0107	-59.4007	17.3461	-3.42	77	0.0010
LOTA	3.1098	2.0396	1.52	137	0.1296	1.6498	1.0232	1.61	77	0.1109
TDTA	-11.9364	4.5109	-2.65	137	0.0091	1.2452	7.6601	0.16	77	0.8713
CIR	0.0003	0.0006	0.53	137	0.5947	-0.2984	0.2006	-1.49	77	0.1409
TDTL	1.9694	1.6330	1.21	137	0.2299	1.8033	0.9577	1.88	77	0.0635
TLTA	3.6516	8.2055	0.45	137	0.6570	4.0070	10.5105	0.38	77	0.7041
LLPL	-129.6750	32.7416	-3.96	137	0.0001	-72.3433	59.7124	-1.21	77	0.2294
ITA	60.6965	43.1623	1.41	137	0.1619	65.6954	70.0445	0.94	77	0.3512
LDR	-0.5730	1.6083	-0.36	137	0.7222	5.5188	4.7952	1.15	77	0.2533
IED	-28.4669	12.6122	-2.26	137	0.0256	-101.6730	41.5418	-2.45	77	0.0167
INF	0.0330	0.1420	0.23	137	0.8163	0.2149	0.1183	1.82	77	0.0731
GDP	0.8696	0.2370	3.67	137	0.0003	0.6513	0.2024	3.22	77	0.0019

Note: β = parameter estimate; SE = standard error; t = t-statistic; DF = degrees of freedom (N-k = Number of observations – Number of parameters); p = p-value.

5. CONCLUSIONS AND RECOMMENDATIONS

In this study, regression analysis was performed to investigate the influence of bank-specific and macroeconomic variables on the profitability of 16 banks, including both domestic and foreign banks, in Jordan, during 2001-2015. The study provides an empirical investigation of the main determinants for bank profitability using two indicators, the ROA and ROE. The empirical findings report that the determinants of profitability differ between foreign and domestic banks. Determinants for the profitability of foreign banks expressed in ROA are LOTA, TLTA, IED, TDTA and GDP, while the determinants for the profitability of foreign banks in terms of ROE are EAR, IED and GDP.

For domestic banks, the ITA, TDTA, IED, LLPL and GDP were found to be significant determinants of profitability in terms of ROA, while the EAR, TDTA, LLPL, IED and GDP were found to be significant determinants for the domestic banks' profitability expressed in terms of ROE. The findings reflect that credit risk, funding cost, and GDP, are the most influencing determinants for the profitability of domestic banks in Jordan. This does not concur with earlier works by Kwadwo (2018) and Islam and Nishiyama (2016).

The high profitability of domestic banks tends to be associated with low credit risk, low funding cost, and high levels of management efficiency. The regression results also showed that higher credit risk and bad loan quality in domestic banks, lowers profitability; management of domestic banks should make best use of their resources and increase their efficiency in risk management. Bank size, liquidity, deposits and GDP were the most important determinants of profitability among foreign banks in Jordan. Capital adequacy was negative and significant in explaining the profits of both foreign and domestic banks, that is, the Jordanian foreign and domestic banks do not manage their capital efficiently. This means that high capital levels are associated with lower risk which eventually leads to low profitability; this implies that Jordanian banks do not manage their capital efficiently. This is a consistent with the results of Hashem (2016).

Furthermore, lower liquidity in foreign banks increases profitability, while liquidity is not a significant factor for profitability among domestic banks. This means that foreign banks are working more efficiently by holding assets with lower liquidity and making excessive loans to optimize profits. However, greater liquidity reduces opportunities for banks and decreases their profits.

The results further show that GDP, a measure of how fast an economy is growing, positively affects foreign banks and domestic banks; GDP has a significant influence on the profitability of both foreign and domestic banks. Higher GDP means that the total economic activity within an economy is developing well, leading to higher

bank profitability; this is consistent with the findings of Ling et al. (2013), Havrylchyk and Olena (2006), and Jreisat and Bawazir (2021), where higher gross domestic product (GDP) led to higher profitability for banks across the MENA region.

Foreign banks benefit from economies of scale in increasing profitability, as large size is connected with high profitability. In contrast, this is not true for domestic banks. This is also reflected in Prabowo et al. (2018). Therefore, as a large number of relatively small banks characterizes the Jordanian market, it is suggested to implement mergers and acquisitions among the small banks, also increasing use of technology to keep up with rival banks.

REFRENCES

Abdul Jamal, Amer Azlan and Hamidi, Masyhuri, Abdul Karim and Mohd Rahimie (2012). Determinants of Commercial Banks' Return on Asset: Panel Evidence from Malaysia. *International Journal of Commerce, Business and Management (IJCBM)*, 1(3), 55-62.

Al-Amarneh, Asma'a (2014). Corporate Governance, Ownership Structure and Bank Performance in Jordan. *International Journal of Economics and Finance*, 6(6), 192-202.

Al-Qudah, Ali Mustafa and Jaradat, Mahmoud Ali (2013). The Impact of Macroeconomic Variables and Banks Characteristics on Jordanian Islamic Banks Profitability: Empirical Evidence. *International Business Research*, 6 (10), 153-162.

Alejo, J., Galvao, A., Montes-Rojas, G., & Sosa-Escudero, W. (2015). Tests for normality in linear panel-data models. *The Stata Journal*, 15(3), 822-832.

Athanasoglou, Panayiotis P. and Delis, Matthaios D. and Staikouras, Christos K. (2006). Determinants of Bank Profitability in the South Eastern European Region, working paper, Bank of Greece. Economic Research Department – Special Studies Division.

Ajmani, V. (2009). *Applied econometrics using the SAS system*. Hoboken, New Jersey: John Wiley & Sons.

Azam, Muhammad and Siddiqui, Sana (2012). Domestic and Foreign Banks' Profitability: Differences and Their Determinants. *International Journal of Economics and Financial Issues*, 2 (1), 33-40.

Ben Moussa, Mohamed Aymen (2015). The Determinants of Bank Liquidity: Case of Tunisia. *International Journal of Economics and Financial Issues*, 5(1), 249-259.

Breusch, T. & Pagan, A. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica*, 47, 1287-1294.

Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and

its applications to model specification in econometrics. *The review of economic studies*, 47(1), 239-253.

Buse, A. (1973). Goodness of fit in generalized least squares estimation. *American Statistician*, 27, 106–108.

Central Bank of Jordan (CBJ) (2015). Financial stability report 2015. Jordan.

Chantapong, Saovanee (2005). Comparative Study of Domestic and Foreign Bank Performance in Thailand: The Regression Analysis. Economic Change and Restructuring, 38 (1), 63-83.

Chatterjee, S. and Hadi, A. (2006). *Regression analysis by example*. Hoboken, New Jersey: John Wiley & Sons, Inc.

Davidson, R., and MacKinnon, J. G. (1993). *Estimation and inference in econometrics*. New York: Oxford University Press.

Dinh, Lien (2013), Banks in Vietnam: Determinants of Profitability and Comparison with Domestic Banks, *Proceedings of World Business and Social Science Research Conference* 24-25 October, 2013, Novotel Bangkok on Siam Square, Bangkok, Thailand,1-13.

Doğan, Mesut (2013). Comparison of Financial Performances of Domestic and Foreign Banks: The Case of Turkey. *International Journal of Business and Social Science*, 4 (1), 233-240.

Firtescu, Bogdan and Roman, Angela (2015). Internal and external Determinants of Commercial Banks Profitability: Empirical Evidence from Bulgaria and Romania. *Annals of Faculty of Economics,* 1(1), 896-904.

Gaber, Abugamea (2018) Determinants of Banking Sector Profitability: Empirical Evidence from Palestine. *MPRA* Paper No. 89772. https://mpra.ub.unimuenchen.de/89772/1/MPRA_paper_89772.pdf

Gilbert, S. (2002). Testing the distribution of error components in panel data models. *Economics Letters*, 77(1), 47-53.

Greene, W. H. (2012). *Econometric analysis*. Upper Saddle River, NJ: Pearson Education Inc.

Gyamerah, Ishmael Appiah and Amoah, Benjamin (2015). Determinants of Bank Profitability in Ghana. *International Journal of Accounting and Financial Reporting*, 5 (1), 173-187.

Hashem, Heba Youssef (2016). Determinants of Egyptian Banking Sector Profitability: Time-Series Analysis from 2004-2014. *International Journal of Business and Economic Sciences Applied Research*, 9 (2), 73-78.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the econometric society*, 1251-1271.

Havrylchyk, Olena and Jurzyk, Emilia (2006). Profitability of foreign and domestic banks in Central and Eastern Europe: does the mode of entry matter?" LICOS Discussion Papers

166/2006 - Centre for Institutions and Economic Performance, KU Leuven, 2-31.

Helhel, Yesim (2015). Comparative Analysis of Financial Performance of Foreign and Domestic Banks in Georgia. *International Journal of Finance and Accounting*, 4 (1), 52-59.

Hill, R. C. & Lim, G. C. (2012). *Using SAS for econometrics*. New York, NY: John Wiley & Sons, Inc.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The stata journal*, 7(3), 281-312.

Islam, Md. Shahidul and Nishiyama, Shin-Ichi Nishiyama (2016): The Determinants of Bank Profitability: Dynamic Panel Evidence from South Asian Countries. *Journal of Applied Finance & Bankin*g, 6(3):1-6.

Jaber, Jamil J. and Al-khawaldeh, Abdullah A. (2014). The Impact of Internal and External Factors on Commercial Bank Profitability in Jordan. *International Journal of Business and Management*, 9 (4), 22-30.

Jreisat, A and Bawazir, H (2021): Determinants of Banks Profitability in the Middle East and North Africa Region. https://www.koreascience.or.kr/article/JAKO202115563416845.pdf

Kwadwo, Boateng (2018): Determinants of Bank Profitability: A Comparative. Study of Indian and Ghanaian Banks. JETIR May 2018, 5(5):643-654.

Khrawish, Husni A. and Seiam Waleed Z. (2002). Factors Affecting the Commercial Bank's Profitability in Jordan. *Journal of King Abdulaziz University: Economics and Administration*, 16 (2), 133-150 (In Arabic).

Kosmidou, K., Pasiouras, F., Doumpos, M. and Zopounidis, C. (2004). Foreign versus domestic banks' performance in the UK: a multi criteria approach. *Computational Management Science*, 1(3), 329-343.

Ling, C.S., Ying, G. H., Ling, H. K., Kuan, L. P., & Yean, S. J. (2013). *Economic Factors Affecting Performance of Foreign Banks in Malaysia*. Universiti Tunku Abdul Rahman.

Marandu, Kudzai Raymond; Sibindi, Athenia Bongani (2016): CAPITAL STRUCTURE AND PROFITABILITY: AN EMPIRICAL STUDY OF SOUTH AFRICAN BANKS. Corporate Ownership & Control 14 (1): 8-19.

Montgomery, D. and Peck, E. (1992). *Introduction to linear regression analysis*. New York: John Wiley & Sons, Inc.

Muda, Muhamad, Shaharuddin, Amir and Embaya, Abdel hakim (2013). Comparative Analysis of Profitability Determinants of Domestic and Foreign Islamic Banks in Malaysia. *International Journal of Economics and Financial*, 3(3), 559-569.

Octaviani, Devi Anggun (2014). Domestic and Foreign Bank

Profitability: Panel Evidence on Bank-Specific and Macroeconomic Determinants in Indonesia, Undergraduate Thesis NIM., Submitted as partial pre requirement to complete the Undergraduate Degree (S1), Department of Management Faculty of Economics and Business, Diponegoro University, SEMARANG Indonesia.

Ongore, Vincent Okoth, Kusa and Gemechu Berhanu (2013). Determinants of Financial Performance of Commercial Banks in Kenya. *International Journal of Economics and Financial*, 3 (1), 237-252.

Oxford Business Group (2020): The Report: Jordan 2016. Jordan's banking sector leading growth in the financial services sector. https://oxfordbusinessgroup.com/overview/still-pillar-led-banking-financial-services-sector-remains-engine-growth-kingdom

Pasiouras, Fotios and Kosmidou, Kyriaki (2007): Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance*, 21 (2), 222-237.

Prabowo, Fahrul Puas Sriawan Rio Halim; Buyung Sarita; Dedy Takdir Syaifuddin; Sujono Salma Saleh; Wahyuniati Hamid; Nuryamin Budi (2018): Effect Of Equity To Assets Ratio (EAR), Size, And Loan To Assets Ratio (LAR) On Bank Performance IOSR. *Journal of Economics and Finance (IOSR-JEF*) 9, Issue 4 Ver. II (July-August 2018), 01-06.

Roman, Angela and Dănuleţiu , Adina Elena (2013): AN EMPIRICAL ANALYSIS OF THE DETERMINANTS OF BANK PROFITABILITY IN ROMANIA. Annales Universitatis Apulensis Series Oeconomica, 15(2): 580-593.

Sandhar, Simranjeet Kaur and Janglani, Silky (2013). A Study on Liquidity and Profitability of Selected Indian Cement Companies: A Regression Modeling Approach. *International Journal of Economics, Commerce and Management*, 1 (1), 1-24.

SAS Institute Inc. (2014). *SAS/ETS 13.2 User's Guide*. Cary, NC: SAS Institute Inc.

Trujillo-Ponce, Antonio (2012). What Determines the Profitability of Banks? Evidence from Spain. *Accounting and finance*, 53 (2), 561-586.

Vejzagic, Mirza and Zarafat, Hashem (2014). An Analysis of Macroeconomic Determinants of Commercial Banks Profitability in Malaysia for the Period 1995-2011. *Asian Economic and Financial Review*, 4 (1), 41-57.

Waqas, Bin Khidmat and Rehman, Mobeen Ur (2014). Impact of Liquidity & Solvency on Profitability Chemical Sector in Pakistan. *Economics management innovation (EMI),* 6 (3), 3-13.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and*

panel data. Cambridge, MA: MIT Press.

Xu, TengTeng; Kun Hu, and Udaibir S. Das (2019): Bank Profitability and Financial Stability. IMF Working Papers.

Yong Tan; Christos Floros (2012): Bank profitability and inflation: the case of China. *Journal of Economic Studies*, 39 (6) :675-696.