Studies in Systems, Decision and Control 587

Abdalmuttaleb M. A. Musleh Al-Sartawi
Abdulnaser Ibrahim Nour
Islam Abdeljawad *Editors*

Business Resilience and Business Innovation for Sustainability

The Double-Edged Role of Artificial Intelligence and Other Disruptive Technologies

Springer

Studies in Systems, Decision and Control

Volume 587

The series “Studies in Systems, Decision and Control” (SSDC) covers both new developments and advances, as well as the state of the art, in the various areas of broadly perceived systems, decision making and control–quickly, up to date and with a high quality. The intent is to cover the theory, applications, and perspectives on the state of the art and future developments relevant to systems, decision making, control, complex processes and related areas, as embedded in the fields of engineering, computer science, physics, economics, social and life sciences, as well as the paradigms and methodologies behind them. The series contains monographs, textbooks, lecture notes and edited volumes in systems, decision making and control spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution and exposure which enable both a wide and rapid dissemination of research output.

Indexed by SCOPUS, DBLP, WTI Frankfurt eG, zbMATH, SCImago.

All books published in the series are submitted for consideration in Web of Science.

Abdalmuttaleb M. A. Musleh Al-Sartawi ·
Abdulnaser Ibrahim Nour · Islam Abdeljawad
Editors

Business Resilience and Business Innovation for Sustainability

The Double-Edged Role of Artificial Intelligence and Other Disruptive Technologies

Springer

Editors
Abdalmuttaleb M. A. Musleh Al-Sartawi
College of Business and Finance
Ahlia University
Manama, Bahrain

Abdulnaser Ibrahim Nour
Department of Accounting
College of Business and Communication
An-Najah National University
Nablus, Palestine, State of

Islam Abdeljawad
An-Najah National University
Nablus, Palestine, State of

ISSN 2198-4182 ISSN 2198-4190 (electronic)
Studies in Systems, Decision and Control
ISBN 978-3-031-87583-0 ISBN 978-3-031-87584-7 (eBook)
https://doi.org/10.1007/978-3-031-87584-7

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Scholars, practitioners, and professionals consider business innovation as a necessity to minimize business risk. Through technological innovation, businesses can adapt to societal changes and reduce the impact of both internal and external threats and risks. Business resilience is the ability to deal with challenging conditions by ensuring the existence and prosperity of the organization. In today's rapidly evolving global landscape, businesses face unprecedented challenges and opportunities. The twin imperatives of building resilience against disruptions and driving innovation for sustainable growth have become paramount for long-term success. This book delves into the complex and often paradoxical role of artificial intelligence (AI) and other disruptive technologies in navigating this intricate terrain.

While AI and related technologies offer transformative potential for enhancing business resilience—from predictive analytics for risk mitigation to automated systems for operational continuity—they also present significant challenges. Ethical considerations, potential biases in algorithms, job displacement concerns, and the environmental impact of technology development all demand careful consideration. This double-edged sword requires a nuanced understanding to harness the benefits while mitigating the risks.

This book aims to provide a comprehensive exploration of this dynamic interplay between technology, resilience, and sustainability. It is targeted towards a diverse audience, including academics, students, researchers, business practitioners, policymakers, and anyone interested in the intersection of technology, business strategy, and sustainable development.

We explore a range of critical topics, including but not limited to technological innovation and inclusivity, sustainable educational planning and integrating technology into educational development strategies, the impact of data analytics on business intelligence, financial technology and inventory management efficiency, augmented reality and digital marketing, and many more.

This work is intended to inspire critical thinking, foster collaboration, and contribute to a more informed and responsible approach to harnessing the power of technology for the benefit of both businesses and society.

Our hope is that this book will serve as a valuable resource for navigating the complex challenges and opportunities presented by AI and other disruptive technologies in the pursuit of sustainable business excellence.

Nablus, Palestine, State of

Dr. Abdulnaser Ibrahim Nour
Dr. Islam Abdeljawad

Contents

Banks Profitability Determinants: Empirical Evidence from Developing Countries

Muath Asmar, Hasan Farhood, and Safaa Jerab

Abstract This paper examines the profitability bank determinants in developing countries. Using balanced panel data from 22 operational commercial banks in Palestine and Jordan between 2011 and 2021, a linear model between the theoretically stated characteristics of commercial banks and their profitability is computed. The study reveals that the non-debt tax shield, tangibles, inflation, capital sufficiency, and leverage of commercial banks in Palestine and Jordan have a negative impact on their return on asset. By delivering actual evidence from a developing nation environment, the paper contributes to the body of knowledge and provides guidance to bank managers and policymakers on how to improve financial performance in emerging markets. The findings highlight how crucial it is to keep up strict regulatory frameworks and responsible management techniques in order to guarantee the stability and financial success of banks in these countries.

Keywords Banks' profitability · Developing countries

1 Introduction

A bank functions as a pivotal institution dedicated to managing financial and monetary activities, encompassing deposits, loans, investments, and currency exchange. Its multifaceted roles are integral to the economy, encompassing the provision of essential financial services, fostering economic expansion, optimizing resource allocation, minimizing transaction expenses, fostering liquidity, facilitating investment economies of scale and reducing financial risks. Given the critical significance of this sector, ensuring its sustained effectiveness is imperative.

M. Asmar (✉)
Deparment of Finance, Faculty of Business and Communication, An-Najah National University, Nablus, Palestine
e-mail: asmar@najah.edu

H. Farhood · S. Jerab
Master of Finance, Faculty of Graduate Studies, An-Najah National University, Nablus, Palestine

A. M. A. Musleh Al-Sartawi et al. (eds.), *Business Resilience and Business Innovation for Sustainability*, Studies in Systems, Decision and Control 587,
https://doi.org/10.1007/978-3-031-87584-7_20

Optimal financial performance not only enhances the market value of a particular organization but also fosters industry-wide growth, thereby contributing to the overall economic success. By driving efficiencies, fostering innovation, and enhancing competitiveness, superior financial performance plays a pivotal role in advancing not just individual firms but the collective prosperity of entire economies [1, 2].

Bank performance has been a significant concern for several decades because of its strong connection to the economy [3]. As a form of financial middleman, banks are absolutely necessary for the continued growth and development of an economy [4]. Banks constitute a cornerstone of any country's financial system and actively participate in its financial markets. In an era marked by globalization, the repercussions of a significant bank failure transcend national borders. As the global financial crisis of 2008 demonstrated, the consequences of such failures can spread quickly and widely across international borders in addition to impeding development and economic growth inside the afflicted nation [5].

Several studies that attempted to investigate profitability of bank determinants in developing countries [e.g., 6–9. Although these studies focused on the bank's profitability determinants in emerging countries, however determinants of bank profitability in developing countries of Palestine and Jordan receive less attentions. Palestine has particular political and economic circumstances [10–12] in addition to high rates of unemployment [13]. Jordan has tremendous difficulties and economic problems due to a variety of causes, including as high unemployment, strain on natural resources, and regional instability [14]. Furthermore the banking sector is considering as the largest financial intermediaries and play an important role in the economic cycle in these countries [15].

This paper has the potential to greatly assist decision-makers in improving financial and managerial effectiveness as well as preventing underperformance. Through figuring out what the main variables affecting banks' profitability are, this study can furnish valuable insights for strategic decision-making aimed at enhancing overall bank performance. Moreover, the findings of this research can serve as a comparative framework for other scholars, facilitating cross-country comparisons between the variables affecting bank profitability in Jordan, Palestine, and other nations.

The rest of this paper is structured as flowing: the next section shows a background and literature review. Section 3 delineates our chosen variables and research methodology, elucidating the framework within which our analysis is conducted. In Sect. 4, we present the findings derived from our empirical analysis, shedding light on the factors that significantly impact bank profitability. These findings are then synthesized and interpreted to draw meaningful conclusions in Sect. 5. Additionally, we offer actionable suggestions based on our findings, providing practical recommendations for stakeholders in the banking industry to optimize performance and foster sustainable growth.

2 Literature Review

Academic scholars have focused a lot of emphasis on bank profitability determinants since the 1970s. Several studies focused on the bank specific factors [4, 9] while other studies seeks to examine the macroeconomic determinants of bank performance [16, 17]. A research by Kanapiyanova, Faizulayev [18] intends to investigate the factors that influence banking stability in emerging nations, with a particular emphasis on social and governmental responsibility factors. Ren et al. [19] have considered the effects of digital transformation on bank profit efficiency, while Djalilov and Piesse [6] Analyze the variables that affect bank profitability in the early transition countries of Central and Eastern Europe (CEE) and the late transition countries of the former USSR. The majority of these studies were conducted on private conventional banks. Recent studies have focused on Islamic banks [20, 21]. Other studies have focused on the public sector banks [22].

The factors influencing banks' profitability hold significant theoretical and practical relevance. Despite this, limited research has delved into unraveling the precise determinants of profitability within the banking sector. Moreover, existing studies present a mosaic of findings, lacking consistency. This study aims to scrutinize key factors highlighted in previous research [2, 23–26]. Previous studies have mostly focused on internal variables like size, liquidity, leverage, and that are under management's authority. Furthermore, the effects of outside factors on the profitability of banks have been examined, such as inflation and GDP growth. The non-debt tax shield, tangibility, and bank capital adequacy are also included in this analysis as potential contributing factors.

2.1 Non-debt Tax Shield (NDTS)

The use of non-debt financing as a tax shield is a fundamental concept in finance theory. Essentially, when a company takes on debt, it incurs interest payments which are tax- deductible expenses. This implies that the business can lessen its tax burden by reducing its taxable revenue by deducting the interest it has paid on its loan [27].

The non-debt tax shield (NDTS) refers to the tax benefits that companies, including banks, can obtain without increasing their debt level. By utilizing various provision and deductions available in the tax laws, companies can reduce their taxable income and increase their after-tax profits. The profitability of banks may benefit from the non-debt tax shield [27].

Based on Feld, Heckemeyer [27] in this paper the authors investigate the factors that influence corporate tax avoidance specifically within the banking sector. Through empirical analysis, the authors examine various determinants such as bank size, profitability, leverage, regulatory environment, financial structure, and international operation to understand the dynamics of tax planning strategies employed by banks. The study sheds light on how banking regulations, tax low, and financial structures impact tax avoidance behavior, providing valuable insights into the complexities of tax management within the banking industry. For instance, Graham et al. [28] proposes analyzing the conservatism of debt policies by evaluating if loss carryover, investment tax credits, and depreciation are included in non-debt tax shields.

It is crucial to remember that the effect of non-debt tax shields on bank profitability can differ based on a number of variables, including the bank's size, the applicable tax jurisdiction, and the particular tax laws. Additionally, tax laws and regulations are subject to change, requiring banks to adopt their strategies accordingly to optimize their tax positions and profitability.

Overall, non-debt tax shields provide opportunities for banks to reduce their tax burdens and increase their after- tax profits. By effectively utilizing these tax benefits and implementing sound tax planning strategies, banks can enhance their profitability in a tax efficient manner [29]. Thus, the following hypothesis is formulated:

H_1: Bank profitability in Palestine and Jordan has a relationship with Non-Debt tax shield.

2.2 Tangibility

Previous research has repeatedly demonstrated a favorable correlation between profitability of a company and the assets tangibility. Ahmeti and Iseni [30] found that their findings validated the theory regarding the connection between physical assets and the performance of insurance businesses in Kosovo. The positive tangible asset coefficient, which shows a positive link between tangible assets and the success of insurance enterprises, lends credence to their theory. However, it is noteworthy that this relationship deemed statistically insignificant [28]. Additionally, Dhiab's [29] analysis revealed a favorable connection between profitability and tangibility in the Saudi insurance market. Isayas [2] recognized a positive association between tangibility and profitability in banks within the Ethiopian context.

Numerous studies have revealed a negative association between tangibility and business profitability. For instance Yadav et al. [31] shown that in the Asia-Pacific markets, tangibility and profitability had a negative connection. Furthermore, Gharaibeh and Khaled [32] determined that, particularly in the Jordanian context, elements that negatively affect profitability include debt to assets, company risk, and tangible assets. As a result, the second hypothesis is:

H_2: Bank profitability in Palestine and Jordan has a relationship with tangibility.

2.3 Capital Adequacy

Of the numerous research projects examining the connection between capital sufficiency and organizational profitability, Weersainghe and Perera [33] revealed a negative relationship between profitability and capital adequacy. Also Serwadda and Isah [34] found that there was a negative correlation between profitability and capital sufficiency. On other hand Căpraru and Ihnatov [24] show that in a selected Central and Eastern European nations, capital adequacy and profitability were positively correlated [24]. Also Menicucci and Paolucci [25] found that the European banking industry's capital adequacy and profitability were positively correlated. Farkasdi et al. [35] found that profitability and capital adequacy from Germany were positively correlated. Accordingly, the third hypothesis follows:

H_3: Bank profitability in Palestine and Jordan has a relationship with Capital adequacy.

2.4 Size

Of the numerous research examining the connection between corporation profitability and size, Derbali [36] carried a research that showed a strong correlation between Moroccan banks' size and profitability. Koroleva et al. [37] found that there was a favorable correlation between Chinese enterprises' profitability and size. Saif-Alyousfi [5] found that, in 47 Asian nations, there was a favorable relationship between the size and businesses profitability. In addition, Neupane [38] indicate that the size and profitability of Nepalese commercial banks were positively correlated in their research. On other hand Vera-Gilces et al. [39] revealed that their research, carried out in a developing nation that has adopted the dollar, showed a negative relationship between size and profitability. Thus, the fourth hypothesis states that:

H_4: Bank profitability in Palestine and Jordan has a relationship with size.

2.5 Liquidity

Isayas [2] revealed that there is a positive correlation between profitability and liquidity in Ethiopian banks, which is in line with the other studies that have investigated the relation between corporate profitability and liquidity. In their Bangladeshi study. Rahman et al. [40] found a favorable correlation between profitability and liquidity. In their Zimbabwean study, Sanderson and Le Roux [41] revealed a favorable relationship between profitability and liquidity. Furthermore, in their study carried out in Malawi, Lipunga and Accounting [42] found a favorable association between profitability and liquidity. However, Almaqtari et al. [43] found that there was a negative correlation between profitability and liquidity in Indian commercial banks. Petria et al. [26] found that there was a negative relationship between profitability and liquidity in the banking systems of the member states of the European Union.

H_5: Bank profitability in Palestine and Jordan has a relationship with liquidity.

2.6 Leverage

Among the myriad of research investigating the connection between corporate profitability and leverage, Isayas (2022) revealed a positive connection between leverage and profitability in Ethiopia [2]. Also Saber Said Al-Delawi and Change [44] discovered a positive connection between leverage and profitability among Iraqi Private Commercial Banks in their research. On other hand Farooq et al. [45] identified a negative connection between leverage and profitability in Pakistan. Alarussi and Gao [23] reported a negative connection between leverage and profitability in China. Nguyen and Nguyen [46] documented a negative connection between leverage and profitability using data from Vietnam. The sixth hypothesis is:

H_6: Bank profitability in Palestine and Jordan has a relationship with leverage.

2.7 External Factors

The inflation and gross domestic product (GDP) are two examples of external variables that impact bank profitability [2].

Gross domestic product

Isayas [2] revealed a positive association between GDP and profitability in Ethiopia. Furthermore, in their cross-country research, Le and Ngo [47] revealed a positive relationship between GDP and profitability. From 47 Asian nations. Saif-Alyousfi [5] discovered a positive relationship between GDP and profitability. A positive connection between GDP and bank profitability was also discovered by Athari [1]. The following is the seventh hypothesis:

H_7: Bank profitability in Palestine and Jordan has a relationship with gross domestic product.

Inflation

Athari [1] discovered a positive connection between inflation and bank profitability in Ukraine, which is consistent with the other research investigating the connection between business profitability and inflation. Furthermore, Saif-Alyousfi [5] discovered a positive connection between 47 Asian nations' inflation and profitability. However, in their cross-country research, Le and Ngo [47] found a negative connection between inflation and profitability. Furthermore, Isayas [2] discovered a negative connection between Ethiopian profitability and inflation. The last supposition is:

H_8: Bank profitability in Palestine and Jordan has a relationship with inflation.

3 Research Methodology

The collection of data, sampling strategy, research model, measurement of variable, and analysis are the main topics of this section.

3.1 Data

Data is gathered from banks' annual reports, which include an income statement and statement of financial situation, and are available on the websites of the Jordan Stock Exchange and the Palestine Stock Exchange between 2011 and 2021. Based on the data that was available, twenty-two banks were considered appropriate for the research. A balanced panel data set with 234 observations makes up the final data set.

3.2 Measurement of Variables

This paper components were measured using previous literature as a guide. The independent and dependent variables are shown in Table 1.

Table 1 Measurement of variables

Type of variable	Variables	Variable Measurement
Dependent	Profitability measured by (ROA)	Net income divided by total assets
	Profitability measured by (ROE)	Net income divided by total equity
Independent variables	Non-debt tax shield (NDTS)	Annual depreciation expense divided by total assets
	Tangibility (TAN)	Fixed tangible assets divided by total assets
	Capital adequacy (CA)	Total equity divided by total asset
	Size	Total asset natural log
	Liquidity (LIQ)	Current assets divided by Current liabilities
	Leverage (LEV)	Total debt divided by total assets
	Gross domestic product (GDP)	Growth of the economy for a country. World Bank indicators
	Inflation (INF)	Annual change in the consumer price index. World Bank indicators
	Country dummy (CD)	1 if the company located in Jordan, 0 otherwise

The research's hypotheses are examined by the estimate of the subsequent linear model.

$$\begin{aligned} profitability &= B_0 + B_1 NDTS + B_3 TAN + B_4 CA + B_5 size \\ &\quad + B_6 LIQ + B_7 LEV + B_8 GDP + B_9 iINF \\ &\quad + B_{10} CD + \in \end{aligned} \tag{1}$$

where

e: error term
NDTS: Non-Debt tax shield
TAN: Tangibility
CA: Capital adequacy
Size: size of banks
LIQ: Liquidity
LEV: leverage
GDP: Gross domestic product
INF: Inflation rate
CD: Country dummy.

In this study, we employed a conventional ordinary least square framework (OLS) to estimate the results using random effect or fixed effect based on the Hausman Test results.

4 Finding

This section contains the study's conclusions. The findings of correlation analysis and descriptive statistics are first shown, and then the topic of model estimation is covered.

4.1 Correlation Analysis

Table 2 displays correlation coefficients that shed light on the relationships between several sets of data. According to the table, Return on Assets (ROA) exhibits a positive correlation with Capital Adequacy, Liquidity, GDP, and Inflation, while displaying a negative correlation with Non-Debt Tax Shield, Tangible Assets, Size, and Leverage. Moreover, the relationships among the independent variables generally demonstrate low magnitudes, suggesting the absence of multicollinearity issues in subsequent regression analyses.

Table 2 Pairwise correlations

	ROA	ROE	NDT	TAN	CA	SIZE	LIQ	LEV	GDP	INF	COUNT
ROA	1										
ROE	0.526	1									
NDT	− 0.104	− 0.286	1								
TAN	− 0.193	− 0.310	0.962	1							
CA	0.034	− 0.574	0.523	0.505	1						
SIZE	− 0.028	0.314	− 0.730	− 0.727	− 0.500	1					
LIQ	0.430	− 0.214	0.569	0.444	0.639	− 0.602	1				
LEV	− 0.053	0.569	− 0.344	− 0.345	− 0.873	0.399	− 0.474	1			
GDP	0.115	0.174	0.039	0.099	0.029	− 0.144	− 0.067	− 0.071	1		
INF	0.032	0.092	− 0.082	− 0.076	− 0.026	0.058	− 0.117	− 0.079	0.428	1	
COUNT	0.043	0.064	− 0.345	− 0.422	− 0.144	0.531	− 0.238	− 0.026	− 0.098	0.289	1

4.2 Descriptive Statistics

For the return on assets (ROA) and return on equity (ROE) which are dependent variables, Table 3 presents descriptive statistical measures such as standard deviation, mean, maximum, median, and minimum. It also includes several independent variables, such as non-debt tax shield, tangibility, capital adequacy, bank size, liquidity, leverage, GDP growth, and inflation.

The ROA range for commercial banks in Palestine and Jordan is − 0.074 to 0.082 at the highest, while the ROE runs from − 0.085 to 0.082 at the minimum during the observed period. The mean ROE is 6.8%, whereas the mean ROA is 1%. Furthermore, the average leverage is around 5.681 and the average capital adequacy is 25.3%. These descriptive data shed important light on the financial makeup and operations of the commercial banks that are the subject of the investigation.

Table 3 Descriptive Statistical variables of the study

	Mean	Median	Maximum	Minimum	Std. Dev	Observations
ROA	0.010	0.011	0.082	– 0.074	0.011	234
ROE	0.068	0.077	0.164	– 0.085	0.047	234
NDT	0.003	0.002	0.032	0.001	0.004	234
TAN	0.057	0.023	0.962	0.005	0.127	234
CA	0.253	0.141	0.910	0.075	0.252	234
SIZE	21.092	21.295	24.042	16.246	1.439	234
LIQ	2.329	1.188	33.754	0.671	3.887	234
LEV	5.681	6.073	12.401	0.099	3.143	234
GDP	0.054	0.047	0.166	– 0.093	0.049	234
INF	0.019	0.016	0.048	– 0.009	0.019	234
COUNT	0.658	1	1	0	0.475	234

4.3 Estimation Results

Table 4 shows regression results from different model of the study, with four variants outlined. Models 1 and 3 employed Panel Least Squares, while Models 2 and 4 utilized Cross-section random effects.

The R-squared values indicate that the models account for approximately 27.4 to 48.9% of the total variability in both Return on Assets (ROA) and Return on Equity (ROE). These findings suggest that the selected independent variables collectively contribute to explaining a substantial portion of the variation observed in the dependent variables across the Palestinian and Jordanian commercial banks studied.

The observed positive relationship between bank size and Return on Equity (ROE) align with prior research findings by Derbali [36] and Koroleva et al. [37]. These scholars attribute this relationship to factors influencing profitability within the banking sector. Similarly, the negative relationship between Capital Adequacy and profitability resonates with the findings of Lanka [33] and Serwadda [34], who offer explanations rooted in profitability determinants.

Furthermore, the negative and significant relationship between leverage and ROE echoes the conclusions drawn by Khan [45] and Alarussi [23]. Conversely, the lack of significance for Non-Debt Tax Shield, Tangibility, and inflation in their negative impact on profitability relationship with the findings of Yadav et al. [31] and Le [47].

Moreover, the positive and significant relationship between liquidity, Gross Domestic Product (GDP), and profitability are in line with the research outcomes of Isayas [2], Abdeljawad and Bahlaq [48] and Rahman et al. [40], highlighting the consistent influence of these factors on enhancing profitability within the banking industry. Use random effect for model 2 and model 4 because prop is Correlated Random Effects—Hausman Test 1.000 as presented in Table 5.

Table 4 Estimation results

Model	(ROA) model 1	(ROA) model 2	(ROE) model 3	(ROE) model 4
Variable	Coefficient	Coefficient	Coefficient	Coefficient
NDT	− 0.669	− 1.080	1.107	− 1.549
	(0.643)	(− 0.945)	(0.400)	(− 0.497)
TAN	− 0.009	− 0.002	− 0.033	0.023
	(0.021)	(− 0.045)	(− 0.368)	(0.270)
CA	− 0.022***	− 0.017**	− 0.094***	− 0.084
	(0.006)	(− 2.130)	(− 3.879)	(− 1.676)
SIZE	0.001	0.001	0.008***	0.007
	(0.001)	(0.874)	(2.773)	(0.851)
LIQ	0.003***	0.003***	0.004***	0.004***
	(0.000)	(3.699)	(3.965)	(3.048)
LEV	− 0.001*	0.000	0.003**	0.003
	(0.000)	(− 0.814)	(1.905)	(0.917)
GDP	0.051***	0.050***	0.242***	0.223**
	(0.013)	(2.752)	(4.447)	(2.479)
INF	− 0.016	− 0.015	0.067	0.054
	(0.034)	(− 0.520)	(0.460)	(0.387)
COUNT	0.000	0.001	− 0.004	0.003
	(0.002)	(0.604)	(− 0.537)	(0.185)
C	− 0.007	− 0.004	− 0.125**	− 0.102
	(0.014)	(− 0.253)	(− 2.023)	(− 0.579)
Observations	234.000	234.000	234.000	234.000
R-squared	0.468	0.489	0.462	0.274
Adjusted R-squared	0.447	0.469	0.440	0.245
Durbin-Watson stat	1.654	1.813	0.660	1.003
F-statistic	21.903	23.822	21.346	9.417
Prob (F-statistic)	0	0	0	0
Cross-section random effects	No	Yes	No	Yes

ROA is the dependent variable. Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5 The Hausman Test for model 2 and model 4

Correlated random effects—Hausman Test (model 2 & 4)			
Equation: untitled			
Test cross-section random effects			
Test summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross-section random	0	8	1.000

Table 6 illustrates the relationships between various factors and profitability for both Palestine and Jordan separately. In Palestine, a negative and significant relationship exists between Non-Deferred Taxes (NDTs) and asset tangibility with the return on assets (ROA). Conversely, firm size, liquidity, and GDP exhibit a positive and significant relationship with both ROA and return on equity (ROE).

In Jordan, leverage and current assets (CA) demonstrate a negative and significant relationship with both ROA and ROE. On the other hand, GDP shows a positive and significant relationship with overall profitability.

5 Conclusions

This study delved into the determinants shaping the profitability decisions of commercial banks in Palestine and Jordan. It found that factors such as Tangibility, Capital Adequacy, Leverage, Non-Debt Tax Shield, and inflation exhibit an inverse relationship with profitability among Palestinian and Jordanian commercial banks. Conversely, the size of banks, Liquidity, and Gross Domestic Product (GDP) demonstrate a positive relationship with profitability.

Moreover, the findings underscore the significance of information asymmetry as the primary driver influencing financing decisions within commercial banks. The study suggests that firm boards and policymakers should prioritize efforts to enhance information dissemination and foster trust in disclosed information to mitigate the impact of this asymmetry on profitability outcomes.

It is essential to recognize the limitations of the study, including its small sample size, which impedes the findings' capacity to be applied outside of Palestine and Jordan. Future research endeavors could address this limitation by broadening the scope of the study to encompass a more diverse range of countries, thereby providing a comprehensive understanding of how various variables impact the profitability of commercial banks on a global scale.

Table 6 The sample split between Palestine and Jordan

	(ROA) model 1 Palestine	(ROA) model 2 Palestine	(ROE) model 3 Palestine	(ROE) model 4 Palestine	(ROA) model 5 Jordan	(ROA) model 6 Jordan	(ROE) model 7 Jordan	(ROE) model 8 Jordan
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
NDT	− 2.000	− 1.796**	− 5.054	− 0.488	0.820	0.472*	6.040	3.081
	(− 1.511)	(− 5.472)	(− 1.203)	(− 0.160)	(1.602)	(0.744)	(1.632)	(0.657)
TAN	0.011	− 0.088**	0.234	− 0.112	− 0.013	− 0.105	− 0.068	− 0.687
	(0.236)	(− 5.906)	(1.559)	(− 0.877)	(− 0.247)	(− 1.434)	(− 0.178)	(− 1.248)
CA	0.015	0.060	− 0.077	0.012	− 0.011	− 0.008	− 0.186***	− 0.108
	(0.731)	(0.868)	(− 1.206)	(0.069)	(− 1.414)	(− 0.732)	(− 3.163)	(− 1.232)
SIZE	− 0.001	0.002	0.023**	0.021	0.000	0.000	0.004	0.005
	(− 0.248)	(0.641)	(2.463)	(1.597)	(0.829)	(0.534)	(1.300)	(0.747)
LIQ	0.002***	0.000	0.007***	0.001	− 0.002*	− 0.001	0.006	0.004
	(3.751)	(0.480)	(3.612)	(0.342)	(− 1.648)	(− 0.652)	(0.769)	(0.387)
LEV	0.001	0.000	0.005	− 0.006	− 0.002***	− 0.001**	− 0.005**	0.002
	(1.107)	(− 0.427)	(1.252)	(− 1.421)	(− 5.187)	(− 2.497)	(− 1.916)	(0.574)
GDP	0.055**	0.044	0.185**	0.181***	0.063***	0.065***	0.503***	0.510***
	(2.332)	(1.402)	(2.485)	(3.414)	(4.150)	(4.693)	(4.553)	(5.225)
INF	− 0.128	− 0.122	0.265	− 0.530	− 0.015	− 0.012	− 0.143	− 0.126
	(− 0.810)	(− 1.091)	(0.529)	(− 1.209)	(− 0.731)	(− 0.673)	(− 0.936)	(− 0.974)
C	0.011	− 0.025	− 0.453**	− 0.306	0.014	0.010	0.000	− 0.038
	(0.195)	(− 0.330)	(− 2.551)	(− 1.176)	(1.250)	(0.571)	(0.003)	(− 0.283)
Observations	80.000	80.000	80.000	80.000	154.000	154.000	154.000	154.000
R-squared	0.562	0.680	0.597	0.831	0.352	0.261	0.456	0.287

(continued)

Table 6 (continued)

	(ROA) model 1 Palestine	(ROA) model 2 Palestine	(ROE) model 3 Palestine	(ROE) model 4 Palestine	(ROA) model 5 Jordan	(ROA) model 6 Jordan	(ROE) model 7 Jordan	(ROE) model 8 Jordan
Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Adjusted R-squared	0.512	0.605	0.551	0.791	0.317	0.220	0.426	0.248
Durbin-Watson stat	1.979	2.345	0.933	1.591	0.803	1.018	0.701	0.977
F-statistic	11.373	9.062	13.140	20.989	9.858	6.393	15.207	7.300
Prob (F-statistic)	0	0	0	0	0	0	0	0
Cross-section fixed or random or none effects	None	Fixed	None	Fixed	None	Random	None	Random

ROA and ROE are Dependent variables. Robust standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

References

1. Athari, S.A.: Domestic political risk, global economic policy uncertainty, and banks' profitability: evidence from Ukrainian banks. Post Communist Econ. **33**(4), 458–483 (2021)
2. Isayas, Y.N.: Determinants of banks' profitability: Empirical evidence from banks in Ethiopia. Cogent Econ. Financ. **10**(1), 2031433 (2022)
3. Veeramoothoo, S., Hammoudeh, S.: Impact of Basel III liquidity regulations on U.S. Bank performance in different conditional profitability spectrums. N. Am. J. Econ. Financ. **63**, 101826 (2022)
4. Asmar, M.: Effects of bank-specific factors on the net interest margin of working banks in Palestine. J. Econ. Manag. **33**, 5–24 (2018)
5. Saif-Alyousfi, A.Y.H.: Determinants of bank profitability: evidence from 47 Asian countries. J. Econ. Stud. **49**(1), 44–60 (2022)
6. Djalilov, K., Piesse, J.: Determinants of bank profitability in transition countries: what matters most? Res. Int. Bus. Financ. **38**, 69–82 (2016)
7. Saona, P.: Intra- and extra-bank determinants of Latin American Banks' profitability. Int. Rev. Econ. Financ. **45**, 197–214 (2016)
8. Ben Selma Mokni, R., Rachdi, H.: Assessing the bank profitability in the MENA region. Int. J. Islam. Middle East. Financ. Manag. **7**(3), 305–332 (2014)
9. Ali, M., Puah, C.H.: The internal determinants of bank profitability and stability. Manag. Res. Rev. **42**(1), 49–67 (2019)
10. Asmar, M., Al-Thaher, M., Shraim, O.: Ownership structure effect on the stock returns for companies listed in Palestine exchange. Jordan J. Bus. Adm. **20**(1) (2023)
11. Nour, A.I., Najjar, M., Al Koni, S., Abudiak, A., Noor, M.I., Shahwan, R.: The impact of corporate governance mechanisms on corporate failure: an empirical evidence from Palestine exchange. J. Account. Emerg. Econ. **14**(4), 771–790 (2024). https://doi.org/10.1108/JAEE-10-2022-0283
12. Alia, M.A., Asmar, M., Ali, F.H.: The relationship between disclosure quality and firm performance: evidence from companies listed in Palestine exchange. In: Explore business, technology opportunities and challenges after the Covid-19 pandemic. Springer International Publishing, Cham (2023)
13. Abed, H., Asmar, M.: E-Recruitment in Palestine: a study into applicant perceptions of an online application system. An-Najah Univ. J. Res. B (Hum.) **37**(6), 1205–1230 (2023)
14. Alabdullah, T.T.Y., Asmar, M.: Under COVID-19 pandemic impact: do internal mechanisms play fundamental role in corporations' outcomes. Bus. Ethics Lead. **6**(1), 83–91 (2022)
15. Asmar, M., Farhood, H.: Financial distress determinants: empirical evidence from insurance companies operating in Palestine and Jordan. In: Musleh Al-Sartawi, A.M.A., Nour, A.I. (eds.) Artificial intelligence and economic sustainability in the era of industrial revolution 5.0, pp. 619–632. Springer Nature Switzerland, Cham (2024)
16. Abaidoo, R., Anyigba, H.: Bank performance variability and strands of inflationary conditions. Eur. J. Manag. Bus. Econ. **29**(3), 235–253 (2020)
17. Ozili, P.K., Ndah, H.: Impact of financial development on bank profitability. J. Econ. Adm. Sci. **40**(2), 238–262 (2024)
18. Kanapiyanova, K., et al.: Does social and governmental responsibility matter for financial stability and bank profitability? Evidence from commercial and Islamic banks. J. Islam. Account. Bus. Res. **14**(3), 451–472 (2023)
19. Ren, X., et al.: Does digital transformation increase bank profit efficiency? Evidence from China. Pac. Basin Financ. J. **86**, 102388 (2024)
20. Alharbi, A.T.: Determinants of Islamic banks' profitability: international evidence. Int. J. Islam. Middle East. Financ. Manag. **10**(3), 331–350 (2017)
21. Chowdhury, M.A.F., Rasid, M.E.S.M.: Determinants of performance of Islamic banks in GCC countries: dynamic GMM approach. In: Mutum, D.S., Butt, M.M., Rashid, M. (eds.) Advances in Islamic finance, marketing, and management, pp. 49–80. Emerald Group Publishing Limited (2016)

22. Kantharia, N.J., Biradar, J.: What influence the performance of banks? Evidence from public sector banks in India. J. Indian Bus. Res. **15**(1), 23–39 (2023)
23. Hirzallah, M.R., Nour, A.I., Daas, G., Nour, M.I.: Evaluating technical efficiency of insurance firms operating in Jordan and Palestine. In: Musleh Al-Sartawi, A.M.A., Nour, A.I. (eds.) Artificial intelligence and economic sustainability in the era of industrial revolution 5.0. Studies in systems, decision and control, vol. 528, pp. 491–509 (2024). Springer, Cham. https://doi.org/10.1007/978-3-031-56586-1_36
24. Căpraru, B., Ihnatov, I.: Banks' profitability in selected central and eastern European countries. Procedia Econ. Financ. **16**, 587–591 (2014)
25. Menicucci, E., Paolucci, G.: The determinants of bank profitability: empirical evidence from European banking sector. J. Financ. Report. Account. **14**(1), 86–115 (2016)
26. Petria, N., Capraru, B., Ihnatov, I.: Determinants of banks' profitability: evidence from EU 27 banking systems. Procedia Econ. Financ. **20**, 518–524 (2015)
27. Fares, Z., Nour, A.I.: The determinants of solvency for insurance companies listed on the Palestine exchange. In: Musleh Al-Sartawi, A.M.A., Nour, A.I. (eds.) Artificial intelligence and economic sustainability in the era of industrial revolution 5.0. Studies in systems, decision and control, vol. 528, pp 271–281. Springer, Cham (2024). https://doi.org/10.1007/978-3-031-56586-1_21
28. Graham, J.R., et al.: Tax rates and corporate decision-making. Rev. Financ. Stud. **30**(9), 3128–3175 (2017)
29. Abualhassan, S.A., Nour, A.I., Atout, S., et al.: Does corporate governance moderate the impact of earnings management on capital structure of the listed corporations on Palestine and Amman Bourses. Discov. Sustain. **5**(1), 8 (2024). https://doi.org/10.1007/s43621-024-00229-y
30. Ahmeti, Y., Iseni, E.: Factors affecting profitability of insurance companies: evidence from Kosovo. Acad. Int. Sci. J. **13**(25), 122–142 (2022)
31. Yadav, I.S., Pahi, D., Gangakhedkar, R.: The nexus between firm size, growth and profitability: new panel data evidence from Asia-Pacific markets. Eur. J. Manag. Bus. Econ. **31**(1), 115–140 (2022)
32. Gharaibeh, O., Khaled, M.: Determinants of profitability in Jordanian services companies. Invest. Manag. Financ. Innov. **17**(1), 277–290 (2020)
33. Weersainghe, V.E.I.W., Perera, T.R.: Determinants of profitability of commercial banks in Sri Lanka. Int. J. Arts Commer. **2**(10), 141–170 (2013)
34. Serwadda, I.: Determinants of commercial banks' profitability: evidence from Hungary. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis **66**(5), 1325–1335 (2018)
35. Farkasdi, S., Septiawan, B., Alghifari, E.S.: Determinants of commercial banks profitability: evidence from Germany. JRAK **13**(2), 82–88 (2021)
36. Derbali, A.: Determinants of the performance of Moroccan banks. J. Bus. Socio Econ. Dev. **1**(1), 102–117 (2021)
37. Koroleva, E., Jigeer, S., Miao, A., Skhvediani, A.: Determinants affecting profitability of state-owned commercial banks: case study of China. Risks **9**(8), 150 (2021)
38. Neupane, B.P.: Profitability determinants of Nepalese commercial banks. Pressacademia **12**(1), 40–45 (2020)
39. Vera-Gilces, P., et al.: A look inside banking profitability: evidence from a dollarized emerging country. Q. Rev. Econ. Finance **75**, 147–166 (2020)
40. Rahman, M.M., Hamid, M.K., Khan, M.A.M.: Determinants of bank profitability: empirical evidence from Bangladesh. Int. J. Bus. Manag. **10**(8), 135 (2015)
41. Abel, S., Le Roux, P.: Determinants of banking sector profitability in Zimbabwe. Int. J. Econ. Financ. Issues **6**(3), 845–854 (2016)
42. Mohammad, R., Nour, A.I., Al-Atoot, S.M.: Risk and reward: unraveling the link between credit risk, governance and financial performance in banking industry. J. Islam. Mark. (2024). https://doi.org/10.1108/JIMA-11-2023-0378
43. Almaqtari, F.A., Al-Homaidi, E.A., Tabash, M.I., Farhan, N.H.: The determinants of profitability of Indian commercial banks: A panel data approach. Int. J. Financ. Econ. **24**(1), 168 (2019)

44. Saber Said Al-Delawi, A.: Determinants of profitability in commercial banks: a field study in a sample of the Iraqi private commercial banks. Int. J. Innov. Creat. Chang. **6**(2), 266–287 (2019)
45. Farooq, M., Khan, S., Siddiqui, A.A., Khan, M.T., Khan, M.K.: Determinants of profitability: a case of commercial banks in Pakistan. Hum. Soc. Sci. Rev. **9**(2), 1–13 (2021)
46. Nguyen, T.N.L., Nguyen, V.C.: The determinants of profitability in listed enterprises: a study from Vietnamese stock exchange. J. Asian Financ. Econ. Bus. **7**(1), 47–58 (2020)
47. Le, T.D.Q., Ngo, T.: The determinants of bank profitability: a cross-country analysis. Cent. Bank Rev. **20**(2), 65–73 (2020)
48. Abdeljawad, I., Bahlaq, A.: Determinants of net interest margin for banks operating in Palestine. An-Najah Univ. J. Res. B (Hum.) **37**, 1565–1594 (2023)