The Relationship Between Liquidity Risk and Financial Performance: A Comparative Analytical Study of A Sample of Banks Operating in Palestine Between 2014-2023

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Abstract: Overview: This study aimed to investigate the relationship between liquidity risk and financial performance. The liquidity risk measurements included: total equity to total assets, total loans to total assets, total deposits to total assets, and total loans to total equity. On the other hand, financial performance measures include: return on assets (ROA), return on equity (ROE), and return on sales (ROS). **Objectives:** The current study aims to achieve the following objectives: Analyzing the relationship between liquidity risks and financial performance of banks operating in Palestine, advising banks on suitable techniques and strategies to manage such risks, among other objectives. **Methodology:** Data was extracted from annual reports for the period of ten (10) years, and analyzed using EViews and Stata. The current study uses descriptive- analytical procedures that rely on secondary data extracted from the financial statements of banks operating in Palestine. **Results:** The study used a multi-regression model and explained that there are different relationships between liquidity risk and financial performance variables for the banks, where both ROA and ROE had negative relationship with TDTE, TLTA, TLTE and TETA. On the other hand, ROS had positive relationship with TDTE only. **Conclusions:** The analysis showed that the (TDTE) is the most relevant variable for measuring liquidity risk. The results support a negative relationship between TDTE and both ROA and ROE. However, a negative relationship between liquidity risk and ROS, is not validated. TDTE does not show a statistically significant or consistent impact on ROS, suggesting that ROS is influenced by other operational and sales-related factors, beyond liquidity risk considerations. **Recommendations:** The study recommended that banks should enforce further liquidity risk controls using recent technology, as well as applying risk-mitigation techniques to alert banks for any liquidity risks in the future.

Keywords: Liquidity risk, financial performance, Risk management, financial failure.

العلاقة بين مخاطر السيولة والأداء المالي: دراسة تحليلية مقارنة لعينة من البنوك العاملة في فلسطين بين عامي 2014-2023

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ملخص: مقدمة: هدفت هذه الدراسة إلى تحليل العلاقة بين مخاطر السيولة والأداء المالي. وشملت مقاييس مخاطر السيولة: إجمالي حقوق الملكية إلى إجمالي الأصول، وإجمالي القروض إلى إجمالي الأصول، وإجمالي الودائع إلى إجمالي الأصول، وإجمالي القروض إلى إجمالي حقوق الملكية. من جهة أخرى، شملت مقاييس الأداء المالي: العائد على الأصول (ROA)، والعائد على حقوق الملكية (ROE)، والعائد على المبيعات (ROS). **الاهداف:** تهدف الدراسة الحالية إلى تحقيق الأهداف التالية: تحليل العلاقة بين مخاطر السيولة والأداء المالي للبنوك العاملة في فلسطين، وتقديم المشورة للبنوك حول التقنيات والاستراتيجيات المناسبة لإدارة هذه المخاطر، من بين أهداف أخرى. **المنهجية:** استُخلصت البيانات من التقارير السنوية لفترة عشر (10) سنوات، وحللت باستخدام برنامجي EViews وStata. حيث تعتمد الدراسة الحالية على إجراءات وصفية تحليلية تعتمد على البيانات الثانوية المستخرجة من القوائم المالية للبنوك العاملة في فلسطين والبالغ عددها سبع بنوك خلال نفس الفترة. **النتائج:** استخدمت الدراسة نموذج الانحدار المتعدد، وأوضحت وجود علاقات متباينة بين مخاطر السيولة ومتغيرات الأداء المالي للبنوك، حيث كان لكلٍ من معدل العائد على الأصول (ROA) ومعدل العائد على حقوق الملكية (ROE) علاقة سلبية مع كلٍ من TDTE وTLTA وTLTE وTETA. وفي المقابل، كان لمعامل العائد على المبيعات (ROS) علاقة إيجابية مع TDTE فقط. **الاستنتاجات:** أظهر التحليل أن TDTE هو المتغير الأكثر أهمية لقياس مخاطر السيولة. وتدعم النتائج وجود علاقة سلبية بين TDTE وكلٍ من العائد على الأصول (ROA) والعائد على حقوق الملكية (ROE). ومع ذلك، لم يتم إثبات وجود علاقة سلبية بين مخاطر السيولة والعائد على المبيعات (ROS). ولا يُظهر TDTE تأثيرًا إحصائيًا ذا دلالة على العائد على الأصول (ROS)، مما يشير إلى أن العائد على المبيعات (ROS) يتأثر بعوامل أخرى تتعلق بالتشغيل والمبيعات، تتجاوز اعتبارات مخاطر السيولة. **التوصيات:** أوصت الدراسة بضرورة قيام البنوك بفرض المزيد من ضوابط مخاطر السيولة باستخدام التكنولوجيا الحديثة، فضلاً عن تطبيق تقنيات التخفيف من المخاطر لتنبيه البنوك لأي مخاطر سيولة في المستقبل.

الكلمات المفتاحية: مخاطر السيولة، الأداء المالي، إدارة المخاطر، الفشل المالي.

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Introduction

Recent trends in financial markets within the past two decades; accompanied by financial and technological globalization, have impacted the financial service industry, and especially banks (Cheng, *et al.,* 2020). Such changes, which were both tremendous and fast, raised concerns about managing risks associated with conducting financial transactions within banks at different parts of the world (Meliza *et al.*, 2024). International trade and exchange amongst customers and banks raised additional pressure to investigate the different risks associated with financial services and ways to manage these. Such risks have negatively impacted on banks' ability to produce returns, and some banks incurred losses (Cheng, *et al.*, 2020). This all led to the need for continuous evaluation of financial performance alongside evaluation of different risks (Kamran *et al.,* 2023). Banks started to use different techniques to avoid risks, as banks needed to perform financial analysis in order to determine level of achievement of its objectives, and what deviations were faced and how to overcome these (Khatib *et al.*, 2022; Cheng *et al.*, 2020). These banks also adapted advanced programs for risk assessment, and used computerized algorithms to determine what caused losses, and how to overcome these, and mapped decisions based on complex processes that ultimately led to lowering such risks (Meliza, *et al.* 2024). The Palestinian context is rich with risks including: Political, economic, and other risks. The Palestinian banking industry faces liquidity risk associated with generating profits; as the industry in growing rapidly in unstable conditions, which adds value to the current discussion of this industry, which constitutes a major gap in literature about the banking industry in less developed countries (Khatib, *et al.* 2022). The study contributes to literature by focusing on a long time series, focusing on Palestinian context, and analyzing liquidity risk

and profitability in a growing industry that is contributing to the overall Palestinian economy. The following parts discuss in detail this topic, and how banks are linking different liquidity risks measurements and financial performance indicators to reach their objectives. The first part explains the problem statement, followed by objectives, hypothesis, significance, and literature review. These are followed by methodology, discussion of results, and conclusions.

Problem statement

In the late 1970's, the banking industry was boosted because of an increase in the demand for financial services (Abbas *et al.*, 2019). Competition increased amongst these banks in order to attract as many customers and funds as possible, and gave these attractive interests (Chy, 2024). Banks also offered loans and other financial services, which altogether increased risks for banks, and led to the need for additional analysis of such risks, especially the ones associated with newly introduced services that aimed to help banks achieve their objectives (Kamran, *et al.* 2023). The current study aims to analyze the impact of liquidity risks associated with banks' services on banks' financial performance. This is driven by the fact that banks expanded their service range without thorough analysis of different risks associated with each service (Abbas *et al.*, 2019; Zaphaniah, 2013). For example, banks offered loans to customers with minimal credit worthiness, and with no collateral. Banks also financed over the sea transactions with little background for the traders and what they are trading. Banks did not focus on cash flows from such investments and services, which all meant that such expansion was non-controllable (Abbas, *et al.* 2019). This was also true for banks operating in Palestine. As the political and economic conditions are deteriorating, banks rushed into providing individuals and businesses many services that carried different

Nael Sayed Ahmed & Mohammed Abu Harb

levels of risk (Khatib, *et al.* 2022). Such random development in the banking industry impacted on competition, and overall ability of customers to evaluate risks and problems related to each service. Banks and customers are now suffering the consequences of such unplanned progression, and risk mitigating efforts are conducted to try and help both parties. Based on the above, this study examines one important reason for fluctuation in financial performance, i.e., the relationship to liquidity risk measurements. The main research question is: *What is the relationship between liquidity risk and financial performance of banks operating in Palestine?* This question is broken into the following sub-questions:

1. What is the relationship between risk measurements and ROA of banks operating in Palestine?
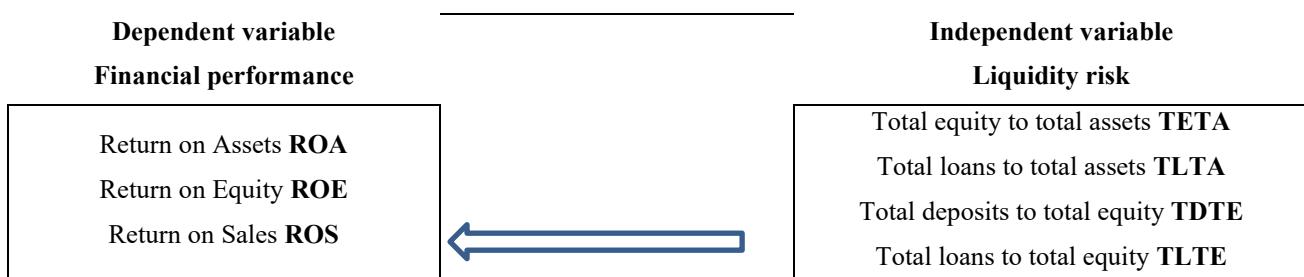
2. What is the relationship between risk measurements and ROE of banks operating in Palestine?

3. What is the relationship between risk measurements and ROS of banks operating in Palestine?

On the other hand, banks use many financial performance indicators. Our study focuses on ROA, ROE, and ROS, as these are considered popular measurements used in financial performance evaluation and found in many previous studies that addressed similar topics. The study is considering the period between 2014-2023 where all banks included in the sampling process continued to exist during this period. The following is the study model based on the above questions:

Dependent variable	Independent variable
Financial performance	**Liquidity risk**
Return on Assets **ROA**	Total equity to total assets **TETA**
Return on Equity **ROE**	Total loans to total assets **TLTA**
Return on Sales **ROS**	Total deposits to total equity **TDTE**
	Total loans to total equity **TLTE**

Figure (1): Study model.

Study objectives

Financial risks are considered as a major problem that financial industry, including banks, face. Recently, and because of different political, economic, and even social changes, such risks became even more alerting (Chy, 2024; Cheng *et al*., 2020). Competition among banks added more to existing problems for banks. All this, accompanied by banks' willingness to add new services to try and maintain a suitable profit level, made it even harder to stay in competition within local and international markets (Kamran, *et al.* 2023). The current study aims to achieve the following objectives:

1. Analyze the relationship between liquidity risks and financial performance of banks operating in Palestine.

2. Advice banks on suitable techniques and strategies to manage such risks,

3. Understand how banks can budget future resources that are required to help these stay competitive and avoid losses related to poor risk management.

Study hypothesis

Based on the study objectives and questions; the current study aims to test the following main hypothesis: *There is a positive relationship between liquidity risk and financial performance of listed banks in*

Palestine. This is broken into the following sub-hypothesis:

H1: There is a negative relationship between liquidity risk measurements and ROA of banks operating in Palestine.

H2: There is a negative relationship between liquidity risk measurements and ROE of banks operating in Palestine.

H3: There is a negative relationship between liquidity risk measurements and ROS of banks operating in Palestine.

Study significance

The current economic and political situation of Palestine lends the current study its importance, especially as banks operating in the region are considered a major player in the financial system (Kamran *et al*., 2023; Khatib *et al*., 2022). Banks also contribute to enabling international trades, enhancing and controlling liquidity in local markets, and redistributing funds among demanders and suppliers of funds (Nour & Momani, 2021; Ahmed *et al*. 2022). This all-increases risks associated with providing financial services. Liquidity, credit, and other risks all increased substantially during the past couple of decades, which all added more burden for banks' strategic and operational management (Olofin *et al*., 2024; Cheng *et al*., 2020). The current study investigates the liquidity risks that banks face in this area, as well as its impact on financial performance. The main results expected from this study can help banks survive overall market conditions, as well as effectively managing their operations, while maintaining a regulatory framework which reduces risks and increases profitability.

Literature review

Explaining liquidity risk

Petty *et al.* (1982) identified risk as a measurement of fluctuation in future returns. Risk was also defined as uncertainty about the future, which can affect operational, strategic

and overall objectives (Olofin, *et al*. 2024). Dorfman (2008) also highlighted that risk is the inability to anticipate future probabilities, and losses associated with each probability. On the other hand, previous studies explained that amongst the risks that banks face is liquidity risk, which relates to weak ability of using money in banks, and the need to find new methods of using the money in suitable investments (Ahmed *et al*., 2022; Kamran *et al*., 2023). Liquidity risk is defined as the inability of banks to satisfy current obligations as they come due. It also shows that banks need not liquidate assets or finance new assets using costly resources (Cheng *et al*., 2020; Khreisat *et al*., 2024). Liquidity risk is caused by two groups of factors: problems of liquidating current assets, and problems related to withdrawal of funds by depositors, and imbalance between cash inflows and outflows (Chy, 2024; Ahmed *et al*., 2022). Basel III requirements for liquidity risks are implemented in banking industry by the Palestine Monetary Authority (PMA) since 2018 (Ahmed, *et al.,* 2022), including Liquidity Coverage Ratio (LRC), and High-quality Liquid Assets (HQLA) that can be easily and immediately converted into cash to meet their liquidity needs for 30 calendar days liquidity stress ratio (Olofin, *et al.,* 2024).

Liquidity risk has many types including: operational liquidity risk and market liquidity risk (Zaphaniah, 2013). These risks can be eliminated through multiple steps that can be used by banks including: good information management system, central control over cash, diversification of financing sources, having emergency plans, and proper analysis of financing sources (Meliza, *et al.,* 2024). Internal control at banks need to be aware about how banks manage their resources, especially off-balance sheet items, which need to improve liquidity requirements (Kamran *et al*., 2023; Albaqqar, 2015). Basel requirements related to

capital requirements are based on risk assessment, as liquidity is considered a major character of banks over other financial institutions (Yunana *et al*., 2024; Golubeva *et al*., 2019). Liquidity risks can alert customers to withdraw their deposits, which can lead to bankruptcy (Kamran *et al*., 2023; Khatib *et al*., 2022). Previous studies used total equity to total assets ratio as a measure of liquidity risk (Chy, 2024). Previous studies used other measures for liquidity and credit risk measurement including: total loans to total assets, total deposits to total assets, and total loans to total equity (Chen *et al*., 2021; Golubeva *et al*., 2019). The current study builds on previous literature to further investigate liquidity risks at listed banks operating in Palestine.

Explaining financial performance

Financial performance is defined as measuring the ongoing operations of banks that lead to reaching predetermined financial objectives (Meliza, *et al.,* 2024). This requires a set of evaluation tools, and the ability to compare performance with these objectives (Kamran *et al*., 2023; Khatib *et al*., 2022). This also requires documenting all control procedures that enable handling budgets, financial statements, costs, and review of general decision-making process; that leads to achieving these objectives (Mikou *et al*., 2024; Kamran *et al*., 2023). Banks' performance has been investigated by literature, which focused on the factors that affect financial performance (Chen, *et al.* 2021). The literature suggested that suitable volume of deposits and funds significantly impact on the banks' ability to enter financing and investing activities (Kamran *et al*., 2023; Khatib *et al*., 2022). This also helps banks offer a wider range of services, and generate additional revenues (Meliza *et al*., 2024; Nour *et al*., 2022). On the other hand, the ability of banks to manage operations that negatively impact on profitability affects overall performance, and services provided by banks for different customers (Olofin *et al*., 2024; Golubeva *et al*., 2019). Also, acquiring funds with suitable cost enables the banks to invest these funds in a profitable alternative that allows for the highest level of profit with the lowest possible costs (Kamran *et al*., 2023; Khatib *et al*., 2022). If liquidity is insufficient, it would negatively impact on the financial performance of banks, especially if the local currency is not enough to finance local investors, while being unable to exchange it for foreign currency (Khatib *et al*., 2022; Cheng *et al*., 2020). Finally, recent banking operations allowed for the highest profits with the lowest costs, which allowed for maximum use of resources by banks for the benefit of achieving their financial objectives (Chy, 2024). Evaluation of financial and non-financial performance in banks is considered essential for banks continuous control over operations (Jallad & Antari, 2024). The literature suggests that monitoring performance can help discover; and evaluate different risks including: liquidity, credit, exchange rate, interest rate, and capital risks (Yunana *et al*., 2024; Abbas *et al*., 2019). Zaphaniah (2013) explained that multiple regression can be used to evaluate the relationship between financial performance and liquidity risks at banks. The study which was conducted in Kenya during 2008-2012 found a negative impact of liquidity risk on financial performance (Mikou *et al.,* 2024). Similarly, Simon, Sawandi, & Hamid (2014), found a negative relationship for banks operating in Malaysia. Other studies also highlighted the negative impact of liquidity risk over financial performance, and the need to properly manage risks for banks in different parts of the world. The study by Albaqqar (2015) conducted on Libyan banks also highlighted a negative impact of liquidity risk on financial performance, which was also the results received by Naji, Mhedi, Falahi, & Shadmehri, (2017) study on Iraqi banks. The same results

were also achieved by Meliza, *et al.* (2024), Cheng, *et al.* (2020), Abbas, *et al.* (2019), and Ebenezer, Islam, & Yusoff, (2019). These studies alerted additional focus on banks operating in Palestine, as many of the studies were conducted on countries which faced similar conditions as these faced currently by Palestinians.

Based on the above discussion, it is clear that research gaps include: the lack of focus on Palestinian context, the lack of link between liquidity risk and profitability within the Palestinian context, and the need to investigate a long series of years to receive better results about banks as the industry is growing fast, and need to further investigate this industry on the basis of solid results in the future.

Study methodology

The current study uses descriptive-analytical procedures that rely on secondary data extracted from the financial statements of banks operating in Palestine. It also used publications and recent literature that discussed the topic in different parts of the world, which added to the discussion in terms of developing the study hypothesis, and improving the overall analysis of results obtained using statistical analysis. The sample selected included 7 banks that existed between 2014-2023, and continued to exist until present date. Data was extracted from annual reports for the period of ten (10) years, and analyzed using EViews and Stata. The sample included Islamic and conventional banks. This helped cover different sectors of the banking industry in Palestine and added to discussion later on. The reason for selecting total equity to total assets (TETA) is related to capitalization of assets and how banks are financing their assets using their own equity, which limits the use of debt financing and lowers liquidity risks; while increasing profitability of the banks. On the other hand, total loans to total assets (TLTA) were selected

as it shows how banks used loans to finance their assets and how this might impact short term and long-term financial obligations. Finally, total debt to total equity (TDTE) was selected to understand how debt financing is used compared to equity as banks of banks capital structure. These are all related to banks' compliance with Basel III requirements; and literature suggested using these in order to understand liquidity risks (Meliza, *et al.* 2024; Cheng, *et al.* (2020). The reason for selecting these three variables as these are the most common on previous literature and can help establish a clear vision about the banking industry in Palestine, and what liquidity problems these might face.

Study results

The current study aims to investigate the impact of liquidity risk on financial performance of banks operating in Palestine during 2014-2023, in order to investigate the study hypothesis, the following models were developed:

- First model : $ROA_{it} = \beta_0 + \beta_1 TETA_{it} + \beta_2 TLTA_{it} + \beta_3 TDTE_{it} + \beta_4 TLTE_{it} + \varepsilon_{it}$

- Second model : $ROE_{it} = \beta_0 + \beta_1 TETA_{it} + \beta_2 TLTA_{it} + \beta_3 TDTE_{it} + \beta_4 TLTE_{it} + \varepsilon_{it}$

- Third Model : $ROS_{it} = \beta_0 + \beta_1 TETA_{it} + \beta_2 TLTA_{it} + \beta_3 TDTE_{it} + \beta_4 TLTE_{it} + \varepsilon_{it}$

Where,

ROA_{it} : Return on assets

ROE_{it} : Return on equity (capital)

ROS_{it} : Return on sales

$TETA_{it}$: Total equity to total assets

$TLTA_{it}$: Total loans to total assets

$TDTE_{it}$: Total deposits to total equity

$TLTE_{it}$: Total loans to total equity

ε_{it} : Error term

The correlation matrix, Table 1. provides insights into the relationships between financial performance metrics and capital structure

indicators, with statistical significance denoted by asterisks (*** for P ≤ 0.001, ** for P ≤ 0.01, and * for P ≤ 0.05). A highly significant positive correlation between ROA and TETA (0.88***) suggests that firms with a higher proportion of equity relative to assets tend to utilize their assets more efficiently. Similarly, the strong and highly significant positive correlation between ROE and ROS (0.65***) indicates that greater profitability from sales is associated with increased returns on equity. On the other hand, the significant negative correlation between ROE and TETA (-0.39***) implies that firms with a higher

equity proportion relative to total assets may experience lower returns on equity, potentially due to reduced financial leverage. Additionally, the highly significant positive correlation between TLTE and TLTA (0.65***) suggests that firms with higher loan-to-equity ratios also tend to have higher loan-to-asset ratios. Other correlations are relatively weak, indicating minimal direct relationships between those variables. The statistical significance of these correlations emphasizes their importance, warranting further investigation into their impact on financial performance.

Table (1): Correlation Matrix of Financial Performance and Capital Structure Indicators.

Variable	ROA	ROE	ROS	TETA	TLTA	TDTE	TLTE
ROA	1						
ROE	-0.05	1					
ROS	0.14	0.65 ***	1				
TETA	0.88 ***	-0.39 ***	-0.03	1			
TLTA	0.05	0.07	0.02	0.02	1		
TDTE	-0.05	0.16	-0.09	-0.08	-0.06	1	
TLTE	0.01	-0.01	0.13	0	0.65 ***	-0.14	1

The following sub-sections investigate each model separately:

First model

The first model examines the results obtained for the effect of liquidity risk measures on banks' financial performance using ROA. In the analysis of panel data regression models, the Hausman test is used to determine whether the random-effects model is better than the fixed-effects model. The null hypothesis of this test states that the difference between the vectors of coefficient estimates for the random and fixed effects model is statistically significant in favour of the random effects model.

H0: βR−βF=0 (There is no difference between the fixed-effects model and the random-effects model). The random-effects model is appropriate (Generalized Least Squares method).

H1: βR−βF≠0 (There is a significant difference between the fixed-effects model and

the random-effects model). The fixed-effects model is appropriate (Ordinary Least Squares method). If the p-value is greater than the conventional threshold of 5%, the null hypothesis is accepted.

Table (2): Hausman test.

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.747628	4	0.0449

The results of the Hausman test indicate that the fixed-effects model is more efficient because the p-value (**0.0449**) is lower than the conventional threshold of 5%. Therefore, the selected model is the random-effects model. In order to select between the random effect model and the pooled regression, the Breusch and Pagan Lagrangian multiplier test is used where the significant test implies to select the pooled regression instead of the random effects model. The results of this test are shown in table (3):

Table (3): Breusch and Pagan Lagrangian multiplier test.

Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
BP-LM test	0.0200	1	0.4497

The results of the BP-LM test indicate that the pooled regression model is more efficient than the random effect model because the p-value (**0.4497**) is higher than the conventional threshold of 5%. This is emphasising that the random effect model should not be selected. The last test is the Redundant Fixed Effects test or what is known as (Chow test) which compares between the pooled regression and the fixed effects model in favour of the fixed effects model when the test is significant, the results of this test are shown in table (4):

Table (4): Redundant Fixed Effects Test (Chow test).

Redundant Fixed Effects Tests			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.584700	(6,50)	0.0293
Cross-section Chi-square	18.910665	6	0.0043

The results of the Chow test indicate that the fixed effects model is more efficient than the pooled regression model because the p-values (**0.0293 and 0.0043**) are lower than the conventional threshold of 5%. This is emphasising that the fixed effects model should be used. The results of estimating the Fixed-effects model are shown in table (5):

Table (5): Fixed effects model.

Dépendent Variable : ROA					VIF
Fixed Effects					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
TETA	-0.1343	0.0170	-7.8844	0.0000	1.0100
TLTA	0.0316	0.0186	1.6996	0.0945	1.7600
TDTE	-0.0038	0.0003	-14.3239	0.0000	1.0300
TLTE	-0.0036	0.0020	-1.8191	0.0740	1.7800
C	0.0665	0.0056	11.9144	0.0000	--------
R-square 0.972482	Adjusted R-square 0.967818	F-statistic 208.5050	Prob(F-statistic) 0.000000		

$ROA = -0.1343 * TETA + 0.0316 * TLTA - 0.0038 * TDTE - 0.0036 * TLTE + 0.0665$

The estimation results show that the coefficients associated with the variables total loans to total assets (TLTA), and total loans to total equity (TLTE) are not statistically significant, as their p-values are greater than 5% in the estimated fixed effects model. On the other hand, the coefficients associated with the variables total equity to total assets (TETA), and total deposits to total equity (TDTE) have significant effects on Return on Assets as their p-values are less than the 5% threshold. The adjusted coefficient of determination is high for the model, at 96.78%, indicating a high quality of fit, and the model is globally significant, as Prob (F-stat) is less than 5%. The values of variance inflation factor (VIF) are lower than 10 indicating that there is no multicollinearity problem exist in estimating the model. The

results show that both TETA and TDTE negatively affect ROA, which means that, the increase of the total equity to total assets (TETA) ratio decreases the ROA of banks holding the other variables constant, and similarly, the increase of total deposits to total equity (TDTE) ratio decreases the ROA of banks holding the other variables constant. Thus, a high TETA or TDTE ratios reflect better bank capitalization, which reduces its financial leverage. This strengthens the bank's resilience to losses and enhances its ability to generate stable returns.

Second model

The second model examines the results obtained for the effect of liquidity risk measures on banks' financial performance using ROE. Table (6) shows the results of

Nael Sayed Ahmed & Mohammed Abu Harb

Hausman test in order to select between the fixed-effects model and the random-effects model:

Table (6): Hausman test.

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.538181	4	0.3380

The results of the Hausman test indicate that the random-effects model is more efficient because the p-value (**0.338**) is higher than the conventional threshold of 5%. Therefore, the selected model is the random-effects model. In order to select between the random effect

Table (8): Random effects model.

model and the pooled regression, the Breusch and Pagan Lagrangian multiplier test is used, and the results of this test are shown in table (7):

Table (7): Breusch and Pagan Lagrangian multiplier test.

Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
BP-LM test	35.89	1	0.0000

The results of the BP-LM test indicate that the random effects model is more efficient than the pooled regression model because the p-value (**0.0000**) is lower than the conventional threshold of 5%. This is emphasising that the random effect model should be selected. The results of estimating the Random-effects model are shown in table (8):

Dependent Variable: ROE					VIF
Random Effects					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
TETA	-0.3410	0.1450	-2.3516	0.0222	1.0100
TLTA	-0.0598	0.4373	-0.1368	0.8916	1.7600
TDTE	-0.0116	0.0029	-3.9420	0.0002	1.0300
TLTE	-0.0336	0.0552	-0.6078	0.5458	1.7800
C	0.2371	0.0501	4.7300	0.0000	--------
R-squared 0.473543	Adjusted R-squared 0.351330	F-statistic 3.874731	Prob(F-statistic) 0.000186		

ROE =-0.3410* TETA -0.0598* TLTA -0.0116* TDTE -0.0336* TLTE+ 0.2371

The estimation results show that the coefficients associated with the variables total loans to total assets (TLTA), and total loans to total equity (TLTE) are not statistically significant, as their p-values are greater than 5% in the estimated random effects model. On the other hand, the coefficients associated with the variables total equity to total assets (TETA), and total deposits to total equity (TDTE) have significant effects on Return on Equity as their p-values are less than the 5% threshold. The adjusted coefficient of determination is moderate for the model, at 35.13%, and the model is globally significant, as Prob (F-stat) is less than 5% indicating a moderate quality of fit. The results show that both TETA and TDTE negatively affect ROE, which means that, the increase of the total equity to total assets

(TETA) ratio decreases the ROE of banks holding the other variables constant, and similarly, the increase of total deposits to total equity (TDTE) ratio decreases the ROE of banks holding the other variables constant.

Thus, a high total deposit to total equity (TDTE) and total loans to total assets (TLTA) ratios can negatively impact Return on Equity (ROE), as it reduces the bank's ability to generate strong returns on its own capital. The costs associated with deposits, such as interest paid to depositors, may outweigh the profits earned, leading to lower returns on equity. Additionally, an elevated TDTE ratio exposes the bank to liquidity risks and financial instability, which can further weaken its financial performance.

Third model

The third model examines the results obtained for the effect of liquidity risk measures on banks' financial performance using ROS. Table (9) shows the results of Hausman test in order to select between the fixed-effects model and the random-effects model:

Table (9): Hausman test.

Correlated Random Effects - Hausman Test			
Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.946065	4	0.2032

The results of the Hausman test indicate that the random-effects model is more efficient because the p-value (0.2032) is higher than the conventional threshold of 5%. Therefore, the selected model is the random-effects model. In order to select between the random effects model and the pooled regression, the Breusch and Pagan Lagrangian multiplier test is used, and the results of this test are shown in table (10):

Table (10): Breusch and Pagan Lagrangian multiplier test.

Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
BP-LM test	2.46	1	0.0583

The results of the BP-LM test indicate that the pooled regression model is more efficient than the random effects model because the p-value (0.0583) is higher than the conventional threshold of 5%. The results of estimating the Pooled Regression model are shown in table (11):

Table (11): Pooled Regression.

Dependent Variable: ROE					
Pooled Regression					VIF
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
TETA	-0.0089	0.0164	-0.5401	0.5910	1.0100
TLTA	-0.7490	0.3307	-2.2646	0.0269	1.7600
TDTE	-0.0036	0.0015	-2.3278	0.0230	1.0300
TLTE	0.1114	0.0377	2.9538	0.0044	1.7800
C	0.2714	0.0247	10.9942	0.0000	--------
R-squared 0.338950	Adjusted R-squared 0.298270	F-statistic 8.332104	Prob(F-statistic) 0.000017		

$ROS = -0.0089* TETA -0.7490* TLTA -0.0036* TDTE +0.1114* TLTE + 0.2371$

The estimation results show that only the coefficient associated with the variable total equity to total assets (TETA) is not statistically significant, as its p-value is greater than 5% in the estimated pooled regression model. On the other hand, the coefficients associated with the variables total loans to total assets (TLTA), total deposits to total equity (TDTE), and total loans to total equity (TLTE) have significant effects on Return on Sales as their p-values are less than the 5% threshold. The adjusted coefficient of determination is moderate for the model, at 29.83%, and the model is globally significant, as Prob (F-stat) is less than 5% indicating a moderate quality of fit. The results show that both TLTA and TDTE negatively affect ROS, while the TLTE positively affects ROS, which means that, the increase of the total loans to total assets (TLTA) ratio decreases the ROS of banks holding the other variables constant, and similarly, the increase of total deposits to total equity (TDTE) ratio decreases the ROS of banks holding the other variables constant, while the increase of total loans to total equity (TLTE) ratio increases the ROS of banks holding the other variables constant. The reason for such positive impact is that lenders tend to provide more debt for banks when they notice that ROS is increasing, as the previous literature suggests that ROS is a measure of both profitability and efficiency in using cash

and other resources to produce both dividends and pay their loans.

Thus, a high Total Deposits to Total Equity (TDTE) ratio can have a negative impact on Return on Sales (ROS), as it increases the bank's reliance on deposits for funding. This can lead to higher funding costs, such as interest paid to depositors, which reduces the bank's ability to generate strong profits from its sales. Additionally, the increased leverage exposes the bank to greater liquidity risks and financial instability, further affecting its overall profitability and efficiency in generating sales-related returns.

Conclusion

The current study aimed to test the effect of liquidity risk on financial performance of banks operating in Palestine during 2014-2023. The liquidity risk measures included four main indicators, where the financial performance measures included three measures. The analysis shows that the Total Deposits to Total Equity (TDTE) is the most relevant variable for measuring liquidity risk, particularly in the context of the fixed effects model. The results support a negative relationship between TDTE and both ROA for hypothesis H1 and ROE for hypothesis H2. Indeed, a high TDTE leads to an increase in financial costs and liquidity risks, resulting in a decrease in asset profitability and equity profitability. However, hypothesis H3, which postulates a negative relationship between liquidity risk and ROS, is not validated. TDTE does not show a statistically significant or consistent impact on ROS, suggesting that ROS is influenced by other operational and sales-related factors, beyond liquidity risk considerations, where lenders tend to focus on operating profit in order to provide debt financing for banks. These results highlight the crucial importance of effective liquidity risk management, particularly to improve the financial performance of banks,

especially in terms of ROA and ROE. These results highlight the importance for banks to maintain a strategic balance between capitalization, deposit dependency, and operational efficiency. An imbalanced approach can negatively impact long-term profitability while increasing financial risks. Therefore, the current study recommends that banks must adopt more diversified funding strategies, balance their equity with liquidity needs, and optimize their operations to maximize overall performance while minimizing financial risks. Finally, the study recommends banks to use AI and machine learning tools to determine and reduce risks in different operations, including: better client credit decision making, identifying possible cyber-attacks, automation of operational tasks, and more robust financial crime monitoring; which all proved to be important to help lower liquidity and other risks.

The current study is limited by the small number of banks which existed during the study period, as well as limited literature about the topic in general in Palestine, and the banking sector in specific. Future studies can address these and other limitations.

Disclosure Date

– **Ethical approval and consent to participate:** This study did not involve human participants, and therefore, no ethical approval or consent to participate was required.

– **Availability of data and materials:** The data utilized in this study can be made available upon reasonable request to the corresponding author.

– **Author contribution: Dr. Nael:** tasks on the article development, conceptualization, validation, investigation, writing-review, and editing. **Dr. Mohammed:** tasks on article development, resources, data

processing, writing-original draft, and finalizing results.

– **Conflict of interest:** The authors declares that they have no competing interests.

– **Funding:** The authors declare that no funding was received for conducting this study.

– **Acknowledgment:** The authors would like to thank both Palestine Technical University and Modern University College, Palestine, for their support in completing this research.

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76 | 78

Nael Sayed Ahmed & Mohammed Abu Harb
The Relationship Between Liquidity Risk and Financial Performance: ......

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