Cash Holdings and Bank Performance: The Covid-19 Effect

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Abstract This study examined the relationship between bank profitability and cash holdings, as well as the evolution of this relationship during the COVID-19 epidemic. The study used data from 13 Palestinian banks obtained from the financial reports of banks listed on the Palestine Exchange between 2013 and 2022. However, the findings show that there is a significant positive association between bank performance and cash holdings. This relationship is not linear, implying that an optimal level of cash holdings may exist. The link between cash holdings and performance weakened during the COVID-19 epidemic. Our findings imply that managers should be extremely cautious when maintaining their cash reserves, as variations from the optimal level can result in considerable expenditures. This might lead to a drop in lending and increased expenses as a result of early payments or additional financing, which can have a negative impact on bank profitability. The findings contribute to our understanding of the necessity of proper cash management and advise that future studies consider the effects of various economic changes on cash holdings. The study's findings will help bank regulators identify weaknesses and develop preemptive steps to increase bank profitability during crises such as COVID-19.

Keywords Cash holding · Bank performance · Non-linear relationship · COVID-19 · Palestine

1 Introduction

Banks have long kept cash reserves to help daily operations, reduce liquidity concerns, and comply with legal requirements [1–3]. These reserves are absolutely vital in times of economic uncertainty since they provide the necessary buffer to lessen shocks and maintain consumer confidence. Still, keeping too much money can

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A. Hamdan (ed.), *Achieving Sustainable Business Through AI, Technology Education and Computer Science*, Studies in Big Data 163,
https://doi.org/10.1007/978-3-031-73632-2_56

lead to lower profitability and inefficiency since these non-earning assets generate returns not on line with those of other investments [4].

Financial entities, especially banks, depend on cash management entirely [5]. While evaluating the general performance of a company, profitability is a major indicator; nonetheless, it is also important to take cash's maintenance of daily operations into account. Still, the banking literature has long battled the issue of the ideal cash holding amount, which might influence banks' profitability and stability [6]. Maintaining a high degree of cash reserves helps the bank to satisfy its short-term obligations and so reduces the danger of insolvency. This can thus improve the bank's creditworthiness and help to lower its default risk. On the other hand, keeping too much cash could lead to large costs. Though cash holding is vital in the banking industry, our knowledge of its relationship with bank profitability remains limited [5].

Many studies have looked at banks' cash holdings in recent years from several angles and in a range of environments. Banks have to keep a dangerous balance between assuring enough liquidity and maximizing profitability. The COVID-19 epidemic aggravated this balancing act by drastically changing the behavior of institutions and consumers, redefining financial environments, and severely affecting the world economy [7–10]. An important feature of this change is the interaction between bank profitability and cash holdings. At an early stage in the epidemic, cash withdrawals surged in response to economic upheavals and lockdown policies as companies and people tried to guarantee liquidity [11]. This in-creased cash demand supports the significance of cash as a safe-haven asset amid crises. Concurrently, the epidemic has accelerated the acceptance of digital payments, therefore reducing the transactional usage of cash and creating further difficulties for banks in cash reserve management [12–14]. The unparalleled difficulties the epidemic presents have heightened the focus on how these cash reserves affect the profitability and general financial situation of a bank.

The COVID-19 epidemic presented historically unheard-of challenges for the global banking industry, which raised demand for good liquidity management and simultaneously impacted profitability. This study seeks to ascertain how Palestinian banks handled their profitability and cash reserves over this period. While excessive cash holdings can lead to the accumulation of idle resources and opportunity costs, cash reserves offer vital liquidity and risk management advantages.

The goal of this study is to look into the relationship between bank profitability and cash holdings, with a focus on the effects of the COVID-19 pandemic on banks in Palestine. In particular, we are responding to the following questions: How do cash holdings affect financial performance? And how is COVID-19 affecting the relationship between the performance of banks and cash holdings?

2 Theoretical Framework

Myers and Majluf [15] formulated the Pecking Order Theory, which states that corporations prefer internal funding (retained earnings) above external financing options such as debt or equity. Firms frequently emphasize retained earnings, using them as cash reserves before turning to external funding sources. Profitability influences the availability of retained earnings, which influences cash management decisions.

According to Trade-off Theory, corporations establish a target debt-to-equity ratio and progressively alter their financial strategies to accomplish it [16, 17], similar to how dividends are adjusted to meet a target payout ratio. In a study on the liquidity-profitability trade-off in commercial banks, Mwizarubi et al. [18] discovered no statistically significant association between bank profitability and liquidity across the factors examined. This means that banks can focus on increasing profitability without compromising liquidity, and vice versa.

According to Jensen's [19] Free Cash Flow Theory, managers reserve large quantities of cash in order to gain more control over a 'assets and greater discretion in investment decisions. However, this method can lead to excessive investment [20, 21]. Large financial reserves decrease the pressure on managers to perform well, allowing them to invest in projects that align with their own interests.

3 Literature Review

Mikkelson and Partch [22] examine whether corporations' performance can be hindered by their considerable cash reserves. They conclude that organizations with substantial cash reserves outperform those with insufficient cash. In the same vein, Palazzo [23] examines the correlation between return on equity (ROE) and cash holdings, concluding that the precautionary motive in trade-off theory supports the positive relationship. La Rocca and Cambrea [24] examine the impact of cash holdings on the performance of small and medium-sized enterprises in Europe, concluding that there is a positive correlation that is in line with the precautionary motive. Abushammala and Sulaiman [25] conduct an investigation into Jordanian listed firms in emerging markets and establish a positive relationship between profitability and cash holdings. Chang and Yang [26] discovered that a company's performance recovers more rapidly following a financial crisis when it maintains a higher level of cash reserves. In contrast, Wang [27], examines Japanese and Taiwanese listed firms and establishes a negative correlation between corporate cash holdings and performance.

Fernandes et al. [28] argue that the level of cash holdings and bank profitability are not linearly connected. This connection is concave, showing that there is an optimal level of cash holdings for maximum profitability. Banks that maintain an adequate level of cash reserves strike a balance between the benefits and drawbacks of holding cash. Furthermore, the data supports the assumption that banks with insufficient cash

reserves face increased risk and lower profitability. This study emphasizes the need of proper cash management in banks.

Numerous investigations have shown that at the start of the COVID-19 pandemic, cash withdrawals increased significantly. This increase was primarily motivated by a desire for cash and uncertainty during times of crisis. Sutrisno et al. [9] investigated the profitability of Islamic banks in Indonesia following the COVID-19 epidemic. The profitability of Indonesian Islamic banks has dropped due to higher provisioning for probable bad loans and a reduction in financing activities. As non-performing loans ratios rose, asset quality fell. Nonetheless, liquidity management remained relatively strong due to the banks' adherence to Sharia norms, which emphasize ethical investing and risk-sharing. The findings show that Islamic banking's inherent stability and risk-sharing procedures provided some resilience despite the considerable obstacles created by the pandemic. The COVID-19 epidemic in Uganda had a significant negative impact on bank profitability, as shown by an increase in nonperforming loans and higher liquidity concerns [11]. Nonetheless, government initiatives and banks' adaptive measures had a substantial impact on the sector's stability and slow recovery.

Gazi et al. [29] found that the COVID-19 pandemic in 2020 had a substantial impact on worldwide trade, and the global economy's growth trend will most certainly remain sluggish in contrast to pre-pandemic levels. During the COVID-19 epidemic, the following factors had a substantial impact on bank profitability: a high proportion of non-performing loans, the retention of more liquid assets, the allocation of a significant amount of capital to hedging, and the bank's size. In contrast, the bank's profits during this period were boosted by its leverage position and low inflation rate. Mateev et al. [8] investigated the impact of bank efficiency both before and after the COVID-19 epidemic. The study underlines that banks with higher efficiency levels prior to the pandemic performed better throughout the crisis. Efficient banks have better liquidity management, lower upsurges in NPL ratios, and smaller decreases in profitability indicators. The report also finds that the epidemic has led to increased efficiency by encouraging digital transformation and boosting cost management techniques.

Given our prior discussion of the relationship between cash hoarding and bank profitability during the COVID-19 epidemic, we present the following hypotheses:

H1: Cash holdings correlate positively with bank profitability.

H2: The connection between cash holdings and bank profitability is non-linear.

H3: COVID-19 influences the link between cash holdings and profit for banks.

4 Research Methodology

4.1 Data

Currently, Palestine has 13 licensed local and foreign banks, including five Jordanian banks and one Egyptian bank. We gathered information for this research from the financial statements of banks operating in Palestine from 2013 to 2022. These data are available from the Palestine Monetary Authority (PMA) [30] and the Palestine Exchange (PEX) [31].

4.2 Measurement of Variables

Dependent variable. Return on assets (ROA) and return on equity (ROE) are the studys dependent variables. ROA measures a bank's profitability in relation to its total assets, whereas ROE represents how well the bank's management uses shareholder equity. Because ROA is lower for financial service providers, most banks use financial leverage to boost their ROE to levels that are competitive.

Independent variable. Cash holdings are the total amount of money that an organization or firm sets aside to meet its financial needs. It is particularly useful when financing through external sources is more expensive than using internally generated funds. In perfect capital markets, there would be no transaction expenses associated with raising cash, rendering the holding of liquid assets irrelevant and having no impact on a firm's value. However, real-world markets are far from perfect, making transaction costs significant and unavoidable.

Control variable. Banks use the rate of non-performing loans to assess their credit risk, with a larger ratio suggesting a greater likelihood of losses resulting from borrower default. Bank size is defined as the natural logarithm of a bank's total assets. A loan-to-deposit ratio calculates a bank's liquidity condition through a comparison of the loan amount disbursed to the deposit amount received. The equity-to-asset ratio represents the proportion of a bank's assets financed by equity stock rather than debt. Finally, COVID-19 dummy represents the consequences of strict lockdown measures, economic downturn, pandemic-related government actions, stimulus plans, and loan guarantees. Table 1 shows the measurements of these factors.

4.3 Models and Estimation Methods

This research will estimate two main models: one without the interaction variable that reflects the moderating effect of COVID-19, and the other with this variable.

Table 1 Measurement of variables

Type of variable	Variables	Measurement	References
Dependent variable	Return on assets (ROA)	Net profit/total assets	[27]
	Return on equity (ROE)	Net income/shareholders' equity	[27]
Independent variables	Cash holdings	Cash and cash equivalents/ sssets	[2]
	Cash holding sqr	The square value of cash holding variable	[32]
Control variables	Non-performing loan (NPL)	Total Non-performing loans/ Total loans	[1, 11]
	Bank size (Size)	ln (Total Bank Assets)	[17, 33]
	Loan-to-deposit	Total loans/Total deposits	[1, 5]
	Equity-to-asset	Total shareholders' equityTotal assets	[29]
Moderator variable	COVID-19	Dummy variable equals 1 for 2020–2021, and 0 otherwise	[29]

$$\text{Performance} = \text{b0} + \text{b1}^{*}\text{cash holdings} + \text{b2}^{*}\text{ cash holdings sqr} + \text{control variables} + \text{e} \tag{1}$$

$$\begin{aligned}\text{Performance} = {} & \text{b0} + \text{b1}^{*}\text{cash holdings} + \text{b2}^{*}\text{ cash holdings sqr} \\ & + \text{b3}^{*}\text{ cash holdings}^{*}\text{COVID19} + \text{Control variables} + \text{e}\end{aligned} \tag{2}$$

ROA and ROE are used measure performance and Table 1 explains other variables. According to the Hausman test, all specifications used panel OLS with a fixed effects approach in the estimation process. We used robust standard errors to mitigate the effects of heteroscedasticity and autocorrelation.

5 Results

5.1 Descriptive Analysis and Correlation Analysis

Descriptive statistics are summarized to provide a comprehensive understanding of the central tendency, variability, and range of each variable in the dataset. The distribution and characteristics of the variables are fundamentally understood by these findings, which can be applied to additional analysis and interpretation in the context of financial performance and other related studies. The average ROA is 0.004 and the standard deviation is 0.019. This implies that ROA values fluctuate by approximately 0.019 around the mean. The average return on equity (ROE) is 0.07 and the standard deviation is 0.106. The cash holdings of banks are substantial,

comprising approximately 0.415 of their total assets. Table 2 provides the averages, standard deviations, minimums, and maximum values for the descriptive statistics of NPL, size, loan to deposits, equity to assets, and COVID-19.

Insights into the relationships between various variables are provided by the correlation matrix, which aids in comprehending their inverse or direct movements. The results demonstrate a robust positive correlation between ROA and ROE (0.757), which reinforces the findings. All variables, with the exception of equity to assets, exhibit a negative correlation with cash holdings. This implies that other variables tend to decrease as cash holdings increase.

In general, the correlation matrix in Table 3 emphasizes the univariate connection of financial performance indicators and other variables in the banking sector. Understanding these relationships facilitates the analysis of the impact of changes in one metric on others, thereby facilitating the development of more informed strategies and decision-making processes in banking operations. The absence of multicolinearity is confirmed by the low correlation between independent variables.

Table 2 Descriptive indicators

Variable	Obs	Mean	Std. Dev	Min	Max
ROA	146	0.004	0.019	−0.174	0.024
ROE	146	0.07	0.106	−0.59	0.41
Cash holdings	146	0.415	0.13	0.251	0.993
NPL	146	0.003	0.003	−0.004	0.022
size	146	20.281	1.147	16.367	22.596
Loan to deposits	145	0.858	0.988	0	6.423
Equity to assets	146	0.162	0.127	−0.051	0.837
COVID19	146	0.178	0.384	0	1

Table 3 The correlation coefficients

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) ROA	1.000						
(2) ROE	0.757	1.000					
(3) Cash holdings	−0.483	−0.440	1.000				
(4) NPL	−0.065	−0.060	−0.178	1.000			
(5) Size	0.583	0.681	−0.514	0.103	1.000		
(6) Loan to deposits	0.076	0.401	−0.257	0.081	0.157	1.000	
(7) Equity to assets	−0.326	−0.520	0.511	−0.084	−0.686	−0.328	1.000

5.2 Estimation Results

The outcomes of the regression analysis for Eqs. (1) and (2) are shown in Table 4. The R-square is roughly 50% for all specifications. Bank performance has a positive and statistically significant correlation with cash holdings, as measured by both ROA and ROE. This positive link holds true across all regressions, implying that higher performance is connected with larger financial balances. The trade-off theory's transaction cost and precautionary incentives for holding cash are compatible with this discovery, since enterprises' large cash holdings allow them to avoid the high costs of external funding and capitalize on profitable investments. These findings are consistent with the bulk of previous research that used a linear specification to examine the impact of cash on performance, including those conducted by Abushammala and Sulaiman [25], and Mikkelson and Partch [22]. Nevertheless, the positive impact of cash on profitability is in direct opposition to the free cash flow theory of Jensen [19] and Wang [27] which posits that increased liquid assets result in managerial waste.

The regression results, which reveal a non-linear link between cash holdings and business performance, show that both cash and cash Sqr have a significant impact on firm performance (measured by ROA and ROE). Cash's squared coefficient is negative, indicating an inverted U-shaped relationship. The non-linear relationship implies that the effect of cash holdings on business performance is strongly influenced by cash reserve levels. Firms with lower levels of cash holdings perform better because the benefits of holding cash (cost savings and cautious reasons) increase until the optimal level of cash holdings is reached. Carrying costs and agency costs of management discretion have a negative (declining) impact on performance for organizations with a lot of cash. As a result, there is a curved-linear relationship between corporate performance and cash holdings.

The connection between cash holdings and profitability has been adversely influenced by the pandemic, suggesting that the relationship that was previously positive has been weakened. Sutrisno et al. [9] discovered that the COVID-19 pandemic resulted in a decline in profitability for Islamic banks in Indonesia. This was attributed to the increased provisioning for bad debts provisions and the reduction of financing activities. Nevertheless, liquidity management remained robust due to the adherence of these banks to Sharia principles, which prioritize ethical investing and risk-sharing. Katusiime [11] observed a substantial decline in bank profitability in Uganda as a result of an increase in nonperforming loans (NPLs) and increased liquidity risks. The profitability of banks was significantly impacted by the COVID-19 pandemic in 2020, as indicated by Gazi et al. [29]. This was primarily due to the high rate of non-performing loans, the retention of more liquid assets, the significant capital allocation to hedging, and the size of the banks. Nevertheless, profitability was boosted by low inflation rates and leverage positions during this period. Mateev et al. [8] conducted research that demonstrated that banks that had higher efficiency levels prior to the pandemic demonstrated superior performance during the crisis. These efficient banks exhibited enhanced liquidity management, reduced increases in NPL ratios, and fewer declines in profitability. The study also observed that the

Table 4 Estimation results

	(5)	(6)	(7)	(8)
Variables	ROA	ROE	ROA	ROE
Cash holdings	0.243*	0.929**	0.255**	0.993**
	(0.118)	(0.357)	(0.118)	(0.346)
Cash holding sqr	−0.295**	−1.013**	−0.305**	−1.063**
	(0.132)	(0.413)	(0.131)	(0.404)
Cash holding*Covid19			−0.0378***	−0.203*
			(0.0116)	(0.0967)
NPL	−1.150***	−3.789***	−1.107***	−3.558***
	(0.337)	(1.182)	(0.352)	(1.111)
Size	0.00677	0.0328*	0.00676	0.0327*
	(0.00422)	(0.0182)	(0.00411)	(0.0177)
Loan to deposits	−0.000103	0.0318***	−8.49e-05	0.0319***
	(0.000421)	(0.00896)	(0.000420)	(0.00894)
Equity to assets	0.0207	−0.0329	0.0210*	−0.0315
	(0.0122)	(0.136)	(0.0120)	(0.136)
COVID19	−0.00304	−0.0352**	0.0109**	0.0398
	(0.00191)	(0.0147)	(0.00426)	(0.0427)
Constant	−0.178*	−0.795*	−0.181*	−0.813*
	(0.101)	(0.429)	(0.0989)	(0.416)
Firm fixed effect	Yes	Yes	Yes	Yes
Observations	145	145	145	145
R-squared	0.500	0.475	0.511	0.482
Number of firm	18	18	18	18

Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

pandemic encouraged efficiency enhancements by fostering digital transformation and improved cost management practices.

In terms of control variables, equity to assets has a positive relationship with company performance. This shows that higher equity financing can improve bank performance by lowering the cost of financial crisis. The size coefficient, which is both positive and significant, indicates the possibility of improving the performance of larger institutions. The positive relationship between size and performance is consistent with Abdeljawad et al. [12], who argue that larger businesses are more technologically advanced and diversify their operations. The loan-to-deposit ratio improves the bank's performance, whereas NPLs have the opposite effect.

6 Conclusion

In closing, this study offers new insights into the impact of COVID-19 on the link between cash holdings and profitability for banks in Palestine, while also taking into account other bank-specific profitability drivers. We assess the profitability of banks using data from 2013 to 2022, calculating the return on assets (ROA) and return on equity (ROE). The research findings indicate that, while there is a significant positive association between increased cash holdings and both ROA and ROE, the connection is concave rather than linear. Moreover, the link between cash holdings and financial performance has been weakened by the COVID-19 pandemic.

Our findings have important implication for academics and bank executives who are researching cash holding investments. Initially, our findings show that managers should exercise caution with their cash holdings, as straying from the ideal amount can result in significant expenses. This can have a negative impact on bank profitability by resulting in lower lending and more expenses owing to early payments or additional funding. Second, the findings improve our understanding of the importance of smart cash management and suggest that future study should examine the impact of various economic changes on cash holdings. The study's findings will help bank regulators identify weak points and develop preemptive steps to improve bank profitability during crises like COVID-19.

We suggest that banks use asset-liability management models to optimize the balance between liquidity and return, thereby reducing liquidity risks and increasing returns. Furthermore, in order to enhance the accuracy of cash flow forecasting and the efficiency of cash management, banks should implement sophisticated artificial intelligence and analytics methodologies. Additionally, it is imperative to implement rigorous internal policies and procedures to guarantee the efficiency of cash management, which includes the establishment of a minimum cash retention level that aligns with regulatory demands and liquidity requirements.

This research has many limitations. We only analyze factors connected to the qualities of the company. We neglected other factors such Islamic values, ownership structure, and macroeconomics. Decisions on corporate cash holding could have bearing on Shariah compliance. Future research should incorporate macroeconomic and ownership factors as well as examine how cash levels relate to performance between Shariah-compliant companies and their traditional counterparts.

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