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Effect of financial technology on liquidity in Jordan

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Abstract: *This study aimed to know the effect of financial technology on liquidity in Jordanian commercial banks listed on the Amman Stock Exchange during the period (2018-2023). To achieve its goal, this study followed the descriptive and standard approach, and data was collected from the annual reports of the 13 Jordanian commercial banks listed on the Amman Stock Exchange. Using generalized least square random-effect (GLS) regression model. The results showed that there is a statistically significant effect of each of ATMs, smart payment cards, and branches on liquidity, while there was no statistically significant effect of mobile banking on liquidity. The results obtained from the fixed effect estimate reveal that total value of automated teller machine negatively and significantly impact on liquidity banks while total value of smart cards and branches exert positive influence on liquidity banks. Also, the relationship between total value of mobile banking and liquidity was also positive but fail the significant test. The study recommended the need for banks to continue their policy of establishing branches throughout the geography, given that they are mainly institutions that contribute to the events of development in the areas on which they are built, as well as continuing the policy of increasing banking awareness among customers regarding the use of smart cards, due to their importance to liquidity.*

Keywords: liquidity, automated teller machine, smart cards, branches and number of ATM cards, Amman Stock Exchange.

1. INTRODUCTION

Over the last ten years, fintech has gained international interest and gained global prominence. Still, there's no agreed-upon definition of fintech. For example, in 2016, the Financial Stability Board (FSB) described fintech as financial innovation driven by technology. Fintech companies are defined by Navaretti et al. (2018) as FinTech businesses, and they are further classified into FinTech lending and FinTech payment companies. Standard & Poor's analysts believe that FinTech will have a significant impact on the global financial sector and that traditional financial services and products will undergo a significant transition. As per the 2019 Klynveld Peat Marwick Goerdeler (KPMG) study, global FinTech investment hit USD 111.8 billion in 2018, indicating a 120% growth rate from the previous year. Right now, there are more than 310 FinTech startups in the Middle East and North Africa (MENA) area, with Jordan accounting for about 7% of these. As FinTech is viewed as the future of the banking industry, the Central Bank of Jordan has been a major contributor in its growth, realizing the critical role that banks play in its advancement (AB Accelerator 2020).

In Jordan, less than 35% of people use banks, whereas more than 100% of people use mobile phones. Through the deployment of retail payment systems, electronic payments like cash transfers and billing, and creative identity solutions that address the needs of disadvantaged groups in society, especially those living in rural areas, the Central Bank of Jordan has played a significant role in advancing financial inclusion. In order to bolster electronic transactions even further, the Central Bank intends to create legislative frameworks. As a result, the banking industry is in a good position to take advantage of cutting-edge FinTech technologies to reduce expenses, boost flexibility, and draw in deposits.

The banking industry's growth has been significantly impacted by fintech development (Lv and Xiong, 2022). Adoption of Fintech can, on the one hand, result in hazards associated with technology and higher operating expenses for banks. Fintech businesses also have the potential to increase market rivalry, divert bank deposits, and endanger banks' lending operations. Fintech, on the other hand, can enhance existing models and optimize banking technology, boosting profitability, risk tolerance, and management effectiveness while giving banks access to additional resources and liquidity creation capability. Thus, how Fintech affects bank liquidity. Existing research, however, barely touches on this subject. The impact of bank Fintech—the creation and use of Fintech in the banking sector—on banks' liquidity has only been examined thus far by Guo and Zhang (2022). The administration of banks, economic growth, and the steady development of the financial system are all significantly impacted by this study, which looks at how financial technology affects liquidity in Jordan.

2. Literature review and hypothesis development

FinTech and Banks

Because FinTech is controversial, governments, regulators, policymakers, and analysts have paid close attention to it (Naz et al. 2022). The elimination of high-interest loans is one of the reasons why FinTech is growing in a nation, according to Fernando and Dharmastuti (2021). FinTech also benefits banks and the general public. They provided additional support for this claim by highlighting how FinTech gives people access to secure money management. In addition, Petralia et al. (2019) clarified that traditional business models in the banking industry are significantly impacted by the emergence and expansion of FinTech.Furthermore, FinTech presents chances for the banking sector to flourish in its operations and improve consumer services by making them better, less expensive, and customized to meet the individual demands of each client. FinTech also has advantages for mobile payments, which can be made more affordably, as Nguyen (2022) notes.

Fintech and bank liquidity

Bank liquidity may be impacted by fintech development in a number of ways. Through lowering bank profitability, raising bank risk, and altering the competitive environment, fintech has the potential to reduce the creation of bank liquidity. Fintech first and foremost has the ability to reduce bank earnings and decrease their incentives to invest in liquidity creation. Wang et al. (2021a) claim that banks are experiencing severe financial strain as a result of the high initial outlay and continuous maintenance costs connected with traditional banks implementing Fintech. According to Qiu et al. (2018), the growth of Fintech increases bank asset risk and debt costs. Deng et al. (2021) also think that in order to attract deposit business in a highly competitive environment, banks may raise deposit rates, which puts further pressure on their capital. Additionally, Zhao et al. (2022) contend that banks' asset quality and profitability may decline as a result of the intense competition brought on by Fintech innovation. According to the theories of disruptive innovation and consumers, fintech developments create new goods and services that can displace more established ones in the traditional financial sector, thereby undermining traditional banks' profitability. Fintech development, as mentioned previously, has the potential to increase bank expenses and decrease bank profitability, which would ultimately lower bank capital, impair bank resilience to negative shocks, and lessen bank incentives to generate liquidity. Second, Fintech has the potential to elevate banks' risks. In the banking industry, using cutting-edge technology like artificial intelligence and big data might raise operational hazards. Data security and app security, for example, are emerging as new security threats for banks. Some customers find fintech companies more appealing since they can offer a more cost-effective and efficient substitute for banks. As a result, banks run the danger of losing business to rival institutions, raising their credit risk. Bank liquidity constraints may result from increased operational and credit risk. Thirdly, according to Yang and Wang (2022), Fintech companies have the potential to create crowding-out effects on the traditional banking sector, infiltrate traditional business areas of banks, and ultimately impact the production of liquidity within banks. According to Boot et al. (2021), Fintech companies have the potential to undermine banks' intermediary position, divert deposits, and jeopardize banks' lending operations.

Fintech, on the other hand, might boost the production of bank liquidity. First off, the banking sector can benefit from Fintech applications by using them to streamline operations (Puschmann, 2017), draw in clients, and grow their loan and deposit business. There may be issues with customer turnover if the incumbent banking sector's old business procedures and management systems are unable to quickly recognize and adapt to the shifting needs of their clientele. Modern technologies help to alleviate these issues by giving banks the opportunity to modernize their antiquated business procedures, improve user experience, and expand the channels via which they may establish enduring relationships with their clients. These elements have the potential to increase bank liquidity by boosting the volume of deposits and loans made by banks. Second, banks are now better able to identify and tolerate risk thanks to fintech. Cheng and Qu (2020) have confirmed that Fintech may successfully mitigate banks' credit risk through enhanced internal governance and increased efficiency in risk management. As of right now, a variety of contemporary technologies are employed in bank operations. For instance, banks frequently employ big data technology to reduce the knowledge asymmetry between them and their clients, which lowers the chance of a customer default during the corporate credit assessment process (Wang et al., 2020). In banks, big data is also used for fraud detection and security (Hassani et al., 2018). Because blockchain technology is tamper-evident and traceable, banks also use it for business activities including information validation and payment settlement (Guo and Liang, 2016). Furthermore, according to Königstorfer and Thalmann (2020), artificial intelligence (AI) assists banks in enhancing the security of their business operations and optimizing their risk defenses, which include fraud detection and financial crime prevention. In summary, traditional banks gain from new technology, which raises their risk tolerance and gives them additional options to generate liquidity. In conclusion, the growth of Fintech credit is likely to increase competition in the loan market and may also affect bank lending (Ding et al., 2022). That is to say, Fintech might help banks with their lending business. Furthermore, banks may adopt more accommodating pricing policies and increase bank liquidity as a result of the growth of Fintech companies. As Tang et al. (2021) point out, intense competition may even encourage banks to extend additional loans with high risk.

Hypothesis development

This section proposes three study hypotheses about the effect of banks' FinTech adoption on their liquidity creation. On the one hand, we contend that banks that adopt FinTech more widely create more liquidity for two reasons. First, by offering extremely user-friendly applications through which their clients can request or demand the banks' services whenever and wherever they choose, these banks are able to achieve more complete financial inclusion. As the world becomes more digitally connected, bank branches are gradually being replaced with mobile applications that offer clients digital services (Gabor & Brooks, 2017). Banks are using mobile technologies (such mobile payments and online banking) to make their business services more accessible to their clients. These customers can apply for these services online and don't even need to visit a branch. Additionally, banks can integrate other FinTech products to get more involved in the community. For instance, robo-advisors are being used by banks in their online services to offer program-based services to their clients around-the-clock at a reduced cost of operation (Jung et al., 2018). A Unified Theory of User Acceptance Technology (UTUAT) model was established by Venkatesh et al. (2003) to describe the elements influencing consumers' intentions to use internet banking. One of the variables is effort expectancy, which describes the idea that people are more likely to adopt technology if they find it simple to use and understand. The influence of users' expectations on their intents to utilize online banking was confirmed by Martins et al. (2014). Banks can enhance their lending and transactional activity by offering user-friendly applications to its clientele, who want simplicity in utilizing their services. Consequently, banks can increase their liquidity by providing more customer service thanks to the increased reach provided by online services.

In addition, this study contend that the different forms of FinTech have differing impacts on banks' efforts to create liquidity. Firstly, banks can employ internet-based FinTech to generate additional liquidity by offering highly accessible services to their clientele, who can access the bank's services through online applications (Chen et al., 2021). In particular, this kind of FinTech broadens the bank's financial inclusion, thereby enhancing its capacity to transact with clients who can apply online for loans or other services. Clientele of a bank that offers highly accessible services are more likely to apply if its branches are not located in their area of residence or they are on the go. FinTech. On the other hand, internet-based FinTech improves banks' departments' capacity to communicate information, allowing banks to exchange client data more quickly and efficiently for communications and analysis. The high degree of information efficacy makes it easier for banks to track client data and flow across departments and lowers the likelihood that customer risk analyses and investment portfolio modifications would be inaccurate. Because internet-based FinTech allows banks to do rapid and precise credit analysis of their borrowers and improve the links between various FinTech applications, it consequently reduces the amount of liquidity that banks create.

Since the generation of liquidity is directly linked to the risks of both success and failure, it is essential to the success of banks (Ghenimi et al., 2017). The good news is that by integrating cutting-edge digital technologies into several financial operations, the risk of liquidity problems can be reduced. In order to avoid a liquidity crisis, these technologies, on the one hand, allow banks to provide a wider range of financial products and services and make it easier and faster for customers to obtain funds when they're needed (Banna et al., 2021). Furthermore, digitalization (Wu et al., 2023) breaks down geographical barriers, giving banks access to a wider consumer base and a rise in their deposit base. However, digital transformation also boosts liquidity capacity, lowers operating costs, and enhances management effectiveness (Wu et al., 2023; Tang et al., 2024). The following hypothesis is based on the empirical and theoretical studies:

First hypothesis (H1a). Bank liquidity is negatively impacted by fintech development.

First hypothesis (H1b). Bank liquidity is positively impacted by fintech development.

3. METHODOLOGY

Population and Sampling

The current study investigated the effects of financial technology specifically ATMs, smart payment cards, branches, and number of ATM cards on liquidity by focusing on the annual reports of a sample 13 Jordanian commercial banks listed on the Amman Stock Exchange over the period of 2018-2023.

Model Specification

To examine the influence of financial technology on liquidity, the followingregression model is employed.

$$LIQit = \beta o + \beta 1\mathrm{ATM}N\mathrm{i} + \beta 2\mathrm{SC}N\mathrm{i}t + \beta 3\mathrm{BR}Nit + \beta 4\mathrm{NATMC}Nit + \mathrm{si}t$$

4. Descriptive Statistics

Table 2
DESCRIPTIVE FINDINGS OF THE STUDY

Variable Names	obser	Mean	Median	Min	Max	Std. Dev.
LIQ	104	8.66819	8.638183	6.589137	9.87713	0.59255
ATM	104	105.4038	96	17	227	61.80953
SC	104	3.76877	3.761101	2.878522	4.75970	0.43967
BR	104	55.19231	52	12	215	44.05933
NATMC	104	3.98653	3.911743	3.462548	4.72608	0.33548

Table 3
CORRELATION MATRIX RESULTS

Variable	LIO	ATM	SC	BR	NATMS
LIO	1				
ATM	0.4271	1			
SC	0.1001	0.4211	1		
BR	0.2458	0.5102	0.3328	1	
NATMC	0.1061	0.2955	0.0933	0.1638	1

TABLE 4
REGRESSION RESULTS (N=104)

	GLS	
Variable	**Coefficient**	**Prob.**
ATM	0.0016611	0.049**
SC	0.0355272	0.611
BR	0.0019879	0.012***
NATMC	0.0015817	0.986
VIF	1.33	
R^2	0.2277	
F - Stat	Prob-f	0.0000
Hausman	chi2 =	0.1249
Homo	No Hetero	

Data Analysis Techniques

Multicollinearity test: Regression analysis method The multicollinearity analysis can be used to determine whether there is a link between the IV. There should be no association between the IV in a successful regression technique. An acceptance level of 0.1 and a VIF level of 10 are the values that are commonly used to characterize the degree of multicollinearity.

Heteroscedasticity test: In a regression model, the test for heteroscedasticity is used to ascertain if the residuals for the two data exhibit unequal variance. Heteroscedasticity occurs when the variance varies, whereas homoscedasticity occurs when the variance between the residuals for one observation and the residuals for another observation is constant. When a regression model is good, it either exhibits homoscedasticity or lacks it. To determine heteroscedasticity, this study used a plot chart.

Heteroscedasticity is absent when the points on the Y-axis have equal spacing between zero and 0 and no discernible pattern.

Hausman Testing: The Hausman analysis was carried out using a random description effect in order to differentiate between the Fixed Effect Approach and the Random Effects Approach. Use the fixed effects model when the random cross-sectional probability ratio is less than the 5% alpha significance. For random cross-section, the Random Effects Model (REM) is selected when the probability level exceeds the 5% alpha ratio. An application of the random-effect model is warranted, as indicated by the results of the Hausman test, which were conducted as indicated in Table 4.

5. EMPIRICAL RESULTS

For each set of independent variables individually. However, at the level of 5%, Table (4) shows that automated teller machine variable has significance given a positive coefficient. For a consideration related to the expansion of banking operations that can be carried out using (ATM), the use of ATMs is no longer limited to cash withdrawal operations only, but rather the use has evolved to include cash deposit operations, depositing checks, and making various transfers between banking banks, and this is supported by the results of previous studies, such as The study (Alghadi, 2024) and the study (Obi-Nwosu, 2023) proved that there is a positive relationship between the use of ATMs and liquidity.

The study's findings also show (see Table 4) no statistically significant impact of smart cards on the liquidity in Jordanian commercial banks listed on the Amman Stock Exchange. Considering that this tool (SC) is not widely used, in addition to its use being limited to somewhat limited operations and within a narrow framework, such as those operations associated with the settlement of simple financial commercial transactions, this result was consistent with some previous studies, which confirmed the existence of a positive relationship. Between the use of smart cards on liquidity, such as the study (Alghadi, 2024), while some previous studies were completely opposite to the result of this study, as the study of (Tang et al., 2024) proved, which concluded that there is a negative relationship between smart cards and liquidity.

Also, the results of the branches (BR) (see Table 4), were positive and logically significant, and this result is justified. Considering that the branches perform a function at a level that cannot be performed through other tools such as (ATM), for example, as these branches receive large cash deposits and through them large bank cash transfers are made, which would enhance the liquidity position, and this was supported by the results. Previous studies, such as the study (Alghadi, 2024), which was conducted in the Hashemite Kingdom of Jordan, demonstrated the existence of a positive relationship between branches and liquidity.

As for the number of ATM cards (NATMC), the result was positive and not significant (see Table 4). This is due to: Given that ATM cards have expanded the operations that can be performed with them, the use of the card is no longer limited to cash withdrawal operations, but rather there is the possibility of making financial settlements for payments resulting from daily purchases using this card in various sales centers, which would enhance the liquidity position of banks. Through the turnover of the values of these purchases using an ATM card between multiple accounts within banks, it was completely opposite to the result of this study, as the study (Tang et al., 2024) proved that there is a negative relationship between the number of ATM cards and liquidity.

6. CONCLUSION

Strategies for controlling bank liquidity are essential to maintaining both the overall stability of the national economy and the banking sector. As the key source of liquidity for the existing economic system, Jordanian commercial banks serve as the principal financing channel for both individuals and businesses. The internal business model of banks and the external industry environment are impacted by fintech, a growing force. This study examines the effects of Fintech development on Jordanian banks' liquidity empirically. As a result, this study focused on 13 Jordanian commercial banks listed on the Amman Stock Exchange for the period of 6 years 2018 to 2023, using generalized least square random-effect (GLS) regression model to study the effect financial technology (automated teller machine, smart cards, branches and number of ATM cards) on liquidity. The results showed that there was a statistically significant effect for both ATMs and the number of branches on liquidity, while there was no statistically significant effect for both smart payment cards and the number of ATM cards on liquidity.

The study recommended the need for banks to continue their policy of establishing branches across the geography, since they are essentially institutions that contribute to development in the areas in which they are located, as well as continuing the policy of increasing banking awareness among customers regarding the use of smart cards due to their importance to liquidity. This study is subject to many constraints. The dearth of data first limits to ability to choose the sample range. Furthermore, the market sample in this study is limited to the Jordanian market. The connections and techniques of influence between Fintech and the banking industry in many political and economic contexts may be covered in more detail in future studies.

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