Research Article

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Risks, Bank Concentration and their Impact on Stability in Jordanian Commercial Banks

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Abstract

The aim of this paper is to examine the effect of risks and financial concentration on the stability of Jordanian commercial banks based on annual data from 2012-2019. Using panel data based on the pooled effects model, the results indicate that funding risk and concentration are positively and statistically significant affects the stability, while credit risk and profitability have a negative and statistically significant impact on the bank's stability. Stability of Jordanian commercial banks is negatively affected by liquidity risk and size but they are not statistically significant. The study recommends bank managers to improve funding risks through the use of greater financing for deposits, which has a positive impact on increasing bank stability, while the credit standards have to be high quality because they reduce the risks of instability. Finally, managers have to make a balance between profitability and the stability of banks.

Keywords: *funding, credit, liquidity, concentration, stability*

1. Introduction

The global financial crisis (GFC) led to a reconsideration of the risks of banks that affect their stability as a result of the failure of some banks, especially the big ones. GFC affects the functioning of the entire banking system. Following the world's recovery from the crisis, the controversy increased about the impact of these financial risks. This motivated academics to understand and measure these risks. The most prominent of these risks are funding risk, liquidity risk, and credit risk. All of these risks can affect the bank's stability assessed by Z-Score. The Z-score is an indicator that takes into account profitability, leverage and volatility (Demirgüç-Kunt and Huizinga, 2010). Also, the Z-score is

employed as an index of bank stability because it is a common measure of bank stability among academics and this measure is easy to calculate and its data is easy to obtain (Adusei, 2015).

In addition to these risks, the global financial crisis showed the importance of banks' concentration. There is a great debate among academics about the concentration and stability of banks. The first point of view is concentration-stability, which indicates that increasing the market share of the bank leads to an increase in its opportunity to improve profitability rates. Thus, the bank's financial fragility decreases due to larger capital reserves (Boyd, De Nicolo, & Smith, 2004). As opposed to that, the other view is concentration-fragility, indicating that banks with large capital tend to take risks. In addition, the big banks will demand high interest rates which will lead to the borrowers defaulting on payments (Boyd & De Nicolo, 2005). The increase in risks can lead to a decrease in the productivity of bank management, which is directly reflected in the increase in operational risks (Uhde & Heimeshoff, 2009).

Besides risk and concentration factors, this study uses control variables such as profitability and size. Thus, this paper aims to exammine the effects of various risks (FRISK, CRISK, and LRISK), financial concentration, profitability and size on the stability of Jordanian commercial banks for the period after the GFC 2012-2019. This study was conducted for the following reasons: First, the previous studies examine the influence of risks on bank profitability and most of them mainly focused on credit risk and its impact on profitability such as Tennant and Sutherland (2014), Dietrich and Wanzenried (2011). Other few studies inspect the impact of credit risk on the bank stability such as Köhler (2015) and Adusei (2015). However, limited studies examine the impact of various risks on the stability of banks, especially in Jordan. Therefore, this work aims to close this gap and focuses on examining the impact of various risks, namely funding risks, liquidity risks and credit risks on the stability of Jordanian commercial banks during the year 2012-2019.

Second, some previous studies found that concentration positively affects the stability of banks (Aldomy, Thim, Lan, & Norhashim, 2020; Boyd, et al., 2004), while others found that concentration negatively affects the stability of banks (Uhde & Heimeshoff, 2009). This research aims to close this knowledge gap and offer evidence to support the current literature. Third, based on the Central Bank of Jordan report for the year 2021, Jordanian banks represent the largest market share in the Amman Stock Exchange (ASE), exceeding 50% of the market share. Therefore, the stability of Jordanian banks is of great importance to stability, whether at the level of the ASE or at the level of the Jordanian economy.

The structure of this work is as follows: Literature review is presented in Section 2. The data and methodology utilized in this investigation are reported in Section 3. Findings are explained in Section 4, whereas 5 conclude the study.

2. Literature Review and Hypotheses Development

2.1 Funding Risk and Bank Stability

The selection of banks' sources and uses of funds is considered one of the most critical components that contributed to the bank's success. To serve the sustainable goals and maintain the bank's stability, funds are raised and used in a way that generates sufficient revenues which satisfy both operational and financial costs, besides a reasonable return on capital. According to the financial intermediation theory, developed by Bryant (1980) and Diamond and Dybvig (1983), liquidity creation plays an important role in banks, creating a strong link between liquidity creation and financial stability.

Prior literature has pointed out that funding structure is a main determinant of bank stability. Thus, the selection of the ideal mix of bank's funding should be carefully decided. According to the theoretical arguments suggested by Calomiris and Kahn (1991), a bank's stability increases as proper monitoring of bank's funds increase in addition to the optimal diversification of the funding structure. Accordingly, it is suggested that part of the bank's fund needs to be financed using equity

to motivate bankers to exert proper motioning. In the meanwhile, using debt in the wholesale capital markets reflects the creditworthiness of the bank and serves as an important signal to the depositors. Thus relying on non-deposit funding might lead to higher stability through sound monitoring. In the meanwhile, non-deposit funding has costs and risks, described as the "dark side" of using these types of funds. Moreover, the wholesale funding cost is adjusted more quickly to indicate a bank's riskiness. Wholesale financiers also might be less motivated to go through costly monitoring, instead, they might rely on public information regarding bank riskiness to withdraw their funds, causing liquidity crisis and increasing instability Huang and Ratnovski (2011).

However, including deposits in the bank's funding structure could positively enhance the bank's stability. Deposits of clients are considered a more stable source of funds, protected and secured Shleifer and Vishny (2010). Empirically, Adusei (2015) studies banking stability and funding risk using a sample from Ghana. The results show that banks with a more effective deposit mobilization policy and relying more on deposit funding, have more stability. Li (2019) presented positive evidence between increasing deposits and bank stability, particularly, for more focused markets. Recently, Lesmana (2021) employs a sample of 141 Indonesian conventional banks over the years 2004-2018. The study reports a positive impact of funding risk on banks' stability. Accordingly, the following hypothesis is proposed:

H1: Funding risk has a statistically significant positive impact on bank stability.

2.2 Liquidity, credit risks and bank stability

Within the view of financial intermediation theory, the structures of both banks' assets and liabilities are closely related (Diamond & Dybvig, 1983). Dermine (1986) views liquidity risk as a profit-lowering cost. Default on bank loans boosts liquidity risk since such default decreases cash inflows. Thus liquidity and credit risk are related to each other's, where banks with risky assets are highly exposed to more shocks (Samartín, 2003). Liquidity risk arises when the bank is unable to satisfy its financial obligation or meet the depositors' demand for a certain period of time (Jenkinson, 2008). Adequate liquidity level is viewed as an important factor for bank reputation, success, and survival. However, liquidity risk limits the main banking functions in terms of accepting deposits and providing credit, affecting its stability and might lead to failure (Submitter, Liang, & Liu, 2021). Another important source of risk that threats the bank's stability and survival is credit risk. Under Basel Committee on Banking Supervision, credit risk is related to "the probability of partial or total loss of outstanding loan due to non-payment of the loan on time" (Ekinci & Poyraz, 2019). The higher probability of credit risk leads to an increase in the cost of both debt and equity, which means a higher funding cost for the bank. Further, exposure to a higher probability of credit risk negatively affects a bank's stability and increases the possibility of a financial crisis (Ekinci and Poyraz, 2019).

Several empirical works support the negative impact of both credit and liquidity risk on a bank's stability. In the Tunisian banks, Zaghdoudi (2019) tested the impact of different types of risks such as liquidity risks, credit risks, and operational risks on the stability. According to the findings, liquidity risk has a positive impact on stability while credit risk has a negative one. A recent study by Djebali and Zaghdoudi (2020) examined 75 banks from eleven countries from 1999–2017, they reported non-linear relationships between liquidity risk, credit risks and stability. However, both types of risk are negatively related to the banks' stability, particularly in high regimes. According to the above discussion the next hypotheses are proposed:

H2: liquidity risk has a statistically significant negative impact on bank stability.

H3: credit risk has a statistically significant negative impact on bank stability.

2.3 Bank concentration and bank stability

The theoretical foundation of the relationship between concentration and bank stability is related to two competing hypotheses i.e., the concentration-stability hypothesis and the concentration-fragility

hypothesis. The main arguments of the concentration-stability hypothesis suggest that as the market share of the bank increase, higher profitability could be achieved. Banks can charge lower interest on customers' deposits, reducing their financial fragility depending on the huge capital buffers they have, thus realizing higher profits. Accordingly, bank managers become less motivated to take risky decisions which are positively reflected in the bank's stability (Boyd, De Nicolo, & Smith, 2004). Supporting empirical studies for this view, provided by Boyd et al. (2006) on a large sample of the U.S. banks, they finds a positive association between bank concentration and bank income. Berger, Klapper, and Turk-Ariss (2017) confirm the results of Boyd et al. (2006) for the US banking industry and indicated that higher concentration decreases bankruptcy risks and enhances banks' profits. Recent studies by Marchionne and Zazzaro (2018); Albaity, Mallek, and Noman (2019); Azmi, Ali, Arshad, and Rizvi (2019) all supported the concentration-stability view.

The competing hypothesis assumes the opposite. The concentration-fragility assumes that banks with higher stakes usually require higher interest rates on loans, creating bad conditions for the borrowers. In such a case, the probability of repayment will decrease while the probability of credit risk will increase leading to a negative effect on bank stability (Boyd and De Nicolo, 2005). Fiordelisi and Mare (2014) who used a big sample of 2529 European banks from 1998 to 2009 reports a negative relationship between concentration and banks' stability. Similar supporting evidence was provided by Fu, Lin, and Molyneux (2014) who conclud that higher concentration consistent with a higher probability of financial fragility, using a sample from 14 different Asian Pacific nations. Recent work by Li (2019), considered a cross-country sample from 22 transition countries covering the years from 1998 to 2016. The Lerner index, which measures a bank's concentration, and the Z-score, which measures the bank's stability, both show a negative correlation in the study. Aldomy (2020) from Jordan provided evidence to support the concentration-fragility hypothesis. The study measures bank concentration using three variables i.e., Herfindahl–Hirschmann Index, the Lerner index, and concentration index. The study covers the Jordanian banks from 2005-2016 and indicated that concentration negatively affects bank stability. According to the above discussion, the following alternatives hypotheses are proposed:

H4a: concentration has a statistically significant positive impact on bank stability.

H4b: concentration has a statistically significant negative impact on bank stability.

3. Research Method

3.1 Data

The aim of this study is to recognize how risks and financial concentration affect the stability of Jordanian commercial banks. The total number of banks is 13, all of which are included in this study. The annual data related to the study variables has been downloaded from the ASE website[1] for the time period from 2012 to 2019. This study chooses this time period to avoid the effect of the GFC that began in September 2008 and the impact of the Corona pandemic that appeared at the end of 2019. The data consists of three variables independent of funding, credit and liquidity risks. In addition, one variable independent of financial concentration, and two controlling variables on profitability and size, while the dependent variable is on stability computed through Z-score.

[1] *https://exchange.jo/en*

Table 1: Dependent variables for Jordanian commercial banks for the period of 2012-2019.

Banks Names (bank symbol)	Average Z-Score
Invest Bank (INVB)	15.34
Bank of Jordan (BOJ)	13.96
The Housing Bank for Trade & Finance (HBTF)	9.87
Arab Banking Corporation (ABC)	6.65
Bank Al Etihad (BETH)	6.43
Arab Jordan Investment Bank (AJIB)	5.94
Cairo Amman Bank (CAB)	4.68
Jordan Kuwait Bank (JKB)	4.66
Societe General De Banque (SGDB)	4.51
Arab Bank (ARB)	3.49
Jordan Ahli Bank (JAB)	2.42
Capital Bank of Jordan (CBJ)	1.74
Jordan Commercial Bank (JCB)	1.43
Average	**6.24**

The first column details the Jordanian commercial banks names, while the second column reports stability Z-Score, which is the average of bank's stability score.

Table 1 indicates that the average Z-Score of Jordanian commercial banks are relatively stable, because the degree of Z-score is high for most banks and on average are 6.24. The stability of the bank increases with the Z-score. The Jordanian commercial banks are ranked in Table 1 from the most stable banks to the least stable ones. The first five most stable banks were written in italics to distinguish them from the rest of the banks, namely: INVB, BOJ, HBTF, ABC, and BETH. Given the stability represented by Z-Score, Mirzaei (2013) indicated that Z-Score in the emerging economies for commercial and non-commercial banks are 1.91 and 2.06, respectively, while in developed economies for commercial and non-commercial banks are 1.09 and 0.99, respectively. Table 1 shows that average Z-Score of Jordanian commercial banks is 6.24. Thus, Jordanian commercial banks show stability more than these banks in developing and developed countries.

Table 2 lists the names of Jordanian commercial banks that have been listed on ASE from 2012 to 2019, in the first column. In the second to fifth columns, the annual average of funding risk (FRISK), liquidity risk (LRISK), credit risk (CRISK) and concentration (CON), respectively. The sixth and seventh columns report the control variables, namely, logarithm of bank size Log (SIZE) and profitability (ROA), respectively.

Table 2: Independent variables for Jordanian commercial banks for the period of 2012-2019.

Bank Symbol	FRISK	LRISK	CRISK	CON%	Log(SIZE)	ROA%
ARB	20.19	0.29	0.44	45.97	23.93	1.12
BOJ	14.17	0.26	0.52	4.85	21.53	1.77
HBTF	13.79	0.24	0.43	13.60	22.75	1.49
JKB	11.08	0.21	0.54	5.90	21.68	1.54
CAB	10.12	0.26	0.50	4.93	21.59	1.56
JAB	10.10	0.19	0.49	5.43	21.69	0.78
CBJ	9.13	0.22	0.43	3.33	21.34	1.12
ABC	8.78	0.16	0.51	2.14	20.72	1.26
INVB	7.33	0.17	0.56	2.03	20.57	1.53
JCB	5.90	0.17	0.49	2.35	20.86	0.46
AJIB	4.23	0.21	0.38	2.43	21.12	1.23
BETH	2.61	0.21	0.54	5.43	21.58	1.03
SGDB	2.11	0.22	0.40	1.61	20.59	0.85

Table 2 shows that the funding risks among banks range from 20.19 to 2.11. This indicates that there is a big difference in funding risks among Jordanian commercial banks. On the other hand, the average liquidity risk among Jordanian commercial banks is slightly low compared to the average credit risk. The average liquidity risk ranges between 0.29 and 0.17, while the average credit risk ranges between 0.54 and 0.38 among Jordanian commercial banks. There is a large gap in the average concentration among some Jordanian commercial banks. For example, the average concentration ratio in the Arab Bank (ARB) and the Housing Bank for Trade and Finance (HBTF) is very high, 45.97% and 13.60%, respectively, while the rest of the Jordanian commercial banks range between 5.90% and 1.61%. The last two columns show the average size of Jordanian commercial banks by logarithm of total assets, and profitability.

Table 3 shows in the first column the stability of the banks (Z-Score) and the explanatory variables employed in this study. The second and third column reports the average and standard deviation, respectively. The third and fourth column details the maximum and minimum value, respectively. In the fifth and sixth columns the skewness and kurtosis are shown, while in the last column the number of observations. Table 3 shows that Jordanian commercial banks are relatively stable because the standard deviation (4.33) of Z-Score is less than the average (6.24). Given the risks, as shown in Table 3, the funding risk (FRISK) and the concentration (CON) are volatile because the standard deviation is greater than the average, while the liquidity risk (LRISK) and credit risk (CRISK) are less volatile than the average.

Table 3: Descriptive Statistics

Variables	Av.	Std. Dev.	Max.	Min.	Skew.	Kurt.	Obs.
Z-Score	6.24	4.33	16.86	-0.13	0.93	2.93	104
FRISK	9.20	4.88	20.55	1.93	0.51	2.91	104
LRISK	0.22	0.05	0.35	0.11	0.46	2.48	104
CRISK	0.48	0.07	0.60	0.31	-0.40	2.30	104
CON	0.02	0.06	0.25	0.00	3.25	11.94	104
ROA	1.21	0.48	2.05	-0.17	-0.60	2.89	104
SIZE	21.54	0.93	23.98	19.70	1.16	4.26	104

3.2 Variables

3.2.1 Z-score

The study's dependent variable is the bank's stability, which was assessed via (Z-score).
It is a measure that accounts for profitability, leverage and volatility (Demirgüç-Kunt and Huizinga, 2010). A popular measure of bank stability among academics, the Z-score has also been employed as an index of bank stability and this measure is easy to calculate and its data is easy to obtain (Adusei, 2015). It is measured as follows:

$$Z-score_{it} = \left[\frac{ROA_{it} + \frac{E_{it}}{A_{it}}}{\sigma ROA_{ip}} \right] \text{..... ....(1)}$$

Where:

$Z-score_{it}$ is the stability of bank *i* in time *t*, ROA_{it} is the return on assets of bank *i* in time *t*, E_{it} is the equity of bank *i* in time *t*, A_{it} is the assets of bank *i* in time *t*, σROA_{ip} is the standard deviation of return on assets of bank *i* in full time period *p*.

3.3 Funding Risk

The first independent variable used in this paper is the funding risk (FRISK). It gauges the number of deviations that deposits of clients must decrease to force the bank to wipe out equity finance. This metric is important because banks finance retailers' activities through customer deposits (Köhler, 2015). Consequently, funding risks can positively affect the stability of the bank. It is calculated as follows:

$$FRISK_{it} = \left[\frac{\frac{DEP_{it}}{TA_{it}} + \frac{E_{it}}{TA_{it}}}{\sigma(DEP_{it} / TA_{ip})} \right] \text{..... ....(2)}$$

Where:

$FRISK_{it}$ is the funding risk of bank *i* in time *t*, DEP_{it} is the deposit of bank *i* in time *t*, E_{it} is the equity of bank *i* in time *t*, TA_{it} is the total assets of bank *i* in time *t*, $\sigma(DEP_{it} / TA_{ip})$ is the standard deviation of the deposit of bank *i* in time *t* -to- total assets of bank *i* in full time period *p*.

3.3.1 Credit Risk

The second independent variable used in this study is the credit risk (CRISK). It measures the loans divided by total assets (Curak, Poposki, & Pepur, 2012). This ratio shows the degree to which the bank is vulnerable to changes in borrowers' payment positions. The higher this ratio, the higher the bank's assets provided in the form of loans. This means that the bank is close to bankruptcy if there is more default by the borrower. The calculation is as follows:

$$CRISK_{it} = \frac{TL_{it}}{TA_{it}} \text{..... ....(3)}$$

Where:

$CRISK_{it}$ is the credit risk of bank *i* in time *t*, TL_{it} is the total loans of bank *i* in time *t*, TA_{it} is the total assets of bank *i* in time *t*.

3.3.2 Liquidity Risk

Following Fiordelisi and Mare (2014) and Rose and Hudgins (2008) who measure liquidity risk (LRISK) through Cash and due from balances held at other depository institutions to total assets. This study used the same scale as the previous one. It is computed as follows:

$$LRISK = \frac{CDOD_{it}}{TA_{it}} \text{.....(4)}$$

Where:

$CDOD_{it}$ is the Cash and receivable from balances held at other depository institutions of bank *i* in time *t*, TA_{it} is the total assets of bank *i* in time *t*.

3.4 Bank Concentration

The Herfindahl-Hirschman Index (HHI) is used to gauge the concentration (CON). This measure concentrates on the total loan of all banks in the sample. The HHI was used instead of other concentration indices because it concentrates on total loans or assets for all banks in the sample, while other concentration indices focuses only take into account the sum of the combined loans of the largest 3, 5 or 7 banks in the loan/asset. It is calculated as follows:

$$HHI = \sum_{I}^{N} A_i^2 \text{.....(5)}$$

Where:

A_i is the total loans of bank *i* and n represents the total number of banks.

3.4.1 Profitability

The return on assets ratio (ROA) was used as controlling factors to measure profitability because it is a common ratio for measuring bank profitability. It is computed as follows:

$$ROA = \frac{NI_{it}}{TA_{it}} \quad \text{.....(6)}$$

Where:

ROA_{it} is the return on assets of bank *i* in time *t*, NI_{it} is the net income of bank *i* in time *t*, TA_{it} is the total assets of bank *i* in time *t*.

3.4.2 Size

Bank size (SIZE) is the second controlling variable and gauged by the logarithm of the bank's assets.

3.5 Method

The panel data set during the period 2012 to 2019 is used in this study. The several pretests are conducted to ensure its suitability to this model. The following panel data based on the random effects model is used to gauge the stability of the bank.

$$Z-score = \alpha_1 + \beta_1 FRISK_{it} + \beta_2 CRISK_{it} + \beta_3 LRISK_{it} +$$
$$\beta_4 CON_{it} + \beta_5 ROA_{it} + \beta_6 SIZE_{it} + \varepsilon_{it} \quad \text{.....(7)}$$

Where:

$Z-score$: is the bank stability, $FRISK_{it}$: is the funding risks of bank *i* in time *t*, $CRISK_{it}$: is the credit risk of bank *i* in time *t*, $LRISK_{it}$: is the liquidity risk of bank *i* in time *t*, CON_{it}: is the concentration of bank *i* in time *t*, ROA_{it}: is the returns on assets of bank *i* in time *t*, $SIZE_{it}$: is the logarithms of total assets of bank *i* in time *t*, α_1 is the intercept, and $\beta_1, \beta_2 ..... \beta_6$ are the coefficients of independents variables, while ε_{it} is the errors.

4. Results and Discussions

4.1 Unit Root Test

The Levine, Lin, and Chu test is used in this study because it is suitable for examining Panel data. This test examines two hypotheses, the first being the null hypothesis which states that time series is not stationary. The second alternative hypothesis asserts that the time series are stationary. Greene (2000) indicates that the alternative hypothesis is accepted in the case of stationary. Given the findings in Table 4, we note that all factors are stationary and less than 5%, except for the bank's stability (Z-Score), credit risk (CRISK) and concentration (CON). Therefore, the difference for these variables was taken. Thus, the results show that these variables are stationary and less than 5%. This study rejects the null hypothesis and the study variables are stationary.

Table 4: Unit root test result based on LLC test

Variables	Level	First-difference
Z-Score	-1.38610	-4.38349
p-value	(0.0829)	(0.0000)
FRISK (-1)	-5.45356	-8.37643
p-value	(0.0000)	(0.0000)

Variables	Level	First-difference
LRISK (-1)	-3.84946	-9.99481
p-value	(0.0001)	(0.0000)
CRISK (-1)	0.76381	-9.58978
p-value	(0.7775)	(0.0000)
CORISK (-1)	-1.41866	-10.5891
p-value	(0.0780)	(0.0000)
ROA (-1)	-1.81691	-5.61881
p-value	(0.0346)	(0.0000)
SIZE (-1)	-2.12648	-4.82237
p-value	(0.0167)	(0.0000)

Z-score is bank stability, FRISK (-1), is lagged funding risk, D (CRISK) is lagged difference credit risk, LRISK (-1) is lagged liquidity risk, D (CORISK) (-1) is lagged difference concentration (CON), ROA (-1) is lagged return on assets and SIZE (-1) is lagged bank size.

4.2 Correlation Test

Table 5 displays a matrix of correlations between independent variable pairs. The two measurements have the highest correlation: FRISK and SIZE is equal to78%. However, according to Gujarati (2021), if the correlation is less than 80%, which refers there is no multicollinearity among the variables.

Table 5: Correlation matrix between independent variables

Probability	CRISK	LRISK	FRISK	CORISK	ROA	SIZE
CRISK (-1)	1					
LRISK (-1)	-0.39*	1				
FRISK (-1)	0.05	0.41*	1			
CORISK (-1)	-0.17	0.42*	0.68*	1		
ROA (-1)	0.03	0.16	0.25*	-0.08	1	
SIZE (-1)	-0.09	0.49*	0.78*	0.77*	0.05	1

Note: * indicate statistical significance at 1%.

4.3 Discussion Results

Table 6 displays the effects of the independent variables, namely, funding risk, liquidity risk, credit risk, concentration, and two control variables: profitability and size on the volatility of the bank's risk-adjusted returns measured by Z-Score. Based on the results of Lagrange multiplier (LM) tests, Table 6 shows that the Pooled test model is the optimal estimation method in the analysis of the model Z-Score because the value of LM test is more than 5%. Thus, this study accepts the Pooled panel regression model. The R^2 value in the Z-Score model is 25%, which reveals that the independent variables explain only 25% in the variation in stability of Jordanian commercial banks measured by Z-Score. The F-statistics is significant at the 1% significance level.

Funding risk (FRISK) is the first independent factor that positively and statistically affects the stability of Jordanian commercial banks. This means that the improvement in funding risk leads to an increase in the stability of banks. This means that increasing the efficient to mobilize deposits leads to increasing bank's stability. This finding is in line with the results of previous studies such as Demirgüç-Kunt & Huizinga (2010), Shleifer and Vishny (2010), Köhler (2015), and Adusei (2015), which indicate the use of larger deposit financing from clients supports stability.

Table 6 shows that credit risk (CRISK) affect negatively and statistically on the bank's stability. This indicates that weak credit standards increase the risks of instability for Jordanian commercial banks. For liquidity risk (LRISK), it affects negatively, but it is not statistically significant. Thus,

liquidity risk is not serious variable for the stability of Jordanian commercial banks.

Table 6: Regression results

Independent Variables	**Dependent Variable D (Z)-Score**	
	Pooled effects	
	Coefficient	*p-value*
Constant	1.922784	(0.3441)
FRISK (-1)	0.078004	(0.0002)
D (CRISK) (-1)	-8.511147	(0.0000)
LRISK (-1)	-0.021243	(0.7704)
D (CON) (-1)	7.584427	(0.0146)
ROA (-1)	-0.928693	(0.0000)
SIZE (-1)	-0.073453	(0.4356)
Adjusted R^2	24.97%	
F-test (*p-value*)	5.271538	(0.0002)
Lagrange multiplier test (*p-value*)	1.257921	(0.2620)
Period included	6	
Cross-section included	13	
Number of observations	78	

The findings in Table 6 also demonstrate that the impact of concentration (CON) on the stability of Jordanian commercial banks is positive and statistically significant. This result is in line with finding of prior studies such as Aldomy, et al.,(2020) and Marchionne and Zazzaro (2018) who point out that concentration is positively related to stability and they justify this relationship by the fact that high market power has crucial role in the stability of banks.

Table 6 also shows that the profitability gauged by ROA negatively and statistically affects the stability of the Jordanian commercial banks. The higher the bank's profits, the lower the bank's stability and the higher the risks. This result is compatible with Tan and Anchor (2016) who find, among the few studies, that higher profitability leads to increased fragility and instability of Chinese banks.

Table 6 displays that bank size (SIZE) negatively affects the stability of Jordanian commercial banks, but it is not statistically significant. This finding is compatible with the study of Altaee, et al., (2013) who demonstrate that bank size is statistically insignificant effect on the bank's stability. However, based on the results of previous studies, it indicates that the effect of size is not clear. Some studies indicate to the agency theory that a large bank indicates higher instability. Laeven, et al., (2016) show that, on average, the risks in big banks are greater than small banks. In other words, Laeven, et al., (2016) show that large banks have a negative and significant impact on the stability of banks. Köhler (2015) also confirms that large banks have a negative effect on the stability of banks. In contrast, there are many studies such as Beck, et al.,(2013), Boot and Thakor (2000) and Uhde and Heimeshoff (2009) support stewardship theory. They discover that size affect positively and statistically significant bank stability. Increasing size, based on this view, denotes strong governance and, ultimately, good stability.

5. Conclusion

This study aims to evaluate the effect of funding risk, credit risk, liquidity risk, concentration, profitability and bank size on the stability of Jordanian commercial banks using annual data from 2012 to 2019. Panel data set with pooled effects has been used for this purpose. The findings show strong evidence that funding risk and concentration positively and significantly affect bank stability, while credit risk and profitability negatively and significantly affect bank stability. The result of concentration is consistent with the concentration-stability view. This indicates that a increase in

market power results in more stability and decrease in risks.

Even though liquidity risk has a detrimental impact on bank stability, it is not statistically significant and so does not significantly contribute to the stability of Jordanian commercial banks. The findings demonstrate that the profitability has negatively and statistically affects the stability, while size of bank has negatively but not statistically significant affects the stability of the Jordanian commercial banks.

This paper recommends an improvement in funding risks and the use of larger deposit financing, which has a positive impact on increasing the stability of banks. The study recommends that credit standards be of high quality because they reduce the risk of instability. Also, the study recommends the managers of Jordanian commercial banks that there be a balance between profitability and the stability of banks.

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