






“Bank size and capital: A trade-off between risk-taking incentives and diversification”

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ARTICLE INFO	Marwan Alzoubi, Alaa Alkhatib, Ayman Abdalmajeed Alsmadi and Hamad Kasasbeh (2022). Bank size and capital: A trade-off between risk-taking incentives and diversification. <i>Banks and Bank Systems</i> , 17(4), 1-11. doi: 10.21511/bbs.17(4).2022.01
DOI	http://dx.doi.org/10.21511/bbs.17(4).2022.01
RELEASED ON	Thursday, 06 October 2022
RECEIVED ON	Friday, 01 July 2022
ACCEPTED ON	Thursday, 22 September 2022
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Banks and Bank Systems"
ISSN PRINT	1816-7403
ISSN ONLINE	1991-7074
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

49



NUMBER OF FIGURES

4



NUMBER OF TABLES

5

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BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 1st of June, 2022

Accepted on: 22nd of September, 2022

Published on: 6th of October, 2022

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Kasasbeh, 2022

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Conflict of interest statement:

Author(s) reported no conflict of interest

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BANK SIZE AND CAPITAL: A TRADE-OFF BETWEEN RISK-TAKING INCENTIVES AND DIVERSIFICATION

Abstract

This paper analyzes the importance of size and capital for risk-taking incentives of Jordanian banks using panel data of 13 commercial banks for the period 2007–2017. The results reveal that size and capital add to stability, consistent with the economies of scale and scope hypothesis. In developing countries, banks are more conservative and less involved in market-based activities; however, they are interconnected just as in developed countries. The results of the first model and second model reveal that as size increases by 1 percent, risk decreases by 0.11 percent and 0.03 percent, respectively, implying that too-big-to-fail is not present and that moral hazard is not a serious issue. In both models, large size is driven by diversification not by risk-taking incentives. In terms of capital, the results of the first model and second model reveal that as capital increases by 1 percent, risk decreases by 0.48 and 0.12 percent, respectively. The fact that Jordanian banks are overcapitalized indicates that the central bank regulation is not binding. Banks increase their capital adequacy ratios to reduce risk. It is clear that there is economic benefit from increased size. However, the failures of large banks are systemic due to their interconnectedness. Therefore, regulators need to pay special attention to them in accordance with Basel III Accord.

Keywords

too-big-to-fail, systemically important banks, capital adequacy, Basel Accord, risk-weighted assets

JEL Classification

G11, G20, G21, G28

INTRODUCTION

Large banks are special complex organizations with certain features that distinguish them from other banks. They operate with economies of scale and scope, which allow them to benefit from diversification and maintain lower levels of risks and capital. They are often described to be too-big-to-fail organizations implying that they have priority over other classes of banks in terms of the bail-out subsidies offered by central banks. Their failure usually triggers systematic risks, the cost of their failure is not affordable financially, and socially, therefore, central banks usually jump and bail them out. Central banks believe that the failure cost outweighs the cost of bailing out. As such, large banks behave with moral hazard by taking more balance sheet risk as well as market-based risks knowing that in distress, regulators will subsidize them. They claim that they are actually less risky because they are highly diversified, which gives them some room for more risk-taking.

It is therefore believed that due to the too-big-to-fail, managers have incentives to increase the less costly leverage (deposits) and increase size to boost their compensations and maximize shareholders benefits. Being large brings economic benefits and creates distortions at the same time, which means that there is a tradeoff between benefits

and distortions and that there is a theoretically optimal size, which has not been investigated enough in empirical research.

For these reasons, large banks have been under heated debate and deep scrutiny after the world financial crisis of 2007–2008. Many believe that they are the main cause of the crisis due to the moral hazard, complexity, involvement in market-based activities, and their interconnectedness with other banks. Regulators need to pay special and more attention to these institutions and impose specific restrictions. This study is motivated by the lack of sufficient research regarding the issue of whether this kind of banks are driven by moral hazard or by diversification in developing countries.

1. LITERATURE REVIEW AND HYPOTHESES

Literature on size, capital and risk is not conclusive. Laeven et al. (2016) report an evidence in support of the argument that large banks create systemic risk and that higher capital reduces risk. These findings support the calls to limit the size or activities of large banks. On the other hand, they may also offer efficiency gains due to their ability to offer certain financial services. Rahman et al. (2015) examine “the impact of bank size on bank regulatory capital ratios and risk-taking behavior using a panel dataset of 30 Bangladeshi commercial banks over the period 2008–2012. Empirical results show that large banks hold lower amount of capital and take higher level of risk” (Boamah et al., 2021; Akter et al., 2018; Anginer et al., 2014).

Laeven et al. (2014) discuss the rationale for banks to be large in asset size and market-based activities and the need for an updated regulation to account for these the special characteristics of the so-called systemically important banks (SIBs). The recent evolution of large banks has been driven by the development of information technology and deregulation trend. Large banks are special because they tend to maintain lower levels of capital, involved in more market activities and more complex compared to small banks. The authors suggest that SIBs create more systemic risk due to their involvement in market-based activities, but are not individually riskier (Barth et al., 2004; Brissimis et al., 2008; Ghosh, 2014).

SIBs are too-big-to-fail, but also, they are more diversified. Whilst there is no recommendation for an optimal size, there is a need for optimal regulation that accounts for micro- and macro-prudential aspects such as the capital surcharges recommended

by Basel III Accord. Similarly, Ghosh (2014) argues that capital regulations are not necessarily effective in interacting with market forces such as market discipline and risk. The author reports a positive risk response to an increase in capital and recommends additional measures to complement the capital adequacy regulation; this evidence is derived from banks operating in GCC countries.

Barrell et al. (2010) discuss the rationale for maximizing shareholder’s wealth behind the moral hazard risk-taking attitudes of large banks operating in major industrial countries and report a strong evidence to support the too-big-to-fail hypothesis. Risk is measured by the value of the loan losses (Boyd & De Nicoló, 2005; Fries & Taci, 2005; Hughes & Mester, 2013; Ioannidou & Penas, 2010). The failures of large banks contribute to systemic risks and induce central banks to provide extraordinary assistance. Large banks being aware of the bail out tend to grow and take more risk in order to boost their returns and take advantage of the potential government subsidies. The paper offers a number of solutions to the size and too-big-to-fail problem, such as establishing a structural reform commission, raising the capital adequacy requirements on large banks, raising taxes and implementing better system of banking supervision.

A number of studies report a reduction in risk in response to increased size. Khan et al. (2017) report that size and capital negatively affect risk of bank holding firms operating in the U.S. during the period 1986–2014. Large banks are usually highly diversified implying that they are subject to less risk (Demsetz & Strahan, 1997; Mercieca et al., 2007; Bertay et al., 2013; Leon et al., 2012; Lepetit et al., 2008; Oudat et al., 2020). Hakenes and Schnabel (2011) argue that small banks are incurring higher fixed cost as a result of apply-

ing Basel 2 Accord. This may force small banks to raise their deposit interest rates in order to preserve their market share leading to more risk-taking. Larger banks are therefore relatively less risky. Bashir (1999) confirms that the risk of Sudanese banks is negatively affected by size.

To summarize, the positive effect is justified on the basis of too-big-to-fail, while the negative impact is based on the diversification front. Clearly, the literature is not firm in any direction, which motivates us to search for answers of direction.

Capital, on the other hand, is a fundamental factor in determining bank risk given that it is considered a cushion against future risk and that risk can be charged against capital, therefore capital is vital. A number of studies advocate that banks raise capital whenever risk is higher suggesting that more capital leads to less risk (Altunbas et al., 2007; Das & Ghosh, 2007; Shrieves & Dahl, 1992).

Guidara et al. (2013) suggest that large well-capitalized Canadian banks raise capital when the business cycle is ascending and lower capital whenever the business cycle is descending, implying a negative relationship between capital and risk. This result is coming from the six largest Canadian chartered banks for the period 1982–2010. Moreover, the negative relationship between capital bank risk is sufficiently established (Furlong & Keeley, 1989; Thakor, 1996; Repullo, 2005; Lee & Hsieh, 2013). Lee and Hsieh (2013) state that raising capital is associated with risk reduction by commercial banks operating in 42 Asian countries for the period 1994–2008. This behavior is more apparent in countries with low to middle income.

Calem and Rob (1999) argue that the movements of risk and capital follow a U-shape, this evidence is derived from Canadian banks behavior. “As a bank’s capital increases it first takes less risk, then more risk. A deposit insurance premium surcharge on undercapitalized banks induces them to take more risk. An increased capital requirement, whether flat or risk-based, tends to induce more risk-taking by ex-ante well-capitalized banks that comply with the new standard” (Ridha, 2020).

Gonzalez (2005) contends that banks in countries with stricter capital regulations take more risk be-

cause these banks are perceived to have a lower charter value. Jokipii and Milne (2011) confirm a positive two-way relationship between capital and risk of American banks and bank holding companies during the period 1986–2008. Besanko and Kanatas (1996) show that when capital rises, bank stock price declines implying that capital positively affects risk. Bitar et al. (2018) demonstrate that capital does not affect bank risk. Other factors positively affecting the risk are the ratio of deposits to assets (liquidity), the shield from deposit runs (run risk). Banks increase risk to cover the cost of deposit insurance and increase management compensations (Keeley, 1990; Acharya & Naqvi, 2012; Wagner, 2007).

This study investigates the factors influencing bank risk in Jordan using a panel data analysis by focusing on bank size and capital. The sample consists of 13-chartered national commercial banks for the period 2007–2017. Islamic banks and foreign banks are excluded due differences in structures and functions. Annual data is taken from bank financial statements documented in the Amman Stock Exchange (ASE), mainly balance sheets and income statements. The hypotheses are:

H_{01} : *Bank size positively affects risk.*

H_{02} : *Capital adequacy ratio positively affects risk.*

Two measures of risk are used for the dependent variable; the first, which is denoted as total risk, is defined as risk-weighted assets to total assets (RWATA) following the Basel Accord, and the second one, which is denoted as credit risk, is the provisions for impairment loans to total loans (LLP). Total risk measure captures operational, market and credit risks. For robustness, the results of both models are reported. The independent variables are bank size, capital adequacy ratio, performance, funding activities, loan to asset ratio, and the macroeconomic variables: gross domestic product and inflation rate. Large size (Ln assets) is expected to be associated with less risk. The fact that Jordanian banks are well capitalized means that they comply with the Central Bank of Jordan regulation, implying that if they inject more capital, they do that to minimize risk. However, the effect of moral hazard cannot be denied, it is possible that large banks behave on the perception

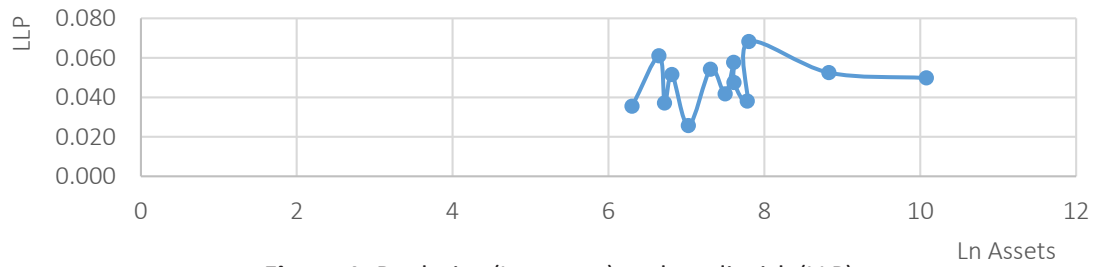


Figure 1. Bank size (Ln assets) and credit risk (LLP)

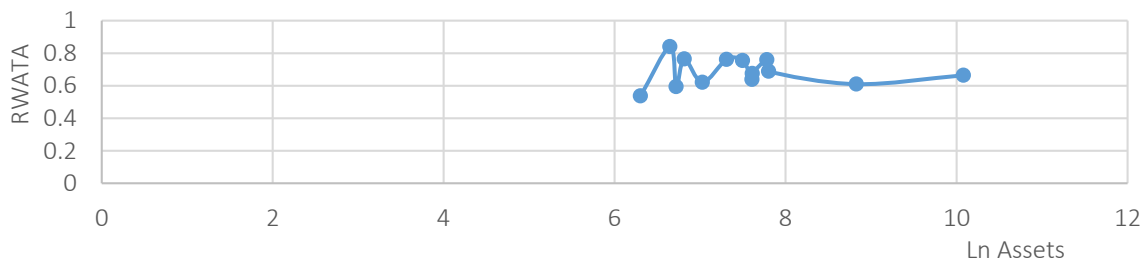


Figure 2. Bank size (Ln assets) and total risk (RWATA)

that they are too-big-to-fail, implying that as they grow in size, they engage in more risky activities seeking to maximize their returns and relying on potential central bank subsidies. Although large banks may hold less capital, this is not due to moral hazard issue because Jordanian banks are well capitalized. The following graphs (see Figure 1 and Figure 2) reveal that risk movements are not highly sensitive to bank size movements.

Capital adequacy ratio (CAR1) is presented in this study by the primary capital ratio because it represents pure capital, which has a greater impact on market discipline. The following graphs (see Figure 3 and Figure 4) show that as capital adequacy ratio goes up, risk (LLP or RWATA) goes down.

Performance is expected to have a negative impact on risk, as return goes up, risk goes down. The study

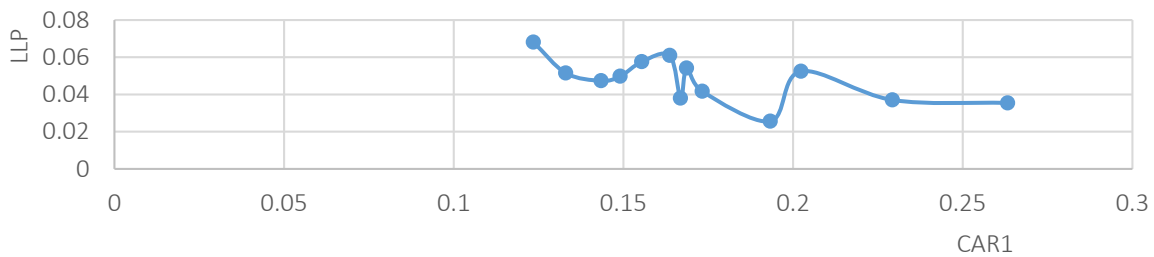


Figure 3. Capital adequacy ratio (CAR1) and credit risk (LLP)

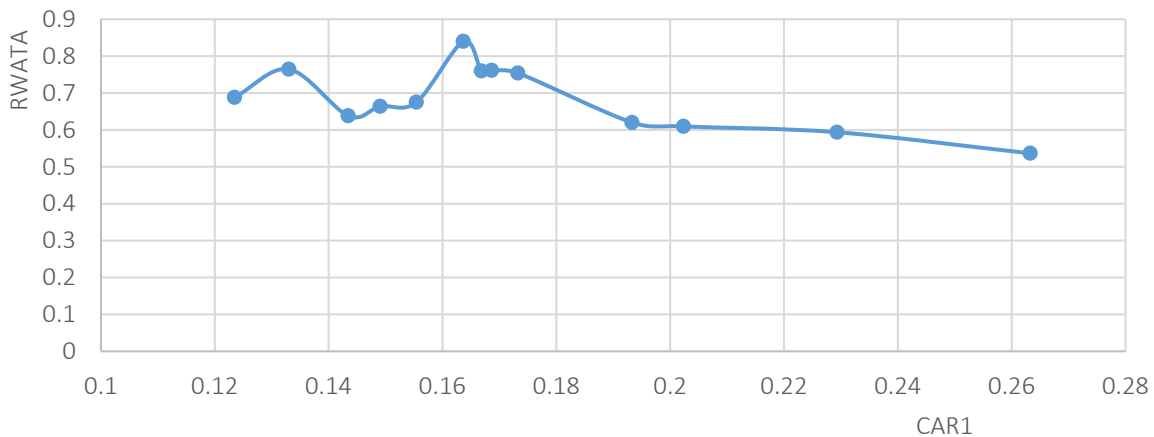


Figure 4. Capital adequacy ratio (CAR1) and total risk (RWATA)

uses return on average assets. It is controversial to use return on average equity given that it is usually used to represent the cost of equity funds. Funding activities represented by deposit to asset ratio is expected to affect risk positively. More leverage increases risk, and bankers prefer debt to equity when raising funds based on moral hazard behavior. It is possible that their incentives to take more risk are due to the subsidy and ambition for more compensations and to cover the cost of the deposit insurance. Loan-to-asset ratio is anticipated to have a positive effect on risk as loans extended represent the main source of credit risk.

As real Gross domestic product growth rate rises, the future of banks becomes promising, implying less risk. Simply, improved economic activity reflects positively on a bank activity and stability. As real growth rate goes up, banks stand ready to finance and accept the increased deposits. A negative effect is anticipated. Finally, since inflation rate is a risk factor, it is expected to have a positive effect, yet a negative sign is possible if banks hold more deposits than loans (negative gap).

2. DATA AND METHODOLOGY

2.1. Data

The sample consists of 13 Jordanian commercial banks operating in Jordan and includes 143 observations. This paper uses a balanced panel analysis; the annual data are sourced from the Amman Stock Exchange (ASE) over the period 2007–2017. The variables and their measurements are reported in Table 1.

Table 1. Variable definition

Variable	Measurement
A. Dependent	
1. Total Risk	Risk-Weighted Assets (RWA)/ Average Assets
2. Credit Risk	Impairment Loan Provision (LLP)/Total Loan
B. Independent	
1. Lagged Risk	Lagged (RWA/ Total Assets) Lagged (LLP/ Total Loans)
2. Tier 1	Primary Capital/RWA
3. Funding	Total Deposits / Total Assets
4. Performance	Return on Average Assets
5. Size	Natural Log of Total Assets
6. Economic Indicator	The Growth Rate of GDP in real terms at Market Prices
7. Inflation Rate	Change in Consumer Price Index

2.2. The model

Risk is the dependent variable represented by (RWATA) (LLP). The explanatory variables for both models are (CAR1), DepA, (LAR), (ROAA), SIZE (Ln assets), (ROAA), (RGDP), and (INFL).

1) The first model

$$RWATA_{it} = \beta_0 + \beta_1 RWATA_{it-1} + \beta_2 CAR1_{it} + \beta_3 DepA_{it} + \beta_4 LAR_{it} + \beta_5 ROAA_{it} + \beta_6 SIZE_{it} + \beta_7 RGDP_{it} + \beta_8 INFL_{it} + \mu_{it} \quad (1)$$

2) The second model

$$LLP_{it} = \beta_0 + \beta_1 LLP_{it-1} + \beta_2 CAR1_{it} + \beta_3 DepA_{it} + \beta_4 LAR_{it} + \beta_5 ROAA_{it} + \beta_6 SIZE_{it} + \beta_7 RGDP_{it} + \beta_8 INFL_{it} + \mu_{it}, \quad (2)$$

where β_0 is the intercept, β_i is the coefficient, RWATA is RWA to total assets, LLP is provision of impaired loans to total credit facilities ratio, CAR1 is primary capital adequacy ratio (core capital or pure capital), DepA is the ratio of deposits to assets, LAR is the ratio of loans to assets, ROAA is return on (average) assets, SIZE is natural log of assets, RGDP is the growth rate of Real GDP at market prices, INFL is the percentage change of consumer price index and μ is the stochastic error.

Tables 2 represents descriptive statistics, and Table 3 is the correlation matrix. Tables 4 and 5 report the findings.

2.3. Model descriptive statistics

CAR1 in Jordan averaged 17.4 percent during 2007–2017, which is well above the 6 percent required level by the Central Bank of Jordan. Jordanian banks are well capitalized and the regulation is not binding. In a way, this implies that RWATA is not high. The fact that banks hold more capital than required implies that the banks are driven by the fundamental factors not by the regulatory requirements. Jordanian banks seem to be more conservative, and this is reflected on their returns, the average ROAA in Jordan is 1.3 percent (Table 2). Real GDP growth rates at market prices have been growing at reasonable levels with an average of 3.7 percent.

Table 2. Descriptive statistics

Variable	ROAA	CAR1	SIZE	RWATA	RGDP	Infl	DepA	LAR	LLP
Mean	0.013	0.174	7.54	0.685	0.037	0.037	0.651	0.474	0.048
Standard deviation	0.005	0.049	1.01	0.108	0.021	0.040	0.071	0.069	0.019
Minimum	0.000	0.110	5.40	0.370	0.020	-0.009	0.488	0.314	0.006
Maximum	0.025	0.360	10.16	0.960	0.082	0.140	0.800	0.603	0.089

Table 3. Correlation coefficient matrix

Variable	ROAA	CAR1	SIZE	RWATA	RGDP	Infl	DepA	LAR	LLP
ROAA	1.000	-	-	-	-	-	-	-	-
CAR1	0.144	1.000	-	-	-	-	-	-	-
SIZE	0.048	-0.346	1.000	-	-	-	-	-	-
RWATA	-0.093	-0.493	-0.071	1.000	-	-	-	-	-
RGDP	0.177	0.201	-0.191	-0.168	1.000	-	-	-	-
Infl	0.206	0.089	-0.122	0.000	0.472	1.000	-	-	-
DepA	-0.036	-0.305	0.170	-0.001	-0.283	-0.191	1.000	-	-
LAR	0.010	-0.323	-0.149	0.635	-0.042	0.047	0.036	1.000	-
LLP	-0.228	0.380	-0.112	0.310	-0.261	-0.063	0.331	0.015	1.000

2.4. Correlation matrix

Table 3 shows no serious issues in the correlation coefficients. The correlation between risk and SIZE (-0.071) is negative but close to zero, indicating that they are not highly correlated. Capital adequacy seems to play an important role in decreasing risk, the correlation coefficient is -0.493.

2.5. Selection of the model: Pooled, fixed and random

Given that the pooled model is restrictive and due to unobserved heterogeneity across banks, this study is using either the fixed effect if the independent variables are correlated with the firm-unique effects. If not, the random model is used. The fixed effect model allows the individual-specific effects to be correlated with the explanatory variables.

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \alpha_i + \varepsilon_{it}, \tag{3}$$

where X represents time-variant independent variables.

The fixed effect model allows each firm to have its own intercept but all sections share the same slope. “The main benefit of the fixed effect model is that it captures all bank characteristics that are difficult to measure and that are time-invariant. This is done by introducing α_i in the model. The fixed effect model can be estimated in a number of ways,

one way is the within-group fixed effects which starts by calculating the means of the dependent and independent variables (demeans), then subtracting the demeans from the observed values” (Alzoubi, 2021):

$$\bar{Y}_i = \beta_1 + \beta_2 \cdot \bar{X}_i + \alpha_i + \bar{\varepsilon}_i, \tag{4}$$

$$Y_{it} - \bar{Y}_i = (\beta_1 - \beta_1) + \beta_2 (X_{it} - \bar{X}_i) + (\alpha_i - \alpha_i) + (\varepsilon_{it} - \bar{\varepsilon}_i), \tag{5}$$

$$Y_{it} - \bar{Y}_i = \beta_2 (X_{it} - \bar{X}_i) + (\varepsilon_{it} - \bar{\varepsilon}_i), \tag{6}$$

“Where \bar{Y}_i is the mean value of the dependent variable for bank i , \bar{X}_i is the mean values of the regressors for bank i , and the mean value of α_i is α_i since it is time-invariant. By eliminating the fixed effect terms, the parameters can be estimated by using OLS estimation of the time-demeaned dependent variable on the time-demeaned explanatory variables” (Alzoubi, 2021). The random effect model allows each firm to have a distinct α but all firms share the same slope. Firm-specific effects are not correlated with the explanatory variables.

$$Y_{it} = \beta_1 + \beta_2 X_{it} + (\alpha_i + \varepsilon_{it}), \tag{7}$$

More specifically, two multiple regression models are estimated in pooled regression, fixed and random effects forms to test the reliability of the theoretical relationship between the dependent and independent variables of Jordanian banks.

Wald test results for both models show that the P-value equals zero for both Chi-square and F-statistic, implying that the fixed effect model is more appropriate than the pooled model. Hausman test results for both models show that the P-value equals zero for Chi-square, which supports the fixed effect model. Tables 4 and 5 report the results for the first model and second model for RWATA and LLP, respectively, as dependent variables.

3. HYPOTHESES TESTING RESULTS

Regulatory risk measure defined as risk-weighted assets to total assets (RWATA) is used in the first model, and bank measure of credit risk (LLP) defined as impaired loan provisions to total loans is used in the second model for the dependent variable. The results of both models are presented below.

3.1. The first model (RWATA)

The results of the fixed effect in the first model, which define risk as RWA to total assets (RWATA), show that except for the deposit to asset ratio, return on assets and inflation rate are not significant, all other variables are significant at the 1 percent level. The model is significant at 1 percent (F-statistic $P_{orb} = 0$) and adjusted R-square is 85.

Size has a negative effect on risk with a coefficient of -0.11 percent (Table 4), and core capital

(CAR1) has the expected negative sign, as the ratio goes up by 1 percent, risk goes down by 0.48 percent. Basel's guidelines help Jordanian banks to be stable. The ratio of loan to asset positively affects risk, once this ratio is up by 1 percent, risk is up 0.60 percent. Apparently, this variable has the biggest influence on risk. Finally, whenever GDP growth rate is up by 1 percent, risk goes down by almost the same amount.

3.2. The second model (LLP)

This model is estimated for robustness purposes, it includes impairment loan provisions to total loans as a dependent variable, and it mainly reflects the credit risk (Table 5).

Size, Tier 1 capital adequacy ratio (CAR1), loan to asset ratio (LAR), performance (ROAA) and RGDP are all highly significant (at 1 percent) and negatively affect risk. The rest of the variables are not. Similar to the first model, Size, CAR1, ROAA and RGDP are negatively and significantly associated with risk just as in the First Model. Loan to asset ratio also has a negative sign, meaning that as LAR goes up, risk goes down.

This model confirms the results of the First Model (RWATA), except for the LAR. Durbin-Watson is within normal levels with a value of 2.21, indicating no autocorrelation issue (in the First Model, DW = 1.35), adjusted R^2 is 76, and F-test is highly significant.

Table 4. Panel regression results of the model (RWATA)

Variable	Pooled Regression		Fixed Effect OLS		Random Effect	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
A-Internal						
C	0.235	0.02	1.21	0.000	0.235	0.006
LAG1RAWATA	0.631	0.00	0.25	0.000	0.631	0.000
CAR1	-0.467	0.00	-0.48	0.006	-0.467	0.000
DEPA	-0.100	0.16	-0.01	0.924	-0.100	0.094
LAR	0.422	0.00	0.59	0.000	0.422	0.000
ROAA	0.265	0.78	0.26	0.819	0.265	0.735
SIZE	-0.005	0.37	-0.11	0.000	-0.005	0.283
B-External						
RGDP	-0.119	0.72	-1.14	0.001	-0.119	0.674
INFL	0.209	0.12	0.02	0.837	0.209	0.064
Adjusted R^2	0.798	-	0.87	-	0.785	-
F-statistic	59.720	0.00	38.68	0.000	59.720	0.000

Table 5. Panel regression results of the model (LLP)

Variable	Pooled Regression		Fixed Effect OLS		Random Effect	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
A-Internal						
<i>C</i>	0.030	0.141	0.33	0.000	0.030	0.061
<i>LAGILLP</i>	0.712	0.000	0.41	0.000	0.712	0.000
<i>CAR1</i>	-0.033	0.219	-0.12	0.001	-0.033	0.118
<i>DEPA</i>	-0.004	0.789	0.01	0.722	-0.004	0.733
<i>LAR</i>	-0.008	0.637	-0.07	0.000	-0.008	0.548
<i>ROAA</i>	-0.453	0.035	-0.66	0.008	-0.453	0.007
<i>SIZE</i>	0.000	0.670	-0.03	0.000	0.000	0.587
B-External						
<i>RGDP</i>	-0.042	0.596	-0.37	0.000	-0.042	0.500
<i>INFL</i>	0.004	0.899	0.01	0.607	0.004	0.872
Adjusted R^2	0.640	–	0.76	–	0.62	–
<i>F</i> -statistic	26.886	0.000	21.80	0.000	26.886	0.000

3.3. Residual diagnostics

The standard model is the one with high R-square and F-statistic, no serial correlation (no autocorrelation) and normally distributed residuals. Regarding the test of serial correlation and according to Breusch-Pagan LM, the null hypothesis in the first model is rejected, which means that residuals are serially correlated. However, according to Pesaran CD test, the null is cannot be rejected. Therefore, the evidence is not conclusive. While in the second model the null hypothesis cannot be rejected regardless of the test used, one can conclude that there is no cross-section dependence (correlation) in residuals. Considering the normality test, the null hypothesis cannot be rejected (H_0 : residuals are normally distributed) in both models based on Jarque-Bera, and it can be concluded that the residuals are normally distributed.

4. DISCUSSION

Size and capital adequacy ratio have a favorable impact on risk in both models. As banks grow in size and capital adequacy, their risk declines, the null hypotheses are therefore rejected. When banks grow in size, they tend to take less risk as evident from Table 4 in the fixed effect OLS. The

relationship is negative and significant but not too strong, contrary with the too-big-to-fail hypothesis, but consistent with the economies of scale and scope. Large banks seem to add stability internally. Size coefficients are -0.11 percent in the first model and -0.03 percent in the second model. Clearly, diversification drives banks to grow and, given that market-based instruments are limited in Jordan and most developing countries, banks diversify in terms of economic sectors, geographic locations, borrowers, etc. However, the fact that the failure of large banks is outrageous and contagious cannot be denied, implying the need to keep large banks under close supervision.

Tier 1 or core capital (CAR1) has the expected negative sign, as the ratio goes up by 1 percent; risk goes down by 0.48 percent in the first model and by 0.127 percent in the second model. Basel's guidelines help Jordanian banks to be stable. It is worth mentioning that Jordan is applying Basel's standard voluntarily and since Jordanian banks are overcapitalized, this means that they have the minimum required level and that they would not increase CAR1 unless risk is increased. Banks are conservative as they react to any increase in risk by raising pure capital leading to a decline in risk (Alzoubi, 2021). The findings however suggest that whenever risk is high, banks raise capital, an indication of rational behavior.

CONCLUSION

This paper examines the impact of size and capital on the risk-taking activities of banks. Large banks are special organizations characterized by economies of scale, scope and too-big-to-fail, which have dis-

tinct implications on risk. Capital is crucial, and both models confirm that when banks grow, they do that with the intension to reduce risk and diversify. Too-big-to-fail is not present, especially when the capital adequacy factor is considered. As capital increases, risk is reduced and since Jordanian banks are overcapitalized, whenever they increase the capital adequacy ratios, they do to minimize risk because the regulation is not binding.

In developing countries, banks are more conservative, and their involvement in market-based activities is not significant, however, they are interconnected just as in developed countries. Indeed, diversification is what drives them to grow, not market-based activities. However, the evidence is not strong in both models. The fact that large banks are stable does not represent a call to ignore them even though they are not involved in market-based activities. It is also a fact that their failures are systemic due to their interconnectedness. Therefore, regulators need to pay special attention to them consistent with Basel III Accord. The evidence on the capital adequacy ratio is stronger than that of size. Banks fight risk by raising capital, even if the cost of equity capital is high.

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