

Journal of Social Sciences (COES&RJ-JSS)
ISSN (E): 2305-9249 ISSN (P): 2305-9494
Publisher: Centre of Excellence for Scientific & Research Journalism, COES&RJ LLC
Online Publication Date: 1st October 2018
Online Issue: Volume 7, Number 4, October 2018
<https://doi.org/10.25255/jss.2018.7.4.350.357>

The Impact of Bank Performance and Credit Risk on Capital Structure: An Empirical Evidence of Jordanian Bank Sector

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Abstract

The study investigates the impact of credit risk of banks measured by the ratio of reserves to Loan Losses to Gross Loans, the performance of bank measured by Return on Equity ratio, and Bank size measured by the log of the total assets of the bank on capital structure of banks measured by Equity to Asset ratio on 11 Jordanian commercial banks listed in Amman Stock Exchange over the period 2010-2015, The existence of such a relationship has important implications for bank decision makers. The study used Fixed Effect Regression; Empirical evidence showed that bank credit risk has a positive effect on capital structure, while the bank performance has a negative impact on capital structure. In addition, bank size as a control variable played a negative role on capital structure. I also recommended that the future researches will direct to pursue the approach by using substitutional accounting indications of banking risk, and to investigate the impact of the firm's capital performance and risk on its capital structure.

JEL-codes:

G21, G32

Keywords:

Banks, Capital, Credit, Risk, Firms.

Citation:

Shubita, Dua'a Fawzi (2018); The Impact of Bank Performance and Credit Risk on Capital Structure: An Empirical Evidence of Jordanian Bank Sector; Journal of Social Sciences (COES&RJ-JSS), Vol.7, No.4, pp:350-357; <https://doi.org/10.25255/jss.2018.7.4.350.357>.

Introduction

Modigliani & Miller (1958), in their seminal research, stated that capital structure is considered as one of the main issues in corporate finance theory. It's important to investigate the capital structure decisions in the case of financial sectors, such as banks' capital structure; and more specifically, banks should determine the main factors that affect their capital structure. The main objective of this study is to test the empirical impact of banks credit risk, the bank performance, and bank size on the banks capital structure. In order to assess risk, banks must choose their capital structure and what factors affects their lending behavior. Credit risk management has become important for banks and other financial institutions (Amidu & Hinson, 2006; Agusman, Monroe, Gasbarro & Zumwalt, 2008; Obeidat, El-Rimawi, S., Maqableh & Al-Jarrah, 2013; Masa'deh, Tayeh, Al-Jarrah, & Tarhini, 2015). However, despite this importance, Altunbas, Carbo, Gardener & Molyneux (2007) demonstrate that most credit risk models assume that the firm's debt level remains the same overtime, but in practice firms adjust their capital financing structures in response to changes in the economic environment. So, it is important to investigate how banks' capital structure choices are affected by credit risk. As stated in different studies such as, Froot, Scharfstein & Stein (1993) and Froot & Stein (1998) and Cebenoyan & Strahan (2000), among others adopting active risk management offers banks more room to invest more as a result of the need to have less capital. Lin, Chen & Lu (2015) found a positive and significant impact of credit risk on bank capital. The statistical method of this research, followed by Ayaydin & Karakaya (2014), is used to explain the relationship between bank credit risk and its capital structure, and performance of banks.

However, as discussed earlier, not only is a bank's capital structure affected by its credit risk, but also by its performance. Banks are willing to maximize their performance, and minimize their financing cost, by maintaining the appropriate capital structure. That's why the optimal capital structure has been the subject of many researches due to its value relevance and impact on both credit risk and performance, this interest covers the globe. Using Nigerian data, Soliman, Mukhtar & Shubita (2018) address this topic while Ayaydin & Karakaya (2014) also aimed to determine the impact of bank capital on profitability and risk using Turkish data. It has been argued that high profitable banks were less depending on equity in their capital structure than less profitable banks, Ozili & Uadiale (2017) found a significant negative effect of Total Equity (TE) to Total Asset (TA) ratio (TE/TA) on Return on Equity (ROE). This is in the same line of earlier findings by Gleason, Mathur & Mathur (2000) study that shows the firm's capital structure has a significant adverse effect on its performance measures. The significance of this study arises from the importance of impact the bank credit risk and its performance has on banks' capital structure. The main contribution of this paper is to investigate the relationship between bank capital structure and its credit risk, performance, and size. This will clarify the scope of optimal equity used in financing the banks' activity in Jordanian market, as an example of emerging markets, which will help financial managers in determining the most appropriate choices in the capital structure policy in the future, and also helps the outside investors to take signals from the insiders through the capital structure.

The paper proceeds as follows: in the next section I briefly assess the banking sector in Jordan then I discuss the relevant literature in section three, in the following section I describe the data construction and methodology, section five presents the empirical results, and section six concludes the paper.

Assessment of Banking Sector in Amman Stock Exchange

The banking sector in Jordan has main contribution to the Jordanian economy. This sector consider as a well capitalized and highly regulated sector, it's currently consists of 26 bank, 15 of them are listed on the Amman Stock Exchange (ASE). Table (1) presents the market capitalization of Services, Banks, and Industrial sectors to the capitalization of the all sectors in year 2013 to 2016. We can noticed that in these years the market capitalization of banks sector is around 50% of the market capitalization of the all sectors, so it is possible to say that the banking sector in Jordan represents the largest market component.

Table (1). Market capitalization of listed companies in services, banks, and industrial sectors as a percentage of capitalization of the total market (%)

Sector	Year			
	2016	2015	2014	2013
Services Sector	16%	18%	19%	18%
Banks Sector	52%	51%	50%	48%
Industrial Sector	20%	20%	20%	24%
All Sectors	100%	100%	100%	100%

*Source: Various Amman Bourse Annual Reports.

The literature Review

Capital structure has been widely investigated in previous literature. Modigliani & Miller (1958) initiated the theory of capital structure and its effect on a firm's value in a pure theoretical way because it is proven under a set of ideal assumptions. In 1963 The Modigliani-Miller theorem extended the 1958 analysis including the effect of taxes. The following section briefly reviews the outcomes of previous studies that investigated the capital structure from different perspectives.

Previous literature was focusing on the effect of credit risk and bank capital display mixed results; most studies found a positive effect of credit risk on capital structure, this encouraged bank to increase their capital as they bear more amount of risk. Amidu & Hinson (2006) examined how credit risk affects a banks' capital structure, profitability, and lending decisions; they used financial data for Ghanaian Banks for the period from 1998 to 2003. The results show a positive effect of bank capital as measured by: Equity to total Asset on its credit risk as measured by: the squared difference between bank loan and the mean of bank loans. Also, Altunbas et al. (2007) analyzed the relationship between capital, risk and efficiency for a large sample of European banks between 1992 and 2000; empirical evidence found that there was a positive effect of bank credit risk measured by Loan Loss Reserve (LLR) on the level of bank capital measured by Equity to total Asset. They concluded that this relationship possibly indicated bank regulators' attitude toward capital determination as a mean of restricting taking activities with high level of risk. In the same year Kyereboah-Coleman (2007) examined the effect of capital

structure on the microfinance institutions performance in Ghana, over the period 1995 - 2004. The results shows that the majority of microfinance institutions with high leverage and finance their operations with long-term instead of short-term debt. Also, highly leveraged institutions perform better as reaching more clients, enhancing their ability to deal with risk. Enjoying economies of scale, and their ability to deal with moral hazard and adverse selection is better. Ayaydin & Karakaya (2014) also aimed to determine the impact of bank capital on profitability and risk in 23 Turkish banks for the period 2003 to 2011; when they measured capital risk by Loan Loss reserve, they found a significant positive relationship between capital and banks reserve rates. According to the results they recommended that the Turkish banking regulators should develop the banking system, by encouraging the financial efficiency of banks to implement the suggestions of Basel III agreement.

Recently Lin et al. (2015) analyzed the impact of capital level, measured by Equity to total Asset, on banking credit risk measured by Nonperforming Loan Ratio (Impaired Loans/ Gross Loan). By using the data of 4828 loans of public bank facilities from the U.S. for the period 1987–2010, they found that there was a positive correlation between banks' capital and credit risk. This study implies that banks with a lower capital level would bear a lower probability of default. The relationship between bank capital and performance is also considered in previous literature. The traditional view suggests a higher equity to asset ratio (ETA) is linked with a lower return on equity (ROE). Empirically, a number of literature find a positive effect of bank performance on its capital, like Amidu & Hinson, (2006) which argue that banks with higher values of profits increase the internal financing level, and Altunbas et al., (2007), by measuring the bank performance by return on asset. While others have found a negative effect of performance on bank capital, like Ayaydin & Karakaya (2014) on Turkish banks, and Alshubiri (2011) on 14 Jordanian banks from 2005 to 2008. Recently Ozili & Uadiale (2017) investigated whether the ownership structure, measured by various variables, such as Equity to total Asset (EQTA), influences bank profitability as measured by Return on Equity (ROE) and other variables. Their study sample covers the 2006 to 2015 period for 27 Nigerian banks. They also found a negative relationship between Equity to total Asset and Return on Equity (ROE). This study recommended that the policy makers should encourage high concentrated ownership, which can help improve bank performance.

Bank size plays an important role in determining bank capital structure, and so researchers determined the effect of bank size on bank capital. For example, Cebenoyan & Strahan (2004) used quarterly data of banks' capital from 1987 to 1993, and found a negative relationship between bank capital and its size measured by total asset. Amidu & Hinson (2006) also found a negative effect of bank size on its capital. In addition, Altunbas et. al (2007) found a strong negative effect of bank size on its capital, so bigger banks have a lower level of capital than smaller ones, Regardless of efficiency level. While Alshubiri (2011) found a positive effect of bank size on capital structure.

Aims

The study investigates the impact of credit risk of banks measured as Loan Loss reserves to Gross Loans ratio, the bank performance measured as Return on Equity ratio, and Bank size on capital structure of banks measured as Equity to Asset ratio.

Methodology

The study sample included 11 commercial banks listed on the Amman stock exchange, covering the period of 2010-2015. The quantitative data needed for econometric model formulation was gathered from the Amman Stock Exchange during the time period 2010–2015. The qualitative data includes researches and papers as they appear in international journals and acclaimed publications. Based on previous literature, the hypothesis can be tested, and will be formulated using the null form as follows:

H₀₁: There is no significant effect of banks' credit risk on its capital structure.

H₀₂: There is no significant effect of banks' performance on its capital structure.

H₀₃: There is no significant effect of banks' size on its capital structure.

The main purpose of this research is to investigate whether credit risk and banks' performance affect capital structure or not. According to previous researches banks with different size differ in product offerings and competitive conditions, as larger size banks have access to a wider range of financial instruments than small size banks (Berger, 1995). That's why Bank size should be controlled for in order to take differences in. So, the previous hypotheses will be tested by the following model:

$$ETA_{it} = \alpha + \beta_1 LLGL_{it} + \beta_2 ROE_{it} + \beta_3 Size_{it} + \epsilon_{it}$$

Where:

ETA_{it}: denotes bank equity to total asset, as a measurement of capital structure, followed by Altunbas et al. (2007).

LLGL_{it}: denotes bank credit risk, which measured as loan loss reserve to gross loans for the bank, as it is measured by Ayaydin and Karakaya (2014).

ROE_{it}: denotes bank return on equity, as a measurement of banks' performance, followed by Amidu and Hinson (2006)

Size_{it}: denotes the log of the total assets of the bank.

i: denotes Bank

t: denotes Time period

The qualitative data, which is essential in building understanding, and directing the research, will be collected through literature reviews from both online and offline academic books and international journals. To answer the main questions of this research, provide data for analysis, and to formulate the econometric model, quantitative data will be collected from the Jordanian stock market as well.

Results and Discussion

First, the descriptive analysis tools for the main variables are shown, and then the regression model analysis results will be provided. Table 2 provides the descriptive analysis of the study variables including the mean, median, standard deviation, minimum value, and maximum value.

Table (2). Descriptive measures

	ETA	LLRG	ROE	SIZE
Mean	0.141677	7.422696	0.090145	9.205590
Median	0.140129	2.090358	0.091539	9.254349
Minimum	0.92757	0.102777	0.005145	8.534858
Std. Dev.	0.026295	24.63300	0.038310	0.320420

Table 3 reports regression model statistical results between the dependent variable (Equity Capital) and the independent variables (Loan Loss Reserve to Gross Loans, Return on Equity, and Size), the coefficient of Loan Loss Reserve to Gross Loans is significant at a 10% level with a positive sign, so the null hypothesis No.1 is rejected, and the alternative one is accepted. There is a positive relationship between banks' equity capital and credit risk. Based on that, banks have incentive to hold larger amounts of capital to be able to avoid failure risk. This finding is consistent with previous studies such as: Amidu & Hinson (2006), Altunbas, et al. (2007), and Ayaydin & Karakaya (2014). The coefficient of Return on Equity is significant at a 1% level with a negative sign, so the null hypothesis No.2 is rejected, and the alternative one is accepted. There is a negative relationship between banks' equity capital and performance. So, the need for equity financing may probably be lower for highly profitable banks in the case where the accumulated reserves are sufficient to finance new investments. This finding is consistent with most studies, such as: Ozili & Uadiale (2017), and Ayaydin & Karakaya (2014).

Finally, when I controlled for bank size, I found the coefficient of the Log of Banks total Asset was negative and significant at a 5% level, so the null hypothesis No.3 is rejected, and the alternative one accepted. There is a negative relationship between banks' equity capital and size. So, large banks seem to operate with less equity capital. The finding supports financial theory, and confirms the earlier empirical studies, such as: Altunbas et al. (2007), Amidu & Hinson (2006), and Cebenoyan & Strahan (2004).

Table (3). The relationship between capital structure and credit risk, bank's performance affect and bank size.

$$ETA_{it} = \alpha + \beta_1 LLGL_{it} + \beta_2 ROE_{it} + \beta_3 Size_{it} + \varepsilon_{it}$$

Variable	coefficient	standard error	t-statistic	probability value
C	0.273457	0.240605	1.136538	0.2616
LLRG	0.000322	0.000190	1.698818	0.0961
ROE	-0.858073	0.269250	-3.186899	0.0026
SIZE	-0.068632	0.026008	-2.638888	0.0113
R-squared	Adj -R2	F-statistic	Prob(F-statistic)	
0.673380	0.581075	7.295125	0.000000	

Where:

ETA_{it}: is bank i's equity to total asset in period t. LLGL_{it}: it bank i's credit risk in period t, which measured as loan loss reserve to gross loans for Bank I in period t. ROE_{it}: it bank i's

return on equity in period t , as a measurement of bank's performance, $Size_{it}$: is the log of the total asset of bank i 's in period t .

Conclusion

The main goal of this study was to test empirically the potential impact of the bank credit risk and the bank performance on bank capital structure on 11 Jordanian, commercial banks listed in Amman Stock Exchange over the period of 2010-2015. The existence of such a relationship has important implications for bank decision makers. The study's main result is that there is a positive relationship between banks' equity capital and credit risk. This outcome is in line of Amidu & Hinson (2006), Altunbas, et al. (2007), and Ayaydin & Karakaya (2014). Further, results of the current study show a negative relationship between banks' equity capital and performance. This provides empirical evidence based on Jordanian data that indicates these banks' performance will increase when the bank equity capital decreases. This study contributes to the knowledge by confirming existing literature using local data, and this hopefully will reflect positively on various stakeholders at Amman Stock Exchange and expects to help in enhancing the market efficiency. Furthermore, this study offers direction for further research in Jordan and the region as it shows a negative effect of bank size on equity capital. The approach could also be expanded to examine the correspondence of findings, by using substitutional accounting indications of banking risk this will help in presenting results from another point of view based on different assumptions.

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