PressAcademia

Journal of Business, Economics and Finance
Year: 2015 Volume: 4 Issue: 2

MARKET DISCIPLINE IN BANKING: THE JORDANIAN EXPERIENCE

DOI: 10.17261/Pressacademia.2015211616

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Keywords:

Jordan,
Bank Discipline,
Risk,
Deposits Growth,
Interest Expense,
Seemingly-Unrelated Regression.

Jel Classification:
G20, G21, N25

ABSTRACT

This paper applies the issue of bank discipline to the Jordanian banking sector. Based on a total of 13 banks, the time period 2001-2012, and the Seemingly-Unrelated Regression (SUR), the results, on average, show that Jordanian depositors demand higher interest rate from banks with higher levels of risk. In addition, depositors seem to withdraw their depositors from banks with increasing levels of risk. These results are encouraging. Indeed, they indicate that depositors' disciplining behavior complements the efforts of the Central Bank of Jordan (CBJ).

1. INTRODUCTION

Efficient financial intermediaries (banks) can play a positive role in the economic development of nations. Indeed, banks promote a more efficient mobilization of savings, spread risk, and provide liquidity. In addition, banks intermediate between suppliers of funds and those that demand them. In other words, by providing these, and other, financial services, banks can contribute to a more efficient allocation of scarce economic resources (Levine, 2004). Relative to the services provided by banks, it is known that the cost of bank failures can be high. For example, this cost varies between 3 percent to more than 55 percent of Gross Domestic Product (Caprio and Klingebiel, 2003). In a more recent paper (Laeven and Valencia, 2013), the costs of major banking crises in advanced economies are estimated at 4.2 percent of GDP (bail-out cost), 23.6 percent of GDP (public debt increase), and 32.4 percent of GDP (cumulative loss in output). Relative to any standard, these costs are extremely high.

To avoid banking crises, or to reduce the risk of bank bankruptcy cases, bank regulators always look for better and more efficient means to regulate the risk-taking behavior of banks. Indeed, this is why, for example, Basel I which came into effect in 1992, was replaced by Basel II (2004). Notwithstanding the fact that there are differences in these two accords, Basel II added a new dimension (Pillar 3). This pillar relies on the disclosure of information and market discipline.

In other words, it encourages private participants (i.e. shareholders, and depositors) to discipline banks by, for example, demanding higher interest rates on their deposits from riskier banks, or withdrawing their deposits from such banks altogether. The issue of market discipline is also important for other reasons. For example, it may improve the efficiency of banks by forcing less efficient banks to become either more efficient, or exit the industry altogether (Berger, 1991). Finally, it goes without saying that the 2008 global financial crisis, and its implications, makes the issues of bank regulation and market discipline all the more compelling.

Relative to the above, it would be interesting to examine the Jordanian banking sector in terms of bank discipline. This paper seeks to answer two questions. First, do depositors require higher (lower) interest rates on their deposits from riskier (less risky) Jordanian banks? Second, do depositors withdraw their funds from riskier Jordanian banks and deposit them in less risky banks?

The paper is thought to be interesting and important for a variety of reasons. First, the Jordanian banking sector has witnessed a bank bankruptcy case. Back in 1989, the third largest bank in the country (Petra Bank) went bankrupt. Then, the government had no choice but to pay about $200 million to the bank's depositors. Second, the size of the banking system in Jordan is large. For example, during the last four years (2011-2014), the mean annual bank assets to GDP ratio was equal to 180 percent. In addition, the mean annual bank credit to the private sector to GDP ratio was equal to 70 percent. This proportion (70 percent) is higher than in, for example, Egypt (30 percent), Qatar (40 percent), and Saudi Arabia (37 percent). It is even higher than that which exists in Turkey (57 percent) and Indonesia (33 percent). The rest of the paper is organized as follows. The following section reviews the literature that examines bank discipline. In section 3, we present and discuss the data, methodology, and empirical results. The final section summarizes and concludes the paper.

2. MARKET DISCIPLINE: LITERATURE REVIEW

In all developed and developing economies banks are supervised and regulated by their respective central banks. As one might expect, the objective of this control or supervision is to oversee banks' liquidity and bankruptcy risk. To maintain and promote the existence of safe, sound and efficient banking systems, it makes sense to have regulatory bodies around (Hall and Miles, 1991). In addition, the fact that in the first place banks are supposed to resolve the asymmetry of information problem between borrowers and lenders, and hence promote more efficient allocation of resources, the case for their regulation is simply a valid one (Fama, 1980). Market discipline, as a complementary tool to the regulatory efforts of central banks, relies on, for example, the behavior of depositors (market participants), and if they require higher interest rates form riskier banks, one can deduce that private sector agents do regulate the risk-taking behavior of banks. Indeed, in such cases, their behavior complements the efforts of central bankers.

Similarly, if depositors take into account the risk-taking behavior of banks before they decide where to deposit their funds, one can also deduce that the market does discipline banks.

Market discipline has generated numerous empirical papers. For example, some researchers choose to examine the relationship between subordinated debt yields and bank risk levels. The assumption behind this effort is that if secondary-market risk premiums on subordinated notes are correlated with bank risk levels, then a case can be made for the existence of market discipline. This method has been used by several researchers including Morgan and Stiroh (2011), Sironi (2012), Krishnan et al. (2013), Hwang (2013), Shin (2014), and Zhang et al. (2014).

In addition, some researchers examine the impact of bank risk measures on the growth rate in deposits or on banks' interest expense. Imai (2008), Ioannidou and de Dreu (2010), Barajas and Catalan (2011), Murata and Hori (2011), Cubillas et al. (2012), Karas et al. (2012), Thiratanapong (2012), Arnold et al. (2015), and Berger and Turk-Ariss (2015) are some of those researchers that used this methodology. For example, based on a total of 2038 banks that operate in the USA, 21 European countries, and in Switzerland, the sub-periods 1997-2007 and 2008-2009, and using deposit growth as the dependent variable, it is stated that "we find significant depositor discipline prior to the crisis in both the US and EU… We also find that depositor discipline mostly decreased during the crisis, except for the case of small US banks" (Berger and Turk-Ariss, 2015).

Relative to the above-mentioned papers which involve the issue of bank discipline, there have been a limited number of papers that examine bank discipline of Islamic banks. For example, based on a total of four Islamic banks in Turkey, and the time period January 2001 to January 2013, it is stated that "depositors adjust the level of their funds in Islamic banks based on the banks' capital adequacy; i.e., better-capitalized banks experienced higher deposit growth rates. Risk factors are, however, not significant in demanding higher returns on deposits" (Aysan et al., 2013).

On average, and based on country-level or cross-country banking data, the above-mentioned, and other researchers, estimate a version of both or one of the following models:

$$Deposit_{i,t} = \alpha_1 + \beta_1\, BankRisk_{i,t} + \beta_2\, Control_{i,t} + \beta_3 Macro_t + \varepsilon_{i,t} \quad (1)$$

$$IntRate_{i,t} = \alpha_2 + \beta_1\, BankRisk_{i,t} + \beta_2\, Control_{i,t} + \beta_3\, Macro_t + \eta_{i,t} \quad (2)$$

where i = 1, …, N and t = 1, …., T, and N is the number of banks and T is the number of observations per bank.

The dependent variables is either $Deposit_{i,t}$ or $IntRate_{i,t}$. Deposit is the growth rate of deposits. IntRate is total paid interest on deposits to total deposits.

The explanatory variables include BankRisk, Control, and Macro. Bank risk measures are the ratio of shareholders equity to total assets (capital adequacy), total loans to total assets (asset quality), non-interest expenses to total assets (management quality), return on assets (earnings capability), and cash to total assets (bank liquidity).

Control is a vector of control variables including bank size and this is usually measured by the natural logarithm of total assets). Finally, Macro refers to the macroeconomic environment like the real GDP growth rate and inflation rate.

Based on the estimated results, researchers make a judgment about whether or not bank discipline exists. When deposits growth (interest on deposits to total deposits) is used as the dependent variable, if the signs of the coefficients of capital adequacy, asset quality, management quality, earnings capability, bank liquidity are, on average, negative (positive) and statistically significant, this implies that market discipline does exist.

3. THE DATA, METHODOLOGY AND RESULTS

The total number of Jordanian banks is equal to 15. Two of these banks operate under the Islamic Sharia Law. The fact that the lending principles of the Islamic banks are different, we rely on the remaining 13 banks and the time period 2001-2012 to examine the issue of banking discipline in the Jordanian banking sector. In other words, the statistical analysis is based on a balanced panel with a total of 156 observations.

To examine whether or not depositors exercise disciplining behaviour on banks, we regress the change in deposits (quantity variable) on a vector of risk measures. In addition, we regress interest expense (price variable) on the same set of bank risk measures. In other words, we estimate the two models outlined below:

$$\Delta Deposits_{i,t} = \alpha_1 + \beta_1 BankRisk_{i,t} + \delta_1 Control_{i,t} + + \delta_2 Macro_t + \varepsilon_{i,t} \quad (3)$$

$$DepositRate_{i,t} = \alpha_2 + \beta_2 BankRisk_{i,t} + \delta_2 Control_{i,t} + \delta_2 Macro_t + \eta_{i,t} \quad (4)$$

where i = 1, …, N and t = 1, …., T, and N is the number of banks and T is the number of observations per bank.

The dependent variables $\Delta Deposits_{i,t}$ and $DepositRate_{i,t}$ are the growth rate of deposits in bank i (the first difference of the log of bank deposits) at time t and total interest expenses paid on deposits to total deposits respectively.

The independent variables include bank-level risk measures, control variable, and macroeconomic measures.

The bank-level risk measures include the ratio of shareholders equity to total assets (capital adequacy), total loans to total assets (asset quality), ratio of non-interest expenses to total assets (management quality), ratio of return on assets (earnings capability), and the ratio of cash to total assets (bank liquidity).

The control variable is bank size (natural logarithm of total assets). Finally, the macro variables include the inflation rate and real GDP growth rate.

As mentioned above, a negative estimate for β_1 and a positive estimate for β_2 indicate the existence of market discipline.

The independent variables enter the models in their lagged values to account for the fact that the financial statements of all banks become available to the public with a certain time delay, and to reduce any potential endogeneity problems. Finally, the estimation method that we use is the Period Seemingly Unrelated Regression (SUR) – Pooled Estimated Generalized Least Squares (EGLS). This method corrects for period serial correlation and period heteroskedasticity between the residuals for a given cross-section.

In Tables 1 and 2, we report some descriptive statistics about all the dependent and independent variables. A look at Table 1 reveals the following comments.

First, the mean of total interest expenses to deposits is equal to 3.4 percent. In addition, this variable had a maximum value of 7.8 percent and a minimum value of 1.1 percent. The mean annual change in deposits, on the other hand, reflects a much larger variation. The maximum and minimum values of this measure are equal to 84 percent and -54 percent respectively. Indeed, the difference between these two variables in terms of respective standard deviations reveals this. Second, asset quality (total loans to total assets) reflects some difference between the 13 banks. Again, the maximum and minimum values of this variable are equal to 68 percent and 19 percent respectively. Naturally, this reflects the conservative nature of some banks in their lending policy. Finally, and as expected, the size of banks reflects the largest variation. As one might expect, the presence of banks like the Arab Bank and the Housing Bank are the reason behind this large variation.

Table 1: **Overall Descriptive Statistics**

Variable	Mean	Median	Maximum	Minimum	Std.Dev.
Deposit rate	0.034	0.031	0.078	0.011	0.014
ΔDeposits	0.109	0.092	0.840	-0.544	0.183
Capital Adequacy	0.079	0.062	0.342	0.006	0.054
Asset Quality	0.437	0.435	0.685	0.192	0.091
Management Quality	0.023	0.024	0.028	0.016	0.004
Earnings Capability	0.018	0.019	0.061	-0.041	0.012
Bank Liquidity	0.329	0.325	0.591	0.138	0.097
Bank Size	20.789	20.616	23.898	17.793	1.214
Growth	0.057	0.056	0.086	0.023	0.023
Inflation	0.042	0.040	0.139	-0.007	0.035

The reported figures in Table 2 reveal that the growth rate in deposits was relatively high in 2004 and 2005. More likely than not, the reason for these figures is the increase in the remittances of Jordanians working in the Gulf countries during this period. Similarly, the annual mean of total interest expenses to deposits has come down from 5.2 percent in 2001 to 2.9 percent by the 2012. Again, the reason for this decrease is the decrease in the interest rate on the US dollar. In other words, the fact that the Jordanian currency is pegged to the dollar, the interest rate on the Dinar reflects the interest rate on the dollar.

Table 2: **The Dependent Variables: Annual Means**

Year	Δ Deposits	Deposit Rate
2001	0.063	0.052
2002	0.025	0.036
2003	-0.033	0.027
2004	0.236	0.019
2005	0.308	0.024
2006	0.158	0.038
2007	0.157	0.047
2008	0.085	0.043
2009	0.099	0.036
2010	0.118	0.026
2011	0.057	0.025
2012	0.040	0.029

We report in Tables 3 and 4 the estimation results of the main models. Again, based on the reported results, a number of observations can be made. First, the coefficient of capital adequacy is positive and significant in both the interest expense model and deposit growth models. This implies that depositors demand higher interest from better capitalized banks and clearly this contradicts market discipline. On the other hand, the fact that better capitalized banks experience higher deposits growth, this implies bank discipline. On average, these observations imply the existence of market discipline. The reason for is peculiar. Whilst nobody really knows how many depositors and the size of their deposits, many bank customers refuse to receive interest on their deposits. This probably explains why the impact of capital adequacy on interest expense is positive. In other words, it might be that less capitalized banks' customers are those who do not accept interest on their accounts.

Table 3: Interest Expense

Variable	Coefficient	Coefficient
Capital Adequacy	0.087 (14.510*)	0.080 (12.274*)
Asset Quality	0.073 (34.848*)	0.066 (26.429*)
Management Quality	-0.634 (-20.360*)	-0.566 (-16.446*)
Earnings Capability	-0.240 (-10.995*)	-0.286 (-11.647*)
Bank Liquidity	0.046 (20.221*)	0.035 (14.531*)
Bank Size	-0.003 (-1.941)	-0.005 (-3.103)
Growth	-----	0.097 (5.630*)
Inflation	-----	0.005 (1.126)
Adjusted R^2	0.812	0.869
F-statistic	256.544*	783.787
D-W Statistic	1.921	1.904

Table 4: Deposit Growth

Variable	Coefficient	Coefficient
Capital Adequacy	0.127 (14.021*)	0.085 (8.710*)
Asset Quality	-0.100 (-15.340*)	-0.077 (-4.587*)
Management Quality	-0.655 (-5.073*)	-0.443 (-2.065*)
Earnings Capability	0.660 (14.275*)	0.228 (13.369*)
Bank Liquidity	0.014 (1.908**)	0.098 (4.711*)
Bank Size	-0.001 (-1.941)	-0.003 (-2.113)
Growth	-----	0.098 (6.253*)
Inflation	-----	-0.655 (-6.325)
Adjusted R^2	0.845	0.789
F-statistic	536.544*	992.952
D-W Statistic	2.022	1.967

Second, the coefficient of asset quality is positive and significant in the interest expense model, and negative and significant in the deposit growth model. Clearly, this is a sign of market discipline. Indeed, this implies that depositors are not prepared to supply more funds to banks that lend more. However, those banks that lend more, must incur greater interest expenses. Third, the coefficient of management quality is negative and significant in the deposit growth model. This implies that less efficient management face lower growth in their bank deposits. This observation support bank discipline. However, when we look at the impact of management on the interest expense variable, we see that its' sign is negative. In other words, it seems that less efficient banks pass on this extra expense on to their customers in the form of lower interest payments. Fourth, the impact of earnings capability on deposit growth is positive and significant. In other words, banks that achieve higher levels of accounting returns experience higher deposit growth. Again, this is a sign of bank discipline. On the other hand, the sign of this coefficient is negative in the interest expense model. Again, this is a sign of bank discipline because one must expect, if discipline is in force, the impact of superior accounting returns to be negative on interest expense. Finally, the coefficient of bank liquidity is positive and significant in the deposit growth model. This is also a sign of bank discipline because more liquid banks' risk is by definition lower, and this encourages depositors to keep their accounts. However, the positive impact of this risk measure on the interest expense model contradicts market discipline.

On average, the above-mentioned observations support the main objective of this paper. On average, there is some strong evidence that market discipline does exist in the Jordanian banking sector. Indeed, this is encouraging. Based on the same number of banks (13) and the time period 1982-2003, Omet and Fayyoumi (2004) report that market discipline is "largely non-existent in Jordan". In other words, Jordanian depositors seem to have become more sophisticated. Relative to this conclusion, it is useful to note that introducing the macroeconomic measures (inflation and real GDP growth rate) did not result in any significant change in the results.

4. CONCLUSION

It is probably accurate to state that banks play a positive role in economic growth and development. Indeed, banks promote a more efficient mobilization of savings, spread risk, and provide liquidity. Relative to these, and other, services, it is also known that the cost of bank failures is relatively high. This is why numerous empirical papers e examine various bank performance issues including market discipline. Based on the time period 2001-2012, and the seemingly-unrelated regression, we conclude, on average, that Jordanian depositors discipline Jordanian banks. This conclusion is encouraging because it indicates that Jordanian depositors complement the efforts of the central Bank of Jordan in regulating the risk-taking behaviour of Jordanian banks. Based on the results of this paper, a number of recommendations can be suggested. For example, one can include further examine the issue of market discipline in terms of the impact of the various risk measures on the banks' stock returns. Similarly, one can look at various governance measures and examine their impact of the risk-taking behaviour of Jordanian banks.

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