
The Impact of Prudential Regulation on Jordanian Banks Liquidity

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Abstract: Regulation of the financial sector is major aspect of consideration by the regulating authority, since financial sector highly influences the performance of the entire economy. The Global Financial Crises underlined the importance of liquidity management, when the credit crisis led to a liquidity crisis. Thus, Jordanian regulatory authorities are trying to achieve and maintain the financial stability by assessment of the banks' financial condition and through regulations that ensure the stability and prevent failures that can occur under adverse circumstances. The study aim to analyze the impact of a prudential regulation on the Jordanian Banks liquidity. The specific objective in this case is; to determine whether the current prudential regulation enhance the banks liquidity in Jordan, or financial regulation still need additional updates. This study examines the impact of both Microprudential and Macroprudential regulation on Banks Liquidity Ratio, within the context of the Jordanian Banking Sector. To carry out the analysis, managed to collect the annual data for 12 listed during the period 2005-2018 with data arranged in the form of a panel, by using Random Effect Approach Regression, and compared the bank liquidity ratios during period before and after Global Financial Crisis (2008). The results indicate that Macroprudential tools have positive significant impact on Banks Liquidity Ratio, while micro is not. The main conclusions from this research indicate that while liquidity requirements tend to reduce liquidity risk, it appear to be more costly to comply with, reduced bank liquidity, and the banking sector still need additional Regulation updates to enhance banks Liquidity.

Keywords: Prudential Regulation Tools, Banks Liquidity, Basel III Accord

1. Introduction

Prudential Liquidity Requirements are a major regulatory instrument against liquidity risk, introduced as part of the Basel III accord in the form of a liquidity coverage ratio (LCR) and a net stable funding ratio (NSFR) [14]. The regulator Central Bank of Jordan continuously improve financial sector through implementing macro and micro prudential supervision policies that maintain financial and banking stability. In this regard, liquidity of banks are monitored with increased interest like as a major indicator of bank performance, by implementing Committee on Banking Supervision explicit mandatory rules for liquidity regulation and supervision in its new framework for banking regulation (the Basel III Accord) [3].

Microprudential instruments as bank stress tests and supervisory guidance, These instruments have been used by supervisors to inhibit excessive risk-taking or prevent growth

in large banks' credit risk exposure from outpacing capital accumulation objectives commonly referred to as "lean-against-the-wind." Stress tests in particular are credited with increasing capital buffers at systemically important financial institutions in the wake of the global financial crisis.

Macroprudential including borrower-based measures effectiveness in influencing bank credit and its substitution effects beyond banking have been a key subject of discussion [10].

The Basel Committee issued revised Liquidity Coverage Ratio (LCR) to promote the short-term resilience of a bank's liquidity risk profile [19]. Following endorsement on 6 January 2013 by its governing members of Group of Central Bank Governors and Heads of Supervision (GHOS) [7]. The LCR is an essential component of the Basel III reforms, which are global regulatory standards on bank capital adequacy and liquidity endorsed by the G20 Leaders.

This by ensuring that a bank has an adequate stock of

unencumbered high-quality liquid assets (HQLA) that can be converted into cash easily and immediately in banks to meet its liquidity needs, and to improve the banking sector's ability to absorb systematic shocks arising from financial and economic stress. Banks are constrained by long-term lending contracts, which benefit them if capital become more expensive. If they are obliged to move rapidly to higher prudential standards, they will have to achieve a higher proportion of the adjustment through raising fresh capital.

2. Research Problem

The global financial crisis 2008 highlights the sensitivity of the financial system to liquidity shocks, and show that banks with inadequate liquidity are weak, as they might not be able to cover unexpected cash outflows or panic-based bank liquidity might causing a large loss of assets that lead to bankruptcy [4].

In this context, the study investigates the impact of prudential regulation on the Jordanian banking sector liquidity, recommended by IMF after the financial crisis, and Basel Committee on Banking Supervision explicit mandatory rules for liquidity regulation and supervision.

Searching either prudential regulation enhancing banks performance, and use in portable time with aright instructions, or policy makers should find alternative policies.

3. Research Importance

Since banks are the key performer of financial sector, the regulator should ensures financial stability through the policy tools and direct actions.

Global financial crises introduced evident that bank liquidity and liquidity risk is a very up-to-date and an important topic which should be of crucial importance for academics and policymakers, and should be carefully monitored with increased interest. In addition, it is also important to learn from the experience of 2008 financial crisis, to reduce crises and finding the most efficient policy to decrease financial system exposure to financial crises. Indeed, such experiences should be useful not only in understanding what really enhance banks performance, but also in guiding the CBJ in any future changes in their policies.

4. Literature Review

Despite the rapidly increasing empirical literature on its effectiveness of prudential regulation to reduce financial crises, there is still limited consensus on how well the instruments works in practice, and which instruments work best, While considerable empirical work has so far been conducted, the pieces of evidence remain segmented.

Diamond and Dybvig's model, a demand for liquidity in banks increases because customers face privately observed risks and liquidation is costly [20].

Calomiris and Kahn and Diamond and Rajan introduce the destructive nature of a run and assert that the delicacy of runs is important in allowing both high amounts of lending and large amounts of liquidity creation [2].

A finding by Kashyap and Stein has shown that banks with relatively large and liquid assets possess great potential to support the growth of the credit portfolio during the period of recession [5].

Rose negotiated the metrics that banks usually use to estimate liquidity needs, including the the structure of funds, liquidity indicators, and market signals [20].

Rochet emphasizes why bank liquidity should be regulated to avoid market failures. main point, that mystery of bank assets generates moral hazard in the form of insufficient effort in screening borrowers and monitoring their activities after a loan has been granted. But when a liquidity need arises, when loans demand increase or depositors withdraw unexpectedly, under these conditions financial markets will not provide sufficient liquidity. Rochet forecast that this type of a market failure and asset opaqueness can creates an externality between lenders, and can be addressed via contractual arrangements in the form of liquidity pools and interbank credit line commitments [12].

Nier et al suggests that higher capital levels in a network, which has high levels of interbank connectivity, in more details each bank has connected to a large number of other banks via interbank assets and liabilities, can increase resilience against contagious defaults [17].

Another scenario is on the macro implications of the task of micro-prudential regulation of banks, which adapted by Hanson, Kashyap and Stein [3]. Consider that the goal of capital regulation is to force banks to internalise losses, thereby protecting the deposit insurance fund and mitigating moral hazard.

Hanson, Kashyap and Stein argues failures leading to fire sales and lending constraints, the pro cyclicity of risk-weighted asset measures; and the premium on raising external equity (relative to retained earnings) that banks may face due to equity issuance being perceived as a negative signal by outside investors [18].

Jennie Bai, Arvind Krishnamurthy, Charles-Henri Weymuller [11], implemented a liquidity measure proposed by Brunnermeier, Gorton and Krishnamurthy, "Liquidity Mismatch Index (LMI)," to measure the mismatch between the market liquidity of assets and the funding liquidity of liabilities. find that banks with more liquidity mismatch experience more negative stock returns during the crisis, but more positive returns in non-crisis periods, experience more negative stock returns on events corresponding to a liquidity run, and more positive returns on events corresponding to government liquidity injection, and borrow more from the government during the financial crisis [6].

Cetorelli and Goldberg suggested that banks with relatively high equity ratios could attract funds from international operations [16].

He, Khang, and Krishnamurthy Introducing the importance of the Basel III committee rules regulating the liquidity of

commercial banks in the crisis. Find that despite its importance there is no consensus on how to measure liquidity [9].

S. Fleming [4] notes that across its many liquidity facilities, the Federal Reserve provided over \$1.5 trillion of liquidity support during the crisis [5]. The number is much higher if one includes other forms of government liquidity support.

In Stein suggest that liquidity prudential regulation is advantageous to a lender of last resort (LoLR) since an LoLR potentially induces moral hazard [12].

Kashyap substantiate the Basel-III-type liquidity regulations since asymmetric information between banks and their deposit customers leads the banks to hold insufficient liquidity [6].

Allen and Gale negotiate the importance of accounting for incentives to innovate around liquidity regulation [13].

IMF working paper finds that a tightening of macroprudential policy has statistically significant effects on credit, with stronger effects found for liquidity measures, with strong variation in the distribution of these effects across instruments and outcomes; for instance, tightening limits on loan-to-value (LTV) or debt-service-to-income (DSTI) ratios produce similar average effects on reducing household credit [16].

5. Research Theoretical Framework

The literature has considered many proxies to measure the bank liquidity as mentioned in literature review, so that there is no uniformly accepted candidate to bank liquidity.

To find the impact of prudential regulation on bank liquidity, The dependent and independent variables used in this study are defined as follows:

The Dependent Variables:

Bank Liquidity ratio: Total Liquid Assets /Total Assets

The Independent Variable:

1-Microprudential tool:

Dummy variable: Bank Stress Test and Supervisory guidance recommended by Basel III.

2- Macroprudential tools:

Loan-to-Value ratio (LTV): Total Credit (Loans) to total Assets

Debt-to-Income ratio (DTI): Total Credit (Loans) to Net income

Capital Adequacy ratio (CAR): (Tier 1 Capital + Tier 2 Capital) to Risk Weighted Assets

Leverage (LEVERAGE): Tier 1 Capital (stockholders equity +RE – goodwill) to total assets.

3- Other variables

Return on Assets (ROA): Net Income to total Assets

Customer Deposits (CD): One of major funding source for bank

Total Liquid assets (LA): The sum Cash and Balances at Central Banks, Balances at Banks and Financial Institutions, and Deposits at Banks and Financial Institutions

Sector Average Deposits Interest rate (IR): Sector Average

Interest Rate on Customer Deposits.(Current, Saving, and Time Deposits)

6. Research Hypothesis

H1: Microprudential Tools has had no impact on Banks Liquidity Ratio

H1: Macroprudential Tools has had no impact on Banks Liquidity Ratio

7. Data and Methodology

7.1. Sample Selection

This study examines the impact of both Microprudential and Macroprudential regulation on Banks Liquidity Ratio, within the context of the Jordanian banking industry.

To carry out the analysis, managed to collect the annual data for 12 listed during the period 2005-2018 with data arranged in the form of a panel. Data was analysed using descriptive statistics, and regression analysis. This sample is based on the availability of the adequate information. However, due to missing observations for some banks since year 2005, a restricted sample covering 12 banks over the same period is employed. The data base is compiled from the annual financial reports of banks from Amman Stock Exchange website. The prudential regulation tools are chooses with respect to tools recommended by Central Bank of Jordan.

7.2. Model Specification and Research Variables

The econometric and statistical analysis is based on 12 listed bank data, the following multiple linear model will be estimated:

$$L_{i,t} = \alpha_0 + \beta_1 \log CD_{i,t} + \beta_2 LEVERAGE_{i,t} + \beta_3 DTI_{i,t} + \beta_4 LTV_{i,t} + \beta_5 CAR_{i,t} + \beta_6 IR_{i,t} + \beta_7 DUM_{i,t} + \epsilon_{i,t}$$

The study employ a proxy of bank liquidity, the dependent variable L is the Bank Liquidity Ratio.

Independent Variables includes:

(LEVERAGE) is Bank's Leverage Ratio estimates by Tier 1 capital (stockholders equity– goodwill) / total assets,(DTI) is total loans to gross income, (CD) is Bank Customer Deposits, (CAR) is the Capital Adequacy Ratio, (LTV) is the Loans to Value ratio estimates by total credit (loans) / total assets, (IR) is the Average Interest Rate on Current, Saving, and Time Deposits banking sector, and (DUM) is a dummy variable of the Bank Stress test and Supervisory Guidance which is equal to 1 for if bank i committed to Basel III and 0 otherwise.

7.3. Data Analysis and Findings

7.3.1. Descriptive Statistics

The study employ Descriptive Statistics to summarizing and describing the performance of banks liquidity ratio so they can be easily understood.

Statistical Analysis

The following chart shown yearly Liquidity ratio for the

sample chosen, the minimum ratio is 4.1% in 2018 compared the maximum value is 59.12% in year 2003

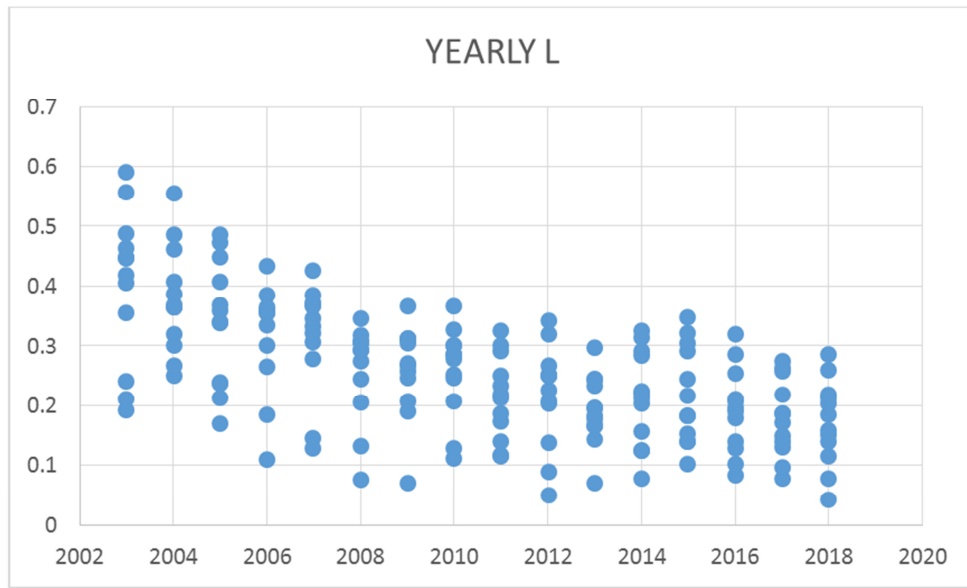


Figure 1. BANKS LIQIDITY RATIO 2003-2018.

To analyse the impact of the prudential regulation, the study employ three time periods:

(2003-2008): before crisis 2008 and stress testing 2009

(2009-2018): after crisis 2008 and stress testing 2009

(2003-2018): the whole period

Table 1 shown average, variance, and standard deviation of the liquidity ratio, in the three periods:

Table 1. Banks liquidity ratio discridtive statistis.

PERIOD	AVERAGE	VARIANCE	STD
2003-2018	0.257393169	0.011441638	0.106966
2003-2008	0.335772703	0.010592092	0.102918
2009-2018	0.211217646	0.005869698	0.076614

The results indicate a relative decrease in the ratio after financial crisis until the year 2018.

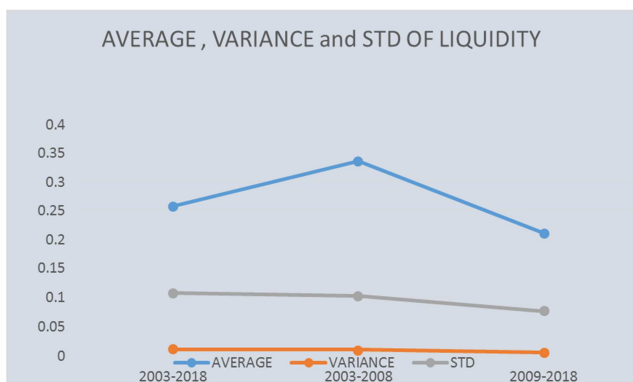


Figure2. Banks liquidity ratio discridtive statistis.

7.3.2. E-VIEWS Regression Results

The results of the multiple regression model show that there is a negative relationship between banks liquidity ratio

and both stress testing as microprudential tool the coefficient is (-.139393) and loan-to value ratio as a macroprudential tool with coefficient of (-.000564).

In addition to positive relationship between banks liquidity ratio and remain macro prudential tools debt-to-income, capital adequacy ratio, and leverage with (.028258,.0017, 1.5740) coefficients respectively, and customer deposits, and average interest rate also have appositive relationship with (5.69 and .042) coefficients respectively.

This implies that a single unit increase in independent variables debt-to-income, capital adequacy ratio, leverage ratio, customer deposits, and interest rate results into a corresponding increase in liquidity ratio of banks in Jordan.

The regression analysis is undertaken at 5% significance level. The criteria for comparing whether the predictor variables were significant in the model was through

Comparing the corresponding probability value get and $\alpha=0.05$. If the probability value was less than α , then the predictor variable was significant but from the above analysis.

The results below shows that the variables debt-to-income, capital adequacy ratio, leverage ratio, customer deposits, stress testing and average interest rate were significant since their corresponding predictor values were below 5%.

Although Adjusted R-squared 34.5352% not high but also not low, F-statistic highly significant, that mean all the dependent variables jointly affect dependent variable.

The normality test shows that all of the data are normally distributed; therefore, further analysis can be carried forward.

Table 2. Regression Results.

E-views results				
Dependent Variable: L				
Method: Panel Least Squares				
Sample: 2003 2018				
Periods included: 16				
Cross-sections included: 12				
Total panel (balanced) observations: 192				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.432438	0.610308	-3.985592	0.0001
CD	5.68E-12	1.72E-12	3.307399	0.0011
DTI	0.028258	0.006121	4.616339	0.0000
ST	-0.139393	0.014897	-9.356871	0.0000
CAR	0.001672	0.001553	1.076621	0.2831
LEV	1.57397	0.542153	2.903186	0.0041
IR	0.042094	0.016769	2.510245	0.0129
LTV	-0.000564	0.000857	-0.657856	0.5115
R-squared	0.3693	Mean dependent var		0.2574
Adjusted R-squared	0.3454	S. D. dependent var		0.1070
S.E. of regression	0.0865	Akaike info criterion		-2.0155
Sum squared resid	1.3782	Schwarz criterion		-1.8798
Log likelihood	201.4883	Hannan-Quinn criter.		-1.9605
F-statistic	115.3943	Durbin-Watson stat		2.0391
Prob (F-statistic)	0.00002			

7.3.3. Results Analysis and Conclusion

The Jordanian financial sectors affected by several political and financial conditions since 2008 global crises, the closure of the Iraqi and Syrian borders with Jordan coupled with weak financial conditions in Gulf countries weigh on trade, tourism and investor sentiment in the country and on growth.

Those conditions adversely affect banks performance, despite those conditions, Jordan has a sound and solid banking system that is generally capable of withstanding shocks and high risks due to the banks' high levels of capital and comfortable levels of liquidity and profitability.

(i) Dependent variable Banks Liquidity Ratio (T. Liquid Assets/ T. Assets)

The Jordanian banking system enjoys safe liquidity as the total highly-liquidity assets accounted for 44.9% of total assets at the end of 2018 compared to 45.8% at the end of 2017.

The average results in statistical, show that there is a simple decline in banks liquidity ratios over time, but in fact both liquid assets and banks size (t. assets) increased over time but the growth rate of banks size higher by 5.3% than banks liquid assets.

In addition, the growth rate of banks liquidity ratios declined during the period after 2008, for the reasons mentioned above.

(ii) The Impact of Independent Variables

The regression results show that Customer Deposits have the most positive significant impact on banks liquidity ratio, a bank is liquid when it is capable of repay deposits and to make such payment based on customers order [17]

Leverage Ratio also has positive significant so that was included in the data used to compute the banking stability index, more specifically within the capital adequacy ratio,

which show insignificant impact on the dependent variable, a the assessment of capital adequacy for precautionary purposes is problematic at best due to rapidly changing economic and financial services industry.

Debt to income ratio has also a positive significant impact since it reflect the ability of clients for saving and meeting obligations.

Interest rate play a major tool to control banks liquidity, since represent average rate granted on current, saving, and time deposits.

Finally stress tasting dummy variable has a negative significant impact on banks liquidity ratio, indicate a higher caution to the regulator to review its content.

8. Summary and Recommendations

The main objective of this research is to investigate whether the microprudential, and macroprudential Regulation, have a positive significant impact the bank's profitability in Jordanian banking sector. The sample in this research is the four state-owned banks in Jordan, which is considered to be the most influenced bank for Jordanian economy. Within 16years period (2003 to 2018). For the analysis purpose, E-Views 9 is used to analyse the data collected. The result from analysis on Multiple Regression shows that Leverage, Debt- to income and stress testing are at 5% significance level to the Liquidity ratio.

But the results show decrease in banks liquidity Ratio over time, negative relationship between stress testing tools and banks liquidity ratio, and insignificant impact of Capital adequacy ratio on Banks Liquidity Ratio.

Therefore, if the Central Bank of Jordan and Jordanian banks are seeking to reduce liquidity risk, they CBJ should update prudential regulation with more concentration on

stress testing and sensitivity analysis.

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