

Determinants of Non-Performing Loans: Evidence from the Jordanian Banking Sector

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Abstract

This paper investigates the determinants of non-performing loans in the Jordanian banking sector during the period 2008-2012. The study used macroeconomic and bank specific factors to identify the determinants of NPLs of Jordanian banks. Using panel data regression, our results report that among bank specific factors, the lagged NPLs and the ratio of loans total assets were the most important factors that affect nonperforming loans positively. However, contrary to international evidence our results show that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts. With respect to the macroeconomic factors, we found that economic growth and inflation rate have a negative and significant effect on non-performing loans. In addition, we found that global financial crisis lead to higher non-performing loans in Jordan.

Keywords: Bank failure, Capital Risk, Depositor discipline, Money laundering, Operating performance, Regulatory Enforcement

JEL Classification: G21, G28

Introduction

Banks can be defined as intermediaries between depositors and borrowers in an economy (Heffernan, 1996). Banks facilitate the flow of funds from surplus units to deficit units in an economy through its traditional role that include accepting deposits (mainly from household sector) and extending credit to all sectors (mainly business sector).

Well functioning banking sector accelerate economic growth, while poorly functioning banking sector is an impediment to economic progress and aggravate poverty (Richard, 2011). Thus, economic growth in any country is not possible without a sound banking sector (Rajaraman and Visishtha, 2002). (Khan and Senhadji, 2001) argued that the performance of banking sector is the symbol of prosperity and economic growth in any country or region and poor performance of these institutions not only hamper the economic growth and structure of the particular region but also affects the whole world.

Based on the traditional role of bank, we can note that loans make up the bulk of banks' assets (Njanike, 2009). Havrilesky and Boorman (1994) pointed out that interest on loans contributes significantly to interest income of banks, which is consistent with the early work of (Reed and Gill, 1989) who find that interest on loans represent about 85 percent of banks' income. Despite the importance of lending for banks in terms of their assets and income, but the lending process is not as easy as can be imagined. Lending requires banks to assess the customers' creditworthiness and their ability to repay the principal and interest on time. Nevertheless, these steps don't lead always to a successful transaction because one cannot know what will happen in the future. Thus lending may creates a big problem for banks which is called non performing loans (Chhimpa J, 2002) as cited in (Upal, 2009).

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Non-performing Loans (NPLs) has attracted a great deal of interest among researchers and policy makers during the last four decades as these increasing non-performing loans are causing banking crisis which are turning into banking failures (Barr and Siems, 1994). Moreover, the non-performing loans were considered one of the main causes of the global financial crisis (2007-2009) which damaged the USA economy and economies of many countries. (Adebola, Wan Yusoff, & Dahalan, 2011). In Jordan, many economists and bankers argued the impacts of global financial crisis on Jordanian economy as whole, and on banking sector in particular. Rising levels of non-performing loans (NPLs) in Jordan since global financial crisis continue to exert strong pressure on banks' balance sheet, with possible adverse effect on banks' lending operations.

Since the onset of the crisis in 2008, NPLs ratio as a percentage of total loans increased from 4.2 percent to 8.4 percent at the end June 2012 (CBJ, Financial Soundness Indicators, 2013). Although the current level of NPLs is considered within the internationally accepted levels, but it increasing trends over time is worrying. By considering these facts it is necessary to control non-performing loans for the economic growth in the Jordan, otherwise the resources can be jammed in unprofitable projects and sectors which not only damages the financial stability but also the economic growth. Based on the above, this paper investigates the determinants of non-performing loans in the Jordanian banking sector during the period 2007-2012.

II. Theoretical Background and Literature Review

Previous studies have identified two sets of factors that affect NPLs over time. The first group is the internal factors that are considered bank specific variables. The second group includes the external factors such as the macroeconomic conditions which affect the borrowers' capacity to repay. Empirical evidence, however, finds support for both sets of factors. The following section will discuss briefly those internal and external factors that affect NPLs.

Bank-Specific Factors Affecting NPLs

The study of Chikoko et al. (2012) was prompted by the gradual deterioration in asset quality in most commercial banks in Zimbabwe after the adoption of the multiple currency exchange rate regimes. The poor asset qualities were reflected by the non-performing loans trending towards the watch list category. In this regard, they investigated the commercial bank credit process with the objective of understanding the fundamental causes of the impaired assets that are bedeviling the Zimbabwean banking sector. They adopted a survey research using questionnaires and interviews with commercial banks head credit risk, head retail, and head corporate banking division from 15 registered commercial banks in Zimbabwe. Research findings show that some banks were sitting on nonperforming loans due to poor credit analysis processes; wrong products offered to the clients; lending based on balance sheet strength instead of cash flow based lending; banks taking too much comfort in security; information asymmetry leading to moral hazard; economic environment and political influence.

Podpiera and Weill (2008) examined empirically the relation between cost efficiency and non-performing loans in the context of the Czech banking industry for the period 1994 to 2005. They conclude that there is strong evidence in favor of the bad management hypothesis and propose that regulatory authorities in emerging economies should focus on managerial performance in order to enhance the stability of the financial system (by reducing nonperforming loans).

Hu et al (2006) analyzed the relationship between NPLs and ownership structure of commercial banks in Taiwan with a panel dataset covering the period 1996-1999. They found that banks with higher government ownership recorded lower non-performing loans. They also found that bank size is negatively related to NPLs while diversification may not be a determinant.

Williams (2004) investigated management behaviour for European savings banks between 1990 and 1998. Following the Granger causality approach of Berger and DeYoung (1997), Williams (2004) examined the inter temporal relationships between loan loss provision, efficiency, and capitalisation for European banks. He found different modes of management behaviour namely bad management, bad luck, skimping, and moral hazard behaviour. He also found that the most pressing management problem for European banks is bad management.

Berger and De Young (1997) studied the links between NPLs, cost efficiency, and capitalization in the US commercial banks for the period 1985-94. They developed four hypotheses that explain the inter temporal relationship between NPLs and cost efficiency. These hypotheses include:

1) Bad Luck Hypothesis

Under this hypothesis, external events (e.g., a local plant closing) precipitate an increase in problem loans for the bank. After the loans become past due or non-accruing, the bank begins to expend additional managerial effort and expense dealing with these problem loans. Thus, under the bad luck hypothesis, it is expected that increases in nonperforming loans will cause decreases in measured cost efficiency. Importantly, the extra expenses associated with problem loans create the appearance, but not necessarily the reality, of lower cost efficiency.

2) Bad Management Hypothesis

Under this hypothesis, low measured cost efficiency is a signal of poor senior management practices, which apply to both day-to-day operations and to managing the loan portfolio. Subpar managers do not sufficiently monitor and control their operating expense, which is reflected in low measured cost efficiency almost immediately. Poor underwriting and monitoring practices lead to high numbers of nonperforming loans only after some time passes, the loan portfolio becomes seasoned, and delinquencies begin to mount. Thus, under the bad management hypothesis, low cost efficiency is expected to occur before or cause higher nonperforming loans. This hypothesis has the opposite temporal ordering from that predicted by the bad luck hypothesis, but both hypotheses predict that nonperforming loans will be negatively associated with cost efficiency.

3) Skimping Behavior Hypothesis

Under this hypothesis, the amount of resources allocated to underwriting and monitoring loans affects both loan quality and measured cost efficiency. Here, the critical decision of the bank lies in the tradeoff between short-term operating costs and future loan performance problems. A bank maximizing long-run profits may rationally choose to have lower costs in the short run by skimping on the resources devoted to underwriting and monitoring loans, but bear the consequences of greater loan performance problems and the possible costs of dealing with these problems in the future. The reduced effort devoted to screening loan customers, appraising collateral, and monitoring and controlling borrowers after loans are issued makes the bank appear to be cost efficient in the short run because fewer operating expenses can support the same quantity of loans and other outputs. The stock of nonperforming loans remains unaffected in the short run, but as time passes, a higher proportion of borrowers become delinquent on their loans and the inattention to the loan portfolio becomes apparent. Thus, under the skimping hypothesis, the Granger-causality between measured cost efficiency and nonperforming loans has the same temporal ordering as the bad management hypothesis, but has the opposite sign – skimping implies a positive Granger-causation from measured efficiency to problem loans.

4) Moral Hazard Problems Hypothesis

Under this hypothesis, banks with relatively low capital respond to moral hazard incentives by increasing the riskiness of its loan portfolio, which results in higher nonperforming loans on average in the future. Thus, under the moral hazard hypothesis, we expect that low financial capital will Granger-cause high nonperforming loans. These four hypotheses are not mutually exclusive. In an extreme case, all four hypotheses could affect the same bank at the same time. For example, bad luck could befall a poorly managed bank that also happens to be skimping on loan monitoring expenses. Any loss of capital as a result of the bad luck, bad management, and skimping might cause the bank to respond to moral hazard incentives and take increased risks. Similarly, banks responding to moral hazard incentives may take increased risks by skimping.

The External and Macroeconomic Factors Affecting NPLs

Many empirical literatures investigate the relationship between the macroeconomic factors and nonperforming loans. Most of these studies found a positive relationship between NPLs and Interest Rate, lending rate, Unemployment, Inflation, public debt, and Exchange Rate, while the economic growth showed a negative relationship with NPLs.

Farhan et al. (2012) examined the perception of Pakistani bankers regarding the economic factors causing non-performing loans in the Pakistani banking sector since 2006. The study sample included the Top 10 Pakistani banks, where a questionnaire was distributed over 201 bankers who are involved in the lending decisions or analyze the credit risk or handling non-performing loans portfolio. Correlation and regression analysis was carried out to analyze the impact of selected independent variables (Interest Rate, Energy Crisis, Unemployment, Inflation, GDP Growth, and Exchange Rate) on the non-performing loans of Pakistani banking sector. The study found that Interest Rate, Energy Crisis, Unemployment, Inflation, and Exchange Rate has a significant positive relationship with the non-performing loans of Pakistani banking sector while GDP growth has significant negative relationship with the non-performing loans of Pakistani banking sector.

Glen and Mondragón-Vélez (2011) look at 22 advanced economies during the period 1996-2008 and found that the developments of loan loss provisions were driven mainly by real GDP growth, private sector leverage and a lack of capitalization within the banking system.

Vogiazas & Nikolaidou (2011) investigated determinants of non-performing loans in the Romanian banking sector during the Greek crisis (Dec. 2001 to Nov. 2010), they found that construction and investment expenditure, unemployment and inflation rate and Romania's external debt to GDP and money supply (M2) influence the credit risk of country's banking system.

Bofondi and Ropele (2011) found that non-performing loans are positively associated with the unemployment rates, lending rates and negatively associated with the growth domestic product rate; they conducted their study in Italy by taking the quarterly data over the period of 1990-2010.

Louzis, Vouldis and Metaxas (2011) used dynamic panel data to highlight the factors causing non-performing loans in the Greek banking sector from 2003 to 2009 considering each loan category (corporate loans, consumer loans and mortgage loans) according to them economic growth (GDP), unemployment, lending rates, public debt and management quality are the determinants of non-performing loans in the banking sector of Greece.

Espinoza and Prasad (2010) estimate a dynamic panel over 1995-2008 on around 80 banks in the Gulf Cooperation Council. They found that lower economic growth and higher interest rates trigger an increase in NPLs. They also found a positive relationship between lagged credit growth and NPLs.

Berge and Boye (2007) found that non-performing loans are highly correlated with the lending rates and unemployment for the Nordic banking system covering the time span from 1993 to 2005.

Rinaldi and Sanchis-Arellano (2006) investigated household non-performing loans for a panel of European countries and found that disposable income, unemployment and monetary conditions are determinants of non-performing loans.

Salas and Saurina (2006) conducted a research in Spain to identify the factors which explains the variation in non-performing loans from 1984-2003 according to the authors high interest rates, GDP growth and soft credit conditions determine the non-performing loans.

Hoggarth, Sorensen, and Zicchino (2005) conducted a research in UK during the time period 1988-2004, and they found that inflation and interest rates have positive relationship with the non-performing loans.

Kalirai and Scheicher (2002) found that lending rate, production of industry, stock market return and business confidence index are the factors which determine the level of loan quality in Australia while conducting a research taking data from 1990-2001.

III. Jordan Banking Sector

Jordan banking sector comprises 26 banks, 16 are Jordanian banks, and 10 are foreign banks. Of the total number of banks, there are 22 commercial banks, while the remaining 4 banks are Islamic banks. As shown in table 1, banks in Jordan registered a notable growth during the last decades in terms of total assets, total credit facilities, and total deposits. Total assets grew from JD 29.8 billion in 2008 to JD 39.3 billion in 2012, with an average growth rate of 8% annually.

Total credit facilities grew from JD 13.0 billion in 2008 to JD 17.8 billion in 2012, with an average growth rate of 9.7% annually. Finally, total deposits grew from JD 18.1 billion in 2008 to JD 25 billion in 2012, with an average growth rate of 9.4% annually.

Table 1: Development of Banks in Jordan during (2008 – 2012)

JD Million	2008	2009	2010	2011	2012
Total Assets	29796.6	31956.9	34973.1	37686.4	39275.4
Growth rate (%)	11.1%	7.3%	9.4%	7.8%	4.2%
Total Credit Facilities	13044.3	13317.2	14451.4	15851.2	17829.8
Growth rate (%)	15.5%	2.1%	8.5%	9.7%	12.5%
Total Deposits	18102.60	20298.40	22504.80	24377.90	24969.70
Growth rate (%)	13.2%	12.1%	10.9%	8.3%	2.4%

On the other side, performance, and soundness indicators of the Jordan Banking sector revealed a notable stability during the period 2008-2012. As shown in table 2, capital adequacy ratio ranged from 18.4% to 20.3%, and reached to 19% in 2012, this ratio is considered much higher than the 12% minimum level required by CBJ, and the 8% minimum level required by Basel committee.

Leverage ratio reflects the rate of shareholders' equity to total assets. The ratio had increased from 12.9% in 2008 to 13.3% in 2012, which is above the 6% minimum set by CBJ.

The legal liquidity ratio, which measures the liquid assets available at a certain bank against its obligations that are due, ranged from 141% and 161%, which is considered much higher than the 100% minimum required by CBJ.

The return on equity (ROE) and return on assets (ROA) declined slightly after 2008, reaching to 8.6% and 1.1% in 2012 respectively. This is due to the decline in banks profits during 2009-2011, in spite of the growth in assets and equity.

Finally, interest margin to gross income ratio revealed a notable stability during the period 2008-2012, reaching 76.6% in 2012, this mean that interest income represents more than three-quarters of the banks' income, which reflect the banks' dependency on lending in making profits.

Table 2: Key performance and Soundness Indictors of the Jordan banking sector

JD Million	2008	2009	2010	2011	2012
Capital Adequacy Ratio	18.4%	19.6%	20.3%	19.3%	19.01%
Leverage Ratio	12.9%	13.0%	13.1%	13.1%	13.31%
Liquidity Ratio	141.2%	159.1%	161.4%	152.9%	143.5%
ROE	11.5%	8.8%	8.8%	8.3%	8.6%
ROA	1.4%	1.1%	1.1%	1.1%	1.1%
Net Profits Before Taxes	564.3	460.4	523.4	516.6	587.75
Net Profits After Taxes	400.0	333.0	365.7	382.3	413.94
Interest Margin/gross income	71.3	71.6	74.3	70.1	76.6%
IV.NPLs in Jordan	%	%	%	%	%

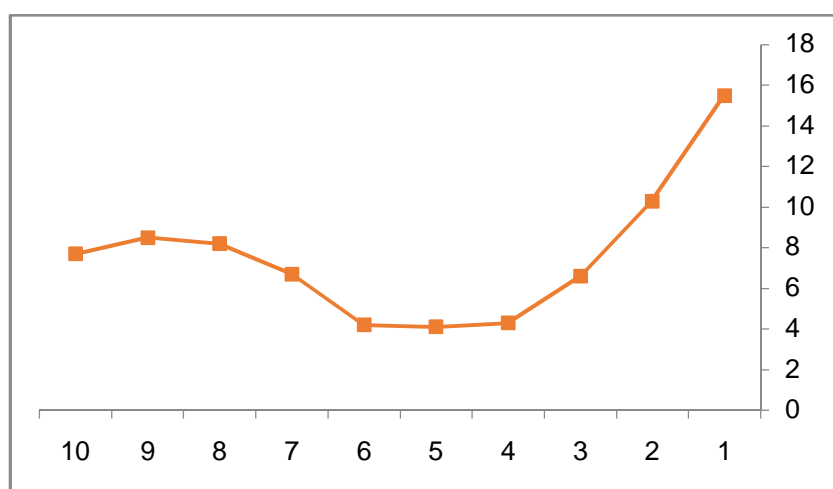
In its regulations No. (10/1//15040) dated 10/12/2009, The Central Bank of Jordan (CBJ) defined non performing loans as the credit facilities that are characterized by any of the following:

1. Past due in all or any one installment of it, or irregular settlements of the original debt and/or its interest, or a dormant current account for (90-179) days in the case of substandard credit facilities; for (180-359) for doubtful credit facilities; and for (360 days or more) for bad credit facilities.

2. Overdraft exceeding the ceiling by (10%) and more over a period of 90 days and more.

3. Credit facilities that expired without renewal for (90) days or more.
4. Credit facilities granted to any customer declared bankrupt or any company declared under liquidation.
5. Credit facilities that have been restructured three times in one year.
6. Current and demand accounts that are overdrawn for (90) days or more.
7. The value of warranties paid on behalf of clients for (90) days or more but not recorded on their accounts.

The percentage of non-performing loans to total loans for all banks in Jordan recorded a noticeable decrease since 2003 reaching their lowest level in 2007 and 2008, when they recorded 4.1% and 4.2% percent respectively. This drop was due to several factors, including the improvement in Jordan's economic performance which positively affected clients' ability to repay loans, and the higher efficiency of banks in managing their assets and collecting their dues, besides adopting another significant step, namely, the write-offs by banks of non-performing loans that have full collaterals. The percentage of non-performing loans, however, has started to increase since 2008 and reached 7.7% at the end of 2012.



On the other hand, the coverage ratio of loan impairment provisions to non-performing loans, which measures the extent of provisions' adequacy created by banks to meet their nonperforming loans, increased from 51.9% at the end of 2003 to reach its highest level of 80% at the end of 2006, and decreased at the end of 2007 and 2008, reaching 67.8% and 63.4% respectively.

This ratio dropped during the period 2009-2011 to about 52%, which is a normal result of the increase in non-performing loans due to the repercussions of the global financial crisis. But the ratio increased at the end of 2012 to 69.4%, which demonstrates the increased capability of banks in Jordan to face credit risks through their revenues. This has positive reflections on the safety of banks in Jordan and enhances the financial stability in the Kingdom.

Table 3: Non Performing Loans to Total Loans and coverage ratio for banks in Jordan (2003 – 2012)

Year	Nonperforming Loans to Total Loans (%)	Coverage Ratio (%)
2003	15.50%	51.90%
2004	10.30%	63.80%
2005	6.60%	78.40%
2006	4.30%	80.00%
2007	4.10%	67.80%
2008	4.20%	63.40%
2009	6.70%	52.00%
2010	8.20%	52.40%
2011	8.50%	52.30%
2012	7.70%	69.40%

V. Data and Methodology

A) Data

In this study, we investigate how macroeconomic factors and bank specific factors affect nonperforming loans in Jordan. We consider a sample of 12 Jordanian banks during the period 2008-2012. To ensure the homogeneity data used, only commercial banks were selected. The data used in this study are drawn from three sources:

1. The annual reports of banks.
2. Central Bank of Jordan.
3. Association of Banks in Jordan.

B) Variables definition

As we mentioned previously, most banking literature used a set of macroeconomic factors and bank specific factors as a determinants of nonperforming loans. Accordingly, we will use two sets of factors to explain the NPLs in Jordan, including macroeconomic factors and bank specific factors.

□ *Bank-Specific Factors*

1. **The lagged NPLs (NPLt-1):** This variable is considered to investigate the effect of previous NPLs on the current NPLS. Researchers found varying results regarding the effect of the lagged NPLs on the current NPLs. (Louzis et al., 2012) found a negative and significant effect of the lagged NPLs, suggesting that NPLs ratio is likely to decrease when it has increased in the previous quarter, due to the write-offs. However, we expect a positive effect of the lagged NPLs on the dependent variable.

2. **Loans to total assets ratio (L/TA):** This variable captures the risk appetite of banks (Sinkey and Greenwalt, 1991). many literatures shows a positive relationship between NPLs and the ratio of loans to asset, because banks that value profitability more than the cost of higher risk (represented by a high loan to asset ratio) are likely to incur higher levels of NPLs during periods of economic downturn (Khemraj and Pasha, 2009).

3. **Bank size (SIZE):** Too big to fail hypothesis assumes that large banks take excessive risks by increasing their leverage too much and extend loans to lower quality borrowers, and therefore have more NPLs. On the contrary, some researchers such as (Salas and Saurina, 2002) found a negative relation between bank size and NPLs and argued that bigger size allows for more diversification opportunities. We expect a positive effect of size on NPLs.

□ *Macroeconomic Factors*

1. **Economic growth (GRTH):** There is a significant empirical evidence of negative association between economic growth and non-performing loans (Farhan et al. 2012). Carey (1998) argues that the state of the economy is the most important factor affecting diversified debt portfolio loss rates. Salas and Saurina (2002) found a significant negative effect of GDP growth on NPLs.

Economic growth usually increases the income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa (Khemraj and Pasha, 2009). Accordingly we expect a negative effect of economic growth on NPLs.

2. **Lending rate (INT):** Lending rates denote the weighted average interest rates on loans and advances. Many empirical evidence such as (Nkusu, 2011), (Adebola et al., 2011) and (Berge and Boye, 2007) found a positive correlation between lending rate and NPLs. An increase in interest rate weakens loan payment capacity of the borrower therefore non-performing loans and bad loans are positively correlated with the interest rates (Nkusu, 2011). (Farhan et al. 2012) argued that banks with aggressive lending policies charging high interest rates from the borrowers incur greater non-performing loans. We expect a positive effect of lending rates on NPLs.

3. **Inflation rate (INF):** many researchers such as (Khemraj and Pasha, 2009) and (Fofack, 2005) found a positive relationship between the inflation NPLs.

While Nkusu, (2011) argued that inflation can affect the borrowers loan payment capacity positively or negatively, higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt; moreover increased inflation can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries are sticky. So according to literature relationship between inflation and non-performing loans can be positive or negative depending on the economy of operations (Farhan et al. 2012).

4. **Global Financial Crisis (CRISIS):** Global financial crisis affected Jordan economy during the period 2009-2010. This was reflected in lower growth rates, lower credit facilities growth, and increasing NPLs. We expect that global financial crisis affected NPLs positively.

C) Methodology

In order to investigate the determinants of non-performing loans in Jordan, we used panel data regression approach. Panel data combines both time series and cross-section data, which is proper for our data set as it includes 5 years (2008-2012) and 12 banks (cross-section).

Based on our review of the literature it is clear that there is extensive international evidence which suggests that NPLs may be explained by both macroeconomic and bank specific factors. In this study we employ an econometric model that is similar to (Ahmad and Bashir, 2103) and (Saba et al., 2012), but with some modifications to fit the Jordanian case. The model is a simple linear regression function that links the ratio of NPLs to total loans and key macroeconomic and bank specific variables. The general regression equation is of the form:

$$NPL_{si,t} = \alpha + \beta_1 NPL_{si,t-1} + \beta_2 L/TA_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GRTH_t + \beta_5 INT_t + \beta_6 INF_t + \beta_7 CRIS_{i,t} + \epsilon_t$$

Where:

$NPL_{si,t}$: The ratio of non-performing loans to total loans for bank i at time t .

$NPL_{si,t-1}$: The lagged nonperforming loans for bank i in the previous year ($t-1$).

$L/TA_{i,t}$: Loans to assets ratio for bank i at time t .

$SIZE_{i,t}$: Total assets of bank i at time t .

$GRTH_t$: Economic growth rate at time t .

INT_t : Lending rate measured by the weighted average lending rate at time t .

INF_t : Inflation rate at time t .

$CRIS_{i,t}$: a dummy variable that denote global financial crisis. It takes the value of zero before crisis (2007-2008), and the value of one after crisis (2009-2012).

VI. Descriptive Statistics

The summary of descriptive statistics for the variables used in the empirical analysis is presented in Table (4). Based on that table we can make the following observations:

- **NPLs:** The average NPLs for sample banks during study period was 8.8%, which is considered much higher than the 6.6% average for all banks operating in Jordan during the same period, this indicates that the 12 banks included in the study have a higher risk than other banks, and thus may represent the change in NPLs adequately. The NPLs ratio ranged from 0.3% to 18.7% with a 4.4 standard deviation, reflecting a high disparity between banks. Finally, Jarque-Bera test and its probability indicate the normal distribution of the dependent variable.

- **L/TA:** The average loans to total asset ratio was 50% approximately, with a minimum of 38% and a maximum of 64% and a standard deviation of 6.8%. These statistics may reflect a relative stability in the moderate lending policies adopted by banks in Jordan.

- **SIZE:** the average total assets and standard deviation indicate the existence of a high dispersion between the size of Jordanian banks.

- **GRTH:** the average economic growth rate during study period was 4.7%. The growth rate ranged from 2.3% to 8.2% with a standard deviation of 2.4%. These statistics indicate the instability of the Jordanian economy, and the inability to achieve sustainable growth rates.

- **INT**: the average lending rate in the Jordanian banking sector reached to 9% during study period, and ranged from 8.7% to 9.5% with a standard deviation of 0.2%. This indicates the stability of lending rates in Jordan, and may reflect the weak competition among banks as they almost impose the similar interest rates.

- **INF**: the average inflation rate in Jordan reached to 5.3% during study period, and ranged from -0.7% to 14.0% with a standard deviation of 4.4%. The average inflation rate and its variability over time are considered very high.

Table 4: Descriptive

Statistics	NPL	NPL1-1	L/TA	SIZE	GRTH	INT	INF	CRISIS
Mean	0.088	0.085	0.499	9.249	0.047	0.090	0.053	0.667
Median	0.084	0.079	0.491	9.176	0.041	0.090	0.047	1.000
Maximum	0.187	0.187	0.642	10.379	0.082	0.095	0.140	1.000
Minimum	0.003	0.003	0.381	8.740	0.023	0.087	-0.007	0.000
Std. Dev.	0.044	0.045	0.068	0.437	0.024	0.002	0.044	0.475
Skewness	0.370	0.481	0.173	1.297	0.292	0.717	0.873	2.527
Kurtois	2.532	2.273	4.098	1.359	2.844	3.249	1.500	0.000
Jarque-Bera	2.311	2.863	1.944	23.795	9.103	6.234	9.331	12.750
Probability	0.315	0.239	0.378	0.000	0.011	0.044	0.009	0.002
Observations	60	60	60	60	60	60	60	60
Cross Sections	12	12	12	12	12	12	12	12

VII. Empirical results

In this study, we employ a panel data model to identify the determinants of NPLs of Jordanian banks. Tables (5) summarize the results of our regression model which is estimated using pooled least squares. Our model is estimated with a balanced panel dataset that consists of both macroeconomic and firm level data from 2007 to 2012.

Based on table we can make the following observations:

- The coefficient of the lagged dependent variable *NPLt-1* is positive and statistically significant at 1 percent level. This means that banks with high NPLs in the previous year are likely to have high NPLs in the current year. The implication is that the NPL ratio is likely to increase when it has increased in the previous year. However, this finding is different from the findings of (Louzis et al., 2012) who found that the lagged NPLs have a negative and significant effect on NPLs due to the write-offs.

- The coefficient of loans total assets *L/TA*, which represents the risk appetite of the Jordanian banks, is positive and statistically significant at 1 percent level. This means that banks which are high risk takers are likely to incur greater levels of NPLs. This finding is similar to the finding of (Sinkey and Greenwalt, 1991) and (Khemraj and Pasha, 2009).

- The coefficient of bank size *SIZE*, which represents the bank's total assets, is positive but insignificant. This evidence is consistent with the findings of (Khemraj and Pasha, 2009), but inconsistent with the findings of (Rajan and Dhal, 2003), (Salas and Saurina, 2002) and (Hu et al., 2006). However, this finding can be explained by the fact that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts.

- The coefficient of economic growth *GRTH* is negative and statistically significant at 1 percent level. This result points to a strong dependence of the customers' ability to repay its loans on the state of economy. Thus an improvement in the real economy is likely to see an instantaneous reduction in the non-performing loan portfolios of Jordanian banks.

- The coefficient of lending rate INT is positive but insignificant, which means that lending rate has no effect on borrowers' ability to repay, and thus doesn't affect nonperforming loans. This finding is inconsistent with many previous findings such as (Sinkey and Greenwalt, 1991), (Fofack, 2005), (Jimenez and Saurina, 2005), and (Khemraj and Pasha, 2009).

- The coefficient of inflation rate INF is negative and statistically significant at 1 percent level. This finding suggests that the increase in inflation rate will decrease NPLs because higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt.

- The coefficient of global financial crisis CRISIS is positive and statistically significant at 1 percent level. This means that the global financial crisis that lead to economic slowdown in Jordan, affect borrowers' ability to repay and thus lead to higher NPLs.

Table 5: The Results of Regression Analysis According to Study Model

$$NPL_{si,t} = \alpha + \beta_1 NPL_{si,t-1} + \beta_2 L/TA_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GRTH_t + \beta_5 INT_t + \beta_6 INF_t + \beta_7 CRISIS_t + \varepsilon_t$$

Variable	Coefficient	t-Statistic	Prob.
Regression Statistics	1.5986	13.0500	0.0000
R-squared	0.7574	14.9746	0.0000
Adjusted R-squared	0.0696	2.7965	0.6495
S.E. of regression	0.0022	0.4570	0.7748
F-Statistic	-10.8921	-9.9983	0.0000
Prob (F-Statistic)	0.1214	0.2876	0.8235
Durbin – Watson Stat	-6.2498	-9.9972	0.7998
	1.0690	9.8839	34.6670

VIII. Conclusion

The purpose of this paper is to examine the determinants of non-performing loans in Jordanian banks over 2007-2012. As nonperforming loans in banks can be affected not only by bank specific factors but also by macroeconomic factors, thus we used two sets of factors including macroeconomic factors and bank specific variables.

Using panel data regression, our results report that among bank specific factors, the lagged NPLs and the ratio of loans total assets were the most important factors that affect nonperforming loans positively. However, contrary to international evidence our results show that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts. With respect to the impact of macroeconomic factors on nonperforming loans, we find that economic growth and inflation rate have a negative and significant effect on non-performing loans. Global financial crisis showed a positive and significant effect on non performing loans indicating that the crisis lead to higher non-performing loans in Jordan.

Based on our findings, Jordanian banks should pay more attention to several factors when providing loans in order to curtail the level of impaired loans. Jordanian banks need to take effective measures to strengthen their loan portfolio and reduce their credit risk to insure the stability of the financial system. These banks should also take the performance of the real economy into account when extending loans given the reality that loan delinquencies are likely to be higher during periods of economic downturn. Finally, banks shouldn't expand their loan portfolio by extending credit to higher risk customers. The Central bank of Jordan should also expand its monitoring framework to include macroeconomic prudential indicators such as GDP and inflation rate when assessing the stability and soundness of the banking system. Further investigations are needed to better understand the interactions and relationships between non-performing loans and the different types of borrowers, namely; individuals, small and medium enterprises, and corporate borrowers. In addition, it is important for other studies to investigate the procedures that banks undertake to handle non-performing loans.

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