

The Determinants of Net Interest Margins in the Jordanian Commercial Banks

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Abstract

The financial sector in Jordan is considered one of the most important sectors as other economic sectors are fundamentally dependent on access to financial services. The financial sector in Jordan witnessed major developments and reforms over the last two decades. The adopted reforms have had some liberalization components and deregulation measures. Net Interest Margin (NIM) is an important tool for tracking profitability of commercial banks. This paper will try to identify the determinants of NIM for panel data of thirteen Jordanian commercial banks during the period (1995-2015). The study has applied Ho & Saunders, (1981) and the extension proposed by Maudos & De Guevara, (2004) using the econometric methods of OLS, fixed and random effects models. The study found that bank specific characteristics explain, to a greater extent, the dynamics of NIM at commercial banks. Macroeconomic factor, represented by the CPI had a low capacity in explaining NIM variations. Also, the results indicated that the deregulation process and the enhancement of the regulatory frameworks have contributed in the adherence to market powers. Moreover, quality of management has an impact on NIM through decreasing incurred costs. The results did not find evidence to support the belief that foreign ownership has enhanced the institutional quality of banks.

Keywords: Net Interest Margin, Fixed effects, Random Effects, Jordan, Banking.

1. Introduction

Many studies have highlighted the importance of the stability in the financial sector as a pre-requisite for economic growth and stability (Hussein & Omran, 2003). The financial sector in Jordan is considered one of the most important sectors as other sectors are fundamentally dependent on access to financial services. Further, financial and insurance services contributed to around 7.8 percent, on average, of Gross Domestic Product (GDP) for the period (2000-2015). It is also considered as one of biggest employers within the private sector and has the largest capitalization at the Amman Stock Exchange (ASE) (ETVET, 2014). The financial sector is dominated by the banking industry as more than 95 percent of its assets belong to the banking industry. Furthermore, total banking sector assets reached 202.8 percent of GDP, on average, for the period (2000-2015), which highlights the importance of preserving the viability of this sector.

The financial system in Jordan witnessed some major developments and reforms especially over the last two decades. The adopted reforms had some liberalization components such as the liberalization of interest rates on deposits and extended credit facilities by commercial banks, and the introduction of new financial regulations that are consistent with international standards and the modernization of Jordan's capital market. Also, the number of banks and branches in Jordan has increased over the last two decades leading to a more competitive environment. In addition, government policies continue to focus on deregulation aimed at promoting greater efficiency in the overall financial sector (Molyneux & Iqbal, 2005; IMF, 2005).

The massive evolution in the regulatory frameworks, the new entrants in the market since 1995 have increased the competition as well as the innovations in the banking industry have affected the behavior and the activities of the Jordanian commercial banks. Net Interest Margin (NIM)¹ could be considered as a useful tool for tracking the profitability of banking investing and lending activities over a specific period of time as it mirrors the interest rate spread between loans and deposits, in addition to transaction costs as well as taxes that are borne directly to borrowers and savers. Thus, we could view the NIM as an indicator of efficiency and profitability of the banking system (Demirgüç-Kunt & Huizinga, 1999).

¹Net Interest Margin is defined as the ratio of net interest income to average earning assets of banks.

Many studies have been made to identify the determinants of NIM in banking sectors. For example, Ho & Saunders, (1981) concluded that the degree of competition and interest rate risk to which the bank is exposed is two basic components of the interest margin. Though the NIM represents an important component of profitability and summarizes the bank net interest rate of return, it only focuses on the core activity of the banks and does not include other revenues from services, such as fees and other non-interest income, and non-interest expenses.

The importance of this study comes from the reliance of the banking sector on interest rate as a main source of income as interest margins accounted for around 77.4 percent of total income in 2015. Accordingly, it is one of the main factors that influence the overall interest rates for the private sector. In a bank-centric environment, factors that affect funding availability should be thoroughly investigated as it influences the stability of the whole banking sector. This paper aims at testing the determinants of NIM for thirteen commercial banks in Jordan over the period (1995-2015). The paper has relied on Ho & Saunders, (1981) dealership model, and Maudos & De Guevara, (2004) extensions. Furthermore, the study intends to test whether bank specific characteristics and macroeconomic factors have an impact on the NIM of Jordanian commercial banks. This paper is organized as follows; section two presents a brief overview of the related literature, section three contains an overview of the evolution of the banking sector in Jordan, section four illustrates the adopted methodology and data specification, section five contains estimation results and analysis, and section six presents some implications and recommendations for general management at commercial banks as well as the regulatory authorities.

II. Literature review

Testing for the determinants of NIM is an issue that has attracted the attention of many financial and banking circles. Such concern stems from the view of NIM as one of the main contributors in banks and financial intermediaries' profitability. In this section we have briefly viewed the available related studies that tested the determinants of NIM in other countries. Most of the literature have employed various models, for the analysis of NIM determinants, that are based on Ho and Saunders, (1981) dealership model, where banks are considered as risk-averse dealers between depositors and borrowers of funds (Fungáčová & Poghosyan, 2011). These studies have focused on developed countries. However, little studies, according to our knowledge, have tested the determinants of the NIM in the MENA region²³.

Empirical studies have tested banks' NIM determinants using variables that are related to bank specific characteristics, and macroeconomic variables. Some of these studies have focused on a specific country, while others have concentrated on a panel of countries. For example, Demirgüç-Kunt & Huizinga, (1999) tested the determinants of NIM and profitability using bank level data for 80 countries during the period (1988-1995). They found that a variety of determinants affects interest margins and bank profitability such as bank characteristics, macroeconomic conditions, banking taxation, regulatory and institutional parameters, and the overall financial structure. They also found that a lower market concentration leads to lower margins and profits.

Other studies have found that banks' regulatory parameters have a direct effect on their optimal interest margin, as an increase in deposit insurance premiums or in capital requirements leads the bank to shift funds from the Federal Funds to loan market. Thus, the scale of the bank is reduced as a result of lower expected profits. They also concluded that an increase in the uncertainty of the banks' loan losses and capital regulations have a negative effect on NIM (Zarruk & Madura, 1992). Furthermore, other studies found that regulatory authorities' decisions for monetary policy stances have an effect on banks' lending activities. A rise in market interest rates increases the costs incurred by banks due to maturity mismatches, which reduces profits and capital accumulation. In this case, if equity is small compared to other balance sheet items, and increasing paid-in capital is too costly, the bank will be forced to reduce the lending volume and widen the spread between loans and deposits (Van den Heuvel, 2002).

Moreover, macroeconomic factors have been tested as one of the determinants of NIM, as these variables could be viewed as exogenous factors that affect the operational process in the banking industry, better economic conditions boost the demand for credit, which stimulates the increase in lending rates when borrowers have no substitute for loans (Kashyap & Stein, 2000).

²The MENA region comprises of the following countries; Algeria, Bahrain, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, the United Arab Emirates, Yemen, Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco, Sudan, Syria, and Tunisia.

³Author have found three studies that tested the determinants of NIM in Tunisia, Jordan, and Lebanon, namely; Naceur, (2003), Husni et al., (2008), and Hamadi & Awdeh, (2012).

A bank's decision to increase/ decrease its rates on loans and deposits in response to exogenous changes in market interest rates is somehow similar to firms' decisions to change their commodities' prices in response to changes in costs (Hannan & Berger, 1991). Some studies found no significant impact of macroeconomic factors on the NIM (Naceur, 2003; Husni, et al., 2008), while other studies have set them as one of the determinants of NIM (Afanasieff, et al., 2002; Alper & Anbar, 2011; Hamadi & Awdeh, 2012; Tarus, et al., 2012).

However, most of these studies have found that banks' specific characteristics are the main factors that affect the NIM as they summarize banks strategies and operational process. For instance, Saunders & Schumacher, (2000) indicated that net interest margin was affected by implicit interest payments, opportunity cost, and capital to assets ratio, market power and volatility of interest rate for six countries of the European Union and in the United States. Others have concluded that cost to income ratio have a negative relationship with NIM as less efficient banks tends to have higher NIM (Dumicic & Ridzak, 2013). Furthermore, Claeys & Vander Vennet, (2008) investigated the determinants of NIM in Central and Eastern European countries (CEEC). They tried to determine the sources of weak bank performance as it could be attributed to the nature of the business environment, i.e. non-competitive market. They found that capital adequacy is an important determinant of bank margins, both in developed and transition bank markets and the adopted reforms in the CEEC reduce the signaling strength of capital as an indicator of solvency.

Further, they did not reject the structure-conduct-performance (SCP)⁴ hypothesis for Western or Eastern European bank markets. Also, they indicated that risk behavior plays an important role in explaining high interest margins, and that higher operational efficiency is rejected in lower interest margins in both Western European bank markets and accession countries, but not in the Eastern European bank sector as a whole. They concluded that Eastern European banks are converging to the Western European pattern after the accession to the European Union. However, the results have varied in specific countries' analysis as the structure, the operational framework of the industry, and the macroeconomic characteristics are different, to some extent.

A previous study on the determinants of NIM at Jordanian banking industry, for the period (1992-2005) indicated that bank specific characteristics tend to have a statistically significant impact on NIM. Higher NIM tend to be associated with the banks' strategies in extending loans while preserving the low levels of Non-Performing Loans (NPL), and lower leverage ratios. They also found that banks are well capitalized and that the overhead costs are transmitted to clients through high (low) interest rates on loans (deposits). Moreover, they found evidence that Jordanian banks do not exercise market power in setting prices, and banks that are operationally less efficient gain reasonable net interest margin (Husni, et al., 2008).

Furthermore, Alper & Anbar, (2011) studied bank-specific and macroeconomic determinants of the bank's profitability in Turkey over the time period (2002-2010). They represented bank profitability by return on assets (ROA) and return on equity (ROE) as a function of bank-specific and macroeconomic determinants. Using a balanced panel data set, the results show that asset size and non-interest income have a positive and significant effect on bank profitability. However, size of credit portfolio and loans under follow-up have a negative and significant impact on bank profitability. These results suggest that banks can improve their profitability through increasing bank size and non-interest income, decreasing credit/asset ratio. In addition, higher real interest rate (macroeconomic variable) could lead to higher bank profitability.

Also, Tarus, et al., (2012) investigated the determinants of net interest margin of commercial banks in Kenya using pooled and fixed effects regression to a panel of 44 Kenyan commercial banks for the period (2000-2009). The estimation results showed that operating expenses and credit risk has a positive and significant effect on net interest margin of the commercial banks in Kenya. The paper also finds that the higher the inflation, the wider the net interest margin, while growth and market concentration have negative effect on net interest margin.

Moreover, the empirical results for NIM determinants in Lebanon indicated that interest rate margins are shaped differently between domestic and foreign banks. For instance, domestic bank size, liquidity, efficiency, and to a lower extent, capitalization and credit risk, have a negative impact on interest margins. The same impact was captured by concentration, dollarization, and to a lower extent, by economic growth. By contrast, growth rates of deposits, loans, price levels, discount rate of the central bank, domestic savings and investments, and the interbank rate have a positive impact on net interest margins.

⁴A hypothesis that asserts the positive relationship between profits and market structure reflects non-competitive pricing behavior in more concentrated markets.

For foreign banks, they indicated that size, liquidity, capitalization, and credit risk, do not show a significant impact. Also, the macroeconomic and monetary conditions have little impact on foreign bank interest margins (Hamadi & Awdeh, 2012). This paper analyzed the effects of banks' specific factors and macroeconomic variables on the NIM of Jordanian commercial banks. The analysis is based on Ho & Saunders, (1981) dealership model and the extensions for including operational costs that is proposed by Maudos & De Guevara, (2004) for thirteen Jordanian commercial banks during the period (1995-2015). The researcher has started gathering the data from 1995 as it marks the pegging of Jordanian nominal exchange rate to the US dollar.

III. Banking sector in Jordan, some stylized facts

The banking sector in Jordan has witnessed a massive evolution during the last two decades. These developments have been driven by several factors that affected banking operations and management in Jordan. These changes could be illustrated through changes in the composition of assets and liabilities. The dramatic developments in the regional economies and the national economy, as well as the evolution in the banking industry during the last decade have posed serious challenges that placed the stability of the banking sector at the heart of regulatory authorities' core responsibilities.

The healthy banking structure in Jordan can be fairly illustrated by taking a quick glance on the soundness indicators of the overall banking system. The Capital Adequacy Ratio (CAR) is well above the regulatory measures set by the regulatory authorities (12 percent); reaching 19.1 percent at the end of 2015. Further, the Coverage ratio for non-performing loans has increased steadily during the last decade to reach around 74.7 percent. The financial strength of the banking sector could be also viewed by the healthy growth in customers' deposits, which is considered a major part of the banks' balance sheet in Jordan, and in the extended credit facilities, reaching a growth rate of 10.1 percent and 12.5 percent on average for the period (2003-2015). Also, the growth of assets and liabilities during the same period by 9.6 percent and 9.1 percent, respectively. These indicators reflect the financial strength of the banking system in Jordan and promote financial stability in the kingdom.

Table (1): Financial soundness indicators

Item	2010	2015	(2003-2015)
CAR	20.3%	19.1%	18.9%
Coverage ratio	52.4%	74.7%	66.2%
NPL/Total loans	12.6%	4.9%	7.2%
Growth in customer deposits	10.9%	7.7%	10.1%
Growth in facilities	8.6%	9.6%	12.5%

- Source: Central Bank of Jordan website.

Developments in total assets have been dominated by the constant increase in the claims of banks on the public sector, which increased on a steady base since the early 2000s, reaching on average 17.9 percent during the period (2000-2015). The banks' portfolio of government securities have increased intensely after the financial crisis in 2008, which resulted from deterioration in the public finances, the government relied heavily on internal borrowing to finance its deficit. The adopted reforms for restructuring public finances did not resolve the reliance of the government to finance its deficit, which is reflected by the accelerated volume and the intensity of issuing treasury bills and bonds in the market, thus, crowding out the private sectors by decreasing availability of funds, and increasing its costs (IMF, 2012).

The growth dynamics of credit facilities extended to the private sector have been widely shaped by the liberalization components of the structural reform programs and the market conditions in the country. The global financial crisis affected negatively the macroeconomic conditions in the country through several indirect channels, the conservative approach coupled with the reluctance of investors to embark new business endeavors, and the market conditions took its toll on the growth of credit facilities, which plummeted to reach 4.7 percent in 2009. Further, the breakout of the Arab spring and the increased uncertainty in the real economy and the financial markets continued to affect the growth level of these facilities reaching around 6.2 percent on average for the period (2010-2015), which can be explained partially by escalating the conservative approach due to the political instability in the region and uncertainty.

Table (2): The Developments in Main Balance sheet Items in selected years (Billion JD, unless otherwise indicated)

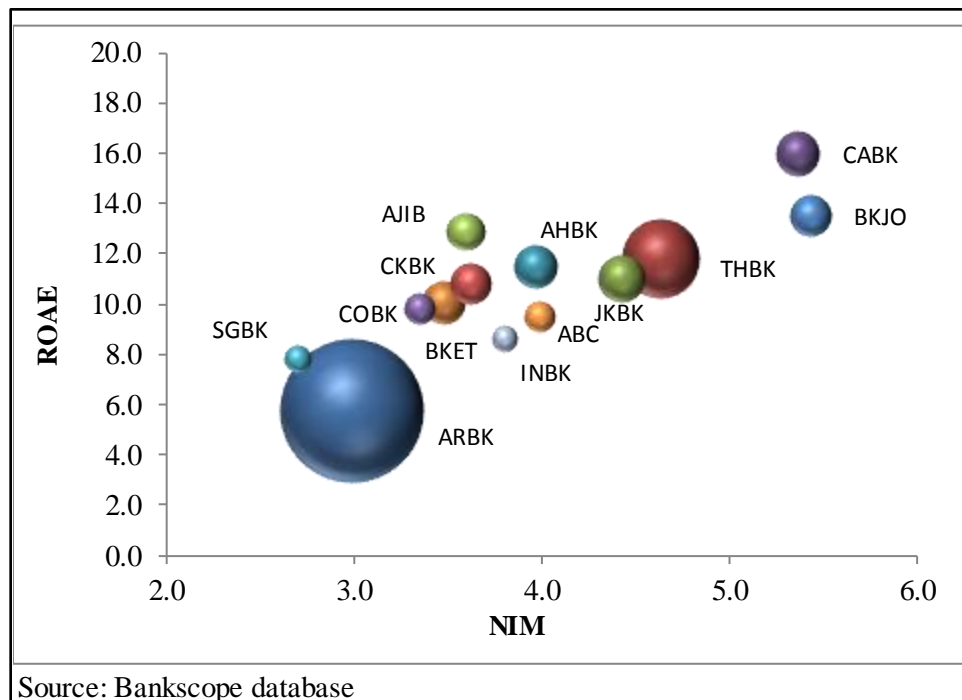
Item	1995	2000	2005	2010	2015
Total Assets	8.4	12.9	21.1	35.0	47.1
% of GDP	178.8	215.3	236.3	186.4	176.9
Total Liabilities	7.2	11.5	18.8	30.0	40.0
% of GDP	151.8	192.3	211.0	160.0	150.3
Total extended credit facilities	3.1	4.5	7.7	14.5	21.1
% of GDP	65.2	75.8	86.8	77.0	79.2
Total Deposits	5.8	8.2	13.1	22.5	32.6
% of GDP	122.8	137.1	147.0	119.9	122.4
Deposits to Loan Ratio	188.2	180.9	169.4	155.7	154.5

- Source: Central Bank of Jordan website.

The developments in the banking sector could not be solely contributed to the growth in the assets. Indeed, the growth in liabilities of the banking system has played a major role in the structure of their balance sheets currently. The main source of growth in total liabilities in Jordan can be attributed to the growth in customers' deposits as it constituted around two thirds of the bank's balance sheets. Deposits of the private sector are considered the main part of the total time deposits in the banking system. It is also considered one of the main components of the liabilities side of their balance sheet, reaching around 40 percent of total liabilities for the period (2000-2015).

The importance of deposits as a major source of funds reflects the prudence of commercial banks while managing their balance sheets. This could be illustrated by taking a quick glance at the loan to deposit ratio and the capital adequacy ratio, which represent a conservative position for commercial banks in Jordan. Loan to deposit ratio reached around 62.8 percent on average during the period (2000-2014), it remained stable for the period under consideration. Further, capital adequacy ratio is well above the regulatory measures and Basel III regulation as it reached around 18.4 percent at the end of 2015. These indicators reflect a strong capital base which is considered the highest in the Middle East and North Africa (MENA) region with comfortable levels of liquidity and profitability (CBJ, 2014).

Banking Industry profits have increased in a steady base since the early 2000s, with the exception of 2009, where the global and domestic market conditions have affected negatively their profits due to the global financial crisis. Despite this effect, profitability indicators, represented by the ROE have decreased since 2006 due to the capitalization process during that period, while the leverage ratio have remained relatively stable which indicates that the banking sector relies heavily on private equity to support its operations and capitalization. The main source of profits for these banks is drawn from traditional operations of extending credit to various sectors in the economy as interest margin to gross income ratio is well above 60 percent throughout the period (2000-2015), which could be seen in Figure (1). Further, the ROA ratio for the banking industry in the kingdom has been relatively low and stable which represents the conservative approach of these banks in allocating its resources.

Figure (1): ROAE & NIM for Jordanian Commercial banks in 2014⁵

The level of profit that is incurred by banks are governed by the economic conditions in the market, favorable conditions tends to increase the profitability level, and thus, more positive profitability ratios. Further, these indicators are often influenced by the level of concentration in the market which is relatively high in Jordan compared to other countries in the region and the degree of risk taking. The conservative policy in Jordan have affected profitability ratios, measured by the ROAA, as it have has been relatively low and stable throughout the period (2003-2014).

IV. Methodology and data

Most of the studies for the NIM determinants have employed panel data regressions in order to estimate the relationship between bank specific characteristics, regulatory, and macroeconomic variables with the NIM. The period of analysis will cover the period from 1995 until 2015. We have selected the year 1995 to start compiling the data as it marks the return of stability to the Jordanian economy and the steadiness in the exchange rate regime as Jordan pegged its nominal exchange rate to the US dollar.

The disaggregated data for thirteen banks, on a yearly basis was acquired from Bank scope database, which captures the data from banks yearly statements. Other data for selected macroeconomic variables was obtained from the Central Bank of Jordan statistical database⁶. Before the econometric analysis the data were revised and checked for extreme values and possible reporting errors. Further, All variables have also been checked for stationarity using panel unit root test ([Annex I](#)), but it is important to note that limited time dimensions render these tests statistical power.

In this study, pooled OLS, fixed effects, as well as random effects models are considered for the robustness of the estimation results. The fixed effects model formulation implies that differences across groups can be captured indifferences in the constant term; it also allows the unobserved individual effects to be correlated with the included variables.

⁵The acronyms for figures 1& 2 are as follows; Arab Bank Plc (**ARBK**), The Housing Bank for trade & finance (**THBK**), Jordan Kuwait Bank (**JKBK**), Cairo Amman Bank (**CABK**), Al-Ahli Bank (**AHBK**), Bank al Etihad (**BKET**), Bank of Jordan Plc (**BKJO**), Capital Bank (**CKBK**), Arab Jordan Investment Bank (**AJIB**), Jordan Commercial Bank (**COBK**), Société Générale (**SGBK**), Arab Banking Corporation (**ABC**), Invest Bank (**INBK**).

⁶www.cbj.gov.jo

But, if the individual effects are strictly uncorrelated with the regressors, then it might be appropriate to model the individual specific constant terms as randomly distributed across cross-sectional units (Greene, 2012). The study model will use time series cross-sectional bank level data in the context of Jordan over the 1995-2015. The empirical specification will estimate the relationship between net interest margin and a set of banks' characteristics. To control for the effect of the exogenous factors macroeconomic variables will be included. The following linear specified equation for the sample set will include the following variables:

$$NIM_{it} = \alpha_{it} + \sum_{k=1}^{11} \gamma_{itk} x_{itk} + \sum_{j=1}^1 \beta_{itj} y_{itj} + \varepsilon_{it} \quad (1)$$

Where (*NIM*) represents the net interest margin for the commercial bank (*i*) at time (*t*). Also, (x_{itk}) and (y_{itj}) represent the vectors for the banks' characteristics variables and macroeconomic variables, the coefficients (α , γ , β) represent the model intercept and the coefficients related to the banks' characteristics and macroeconomic variables, respectively. Following (Maudos & De Guevara, 2004), the set of the bank specifics variables include:

Market Power (MARS): which is used to proxy the market structure and the banking activities on a national scale. It is estimated by dividing the total asset of the bank (*i*) to the total assets of the banking industry at time (*t*).

Operating Costs (OCTA): This ratio is used as a proxy for capturing the operational efficiency at banks. It is estimated by taking the ratio of overhead costs to total assets for commercial banks.

Degree of risk aversion (EQTA): The degree of risk aversion is captured by using total capital ratio, which is calculated by dividing total equity by total assets. If the relationship with the NIM is positive, then banks tend to increase NIM to cover the higher costs of equity financing compared to external financing. Using this variable has some limitations given the influence of the regulators through setting minimum capital requirements. However, little disaggregated data could be found on excess reserves for commercial banks as it is considered a better proxy of the degree of risk aversion.

Volatility of Market interest rates (VOLR): Money markets uncertainty is reflected in the theoretical model proposed by Ho & Saunders, (1981) by the variance of market interest rates. We will use the annual standard deviation of the Interbank interest rate (*IBR*) as a proxy for market interest rate risk. The standard deviation for each year was calculated on a monthly basis according to the following:

$$Volatility = \sqrt{\frac{(IBR_i - \overline{IBR}_i)^2}{n}} \quad (2)$$

Credit risk (NLTA): Will be estimated through dividing total loans extended by commercial banks to total assets. This ratio was used as a proxy for credit risk due to the limited availability of disaggregated data on loan loss provisions, or non-performing loans.

Interaction between Credit risk and Market risk (CMR): As a proxy, we will use the product of loans to total assets (LTA) and the Interbank rate of interest.

Average size of operations (LLON): The natural logarithm of loans is used as a proxy for the size of operations due to limited availability of the data at the Bank scope database.

Implicit Interest payments (IIP): we will use operating expenses net of non-interest revenues, expressed as a percentage of total assets as a proxy for the variable following (Saunders & Schumacher, 2000).

Opportunity costs of bank reserves (LQATA): This variable will be proxied by the ratio of liquid reserves to total assets, using the cash variable as a proxy for bank opportunity costs of holding reserves.

Quality of management (CTIR): We will use the cost to income ratio as a proxy for this variable as an increase in this ratio implies a lower NIM due to the increase in the efficiency of the banks' management.

Foreigner's ownership (FORE): This variable will capture the effect of foreigner's ownership at Jordanian banks. Foreign ownership affects banks efficiency as it influence the quality of institutional efficiency at banks, which could be translated into lower costs, thus, decreasing the NIM.

Macroeconomic variables are included to control for the business environments shocks on the banking industry, the included variables are as follows:

Price levels (LCPI): This variable reflects the inflationary conditions in an economy. It is proxied by taking the natural logarithm of Consumer Price Index (CPI).

V. Estimation results and analysis

The estimation results as shown in Table (2), illustrate the effects of banks' specific characteristics as well as macroeconomic effects on NIM. The different columns correspond to different empirical approaches used in order to estimate the relationships between independent variables and NIM. The cross-section dependence test for the residuals shows little evidence for rejecting the null hypothesis that there is no correlation in weighted residuals for the fixed effect model. Also, Hausman test was employed in order to determine the significance of the fixed effects (Table 3), and choose which specification category to be used, random or fixed effects model.

Table (3): Estimation Results

Variable	OLS	Random Effects	Fixed Effects
<i>Constant</i>	4.689**	-3.69**	-3.11
Bank Specific metrics			
<i>MARS</i>	-0.03*	-0.03*	-0.036*
<i>OCTA</i>	0.72*	0.68*	0.76*
<i>EQTA</i>	0.03*	0.039*	0.02*
<i>VOLR</i>	-0.46	-0.14	-0.29
<i>NLTA</i>	0.03*	0.02*	0.02*
<i>LLON</i>	0.47*	0.504*	0.54*
<i>IIP</i>	0.05	0.06	-0.02
<i>LQATA</i>	0.008	0.006	0.006
<i>CTIR</i>	-0.02*	-0.013*	-0.019*
<i>FORE</i>	0.008*	0.006*	0.006*
<i>CMR</i>	0.02	0.012	0.02
Macroeconomic variables			
<i>LCPI</i>	0.51	0.24	0.19
Diagnostic tests			
R- Squared	0.79	0.737	0.72
F-statistic	59.42	43.5*	40.08*
J-B test	3.25	5.31	2.46
Panel tests			
Pesaran Scaled LM	---	133.3*	1.64
Pesaran CD	---	2.867*	1.49
Bias-correlated Scaled LM	---	3.387*	1.23
* Significant at 1 percent. ** Significant at 5 percent. *** Significant at 10 percent.			

The results showed that the fixed effect model is more appropriate as the statistic provides strong evidence against the null hypothesis that there is no misspecification. Further, the redundant fixed effects estimates are significance and we can reject the null hypothesis that the cross-section effects are redundant.

Table (4): Diagnostic tests

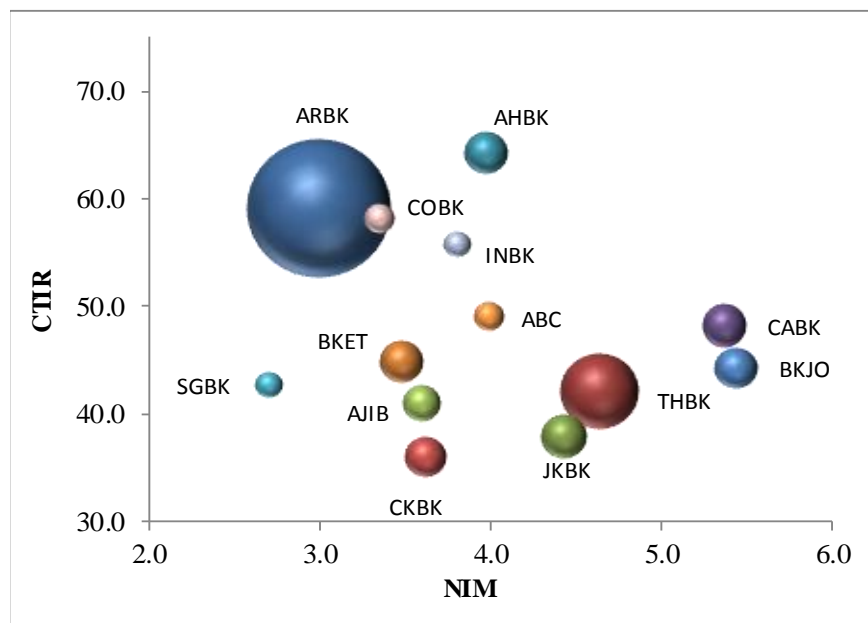
	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Hausman test	166.2	12	0.000
Redundant fixed effects test	Cross section F-statistic	d.f.	Prob.
	18.124	(12,174)	0.000

The estimated results indicated that the market power, measured by the share of the banks’ assets to the total assets of the banking sector, affects negatively the NIM, which contradicts the belief that higher market power would be used by banks to charge higher NIM. These findings are supported by Husni, et al., (2008) Jordanian banks do not exercise market power in setting prices, and banks that are operationally less efficient gain reasonable net interest margin.

Furthermore, we found evidence that Jordanian banks are risk averse and tend to charge higher interest rate margins in order to compensate for high costs of equity financing. Also, commercial banks in Jordan that have higher credit risk exposure tend to increase the interest rate margins though the coefficient of the explanatory variable (*NLTA*) is small. The results also indicated that banks that bear higher average operating expenses need to operate with higher margins, thus, we could conclude that banks transmit around 72 percent of its overhead costs to their clients through increasing interest rates on loans and/ or lowering deposit rates.

The effects of interest rate volatility, measured by the standard deviation of interbank interest rates, was expected to have a positive sign, as banks tends to charge higher interest rate margins in times of uncertainty. However, estimation results indicated the existence of a negative, but insignificant relationship with NIM. This could be explained by the conservative nature of commercial banks in Jordan, as they tend to encourage depositors through increasing interest rates on deposits and curb their appetite for lending, which would, in turn, decrease NIM. Also, the implicit interest payments have a negative small coefficient that is statistically insignificant, which indicate that banks do not offset these payments through higher NIM.

Figure (2): Cost to Income ratio (CTIR) and NIM for commercial banks in 2014



Source: Bankscope database

The interaction between credit risk and market interest rate risk showed a positive relationship, though statistically insignificant, it signals that higher interest rates could increase the probability of default. Also, the opportunity costs of bank reserves shows a positive sign, though it was statistically insignificant, it indicates that higher liquid reserves increases the opportunity costs, thus, higher NIM is needed in order to cover these costs. Furthermore, results indicated that management quality, proxied by cost to income ratio (*CTIR*), tends to lower NIM. The relationship between efficiency, size of operations, and NIM is shown for sample banks in 2014 is shown in Figure (2). Jordanian commercial banks NIM depend on the costs they incur and the size of their operations. Also, the results provided some evidence that the increase of foreign ownership in banks tends to affect, by a small portion, positively NIM. The literature on foreign ownership and bank efficiency showed that enhancing the institutional quality of banks depends on the host country institutional quality and on institutional differences between the home and host country (Lensink, et al., 2008).

As for the size of operations, measured by the natural logarithm of loans (*LLON*), the results indicated the existence of a positive relationship as the higher the size of operations, the higher the potential loss, thus, the bank would require higher NIM. The macroeconomic indicator, measured by the natural logarithm of Consumer Price Index (*LCPI*) indicated the existence of a positive relationship with NIM, which shows that banks tend to charge higher NIM in times of high inflation in order to keep the real interest rate on extended loans positive as bank spreads tends to be correlated with inflation (Gelos, 2009).

VI. Policy implications and recommendations

The sustainability of the banking industry in Jordan is one of the main pillars for ensuring economic and financial stability. A profitable and healthy banking sector is one of the main concerns of policy makers in Jordan. This study has tried to identify the main determinants of Net Interest Margin (NIM) as a major factor in the levels of profitability realized by commercial banks. One of the main conclusions is that bank specific characteristics explain, to a greater extent, the dynamics of NIM at commercial banks. Macroeconomic factors, represented by natural logarithm of CPI, were found to have low capacity in explaining NIM variations.

This study have captured the effects of operating costs and foreign ownership in Jordanian commercial banks, The results indicated that the deregulation process and the enhancement of the regulatory frameworks have contributed in the adherence of commercial banks to market powers and setting prices according to their dynamics. Further, we could conclude that throughout the period there was no significant change in banks income structure as they are still relying on the traditional approach by depending on interest income as a main source.

Also, one of the main factors for explaining NIM variations is the average size of operations as it contains the average costs for extending loans could be a major factor in reducing NIM. This results justifies applying the extension proposed by (Maudos & De Guevara, 2004). Moreover, quality of management has an impact on NIM through decreasing costs incurred by banks. Thus, regulatory authorities and commercial banks should pay more attention for enhancing their quality of management and their operational efficiency as they transmit around 72 percent of their overhead costs to their clients through increasing interest rates on loans and/ or lowering deposit rates. The results did not find evidence to support the belief that foreign ownership has enhanced the institutional quality of commercial banks.

Interest rate volatility in the interbank market has a negative impact on NIM, though statistically insignificant, it signals the behavior of commercial banks at time of high uncertainty in the market. It could be explained that banks tends to increase held deposits in order to attain liquidity for facing liquidity strains or contingent liquidity needs, while decreasing the level of extended credit, which decreases NIM. Also, credit risk, as well as the interaction between interest rate risk and credit risk has positive impacts on NIM, as increasing uncertainty drives up interest rates and increases the probability of defaults. Jordanian commercial banks tend to be conservative through ensuring adequate capital levels (well capitalized). However, regulatory authorities should encourage them to enhance their operational efficiency and quality of management in order to reduce their interest rate margins and utilize their high levels of liquidity to generate more profits and reduce their opportunity costs.

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Annex (1): Unit root tests for the dependent and the explanatory variables:

Variable	Levin, Liu & Chu (2002)	Im, Pesaran and Shin (2003)
<i>NIM</i>	I(0)	I(0)
<i>MARS</i>	I(0)	I(0)
<i>OCTA</i>	I(0)	I(0)
<i>EQTA</i>	I(0)	I(0)
<i>VOLR</i>	I(0)	I(0)
<i>NLTA</i>	I(0)	I(0)
<i>LLON</i>	I(0)	I(0)
<i>IIP</i>	I(0)	I(0)
<i>LQATA</i>	I(0)	I(0)
<i>CTIR</i>	I(0)	I(0)
<i>FORE</i>	I(0)	I(0)
<i>CMR</i>	I(0)	I(0)
<i>LCPI</i>	I(0)	I(0)

* The level of stationarity of the variables was decided at 1 percent significance.