DETERMINANTS OF BANK PROFITABILITY: EVIDANCE FROM JORDAN

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ABSTRACT

In this study, a balanced panel data set of Jordanian banks was used for the purpose of investigating the nature of the relationship between the profitability of banks and the characteristics of internal and external factors. For this purpose 100 observation of 10 banks over the period 2001-2010 were comprised. Two measures of bank's profitability have been utilized: the rate of return on assets (ROA) and the rate of return on equity (ROE). Results showed that the Jordanian bank's characteristics explain a significant part of the variation in bank profitability. High Jordanian bank profitability tends to be associated with well-capitalized banks, high lending activities, low credit risk, and the efficiency of cost management. Results also showed that the estimated effect of size did not support the significant scale economies for Jordanian banks. Finally, the estimation results indicated that individual effects on the profitability are present; this is concluded due to the fact that some of the differential slope coefficients are statistically significant.

Key words: Bank profitability; panel data; Jordan

1. INTRODUCTION

Jordanian banking sector has witnessed significant developments during the past two decades. These developments are mainly attributable to the Central Bank of Jordan. Supervisory and regulatory roles, as well as following the latest global financial practices were implemented to develop and upgrade the banking sector performance in Jordan. In Jordan, banking sector plays a key role in Jordan by pushing forward the economic growth rates, through the mobilization of national savings and using them to finance productive economic sectors. The last seven years have witnessed an unprecedented development in the work of banks in terms of quantity and quality. It is believed that this development is due to the strong and real growth rates recorded by the Jordanian economy during this period, During the period (2003-2010), the work of banks recorded a strong growth reached at the end of the first half of 2010 to JD32.5 billion ($45.9 billion) registering an increase of 3.2% compared with the first half of 2009.

Beyond the importance of the Jordanian banking sector position as a major contributor to the gross domestic product, it also plays a major role as an engine and a key supporter to the Jordanian economy. In this sense, the efficient functioning of the banking sector has become one of the main objectives of financial reforms. The profitability and efficiency also become one of the challenges faced by the banks to strengthen their financial positions in order to meet the risks associated with openness and globalization.

Determinants of bank profitability have received much attention from academic researchers. In this context, the importance of this study is an attempt to identify the determinants of bank profitability in general and Jordanian banks in particular.

This study follows a study of Vong and Chan (2006), Athanasoglou et al., (2006) and Naceur (2003), among others. And complement and differ from these studies in that this study uses the dummy variable technique to allow the intercept and the slope coefficient to vary across-sectional units, to take into account the impact of specific nature of each individual bank on profitability.

The rest of the paper is organized in the following manner. Section *2* discusses the existing literature on bank profitability. Section *3* discusses the data, methodology and the estimation method. Section *4* presents the empirical results. Section *5* conclusions.

2. LITERATURE REVIEW

Literature, deals with bank profitability as a Function of internal and external determinants. Internal determinates can be seen as factors that are affected by the decisions of the banks' management. The quality of decision can be examined in terms of the operating performance. Variables that track the most attention in the literature to assess the operating performance are: capital adequacy, income source, credit risk, efficient management, and bank size. On the other hand, the external determinants are the factors that reflect the legal and economic environment in which the bank operates, and affects bank's performance. The main components of these factors are the industry-specific and macroeconomic factors; these factors are inflation, industry size, ownership status, competition and concentration.

Using a sample of *389* banks on an unbalanced panel of *41* Sub-Saharan Africa (SSA) countries over the period 1998-2006. Flamini and Schumacher (2009) studies the determinants of bank profitability, the paper proposed that higher returns on assets are associated with larger bank size, activity diversification, and private ownership. Bank returns are affected by macroeconomic variables, which indicate that macroeconomic policies that promote low inflation and stable output growth promote the expansion of credit. The results also indicated moderate persistence in profitability. Causation in the Granger sense from returns on assets to capital occurs with

a considerable lag, which means that it does not maintain high returns immediately in the form of capital increases. Thus, the paper gives some support to the policy of imposing higher capital requirements in the region to promote financial stability.

Athanasoglou et al. (2008) examined the effect of bank-specific, industry-specific and macroeconomic determinants of bank profitability, using an experimental framework that includes the traditional Structure-Conduct-Performance (SCP) hypothesis. To account for profit persistence, the authors applied a Generalized Method of Moments (GMM) technique to a panel of Greek banks that covers the period (1985-2001). The results showed that profitability persists to a moderate extent, indicating that departures from perfectly competitive market structures may not be that large. All bank-specific determinants, with the exception of size, affect bank profitability significantly in the anticipated way. However, no evidence was found in support of the SCP hypothesis. Finally, the business cycle had a positive, albeit asymmetric effect on bank profitability, being significant only in the upper phase of the cycle.

Using accounting analyzing, and panel regressions technique, Al-Haschimi (2007) studies the determinants of bank profitability in 10 SSA countries. The study finds that credit risk and market power explain most of the variation in bank's profitability across the SSA countries. Also, the study finds that Macroeconomic risk has limited effects on bank's profitability.

Vong and Chan (2006) examined the impact of bank characteristics, macroeconomic variables and financial structure on the performance of the banking industry of Macau. The results showed that the strength of the bank's capital is of paramount importance in influencing profitability. A well-capitalized bank is perceived to be of lower risk and such an advantage will be translated into higher profitability. On the other hand, the quality of assets, as measured by loan-loss provision affects the performance of banks negatively. In addition, banks with a large retail deposit-taking network do not achieve a level of profitability higher than those with a smaller network. Finally, with regard to macroeconomic variables, only the rate of inflation showed a great relationship with the performance of banks.

Kosmidou et al. (2006) studies the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on the profits of UK owned commercial bank during the period 1995-2002. The results showed that the strength of capital of these banks has a positive impact on profitability; and other important factors being the efficient management of expenditures and size of the bank. These bank-specific determinants are robust to the inclusion of additional macroeconomic and financial market measures of bank performance, which adds little to the explanatory power but it seems, however, that had positive impact on profitability.

Gelos (2006) studies the determinants of bank profitability in Latin America, finds that spreads are large because of relatively high macroeconomic risk, including from inflation, less efficient banks, and higher reserve requirements.

In a study of United States banks, Angbazo (1997) found evidence that bank profitability is positively related to capital, non-interest income, and management quality, and negatively related to liquidity risk.

3. DATA AND METHODOLOGY

The bank-specific variables to be examined in this study are derived from the income statements and the balance sheets of commercial banks published in the Amman Stock Exchange (ASE) while the sector and macroeconomic variables are derived from the Central Bank of Jordan (CBJ) and the Department of Statistics of Jordan (DOS) databases. The data covers a 10-years period from 2001-2010, with a sample of 10 banks, which accounts for about 87% of the total asset in the banking sector.

3.1 Determinants of bank profitability

Table 1 lists the variables used in this study, notation, and the expected effect of the determinants based to the literature. The profitability of the bank measured by its return on assets (ROA) is defined as the banks' after tax profit over the total assets; and/or its return on total equities (ROE) is defined as the banks' after tax profit over the total equities. ROA measures the ability of the bank to generate profit from its assets, while ROE reflects the return to shareholders on their equity.

3.1.1 Bank-specific determinants

Capital adequacy: In the presence of asymmetric information and bankruptcy costs, the way the assets are funded could affect the banks value. In a way or another a well-capitalized bank may send a good signal to the market regarding its performance (Athanasoglou et al., 2006 and Berger, 1995a). In this regard, well-capitalized banks perceived to be safer, with lower profits commensurate with the risks, for this reason a negative relation between capital and profits is expected. On the other hand, if the profits earned are reinvested, a positive relation between capital and profits, should be valid.

In his study for 12 European countries, Bourke (1989) concluded a positive and significant effect of the capital adequacy on bank profitability. Berger (1995a), finds that the capital and bank profitability tend to be positively related for a sample of US banks. Also, Anghazo (1997) finds that well-capitalized banks in USA are more profitable than other less-capitalized banks. A positive relation between capital adequacy and profitability was suggested by Kosmidou (2007).

Following Flamini (2009) we proxy for capital adequacy with the capital ratio which is defined as the ratio of equity to total assets (EQTA).

Asset Composition: Deposits and loans are the most important indicators in the bank financial statements because they reflect the bank's primary activity. Assumed other variables constant, the higher the rate of transforming deposits into loans, the higher the profitability will be. For that, a positive relation between the loans

and banks profitability are expected. On the other hand, if increasing loans leads to higher funding requirements, a negative impact of the loan ratio on the banks profitability may accrue.

In their study Abreu and Mendes (2000) found a significant positive relation between asset composition and profitability, in contrast Staikouras and Wood (2004) and Bashir and Hassan (2003) documented a negatively significant relation with the profitability.

Following Vong and Chan (2006) we proxy for asset composition with the ratio of total loans to total assets (TLTA)

Credit Risk: credit risk can be defined as the potential loss of all or part of the interest owed, or the origin loan, or both together. The environment in which the bank works affects the bank's credit risk, poor legal environment leads to weak enforcement of bank rights, which leads to higher credit risk. In addition, lack of accurate information about borrowers, and weak economic growth, may expose the bank to higher credit risk.

Theoretically, the greater the exposure to credit risk, the lower is the banks profits; a negative effect of the credit risk on the banks profitability is expected. On the other hand, and based on the CAPM arguments, the credit risk may positively affect the profitability.

While Athanasoglou, et al., (2008) and Miller and Noulas (1997) find that the effect of the credit risk on the profitability is negative in the USA, Al-Haschimi (2007) finds a positive effect of credit risk on Sub-Saharan African profitability.

Following Athanasoglou, et al., (2008) we proxy for the credit risk with the ratio of loan-loss provisions to loans (LLPL).

Cost management: closely related to operating expenses efficient management can be considered to be one of the most important determinants of profitability, and unless banks manage to transfer their costs to the lenders, operating expenses are expected to have a negative effect on the profitability, Bourke (1989), Molyneux and Thornton (1992), Mayhyrech and Shammout (2004) and Athanasoglou, et al., (2008) find a positive relationship between better quality management and profitability, Brock and Rojas (2000) and Al-Haschimi (2007) in Latin American countries and in SSA economies respectively, found that inefficient management appears to be the prime determinant of the high spreads is expected.

Following Flamini (2009) we proxy for cost management by the nature logarithm of overhead costs (LOC). And a negative relation between the nature logarithm of overhead cost as inverse proxy of the cost management and profitability.

Bank size: in most finance literature, bank size introduced to account for economies or diseconomies of scale in the market. Empirical results of the relationship between size and profitability are mixed, a risk approach to size suggest that through lower interest rates charged to borrowers, larger banks would require lower profits. However, if larger banks control big share of the market in a non-competitive environment, larger banks may require higher profit through high lending rate, and low deposit rate. Berger, et al. (1987) and Boyd and Runkle (1993) find negative significant relation between size and profitability. In contrast, Smirlock (1985), Akhavein, et al. (1997), Genay (1999), Bikker and Hu (2002) and Goddard, et al., (2004) concluded a positive relation between size and profitability.

Following Flamini (2009) we proxy for the size of the bank by using the nature logarithm of total assets (LOTA) because of the possibility of nonlinearities.

To avoid the impact of bank-specific factors on its profitability, external variables were used as control variables including the industry-specific determinants and macro-economic determinants as follows:

3.1.2 Industry-specific determinants

Market concentration: Most of the results obtained by the literature for the relation between concentration and profitability are generally conflicting, and relied on two approaches; the structure-conduct-performance (SCP) hypothesis and the efficient structure (EFS) hypothesis. While the (SCP) investigates the relation between highly concentrated market and the profitability, the (EFS) investigate if the efficiency of larger banks affects its profitability.

Bikker and Bos (2005) find that the ability of the bank to charge higher rates for the loans and lower rates on the deposit increases in the concentrated markets, resulting in a greater profit regardless of banks efficiency. Bourke (1989), Molyneux and Thornton (1992), Jeon (2002), and Dietrich and Wanzenried (2009) assert this conclusion in their studies and show a positive statistically significant relation between concentration and banks profitability. Smirloch (1985) finds a significantly positive relation between concentration and profitability only when the market-share variable is excluded from the model. Conversely, the results of Berger (1995b), Demirguc-Kunt and Huizinga (1999), Mamatzakis and Remoundos (2003), Staikouras and Wood (2004), and Flamini (2009) did not support the concentration-profitability relation.

Following Naceur (2003) we measure concentration using the 3-bank concentration ratio defined as the ratio of the largest three banks' assets to total assets (CONC).

Banking sector size: we proxy for the size of the banking sector by the ratio of the total assets of banks to GDP, and we expected the banking sector size-profitability relation (BSS) to be positive.

3.1.3 Macro-economic determinants

A common use of macro-economic determinants of bank's profitability is inflation. Previous studies of the inflation-profitability relation reported a positive association. Bank's ability to predict inflation accurately can positively affect the profitability of the bank as bank can adjust interest rates in the desired direction in order to increase profit, while failure to accurately predict inflation could raise costs due to imperfect adjustment of interest rates and thus adversely affect bank's profit.

Guru et al. (2002), Jiang et al. (2003), Vong and Chan (2006), and Athanasoglou et al. (2008), on their studies, they stressed on the positive relation between inflation and the bank profitability. Perry (1992) finds that the

affect of inflation on bank's profitability depends on the accuracy of anticipating the inflation. In contrast, Demirgue-Kunt and Huizinga (1999) find that in developing countries inflation and profitability tend to have negative relation especially when capital ratio is high, due to the fact that costs tend to increase faster than revenue in inflationary environments. Naceur (2003) finds no effect for the inflation on bank profitability.

Following Vong and Chan (2006), we proxy for the inflation with the consumer price index (INF)

Economic growth: In a high growth economic environment, banks tend to lend more and allowing banks to charge higher rates for the loans. According to the literature on the economic growth-profitability relation, economic growth is expected to have a positive effect on bank's profitability.

In their studies Neely and Wheelock (1997), Demirguc-Kunt and Huizing (1999), Bikker and Hu (2002), Athanasoglu et al. (2008), and Dietrich and Wanzenried (2010) concluded a positive relation, in contrast, Naceur (2003) finds no impact for the economic growth on bank's profitability. Athanasoglou et al. (2006) finds no significant effect for the economic growth measured by the real GDP per capita on bank's profitability.

Following Vong (2006), we proxy for the economic growth with the real GDP growth rate (RGDP).

3.2 Methodology

Excluding Islamic banks because of its specific-characteristics, a sample of 10 Jordanian banks over the 2001-2010 interval were used to investigate the determinants of bank profitability in Jordan. Following the widely used in the literature, and due to the fact that any functional form of the bank profitability is good as the liner model (Molyneux and Thornton, 1992; Athanasoglou et al. 2008), the balanced panel data liner regression model is used to analyze the cross-section time series data to determine the internal and external determinants of banks profitability.

Since the profitability of a bank is a function of both the internal and external determinants, we can express this relationship by the following formula:

$$\text{Prof it} = f(\text{Bsit} + \text{Ist} + \text{Mst}) \qquad (1)$$

Where: Profit indicate the performance measure for ith cross-sectional bank and for the tth time period; Bsit is the bank-specific determinants for the bank i at time t; Ist is the industry-specific during the period t; and Mst is the macro-economic determinants during the period t.

The linear regression model can be estimated by converting formula (1) as follows:

$$\text{Prof}_{it} = \alpha + \sum_{k=1}^{K} \beta_k \text{Bs}_{it}^{k} + \sum_{l=1}^{L} \beta_l \text{Is}_{t}^{l} + \sum_{g=1}^{G} \beta_g \text{Ms}_{t}^{g} + \varepsilon it \qquad (2)$$

Where: Profit are the two alternative performance measures for ith cross-sectional bank for the tth time period, with i = 1,…,N, N=10, t = 1,…,T, T=10, α is a constant term, βs are the coefficients of the model, Bs_{it}^{k} , Is_{t}^{l} , Ms_{t}^{g} are the independent variables grouped into bank-specific, industry-specific and macro-economic respectively, with k = 1,…,K, K=5, l = 6,…,L, L=7, g = 8,…,G, G=9, εit is the error term.

We assume that Bs, Is, and Ms are non-stochastic and that the error follows the classical assumptions, E(εit) ~ N(0, σ2).

External determinants (Is_{t}^{l} , Ms_{t}^{g}) were included in the model as a control variables to control for cyclical factors that might affect the bank's profitability in Jordan.

Due to a small number of cross-sectional units and 10 years time period, a fixed effects regression model (FEM) was used, allowing the intercept to vary between banks by using the differential intercept dummies. Therefore equation (2) can be rewritten as:

$$\text{Prof}_{it} = \alpha 1 + \alpha 2 D2i + \alpha 3 D3i + \alpha 4 D4i + \alpha 5 D5i + \alpha 6 D6i + \alpha 7 D7i + \alpha 8 D8i + \alpha 9 D9i + \alpha 10 D10i + \sum_{k=1}^{K} \beta_k \text{Bs}_{it}^{k} + \sum_{l=6}^{L} \beta_l \text{Is}_{t}^{l} + \sum_{g=8}^{G} \beta_g \text{Ms}_{t}^{g} + \varepsilon it \qquad (3)$$

Where: D stands for the Bank i dummy-variable, and it is equal to:

$$D = \begin{cases} 1 \text{ if the observation belong to bank i} \\ 0 \text{ otherwise} \end{cases}$$

α1 represents the intercept of comparison bank, α2, α3, α4,…., and α10, the differential intercept coefficients, and it indicates how much the intercepts of the banks differ from the intercept of the comparison bank.

To allow the slope coefficient to vary between the cross-section banks, as the profitability function of each individual bank might be different. The (FEM) were extended to take in to account this situation by multiply each of the company dummies by each of the bank-specific determinant, and this will add 45 more variables to equation (3). So the following model was estimated:

$$\text{Prof}_{it} = \alpha 1 + \alpha 2 D2i + \alpha 3 D3i + \alpha 4 D4i + \alpha 5 D5i + \alpha 6 D6i + \alpha 7 D7i + \alpha 8 D8i + \alpha 9 D9i + \alpha 10 D10i + \sum_{k=1}^{K} \beta_k \text{Bs}_{it}^{k} + \sum_{l=1}^{L} \beta_l \text{Is}_{t}^{l} + \sum_{g=1}^{G} \beta_g \text{Ms}_{t}^{g} + \sum_{d=1}^{D} \gamma_d \left(\begin{bmatrix} D2_i \\ D3_i \\ . \\ . \\ D10_i \end{bmatrix} \times [\text{EQTA} \quad \text{TLTA} \quad \text{LLPL} \quad \text{LOC} \quad \text{LOTA}] \right) + \varepsilon it \qquad (4)$$

Where: γ′s are the differential slope coefficients, with d = 1,…,D.

If one or more of the γ′s coefficients are statistically significant it means that the profit determinants for that bank/or banks are different from others.

4. EMPIRICAL RESULTS

Table 2 (3) presents the empirical results of the regression analysis of pooled data of models 1, 2, 3, 4, and 5 using ROA (ROE) as the profitability variable. Table 4 presents the excluded dummy variables in model 5 for both alternative ROA and ROE due to their highly correlation with other variable.

In model 1, the bank-specific characteristics as determinants of the profitability of the Jordanian banks, with the absence of Industry-specific and Macro-economic determinants was tested. In model 2 the industry-specific determinants was added to the first model as a control variable. In model 3 we controlled with the Macro-economic determinants, in model 4 the intercept was allowed to vary between banks by using differential intercept dummies, while in model 5 differential slope coefficient dummies were used to allow the slope coefficient to vary between banks.

In line with expectations and consistent with the previous research, tables 2 and 3 showed that in all ROA models and in ROE models 1, 2, and 3, the coefficients of capital adequacy (EQTA) are positive and significant. This means that well-capitalized banks are seen as better able to (i) exploit investment opportunities (ii) reduce the costs of bankruptcy and (iii) overcome the problems that arise from unexpected losses, than other banks. This is reflected positively on the cost of capital and it increases profitability.

The asset composition (TLTA) is found to have a significant positive impact on ROA as a proxy of profitability in models 1, 2, and 5, and insignificant positive impact in models 3, and 4. But when using ROE as a proxy of profitability the results show insignificant impact in all models, this means that banks can maximize the return on assets significantly through increasing lending activities. The present result is in line with expectations, and contrary to the findings of a study of Vong and Chan (2006).

With respect to credit risk (LLPL), the results are the same when using both alternatives of profitability ROA and ROE. The results showed statistically significant inverse relationship between credit risk and the profitability in each of models 1, 2 and 3, and insignificant inverse relationship in model 4. The present result is in line with the expectations, and adds pressure on banks' responsibility to focus more on credit risk management due to its negative impact on profitability.

As expected (ln(overhead costs)) as inverse proxy of cost management (LOC) has a negative significant impact on profitability when using ROA in model 1, 2, and 4. This means that whenever the bank is better able to manage costs, the profitability will increase. When using ROE as proxy for profitability, the cost management (LOC) does not have a statistically significant effect on bank profitability in any of the models.

As for the bank size (LOTA), the estimated equations, when ROA is the dependent variable, showed no statistically significant effect of the bank size on bank profitability. When ROE is the dependent variable, the coefficients of the bank size are negative in all models and significant only in model 5. This finding is in line with the study of Berger et al., (1987) and Micco et al., (2007) which concluded that little saving in cost can be achieved, and the possibility for the inability of the bank to take advantage of higher product and loan diversification, and facing scale inefficiencies will increase by increasing the size of the bank.

As to the industry-specific determinants, two variables were included. The first variable is the market concentration (CONC), the estimated models regardless of the dependent variable showed negative impact for the CONC variable on the profitability, and the coefficients are significant in all models when ROA is the dependent variable. When ROE is the dependent variable coefficient of model 4 and 5 are insignificant. Some researchers have suggested that in higher concentration markets bank profitability tends to be lower due to aggressive non-price competition, and the behavior of managers as risk-averse.

The second variable is the size of the banking sector (BSS). The estimated models regardless of the dependent variable showed no effect of the banking sector size on bank profitability with an estimated coefficient of zero in the profitability. The estimated coefficients are significant for model 2 and 3 for both profitability alternatives.

Results shown in tables 2 and 3 are associated with the macro-economic determinants; inflation (INF) and economic growth (RGDP). The results showed a positive insignificant impact on return on assets and return on equity, This may suggest that due to the inability of banks to accurately predict the levels of inflation, the banks lose the opportunity to benefit from inflationary environment to increase profits, and that banks have not benefited from economic growth and additional business opportunities to increase profitability. One reason for this may be the entry of new banks to the industry which led to more intense competition.

As indicated in tables 2 and 3, the differential slope coefficients are statistically significant, which means that these coefficients are different from the group. This indicates that the impacts of bank-specific determinants on profitability are different between Jordanian banks due to unique features of each bank, such as differences in management efficiency.

Finally, as indicated in table 1 (2), the ROA (ROE) regression explanatory power rose from 0.412 (0.039) to 0.439 (.088) when the industry-specific determinants was added to model 1. It also rose to 0.447 (0.091) when controlled model 3 with the macro-economic variables. Also a rose in the explanatory power to 0.625 (0.374) and to 0.772 (0.583) when the differential intercept dummies and the differential slope dummies were included in models 4 and 5 respectively. This shows that the highest explanatory power for the ROA (ROE) regression is when bank-specific determinants, industry-specific determinants and macro-economic variables along with the differential intercept dummies and the differential slope dummies are included in the regression estimation.

5. CONCLUSIONS

In light of the great transformations in the global banking sector, and the major challenges faced by the Jordanian banking sector, studying and analyzing the determinants of profitability of Jordanian banks become a

great importance. In this context, this study has sought to examine how bank-specific determinants, Industry-specific determinants and macro-economic variables affect the profitability of Jordanian banks over the period 2001-2010.

Based on the results of the empirical analysis, bank-specific determinants are able to explain significant part of bank profitability in Jordan. A major outcome of this study is that banks with high capital ratio tend to earn more profit through translating the safety advantage into profit. The study also concluded that the lending activities in Jordanian banking sector are associated with profit, and in order to maximize the profit, banks in Jordan should maintain sizable volume of lending activities.

Another finding of the study is that the credit risk is associated with significant inverse relationship with profitability in Jordan, thus, increased exposure to credit risk in Jordanian banking sector lowers profits. So, to improve the profitability of Jordanian banks, banks should work to improve the efficiency of cost management, which according to the analysis crucially affect profits of Jordanian banks.

Bank size has found to be negatively insignificant in the Jordanian banking sector in all estimated models regardless of the dependent variable, one exception is in model 5 when the ROE is the dependent variable, the impact was statistically significant. This result does not support the economies of scale theory. In contrast, it is in line with that models emphasize the negative role of the size arising from scale inefficiencies.

Also the study concluded that the amount of impact of the bank-specific determinants on bank's profitability varies between Jordanian banks due to special features of each bank.

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TABLES

Table 1. Definition, notation and expected effect of the explanatory variables of bank profitability

		Variable	Measure	Notation	Expected effect
Dependent variable		Profitability	Net profit before tax / assets Or Net profit before tax / equity	*ROA* *Or* *ROE*	
Determinants	Bank-specific	Capital adequacy	Equity / Assets	*EQTA*	+
		Asset composition	Total loans / total assets	*TLTA*	+
		Credit risk	Loan-loss provision / loans	*LLPL*	-
		Cost management	ln(overheads costs)	*LOC*	-
		Size	ln(total assets)	*LOTA*	?
	Industry-specific	Market concentration	Largest 3 banks assets / total assets	*CONC*	?
		Banking sector size	Total assets of banks / GDP	*BSS*	?
	Macro-economic	Inflation	Consumer prices	*INF*	?
		Economic growth	Real GDP growth rates	*RGDP*	?

Table 2. ROA models of determinants of Jordanian banks' profitability[a]

	model 1	2	3	4	5
	coefficient	coefficient	coefficient	coefficient	coefficient
Constant	.208	10.546*	13.455**	45.559***	63.373***
	(.108)	(1.871)	(2.134)	(4.025)	(3.216)
EQTA	7.106***	6.979***	7.219***	8.606***	3.172**
	(4.206)	(3.822)	(3.962)	(4.932)	(2.189)
TLTO	1.375*	1.658*	1.376	.644	6.388*
	(1.753)	(1.871)	(1.541)	(.458)	(1.762)
LLPL	-1.303*	-1.350**	-1.153**	-.032	35.547
	(-1.907)	(-2.064)	(-2.571)	(-.030)	(1.078)
LOC	-.503*	-.40**	-.376	-1.679***	-8.01
	(-1.778)	(-2.036)	(-1.323)	(-3.932)	(-1.234)
LOTA	.936	.759	.707	.040	-3.122
	(1.439)	(1.161)	(1.068)	(.034)	(-1.642)
CONC		-19.019**	-24.689**	-16.316**	-20.255**
		(-2.353)	(-2.530)	(-1.836)	(-2.296)
BSS		.000**	.000*	.000	.000
		(2.530)	(2.634)	(-.280)	(-1.273)
INF			.059	.019	-.024
			(1.635)	(.587)	(-.871)
RGDP			-.044	-.010	.051
			(-.665)	(-.178)	(1.067)
D2				-2.231***	-
				(-3.204)	
D3				-2.879***	-
				(-2.706)	
D4				-3.264***	-
				(-3.613)	
D5				-5.002***	2.214
				(-3.735)	(.189)
D6				-5.758***	-8.196
				(-4.462)	(-.724)
D7				-3.350***	-14.866
				(-3.147)	(-1.267)
D8				-3.336***	-1.990
				(-3.201)	(-.308)
D9				-5.907***	-9.440
				(-4.288)	(-1.091)
D10				-5.408***	-
				(-3.750)	
D2_EQTA					7.549
					(.641)
D2_TLTO					-6.280
					(-.582)
D2_LLPL					-47.906
					(-1.377)
D2_LOC					.025
					(.084)
D3_LOC					-.376**
					(-2.190)
D4_EQTA					7.171
					(.682)
D4_TLTO					-2.945
					(-.212)
D4_LLPL					-27.931
					(-.818)
D4_LOTA					-.462
					(-.599)
D5_EQTA					-12.423
					(-6.25)
D5_TLTO					2.960
					(.248)
D5_LLPL					-46.600

					(-1.205)
D5_LOC					-.422 (-.550)
D6_EQTA					7.719 (.767)
D6_TLTO					-11.981 (-1.015)
D6_LLPL					-54.471 (-1.321)
D6_LOC					.461 (.696)
D7_EQTA					-5.483 (-.420)
D7_TLTO					4.568 (.323)
D7_LLPL					-20.678 (-4.74)
D7_LOC					.501 (.700)
D8_EQTA					22.086** (1.917)
D8_TLTO					-11.235 (-.863)
D8_LLPL					-33.092 (-.941)
D9_EQTA					-9.346 (-.482)
D9_TLTO					10.510 (.472)
D9_LLPL					6.761 (.115)
D10_EQTA					24.907*** (4.784)
D10_TLTO					23.784** (2.088)
D10_LLPL					-31.820 (-.964)
D10_LOTA					-2.710*** (-4.074)
Adj R2	.412	.439	.447	.605	.772
D W Statistics	1.419	1.535	1.497	1.793	1.971
df Regression	5	7	9	18	45
Residual	94	92	90	81	54
Total	99	99	99	99	99
No. of observation	100	100	100	100	100
F	14.883	12.048	9.890	9.435	8.469
F Sig.	.000	.000	.000	.000	.000

a)dependent variable: ROA
*,**,*** indicate significance level of 10,5 and 1 percent respectively.

Table 3. ROE models of determinants of Jordanian banks' profitability[a]

	model 1	2	3	4	5
	coefficient	coefficient	coefficient	coefficient	coefficient
Constant	34.201**	142.770***	133.415**	299.612***	359.601*
	(2.022)	(2.904)	(2.405)	(3.065)	(1.967)
EQTA	-28.316*	-32.448**	-32.659**	-21.820	-30.574
	(-1.912)	(-2.038)	(-2.037)	(-1.448)	(-.770)
TLTO	10.182	11.524	10.413	-20.141	7.010
	(1.397)	(1.491)	(1.326)	(-1.661)	(.072)
LLPL	-18.130*	-19.193**	-19.755**	-5.753	266.33
	(-1.917)	(-2.061)	(-2.085)	(-.622)	(.871)
LOC	-.565	.491	1.058	-3.482	5.049
	(-.228)	(.200)	(.423)	(-.944)	(.839)
LOTA	-1.320	-3.478	-4.795	-10.902	-35.919**
	(-.232)	(-.610)	(-.824)	(-1.064)	(-2.037)
CONC		-187.324***	-170.246*	-119.576	-93.988
		(-2.657)	(-1.982)	(-1.559)	(-1.149)
BSS		.000***	.000*	.000	.000
		(2.657)	(1.785)	(-.609)	(-1.035)
INF			.098	-.141	-.026
			(.311)	(-.500)	(-.102)
RGDP			.355	.77	.440
			(.616)	(1.572)	(1.000)
D2				-12.248**	-
				(-2.037)	
D3				-6.175	-
				(-.672)	
D4				-21.567***	-
				(-2.765)	
D5				-20.532*	84.697
				(-1.776)	(.778)
D6				-24.825**	38.605
				(2.228)	(.368)
D7				-9.507	28.360
				(-1.034)	(.261)
D8				-18.989**	-58.40
				(-2.110)	(-.974)4
D9				-30.103**	-16.916
				(-2.531)	(-.211)
D10				-23.920*	-
				(-1.921)	
D2_EQTA					47.067
					(.431)
D2_TLTO					-22.522
					(-.225)
D2_LLPL					-360.583
					(-1.117)
D2_LOC					-.069
					(-.025)
D3_LOC					-1.737
					(-1.090)
D4_EQTA					137.469
					(1.409)
D4_TLTO					-16.657
					(-.129)
D4_LLPL					-242.698
					(-.767)
D4_LOTA					-3.310
					(-.463)
D5_EQTA					-118.496
					(-.643)
D5_TLTO					35.923
					(.325)
D5_LLPL					-400.086

					(-1.116)
D5_LOC					-6.213 (-.874)
D6_EQTA					-58.992 (-.632)
D6_TLTO					-95.993 (-.877)
D6_LLPL					-670.278* (-1.753)
D6_LOC					.352 (.057)
D7_EQTA					-57.037 (-.471)
D7_TLTO					-38.718 (-.295)
D7_LLPL					-550.125 (-1.358)
D7_LOC					-.302 (-.045)
D8_EQTA					300.352*** (2.811)
D8_TLTO					-2.886 (-.024)
D8_LLPL					-159.296 (-.488)
D9_EQTA					-95.880 (-.533)
D9_TLTO					12.217 (.059)
D9_LLPL					-255.159 (-.467)
D10_EQTA					-51.422 (-1.065)
D10_TLTO					-235.514** (-2.229)
D10_LLPL					-308.917 (-1.009)
D10_LOTA					12.347* (2.001)
Adj R2	.039	.088	.091	.374	.583
D W Statistics	1.454	1.619	1.571	1.830	2.086
df Regression	5	7	9	18	45
Residual	94	92	90	81	54
Total	99	99	99	99	99
No. of observation	100	100	100	100	100
F	1.794	2.414	2.066	4.279	4.080
F Sig.	.082	.026	.041	.000	.000

a)dependent variable: ROE
*,**,*** indicate significance level of 10,5 and 1 percent respectively.

Table 4. Excluded dummy variables from model 5

Variable	*ROA*			*ROE*		
	Beta	*T*	*Sig.*	*Beta*	*t*	*Sig.*
D2	*-4.809*	*-.878*	*.384*	*1.349*	*.181*	*.857*
D3	-	-	-	-	-	-
D4	*-2.394*	*-.198*	*.844*	*-13.575*	*-.833*	*.408*
D10	*-8.062*	*-1.046*	*.300*	*.259*	*.023*	*.980*
D2_LOTA	*6.611*	*.627*	*.533*	*16.263*	*1.151*	*.255*
D3_EQTA	-	-	-	-	-	-
D3_TLTO	-	-	-	-	-	-
D3_LLPL	-	-	-	-	-	-
D3_LOTA	-	-	-	-	-	-
D4_LOC	*7.521*	*.721*	*.474*	*1.733*	*.122*	*.903*
D5_LOTA	*-18.865*	*-1.619*	*.111*	*-6.924*	*-.429*	*.669*
D6_LOTA	*-41.084*	*-4.216*	*.000*	*-42.032*	*-2.980*	*.004*
D7_LOTA	*-10.687*	*-.525*	*.602*	*-6.440*	*-.233*	*.816*
D8_LOC	*-2.728*	*-.202*	*.840*	*-3.444*	*-.189*	*.851*
D8_LOTA	*8.800*	*.702*	*.486*	*32.794*	*1.994*	*.051*
D9_LOC	*.533*	*.104*	*.918*	*-2.120*	*-.304*	*.762*
D9_LOTA	*.479*	*.054*	*.958*	*-1.102*	*-.091*	*.928*
D10_LOC	*-16.194*	*-2.606*	*.012*	*5.067*	*.569*	*.572*

REFERENCES

1. Abreu, M. and V. Mendes (2000), "Commercial Bank Interest Margins and Profitability: Evidence for Some EU Countries", presented on the 50th International Altantic Economic Conference (www.iaes.org/conferences/past/charleston_50/prelim_program/index.htm**(**
2. Akhavein, J., Berger, A. and D. Humphrey (1997). "The effects of megamergers on efficiency and prices: Evidence from a bank profit function." Finance and Economic Discussion Series No. 9, Board of Governors of the Federal Reserve System, Washington, D.C.http://ideas.repec.org/p/fip/fedgfe/1997-9.html**.**
3. Al-Hashimi, A. (2007). "Determinants of Bank Spreads in Sub-Saharan Africa," . www.scribd.com/doc/36905178/Thesis-Final-Draft**.**
4. Angbazo, L. (1997), "Commercial Bank Interest Margins, Default Risk, Interest-rate Risk, and Off-balance Sheet Banking," Journal of Banking and Finance, Vol. 21, 55-87**.**
5. Athanasoglou P., Delis M. and C. Staikouras (2006). "Determinants of Banking Profitability in the South Eastern European Region," Bank of Greece Working Paper 06/47.online at htty://mpra.ub.uni-muenchen.de/10274**.**
6. Athanasoglou, P., Brissimis, S., Delis, M., 2008. "Bank-specific, industry-specific and macroeconomic determinants of bank profitability", Journal of International Financial Markets, Institutions and Money 18 (2), 121-136**.**
7. Bashir, A. M. and M. K. Hassan (2003), "Determinants of Islamic Banking Profitability, presented on the ERF 10th Annual Conference". (www.erf.org.eg/tenthconf/Financial_Markets_Presented/Kabir_Bashir.pdf**(**
8. Berger, A. (1995a). "The Relationship Between Capital and Earnings in Banking," Journal of Money, Credit and Banking 27, 432-456**.**
9. Berger, A. (1995b). "The Profit-Structure Relationship in Banking: Test of Market-Power and Efficient-Structure Hypotheses," Journal of Money, Credit and Banking 27, 404-431**.**
10. Berger, A., Hanweck, G. and D. Humphrey (1987). "Competitive Viability in Banking: Scale, Scope and Product Mix Economies," Journal of Monetary Economics 20, 501-520**.**
11. Bikker, J. and H. Hu (2002). "Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements." BNL Quarterly Review 221, 143-175**.**
12. Bikker, J.A. and J.W.B. Bos (2005). "Trends in competition and profitability in the banking industry: A basic framework." SUERF - The European Money and Finance Forum, 2005/2.http://ideas.repec.org/b/erf/erfstu/35.html
13. Bourke, P. (1989), "Concentration and Other Determinants of Bank Profitability inEurope, North America and Australia," Journal of Banking and Finance, Vol. 13, 65-79**.**
14. Boyd, J.H. and D.E. Runkle (1993). "Size and Performance of Banking Firms. Testing the Predictions of Theory," Journal of Monetary Economics 31, 47-67**.**
15. Brock, P. and L. Rojas Suarez (2000). "Understanding the Behavior of Bank Spreads in Latin America," Journal of development Economics 63, 113-134**.**
16. Demirguc-Kunt, A. and H. Huizinga (1999), "Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence," World Bank Economic Review, Vol. 13, 379-408**.**

17. Dietrich, Andreas and Wanzenried, Gabrielle,(2010) "Determinants of Bank Profitability Before and During the Crisis: Evidence from Switzerland" Available at SSRN: http://ssrn.com/abstract=1370245
18. Flamini, V., McDonald C. and Schumacher, L., 2009, "The Determinants of Commercial Bank Profitability in Sub-Saharan Africa", Working Paper, WP/09/15, International Monetary Fund .
19. Gelos, Gaston, (2006) "Banking Spreads in Latin America". IMF Working Paper, Vol. , pp. 1-31. Available at SSRN:http://ssrn.com/abstract=892935
20. Genay, H. (1999), "Assessing the Conditions of Japanese Banks: How Information are Accounting Earning?" Economics Perspectives, Federal Reserve Bank of Chicago, No. 15, P.12-34. http://www.chicagofed.org/digital_assets/publications/economic_perspectives/1998/ep4Q98_2.pdf
21. Goddard, J., Molyneux, P. and J.O.S. Wilson (2004). "Dynamics of Growth and Profitability in Banking," Journal of Money, Credit and Banking 36, 1069-1090.
22. Guru B., J. Staunton and B. Balashanmugam (2002), "Determinants of Commercial Bank Profitability in Malaysia," University Multimedia Working Papers.
23. Jeon, Yongil and miller, Stephen M.,"Bank Concentration and Performance" (2002).Economic Working Papers. Paper 200225. htt://digitalcommons.uconn.edu/econ_wpapers/200225.
24. Jiang, G., N. Tang, E. Law and A. Sze (2003), "Determinants of Bank Profitability in Hong Kong," Hong Kong Monetary Authority Research Memorandum, September.
25. Kosmidou Kyriaki, Tanna Sailesh, and Pasiouras Fation, (2006) "Determinants of profitability of domestic UK commercial bank: panel evidence from the period 1995-2002" Applied Research working paper series.http://www.coventry.ac.uk/cu/external/content/1/c4/09/52/v1204731103/user/RP2008-4.pdf
26. Kosmidou, M. and F. Pasiouras. (2007). "Factors Influecing the Profitability of Domestic and foregn Commercial Banks in European Union", Research in International Business and Finance, Vol. 21, No. 2, P. 222-237.
27. Mamatzakis, E., Remoundos, P., (2003). "Determinants of Greek Commercial Banks Profitability, 1989-2000". Spoudai 53 (1), 84-94.
28. Miller, S. and A. Noulas (1997), "Portfolio Mix and Large-bank Profitability in the USA," Applied Economics, Vol. 29, 505-12.
29. Micco, A., Panizza, U., Yanez, M., (2007), "Bank ownership and performance. Does politics matter?" Journal of Banking and Finance 31 (1), 219-241.
30. Molyneux, P. and J. Thornton (1992), "Determinants of European Bank Profitability: A Note," Journal of Banking and Finance, Vol. 16, No. 6, 1173-8.
31. Naceur, S. B. (2003), "The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence," Universite Libre de Tunis Working Papers. http://www.mafhoum.com/press6/174E11.pdf
32. Neely, M. and D. Wheelock (1997). "Why does bank performance vary across states?" Federal Reserve Bank of St. Louis Review, pp. 27-38 .
33. Perry, P. (1992), "Do Banks Gain or Lose from Inflation?," Journal of Retail Banking, Vol. 14, No. 2, 25-30.
34. Smirlock, M. (1985), "Evidence on the (Non) Relationship between Concentrationand Profitability in Banking," Journal of Money, Credit and Banking, Vol. 17, No. 1,69-83.
35. Staikouras, C., Wood, G., 2004. "The determinants of European bank profitability". International Business and Economics Research Journal 3 (6), 57-68 .
36. Vong P.I., and Chan Hoi Si.(2006), "Determinants of Bank Profitability in Macao", The 30th Anniversary of Journal of Banking and Finance Conference,Beijing,2006.avalable at wanfangdata.com.cn/periodical_lzsxyxb201006009.aspx