The Determinants of the Jordanian's Banks Profitability: A Cointegration Approach

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ABSTRACT

This study aims to recognize the determinants of the Jordanian's banks profitability over the period 2000-2006. Utilizing the cointegration and error correction models on all Jordanian's banks over the study period, various potential internal and external determinants are examined to identify the most important determinants of profitability. Our findings reveal that the most important internal determinants of the banks' profitability are the loans to total assets ratio, the operating expenditures ratio, the capital structure, the deposit ratio and non-operating expenditures ratio over the 2000-2006 period. On the other hand, money supply and inflation are the most important external determinants of profitability over the same period. This study also measured the speed of adjustment process towards the long-run equilibrium. Our results reveal that though the suggested determinants of profitability have a long run relationship with profitability, the coefficients of error correction term is quantitatively and in some cases statistically insignificant. This demonstrates a slow adjustment process for profitability measures towards a change in the equilibrium conditions. In other words, profitability of Jordanian's banks does not respond speedily to changes in the explanatory variables in the short-run.

Keywords: Bank profitability, Jordan, Cointegration, Determinants of Profitability, JEL Classification: G21.

INTRODUCTION

The banking sectors especially those of the developing countries, including Jordan, have witnessed significant changes over the past few years. These changes are supposed to affect their profitability greatly. For instance, operating banks have benefited from advances in banking technology and the growth of institutional investors especially those coming from Arab oil producing countries. In addition, the regulatory authorities have updated the regulations governing the operations of the financial institutions. Some banks have responded to these changes partly by increasing their focus on non-interest income while others focused on their competitive strengths by expanding their menu of services and improving the quality of these services. In addition, banks have become increasingly concerned about controlling and analyzing their costs and revenues, as well as measuring the risks taken to produce acceptable returns.

In this regard, various studies have been conducted with intention of determining the factors that have a significant impact on banks' profitability with the purpose of boosting the impact of positive factors and lessening the impact of negative ones. However, there is a disagreement about the most important determinants of banks' profitability based on the findings of the research conducted in various environments given the determinants sometimes related to external factors that are beyond the management hand.

Thus, this study extends the established literature by recognizing the determinants of Jordan banks' profitability, utilizing the cointegration approach, over the period 2000–2006. This study period is assumed to be adequate and pertinent to draw robust results about

Received on 8/3/2009 and Accepted for Publication on 20/1/2010.

the significant determinants that shape the profitability of Jordanian's over the period 2000-2006. The cointegration approach is one of the recent methodologies employed to identify the determinants of profitability in banking. It enables the estimation of relationship among non-stationary variables by revealing the long-run equilibrium relationship among the variables. In line with the previous studies, determining the most important factors of profitability in Jordanian banks is supposed to help banks' stakeholders especially the managers and regulatory authorities to improve the sector soundness by boosting the impact of positive factors and lessening the impact of the negative factors.

This study is structured into six sections. Section 2 contains a brief review of the literature. Section 3 presents the study data and the measurements of the variables. Section 4 discusses the methodology employed. Section 5 presents the empirical results. Finally, Section 6 summarizes the findings and gives the conclusion of the study.

Literature Review

The determinants of bank profitability can be divided into internal factors and external factors. The internal factors are those factors within the control of bank and these can be classified into financial statements variables and non-financial statement factors such as number of branches and number of employees. Mullineaux (1978) and Hester and Zoellner (1966) argued that the balance sheet structure has a significant impact on profitability. In general, the assets items are argued to have positive association with profitability while liability items have an adverse effect on profitability.

On the liability side, deposits are supposed to have significant impact on banks' profitability. Heggested (1977) examined the profitability of commercial banks and reports that time and savings deposits have negative impact on profitability. Smirlock (1985) found a significant positive relationship between demand deposits and profits.

Concerning the Income statement items, Bourke (1989), and Molyneux and Thorton (1992) found that capital and staff expenses are positively related to bank's profitability. Similar association is found regarding overhead expenditure by Steinherr and Huveneers (1994).

Non-financial statement variables, on other hand, include the number of branches, status of branches, location and bank's size. Mullineaux (1978) found a positive impact for bank's size on profitability. The location is also found to have positive impact on profitability (Emery (1971) and Vernon (1971)). On the other hand, Kwast and Rose (1982), Heggested (1977) and Smirlock (1985) found that size have no effect on profitability. Regarding the number of branches, Hester and Zoellner (1966) did not find any effect for this factor on profitability.

On the other hand, the external determinants of profitability are those factors that are beyond the control of bank such as competition, regulation, interest rate, economic condition and inflation. These also include market concentration, market share, ownership, money supply, inflation and bank size.

Studies of Pelzman (1968), Vernon (1971), Emery (1971), Mullineaux (1978) and Smirlock (1985) concluded that regulation have a significant impact on banks' profitability. Emery (1971) examined the effect of competition on banks' profitability and find insignificant association between the two variables. Heggested and Mingo (1976) used market structure and report that the market power of an individual bank increases with the degree of monopoly. Heggested (1977) and Mullineaux (1978) argued that market share is inversely related to profitability. Emery (1971), Vernon (1971), Fraser and Rose (1972) and Smirlock (1985) further examined the effect of concentration on profitability and the findings of these studies were mixed

and inconclusive.

Molyneux and Thornton (1992) found a significant positive relationship between ownership and profitability. Concerning the growth in the market, Molyneux and Thornton (1992) found that market expansion, represented by growth in money supply have a significant impact on profits. Revell (1980) contended that inflation could also be a factor contributing to the variations in a bank's profitability.

Demirgüç-Kunt and Huizinga (1998) examined the determinants of banks' interest margins and profitability utilizing data for 80 countries during the 1988-1995. They argued that the well-capitalized banks have higher net interest margins and are more profitable. Banks with relatively high non-interest earning assets are less profitable, and banks that rely largely on deposits for their funding are less profitable. Finally, they found that Inflation is associated with higher realized interest margins and higher profitability.

Alrashdan (2002) examined the determinants of Jordanian's banks profitability for the period 1985-1999. The author found that the return on asset (ROA) is positively related to liquidity and total assets while ROA is negatively related to financial leverage and cost of interest. Finally, the authors found insignificant relation between interest rate risk and ROA.

Naceur (2003) examined the determinants of Tunisian banks' profitability over the period 1980-2000. The author concludes that the capital ratio, loans and stock market development have positive impact on profitability while the bank's size has a negative impact. Finally, macro-economic indicators such inflation and growth rates are found to have no impact on profitability.

Hassan and Bashir (2003) analyzed the impact of bank characteristics on the performance of Islamic banks worldwide during 1994-2001. The authors conclude that profitability measures respond positively to increases in capital ratio and negatively to loan ratios. The results stressed on the importance of customer and short-term funding, non-interest earning assets, and overhead in promoting profits. The liabilities over total assets ratio is found to have significant positive impact on profitability while total assets is found to have a negative impact on profitability.

Similarly, Haron (2004) examined the determinants of performance of Islamic banks in Singapore. The author finds that liquidity, expenditures, the money supply and the levels of interest rates to have positive impact on profitability while the capital ratio and the market share to have negative impact. Various deposits are found to have mixed impact on profitability. Haron and Azmi (2004) also investigated the determinants of Islamic Banks across various countries using time series techniques of cointegration and error-correction mechanism (ECM). The study concludes that liquidity, deposit, asset structure, total expenditures, consumer price index and money supply to have significant impact on profitability while capital structure, market share and bank size to have no impact.

Alkassim (2005) examined the determinants of profitability of Islamic and conventional banking in the GCC Countries between 1997 and 2004. The study concludes that total asset have a negative impact on profitability of conventional banks but have a positive impact on profitability of Islamic banks. Total equity are found to have a negative impact on conventional banks' profitability while tend to have a positive impact on Islamic banks' profitability. A total loan, for both types of banking, is found to have a positive impact on profitability. Finally, deposits are found to have a positive impact on profitability for conventional but have a negative impact for Islamic banking.

As for the most recent literature, Bolda and Verma (2006) identify the key determinants of profitability of

public sector banks in India utilizing stepwise multivariate regression model on temporal data from 1991-92 to 2003-04. Their analysis indicated that the variables such as non-interest income, operating expenses, provision and contingencies and spread have significant relationship with net profit. Liu and Hung (2006) examine the relationship between service quality and long-term profitability of Taiwan's banks. Their analysis reveals a strongly positive link between branch number and long-term profitability. Furthermore, average salaries are detrimental to banks' profit.

Finally, Athanasoglou et al. (2008) examine the effect of bank-specific, industry-specific and macroeconomic determinants of Greek banks' profitability s over 1985-2001. They find that capital is important in explaining bank profitability and the increased exposure to credit risk lowers profits. Additionally, labor productivity growth has a positive and significant impact on profitability, while operating expenses are negatively linked to it. The estimated effect of size does not provide evidence of economies of scale in banking. Finally, macroeconomic control variables, such as inflation and cyclical output affect the performance of the banking sector.

Measurements of the Study Variables

In line with the banking literature that have addressed the determinants of banking profitability, this study will uses two measures of profitability. First, it uses the return on asset (ROA) to capture the effects of internal and external determinants on a bank's profitability. Second, the return on equity (ROE) ratio is used to measure the effects of profitability determinants on returns to shareholders. It has been argued that ROA is one of the most important measures of profitability in recent banking literature (Rose and Hudgins, 2005). The ROA has been used extensively in literature; for instance, the following are among the studies that utilized this measure: Haron (2004), Hassan and Bashir (2003), Bashir (2001), Demirgüç-Kunt and Huizinga (1998), Naceur (2003), Alkassim (2005), and Alrashdan (2002).

To recognize the determinants of Jordanian's banks profitability, various potential internal and external factors suggested in literature are used. The aim is to see how Jordanian banks' profitability responds to changes in these factors.

First, the liquidity ratio, measured by the liquid assets as a percentage of total assets, is utilized. Various studies used different measures for liquidity including Bashir (2001), Hassan and Bashir (2003), and Alkassim (2005). All these studies find that the liquidity ratio has a significant impact on various profitability measures.

The capital ratio is also utilized as a safety indicator, as this factor has long been used extensively in literature. Bashir (2001) finds that capital has a positive impact on banks' profitability. This result is confirmed by Hassan and Bashir (2003) who find that capital has a positive impact on profitability. Haron (2004) also finds a significant positive relationship between capital and ROA. Alkassim (2005), however, finds that the capital has a negative impact on profitability of commercial banks.

The customers' deposit over total assets is widely used as a financial leverage measure. Bashir (2001) and Bashir and Hassan (2003) stress on the importance of deposits in promoting bank profits. Demirgüç-Kunt and Huizinga1 (1998) find that commercial Banks that rely largely on deposits for their funding were less profitable Alkassim (2005) finds deposits have a positive relation with profitability for commercial banks.

Regarding asset structure, two measures are examined in this study: the loans as percentage of total assets and investment as percentage of total assets. Bashir (2001) finds that loan ratio has a positive impact on profitability. Hassan and Bashir (2003) find Islamic banks' profitability respond negatively to the increases

in loans. The investment ratio is expected to have similar impacts on banks' profitability.

As for expenditure structure, two measures are also examined: the total operating expenditure (mainly interest expense) as a percent of total assets, and the non-operating expenditure as a percent of total assets. Alrashdan (2002) finds a negative relationship between interest cost and ROA. The non-operating expenditures (overhead ratio) is also used as a measure of the management efficiency in controlling non-operating expenses. Haron (2004) finds a positive relationship between expenditures and profitability. Bashir (2001), and Hassan and Bashir (2003) stressed on the importance of the overhead expenses in promoting bank's profitability.

Regarding the size, many studies have found a positive relationship between size and profitability. Haron (2004) finds that size has no significant impact on ROA. Hassan and Bashir (2003) find that size has a negative impact on profitability. Alkassim (2005) find total assets to have a negative impact on profitability of commercial banks. Finally, Alrashdan (2002) find a positive relationship between total assets and ROA in the Jordanian banking industry.

As for external determinants of profitability, this study utilizes the variables that have been extensively used in earlier studies. First, the market share ratio (the bank deposits to total banking deposits) is used to control for the effect of competition in banking market. Haron and Wan Azmi (2004) find that there is no significant relation between market shares and ROE. The money supply growth (M2) is also utilized as a proxy for credit and economic conditions. Haron (2004) find that this variable has no significant impact on ROA.

The interest rate is also utilized in the earlier stage of our analysis. However, we excluded this variable later as it is found to be highly correlated with other profitability determinants, in particular with the money supply growth. Finally, the inflation measured by the percentage increase in consumer price index. Haron and Azmi (2004) find that consumer price index has a significant positive relation with the profitability indicators.

Based on the banking literature that has been addressed earlier, this study aims to recognize the profitability determinants of the Jordanian's banks over the period 2000-2006. The data related to potential determinants of profitability are collected from the annual reports of the banks under study and from the annual reports of the Central Bank of Jordan over the study period. The variable definition and measurements are presented in table 1.

Table 1: The Measurements of the Variables Utilized

Variables	Measurements	Mean	Std. Dev.	Min.	Max.
Profitability Measures					
The Return on Assets (ROA):	The net income/ T. Assets	1.22%	1.63%	-6.94%	7.91%
The Return on Equity (ROE):	The net income/ T. equity	10.34%	8.59%	-25.10%	39.92%
Internal Determinants of Profitability					
Liquidity	(Cash, Bal. and Deposits at other banks)/ T. Assets	39.49%	9.15%	16.87%	59.12%
Capital Structure	T. Equity/ T. Assets	11.88%	9.25%	-31.36%	46.30%

Deposits Structure	Customer Deposits/ T. Assets	62.22%	19.91%	0.12%	91.09%
Asset Structure	T. loans/ T. Assets	40.95%	10.90%	19.17%	68.88%
	T. Investments/ T. Assets	13.37%	7.97%	0.00%	34.11%
Expenditure Structure	Oper. Expenditure/ T. assets	2.61%	1.37%	0.64%	10.64%
	Non. Oper Exp/ TA	0.31%	0.56%	-1.99%	1.84%
Size	T. assets in logarithm	20.261	1.207	17.793	23.638
External Determinants of Profitability					
Market Share	T. Bank's Assets/ T. Banking Assets	6.35%	13.94%	0.00%	62.62%
Money Supply	Growth in money supply (M2) each year	11.33%	3.56%	5.80%	16.96%
Interest Rate	Interest expense/ total assets	2.14%	0.42%	1.68%	2.99%
Inflation	% increase in consumer price index for each year	2.76%	1.72%	0.70%	6.25%

Study Methodology:

This paper employs the cointegration and error correction model, within a vector autoregression (VAR) framework, to examine the factors that determine the profitability of Jordanian's banks over the period from 2000 to 2006. This study period is assumed to be adequate and pertinent to draw robust results about the significant determinants that shape the profitability of Jordanian's over the period 2000-2006. Following the methodology of Haron and Azmi 2004, cointegration enables the estimation of a relationship among non-stationary variables where cointegration reveals the existence of a long run equilibrium relationship among the variables.

To use the VAR model, all variables are required to be stationary. To do this, we employed the Augmented Dickey-Fuller (ADF) and a multivariate test of cointegration developed by Johansen (1988) and Johansen and Juselius (1990). The Johansen-Juselius procedure of cointegration test is based on the maximum likelihood estimation of the VAR model. The test is carried out through a VAR system such as follows:

$$P_t = \alpha + \beta_1 P_{t-1} + \beta_2 P_{t-2} + \ldots + \beta_k P_{t-k} + \nu_t, \quad t = 1, \ldots, T \qquad (1)$$

where P_t is a $(n \times 1)$ vector of I(1) variables; β_i are $(n \times n)$ matrices of parameters; α is a $(n \times 1)$ vector of constant; ν_t is a vector of normal distributed error term with zero mean and constant variance; and k is the maximum number of lag length processing the white noise. Differencing equation (1), the system can be rewritten as:

$$\Delta P_t = \Pi_1 \Delta P_{t-1} + \ldots + \Pi_k \Delta P_{t-k} + \Pi P_{t-1} + \mu + \varepsilon_t \qquad (2)$$

Π defines the impact matrix which relates the ΔP_t to the P_{t-k} of k periods earlier. The rank of Π determines the number of cointegrating vector r. If the rank of Π is zero, then there are no combinations of the variables as they are stationary. Hence, equation (2) is reduced to a standard VAR model of the first difference.

If the rank Π is r such that $(0 < r < n)$, then there is cointegration between the variables with r cointegrating vectors. The trace and maximum Eigenvalue statistics are calculated to test for the presence of r cointegrating vectors. If cointegration is found, error correction models are constructed. However, if no cointegration is found, the analyses will be based on the first differences of the variables using a VAR model.

Error correction model (ECM) shows how

equilibrium relationship among variables is achieved. Cointegration implies, and is implied by, the existence of an error correction term. This means that changes in the dependent variable are a function of the level of disequilibrium in the cointegrating relationship as well as changes in other explanatory variables. Once the variables are found to be cointegrated, a vector correction model will be used to investigate the dynamic interactions among them in the system.

Empirical Findings

In line with Engle and Granger (1987), a necessary but not sufficient condition for cointegration is that each of the series be integrated of the same order. Thus, each series needs to be tested for stationarity. The null hypothesis for the presence of a unit root (non-stationarity) is tested using Augmented Dickey-Fuller (ADF) test with and without a time trend. The stationarity results are presented in Table 2. The test is applied to the levels as well as to the first difference of the series. For series levels, the null hypothesis cannot be rejected at the 5% significance level for most variables series. However, when the data are differenced, non-stationarity hypotheses are rejected for all data series. This finding is not sensitive to the inclusion of a deterministic trend variable in the ADF regression equations. Hence, the results imply that each data series are integrated of order one I(1). In other words, the features of each of the time series representing various explanatory variables are stable –the mean and autocovariances of the series do not depend on time.

Table 2: The ADF test statistics for a unit root

Variables	Levels		First difference	
	No Trend	With Trend	No Trend	With Trend
Internal variables				
Liquidity	-0.938	-5.245	-13.017*	-12.897*
Capital Structure	-2.551*	-4.577*	-11.393*	-11.287*
Deposits Structure	-1.257	-3.320	-10.379*	-10.294*
Loans/ Total Assets	-0.857	-3.189	-12.552*	-12.437*
Investments/ T. Assets	-1.736	-3.604*	-10.478*	-10.378*
Operating Expenditures/ T. Assets	-1.101	-5.874	-9.394*	-9.304*
Non-operating Expenditures/ T. Assets	-6.334*	-7.701*	-12.596*	-7.665*
External Variables				
Market Share	-2.578*	-2.877	-10.152*	-10.059*
Money Supply	-0.015	-5.351	-6.546*	-6.476*
Interest Rate	-0.086	-4.953*	-6.337*	-6.266
Inflation	-0.154	-5.113	-12.798*	-12.660*
Size	-0.225	-3.442	-10.659*	-10.559*

Note: * indicates the 5% level of significance (since the calculated Dickey-Fuller test statistic is less than the 5% critical value, we reject the null of nonstationarity).

Given that all the data series are of order one I(1), we next test for the presence of cointegration using the Johansen-Juselius test based on the maximum likelihood estimation of the VAR model. The goal of cointegration test is to determine if the integrated time series can be combined to create (up to N-1) stationary series.

Table 3 and 4 present the results of the cointegration tests. In all cases, a single cointegrating equation is observed from the trace and maximum Eigenvalue statistics.

Table 3: Cointegration test statistics of the internal variables

Hypothesis		Dependent Variable	
Null	**Alternative**	**ROA**	**ROE**
Test statistics: Max Eigenvalue			
r=0	r=1	54.47*	48.04
r≤1	r=2	30.11	31.20
r≤2	r=3	28.38	29.33
r≤3	r=4	22.35	21.48
Test statistics: Trace			
r=0	r=1	91.94*	93.62*
r≤1	r=2	63.56*	64.29*
r≤2	r=3	41.20	42.81
r≤3	r=4	21.79	22.15

Note: *indicates rejection of the null hypothesis at the 5% level of significance

Table 4: Cointegration test statistics of the external variables

Hypothesis		Dependent Variable	
Null	**Alternative**	**ROA**	**ROE**
Test statistics: Max Eigenvalue			
r=0	r=1	58.13*	63.92*
r≤1	r=2	31.05	22.52
r≤2	r=3	12.23	13.52
r≤3	r=4	0.089	0.11
Test statistics: Trace			
r=0	r=1	101.52*	100.09*
r≤1	r=2	43.38	36.17
r≤2	r=3	12.32	13.64
r≤3	r=4	0.089	0.11

Note: *indicates rejection of the null hypothesis at the 5% level of significance

The findings indicate that a long-term relationship exists among the variables. Thus, the profit models given the explanatory variables indicated are cointegrated (the dependent and independent variables patterns of movements are identical). Given the presence of a single cointegrating vector, we test whether each of the variables entering the cointegrating vector is significant by imposing restrictions and using the likelihood ratio tests which are asymptotically distributed as a Chi-Squared distribution with one degree of freedom. Table 5 reports results of the Johansen's cointegration test for internal variables.

Table 5: Cointegration results for the internal variables

	ROA		**ROE**	
	Coefficient	**t-statistics**	**Coefficient**	**t-statistics**
Liquidity	-0.0169	-1.498	0.0038	0.045
Capital Structure	0.0720	4.096***	-0.0633	-0.474
Deposits Structure	0.0140	1.764*	0.0470	0.780
Loans/ Total Assets	0.0440	4.521***	0.2730	3.642***
Investments/ T. Assets	0.0173	1.366	0.1490	1.546
Operating Expenditures/ T. Assets	-0.6910	-8.592***	-2.5390	-4.151***
Non-operating Expenditures/ T. Assets	-0.3560	-2.026**	4.4870	3.353***

***, ** and * denotes significance at 1%, 5% and 10% level respectively

The results shown in the table above indicate that the asset structure variable represented by the ratio of loans to total asset have a significant positive impact on both profitability measures. Thus, an increase in loans by 1% is expected to increase ROA by 0.04% and ROE by 0.27%. The investment to total asset seems to have a positive but insignificant impact on both profitability measures. These findings agree with most findings of previous literature, Mullineaux (1978), Hester and Zollener (1977), Naceur (2003) and Haron and Azmi (2004).

As for capital structure ratio, a significant positive relationship is found between capital structure and ROA but negative relationship with ROE. This implies that for every 1% increase in bank capital, the ROA is expected to increase by 0.07% while ROE is expected to decrease by 0.06%. These results agree with the findings of Bourke (1989), Molyneux and Thornton (1992), Steinherr and Huveneers (1994) and Haron (1996a) who found a positive relationship between capital and profitability.

On the other hand, our results show that liquidity has insignificant negative impact on ROA but has a positive impact on ROE. This result somehow disagrees with previous literature findings. For example, Molyneux and Thornton, 1992; Steinherr and Huveneers, 1994; and Haron (2004) and Haron (1996a) found a positive impact for liquidity on profitability.

As for the deposit structure variables, a significant positive impact for increase in deposits on ROA (the impact is also positive but insignificant in the case of ROE) is found. Our findings agree with the findings of Smirlock (1985) and Haron (1996a, 2004) and are in line with normal banking practices whereby bank could use the deposits for generating additional revenue.

As expected, operating expenditure is found to have an inverse relationship with both profitability measures. On the other hand, the non-operating expenditures are

found to have positive impact on ROE. A possible reason for this is that the expenses incurred contribute to the income generating activities. In this regard, Bolda and Verma (2006) have found that operating expenditures have a positive impact on the profitability of the Indian banking sector over the period 1991-2004.

To summarize, the loans to total assets ratio and the operating expenditure ratio seem to be the most important internal determinants of profitability for the Jordanian's banks over the study period. On the other hand, the capital structure, the deposit ratio and non-operating expenditure ratio have a significant impact but mixed impact on ROA and ROE.

Concerning the external determinants of profitability, the cointegration results for these variables are presented in Table 6.

Table 6: Cointegration results for external variables

	ROA		ROE	
	Coefficient	**t-statistics**	**Coefficient**	**t-statistics**
Market Share	-0.0030	-0.2842	0.0012	0.0232
Money Supply	0.0563	1.9922**	0.6063	2.6929*
Inflation	0.3098	3.4237***	1.3309	2.807***
Size	-0.001	-1.178	-0.0001	-0.067
Interest Rate[1]				

***, ** and * denotes significance at 1%, 5% and 10% level

Market share and size are found to have no significant impact on profitability. Our findings disagree with Short (1979) and Smirlock (1985) and Haron (2004) who find that the market share and size is positively related to profits. However, our findings agree with those of Hester and Zoellner (1966), Heggested (1977) and Mullineaux (1978).

Our results also show that Inflation have a positive significant relationship with both profitability measures, confirming to the findings of Bourke (1989) and Molyneux and Thornton (1992) and Haron and Azmi (2004). Furthermore, our results found a positive relationship between money supply and profitability measures. These findings agree with Haron (1996b) and Haron and Azmi (2004).

In brief, money supply and inflation appear to have positive and significant impact on both profitability measures of Jordanian's banks over our study period.

To summarize our findings, the most important internal determinants of profitability of the banks under this study are the loans to total assets ratio, the operating expenditure ratio, the capital structure, the deposit ratio and non-operating expenditure ratio over the 2000-2006 period. On the other hand, money supply and inflation are most important external determinants of profitability over the same period.

Since all the profitability measures and their corresponding explanatory variables exhibit cointegrating relationship, the vector error-correction term (VEC) is estimated to model the short-run dynamics. The size of the error-correction term (ECT) measures the speed at which profitability measures adjust to the change in equilibrium conditions. Results from the VEC tests are reported in Table 7 and 8.

[1]This variable is excluded from analysis as its highly correlated with other determinants of profitability, in particular the money supply.

Table 7: Error-Correction Models for Internal Variables

	D(ROA(-1))		D(ROA(-1))	
	Coefficient	**P-value**	**Coefficient**	**P-value**
D(ROA(-1))	0.1544	0.1358		
D(ROE(-1))			-0.2707	0.1127
D(Liquidity(-1))	-0.0073	0.0513	0.20188	0.3501
D(Capital Structure(-1))	-0.0041	0.0272*	0.2441	0.1876
D(Deposits Structure(-1))	-0.0004	0.0184*	-0.0344	0.1286
D(Loans/ Total Assets(-1))	-0.0167	0.0496*	0.1199	0.3466
D(Investments/ T. Assets(-1))	0.0397	0.0474*	0.2717	0.3265
D(Operating Expenditures/ T. Assets)	0.0452	0.1841	0.4077	1.2037
D((Non-operating Expenditures/ T. Assets)(-1))	-1.1106	0.2292	-3.2554	1.8284
ECT(-1)	-0.5596	0.1054	-0.0039	0.0127
F-statistics	8.886		2.708	

* is statistically significant at 5%.

The results in Table 7 reveal that the ECT is negative but statistically insignificant. The negative coefficients imply that the profitability measures increases in response to any negative deviations in the long- run equilibrium relationship that exist among the variables included in the models. In other words, the banks response to negative changes in the values of explanatory variables to decrease their negative impact on their profitability levels.

However, the coefficients of ECT are small and statistically insignificant which demonstrate a slow adjustment process towards a change in the equilibrium conditions. Nevertheless, the contemporaneous change in capital structure, deposit ratio and asset structure ratios significantly influence any possible changes in profitability.

Table 8: Error-correction models for external Variables

	D(ROA)		D(ROE)	
	Coefficient	**P-value**	**Coefficient**	**P-value**
D(ROA(-1))	-0.2743	0.0967		
D(ROE(-1))			-0.4624	0.0881
D(Market Share(-1))	-0.0004	0.0358*	-0.0585	0.2026
D(Money Supply(-1))	0.0860	0.0703	0.3002	0.3912
D(Inflation(-1))	0.0622	0.1642	1.1613	0.8621
D(Size(-1))	-0.0025	0..0038*	0.0021	0.0216*
ECT(-1)	0.0077	0.0035*	-0.00034	0.0001*
F-statistics	7.620		10.053	

* is statistically significant at 5%.

For the external determinants, the corresponding error correction terms for both profitability measures are significant but have different signs as shown in Table 8. This implies that the profitability measures are adjusting to deviations in the long run equilibrium relationship. The negative deviations are rectified by increases in profitability in case of ROE but not in the case of ROA. Similar to results in table (7), the profitability measures seem to have a slow speed of adjustment towards long-run equilibrium, as the coefficients of ECT are small. However, contemporaneous change in market share and size significantly influence changes in profitability measures.

CONCLUSION

This study employed the cointegration approach to recognize the determinants of profitability of Jordanian's banks over 2000- 2006. Our findings demonstrate that the most important internal determinants of profitability of the banks under study are the loans to total assets ratio, the operating expenditure ratio, the capital structure, the deposit ratio and non-operating expenditure ratio over the 2000-2006 period. On the other hand, money supply and inflation are the most important external determinants of profitability over the same period. On this basis, managers of the banks under study must closely monitored these factors as these items are statistically significant and any changes in these variables will have a long term impact on profitability.

Finally, this study also measured the speed of adjustment process towards the long-run equilibrium. Our results reveal that the coefficients of ECT are generally negative but quantitatively and in some cases statistically insignificant for both internal and external determinants of profitability. This demonstrates a slow adjustment process for profitability measures towards a change in the equilibrium conditions. Thus, though the suggested determinants of profitability have a long run relationship with profitability, Jordan's banks profitability measured by ROA and ROE adjust slowly in the short-run to deviations in the cointegrating relationship. In other words, profitability of Jordan banks does not respond speedily to negative changes in the values of explanatory variables in the short-run.

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محددات ربحية البنوك الأردنية: نموذج السلاسل الزمنية المستقرة

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ملخـص

تهدف هذه الدراسة إلى التعرف على محددات ربحية البنوك الأردنية خلال الفترة 2000 إلى 2006. تم استخدام نماذج السلاسل الزمنية المستقرة (A cointegration models) ونماذج السلاسل المستقرة بترتيبات مختلفة (Error Correction Models) حيث أدخلنا بهذه النماذج العديد من المحددات المحتملة للربحية الداخلية والخارجية لتحديد أهم محددات ربحية البنوك الأردنية خلال فترة الدراسة. أظهرت نتائج دراستنا أن أهم المحددات الداخلية للربحية خلال فترة الدراسة هي نسبة القروض إلى أجمالي الموجودات، نسبة المصروفات التشغيلية، هيكل رأس المال، نسبة الودائع ونسبة المصروفات غير التشغيلية. من جهة أخرى، بينت الدراسة أن عرض النقد والتضخم هي أهم محددات الربحية الخارجية خلال فترة الدراسة. قاست دراستنا أيضا سرعة استجابة البنوك إلى العودة إلى التوازن الأمثل بالمدى الطويل. أظهرت النتائج أنه بالرغم من محددات الربحية المقترحة ترتبط ارتباط طويل الأجل بمقاييس الربحية، فإن معاملات الخطأ التصحيحي (Error Correction Term) هي غير مهمة كميا وفي بعض الأحيان غير مهمة إحصائيا. هذه النتيجة تتضمن أن عملية استعادة التوازن تتم ببطء لمقاييس الربحية في حال تغيرت ظروف التوازن. بمعنى آخر، ربحية المصارف الأردنية لا تستجيب بسرعة للتغير السلبي بقيم المتغيرات المستقلة في حال تغيرت قيمها بالآجل القصير.

الكلمات الدالة: ربحية البنوك، الأردن، السلاسل الزمنية المستقرة، محددات الربحية.

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تاريخ استلام البحث 2009/3/8، وتاريخ قبوله 2010/1/20.