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Abstract

Understanding and monitoring the impact of a declined economy on the health of the banking industry is a particularly important challenge for bank regulators and policy makers. In fact, economic activities experience over long period of time recurring fluctuations occurring at irregular intervals because of disturbances and imperfections in the economy of one sort or another. Those fluctuations last for varying lengths of time and compose what economic community commonly calls the “Business cycle”. In this paper, we are interested to assess empirically for the main bank specific factors behind the profitability of MENA banks taking into consideration business cycle fluctuations. Specifically we attempt to know how business cycle fluctuations can affect bank profitability. Results showed that the increase of banks’ capitalization and liquidity ratios enhanced profitability while the latter decline with bad asset quality and more costs. Capitalization and asset quality should be considered attentively during recessions since their implications are more pronounced during those periods. During prosperous times, banks should reinforce their liquidity position to get additional profits.

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Keywords: Banking profitability, Macro-prudential analysis, Business cycles, Markov Switching models, System Dynamic Panel data modeling, MENA countries

ملخص

فهم ورصد أثر تراجع الاقتصاد على صحة القطاع المصرفي يشكل تحديا بالغ الأهمية للمنظمين وصانعي السياسات المصرفية. في الواقع، تعانى الأنشطة الاقتصادية من التقلبات المتكررة التي تحدث على فترات غير منتظمة بسبب اضطرابات وعيوب في الاقتصاد. تلك التقلبات تمتد لفترات متفاوتة من الزمن، وتكون ما يدعوه الاقتصاديون عموما "بدورة الأعمال". نهتم في هذه الورقة، بتقييم عوامل معينة وراء ربحية المصارف خاصة فى البنوك الرئيسية فى منطقة الشرق الأوسط وشمال أفريقيا MENA مع الأخذ في الاعتبار تقلبات دورة الأعمال التجارية. وعلى وجه التحديد نحاول أن نعرف كيف يمكن أن تؤثر تقلبات دورة الأعمال التجارية على ربحية البنوك. وأظهرت النتائج أن زيادة القيمة السوقية للبنوك ونسب السيولة قد عززت الربحية في حين أن تراجع الأخير مع نوعية الأصول السيئة يزيد من التكاليف. وينبغي النظر في القيمة السوقية وجودة الأصول خلال فترات الركود باهتمام حيث ان آثارها تكون أكثر وضوحا خلال تلك الفترات. في أوقات الرخاء، يجب على البنوك تعزيز موقف السيولة لديها للحصول على أرباح إضافية.

1. Introduction

Banks as funds providers fit into the economic cycle, which means that some of their banking key decisions have direct impact on the economy. Conversely, households and businesses' decisions rely directly on banks. This assumption was largely debated and several studies have proved a positive correlation between financial market development and economic growth both in short and long term (see Levine1998, Arestis et al., 2001).

However, from another side, understanding and monitoring the impact of a declining economy on the health of the banking industry is also a particularly important challenge for bank regulators and policy makers. In fact, economic activities experience over long periods of time recurring fluctuations occurring at irregular intervals because of disturbances and imperfections in the economy of one sort or another. Those fluctuations last for varying lengths of time and compose what economic community commonly calls the "Business Cycle". Every recession in which the economy is involuntarily driven results in a loss of output that cannot be regained. Thus, cycles are costly, difficult times and unpleasant experiences for most economic agents.

The financial market in general and the banking sector in particular were not spared of the impacts of business cycles. Their health nowadays is a tangible proof for this assumption. In fact, the current economic slowdown is the second wave to hit the financial systems since August 2007 following the disruption in global financial markets. This serious downturn in the economy has wrecked a majority of banks in the world when the turmoil in financial markets continued. It affected equity but also banks' profits. Moreover, the scope and the severity of its impacts were difficult to predict. Hence, it is crucial for regulators to fully comprehend the nexus between banks' profitability and different business cycle regimes to be able to avoid negative repercussion of any upcoming financial crisis.

Besides, to make accuracy forecasts of bank profitability level, bank decision makers, stockholders and policy makers need to use real observations of bank profit components, which are difficult to obtain since they are published, in a best-case scenario, only quarterly. Accordingly, it is of great interest to integrate information relative to the health of the economy in the computation of the level of bank profit. The former is driven from highly observed information like several macroeconomic and structural indicators. Based on this estimation, obtained results will be updated by taking into account the potential implication of cyclical fluctuations on banking activities.

In this paper, we are interested to assess empirically for the main bank specific factors behind the profitability of MENA banks taking into consideration business cycle fluctuations. We aim to overcome the literature gap in the importance of considering business cycle switching regimes in the evaluation of banking profitability in emerging countries. We are interested specifically in four MENA countries, which are Tunisia, Morocco, Egypt and Jordan.

To our knowledge there are no studies that consider the direct effect of business cycle fluctuations on bank characteristics and consequently on profitability using probabilities describing the state of the economy rather than simply adding macroeconomic information as an explanatory variable. This new formulation of the problem is the main novelty of this paper. We are absolutely convinced that banks' strategies and decisions are ultimately linked to the health of the economy and consider such information in the evaluation of the bank's performance crucial to decisions.

The paper is organized as follows: in section 1, we criticize previous studies related to bank profitability. Section 2 deals with the bank profitability specific determinants over the business cycle. In section 3, we present data and the followed methodology. Section 4 is devoted to results and to presenting the main conclusions.

2. Review of Empirical Literature

It is generally assumed that business cycle fluctuations substantially affect profitability of banking institutions as well as consumption, investment and aggregate demand. However, few empirical papers deal with this issue. Investigations were generally limited to the study of the relationship between bank profitability and macroeconomic variables to determine if they are relevant in explaining the profitability level of the bank.

Albertazzi and Gambacorta (2009),Demirguc-Kunt and Huizinga (2001) and Bikker and Hu (2002) studied the link between bank profitability and the business cycle and measured the extent to which this correlation could be maintained. Their findings suggested that such correlation exists, although variables used were not direct measures of the business cycle. They argued also that banks' profit pro-cyclicality derives from the effect that the economic cycle exerts on net interest income and loan loss provisions. However, non-interest income was not significantly influenced by GDP changes.

Apergis (2007) and Gasha and Morales (2004) identified whether bank profitability was affected to a larger (or smaller) extent by recessionary (expansionary) conditions. They followed methodologies based on panel threshold models and self-exciting threshold autoregressive (SETAR) models with an objective of identifying endogenously the thresholds at which the system switches from one regime to the other. Results justified a positive relationship between the bank profitability and the business cycle and this positive cyclicality remained robust in either phase of the business cycle. However, GDP growth affected nonperforming loans only below a certain threshold.

In the same vein, Marcucci and Quagliariello (2008) focused on the relation between credit risk and the business cycle and successfully proved the presence of asymmetric effects. They examined this relation both at the aggregate and the bank level exploiting a dataset on Italian banks' borrowers' default rates. Using Threshold Autoregressive (TAR) models allows for endogenously identifying the thresholds over or below which credit risk is more/less cyclical. They found that effects of the business cycle on credit risk were more pronounced during downturns and that cyclicality was also higher for those banks with riskier portfolios.

Bikker and Metzemakers (2003) investigated how bank provisioning behavior was related to the business cycle and found that provisioning turns out to be substantially higher when GDP growth was lower, reflecting increased riskiness of the credit portfolio when the business cycle turns downwards, which also increases the risk of a credit crunch. However, they stipulated that this effect was mitigated somewhat as provisions rise in times when earnings were higher, suggesting income smoothing, and when loan growth was higher, indicating increased riskiness.

Besides that, less developed countries were rarely concerned with such an investigation. There was more interest in identifying bank profitability determinants, to compare the power of macroeconomic indicators in explaining profitability between private and state owned banks or between domestic and foreign banks, rather than seeing if these effects stay stable or change when economy switch to a recessionary regime.

Particularly, Ben Naceur and Goaied (2001, 2003 and 2008), and Ben Khediri et al. (2005) focused on Tunisian bank's performances and show that private banks were relatively more profitable than their state owned counterparts and that individual bank characteristics explained a substantial part of the within-country variation in bank interest margins and net profitability. However, macro-economic indicators such inflation and growth rates have no significant impact.

Chantapong (2005) studied the question of banks profitability in relation with crisis in the case of Thailand and justified that banks reduced their credit exposure during crisis and gradually improved their profitability during post crisis years.

The interest to bank profitability determinants was also the focus in the studies of Bashir (2000), and Hassan and Bachir (2003), in the case of Islamic banks. They revealed that foreign banks profitability was higher than the average profitability of the domestic banks that profitability increased with high capital and liquidity ratios and with efficient management. Results indicated a strong positive correlation between profitability and overhead costs. Among the macro-indicators, high interest ratio was associated with low bank profitability, inflation was found to have a positive effect on bank performance and implicit and explicit taxes affected the bank performance measures negatively.

Kobeissi (2010) and Ben Naceur and Omran (2008) examined the influence of bank regulations, concentration, ownership structure and financial and institutional development on margin and profitability of MENA countries. They found that bank specific characteristics, in particular bank capitalization and credit risk, have positive and significant impact on banks' net interest margin, cost efficiency, and profitability. On the other hand, macroeconomic and financial development indicators have no significant impact on bank performance. Results showed also that private banks, especially foreign ones, were significantly better performers than all sample groups. State-owned banks were lagging behind other banks and were performing the worst among the sample banks.

However, the majority of the abovementioned studies dealing with developed countries have not explored the possibility of asymmetric effects, for which the impact of macroeconomic conditions on banks' characteristics is dissimilar in different phases of the business cycle. Whereas, this question is of great importance essentially for bank supervisors who are more concerned about downturns rather than expansions. In fact, ignoring the effect of business cycle recessions on banks by assuming a linear relationship between profitability and bank characteristics' may hinder some important features of banks' riskiness.

3. Bank Profitability Determinants over Business Cycle Regimes

Many banking characteristics, bank size, capitalization, loan loss provisions and costs, have been demonstrated to be significant in explaining banks performance and are potentially able to convey signals about the evolution of banks' health over the business cycle.

3.1 Bank size

Studies related to the bank performance often included the bank size among the key determinants of profitability. The former is expressed as the Log of total assets and reveals differences in costs and products between banks. Thus, it indicates to what extend the bank realizes economies of scales resulting in an increasing profitability as stipulated by Bourke (1989), Molyneux and Thornton (1992), Akhavein et al. (1997), Bikker and Hu (2002), and Goddard et al. (2004)).

In addition, following results of Berger et al. (1987), Boyd and Runkle (1993), Miller and Noulas (1997) and Athanasoglou et al. (2006)), increasing the bank size should help to save managerial costs, especially as markets develop, which indicates a more profitable bank.

Besides, Short (1979) Bikker and Hu (2002) and Goddard et al. (2004) argued that the larger the bank, the more it can raise capital with less expense and, consequently, appear more profitable.

From another point of view, bank size is also an indicator of risk diversification, which is, contrary to economies of scales, negatively correlated to bank profitability since increased diversification leads to lower credit risk and thus, lower returns.

Moreover, the effect of size could be negative due to bureaucratic relations and long hierarchical processes, which delay decision-making. Hence, size-profitability relationship may be expected to be non-linear. Eichengreen and Gibson (2001), who assessed that the effect of a growing bank's size on profitability might be positive up to a certain threshold, supported this hypothesis.

Banks with much more assets could be able to face vigorously financial crisis, since they are able to diversify more and take a more risky position. However, during the recent financial crisis, it was seen that bigger is not always better in terms of bank size.

3.2 Bank capitalization

Capital ratio indicates what proportion of total assets is financed by equity, and hence what proportion is financed by deposits and loans. Bourke (1989), Molyneux and Thornton (1992), Molyneux and Forbes (1995), and Goddard et al. (2004) justified that there was a positive relationship between bank profitability and capitalization[1]. They explained this finding by the fact that when there is a higher level of equity, cost of capital will automatically decrease and this should lead to an increase in profitability. Moreover, an increase in capital may raise expected earnings by reducing expected costs of financial distress, including bankruptcy(see Berger1995). This evidence was generalized by Demirgüç-Kunt and Huizinga (1999) for 80 industrial and emerging countries and supported also by Athanasoglou et al. (2008).

Business cycle fluctuations influence the ability of the bank to maintain an optimal capital that prevents risks. In fact, it was demonstrated that in a recessionary economy, firms' profits tend to decrease, asset prices drop and customer's expectations are less optimistic. In such a case, borrowers' repayment ability and the value of collateral will be deteriorated. These facts will automatically reduce banks' equities, and consequently increase cost of capitals and decrease profitability. Moreover, banks are constrained to reduce lending to meet authoritarian capital requirements and cannot overcome the situation by issuing new shares because of the increasing agency costs. This is why the positive relationship between profitability and bank capitalization, as found in the above-mentioned studies, risk be inverting and becoming negative during recession periods.

3.3 Asset quality

The effect of asset quality on the profitability of the bank is also an important issue to consider. Asset quality refers to the overall risk attached to the various assets held by banks. It determines how many of their assets are at financial risk and how much allowance for potential losses they must make. The most common assets requiring a strict determination of asset quality are loans, which can be non-performing assets if borrowers fail to paytheir obligations. Consequently, poor asset quality was found to be the cause of reducing profitability. Such a priori was generally confirmed for developed countries but not always in emerging ones. Brock and Rojas-Suárez (2000), for example, showed a negative relationship between bank spreads and Non Performing Loans' over total loans for most Latin American banking systems. They argued that this was due to distortions caused by inadequate regulation allowing banks to report misstated loan losses.

Besides that, when business cycle is in expansionary phase, the increase of aggregate demand is accompanied with a growth of bank lending and an increase in economic indebtedness. Whereas, during recessions, some banks may underestimate their risk exposures, relaxing credit standards and reducing provisions for future losses, which in turn will have strong, negative effects on the banks' gains.

[1] Modeled as the equity relative to total assets, it measures bank's ability to maintain capital commensurate with the bank's risk. It determines the capacity of the bank in terms of meeting the time liabilities and other risks such as credit risk, operational risk.

In the same vein, bad economic conditions enhance unemployment, which reduces households' disposable income and their ability to repay their debts. As a consequence, banks are confronted to an increasing risk involving more provisions. Moreover, from the time when economic recessions are commonly accompanied with banking crises (Demirguc-Kunt and Detragiache1998), the proportion of non-performing loans will dramatically increase. For this reason, the flow of new bad debts, i.e. the amount of loans classified as bad debts for the first time in the reference period, can be considered to be a sign of decreasing profitability since it indicates additional loan loss provisions to be deducted from bank revenues.

3.4 Management efficiency

Another determinant ratio that should be examined is the cost to income ratio closely related to the notion of efficient management. It provides information on the variations of bank operating costs[2] and reflects management's ability to identify, measure, monitor, and control risks.

For the most part, the literature argued that reduced expenses had improved the efficiency and hence raised the profitability of financial institutions, implying a negative relationship between operating expenses ratio and profitability (see Bourke 1989). However, Molyneux and Thornton (1992) observed a positive relationship, suggesting that high profits earned by firms may be appropriated in the form of higher payroll expenditures paid to more productive human capital.

3.5 Liquidity ratio

Liquidity is also a key determinant of bank profitability since it is directly linked to bank failure. In this respect, it seems of a great interest to evaluate the effect on bank profitability of liquidity ratio. This ratio is measured by the net loans divided by total assets and provides information about a firm's ability to meet its short-term financial obligations.

From the literature, there was no consensus on the kind of liquidity level effects' on profit. In fact, some authors like Bourke (1989) advocated a positive effect of increasing liquidity on profitability based on the fact that the loans market, especially credit to households and firms, even if it is risky, has a greater expected return than other bank assets, such as government securities. Conversely, authors like Eichengreen and Gibson (2001) or Molyneux and Thornton (1992) reported opposite results.

Moreover, it is already seen that during recessionary periods banks are unable to tap traditional sources of funding. The resulting increased counterparty risk will freeze their traditional short-term funding sources, which in turn will create liquidity pressures.

From another side, recessionary periods are accompanied with an increase in solvency risks. In such periods banks will be obliged to diversify their portfolios and/or raise their liquid holdings in order to reduce their risk, and this supports the positive correlation between liquidity ratio and profitability during recessions.

4. Methodology

In this paper, we investigate the profitability of some selected MENA commercial banks over the period of 1990-2007 in relation with their relative business cycles. Particularly, we consider the case of four MENA countries, which are Tunisia, Morocco, Egypt and Jordan. Banking information is extracted from the Bankscope database, while macroeconomic variables are obtained from the IMF database. Table 1 summarizes the data used in this study and Appendix (1) provides some descriptive statistics for the average of each variable for each country and for the whole sample.

[2] Operating costs represents the total amount of wages and salaries, as well as the costs of running branch office facilities.

4.1 Identifying business cycle regimes

MENA's business cycle turning points will be identified based on the Markov Switching model with two regimes. For this aim, monthly Industrial production indices (IPI) from January 1980 to December 2008 in the cases of Tunisia, Egypt, Morocco and Jordan are used as proxies for the economy rather than GDP first of all because the latter is not available in a monthly scale for the four countries but also because even if it refers only to the manufacturing sectors, IPI represents a high quality indicator of the business cycles because industry is known to be the most sensitive sector to business cycle fluctuations. Moreover, the IPI represents a times series strongly homogeneous across time which helps to identify business cycle turning points with much more precision.

From IPI time plots represented in Figure 1, we observe that long periods of sweet growth that signal prosperity or expansion periods separates brief periods of rough slowing down that indicates short recessions. Moreover, increases in increasing periods are slower than decreases in decreasing periods. Those findings are for the asymmetry between regimes.

The problem of dating the Business Cycle has recently received many contributions, with several proposed statistical parametric and non-parametric methodologies. The latter class essentially derives from the seminal work of Bry and Boschan (1971), whereas the best-known parametric model is the Markov Switching (MS) of Hamilton (1989) fitted to quarterly US GDP.

Markov Switching model involves multiple structures that characterize time series behaviors among different regimes. By allowing Switching between these structures, it is able to capture their complex dynamic patterns. In Markov-Switching models, the Switching mechanism is controlled by an unobservable state variable that follows a first order Markov chain so that the state of the economy can be separated into recession and expansion phases. Moreover, the Markovian property regulates that the current value of the state variable depends on its immediate past value.

We consider the case of a reduced form of a Markov Switching model with only two states summarized by the discrete random variable $S_t \in (1,2)$, denoting recession (resp.Expansion)when it takes the value of 1 (resp.2). For simplicity, y_t isis assumed to be normally distributed conditional on the state S_t,$y_t / S_t = i \rightsquigarrow N(\beta_i, \sigma_i^2)$, then:

$$y_t = \beta_{s_t} + \varepsilon_t$$

Where$\varepsilon_t = i \rightsquigarrow N(\beta_i, \sigma_i^2)$ and $\beta_{s_t} = \beta_{s_1}(1 - S_1) + \beta_{S_2}$

The probability that y_{t+1} is in the state "j" considering that y_t was in the state "i" is called one-step transition probability (P_{ij}). The matrix P of transition probabilities is given by:

$$P = \begin{bmatrix} p_{11} & p_{21} \\ p_{12} & P_{22} \end{bmatrix},$$

Where:

$$P(S_t = 1/S_{t-1} = 1) = p_{11} \qquad P(S_t = 1/S_{t-1} = 2) = p_{21} = 1 - p_{22}$$
$$P(S_t = 2/S_{t-1} = 1) = P_{12} = 1 - p_{11} \qquad P(S_t = 2/S_{t-1} = 2) = p_{22}$$

The Maximum Likelihood Estimation method is used to estimate the relevant parameters of the model summarized in the vector$\theta = (P_{11}, P_{22}, \beta_1, \beta_2, \sigma_1^2, \sigma_2^2)'$. Then the probability distribution of the unobserved regimes S_t is inferred following Krolzig (1997). For this aim, we calculate the filtered probability of regimes: $P_f = p(S_t | Y_t)$ as the probability density of

observing Y_t conditional on the regime variable S_t and given the currently available information set to Y_t[3].

4.2 Empirical model

Since the data set includes both cross section and time series data, Panel Data Regression approach is appropriate. The research design of this paper builds on the econometric model inspired from Athanasoglou et al. (2008) presented in the equation below.

$$y_{i,t} = \alpha + \lambda y_{i,t-1} + \sum_{k=1} \beta_k X_{i,t-k} + \mu_{i,t}$$

$y_{i,t}$ is the bank profitability measure of the bank i at time t, with $i = 1, \dots, N$ and $t = 1, \dots, T$. N denotes the number of cross-sectional observations and T the length of the sample period. Bank profitability is evaluated through the Returns on Assets ratio measured by the ratio between the net income and the total assets. It is an indication of the bank's equity multiplier, which measures the financial leverage of the bank. It gives investors an idea of how effectively the company is converting the money it has to invest into net incomes. In that sense, bank profitability defined, as the ROA is an indicator of the bank profitability as seen by the manager of the bank. It indicates whether the bank had achieved or improved its objectives in term of gain. Hence, the higher the ROA ratio, the better is the bank performance.

The model further consist of a constant term, measured by the scalar α, and of a vector of k×1 slope parameters β that estimate the sign of the explanatory variables grouped in the vector $X = [S, C, A, M, L]'$, where:

1. "S" denotes the bank size measured by the Log of the total assets
2. "C" indicates the capital Ratio (C) measured as the ratio between total equity and total assets.

   Based on previous empirical findings, we expect that increasing bank capitalization will enhance profitability in MENA banks. A negative correlation between these two indicators is predicted during recession periods.

   Moreover, based on the theoretical assumption of symmetric information, banks that expect to have better performance should credibly transmit this information through higher capital. This motivates us to model the capital ratio as an endogenous variable.
3. "A" is the asset quality ratio, which divides the loan loss provisions of the bank by its net interest revenue[4].

   We expect a negative relation with bank profitability. Besides, we expect that this negative effect will be more pronounced during recessions due to the non-ability of banks to estimate rigorously its risks of unpaid loans.
4. "M" is the penultimate bank specific indicator we evaluate in this paper. It is the ratio of cost to income (M). It gives an idea about the cost of management in a bank and is commonly used as an efficiency measure similar to operating margin.

   Other things being equal, a decrease in the efficiency ratio is viewed as a positive while a rising efficiency ratio is generally undesirable. Hence, we expect to get negative effect of the cost to income on the asset to income ratio.

[3] More details about the computation of P_f are given on Krolzig (1997)

[4] We analyze the asset quality using this ratio rather than the ratio of loan loss provisions to total loans, which is the comment indicator of asset quality, because the first is the more available for the majority of banks' balance sheets in our sample.

5. "L": the liquidity ratio is the last indicator that we deal with. It is the ratio between net loans and total assets. Even if there is no consensus on how liquidity can affect profitability, we expect a negative relationship between liquidity and profitability in MENA countries as long as banks do not take an unacceptable level of risk.

Moreover, as MENA banks are not able to diversify their portfolios and activities and raise their liquidities during recessions, we expect that negative economic conditions will increase their liquidity risk and induce decreasing profitability.

Following Athanasoglou et al. (2008) banks' profitability is persistent over time, which enhances as to add one-period lagged dependent variable $y_{i,t-1}$. The coefficient λ of the one-period lagged dependent variable measures the adjustment speed of banks' profitability to equilibrium. A value of Lambda between 0 and 1 implies that profits will eventually return to their equilibrium but some degree of profit persistence exists.

Finally, the model includes a one-way error disturbance term μ_{it} capturing a bank-specific or fixed effect (α_i) and a remainder or idiosyncratic effect that vary over time and between banks (ε_{it}), $u_{it} = \alpha_i + \varepsilon_{it}$

In this paper, we control only for bank specific determinants and we do not consider market ratios like concentration, the market structure…We do also not consider macroeconomic determinants as inflation, interest rates and unemployment in order to isolate the transmission of business cycle fluctuations through the ratios that banks can control and manage which are only the internal determinants of profitability.

Since we are using a dynamic panel data model with endogenous regressors[5] and finite number of time periods and a large number of cross-section observations in addition to unobserved individual specific heterogeneity, least-squares estimators, i.e. fixed effects or random effects estimators, are inconsistent[6].

Besides, since the dependent variable (y_{it}) is a function of the disturbance term (u_i), the lagged dependent variable (y_{it-1}) is immediately a function of (u_i)[7].

Thus, autocorrelation, unobserved heterogeneity and endogeneity will give biased and inconsistent coefficients in a pooled OLS regression, which is behind our motivation to tackle those problems using the Generalized Method of Moments of Arrelano Bover (1995), to provide asymptotically efficient inference assuming a minimal set of statistical assumptions.

Based on previous studies focusing on the linkage between bank ratios and profitability we estimate our model considering the capital (C), and the asset quality (A) ratios as endogenous and the liquidity ratio (L) as predetermined. We confirm this theoretical suggestion by estimating firstly the model without this assumption, and thus we treat all the variables as exogenous, and secondly we re-estimate it, imposing this time, the constraint of endogeneity and predetermination on the mentioned variables. The Sargan test of over-identifying restrictions is strongly rejected in the first method of estimation with p-values equal to zero, while it indicates that the second specification is well since all ki-2 statistics are significant.

We account for endogeneity using as instruments lagged values of dependent variables in levels and in differences as well as lagged values of independent variables that could

[5] Several researchers argued that some explanatory variables could suffer from endogeneity. For instance, Berger (1995) assessed that banks' profitability influenced also the equity-to-asset ratio.

[6] The characteristics of the model and proposed variables in equation likely violate the classical assumptions underlying the LS model. First, among other assumptions of OLS to give unbiased, consistent and efficient estimates, it is a prerequisite that the data follows a normal distribution with unknown mean and variance and that the kurtosis of the distribution equals three. In finance, the distribution of the data is often heavy-tailed and skewed with numerous large outliers, which violate the assumptions of OLS.

[7] In general, autocorrelation (or serial correlation), between the disturbance terms, exists (Baltagi 2005).

potentially suffer from endogeneity. Hence, we instrument for all regressors that are not clearly exogenous.

The model is estimated in a first stage for the whole sample and then re-estimated separately for each regime denoting by "0" recession periods and "1" expansions phases.

4.3 Overview of the banking system in MENA countries

Banks in MENA countries are quite similar despite some differences between regions in term of size, per capita GDP and financial development. In this study we focus particularly on bank profitability in Tunisia, Morocco, Egypt and Jordan and we suppose that banking behavior across those countries is homogenous based on the fact that the latter are both classified by the world bank as lower middle income countries, Resource-poor and labor-abundant economies. They have followed similar IMF and World Bank programs and are at a comparable stage of economic development.

The study is limited to commercial banks not only because of availability of data but also as this category of banks offers similar services and follows the same international accounting standards which in turn ensure the homogeneity of the panel and hence allow cross country comparisons.

Moreover, similar to the majority of developing countries, financial systems in Tunisia Egypt, Morocco and Jordan are bank-based where banks represent a significant proportion of the stock market capitalization. They are also the main source of external finance for the corporate sector.

Given that, their stability and consistency were sought as key factors in many liberalization programs. In this context, governments have set up significant financial reforms over the past few years under the auspice of the International Monetary Fund in order to enhance other financial institutions with an objective to give the financial sector a better market aspect.

The advances in banking technologies, information and communication, the growing institutional investment, the updating of regulations governing financial institutions operations and the recent trend towards market-oriented systems by encouraging the entry of privately owned banks of different organizational structures were among several reforms that occurred in those MENA banks (Omran et al. 2004).

Based on those reforms, banks have been universalized significantly, reorganized and computerized their functioning systems, and have more diversified products and are working to be internationalized, thus giving birth to firms that must now be examined with fresh eyes. Profound changes experienced by various banking systems are the source of much debate concerning this industry.

Although there have been good results in term of development, profitability and efficiency in several MENA countries, some others are still dominated by public banks and government intervention; and this is the case of all banks understudy.

Moreover, many governments in the MENA region, mainly the non-oil producing ones, have controlled the nominal interest rates by moderating their free determination, and by avoiding overpassing the prevailing inflation rates. With adopting such a repression policy, monetary authorities created a non-competitive and segmented financial system with an excessive control of the money supply and a reduction of the cost of servicing government debts.

5. Empirical Results

5.1 Business cycle regimes in MENA countries

A two regimes Markov Switching model MS(2) AR(0) with mean and variances regime dependent and with no autoregressive terms is estimated separately for each country[8]. Then filtered probabilities are used to identify recession and expansion dates as follows: a month is considered to be in recession when the inferred probability is greater than 0.5, and a period of recession must last at least six consecutive months. We considered Estimation results are summarized in Table 2.

β1 coefficients indicating the monthly percentage rate of decline in regime 1 are negative in the four specifications, whileβ2coefficients representing the monthly percentage rate of growth, are positive and greater than β1 in absolute value.

Transition probabilities Pijare significant at 1% confidence level and are very closer to "one" which traduce the persistence of data through regimes.

We notice finally that, variances fluctuate considerably across regimes, which indicate that the MENA's economies react very sensitively to changes in the national and international areas.

Filtered probabilities of recession higher than (resp. less than) 0.5 indicates lowdown (resp. prosperity) periods. A recession (resp. an expansion) is noticed after a minimum of 6 consecutive months of slowdowns (resp. prosperity). The last month indicates the recession (resp. the expansion) date and is coded 0 (resp.1). (See figure 2).

Since the obtained recoded series is in a monthly scale, it will be transformed to annual scale in order to be integrated it in the panel model next as a dummy variable denoting the business cycle regime. For this aim we propose to consider that the economy is in a recession in a given year if the latter contains more than six recessions, otherwise the economy is considered to be in expansion. Table 3 gives the annual business cycle chronology for the four countries following this assumption.

5.2 MENA bank profitability determinants across business cycle regimes

Panel Estimation results are detailed in Appendix (2) and summarized in Table 4. We did not reported results for Morocco during recession periods since business cycle dating resulted to only two years of bed economic conditions, which enable as to estimate the system dynamic panel model.

A first look to these results let as conclude that the profitability of the banks is always persistent in all estimations without carrying about business cycle regimes. The lagged dependent variables were significant[9] with coefficient varying from 0.107 for the group on MENA banks to 0.541 for Tunisia, which indicates that profits seem to persist to a moderate extent, and implies that market structure in those banking sectors may not be large enough to ensure a perfectly competitive market.

The existence of persistence in profitability can be interpreted as a signal of barriers to competition, which is in its high level when the parameter approaches one. Moreover, the persistence of the profitability can also reflect a high degree of government intervention and we think this is true in case of the countries we study where banks are given yearly targets for asset quality and capitalization so that they cannot really change their business models, even if opportunities arise.

[8] We use for this aim the MSVARLib2.0 package developed by (Bellone 2005).
[9] All lagged profitability ratios are significant at 99% significance level.

The case of MENA countries is quite different from the one of European countries according to results of Goddard et al. (2004) who found weak evidence for profit persistence there.

Moreover, results show that the profitability remained persistent for all specifications during expansion and recession phases stipulating that government decisions relative to relaxing entry barriers were not sensitive to economic health. While we did not find evidence of profitability persistence in the cases of Egypt, Jordan and generally for the whole MENA group of banks during expansion phases. This could be attributed to liberalization programs enhancing competitiveness. Economic prosper periods are favorable to such competitiveness.

In concordance with above-mentioned empirical studies, mainly results of Ben Naceur and Goaied (2008) for the case of Tunisia and those of Berger (1995) and Dermerguç-Kunt and Huizingua (1999) and many others for several other contexts, this paper presents evidence for a positive relationship between bank performance and capitalization globally and also whether the economy was in recession or in expansion. Coefficients were ranging from 0.0339 for the group of MENA banks without taking into consideration business cycle fluctuation to 0.161 in Egypt during periods of recession.

This may indicate that well-capitalized banks face lower costs of going bankrupt, which reduces their cost of funding. Moreover, high equity to asset ratios ensures less risks and leverage, which reduces also the borrowing costs and increases banks profitability ratios.

This positive effect of capitalization on profitability is much more pronounced during periods of recession rather than expansion in the case of Jordan, Egypt and generally for whole MENA banks. This could be due to the fact that banks need to increase much more their capital ratio during recessions than during prosperity periods in order to upgrade its profitability for its investors. Indeed, a strong capital structure enhances the profitability from the moment where it provides additional strength to support and avoid global financial crises and increased safety for depositors during unstable macroeconomic conditions. While opposite results are found in the case of Tunisia since the effect capitalization enhanced profitability was more evident during expansions.

We noticed finally that Egyptian banks should rely on capitalization to improve their performance only during economic downturns since we did not found evidence of a significant effect of capital ratio during expansions. As well, we did not found proofs relationship between return on assets and capital ratio in the case of Morocco.

In conformity with our previous expectations, it was found that the effect of asset quality or loan quality, on profitability was negative. Lack of experience among MENA banks in controlling their lending's compared to well-developed banking systems, often led to risky loans which increases their loan loss provisions inducing thus a decrease of their profitability. Similar results were found in recessionary and expansionary contexts showing that MENA banks do not control for macroeconomic fluctuations when they make loans decisions, which could be also the reason for their decreasing profits.

The cost to income ratio appeared to be an important determinant of profitability. We found strong significant and negative coefficients for the M ratio in each equation we estimated and this is in accordance with the theory. Particularly results go in hand with the findings of Pasiouras and Kosmidou (2007) that poor expenses management is the main contributor to poor profitability. Hence, the increase of the bank operating costs relative to the total income reduces the bank profitability. When costs increase banks generally transfer a part of this charge to its customers in the form of higher loan rates and/or lower deposit rates, thereby lowering their interest margins. This is not always possible because of market competition. Thus, banks seem to be obliged to compensate these costs by the remaining part of profits. In that instance the effects of lack of competence in managing bank costs induces the decrease

of the bank's profitability. Therefore, efficient cost management is a prerequisite for improved profitability for MENA banks. Apparently, the latter have not reached the required maturity level to be able to orient its increased spending to the direction and the objective of higher profits.

The effect of cost management on profitability remained negative in difficult economic contexts but also in prosperous periods with relatively similar coefficients (see Appendix (2)). This can indicate that its effect on bank profitability was not influenced by business cycle fluctuations. MENA banks uses high operating expenses with wider margins, they should improve the cost management efficiency in order to improve profitability.

Looking to the liquidity ratio, we did see a noteworthy implication on profitability during the first estimations and in relation with business cycle regimes in the case of Tunisia, Egypt and Morocco while for the case of Jordan, we noticed a significant positive association with the ROA during expansions and more during recessions showing banks exploit efficiently their deposits and transform them into loans to customers, which make the profits higher.

Finally, we assessed that generally in the case of Tunisian and Jordanian banks, the larger the bank the lesser is the profitability This negative effect appeared much more during recessions. Conversely, the increase in bank size through margins and acquisitions allowed Egyptian banks to gain more economy of scale, which enhanced their profits.

6. Conclusion

From this analysis, we draw some proposals to monitor bank profitability in MENA countries. Results show that MENA banks should support their capitalization through adequate regulation programs. To this aim they should reduce the proportion of non-performing loans to bank loans that ameliorate the asset quality and ensure greater profits. Moreover, Capitalization and asset quality should be considered attentively during recession since their implications are more pronounced during economic slowdowns. During prosperous times, banks should reinforce their liquidity position to earn additional profits.

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Figure 1: MENA Countries Business Cycles: 1980-2008

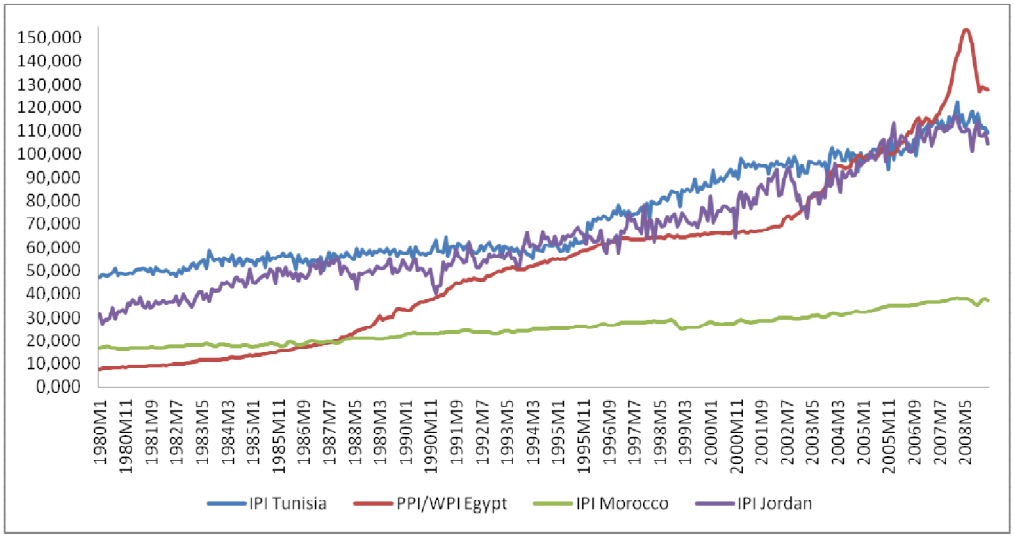

Figure 2: Filtered Probabilities of Recession

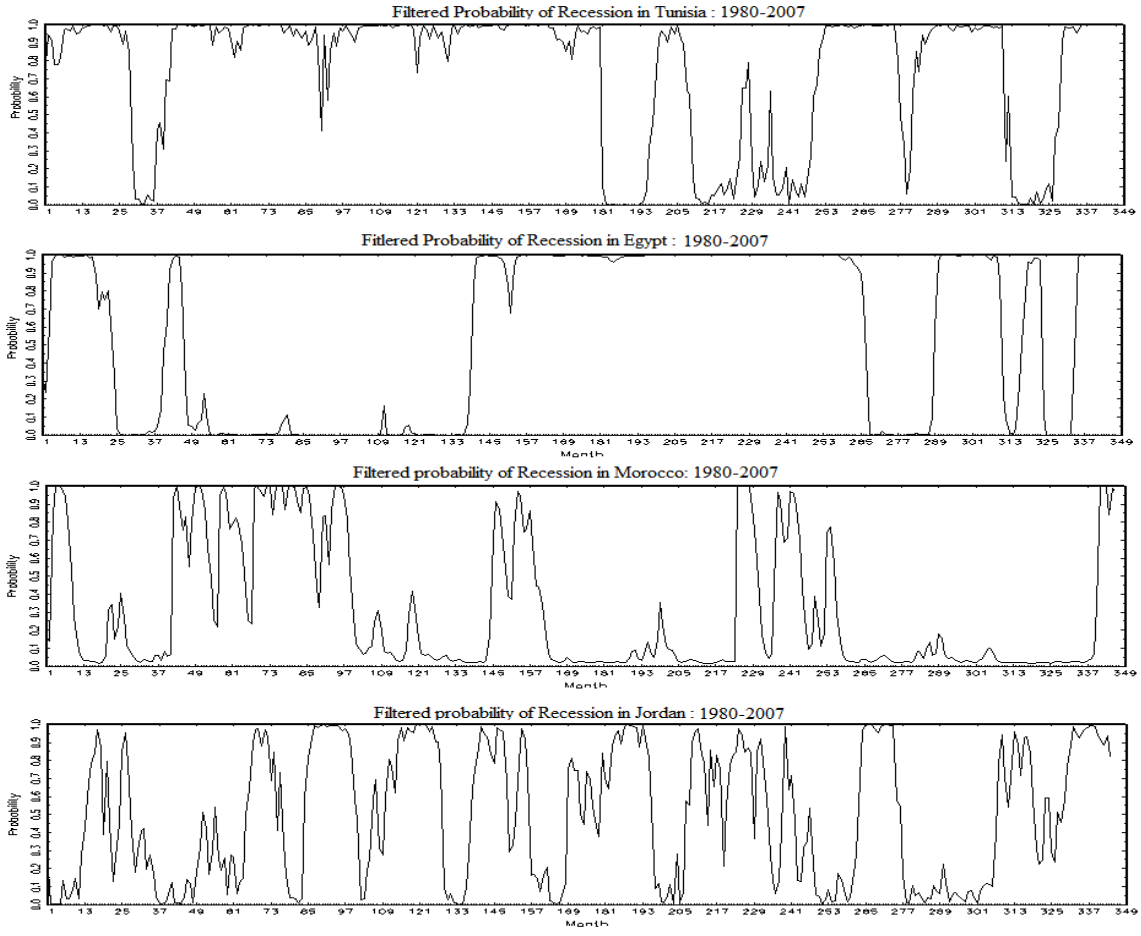

Table 1: Data Definition

Variable	Code	Proxy	Data Source
Bank profitability			Bankscope
Return On Assets	ROA	Net income / Total Assets	
Bank specific determinants			Bankscope
Bank size	S	Log (Total assets)	
Capital adequacy	C	Equity / Assets	
Asset quality	A	LLP/Net Interest revenue	
Cost Management	M	Cost/Income	
Liquidity	L	Net Loans / Tot Assets	
Business Cycle	BC	IPI (monthly)	IMF

Table 2: MS(2)AR(0) Estimation Results

	Parameters	Estimates	Standard-errors	Pvalue.
Tunisia	P_{11}	0,979	0,010	0,000
	P_{22}	0,933	0,030	0,000
	β_1	-0,361	0,052	0,000
	β_2	1,077	0,114	0,000
	σ_1	0,559	0,052	0,000
	σ_2	0,752	0,122	0,000

	Parameters	Estimates	Standard-errors	Pvalue.
Morocco	P_{11}	0,937	0,035	0,000
	P_{22}	0,969	0,015	0,000
	β_1	-0,320	0,167	0,057
	β_2	0,138	0,042	0,001
	σ_1	2,423	0,386	0,000
	σ_2	0,321	0,037	0,000

	Parameters	Estimates	Standard-errors	Pvalue.
Egypt	P_{11}	0,974	0,012	0,000
	P_{22}	0,964	0,015	0,000
	β_1	-0,728	0,043	0,000
	β_2	0,875	0,067	0,000
	σ_1	0,246	0,028	0,000
	σ_2	0,498	0,059	0,000

	Parameters	Estimates	Standard-errors	Pvalue.
Jordan	P_{11}	0,917	0,041	0,000
	P_{22}	0,915	0,028	0,000
	β_1	-0,590	0,152	0,000
	β_2	0,611	0,145	0,000
	σ_1	0,657	0,078	0,000
	σ_2	0,616	0,076	0,000

Table 3: Annual Business Cycle Chronology in MENA Countries

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TN	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	1
EG	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
MO	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1
JR	0	0	0	0	1	0	0	1	0	0	0	1	1	0	1	1	1	0

Table 4: System Dynamic Model estimations: summary of results

y_{t-1}	Expansion	Recession	T
Tunisia	0.578***	0.187**	0.541***
Egypt		0.155**	0.202***
Morocco	0.445***	####	0.505***
Jordan		0.251*	0.189**
MENA		0.135**	0.107**

S	Expansion	Recession	T
Tunisia		-0.227***	-0.120*
Egypt	0.465*		
Morocco		####	
Jordan			-0.205***
MENA			

C	Expansion	Recession	T
Tunisia	0.0770***	0.0408**	0.0799***
Egypt		0.161***	0.151***
Morocco		####	
Jordan	0.0476***	0.0585**	0.0339***
MENA	0.0525***	0.0764***	0.0723***

A	Expansion	Recession	T
Tunisia	-0.0103***	-0.0113***	-0.0105***
Egypt	-0.00911**	-0.00593***	-0.00858***
Morocco	-0.0127***	####	-0.0142***
Jordan	-0.0270***	-0.0199**	-0.0253***
MENA	-0.0145***	-0.0101***	-0.0106***

M	Expansion	Recession	T
Tunisia	-0.0150**	-0.0318***	-0.0218***
Egypt	-0.0359***	-0.0312***	-0.0307***
Morocco	-0.0308***	####	-0.0168**
Jordan	-0.0569***	-0.0336**	-0.0407***
MENA	-0.0410***	-0.0355***	-0.0417***

L	Expansion	Recession	T
Tunisia			
Egypt		0.0244**	
Morocco		####	
Jordan	0.0337**	0.0435**	0.0455***
MENA	0.0225***	0.0148*	0.0155**

*** p<0.01, ** p<0.05, * p<0.1

N.B. Results for Morroco during recession are not reported since the model cannot be fitted due to very few data: Morroco experienced only 2 years of recession during the sample period

Appendix 1: Descriptive Statistics

Tunisia		Mean	Std, Dev,	Min	Max	Observations
ROA	O	**0,953**	0,880	-1,590	4,830	N = 243
	B		0,590	-0,572	2,213	n = 20
	W		0,697	-2,850	3,570	T-bar = 12,15
S	O	**6,663**	1,181	3,405	8,527	N = 243
	B		1,179	4,439	8,059	n = 20
	W		0,393	5,297	7,848	T-bar = 12,15
C	O	**13,302**	12,185	0,450	91,670	N = 244
	B		14,553	3,043	51,523	n = 20
	W		5,637	-23,020	53,450	T-bar = 12,2
A	O	**41,389**	37,461	-137,500	255,560	N = 239
	B		21,355	11,535	97,607	n = 20
	W		33,312	-107,646	199,342	T-bar = 11,95
M	O	**52,169**	16,633	20,240	100,000	N = 238
	B		17,785	23,115	87,581	n = 20
	W		8,294	30,344	86,512	T-bar = 11,9
L	O	**64,561**	16,535	2,030	88,330	N = 211
	B		14,966	31,720	80,017	n = 16
	W		10,305	15,861	104,942	T-bar = 13,1875

Egypt		Mea	Std, Dev,	Min	Max	Observations
ROA	O	**1,148**	1,434	-6,070	6,570	N = 425
	B		0,943	-0,381	4,284	n = 31
	W		1,140	-6,039	4,860	T-bar = 13,7097
S	O	**8,162**	1,497	4,913	12,269	N = 425
	B		1,374	5,698	11,290	n = 31
	W		0,577	6,452	10,674	T = 13,7097
C	O	**9,125**	5,144	-12,570	26,810	N = 430
	B		4,382	3,256	18,914	n = 31
	W		2,872	-12,509	20,734	T-bar = 13,871
A	O	**53,732**	53,221	-91,333	293,030	N = 349
	B		33,363	5,558	112,635	n = 29
	W		41,452	-100,706	240,695	T-bar = 12,0345
M	O	**49,483**	17,615	20,060	100,000	N = 408
	B		8,715	34,683	71,127	n = 31
	W		15,530	13,786	106,489	T-bar = 13,1613
L	O	**43,275**	15,080	0,500	91,670	N = 430
	B		13,308	14,479	84,193	n = 31
	W		9,644	4,407	66,730	T-bar = 13,871

Morocco		Mean	Std, Dev,	Min	Max	Observations
ROA	O	**0,894**	0,641	-1,290	2,770	N = 145
	B		0,609	-0,338	1,970	n = 13
	W		0,424	-1,063	2,178	T-bar = 11,1538
S	O	**10,071**	1,293	2,833	12,033	N = 149
	B		2,393	3,315	11,131	n = 13
	W		0,428	9,035	11,296	T-bar = 11,4615
C	O	**9,328**	4,335	0,700	36,500	N = 147
	B		3,592	5,534	17,620	n = 13
	W		3,280	-1,640	29,410	T-bar = 11,3077
A	O	**21,659**	31,480	-93,080	288,900	N = 116
	B		79,787	-4,749	288,900	n = 12
	W		16,297	-66,672	101,358	T-bar = 9,66667
M	O	**52,363**	9,342	39,430	88,430	N = 115
	B		13,070	44,642	87,110	n = 12
	W		5,370	34,112	77,262	T-bar = 9,58333
L	O	**44,948**	21,053	0,320	100,000	N = 147
	B		19,816	4,774	71,117	n = 13
	W		7,055	11,613	78,283	T-bar = 11,3077

Jordan		Mean	Std, Dev,	Min	Max	Observations
ROA	O	**1,084**	1,012	-4,420	4,460	N = 158
	B		0,516	0,444	2,378	n = 11
	W		0,900	-3,780	5,100	T-bar = 14,3636
S	O	**6,902**	1,655	3,262	10,554	N = 158
	B		1,683	4,539	9,930	n = 11
	W		0,540	4,883	8,373	T-bar = 14,3636
C	O	**8,246**	8,351	-31,370	39,080	N = 158
	B		6,521	-7,591	18,953	n = 11
	W		5,908	-15,533	36,517	T-bar = 14,3636
A	O	**15,848**	22,635	-44,090	119,230	N = 151
	B		13,421	-16,813	33,304	n = 11
	W		19,884	-47,114	101,774	T-bar = 13,7273
M	O	**57,272**	15,431	22,450	100,000	N = 158
	B		11,812	31,597	74,730	n = 11
	W		11,817	29,072	86,355	T-bar = 14,3636
L	O	**43,480**	7,495	27,060	61,220	N = 158
	B		5,202	36,208	53,304	n = 11
	W		5,780	26,629	58,334	T-bar = 14,3636

MENA		Mean	Std. Dev.	Min	Max	Observations
ROA	O	1,051	1,153	-6,070	6,570	N = 971
	B		0,752	-0,572	4,284	n = 75
	W		0,920	-6,136	5,067	T-bar = 12,9467
S	O	7,876	1,820	2,833	12,269	N = 975
	B		1,852	3,315	11,290	n = 75
	W		0,508	5,857	10,388	T-bar = 13
C	O	10,055	8,131	-31,370	91,670	N = 979
	B		8,934	-7,591	51,523	n = 75
	W		4,327	-26,268	50,202	T-bar = 13,0533
A	O	39,240	44,661	-137,500	293,030	N = 855
	B		42,050	-16,813	288,900	n = 72
	W		33,386	-115,199	226,202	T-bar = 11,875
M	O	51,878	16,376	20,060	100,000	N = 919
	B		13,039	23,115	87,581	n = 74
	W		12,335	16,181	108,884	T-bar = 12,4189
L	O	48,317	17,831	0,320	100,000	N = 946
	B		15,721	4,774	84,193	n = 71
	W		8,892	-0,383	88,698	T-bar = 13,3239

O: Overall **B: Between** **W: Within**

Appendix 2: System Dynamic Panel Model: Estimation Results

Tunisia	Expansion	Recession	T
y_{t-1}	0.578***	0.187**	0.541***
	(0.0850)	(0.0810)	(0.0616)
S	-0.0550	-0.227***	-0.120*
	(0.119)	(0.0828)	(0.0708)
C	0.0770***	0.0408**	0.0799***
	(0.0284)	(0.0179)	(0.0158)
A	-0.0103***	-0.0113***	-0.0105***
	(0.00260)	(0.00191)	(0.00180)
M	-0.0150**	-0.0318***	-0.0218***
	(0.00620)	(0.00445)	(0.00343)
L	0.000831	0.00533	0.00291
	(0.00978)	(0.00945)	(0.00585)
Constant	0.863	4.741***	2.814***
	(1.010)	(0.921)	(0.696)
Sargan test [a]	$\chi^2(51)$	$\chi^2(90)$	$\chi^2(139)$
	54.11673	84.81199	126.9216
Prob > χ^2	0.3563	0.6347	0.7600
Observations	57	87	123
N	12	14	13

Egypt	Expansion	Recession	T
y_{t-1}	-0.117	0.155**	0.202***
	(0.198)	(0.0769)	(0.0640)
S	0.465*	-0.0598	-0.00842
	(0.266)	(0.0973)	(0.0851)
C	0.0999	0.161***	0.151***
	(0.0993)	(0.0241)	(0.0217)
A	-0.00911**	-0.00593***	-0.00858***
	(0.00418)	(0.00203)	(0.00178)
M	-0.0359***	-0.0312***	-0.0307***
	(0.0139)	(0.00593)	(0.00506)
L	0.00759	0.0244**	0.0143
	(0.0271)	(0.0106)	(0.00906)
Constant	-3.256	2.807**	2.732**
	(3.913)	(1.176)	(1.072)
Sargan test [a]	$\chi^2(29)$	$\chi^2(171)$	$\chi^2(217)$
	19.46727	173.6885	232.6546
Prob > χ^2	0.9087	0.4283	0.2219
Observations	38	171	209
N	20	27	27

Morocco	Expansion	T
y_{t-1}	0.445***	0.505***
	(0.0879)	(0.0883)
S	0.0334	0.0605
	(0.0963)	(0.0932)
C	0.00507	0.00161
	(0.0103)	(0.00916)
A	-0.0127***	-0.0142***
	(0.00309)	(0.00346)
M	-0.0308***	-0.0168**
	(0.00810)	(0.00692)
L	0.00719	0.00354
	(0.00995)	(0.00967)
Constant	1.567	0.672
	(1.304)	(1.192)
Sargan test [a]	$\chi^2(77)$	$\chi^2(94)$
	0.7223	0.9479
Prob > χ^2		
Observations	63	73
N	9	9

*** p<0.01, ** p<0.05, * p<0.1

[a] The test for overidentifying restrictions in GMM system dynamic model estimation

[b] Results for Morroco during recession are not reported since the model cannot be fitted due to very few data:

Appendix 2 (Cont'd)

Jordan	Expansion	Recession	T
y_{t-1}	-0.00394	0.251*	0.189**
	(0.119)	(0.138)	(0.0817)
S	-0.167	-0.0825	-0.205***
	(0.102)	(0.127)	(0.0719)
C	0.0476***	0.0585**	0.0339***
	(0.0151)	(0.0284)	(0.0117)
A	-0.0270***	-0.0199**	-0.0253***
	(0.00606)	(0.00922)	(0.00406)
M	-0.0569***	-0.0336**	-0.0407***
	(0.00992)	(0.0143)	(0.00689)
L	0.0337**	0.0435**	0.0455***
	(0.0144)	(0.0171)	(0.0109)
Constant	6.198***	3.630*	5.858***
	(1.556)	(1.984)	(1.039)
Sargan test [a]	$\chi^2(61)$	$\chi^2(47)$	$\chi^2(123)$
	59.44027	42.28957	127639
Prob > χ^2	0.5327	0.6677	0.3690
Observations	56	47	103
N	11	10	11

MENA	Expansion	Recession	T
y_{t-1}	0.0937	0.135**	0.107**
	(0.0605)	(0.0631)	(0.0427)
S	-0.00181	-0.0170	-0.0281
	(0.0385)	(0.0884)	(0.0477)
C	0.0525***	0.0764***	0.0723***
	(0.00883)	(0.0136)	(0.00851)
A	-0.0145***	-0.0101***	-0.0106***
	(0.00189)	(0.00205)	(0.00161)
M	-0.0410***	-0.0355***	-0.0417***
	(0.00519)	(0.00527)	(0.00387)
L	0.0225***	0.0148*	0.0155**
	(0.00707)	(0.00897)	(0.00679)
Constant	3.065***	3.475***	3.901***
	(0.577)	(0.976)	(0.586)
Sargan test [a]	$\chi^2(201)$	$\chi^2(231)$	$\chi^2(331)$
	211.5625	221.6576	369.5876
Prob > χ^2	0.2908	0.6589	0.0707
Observations	198	248	417
N	51	55	56

*** p<0.01, ** p<0.05, * p<0.1

[a] The test for overidentifying restrictions in GMM system dynamic model estimation