

## **Determinants of Operating Efficiency for Lowly and Highly Competitive Banks in Egypt**

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## **Abstract**

This paper examines the contribution of the Egyptian banks financial aspects to their operating efficiency. The paper introduces a link between banks relative competitive position and operating efficiency through examining the financial profile of the highly versus the lowly competitive banks. The sample includes twenty four commercial banks covering the period 2001-2008. The statistical methodology utilizes the benefits of the “Partial Adjustment Model” that measures the extent to which bank financial performance affects its operating efficiency. The results show that, in the highly competitive banks, the operating efficiency is positively and significantly affected by the asset quality, capital adequacy, credit risk and liquidity of banks. This provides clear evidence that the highly competitive banks in Egypt are distinguished from lowly competitive banks through their carefully-designed financial policies.

## **Introduction**

The vital role of the financial institutions in countries economic development is well cited in the literature. It is widely recognized that the operating efficiency of the financial institutions supports their functionality in the economy. The financial institutions in developing countries are much concerned with their operating efficiency in particular since the financial development is not anymore to certain economy but indeed guided by universal guidelines. World banks are, for example, guided by the Basel regulations. This calls for banks in the developing countries to continuously examine their operating efficiency.

This paper takes a forward looking at the issue of operating efficiency through creating the link between bank operating efficiency and its relative competitiveness. The latter is measured by the relative ratio of bank net interest revenue to the total net interest revenue in all banks. This is a well-known measure of the relative market share of financial institutions.

The orientation of this paper is based on the understanding that bank's operating efficiency has to help improve the bank's net interest income and eventually help the bank expand its market share.

### **Research Objectives**

This research aims at providing a practical answer to the question of "how do competitive banks improve operating efficiency?" The authors examine the answer to this question using data about the rated commercial banks in Egypt. The authors use banks' market share as a measure of competitiveness. The understanding is that competitive banks have relative market share higher than other less competitive banks. The operating efficiency is measured by 'operating efficiency ratio.' The objective of the statistical analysis in this research is to provide robust results of the

financial determinants of operating efficiency for the highly competitive banks. In this case, bank financial ratios (Asset quality, Capital Adequacy, Credit Risk, Liquidity and Profitability) are used as the explanatory variables that affect banks' operating efficacy.

### **Research Contribution**

This research contributes to the current literature as follows.

- 1- According to the previous studies, this paper takes a forward looking at bank's operating efficiency through linking it to bank relative competitive position in the market.
- 2- As far as the author's knowledge is concerned, this paper is the first paper in Egypt that examines the relationship between bank operating efficiency, bank financial performance and the relative competitive position.

The paper is organized as follows. Section I reviews the importance of financial sector. Section II reviews the evolution and developments in the Egyptian banking sector. Section III discusses the relevant literature on the determinants of competitiveness and efficiency in the banking sector. Section IV describes the data and the statistical methodology. Section V discusses the results of the analysis. Section VI concludes.

## **I. Importance of Financial Sector to Economic Growth**

Financial sector, especially in developing countries, is the corner stone for nations' economic growth and development. Thus, efficient and competitive financial sectors help enhance and improve economic growth and development. Consequently, many developing countries have initiated financial sector reforms to enhance competition and efficiency in the financial sector. In many countries, policy makers were facing the problem that banks are state owned. This means that such banks are suffering from political interference and as a result their financial intermediation efficiency is deteriorated. The main aim of the reform is to restructure state-owned institutions through privatization and lower the barriers for entry of international financial institutions to make the financial sector more efficient and competitive (Barth, Caprio et al. 2003). When financial institutions become more efficient and competitive, this leads to a better allocation of individual and institutions savings to more productive investments that improve economic growth. The importance of financial reform to economic growth in the academic literature is vague. Many studies have shown that financial reforms are expected to result in a higher competitive banking sector, better saving mobilization and efficient allocation of resources to enhance nations' economic growth (Besanko and Thakor 1992; Levine 1997; Classens and Laeven 2004). On the other hand, some papers develop a link between the implementation of financial reform and the vulnerability of financial systems which result in financial and economic crisis (Rajan 1992; Allen and Gale 2000).

It is worth noting that the role of financial sector on countries' economic development has been of great concern during the last few years, especially during the financial crisis. This is mainly because private sectors were highly dependent on the credit market in which banks and other financial institutions are the key players. Saving mobilization, credit allocation across markets,

implementation of economic liberalization program and increase in cross border trade and foreign direct investment resulted in the initiation of globalized financial markets. This means that credit has to flow smoothly across countries and continents to facilitate investment and economic growth. That is, the role of a competitiveness and efficient financial sector is crucial for economic development and growth in developing countries. In their study, (Kirkpatrick, Murinde et al. 2008) assure the significance of competitiveness and efficiency of financial sector in African countries – mainly the largest four economies i.e. South Africa, Algeria, Egypt and Nigeria- since the economies are service oriented. They stress on the importance of doing extensive research on different African countries, especially the above mentioned four African countries, since these countries are implementing difficult and crucial financial reforms. In these economies policy makers need to evaluate the effect of reforms on their financial sector especially in the wake of current global financial crisis.

## **II. The Banking Sector in Egypt**

The Egyptian financial sector is well established and huge. It provides wide range of financial services ranging from commercial banking, insurance, mortgage lending and financial advisory services. The vast majority of Egyptians (approximately 77,307,143 people)<sup>1</sup> are using consumer banking and insurance services. This is not the case for mortgage market as it is still infancy. The Central Bank of Egypt (CBE) is the main regulatory body that is responsible for regulating and managing the banking sector and the monetary system in general. CBE has classified banks' capital into two components: primary capital (paid-up capital and reserves) and other capital (provisions for general banking risk and subordinated long-term loans of at least five-year

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<sup>1</sup> [http://www.trueknowledge.com/q/what\\_is\\_the\\_population\\_of\\_egypt\\_2010](http://www.trueknowledge.com/q/what_is_the_population_of_egypt_2010)

maturity). CBE has established general rules and guidelines to keep the Egyptian banking industry safe and sound. One of these rules is that the primary capital should be at least 50% of the capital adequacy ratio. In addition, the provisions for general banking risks should not exceed 1.25% of the risk weighted assets. Moreover, the subordinate loans would account for no more than 50% of primary capital.

In April 2003, the Egyptian banking sector included 57 banks classified as follows: 28 commercial banks (out of which 4 are state-owned banks<sup>1</sup>), 26 investment banks (out of which 11 were joint venture banks and 15 foreign banks) and 3 other specialized banks. Due to privatization of governmental banks, consolidation of smaller banks, a series of acquisitions, mergers, and revoking of licenses of banks that do not comply to capital adequacy constraint of Basel Accord II, the number of Egyptian banks has been reduced to 37 banks in 2010. These are classified as follows: 24 commercial, 1 real estate and mortgage, 3 investment banks, 3 Islamic banks, 5 specialized governmental credit institutions, 1 bank holding company<sup>2</sup>. The state-owned banks' shares in 15 joint-venture banks,<sup>3</sup> accounting for 20 percent of the system's assets, were also divested.

In spite of the fact that Egyptian financial sector is not as well established as in other developed countries; it is obvious that the Egyptian banking sector plays a crucial role in terms of the sector's contribution to the overall economic growth. This is supported by the fact that Egyptian banking sector commands for more than 60% of financial assets in the economy where the

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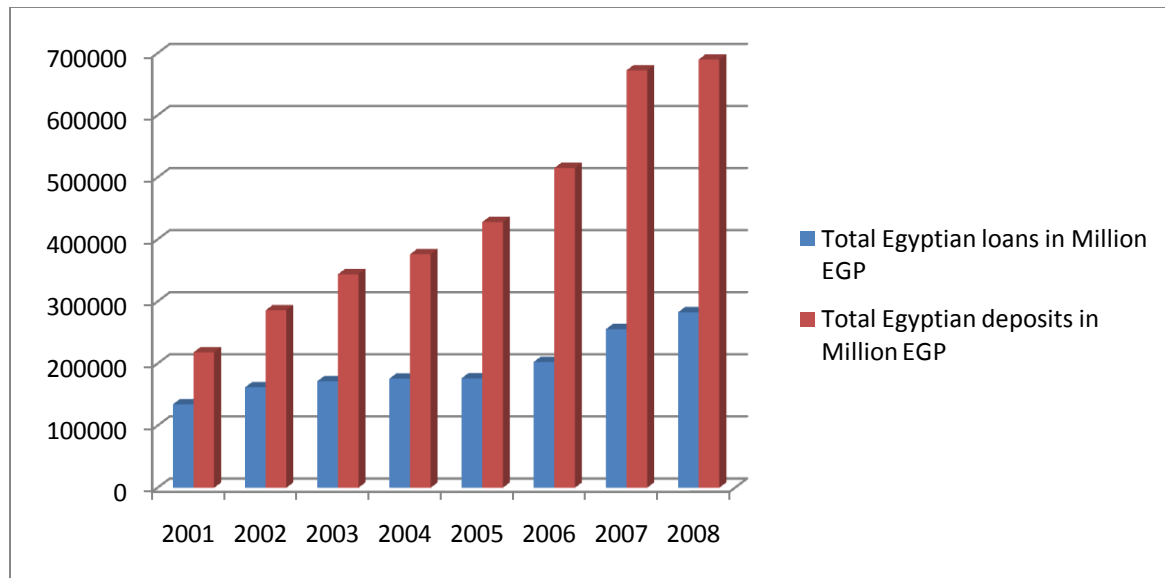
<sup>1</sup> National Bank of Egypt, Banque du Caire, Banque Misr and Bank of Alexandria

<sup>2</sup> Based on Bankscope database that contains the financial statements and data of over 11,000 public and private banks worldwide.

<sup>3</sup> This includes the four largest holdings, namely, National Société Générale Bank (NSGB), Misr International Bank (MIBank), Egyptian American Bank (EAB), and Commercial International Bank (CIB).

deposits-to-GDP ratio reached nearly 100% as of June 2008 (Poshakwale and Qian 2009) . This percentage is much higher than the world average and substantially higher than many developed economies. However, little portion of deposits are channeled to finance real and private-owned enterprises but allocated mainly to finance government deficit or extending loans for unsuccessful state-owned enterprises. Banks, especially state-owned banks, are using huge amount of deposits in investing in treasury bills and government bonds, holding about 91 percent and 70 percent of the outstanding respectively as of June 2008. Consequently, the small and medium-size enterprises (SMEs) –which are the majority of Egyptian firms- depend on informal markets and/or their own funding to finance their projects. This is supported by the fact that the ratio of private credit to total credit has declined from 70% in 2000 to 66% in 2008 (Nasr 2009). In sum, the main source of finance for large corporation operating in Egypt are state-owned banks; while SMEs depend mainly on private, joint venture, specialized state-owned banks and foreign banks to finance their projects. It is worth noting that 70% of total loans are extended to large corporate sector, while the remaining 30% account for SMEs and retail lending (20% and 10%, respectively)(Nasr 2009). Subsequently, the loan distribution in Egypt is quite concentrated and has a negative impact on banks' credit risk and product diversification.

Figure 1 provides an overview of the growth in bank deposits and loans. Egyptian bank loans and deposits have grown steadily over time. Loans grew from L.E. 134,444 million in 2001 to L.E. 282,691 million in 2008 showing a massive increase that reaches about 110%. In addition, deposits have increased during the same period from LE 218,272 million in 2001 LE 649,953 million in 2008 (CBE 2009) .



Source: The author's work

In the last few years, the Egyptian banking sector faced serious problems. This is due to the fact that, before 1990, the Egyptian banking sector was controlled mainly by state-owned banks (Dobronogov and Iqbal 2005). Egyptian government imposed barriers against the entry of foreign banks. This is done by applying restrictive regulations such as special licenses and permits that deter new entry as well as branch expansion. Non-profitable banks were supported by the government and were left to operate while measures such as restructuring and merging were not applied. Accordingly, banks operating efficiency was at risk since inefficient banks were left to operate and undertake high-risk activities; while efficient banks were forced to subsidize them. These institutionalized attitudes have resulted in an inefficient and uncompetitive banking sector which consequently has led to a poor level of financial intermediation. As stated earlier, government-owned banks were not motivated to serve small and medium private enterprises simply because they were generating guaranteed income by investing in government securities. This operational strategy affected the Egyptian economy negatively as small and

medium private enterprises are the backbone of the economy and needed access to banking products as much as large corporations.

Non-performing loans (NPL) was another major problem that faced the Egyptian banking sector during that period. In the late 1990, NPL accumulated and reached its peak. This was mainly due to many factors such as severe corruption associated with the lending activity, the weak supervision by CBE, lack of financial innovation, poor quality of governance structure and poor asset quality. In addition, the Egyptian government forced banks to lend state-owned companies; which resulted in 30 billion EGP was owed by such companies to the four state-owned banks. Unfavourable lending terms was another significant problem facing the Egyptian banking sector. Banks prefer to over-collateralize rather than making their credit decision on cash-flows. This approach affects the Egyptian credit market negatively and increases the lending costs. In the same line, banks in Egypt are suffering from inadequate and insufficient credit information about their clients' creditworthiness and sector –related statistics. Consequently, bankers' credit decisions were negatively affected and NPL accumulation was not surprising.

The Egyptian government started to implement the first stage of the Financial Sector Reform Program (2004-2008), authorized in September 2004. The first stage focused on four pillars: (1) removing government demonization on banking sector and restructuring state-owned banks, (2) raising the minimum capital requirement for banks, (3) strengthening the banking supervision at CBE, (4) addressing of the problem of NPL.

The Egyptian government started with the privatization of state owned banks and the divesture of the shareholding in a number of joint ventures and foreign banks. The privatization program was first put into practice within the five year plan 1992/93-97-98. In 1993, The Commercial

International Bank (CIB) issued 57% of its shares as initial public offering. The National Bank of Egypt issued 20% of its equity stake through Global Depositary Receipts (GDR) on the London Stock Exchange. In October 2006, 80% of Bank of Alexandria's stake - the fourth largest state-owned bank<sup>1</sup> - was sold to Italy's Sanpaolo IMI Group for US\$1.61 billion. The Egyptian government supported this action by spending EGP 6.9 billion, owed by public companies to the bank to settle bank's loan portfolio. Moreover, Banque du Cairo, the third largest public bank, privatization will generate expected revenue of USD 2.4 billion. An estimated 80% of the expected revenue will be used to cover banks' non performing loans. The government modified banking and credit law to encourage the entry of more foreign banks. This is done by removing the 49% ceiling on foreign ownership of Egyptian banks. Finally, the Banking Reform Unit at the CBE started to establish new departments in state-owned banks, particularly for risk management, information technology and management information system as a step for financial and management restructuring. This is followed by auditing – according to the international accounting standards- all the financial statements of state-owned banks during the period from 2004 to 2007. The aim of such phase was to increase competition and reduce concentration in the banking sector

In July 2003, Egyptian parliament passed a new banking sector law (Law No. 88/2003) requiring a minimum capital requirement of EGP 500 million for domestic banks and US\$ 50 million for branches of foreign banks. Additionally, the ratio of banks' minimum capital requirements to their risk weighted assets has increased to 10% and an additional capital injection to all state-owned banks has been implemented. This new law forced many banks into mergers and

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<sup>1</sup> Accounting for 7% of the Egyptian banking system's assets and offers wide range of corporate and retail financing products and services through a network of 188 branches and outlets across the country and in most governorates. Its privatization is expected to bring enhanced management practices, new technologies, and additional capital through higher levels of foreign participation

acquisitions to meet the new capital requirements. This is followed by liberalization of government to deposit and lending rates as well as allowing banks to set their own service charges and fees. Furthermore, the government rescheduled more than 45% of NPLs (26 billion EGP) and the outstanding loans of state-owned enterprises to state –owned banks. This is done by swapping such loans for long-term government bonds to be repaid by debtor firms over 20 years. Each banking institution was obliged to install an internal audit department to avoid future recurrences of NPLs. The Egyptian government started to execute the final financial reform phase which is strengthening regulatory supervision by CBE. The purpose of such reform is to assure that CBE’s supervisory role matches the latest international standards. The supervisory method implemented by CBE focused on evaluation of risks and assessment of the Egyptian Banks’ abilities to identify current and future risk.

After the completion of the first stage of the reform program, the government focused on implementing the second stage of banking sector reform. The main objective of the second stage was to implement the full Basel Accord II in the banking sector by the bank’s supervision sector through addressing the three risk exposures facing banking institutions. These risks are credit risk, operational risk and market risk rather than accounting only for credit risk exposure. The second stages included as well the full restructuring and mergers between state-owned banks. In addition, in the second stage of reform, banks were urged to enhance risk management and internal control, improve disclosure and transparency, and establish good governance rules. In this context, in January 2009, an agreement was signed between CBE and the European Central Bank and seven European Central banks to provide a three-year technical assistance program to assist in implementing Basel II in the Egyptian banking sector. Finally, starting from January 2010, registered banks are obliged to prepare their financial statements in accordance with the

Egyptian Accounting Standards<sup>1</sup>, in conformity with the International Accounting Standards and the International Financial Reporting Standards (IFRS). This obligation helps the Egyptian banks enhance the disclosure of banks' financial statements and transparency of their financial position and operation outcomes.

### **III. Determinants of Competitiveness and Efficiency for the Banking Sector**

Competition in the financial sector – especially banks- is of great importance to country's economic growth. The degree of competition in the financial sector results in higher efficiency of financial services, better quality of financial products and improves the degree of financial innovation. The access of firms and households to financial services is also influenced by the degree of competition in the financial sector (Classens and Laeven 2004). (Besanko and Thakor 1992)) confirmed that governments can achieve the desired economic growth rate by increasing banking sector competitiveness.

According to the relevant literature, bank competition can be measured by two main streams which are the structural and non-structural approaches. The structural approach constitutes a natural link between concentration and competition (Bikker and Haaf 2000). It includes two models. The first model is the structure-conduct-performance paradigm and the second model is efficiency hypothesis. The former model states that market performance is greatly affected by exogenous factors related to market structure, explicitly basic demand and supply condition which affect banks' performance in the industry. It is used to test whether higher level of concentration in the market causes collusive behavior among the larger banks and thus results in superior performance (Gilbert 1984; Molyneux, Lloyd-Williams et al. 1993). The latter model ,

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<sup>1</sup>In 2008, CBE's Board of Director approved the rule entitled “ preparation and presentation of banks' financial statements and the principles of recognition and measurement”

developed by (Demsetz 1973) and (Peltzman 1977) investigates the relationship between market structure and performance through claiming that highly efficient banks gain market share by reducing prices due to their profit maximizing behavior (Berger 1995). That is, market concentration is resulted from the superior efficiency of leading banks.

On the other hand, the non-structure approach states that competition can be measured directly without using the relationship between structure, conduct and performance. Competition under non-structure approach can be measured using factors such as revenue behavior, risk profiles and entry and/or exit barriers. Two non-structure measures of competition, namely the Bresnahan model and the Panzar and Rosse approach were developed. The former states that the general market equilibrium model is used in the essence that profit maximizing firms will achieve equilibrium by choosing prices and quantities that equate marginal costs to their perceived revenues. This ultimately agrees with the demand price under perfect competition (Bresnahan 1989). The alternative approach uses firm (or bank) – level data to investigate the extent to which a change in factor input prices is reflected in (equilibrium) revenues earned by a specific bank (Panzar and Rosse 1987). Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount as the rise in costs. This is not the case under monopoly where increases in input prices will increase marginal costs, reduce equilibrium output and thus will reduce total revenues.

Two strands in the literature have been discussed concerning bank competition and financial stability. The traditional view of “Competition–fragility” stating that high bank concentration erodes market power, resulting in lower profit margins and accordingly reduces banks’ franchise value that encourages bank risk taking to increase return (Jimenez, Lopez et al. 2007). The second alternative view is the “Competition-stability” contending that more market power in the

loan market will increase bank risk as high interest rates on loans result in the default of loan customer and aggravate moral hazards incentives of borrowers to shift into risks. It is noted that highly concentrated banking market motivate institutions to accept more risk as they believe that they are too big to fail and that they are explicitly or implicitly protected by the government safety net. This is well supported by recent empirical studies stating that the risk of bank failure rises in more concentrated markets e.g. (Boyd, Nicolo et al. 2006; Nicolo and Loukoianova 2006).

The competitive condition in banking system has been investigated in many papers. (Berger and Hannan 1989)) main objective was to examine the relationship between market concentration and profitability using U.S. banks data during the period from 1983 to 1985. They conclude that noncompetitive price behavior could explain that relationship. Other studies have focused on how bank performance is affected by regulations and other factors supposed to relate to the competitive environment. It has been found that tighter entry restrictions are negatively linked to bank efficiency, leading to higher interests margins and overhead expenditures as well as increasing bank fragility (Barth, Jr. et al. 2004).

An efficient banking sector is able to absorb negative shocks and enhance financial system stability. Thus, many researchers focused in their publications on the best methodology to employ whether parametric or non-parametric to estimate bank efficiency (Aiger, Knoxlovel et al. 1977; Chames, W. et al. 1978). Bank efficiency is usually measured through both internal and external determinants. Bank accounts (balance sheet and/or profit and loss accounts) are used as internal determinants. The external determinants are variables not related to banks' management but reflect the economic and legal environment that affects the operation and performance of financial institution. As for internal determinants, many variables are proposed such as size,

capital and risk management. The size variable is considered as a milestone for determining bank efficiency. Generally, large banks are considered to be more efficient than small banks due to economies of scale and customer confidence level. However, very large banks can have negative impact on bank efficiency due to bureaucratic and other reasons. That is, a non-linear relationship can be drawn between bank size and bank efficiency. Credit risk is another important internal factor that affects bank efficiency. Since risk management is vital aspect for the operational and survival of banks, any changes in credit risk reflect on the health of banks' loan portfolio. That is, poor asset quality ultimately increases the chances of bank failure (Cooper, Jackson et al. 2003).

As for external determinants, researchers focused on the relationship between foreign ownership and bank efficiency. This is mainly due to four important reasons: (1) the fiscal costs of banking restructure is reduced through foreign capital investment (Tang, Zoli et al. 2000); (2) the quality of staff working in foreign banks may be more expert in risk management and may bring a better culture of corporate governance which results in better banking sector efficiency (Bonin, Hasan et al. 2005); (3) the entry of foreign banks will increase the competition in the banking sector market and thus forces domestic banks to cut cost in order to improve efficiency (Claessens, Demirguc-Kunt et al. 2001) and (4) technology transfer by foreign banks affects positively the domestic banks' operation and efficiency. Bank ownership and bank efficiency may be closely related to each other in a sense that private banks are considered to be more efficient than public or state-owned banks. This is supported by a study of (Barth, Caprio et al. 2003) stating a negative relationship between state ownership and an overall banking sector development and banking efficiency.

In this paper, the author seeks to contribute to the banking efficiency literature in emerging markets. To the best of author's knowledge, this research contributes to the literature of banks' operating efficiency, especially in the case of Egypt as a developing country adopting major banking reforms. This is supported by the fact that emerging countries are known for highly inefficient banking sector, resulting in losses to financial development and stability. Thus, research in different regions with different environmental and economic factors, may help regulators and managers achieve an efficient banking system.

#### **IV. Data and Research Method**

The data are obtained from the Bankscope<sup>1</sup> database. The sample of the study consists of 24 Egyptian commercial banks covering the period from 2001-2008 periods. The author focuses only on commercial banks to avoid comparison problems between various types of banks.

##### **Dependent Variables**

The dependent variable is bank operating efficiency ratio (OER). This ratio is calculated as follows.

$$\text{Operating Efficiency Ratio} = \frac{\text{interest income} + \text{non interest income} + \text{securities gains (or losses)}}{\text{interest expense} + \text{non - interest expense} + \text{provisions for loan losses} + \text{taxes}}$$

The bank competitiveness is measured by the ratio of net interest revenue of each bank at specific year to the total net interest revenue for all Egyptian banks at the same year. The methodology examines two levels of bank competitiveness. The low-competitive banks correspond to the 1<sup>st</sup> quartile of the data and the high-competitive banks correspond to 3<sup>rd</sup> quartile of the data.

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<sup>1</sup> Bankscope database contains the financial statements and data of over 11,000 public and private banks worldwide

## Independent Variables

The independent variables are the groups of bank financial performance. These are asset quality, capital adequacy, credit risk, liquidity and profitability. A detailed explanation of each variable is presented in Table (1). The methodology examines the effects of bank financial performance on bank operating efficiency. The estimating equation of the autoregressive model takes the form that follows.

$$y_{itk} = \alpha_k + \beta_{it-1k} y_{it-1k} + \sum_{i=1}^k \beta_{ik} X_{itk} + \varepsilon_{tk}$$

Where  $t = 1, \dots, n$

$y_{itk}$  = Bank Operating Efficiency Ratio.

$y_{it-1k}$  = Bank operating Efficiency in the previous period.

$X_{itk}$  = Bank financial indicators.

$\beta_{itk}$  = Coefficient of Bank financial indicators.

$\beta_{it-1k}$  = Speed of adjusting bank operating efficiency to a target level.

$\varepsilon_{tk}$  = estimation error

Table (1) List of the factors examined in the study

Factors (Predictors of Bank Performance)	Variables (Ratio/Proxy)	Definition
Asset Quality <sup>1</sup>	Loan Loss Provision / Net Interest Revenue (LLPNIR)	The ratio of loan loss provision to net interest revenue presents the relationship between provisions in the profit and loss account and the interest income over the same period. Ideally this ratio should be as low as possible. In a well-run bank, if the lending book is higher in risk, this would be reflected by higher interest margins. If the ratio deteriorates this means that risk is not being properly remunerated by margins.
	Loan Loss Reserve / Impaired Loans (LLRIL)	The ratio of loan loss reserve to the impaired loans or non-performing loan. The higher this ratio is the better provided the bank is and the more comfortable we will feel about the assets quality.
	Impaired Loans / Gross Loans (ILGL)	The ratio of impaired loans to gross loans (Loans + Loan loss reserve). This is a measure of the amount of total loans which are doubtful. The lower this figure is the better the assets quality.
	Net Charge-Off / Net Income before provision for loan losses (NCONIBLLP)	The ratio of net charge-off (the amount written off from loan loss reserves less recoveries from loans) to net income before loan loss provisions. Net charge-off over net income before loan loss provision ratio is measured similar to charge-offs but against income generated in the year. The lower this ratio is the better, other things being equal
	Impaired Loans / Equity (ILE)	The ratio of impaired loans to equity
	Unreserved Impaired Loans / Equity (UILE)	The ratio of unreserved impaired loans to equity
	Capital Adequacy	Tier 1 Ratio (TR)
Total Capital Ratio (TCR)		The ratio of total capital (Tier 1 + Tier 2) to risk-weighted asset and should be at least 8 %.
Equity / Tot Assets (CS)		The ratio of total equity to total assets. This is used as a proxy for banks' capital structure. This ratio measures the ability of the bank to withstand losses. A declining trend in this ratio may signal increased risk exposure and possibly capital adequacy problem.
Equity / Net Loans (ENL)		The ratio of total equity to net loans. This ratio measures the equity cushion available to absorb losses on the loan book.
Equity / Liabilities (EL)		The ratio of total equity to total liabilities. This leverage ratio is simply another way of looking at the equity funding of the balance sheet and is another way of looking at capital adequacy.
Equity / Deposit & Short-term Funding (EDSF)		The ratio of equity to total deposits and short term funding. This ratio measures the amount of permanent funding relative to short term potentially volatile funding. The higher this ratio is the better from bank risk perspective.
Capital Funds / Total Assets (CFTA)		The ratio of capital fund to total assets

<sup>1</sup> All definitions of Asset Quality, Capital, Operations and Liquidity are obtained from the Bank scope database.

	Capital Funds / Net Loans (CFNL)	The ratio of capital fund to net loans
	Capital Funds / Deposit & Short-term Funding (CFDSF)	The ratio of capital fund to deposits and short term funding
	Capital Funds / Liabilities (CFL)	The ratio of capital fund to total liabilities
	Subordinate Debt / Capital Funds (SDCF)	The ratio of subordinate debt to capital funds. This ratio indicates what percentage of total capital funds is provided in the form of subordinated debt.
	Equity multiplier (EM)	The ratio of total assets to total equity. This ratio measures how many times a dollar of equity is leveraged. A higher equity multiplier indicates higher financial leverage, which means the bank is relying more on debt to finance its assets, the more exposed to failure risk the bank is.
Profitability	Net Interest Margin (NIM)	This ratio is the net interest income (interest received minus interest paid) expressed as a percentage of earning assets (loans plus other earning assets excluding fixed assets). The higher this ratio, the cheaper the funding or the higher the margin the bank is commanding. Higher margins and profitability are desirable as long as the asset quality is being maintained
	Net Interest income / Average Assets (NIAA)	Net Interest Income over average assets indicates that the item is averaged using the net income expressed as a percentage of the total balance sheet.
	Other Operating Income / Average Assets (OIAA)	When compared to the above ratio, this indicates to what extent fees and other income represent a greater percentage of earnings of the bank. As long as this is not volatile trading income it can be seen as a lower risk form of income. The higher this figure is the better.
	Non Interest Expense / Average Assets (NIEAA)	The ratio of non interest expense to average total assets. Noninterest expenses or overheads plus provisions give a measure of the cost side of the bank's performance relative to the assets invested
	Pre-Tax Operating Income / Average Assets (PTOIAA)	The ratio of pre-tax operating income to average total assets. This is a measure of the operating performance of the bank before tax and unusual items. This is a good measure of profitability unaffected by one of non trading activities.
	Non Operating Items & Taxes / Average Assets (NOITAA)	The ratio of non operating items and taxes to average total assets This ratio measures costs and tax as a percentage of assets.
	Return On Average Assets (ROAA)	The ratio of net income to average total assets
	Return On Average Equity (ROAE)	The ratio of net profit to average Tier one capital plus average revaluation reserve.
	Dividend Pay-Out (DPO)	This is a measure of the amount of post tax profits paid out to shareholders. In general the higher the ratio the better but not if it is at the cost of restricting reinvestment in the bank and its ability to grow its business.
	Income Net of Distribution /	This ratio is effectively the return on equity after deducting the dividend from the return and it shows by what percentage the equity has increased from

	Average Equity (INODAE)	internally generated funds. The higher the better.
	Non Operating Income / Net Income (NOINI)	The ratio of non operating income to net income. This denotes to the percentage of total net income consists of unusual items.
	Cost To Income Ratio (CIR)	The ratio of overheads to the sum of net interest revenue and other operating income. This is one of the most focused on ratios currently and measures the overheads or costs of running the bank, the major element of which is normally salaries, as percentage of income generated before provisions. It is a measure of efficiency although if the lending margins in a particular country are very high then the ratio will improve as a result. It can be distorted by high net income from associates or volatile trading income.
	Recurring Earning Power (REP)	The ratio of Pre-provision income to average total assets. This ratio is a measure of after tax profits adding back provisions for bad debts as a percentage of Total Assets. Effectively this is a return on assets performance measurement without deducting provisions
	Net Profit Margin (NPM)	The ratio of net income to interest income plus non-interest income
	Asset Utilization (AU)	The ratio of interest income plus non-interest income to total assets
	Tax Management Efficiency (TME)	The ratio of net income to pre-tax operating income. This ratio reflecting the bank's use of security gains or losses and other tax-management tools (such as buying tax-exempt bonds) to minimize its tax exposure.
	Expense Control Efficiency (ECE)	The ratio of pre-tax operating income to interest income plus non- interest income. It measures the bank's effectiveness in controlling operating expenses.
Credit risk	Net Charge-Off / Average Gross Loans (NCOAGL)	The ratio of net charge-off to average gross loans. Net charge off or the amount written-off from loan loss reserves less recoveries are measured as a percentage of the gross loans. It indicates what percentage of today's loans have been finally been written off the books. The lower this figure the better as long as the write off policy is consistent across comparable bank
	Loan Loss Provision / Total Loans (LLPTL)	The ratio of loan loss provision to total loans
	Loan Losses Provision / Equity (LLPE)	The ratio of loan loss provision to total equity
	Loan Loss Reserve / Gross Loans (LLRGL)	The ratio of loan loss reserve to gross loans (loans plus loan loss reserves) indicates how much of the total portfolio has been provided for but not charged off. It is a reserve for losses expressed as percentage of total loans. Given a similar charge-off policy, the higher the ratio the poorer will be the quality of the loan portfolio
	Loan Loss Reserve / Equity (LLRE)	The ratio of reserve for loan losses to total equity
Liquidity	Interbank Ratio (IBR)	This is money lent to other banks (due from other banks) divided by money borrowed from other banks (due to other banks). If this ratio is greater than 100 then it indicates the bank is net placer rather than a borrower of funds in the market place, and therefore more liquid.

	Net Loans / Total Assets (LR)	This liquidity ratio indicates what percentage of the assets of the bank is tied up in loans. The higher this ratio the less liquid the bank will be. It is also known as the loan ratio
	Net Loans / Deposits & Short-term Funding (NLDSTF)	The loan to deposit ratio is a measure of liquidity in as much as high figures denotes lower liquidity.
	Net Loans / Total Deposits & Borrowing (NLTDB)	This similar ratio has as its denominator deposits and borrowings with the exception of capital instruments (where total deposits and borrowings = customer and short-term funding plus other funding minus hybrid capital and subordinated debt).
	Liquid Assets / Deposit & Short- Term Funding (LADSTF)	This is a deposit run off ratio that looks at what percentage of customer and short term funds could be met if they were withdrawn suddenly, the higher this percentage the more liquid the bank is and less vulnerable to a classic run on the bank. Liquid assets include cash and due from other banks plus deposits with other banks plus due from central banks plus trading securities.
	Liquid Assets / Total Deposits & Borrowing (LATDB)	This ratio is similar to the mentioned above but looks at the amount of liquid assets available to depositors as well as borrowers.

## V. Results

The methodology addresses the relationship between the Egyptian banks operating efficiency and the five categories of bank financial performance (Asset quality, Capital adequacy, credit risk, liquidity and profitability). The results of the analysis are reported in tables 2 to 6.

### 1. Asset quality

Table (2) Operating Efficiency & Asset Quality<sup>1</sup>

Variables	Levels of Competitiveness		
	High Competitiveness	Low Competitiveness	All Sample
<i>Dependent:</i> Operating Efficiency Ratio (OER)			
<i>Independents:</i>			
Constant	-2.752	1.069	1.517
Lag OER	1.456 (12.485)**		0.260 (1.570)
LLPNIR (Loan loss provision to net interest revenue)	-0.579 (-9.658)*	-0.092 (-2.744)***	-0.429 (-2.303)*
LLRIL (loan Loss reserve to Impaired loans)	4.084 (16.864)**		
NCONIBLLP (net charge off to net income before loan loss provision)		-0.405 (3.422)***	
ILE (Impaired loans to Equity)			-0.177 (-1.970)*
<i>N</i>	5	16	10
F statistics ( <i>Sig F</i> )	155.2*	10.719***	7.422***
$\bar{R}^2$	0.991	0.564	0.682
D-W test	2.314****	2.339****	2.244****

\*\*\*\* D-W test significant at 5% two-sided level of significance

\*\*\* Significant at the level 1% \*\* Significant at the level 5% \* Significant at the level 10%

Table 2 shows the results of the association between operating efficiency and asset quality. The characteristics of operating efficiency are described in two levels (highly versus lowly competitive banks). As for the highly competitive banks, the speed of adjusting operating efficiency to a target level is positive and statistically significant. This results shows that highly

<sup>1</sup> Stepwise regression (Backward) coefficients of the asset quality ratios as determinants of bank operating efficiency. The dependent variable is the operating efficiency ratio. The t-statistics are shown between brackets. The multicollinearity is examined and the variables associated with VIF > 5 are excluded. Outliers are detected and excluded as well.

competitive banks due care about improving their operating efficiency. The negative relationship between Loan loss provisions to net interest revenue (LLPNIR) and operating efficiency ratio (OER) reflects the true nature of the banking activity; where an increasing amount of loan loss provision affects the banks' operating efficiency negatively. The positive relationship between loan loss reserve to impaired loans (LLRIL) and OER reflects a major banking policy that the high levels of reserves are considered a safe guard that improves operating efficiency.

As for the lowly competitive banks, the results show that the lag operating efficiency ratio (Lag OER) is insignificant, thus, was pulled out from the regression analysis. This shows that the standard error of Lag OER ratio variable is considerably high and therefore its estimate is unreliable. The negative relationship between LLPNIR and OER validates the results for the highly competitive banks and also reflects the nature of banking industry despite the level of competitiveness. The negative relationship between net charge off to net income before loan loss provision (NCOBLLP) and OER reflects a significant characteristic of the lowly competitive banks, that lowly competitive banks are characterized by increasing amounts of net charge-off.

Table 2 validates the results of the association between OER and asset quality through analyzing all sample disregarding the level of competitiveness. The negative relationship between the LLPNIR is quite valid and consistent. A negative relationship between impaired loan to equity (ILE) and OER is statistically significant and logic as well. That is, the higher the ILE the lower the banks operating efficiency regardless the level of competitiveness.

## 2. Capital adequacy

Table (3) Operating Efficiency & Capital Adequacy<sup>1</sup>

Variables	Levels of Competitiveness		
	High Competitiveness	Low Competitiveness	All Sample
<i>Dependent:</i> Operating Efficiency Ratio (OER)			
<i>Independents:</i>			
Constant	0.197	1.167	1.405
Lag OER	0.700 (6.457)***		
CFNL (capital fund to net loans)	0.354 (1.907)*		
CFDSTF (capital fund to deposit and short term funding)	1.609 (1.151)		
ENL (equity to net loans)		2.035 (5.715)***	
EDSTF (equity to deposit and short term funding)		-4.943 (-3.107)***	
SDCF (subordinated debt to capital fund)		-0.660 (-2.678)***	
TCR (total capital ratio)			-6.366 (-2.422)**
CFTA (capital fund to total assets)			6.343 (1.733)*
CFNL (capital fund to net loans)			0.206 (1.018)
<i>N</i>	11	23	22
F statistics ( <i>Sig F</i> )	21.866***	15.374***	5.893***
$\bar{R}^2$	0.862	0.662	0.463
D-W test	3.112****	2.488****	1.336

\*\*\*\* D-W test significant at 5% two-sided level of significance

\*\*\* Significant at the level 1% \*\* Significant at the level 5% \* Significant at the level 10%

Table 3 shows also that highly competitive Egyptian banks use capital adequacy ratios to adjust banks operating efficiency to a target level. The positive relationship between capital fund to net loans (CFNL) and OER reflects one of the main strength points of highly competitive banks.

As for the lowly competitive banks, the positive relationship between equity to net loans (ENL) and OER indicates that lowly competitive banks are characterized by decreasing amounts of net

<sup>1</sup> Stepwise regression (Backward) coefficients of the capital adequacy as determinants of bank operating efficiency. The dependent variable is the operating efficiency ratio. The t-statistics are shown between brackets. The multicollinearity is examined and the variables associated with VIF > 5 are excluded. Outliers are detected and excluded as well.

loans. The negative relationship between equity to deposit and short term funding (EDSTF) and OER shows that the lowly competitive banks are characterized by decreasing equity to deposits ratio. The results also show that the negative relationship between subordinated debt to capital fund (SDCF) and OER provides clear indication that the lowly competitive banks are not able to raise subordinated debt.

The negative relationship between total capital ratio (TCR) and OER for the whole sample indicates one of the characteristics of the Egyptian banks. That is, TCR in the Egyptian banks affects the OER negatively. This indicates that the risk weighted assets are increasing which consequently will affect the banks OER negatively. The positive relationship between capital fund to total assets (CFTA) and OER shows that the efficient use of banks' capital improves banks' operating efficiency.

3. Credit RiskTable (4) Operating Efficiency & Credit risk<sup>1</sup>

Variables	Levels of Competitiveness		
	High Competitiveness	Low Competitiveness	All Sample
<i>Dependent:</i> Operating Efficiency Ratio (OER)			
<i>Independents:</i>			
Constant	0.544	0.263	1.533
Lag OER	0.827 (2.588) ***	0.109 (1.072)	0.124 (2.233) ***
LLPE (loan loss provision to equity)	-5.157 (-1.944)		
LLRGL (loan loss reserve to gross loans)	2.353 (1.289)	2.427 (5.890) ***	
LLPTL (loan loss provision to total loans)		-5.734 (-4.604) ***	-2.084 (-1.565)
LLRE (loan loss reserve to equity)		0.172 (2.268) **	-0.344 (-4.441) ***
NCOAGL (net charge off to average gross loans)			6.024 (3.263) ***
<i>N</i>	22	29	57
<i>F statistics (Sig F)</i>	9.722 ***	19.438 ***	19.770 ***
$\bar{R}^2$	0.766	0.86	0.595
D-W test	1.583	1.578	1.443

\*\*\*\* D-W test significant at 5% two-sided level of significance

\*\*\* Significant at the level 1% \*\* Significant at the level 5% \* Significant at the level 10%

The results of the credit risk ratios are reported in table 4. The lag OER shows that the highly competitive banks care about adjusting their operating efficiency to a target level. The other credit risk ratios are not statistically significant for highly competitive banks.

As for lowly competitive banks, the speed of adjusting OER to a target level is insignificant; thus, is not indicative. The positive relationship between loan loss reserve to gross loans (LLRGL) and OER gives an indication that the lowly competitive do care about accumulating increasing reserves for future loan losses. Nevertheless, the negative relationship between loan

<sup>1</sup> Stepwise regression (Backward) coefficients of the credit risk ratios as determinants of bank operating efficiency. The dependent variable is the operating efficiency ratio. The t-statistics are shown between brackets. The multicollinearity is examined and the variables associated with VIF > 5 are excluded. Outliers are detected and excluded as well.

loss provision to total loans (LLPTL) and OER indicates that the lowly competitive banks suffer from high credit risk. The positive relationship between loan loss reserves to equity (LLRE) carries the same implication of LLRGL.

The results for the whole sample irrespective to the level of competitiveness do confirm that Egyptian banks seem to be keen about using credit risk ratios for adjusting the operating efficiency to a target level. It is worth noting that, technically speaking, the estimates of LLPTL and LLRE are not reliable for drawing a conclusive conclusion since they are consistent in terms of statistical significance and trend. The positive relationship between net charge-off to average gross loans (NCOAGL) and OER indicates that the Egyptian banks suffer from increasing interest expenses to the extent that they depend on increasing gross loans. Thus, an increase in gross loans will result in an increase in NCOAGL ratio and draw the positive relationship between the ratio and banks' OER.

4. LiquidityTable (5) Operating Efficiency & liquidity <sup>1</sup>

Variables	Levels of Competitiveness		
	High Competitiveness	Low Competitiveness	All Sample
<i>Dependent:</i> Operating Efficiency Ratio (OER)			
<i>Independents:</i>			
Constant	-0.484	0.253	0.634
Lag OER	0.705 (5.701) ***	0.278 (1.381)	0.182 (3.120) ***
NLDSTF (net loans to deposit and short term funding)	0.479 (1.113)		
LADSTF (liquid assets to deposit and short term funding)	1.800 (2.463) ***		
LATDB (liquid assets to total deposits and borrowing)		1.101 (2.738) ***	1.016 (2.996) ***
<i>N</i>	36	37	116
F statistics ( <i>Sig F</i> )	27.613 ***	4.886 ***	14.018 ****
$\bar{R}^2$	0.776	0.205	0.292
D-W test	2.264 ****	1.453	1.541

\*\*\*\* D-W test significant at 5% two-sided level of significance

\*\*\* Significant at the level 1% \*\* Significant at the level 5% \* Significant at the level 10%

The results in table 5 show that the highly competitive banks adjust their operating efficiency to a target level. The positive relationship between liquid assets to deposit and short term funding (LADSTF) and OER gives an indication that highly competitive banks are characterized by high liquid assets.

As for the lowly competitive banks, the results also show that these banks are not keen for adjusting OER to target level. The positive relationship between liquid assets to total deposit and borrowing (LATDB) and OER is as significant as the LADSTF; thus, carries the same implication. This is due to the fact that, irrespective to the level of competitiveness, Egyptian banks liquidity is controlled and managed according to certain rules imposed by the Central

<sup>1</sup> Stepwise regression (Backward) coefficients of the liquidity ratios as determinants of bank operating efficiency. The dependent variable is the operating efficiency ratio. The t-statistics are shown between brackets. The multicollinearity is examined and the variables associated with VIF > 5 are excluded. Outliers are detected and excluded as well.

Bank of Egypt. This explanation is supported by the positive estimate of LATDB using the whole sample.

## 5. Profitability

Table (6) Operating Efficiency & profitability <sup>1</sup>

Variables	Levels of Competitiveness		
	High Competitiveness	Low Competitiveness	All Sample
<i>Dependent:</i> Operating Efficiency Ratio (OER)			
<i>Independents:</i>			
Constant	1.959	0.927	0.626
Lag OER			0.158 (1.908) *
NIEAA (Non interest expense to average assets)	-54.285 (-6.760) ***		-54.162 (-8.732) ***
DPO (dividends payout)	0.869 (3.978) ***		
INODAE (income net of distribution to average equity)	2.250 (3.065) ***	-1.045 (-1.508)	
CIR (cost to income ratio)	-1.047 (-2.452) **		
TME (Tax management efficiency)			0.878 (2.561) ***
ROAE (return on average equity)		3.361 (10.984) ***	
NIRAA (net interest revenue to average assets)		3.805 (2.145) *	33.881 (8.270) ***
OOIAA (other operating income to average assets)	47.459 (5.289) ***		29.478 (10.161) ***
NOITAA (non operating item and taxes to average assets)		-18.501 (-9.103) ***	
<i>N</i>	17	15	104
<i>F statistics (Sig F)</i>	69.345 ***	75.032 ***	77.948 ***
$\bar{R}^2$	0.955	0.971	0.921
D-W test	2.133 ****	1.787	2.191 ****

\*\*\*\* D-W test significant at 5% two-sided level of significance

\*\*\* Significant at the level 1% \*\* Significant at the level 5% \* Significant at the level 10%

<sup>1</sup> Stepwise regression (Backward) coefficients of the profitability ratios as determinants of bank operating efficiency. The dependent variable is the operating efficiency ratio. The t-statistics are shown between brackets. The multicollinearity is examined and the variables associated with VIF > 5 are excluded. Outliers are detected and excluded as well.

The results reported in table 6 show a high degree of consistency and reflect the nature of banking activities. The expense and cost elements (non-interest expense to average assets (NIEAA) and cost to income ratio (CIR)) are negatively associated with OER. At the same time the income elements (dividends payout (DPO), income net of distribution to average equity (INODAE) and other operating income to average assets (OOIAA)) are positively associated with the OER. Thus, it can be stated that highly competitive banks are focusing on generating more profit and reducing expense and costs.

The results for the lowly competitive banks do confirm that bank competitiveness might not be related to profitability. The evidence is that return on average equity (ROAE) and net interest revenue to average assets (NIRAA) are positively associated with operating efficiency. This argument is further supported by the result of the cost elements such as non operating item and taxes to average assets (NOITAA). That is, the negative association of the latter estimate shows that lowly competitive banks are as much concerned with costs as the highly competitive banks are.

The overall sample results for profitability show sources of robust. That is, the effect of NIEAA, NIRAA and OOIAA on operating efficiency is very robust. As for OOIAA, it is supported by the fact that the non-operating income growth rate for highly competitive banks is 76.7% while it is -34.4% for lowly competitive banks.

## **VI. Conclusion: Lessons to learn for the Egyptian Banking Sector**

The results show that, in the highly competitive banks, the operating efficiency is positively and significantly affected by the asset quality, capital adequacy, credit risk and liquidity of banks. This provides clear evidence that the highly competitive banks in Egypt are distinguished from lowly competitive banks through their carefully-designed financial policies. The results can be used to outline the characteristics of Egyptian highly competitive banks as follows:

- 1- An increasing amount of loan loss provision affects the banks' operating efficiency negatively.
- 2- High levels of reserves are considered a safe guard that improves operating efficiency
- 3- The positive relationship between capital fund to net loans (CFNL) and operating efficiency ratio (OER) reflects one of the main strength points of highly competitive banks.
- 4- Egyptian banks seem to be keen about using credit risk ratios for adjusting the operating efficiency to a target level.
- 5- Highly competitive banks are characterized by high liquid assets
- 6- Highly competitive banks are focusing on generating more profit and reducing expense and costs
- 7- The non-operating income growth rate for highly competitive banks is 76.7% while it is - 34.4% for lowly competitive banks.

In the same sense, the results can be used to outline the characteristics of Egyptian lowly competitive banks as follows:

- 1- Lowly competitive banks are characterized by increasing amounts of net charge-off.
- 2- Lowly competitive banks are characterized by decreasing amounts of net loans as well as equity to deposit ratio.
- 3- Lowly competitive banks are not able to raise subordinated debt. Risk weighted assets are increasing which consequently will affect the banks operating efficiency ratio (OER) negatively.
- 4- Lowly competitive do care about accumulating increasing reserves for future loan losses.
- 5- Lowly competitive banks suffer from high credit risk.
- 6- Egyptian banks suffer from increasing interest expenses.
- 7- Lowly competitive banks do confirm that bank competitiveness might not be related to profitability. Lowly competitive banks are as much concerned with costs as the highly competitive banks are.

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