

Three-Dimensional Analysis of Bank Profit with the Development of Regulatory Restrictions: Evidence from Egypt

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Abstract

This study experienced the effect of different regulatory restrictions and macroeconomic status on banks' profit in Egypt. The study used factor analysis and event study techniques on data that covered the time period from 2003 to 2016 for banking sector as a whole and individual bank unit using a sample of 13 bank units in Egypt; in addition, the study experienced the performance of common stocks of the bank units in the sample. The study found that the development of regulatory restrictions has a positive effect on the profitability of the banking sector; however, due to the differentiated characteristics of individual bank units, this effect was dissimilar for different bank units in the sample. Finally, the study concluded that if individual bank units play their development role in the economy, they will be able to meet the new set of regulatory restrictions and at the same time achieve high rates of return on their assets.

Keywords: regulatory restrictions, bank profitability, basel committee, capital adequacy, Egypt

1. General Framework of the Research

1.1 Introduction

The 2008 global financial crisis revealed a number of dynamic relationships between economic and financial variables that result in multiple default cases in the banking sector. These defaults or failures are attributed to high levels of financial leverage, incompatible due periods of assets and liabilities, inadequate liquidity against financial obligations, asymmetric information, and rapid changes in financial position's items which represents, by itself, an obstacle in the process of proper evaluation of banks' financial positions (Baba et al., 2009; Fernando et al., 2012; Johnson & Mamun et al., 2012; Prügl, 2012; Dumontaux & Pop, 2013; Gambacorta & Paolo, 2014; Kim & Song, 2017).

In this context, the importance of capital adequacy concept and its development has been increased to support the financial positions of commercial banks; this was a main pillar ratified by Basel I in July 1988 which obliged banks to retain not less than 8% of total assets value to meet credit risk. In 2001, as a result of Basel I failure in determining a minimum capital adequacy to meet different risks incurred by banks, Basel II standards have been issued to develop capital adequacy concept, ensure the quality of controlling systems and maintain market discipline (Gordy & Howells, 2006).

In the wake of 2008 financial crisis and its negative consequences on the economies of developed countries in Europe and United States of America, attention was directed to the institution who is responsible for the formulation of the standards and norms of controlling the banking system, Basel Committee. Basel II standards and norms failed to provide financial protection for financial institutions around the world and protect them against collapse and exposure to losses, where many weaknesses related to high risk investments, risk management operations, assets evaluation, disclosure, transparency, stress tests, liquidity management and capital adequacy emerged (BCBS, 2012). The previous weaknesses in Basel II standards and norms represent the main pillars in forming Basel III standards and norms in 2010. The new set of standards states that banks should

increase the minimum equity requirements of common shares. In addition, banks will be required to maintain a capital reserve to meet future financial stress periods, so that the ratio of equity rights to common shares is set at 7%, in order to reduce the exposure to future financial crises, and enable for more coverage and protection against different risks that banks might expose to such as credit risk, operational risk and market risk.

1.2 Literature Review

There are multiple studies related to the effect of Basel Committee rules and regulatory restrictions and macroeconomic variables on the performance of banks. The findings of these studies represent a base for this study and support it by one way or another. These studies are summarized in table (1).

Table 1. Literature review

Author(s)	Study Period & Population	Examined Variables	Conclusions
Pasiouras, Fotios, Sailesh Tanna, and Constantin Zopounidis (2009)	2000–2004 74 countries	capital adequacy requirements, official supervisory power, market discipline mechanisms, cost and profit efficiency of banks	The study concluded that banking system regulations that enhance market discipline and empower the supervisory power of the monetary authority increase both cost and profit efficiency of banks. Moreover, stricter capital requirements improve cost efficiency but reduce profit efficiency, while restrictions on bank activities reduce cost efficiency and improve profit efficiency.
Samy Ben Naceur and Magda Kandil 2009	1989-2004 Egypt	Returns on assets, returns on equity, earning assets to total assets, overhead to total assets, required reserve ratio, net interest revenue over average interest-bearing assets, net interest income over average total assets; inflation, real GDP and potential GDP	The study concluded that new capital regulations have significantly increased both the cost of financial intermediation process and the level of liquidity. In the post regulation period, there were no significant improve in management efficiency, cost efficiency did not change significantly, and there was no significant change in the market power of commercial banks.
Bill Allen, Ka Kei Chan, Alistair Milne and Steve Thomas 2012	2001-2010 United Kingdom	Risk weighted assets, aggregate demand, aggregate supply, inflation, risk adjusted capital ratio and liquid assets to total assets ratio.	As a respond to Basel III adjustments, the cost of credit to low risk borrowers will be only moderately affected; however, there will a reduction in the available credit to high risk activities and the cost of financing such credit will significantly increase. In addition, the importance of securitization will increase as an alternative way of financing the risky activities and the new liquidity rules could create new unintended systemic risks.
Sami Ben Naceur and Magda Kandil 2013	1989-2004 Egypt, Jordan, Lebanon, Morocco & Tunisia.	Real change in total assets, net loans over total assets and banks' holdings of government securities over total assets, GDP growth rate, interest rate and inflation rate.	The study concluded that there was significant increase in credit growth following the implementation of capital regulations. This means that at higher capital adequacy ratios, banks managed to expand credit and asset growth, where credit growth appears to be driven by demand fluctuations attributed to real growth, cost of borrowing, and exchange rate risk. In other words, the effects of macroeconomic variables appear to be more dominant in determining credit growth.
Osama A. El-Ansary and Hassan M. Hafez 2015	2004-2013 Egypt	Capital adequacy; the ratio of earning assets to total assets, the ratio of securities to total assets, the ratio of provisions to total loans, the ratio of loans to deposits, return on assets, log assets (asset size), the ratio of net loans to total assets; the ratio of loans loss reserves to total loans and return on equity.	The study concluded that determinants of capital adequacy are not static over time for Egyptian banks. Till year 2008, assets liquidity and quality of management were the dominant variables in determining the variation in capital adequacy. Starting from 2009, factors such as assets quality, size and profitability arise as important variables in explaining the variation in capital adequacy.

Changjun Zheng, Mohammed Mizanur Rahman, Munni Begum and Badar Nadeem Ashraf 2017	2000-2015 Bangladeshi	The ratio of net interest revenue over average total interest-bearing assets, the ratio of net interest income over average total assets, the ratio of pre-tax profit over average total assets, the ratio of pre-tax profit over average total interest-bearing assets, capital adequacy ratio, the ratio of shareholders equity over total assets, the ratio of earning assets to total assets, noninterest income over total operating income, total loan over total deposit, , Non-interest expenses relative to non-interest incomes, inflation rate and economic growth rate.	The study concluded that regulatory restrictions on capital reduced the cost of financial intermediation and increased bank profitability. The development of regulatory restriction from Basel I to Basel II has no measurable impact on the cost of financial intermediation and bank profitability in Bangladesh. The efficiency of bank management stands behind the lower cost of financial intermediation and higher bank profitability.
Ahmed Hamdy Mohamed Zaky and Mohamed Mostafa Soliman 2017	2013-2016 Egypt	Basel capital ratio; risk weighted assets, return on assets, return on equity, cost to income ratio, net interest margin; earnings per share, total share return, price to earnings ratio and price to book value.	The study concluded that the announcement of Basel III has a negative impact on stock prices of listed banks. Moreover, banks with high leverage ratio are less affected by the announcement of Basel III than banks with low leverage ratio.
Abdul Rashid and Samia Khalid 2017	2008-2015 Pakistan	Return on equity, burden ratio, the asset quality, loan to asset, deposits to assets, deposits to equity, the bank size, the real of inflation, the real interest rate, the inflation uncertainty, the real interest rate uncertainty.	The study concluded that volatility of inflation rate and interest rate has dissimilar effects on the performance and solvency of conventional and Islamic banks.
Rizwan, Muhammad Suhail, Muhammad Moinuddin, Barbara L'Huillier, and Dawood Ashraf 2018	2000–2015 15 countries	Probability-of-Default, Modified Probability-of-Default, Capital Regulatory Index, Independence of Supervisory Authority-Overall, Limitations on Foreign Bank Entry or Ownership, Official Supervisory Power, Overall Financial Conglomerates Restrictiveness, Overall Restrictions on Banking Activities, Natural log of Total Assets & Ratio between bank deposits and customer deposits. Gross Gini coefficient, Banking supervision, Financial liberalization, Real GDP per capita, Population, Government consumption/GDP & Trade/GDP	The study concluded that not all financial regulations have risk-reducing benefits for banks and the impact of financial regulations on default risk is not the same for conventional banks and Islamic banks. The empirical evidence suggests that regulations that work on reducing the overall default risk have greater impact on Islamic banks rather than conventional banks.
Manish, G. P., and Colin O'Reilly 2018	1973 -2005 91 Countries		The study concluded that banking supervision regulation is associated with greater income inequality.

What is new with this study?

Despite the effect of macroeconomic variables on the performance of banks has been experienced by a number of studies such as Athanasoglou et al. (2008); Naceur and Kandil (2013); Rashid and Khalid (2017); however, these studies did not consider the return on government securities, classified by Basel Committee as low risk assets, as a determinant of bank profitability. Thus, this study will examine the effect of the return on government securities on bank profitability. In addition, this study will examine the direct effect of economic growth on the performance of banks, where Naceur and Kandil (2013) pointed out to just the indirect effect of economic growth on the performance of banks through the effect of economic growth on the size of granted loans.

This study introduces mixed methodologies in determining the effect of development of banks' regulatory standards and norms on the profitability of banks. These methodologies are based on factor analysis and event study techniques applied on aggregate data of banking sector, financial data of individual bank units and macroeconomic indicators for a relatively longer time series and more comprehensive data of banks listed on Egyptian Exchange relative to other studies such as Zaky and Soliman (2017).

1.3 Study Problem

The successive changes in the contemporary business environment and development of international regulatory restrictions on banks are expected to raise number of challenges for Egyptian banks as individual units and as a whole sector.

Regarding individual bank units:

- Maintaining a high level of profitability while complying with Basel III standards will be difficult especially in the light of bad economic conditions experienced by the country, where increasing the cost of capital and the cost of liquidity will negatively affect the profit margins of most bank units (the mean of return on average assets of Egyptian Banks is 0.8429% and it fluctuated between 0.1% to 2% during the period 2003-2016).
- The development of liquidity measurements and standards like Liquid Concentrate Repair (LCR) and Net Stable Funding Ratio (NSFR) will make bank units compete vigorously with each other to attract retail and corporations' deposits, in addition to the increasing tendency of granting loans and facilities with less than one-year maturities to be able to comply with the Net Stable Funding Ratio (NSFR).
- Egyptian banks have to consider number of factors such as: assets liquidity and improving the process of liquidity risk management, assets' size and profitability, and the quality of management were these factors are essential in determining the level of capital adequacy which is a main pillar to cope with different financial crises. In addition, Egyptian banks' plans have to include stress tests and contingency funding plan.

Regarding the banking sector as a whole:

- Preserving a portion of bank capital as a margin to protect against any future pressures may limit the distribution of profits, payment of dividends and repurchasing operations of shares, which negatively affects the fair value of banking sector shares in addition to the negative impact on the market value of shares in the secondary market (till July 2017, only 5 stocks out of 13 banks' common stock listed on Egyptian Exchange managed to exceed their 2008 market values).
- Granting credit will become more stringent and interest rate adjustments will be more dynamic with changes in business environment.
- In order to decrease investment in risky assets, banks are expecting to expand their purchases of government securities, which limit the amount of funding available for the private sector. In other words, the crowding out effect will be worsened.
- If the effect of macroeconomic variables on the size of credit granted by banks is more dominant relative to the capital adequacy variable as stated by Naceur and Kandil (2013); then the study expects to find simultaneous effect of both macroeconomic and capital adequacy variables on the operational performance of banks. In other words, it can be said that regulatory requirements of Basel (I) (II) (III) may have direct and indirect effects on the operational performance of banks under different economic growth rates and other macroeconomic variables, and that the effect of these variables may extend to the performance of banks' stocks and prevent achieving peak market values relative to 2008 market values during the time period from 2003 to 2017.

1.4 Study Objective

This study examines the potential effect of the development of regulatory restrictions of Basel's standards and norms on Egyptian banks through dual-level analysis on the profitability of banking sector, profitability of a sample of individual bank units and performance of banks' common stocks in Egyptian Exchange market. The following figure illustrates the study layout.

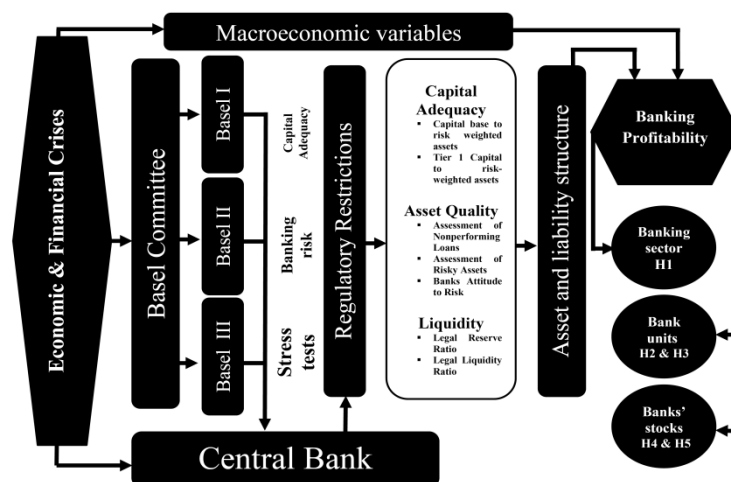


Figure 1. Study layout

Figure 1 shows that Basel Committee emerged as a response to the negative effects of economic and financial crises on the banking sector and designed a number of regulatory restrictions and spread these regulations all over the world through Central Banks to supervise and control the performance of commercial banks and to work as a caution against different risks confront by commercial banks. On one hand, these regulations have had a number of repercussions on banks performance and, on the other hand, the economic and financial crises have their effects on number of macroeconomic variables which in turn affect assets and liabilities structure of commercial banks and eventually affect the performance of commercial banks.

In this context, a number of inquiries have been raised such as:

- What is the effect of both the development of regulatory restrictions and macroeconomic variables on the profitability of banking sector in Egypt?
- What is the effect of both the development of regulatory restrictions and macroeconomic variables on the profitability of individual bank units in Egypt?
- Does the performance of banks' common stocks vary with the development of regulatory restrictions and different macroeconomic variables?

1.5 Study Hypotheses

- The development of banks' regulatory restrictions and macroeconomic variables has significant effect on the profitability of banking sector in Egypt.
- The development of banks' regulatory restrictions has a positive effect on interest returns to loan ratio of bank units in Egypt.
- The development of banks' regulatory restrictions has a positive effect on the ratio of net operating income to assets of individual bank units in Egypt.
- The development of banks' regulatory restrictions has significant effect on the returns of Egyptian banks' common stocks.
- The development of banks' regulatory restrictions has significant effect on the total risk characteristics of Egyptian banks' common stocks.

1.6 Study Methodology

The study used dual-level analysis on three dimensions for testing the study hypotheses. The first level examines the performance of banking sector through factor analysis technique, which enables for selecting profitability determinants of banking sector with different financial positions indicators, regulatory restrictions and macroeconomic variables (H₁). The second level examines the performance of individual bank units through event study technique, which enables for experiencing both the profitability of individual bank units (H₂) and the performance of their common stocks (H₃) in the light of the development of regulatory restrictions and dynamic economic environment.

2. A Glance on the Development of Basel Committee and its Regulatory Restrictions

2.1 The Origin and Objectives of Basel Committee

Basel Committee has been established in 1974 by a decision of Central Bank governors of a group of 10 industrialized countries: Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, Spain, Switzerland, the United Kingdom and the United States under the auspices of the Bank for International Settlements (BIS). The purpose of Basel Committee is to determine the minimum limits on capital adequacy of banks, develop and improve techniques for controlling the operation of banks and to facilitate the diffusion and exchange of information on the procedures and methods of control adopted by different monetary authorities worldwide.

2.2 Types of Risks Covered by Basel I Standards

In 1988, Basel Committee determined the minimum capital to be met by banks at 8% of risk weighted assets plus conditional obligations weighted by their risk weights (Basel, 1988). According to Basel I norms, capital consists of two tranches: Core Capital and Supplementary Capital. Where the core capital is the paid-up capital, reserves and retained earnings, the supplementary one consists of undeclared reserves, assets revaluation reserves, provision for non-specific general risks, subordinated loans and other capital instruments.

In 1995, another tranche has been added to capital represented by two-years loans to cover only market risks. Market risks, as described in the proposed amendment to Basel I, include the followings:

- 1) Risks related to factors with direct and indirect effect on the returns and value of securities in banks' portfolios.
- 2) Exchange rate risk.
- 3) Interest rate risk.
- 4) Equity risk.

2.3 Types of Risks Covered by Basel II Standards

Basel II committee focused on three basic pillars: minimum capital requirements, continuous monitoring of these requirements, and market discipline. Basel II decisions differ from those of Basel I in the form of capital adequacy ratio, where the operational risk is added to the denominator of the fraction of capital adequacy ratio. Basel II did not modify the methods of measuring market risk, but it modified the credit risk measurement methods.

the following points represent the main differences between Basel I and Basel II:

- 1) Basel I set minimum capital requirements for both credit risk and market risk, while Basel II added operational risk to minimum capital requirements.
- 2) Basel II classified risks more precisely by adjusting asset categories to include all granted loans.
- 3) Basel II introduced new ways of measuring credit risk, allowing banks to use the external credit rating of specialized agencies or relying on the internal classification of banks if they have the internal systems capable of doing so.
- 4) In Basel I, weights of asset credit risk range from 0% to 100%, whereas in Basel II they range between 0% and 150%.
- 5) Basel II standards added two new pillars, regulatory review and market discipline, as complements to the first and only pillar of Basel I, the minimum capital requirements.

2.4 Types of Risks Covered by Basel III Standards

The emergence of Basel III standards was a response to the deficiencies of banks' regulations that were noticed during the 2008 global financial crisis. Basel III standards aim at improving the banking system ability to absorb shocks arise from financial and economic crises and pressures. Basel committee further strengthened the liquidity framework by developing liquidity financing standards, and these measures were developed to achieve the following objectives:

- 1) Improving short-term elasticity of liquidity risk by ensuring that there are sufficient high-liquid assets to ensure stable liquidity risk under one-month of continuous pressure scenario.
- 2) Improving long-term elasticity of liquidity risk by creating additional incentives for banks to finance their activities using fixed sources of finance on a continuous basis.

2.5 Expected Challenges with Basel III

The norms and accords of Basel III will eventually affect all banks; however, this effect may vary according to the differentiated characteristics of banks. The followings are the main challenges that commercial banks are expected to face with Basel III regulations.

- 1) The fundamental defects of Basel I and II are not fully addressed by Basel III norms. For instance, the risk weighting system still suffers from the invalid assumption of indifferent portfolios.
- 2) Banks in different countries are facing differentiated sets of risks which may not all covered by Basel's standards.
- 3) Basel III has not adequately addressed a number of issues related to prudential risk management such as corporate governance, market transparency and the quality of supervisors; however, these factors contributed to bank failures during financial crises.
- 4) It may not be prudent to treat all government bonds as non-risky assets considering that their volatility may influence the solvency of banks.
- 5) Basel committee have tried to incorporate all risk categories such as credit risk, liquidity risk, market risk, operational risks, and foreign exchange risks while calculating the capital adequacy of banks, classifying the asset into various risk categories and designing a proper risk management governance system; however, some risk measurement methodologies, such as Value at Risk (VaR) models, still have limitations where tail risks are still difficult to be predicted, and the systemic risk measurement tools are still in the development phase. In addition, adjusting these risk measurements for capital adequacy will be difficult especially when the economy is experiencing cyclical process of ups and downs.

3. Data Description and Hypotheses Testing

3.1 Data

The annual data of the study cover the time period 2003-2016 and are used for both sector and individual bank units. The data consist of components of banks' balance sheet as a sector and individual bank units, in addition to data of macroeconomic variables of the Egyptian economy. For individual bank units, the data cover a sample of 13 banks of which 10 are traditional commercial banks and 3 are Islamic banks. Table 2 shows the banks included in the sample of the applied study and the date of listing their shares on the Egyptian Stock Exchange.

Table 2. The Egyptian Banks in the Sample of the Applied Study

Listed Securities	REUTERS	LISTING DATE
Société Arabe Internationale De Banque (SAIB)	SAIB.CA	29/11/1980
Suez Canal Bank	CANA.CA	15/09/1982
Housing & Development Bank	HDBK.CA	13/09/1983
Egyptian Gulf Bank	EGBE.CA	17/11/1983
Al Baraka Bank Egypt	SAUD.CA	25/12/1984
National Bank of Kuwait- Egypt- NBK	NBKE.CA	12/09/1994
Commercial International Bank (Egypt)	COMI.CA	02/02/1995
Faisal Islamic Bank of Egypt - In EGP	FAIT.CA	07/06/1995
Union National Bank - Egypt " UNB-E	UNBE.CA	05/11/1995
Export Development Bank of Egypt (EDBE)	EXPA.CA	14/12/1995
Abu Dhabi Islamic Bank- Egypt	ADIB.CA	19/06/1996
Qatar National Bank Alahly	QNBA.CA	03/07/1996
Credit Agricole Egypt	CIEB.CA	03/07/1996

Source: The Egyptian Exchange.

This study excludes the stocks of Banque Du Caire where its stock has been listed on the Egyptian Exchange on 19-02-2017; however, no trade transactions took place on these shares so far and Initial Public Offering (IOP) is expected.

3.2 Data Description at Sectoral Level

3.2.1 Overview of the Development of Banking Sector Structure in Egypt

The structure of banking sector in Egypt experienced noticeable changes regarding the number of operating

banks during the time period 2003-2016, where the number of operating banks decreased from 62 banks in 2003 to 38 banks in 2016 (-38.7%); however, the number of branches increased by 50% during the same time period, where the number of branches increased from 2588 branches in 2004 to 3882 branches in 2016, see figures (2) and (3).

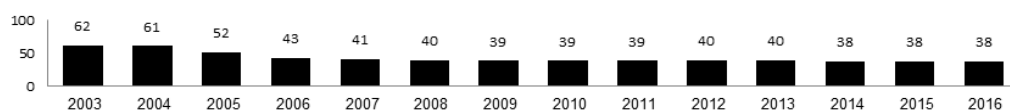


Figure 2. Number of banks operating in Egypt

Source: Central Bank of Egypt; Economic Review; Miscellaneous Issuance from 2008/2009 No.4 to 2016/2017 No.3.

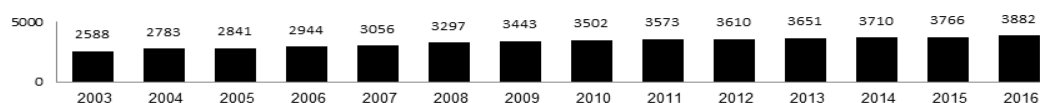


Figure 3. Number of banks' branches in Egypt

Source: Central Bank of Egypt; Economic Review; Issuance from 2008/2009 No.4 to 2016/2017 No.3.

The changes in the number of both operating banks and branches may be explained by the ability of banks to cope with changes in the regulatory restrictions set by Egyptian Central Bank according to recommendations of the Basel committee. The Central Bank of Egypt made a number of efforts to reform and develop the banking sector by executing voluntary or compulsory mergers and acquisitions operations between banks to meet minimum capital requirements.

3.2.2 A Glance on the Financial Inclusion in Egypt

The level of financial inclusion in the Middle East and North Africa (MENA) region is one of the lowest worldwide. According to World Bank statistics, in 2014 Egypt suffers from high levels of financial exclusion, where only about 12% of Egyptians and 14% of adults are having bank accounts. This may be attributed to a number of factors. Relative high size of the informal sector in Egypt, high unemployment and poverty rates come on the top of these factors. In addition, Egypt is considered a cash-based economy, where cash transactions dominate most activities in the economy. Table 3 illustrates the efforts taken by Egypt regarding the issue of Financial Inclusion.

Table 3. Egyptian microscope on financial inclusion, 2016.

	Score 100
Government Support for Financial Inclusion	22
Regulatory and Supervisory Capacity for Financial Inclusion	25
Prudential Regulation	38
Regulation and Supervision of Credit Portfolios	56
Regulation and Supervision of Deposit-Taking Activities	38
Regulation of Insurance for Low-Income Populations	8
Regulation and Supervision of Branches and Agents	72
Requirements for Non-Regulated Lenders	50
Regulation of Electronic Payments	50
Credit Reporting Systems	42
Market Conduct Rules	19
Grievance Redress and Operation of Dispute Resolution Mechanisms	25

Source: Global Microscope on Financial Inclusion Data, 2016.

It can be said that low level of financial inclusion is one of the main challenges to the prosperity of the banking sector in Egypt and may represent another reason for the modest size and role of banking sector in the Egyptian economy.

3.2.3 Data of Banking Sector's Balance Sheet

Figure 4 illustrates that the most important components of banking sector's balance sheet (total assets, deposits,

loans, securities and total equity) have followed an upward sloping trend from 2003 to 2016. Regarding the type of investments in banks' portfolios, the study found that the relative weight of total loans has followed a decreasing trend while the relative weight of securities, especially government securities, has followed an upward sloping trend. The changes in the relative weights of loans and securities can be explained in two ways: first, the public budget deficit has been exaggerated with a tendency by the Egyptian government to finance this deficit through internal borrowing; second, there is a tendency of banks to invest in a relatively safer investment.

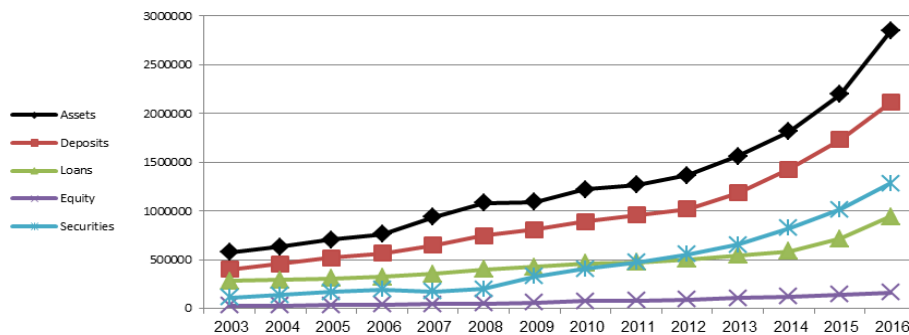


Figure 4. Egyptian banking activities (at end of June)

Source: Central Bank of Egypt; Economic Review & Annual Reports; Miscellaneous Issuance.

3.2.4 Indicators of the Performance of Egyptian Banking Sector

The performance of banking sector has been experienced by a number of empirical researches through several methodologies and measurements. In this study we used a number of financial ratios to examine the performance of Egyptian banks and determine the effect of the regulatory restrictions imposed by the Egyptian Central Bank on the profitability and operating standards of commercial banks. Return on assets, return on equity and capital adequacy ratio are considered important financial indicators regarding the performance of banking sector. The behavior of these indicators, regarding the Egyptian banking sector, are illustrated in figures 5, 6 and 7.

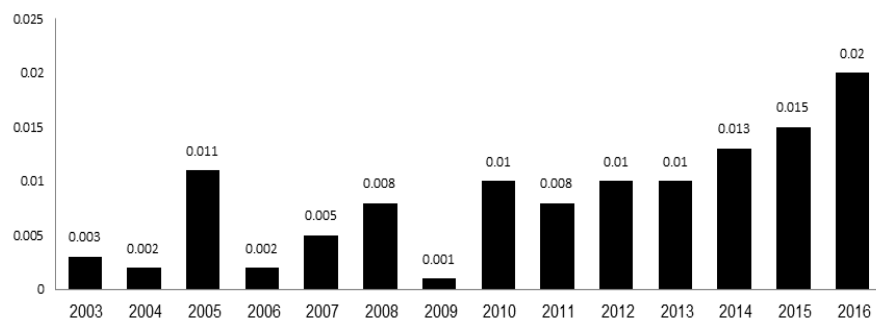


Figure 5. Return on average assets of Egyptian banking sector

Source: Central Bank of Egypt; Economic Review & Annual Reports; Miscellaneous Issuance.

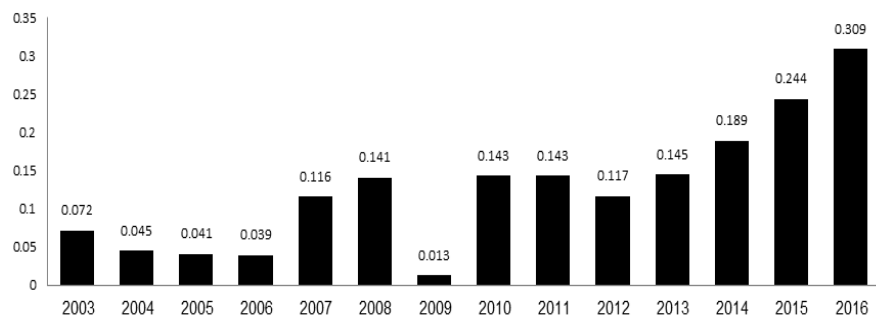


Figure 6. Return on average equity of Egyptian banking sector

Source: Central Bank of Egypt; Economic Review & Annual Reports; Miscellaneous Issuance.

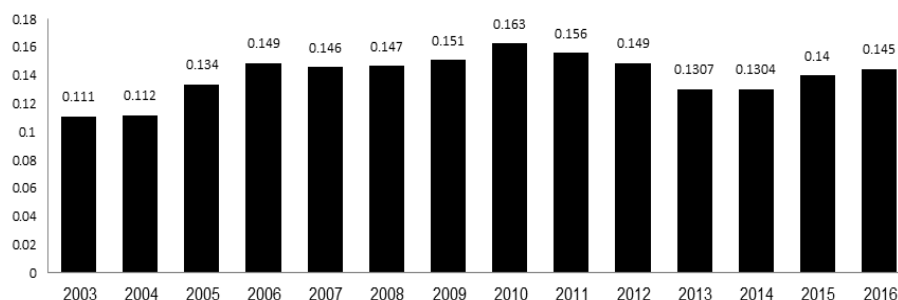


Figure 7. Capital adequacy ratio of Egyptian banking sector

Source: Central Bank of Egypt; Economic Review & Annual Reports; Miscellaneous Issuance.

The previous figures show that there is a tendency to maintain a minimum rate of capital adequacy at 10% as planned in the first phase of reforming the banking sector by the Egyptian Central Bank and this extended to the second phase; then, the banking sector exposed to the global financial crisis in 2008. The repercussions of the financial crisis on the banking sector appeared in a relatively low rate of return on assets and equity in 2009. In 2012, the gradual implementation of Basel III norms started to take place and because changing the technique of calculating the capital adequacy ratio was on the top of these norms, requiring formation of provision to support capital, the rates of capital adequacy and return on equity responded negatively; however, these rates and indicators started to improve from year 2014 after adjustment to the new set of regulations.

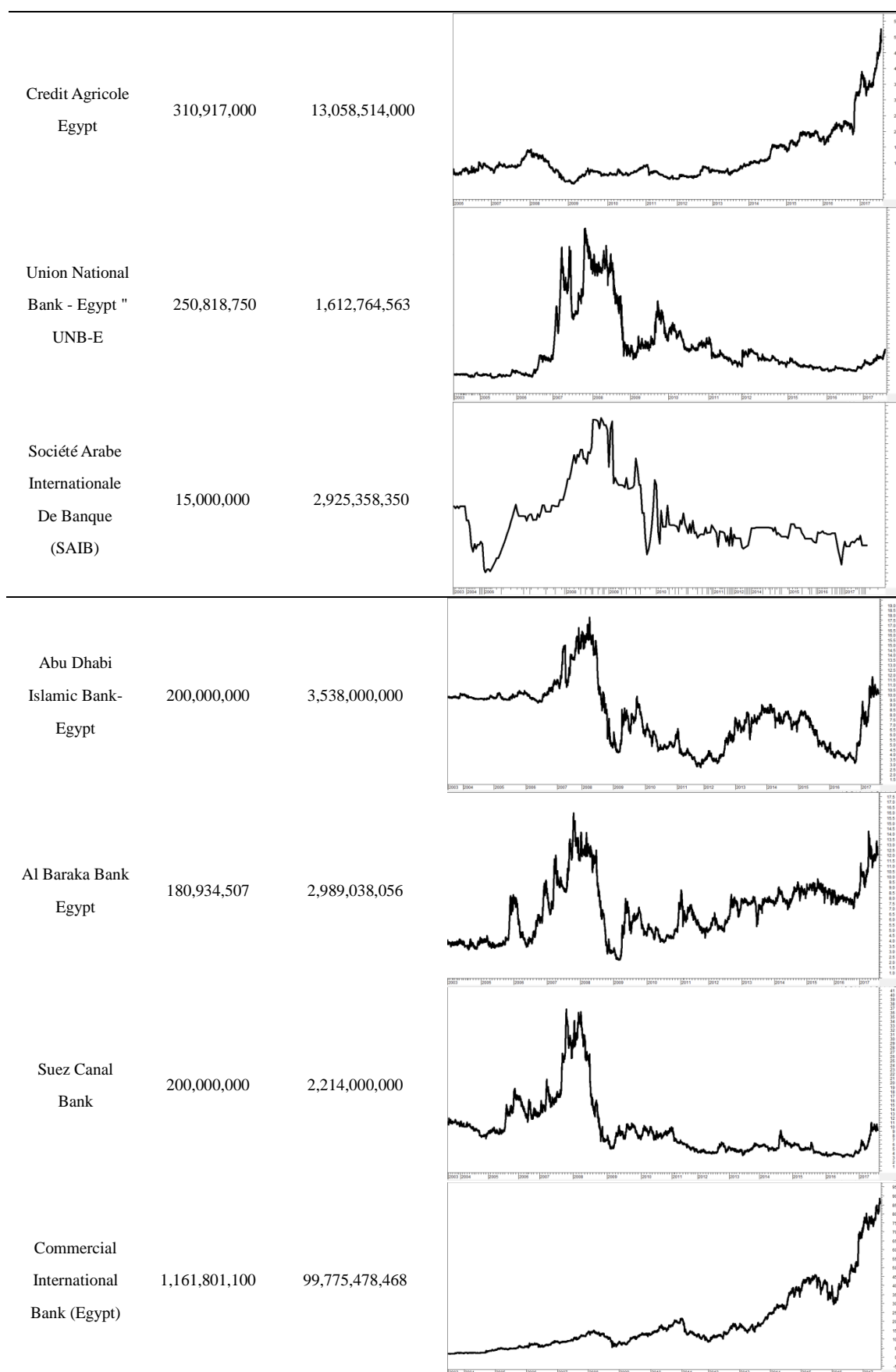
3.3 Data Description at Individual Bank Units and their Common Stock Performance

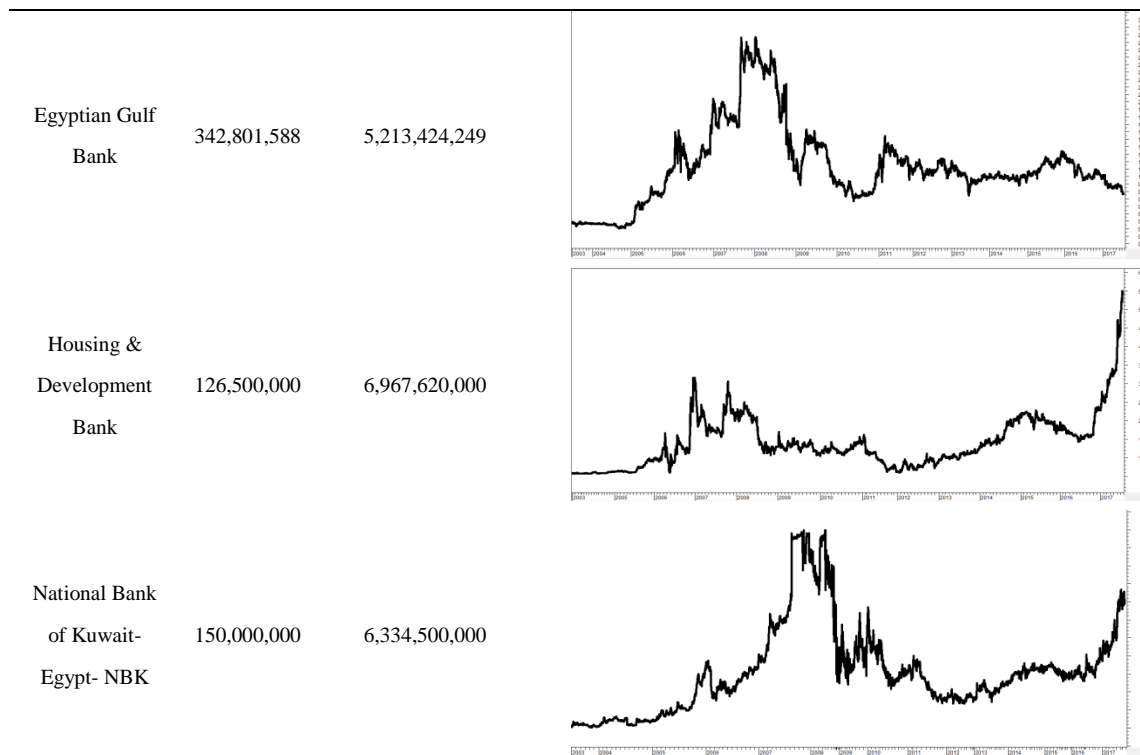
3.3.1 The Performance of Common Stocks of Individual Bank Units

The participation of bank units in Egyptian Exchange is a relatively modest one, where just 13 units out of 40 bank units have listed stocks in the stock market. Table 4 represents the performance of common stocks of bank units in the study sample.

Table 4. The performance of common stocks of bank units in the Egyptian stock market

Bank	Listed shares	Market Cap	Common Stocks Charts
Export Development Bank of Egypt (EDBE)	272,800,000	2,801,656,000	
Qatar National Bank Alahly	890,422,714	45,411,558,414	
Faisal Islamic Bank of Egypt	366,830,586	6,863,220,933	





Source: Prepared by the authors based on data extracted from The Egyptian Exchange.

The previous figures show that till year 2017, the common stocks of only 5 bank units managed to exceed their peak levels achieved in year 2008. This may explain the dissimilar effect of 2008 financial crisis and the associated financial regulations on different bank units.

In order to help investors in making proper and informed investment decisions, EGX launched, for the first time, the Banks index in 2007 with a base value of 1000 points. The Banks index is a free-float market capitalization weighted index. Figure 8 shows the Banks index performance.

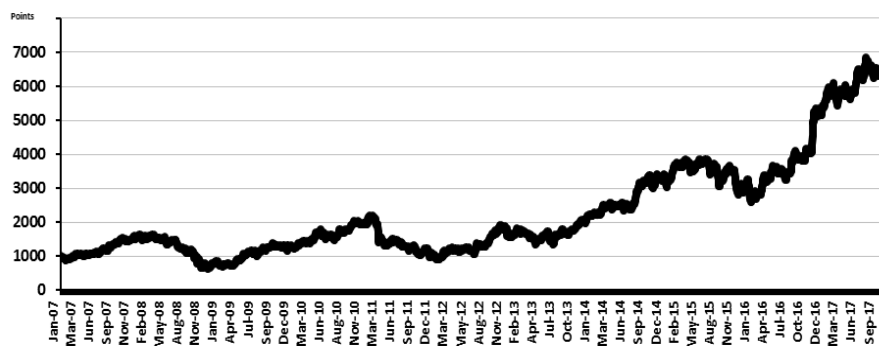


Figure 8. The banks index performance

Source: Authors calculations based on data extracted from the Egyptian Exchange.

From January 2007 to May 2018 the returns on common stocks of bank units, according to the sector index, was 583.6%, however, this return attributed mainly to the contribution of only 5 bank units: Commercial International Bank-Egypt, Qatar National Bank Alahly, Credit Agricole-Egypt, Housing & Development Bank and Faisal Islamic Bank of Egypt.

3.3.2 Performance Indicators of Egyptian Bank Units

The development of Basel norms and standards have had different effect on the return and performance of bank units. The differentiated impact of the development of Basel norms and standards illustrated by figures 9 and 10.

Figure 9 shows average interest returns to loans with different regulatory restrictions according to Basel I and Basel II standards.

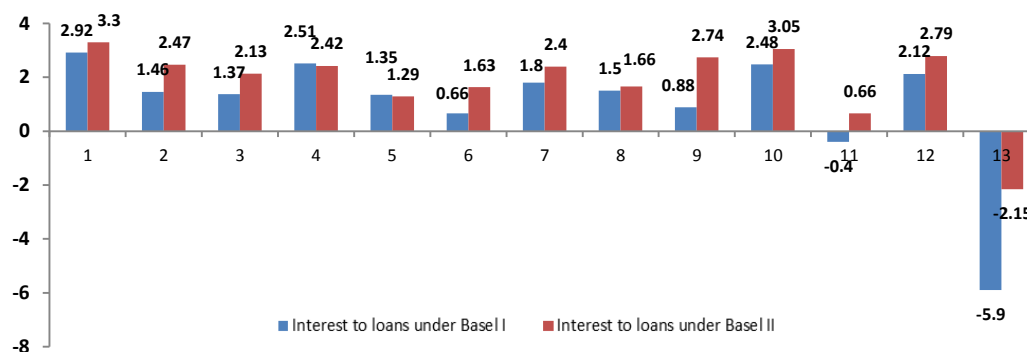


Figure 9. Average interest returns to loans as an index to bank units' profitability

Source: Authors calculations based on data extracted from financial reports of banking units.

Figure 10 shows average net operating income to assets with different regulatory restrictions according to Basel I and Basel II standards.

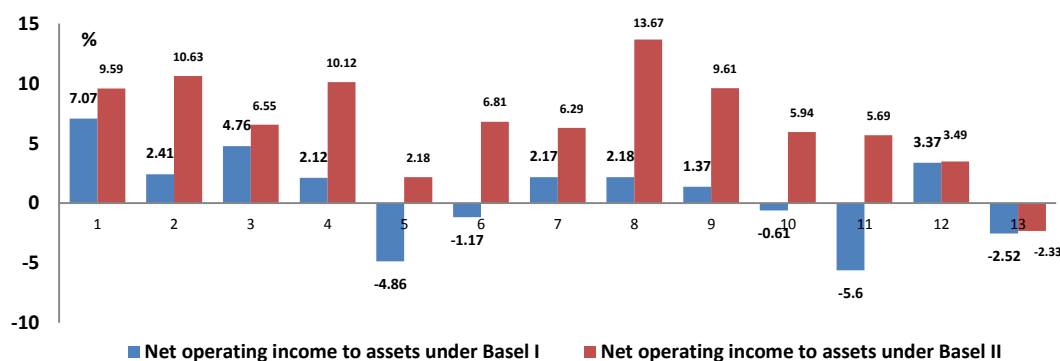


Figure 10. Average net operating income to assets as an index of banks performance

Source: Authors calculations based on data extracted from financial reports of banking units.

The differentiated effect of regulatory restrictions on the performance of bank units may lead us to conclude that the characteristics of different bank units, such as bank size, assets quality, management efficiency, effectiveness of bank governance, play a crucial role in determining the impact of development of Basel norms and standards on the profitability of these units. This agrees with (Pasiouras & Kosmidou, 2007; Zaky & Soliman, 2017).

Table 5 shows the development of profitability indicators of bank units, interest returns to loan and net operating income to assets, with different regulatory restrictions according to Basel I and Basel II standards.

Table 5. Development of profitability indicators with different regulatory restrictions

<i>indicators of Egyptian Banking units Performance</i>	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewers Statistic	Std. Error	Kurtosis Statistic	Std. Error
Interest Returns to loans with Basel I	8.26	20.67	13.6069	3.285332009	0.735	0.616	0.8197	1.191
Interest Returns to loans with Basel II	13.64	54.49	21.12	10.82564702	2.838	0.616	8.661	1.191
Net operating income to assets with Basel I	-5.9	2.92	0.98077	2.24476228	-2.715	0.616	8.41101	1.191
Net operating income to assets with Basel II	-2.15	3.3	1.87615	1.417559749	-2.104	0.616	5.3817	1.191

Source: Statistical Package for the Social Sciences output.

Table 5 illustrates that the ratio of average interest returns to loan increased from 13.6% with Basel I regulations to 21.1% with Basel II regulations; on contrary, the average net operating income to asset ratio decreased from 1.88% with Basel I regulations to 0.98% with Basel II regulations. This indicates an improvement in the process of credit management of bank units due to the new set of regulatory restrictions of Basel II on the expense of net operating income as a result of increasing the operational expenses of internal auditing and risk management process, this conclusion agrees with (Allen et al., 2009), (Petria et al., 2015) and (Ozili, 2017), in addition to the tendency of bank units to direct their funds to more liquid and low risk assets such as government securities (see figure 3).

3.4 The Response of Egyptian Banking System to Different Sets of Regulatory Restrictions

Factor analysis technique will be used to examine the effect of different regulatory restrictions on the Egyptian banking system. This technique is based on selecting and classifying just a few groups of variables that could have a noticeable effect on the dependent variable. In this study, a multiple number of variables that may affect the profitability of banking sector are used and the factor analysis technique classified these variables into just four groups or factors. Each factor captures a certain amount of the overall variance in the observed variables, and the factors are always listed in order of how much variation they explain; the relationship of each variable to the underlying factor is expressed by the so-called factor loading.

Table 6 shows the relationship of each variable to the underlying factor and it is expressed by the factor loading of performance indicators of Egyptian banking sector and a number of macroeconomic variables. The results indicate four groups of factors as shown in Table 6.

Table 6. Rotated component matrix

Variable	Sign	Component			
		F1	F2	F3	F4
Economic Growth Rate	X1	-0.65942		0.578644	
Exchange Rate	X2	0.584976	0.520674	0.551637	
T-Bill Returns	X3	0.668062	0.445507		
Inflation Rate	X4			0.774281	
Stock Market Return	X5		0.757005		
Weight of Foreign Currency Deposits	X6	0.589124	0.42411	0.525843	
Capital adequacy rate	X7		-0.81045		
Net Interest Margin	X8	0.959466			
Liquidity Ratio of Local Currency	X9	0.948902			
Liquidity Ratio of Foreign Currencies	X10	0.427792	0.518212		-0.60166
Securities to Assets	X11	0.981088			
Deposits to Assets	X12	0.793945			
Loans to Deposits	X13	-0.9091			
Equity to Assets	X14	0.832174		-0.46274	
Securities to Deposits	X15	0.983113			
Balances of Treasury (LOG)	X16	0.973629			
Gross Domestic Debt (LOG)	X17	0.978999			
Treasury bills to GDD	X18	0.866655			
Total Public Budget Deficit Growth Rate	X19	-0.4501	0.617194		0.542786
Total Deficit to GDP	X20	0.703171	0.586739		
Return on Average Assets	Y1	0.803565			

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Source: Statistical Package for the Social Sciences output.

In the previous Table 6, the study found common variables between the four groups. Accordingly, variables with the lowest coefficient of loading are deleted from the other factors.

Table 7. Comparative rotated component matrix

Variable	Sign	Component			
		F1	F2	F3	F4
Economic Growth Rate	X1	√			
Exchange Rate	X2	√			
T-Bill Return	X3	√			
Inflation Rate	X4			√	
Stock Market Return	X5		√		
Weight of Foreign Currency Deposits	X6	√			
Capital adequacy rate	X7		√		
Net Interest Margin	X8	√			
Liquidity Ratio of Local Currency	X9	√			
Liquidity Ratio of Foreign Currencies	X10				√
Securities to Assets	X11	√			
Deposits to Assets	X12	√			
Loans to Deposits	X13	√			
Equity to Assets	X14	√			
Securities to Deposits	X15	√			
Balances of Treasury Bills (LOG)	X16	√			
Gross Domestic Debt (LOG)	X17	√			
Treasury bills to GDD	X18	√			
Total Public Budget Deficit Growth Rate	X19		√		
Total Deficit to GDP	X20	√			
Return on Average Assets	Y1	√			

Source: Prepared by authors based on table 8 data.

Table 7 shows that there are four factors affecting the profitability of banks. The first factor includes a number of variables with relatively high weight effect on the profitability of banks: economic growth rate, exchange rate, T-Bills return, relative weight of foreign currency deposits, net interest margin, liquidity ratio of local currency, securities to assets, deposits to assets, loans to deposits, equity to assets, securities to deposits, balances of treasury bills, gross domestic debt (GDD) and treasury bills to GDD. This factor is nominated in the study as *"Assets and liabilities structure of banking Sector and macroeconomic status"*. The second factor includes three variables: stock market return, capital adequacy ratio and public budget deficit growth rate. This factor is nominated in the study as *"Financial Markets Performance and Financial Stability"*. The third factor includes just one variable: Inflation Rate. Finally, the fourth factor includes just one variable: Liquidity Ratio of Foreign Currencies" and nominated as *"Foreign Currencies"*.

Table 8 shows OLS estimates of return on average assets and return on average equity according to Vector Autoregressive (VAR) models with lag order 1.

Table 8. OLS estimates for banking profitability

VAR system, lag order 1									
OLS estimates, observations 2004-2016 (T = 13)									
Log-likelihood = 90.068246									
Determinant of covariance matrix = 3.2899045e-009									
AIC = -11.7028									
BIC = -11.0944									
HQC = -11.8279									
Portmanteau test: LB (3) = 17.7936, df = 8 [0.0228]									
Equation 1: Y2					Equation 2: Y1				
Heteroskedasticity-robust standard errors, variant HC1					Heteroskedasticity-robust standard errors, variant HC1				
	coefficient	std. error	t-ratio	p-value		coefficient	std. error	t-ratio	p-value
const	0.0781308	0.166951	0.4680	0.6563	const	0.0157606	0.0108120	1.458	0.1952
Y2_1	-0.512089	0.372073	-1.376	0.2179	Y2_1	-0.0212133	0.0233709	-0.9077	0.3990
Y1_1	0.674372	3.40315	0.1982	0.8495	Y1_1	-0.357430	0.284877	-1.255	0.2563
FAC1_1	0.0622985	0.0196415	3.172	0.0193**	FAC1_1	0.00434038	0.00101377	4.281	0.0052***
FAC2_1	0.0709884	0.0140026	5.070	0.0023***	FAC2_1	0.00573902	0.00104178	5.509	0.0015***
X10	-0.0376073	0.359916	-0.1045	0.9202	X10	-0.00908659	0.0184736	-0.4919	0.6403
X4	1.13756	0.338094	3.365	0.0151**	X4	0.0235372	0.0432453	0.5443	0.6059

Mean dependent var	0.129615	S.D. dependent var	0.084991	Mean dependent var	0.008846	S.D. dependent var	0.005475
Sum squared resid	0.014160	S.E. of regression	0.048579	Sum squared resid	0.000066	S.E. of regression	0.003312
R-squared	0.836645	Adjusted R-squared	0.673290	R-squared	0.817064	Adjusted R-squared	0.634128
F(6, 6)	20.04136	P-value(F)	0.000998	F(6, 6)	68.55396	P-value(F)	0.000029
rho	-0.017231	Durbin-Watson	1.781464	rho	-0.413931	Durbin-Watson	2.351032
F-tests of zero restrictions:				F-tests of zero restrictions:			
All lags of Y2	F(1, 6) =	1.8942 [0.2179]		All lags of Y2	F(1, 6) =	0.82388 [0.3990]	
All lags of Y1	F(1, 6) =	0.039268 [0.8495]		All lags of Y1	F(1, 6) =	1.5742 [0.2563]	

Source: Gnu Regression, Econometrics and Time-series Library output.

Factor analysis revealed that there are four factors with significant effect on banks' profitability through their effects on return on assets and return on equity. The two independent indicators of banks' profitability have been examined by two models. Where Y_2 is a measure of return on average equity of banking sector, Y_1 is a measure of return on average assets of banking sector, F_1 is a measure of "Assets and liabilities structure of banking sector and macroeconomic status", F_2 is a measure of "Financial Markets Performance and Financial Stability", X_4 is a measure of Inflation and X_{10} is a measure of Liquidity Ratio of Foreign Currencies.

The following regression model is used to examine factors that affect the return on average equity of banking Sector:

$$Y_{2,t} = 0.0781308 - 0.0212Y_{2,t-1} + 0.674372Y_{1,t-1} + 0.00434F_1 + 0.0709884F_2 + 1.13756 X_4 - 0.0376X_{10} \quad (1)$$

The following regression model is used to examine factors that affect the return on average assets of banking Sector:

$$Y_{1,t} = 0.0157606 - 0.021Y_{2,t-1} - 0.35743Y_{1,t-1} + 0.00434F_1 + 0.005739F_2 + 0.0235372X_4 - 0.00908659 X_{10} \quad (2)$$

Despite the two regression models are valid at 1% significant level; however, the validity of explanatory variables varies between the two modules as follows:

- Inflation rate variable, as a determinant of banks' profitability, is valid in one model and invalid in the other one. This may be attributed to price distortion of some commodities with high weights in the market basket that used in the calculation of Consumer Price Index, where the prices of bread and gasoline are subject to mandatory prices set by the Egyptian government. This decreases the quality of measuring domestic price inflation.
- Formal Egyptian exchange rate variable, as a determinant of banks' profitability, is insignificant in both models. This may be attributed to the imposition of price ceilings on exchanging the US dollar for Egyptian pound, the case which ended by the flotation of the Egyptian pound by the end of 2016 and depreciation of Egyptian pound against US dollar by more than 100%.

In general, we may conclude that the development of banks' regulatory restrictions and macroeconomic variables has significant effect on the profitability of banking sector in Egypt

3.4.1 Examining the Effect of Different Regulatory Restrictions on Interest Returns to Loans

This hypothesis examines the effect of development of regulatory restrictions on interest returns to loans in Egyptian bank units. The study used Wilcoxon Signed Ranks test to examine this hypothesis as an event study.

Table 9. Wilcoxon signed ranks output for interest returns to loans with the developments of regulatory restrictions

Test Statistics	
Interest to loans with Basel I - Interest to loans with Basel II	
Z	-3.10991168
Asymp. Sig. (2-tailed)	0.001871433
a	Based on negative ranks.
b	Wilcoxon Signed Ranks Test

a. Based on negative ranks; b. Wilcoxon Signed Ranks Test.

Source: Statistical Package for the Social Sciences output.

The previous statistical results show that there is a general tendency to change the ratio of interest returns to loans, and it is significant at 0.01 level. In other words, it can be said that the development of regulatory restrictions has a significant effect on interest returns to loans ratio in the Egyptian bank units, where the ratio of

interest returns to loans tends to increase with the development of regulatory restrictions.

3.4.2 Examining the Effect of Different Regulatory Restrictions on Net Operating Income to Assets

This hypothesis examines the effect of development of regulatory restrictions on net operating income to assets in Egyptian bank units. The study used Wilcoxon Signed Ranks test to examine this hypothesis as an event study.

Table 10. Wilcoxon signed ranks output for net operating income to assets with the developments of regulatory restrictions

Test Statistics	
	Net operating income to assets with Basel II - Net operating income to assets with Basel I
Z	-2.970140457
Asymp. Sig. (2-tailed)	0.002976636
a	Based on positive ranks.
b	Wilcoxon Signed Ranks Test

a. Based on positive ranks; b. Wilcoxon Signed Ranks Test.

Source: Statistical Package for the Social Sciences output.

The previous statistical results show that there is a general tendency to change the ratio of net operating income to assets, and it is significant at 0.01 level. In other words, it can be said that in the light of the development of regulatory restrictions the ratio of net operating income to assets of Egyptian bank units tends to increase. Thus, the development of regulatory restrictions has a significant positive effect on the net operating income to assets of Egyptian bank units.

3.4.3 Examining the Effect of Different Regulatory Restrictions on the Returns of Egyptian Banks' Common Stocks

This hypothesis examines the effect of development of regulatory restrictions on the returns of Egyptian banks' common stocks. The study used one-way ANOVA Test to examine this hypothesis.

Table 11. One-way ANOVA output for the returns of banks' common stocks with the developments of regulatory restrictions

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.38337	1	14.38337	3.959446	0.046751
Within Groups	6978.363	1921	3.632672		
Total	6992.746	1922			

Source: Statistical Package for the Social Sciences output.

The previous statistical results show that there is a general tendency to change the returns of banks' common stocks, and it is significant at 0.05 level. In other words, it can be said that in the light of the development of regulatory restrictions the returns of Egyptian banks' common stocks increased; so that the development of regulatory restrictions has a significant positive effect on the improvement of the returns of Egyptian banks' common stocks.

3.4.4 Examining the Effect of Different the Regulatory Restrictions on the Total Risk of Egyptian Banks' Common Stocks

This hypothesis examines the effect of development of regulatory restrictions on the total risk of Egyptian banks' common stocks. The study used Test of Homogeneity of Variances to examine this hypothesis.

Table 12. Test of homogeneity of variances output for banks' common stocks with the developments of regulatory restrictions

	Levene Statistic	df1	df2	Sig.
RBI	3.17446	1	1921	0.074956

Source: Statistical Package for the Social Sciences output.

The previous statistical results show that there is no general tendency to change the total risk of banks' common stocks; thus, it can be said that the development of regulatory restrictions has no significant effect on the status of total risk of Egyptian banks' common stocks.

4. Conclusions and Recommendations

4.1 Conclusions

- The development of regulatory restrictions and macroeconomic status have meaningful effect on the profitability of banks in Egypt which confirms the validity of the first hypothesis of the study.
- There are two factors that are statistically significant in affecting the return on average equity of banking sector. The first factor is nominated as “*Assets and liabilities structure of banking Sector and macroeconomic status*” and it includes a number of variables that are related to the banking sector balance sheet structure and macroeconomic variables. The second factor is nominated as “*Financial Markets Performance and Financial Stability*” and it includes three variables: stock market return, capital adequacy rate, total public budget deficit growth rate. This conclusion directly agrees with (Bikker & Hu, 2002) (Naceur & Kandil, 2013) (Petria et. al., 2015) and indirectly agrees with (Khan et. al., 2015).

The study attributes this conclusion to the effect of macroeconomic variables on the profitability of banks, where during periods of economic prosperity and high rates of economic growth loan defaults declines and profitability of banks tends to increase. In contrary, during periods of economic recession and low rates of economic growth loan defaults increases and the provision for default increases as well and the profitability of banks tends to decrease. This agrees with (De Jonghe & Ö ztekin, 2015).

- The development of regulatory restrictions has a positive effect on "interest returns to loan ratio" in Egyptian bank units. This may attribute to the improvement in the process of credit management in bank units with the new set of regulatory restrictions. This finding confirms the validity of the second hypothesis of the study.
- Despite that the development of regulatory restrictions has a short-term negative effect on "net operating income to assets ratio" in Egyptian bank units, where operational expenses tend to increase as a result of the increase in internal audit and risk management processes and capital adequacy provisions and the tendency of different bank units to direct their funds to more liquid and low risk assets, such as treasury bills, in order to support capital adequacy standard; however, this effect turned to be positive in the long-term, where different bank units started to adapt to the new set of regulatory restrictions and improve the return to unit risk resulted from turning to low risk assets. This finding confirms the validity of the third hypothesis of the study.
- The differentiated effect of regulatory restrictions on bank units may lead us to conclude that the characteristics of different bank units, such as bank size, assets quality, management efficiency, effectiveness of bank governance, play a crucial role in determining the impact of development of Basel norms and standards on the profitability of these units. This finding agrees with (Pasiouras & Kosmidou, 2007) and (Zaky & Soliman, 2017).
- The returns of Egyptian banks' common stocks have improved with the development of regulatory restrictions. This confirms the validity of the fourth hypothesis of the study.
- The development of regulatory restrictions has differentiated effect on the performance of Egyptian banks' common stocks. On one hand, the hold returns improved with the development of regulatory restrictions (this finding disagrees with Zaky & Soliman, 2017); however, on the other hand, the development of regulatory restrictions has no significant effect on the status of total risk of Egyptian banks' common stocks. This confirms the invalidity of the fifth hypothesis of the study.

4.2 Recommendations

- Where the development of regulatory restrictions and macroeconomic status play a critical role in determining the profitability of bank units and prosperity of banking system in Egypt, then banking system should find an operating framework that simultaneously enhances the macroeconomic status and enables banks to obey to the new set of regulatory restrictions. This framework should be based on two main pillars. 1st Reducing the weight of government securities in the investment portfolio of banks as this type of finance has negative effects on the performance of the economy; 2nd Financing a multiple number of small ventures in different fields, sectors and markets, where financing such small business ventures has a number of positive effects on both the economy as a whole and the returns of bank units' portfolios.

The positive spillovers on the economy include the following points:

- Stimulate economic growth.
- Decrease unemployment rate.

- Maintain price level stability.
- Decrease poverty rate.

For the banking sector:

- Providing loan for a multiple number of small ventures represent a relatively low risk and more liquid investments (assets) for bank units.
- Growth and prosperity of small ventures through banking finance will improve the degree of financial inclusion and enables for prosperity of the banking sector, in addition to the positive effect of both the decline in unemployment and poverty on the degree of financial inclusion.
- The stock exchange may play an important role in supporting the profitability of banks and capital adequacy requirements. By moving from dividends in cash scheme to dividends in stock scheme the bank will be able to expand its capital and make use of the economies of scale, in addition to the role of new issuing of stocks in expanding the paid-up capital. Moreover, the stock market may play an assessment role, where the performance of banks' stocks in the stock market may reflect the effect of regulatory restrictions on the performance of banks in general and the performance of banks' stock in particular.

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