Determinants of Capital Adequacy Ratio
In Jordanian Banks

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Thesis submitted in partial fulfillment of the requirements
for the degree of Master of (Banking & Finance sciences) at
Yarmouk University.

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Dedicated to

MY MOTHER
<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>II</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>III</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>IV</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>VII</td>
</tr>
<tr>
<td>LIST OF NOTATIONS</td>
<td>VIII</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>X</td>
</tr>
<tr>
<td>OPERATIONAL DEFINITIONS</td>
<td>XI</td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 preface</td>
<td>2</td>
</tr>
<tr>
<td>1.2 Importance of the study</td>
<td>4</td>
</tr>
<tr>
<td>1.3 Thesis objectives</td>
<td>6</td>
</tr>
<tr>
<td>1.4 Hypothesis of the study</td>
<td>6</td>
</tr>
<tr>
<td>1.5 Data and Methodology</td>
<td>8</td>
</tr>
<tr>
<td>1.6 Limitations of the study</td>
<td>9</td>
</tr>
<tr>
<td>1.7 Thesis outline</td>
<td>9</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW</td>
<td>11</td>
</tr>
<tr>
<td>2.1 Review of Literature</td>
<td>12</td>
</tr>
<tr>
<td>2.2 Classifications of literature review</td>
<td>12</td>
</tr>
</tbody>
</table>
III. GENERAL FRAMEWORK OF 1988

BASEL CAPITAL ACCORD ........................................ 34

3.1 Introduction to 1988 Basel Accord ..................................... 35
3.2 Major points in 1988 Basel Accord ..................................... 36
3.3 Definition of capital ..................................................... 37
3.4 Risk Adjustments ....................................................... 42

IV. BASEL II STANDARDS AND ITS IMPLICATIONS

FOR ARAB BANKING INDUSTRY .................................... 51

4.1 Introduction to Basel II .................................................. 52
4.2 Objectives of Basel II .................................................... 53
4.3 Main characteristics of Basel II ......................................... 54
4.4 Measuring Credit Risk ................................................... 57
4.5 Effects of Basel capital requirements
   on emerging markets .................................................... 59

V. METHODOLOGY AND MODEL

SPESIFICATIONS ......................................................... 62

5.1 Overview ............................................................... 63
5.2 Data sources ........................................................... 63
5.3 Instruments used ....................................................... 64
5.4 Population of the study ................................................ 64
5.5 Variables included in the model........................................ 65
5.6 Hypothesis of the study.................................................. 71
5.7 Model of the study....................................................... 72

VI. STATISTICAL ANALYSIS.............................................. 74
6.1 Statistical analysis..................................................... 75

VII. RESULTS AND RECOMMENDATIONS............................. 97
7.1 Major Results......................................................... 98
7.2 Recommendations.................................................... 100

VIII. REFERENCES.......................................................... 101

IX. APPENDICES............................................................. 106
Appendix 1: Categories of capital....................................... 107
Appendix 2: Risk weighting for (Type A) assets..................... 108
Appendix 3: Risk weighting for (Type B) assets..................... 109
Appendix 4: Risk weighting for (Type C) assets..................... 110
Appendix 5: Risk weighting for off-balance sheet foreign

Exchanges & interest related contracts............................... 111

Appendix 6: Risk weights given external credit

Ratings............................................................................. 112

Appendix 7: List of banks under the study............................ 113
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Tables</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 1:</strong> Descriptive statistics[1985-1994]</td>
<td>75</td>
</tr>
<tr>
<td><strong>Table 2:</strong> Descriptive statistics[1995-2001]</td>
<td>78</td>
</tr>
<tr>
<td><strong>Table 3:</strong> Correlation coefficients[1985-1994]</td>
<td>81</td>
</tr>
<tr>
<td><strong>Table 4:</strong> Correlation coefficients[1995-2001]</td>
<td>84</td>
</tr>
<tr>
<td><strong>Table 5:</strong> Regression[1985-1994]</td>
<td>88</td>
</tr>
<tr>
<td><strong>Table 6:</strong> Regression[1995-2001]</td>
<td>92</td>
</tr>
</tbody>
</table>
LIST OF NOTATIONS

CAR: Capital Adequacy Ratio

LogSIZE: The natural logarithm of banks’ total assets

RAR: Risky Assets Ratio

LAR: Loans Assets Ratio

ROE: Return On Equity

ROA: Return On Assets

DAR: Deposits Assets Ratio

LPR: Loan Provision Ratio

DR: Dividends payout Ratio

EQR: Equity Ratio

OECD: Organization of Economic Countries and Development

GCC: Gulf Cooperative Countries

BIS: Bank for International Settlements

BHCs: Bank Holding Companies

LLP: Loan Loss Provision

CAER: Cumulative Average Expected Earnings

SLC: Standby Letter of Credit

GLS: Generalized Least Square

A LOSS: loan loss reserves/ total assets
MOP: Medium Of Payments

RWA: Risk Weighted Assets

RBC: Risk Based Capital

IRB: Internal Rating Based

PSIAs: Profit Sharing Investment Accounts

MVRM: Multivariate Regression Model

WTO: World Trade Organization

PD: Probability of Default

LGD: Loss Given Default

EAD: Exposure At Default
ABSTRACT


This study analyzed determinants of capital adequacy ratio (CAR), by studying the financial statements of a sample of 17 banks in Jordan in two periods. The first period is conducted from [1985-1994] which represent a time before applying Basel committee standards for capital adequacy ratio in Jordanian banks. While the second period covers from [1995-2001] which is a time after applying Basel committee standards for capital adequacy ratio, that represented in a minimum capital adequacy ratio (CAR) of 8%. The study found that most Jordanian banks are committed by a minimum 8% capital adequacy ratio, while some banks have higher than 8% ratio. We used a model of nine independent variables expected to affect CAR. Using correlation coefficients and regression analysis, we found a negative relation between CAR and bank's size, while CAR was positively affected by ROA, loan to assets ratio(LAR), and equity ratio(EQR). CAR has a positive relation to risky assets ratio(RAR) in the period [1985-1994], while the relation becomes negative over the period [1995-2001]. CAR is negatively affected by deposits assets ratio between [1985-1994] and positively affected by a size of banks’ deposits in a period[1995-2001]. CAR is negatively affected by loan provision ratio(LPR), and positively affected by dividend payout ratio(DR) over the period [1995-2001]. According to these results, banks in Jordan should maintain or increase their capital adequacy ratio(CAR) to enhance the safety of the banking system, and the safety to depositors.
OPERATIONAL DEFINITIONS

Soundness: the soundness of a bank can be defined as the likelihood of a bank becoming insolvent. The lower this likelihood the higher is the soundness of the bank. Soundness could be achieved by increasing bank capital, because capital provides a cushion against failure.

Goodwill: it represents capitalization of anticipated future earnings over and above what is implied by fair market value of tangible and intangible assets. Furthermore, supervisory experience suggests that when organizations were under strain and need to drawn upon their capital base, goodwill was not a source of financial strength.

OECD countries: Organization of Economic countries and Development. Which have a special lending arrangements with the IMF associated with the funds’ general arrangements to borrow.

GCC countries: Gulf Cooperative Countries that include (Oman, Kuwait, Qatar, Bahrain, UAE, and Saudi Arabia).

Forward contract: Agreement between a bank and a customer( which could be another bank) that calls for delivery, at a fixed future date, of a specified amount of two currencies; the exchange rate is fixed at the time the contract is entered into.
Currency Futures Contract: Contract for future delivery of a special quantity of a given currency, with the exchange rate fixed at the time the contract is entered. Futures contracts are similar to forward contracts except that they are traded on organized futures exchanges and the gains and losses on the contracts are settled each day.

Currency Option: A financial contract that gives the buyer the right, but not the obligation, to buy(call) or to sell(put) a specified number of foreign currency units to the option seller at a fixed price, up to the option expiration date.

Interest Rate Swap: An agreement between two parties to exchange interest payments for a specific maturity on an agreed upon principal amount. The most common interest rate swap involves exchanging fixed interest payments for floating interest payments.

Basis Swap: Swap in which two parties exchange floating interest payments based on different reference rate.
Chapter one

Introduction
1.1 preface:

Capital adequacy ratio for banking organizations is an important issue that has received a considerable attention in finance literature. It can be defined as a measure of a bank’s risk exposure. Bank’s risk is classified into credit risk, market risk, interest rate risk, and exchange rate risk, that are included in the calculation of capital adequacy ratio. So, regulatory authorities used capital adequacy ratio (CAR) as an important measure of “safety and soundness” for banks and depository institutions because they view capital as a buffer or cushion for absorbing losses (Abdel-Karim 1996).

The concept of capital adequacy appeared in the middle of the 1970’s because of the expansion of lending activities in banks without any parallel increase in its capital, since capital ratio was measured by (total capital/total assets). This lead to the evolution of international debt crisis and the failure of one of the biggest American banks: Franklin National Bank (Koehn 1980). These events forced regulatory authorities to stress more control procedures and to improve new criteria and methods to avoid bank’s insolvency.
A committee on banking regulation and supervisory practices of the Bank for International Settlements (BIS) which is called Basel Committee, met for the first time in Basel city in Switzerland in 1987. The committee include representatives of The Group of Ten (G-10) countries. Central banks of G-10 countries approved the adjusted proposal about banks’ capital adequacy and a way to measure capital adequacy ratio (CAR) by (total capital/risky-weighted assets) to be applied by the year 1988. Major points of Basle Committee( Alshana 1990) are: connecting of bank capital requirements with risks resulted from a bank’s activities, dividing capital into two Tiers: core capital and supplementary capital, classifying bank’s activities into different categories according to it’s degree of risk, and classifying countries into two groups according to their ability to pay back commitments.

One of the most important trends that arose at the end of 1980s is the emphasis on capital. So capital adequacy has become now the major benchmark for financial institutions and considered as a primary measure of safety and soundness (Jeff 1990). It had received also a considerable attention by regulatory authorities around the world, which appeared after the adoption of the 1988 Basel accord by representatives of the G-10 countries.

This study will discuss the status of Jordanian banks, and if these banks are committed by capital adequacy ratio and Basel Accord standards which was determined internationally by (8%), and if there is a relation between capital adequacy ratio and, banks’ lending activities, size of deposits, banks’ size, banks’ profitability index, loan loss provisions, risky assets, and dividends payout ratio. By analyzing the financial statement of 17 Jordanian banks in two periods, before applying 1988 Basel capital standards between [1985-1994] and after applying the 1988 Basel capital standards between [1995-2001].

1.2 Importance of the study:
This research will be directed to study a case of Jordanian banks, and to which limit they achieved the minimum of bank’s safety and soundness represented by capital adequacy ratio. Which is set internationally by 8% in 1988 Basel Accord.
Until 1990s bank regulators based their capital adequacy policy on a simple ratio defined as (Total Capital / Total Assets). The higher this ratio is, the higher is the cushion against failure. But this ratio doesn’t distinguish between assets according to their risks. So banks’ risky assets increases (increase the likelihood of insolvency), while their capital stay the same if bank satisfies the minimum capital ratio.

After applying risk based capital requirements in Basel I accord to deal with weaknesses in simple capital ratio as a measure for insolvency, capital adequacy ratio is measured by (Total Capital / Risk-Weighted Assets). Overtime, Basel I accord has become internationally accepted in more than 100 countries applying Basel framework in their banking system (Hasan 2003).

It is important to examine if Jordanian banks are implementing a simple capital ratio before applying 1988 Capital Accord, and if they attain a minimum required conditions of safety to depositors and shareholders. After applying Basel Capital Accord, banks’ soundness can be enhanced through control of a refined capital adequacy requirements.
1.3 Thesis objectives:

Main objectives of this thesis are:

- To see whether Jordanian banks are committed by regulatory capital adequacy ratio which is set at 8 percent.
- To define and analyze the determinants of capital adequacy ratio in two important periods before and after applying Basle Committee standards between [1985-1994] and [1995-2001] in Jordanian banks.
- To find a significant relationship between capital adequacy ratio and Jordanian banks' financial ratios.

1.4 Hypothesis of the study:

We expect a significant relationship between banks' financial ratios and its' capital adequacy ratio, by hypothesizing a significant relationship between CAR and nine independent variables as below.

**H1:** The natural logarithm of total assets (LogSIZE) is positively and significantly related to capital adequacy ratio (CAR).
H2: Risky assets to total assets, Risk Assets Ratio (RAR) is negatively and significantly related to capital adequacy ratio (CAR).

H3: ratio of total loans to total assets, Loan Assets Ratio (LAR) is positively and significantly related to capital adequacy ratio (CAR).

H4: net income to shareholders’ equity, Return on equity ratio (ROE) is positively and significantly related to capital adequacy ratio (CAR).

H5: net income to total assets, Return on assets (ROA) is positively and significantly related to capital adequacy ratio (CAR).

H6: ratio of total deposits to total assets, Deposit assets ratio (DAR) is positively and significantly related to capital adequacy ratio (CAR).

H7: total equity to total assets, Equity ratio (EQR) is positively and significantly related to capital adequacy ratio (CAR).
**H8**: ratio of cash dividends to net income, dividends payout ratio (DR) ratio is negatively and significantly related to capital adequacy ratio (CAR).

**H9**: ratio of loan loss provisions to total loans, Loan provision ratio (LPR) is negatively and significantly related to capital adequacy ratio (CAR).

### 1.5 Data and Methodology:

The study will apply a Time series- Cross sectional regression which will test relationships between capital adequacy and its determinants for a sample of (17) Jordanian banks in two periods, before applying Basle capital adequacy standards in a time between [1985-1994], and after applying Basel capital standards between [1995-2001]. Data for this study is taken from bank’s annual reports. A model will be formulated and related hypothesis will be tested using an appropriate statistical analysis.
1.6 Limitations of the study:

1. Lack of data on Loan provision ratio (LPR) variable between [1985-1994] time period lead to not considering LPR as an independent variable at that period.

2. Differences in calculating capital adequacy ratio (CAR) between [1985-1994] and [1995-2001] time periods prevented the study to join the two periods together.

3. Capital adequacy ratio was applied in Jordan in 1992, but banks' annual reports didn't disclose its capital adequacy ratio until 1995. So the study measures CAR by (Total Capital / Total Assets) ratio in a period from [1992-1994].

1.7 Thesis outline:

This thesis consists of seven chapters, next chapter will introduce a comprehensive literature review by documenting papers related to problem of the study.

Chapter Three will discuss general framework of 1988 Basle Accord, capital definition, risk adjustments, and a way of measuring capital adequacy ratio in banks. While Chapter Four will discuss the proposed
framework of New Basel Accord which is also called Basel II, and will be implemented in the year 2005.

In Chapter Five we will generate methodology of the study, to define variables and methods used to analyze it’s relations according to our hypothesis. We will outline also in chapter Five the model and it’s specifications. While chapter Six will introduce statistical analysis for the two periods, using correlation coefficients and linear regression to test hypothesis. Chapter Seven will conclude and provide recommendations about capital adequacy in Jordanian banks, and their commitment by Basel committee requirements about the adequate amount of capital.
Chapter Two

Literature Review
2.1 Review of Literature:

The literature in this thesis will consider regulated capital adequacy ratio (CAR) related to different variables and ratios such as bank's size, return on assets, loan loss provisions, deposits, loans, and risky assets.

It will also consider a relationship between capital adequacy ratio, bank's performance and financial structure of the bank. In addition to the relationship between capital adequacy ratio and risks in the bank's portfolio.

Some of studies are related to industrial countries, while others will discuss capital adequacy ratio in the Middle Eastern countries and third world countries plus emerging markets.

In this study we will discuss determinants of capital adequacy ratio in Jordanian banks in two important time periods. Before applying Basel capital standards from [1985-1994], and after applying Basel capital standards from [1995-2001].

2.2 Classifications of literature review:

2.2.1 Capital Adequacy, banks' portfolio, and banks' performance:
Koehn and Santomero (1980), examined a portfolio reaction to capital requirements by investigating the effect of capital ratio regulation on portfolio behavior of commercial banks. They examined the effects on bank portfolio risk of a regulatory increases in a minimum capital asset ratio that is acceptable to the supervisory agency. They assumed that the central purpose of bank regulation is to reduce the risk ness of banks’ portfolio so as to reduce the probability of failure, and to increase stability and viability. They found that an increase in variance of returns increases the probability of failure, while an increase in returns or capital ratio decreases failure risk. Their findings was consistent with Madura and Zarruk (1993) who assessed the stock market reaction to information on uniform capital requirements. Madura and Zarruk (1993) determined a share price response of U.S commercial bank holding companies (BHCs) to uniform risk based capital requirements. Results of their analysis had implications regarding whether market believes that the new requirements will benefit banks by reducing risk, or adversely affect banks by forcing a sub-optimal capital structure. Several U.S banks would need to raise funds (or sell assets) in order to satisfy capital adequacy guidelines. Furthermore, an analysis of bank
capital ratios by Salomon Brothers in 1988 verified that several money center banks were deficient in capital. They found that uniform capital requirements could enhance BHCs values because of risk reduction, so capital can cushion a bank against its’ asset portfolio losses, and reduce a bank’s default risk.

Mpuga (2002), also argued that the inadequacy of minimum capital standards in accounting for risks in bank’s assets portfolio could be one of the major factors leading to bank failures. He studied the 1998-99 banking crisis in Uganda and how the new banking guidelines in Uganda was to increase bank solvency and capital adequacy by shifting their portfolio towards lower risk assets, in an effort to meet the new requirement. He also analyzed empirically the impact of new capital requirements on performance and risk level of commercial banks in Uganda. The results of the study indicate that new capital requirements had a positive impact on commercial bank performance in terms of accumulation of deposits, assets and liquid assets, paid-in capital, core capital, total capital, and net profits.
While Choi(2000), when studied the credit crunch in the banking sector in Korea in year 1997, found the replacement of an old capital standards with risk based capital RBC in 1997 increased number of banks below the regulatory capital requirements from 0-14, and a number reduced to 7 in 1998. And that banks' capital deficiency amounted to 59 per cent of total Korean assets in 1997, reduced to 26 per cent, either by raising expensive capital, or by reducing risky- weighted assets through substituting less risk assets, such as commercial loans. So banks with less satisfactory CARs reduced bank lending, and banks that met satisfactory CARs increased bank lending.

2.2.2 Capital Adequacy Ratio, bank’s variables, and financial ratios:

Blose(2001) searched of Standards & Poor’s Dialog system for the period 1980 through 1993 identified 213 announcements of increases in loan loss provisions(LLP). He hypothesized that the announcements for LLP causes a stock price decrease. He explained that negative reaction from both informational asymmetry regarding asset value and the cost associated with capital adequacy regulation. Cross-sectional regression was performed, and a model of 9 variables has been expected to affect
bank's cumulative average expected earnings (CAER). He assumed inadequate capital, assets' size, LLP size, and assets' type as an independent variable. He found a negative returns accompanying LLP announcements. And that institutions with capital adequacy problem have significantly greater price declines associated with LLP announcements than do institutions with stronger capital adequacy positions. The stock market reactions are depend also upon the type of assets being provisioned. So the provisioning of third world debt is accompanied by a positive price reaction, while the provisioning of real estate and other loans are accompanied by a negative price reaction.

While Powell (2002), argued that capital should cover both expected and unexpected losses. But the lack of international agreement on provisioning rules, and the actual treatment of provisioning in some G 10 countries, about the fact that general provisions can count as capital, So the importance of provisions versus capital appeared in that provisions covered the expected losses in some countries like Argentina.

Hassan (1992), mentioned that banks had been exposed to standby letters of credit (SLC) and off-balance sheet activities, which has become a major concern to regulators. This exposure has been examined by
employing option pricing methodologies. He found that SLC reduce systematic risk, equity risk, and implied asset risk. Riskiness of SLCs has been examined in empirical literature by regressing SLCs over market measures of risk such as systematic risk (beta), and equity risk. Also better capitalized and less risky banks are found to issue larger volume of SLCs.

Linear model was estimated over cross-section and time-series data using generalized least-squares (GLS) technique to test risk behavior of bank SLC activities. He found that leverage factor (total liabilities/total assets) was positively related to market measures of risk, and credit risk variable ALOSS (loan loss reserves/total assets) was also positively related to market measures of risk. The larger the banks’ size, the lower is its’ earnings variability. In addition, investors may believe that large banks are protected from failure by greater degree of regulatory support, so bank’s risk and size should be negatively related.

Jeff(1990), in his article gave an overview of capital requirements for banks and financial institutions showing that there was no difference in capital standards for these two types of financial institutions.
He said that Capital adequacy was reflected in asset size as a proxy of a well-managed bank. This gave benefits for a strongly capitalized banks according to poorly capitalized banks which will sell assets to raise capital. In 1990’s capital adequacy has become the major benchmark for financial institutions. And was considered as a primary measure for safety and soundness. Jeff was also regards the return on assets ratio as a primary measure of a well-managed bank.

Renolds, et al.(2000). Studied financial structure and bank performance from 1987 to 1997. Financial performance ratios which were used as dependent variables (capital adequacy, liquidity, profitability, and loan preference) were regressed to structural variables (bank assets, net income, administrative expenses and time). They have examined the financial structure and performance of banks in eight East and Southeast Asian Countries. They found that profitability and loan preferences increases with size, but capital adequacy decreases with size, so large banks have smaller capital adequacy ratios, and profit is directly related to capital adequacy. And as management (given by administrative expenses) increased from a small size, the capital adequacy ratio fill to a minimum, then increased as management became larger and larger. So
small and large banks were less risk prone with higher capital adequacy ratios than medium-sized banks.

We can see in Marcus(1983) study how he explained the dramatic decline in capital to asset ratio in U.S commercial banks during the last two decades. He hypothesized that the rise in nominal interest rates might have contributed to the fall in capital ratios, time series- cross section estimation supports the hypothesis regarding the interest rate.

2.2.3 Capital Adequacy and Deposit Insurance:

The study of Grullon, et al(1997). considered the need to improve capital ratios as an important factor in the merger activity because capital levels for many banks have been declining since the late 1970s. Furthermore, the increasing pressure from bank regulators to improve capital levels has induced many banks to seek alternative sources of capital such as merging with other bank, so they concentrate on the merger and acquisition decision and how capital requirement affect it. By analyzing the determinants of the medium of payments (MPOs) in a sample of 146 bank merged over the period from Jan 1981 to Dec 1990 in US banking
sector. They found capital position and the return on equity (ROE) ratio of the merged banks as one of the important factors affecting (MPOs) in the merger activity. So the higher the capital ratio of the target bank compared to that of the acquirer, the more desirable the stock swap as a device for increasing the capital adequacy of the merged bank. The higher the capital ratio of the acquirer, the more feasible it will be to arrange a stock swap. While as ROE ratio of the target decrease, the MPO is more likely to be cash. So bank mergers are partly motivated by a desire to remove inefficient management.

_Dowd (1999)_ found in his study that the imposition by regulators of minimum capital standards on financial institutions can be seen as a mean of strengthening the safety and soundness of the banking system. Also as a response to the moral hazard problems created by deposit insurance. He also suggested that an information asymmetry between bank managers and depositors could produce market failure that provides a rational for government or (central banks) intervention in the financial system. This intervention would take the form of capital adequacy regulation to force banks to maintain a stronger capital position.
Also Harold(1999), found the same result as Dowd, in that many regulators and consumers were concerned about the safety of deposit insurance system. His study applied existing bank risk-based capital (RBC) requirements to current credit union data to measure credit union’s RBC strength. Credit union capital was strong between 1992 and 1997, credit union capital protection grew dramatically, even though risk-weighted assets (RWAs) increased significantly. But banks still have stronger RBC ratios because credit unions had more RWAs than banks. Credit unions were classified as “well-capitalized” by the ratio that use RWAs to assess capital adequacy. Asset size made no major difference when examining the strength of RBC ratios. So banks as profit making organizations interested in high returns for shareholders, will optimize capital levels to earn the highest return on equity (ROE) while meeting the “well-capitalized” level of regulatory capital adequacy.

Yu Min- Teh(1996), defined the adequate capital for banks as the level at which the deposit insuring agency would just breakeven in guaranteeing the deposits of individual banks with the premium the bank pays. An option theoretical framework was employed in his study for measuring

Except for the 1989, most banks in their sample proved to be inadequately capitalized so that capital infusion is required. The adequate level of equity to asset ratio, were found to exceed the 8% level required by the bank for international settlement (BIS).

While Sharpe(1977), defined capital as a difference between assets and deposits, so the larger the ratio of capital to assets (or the ratio of capital to deposits) the safer the deposits. As capital was adequate, deposits was "safe enough". His idea was that if the value of an institutions' assets may decline in the future, its' deposits will generally be safer the larger the current value of assets in relation to the value of deposits.

2.2.4 Capital Adequacy, various risks and banks' failure:

Pettway(1976), studied the sensitivity of capital market to differential bank capital standards established by managerial and regulatory policy. First he looked at relationship between bank capital and risk premium required on bank debt. Then he tested a relationship between bank capital and other variables to market Beta and price earning ratio on common
stocks of large banks and holding companies. The period of the study was from 1971-1974 and capital adequacy ratio was measured by capital /risk assets. He found that the amount of bank equity was significant in determining a bank’s price earning(P/E) ratio in 1972 and 1974 and of a bank’s market beta in 1974. While the level of significance of capital adequacy coefficients was much below non-capital variables. Pettway found that prior to 1974, the market was not sensitive to variations in capital positions of large banks. But since 1974 investors has become concerned along with bank regulators about the level of capital.

Karles, et al(1989), examined a relationship between various market measures of risk and a primary capital adequacy ratio measured by primary capital to total assets for banking firms in an attempt to evaluate whether or not market measures and capital adequacy are complementary. Theoretical covariance relationships between capital adequacy and market risk measures were developed first. Then theoretical results were tested using a sample of 24 banks chosen by combining the CRSP and bank Compustat data files. Empirical results demonstrated that theoretical relationship between bank’s primary capital adequacy measures and various measures of market risk should be negative.
Shome, et al (1986), investigated capital adequacy issue for bank holding companies (BHCs) over the 1974-1983 period, one of the most turbulent periods in recent banking history. A time when there was a major restructuring of the economy and the failure of Franklin National Bank. This failure signaled financial markets that at least some of larger banking organizations in the United States would be allowed to fail, resulting in losses to stockholders, therefore capital may have more value after this event.

They empirically analyzed a relationship between equity valuation of BHCs and their capital structure. They found that during the 1974-1983, large BHCs were on average under capitalized, and the elasticity of price per share with respect to capital ratio was positive. This means that market value of BHCs would have increased with increasing capital levels.

While Choi (2000), evaluated the impact of introducing a regulatory framework that causes corporate sector to face a decline in credit in the wake of 1997 currency crisis. Using banking data, and controlling for macro factors that influence supply and demand factors for bank loans, to investigate the rule of capital requirements in determining size of loans. He argued how a credit crunch is brought about by regulatory measures.
imposed in Korean banks, to reduce loan supply to corporate sector, especially to small and medium size enterprises SMEs.

According to Choi, Korea recently experienced the worst recession in its post-war history, as partly evident by credit crunch. A credit crunch arises because of deterioration in financial position of lenders that constrains their ability to supply credit. In addition, bank's lending may be constrained by a fall in their surplus capital as a result of losses. So if losses cause capital surplus to decline, banks might decide to reduce their total asset base (essentially their loans), or to seek out assets carrying a lower regulatory risk-weighting. Banks facing binding capital constraints as a result of large loan losses due to continued bankruptcies have an option of either raise capital/asset ratio, or lower both assets and liabilities.

2.2.5 Capital Adequacy in Middle East and Emerging Markets:

Shalabe (2002), discussed banking industry with a present international changes and it's effects on bank's business in Egypt. She also discussed banks supervision and it's objectives in risk management, and the efforts of Basel committee in bank's supervision developments and how these
developments will reduce bank’s credit risks. She criticized new Basel committee of capital adequacy, and the future of banking business with this new frame. She also discussed bank’s failures in Egypt, reasons and solutions.

Medad(2003), and Al zodjali(2003). studied the effects of Basel committee recommendations, which is known as Basel II, on Arab countries. This new Basel Capital Accord based on three main bases: the first contains a modern method to measure capital, weighted by risks (market risks, operational risk, credit risk). The second base is that every bank or financial institutions should have an internal rating-based(IRB) approach, with capital requirements set on the basis of a bank’s own quantitative and qualitative assessment of its credit risk. While the third base required every bank or financial institution to disclose their capital and their exposure to risks and the ways they used to deal with risks. This New Accord will be implemented in year 2005, which will aim to let the board of directors be responsible on an agreement of implementing credit strategies and policies to face credit risks. And that banks should determine and manage their credit risk effectively.
Cornford (2003) in his study discussed the standards of 1988 Basel Accord and ways in which its rules were eventually adopted much more widely. He also reviewed criticisms of 1988 Accord to which new framework for capital adequacy Basel II is a response. He also argued three issues which concern developing countries. The first was the Accord's system of weights for main risks whose arbitrary calibration was felt by some developing countries to give inadequate recognition to their credit worthiness. The second and third issues, were a focus of special attention during the aftermath of East Asian crisis.

Also Reding (2001), discussed major benefits and criticisms of New Basel Capital Accord especially to Arab countries. He questioned the fairness of proposed framework for business in Middle East markets. Despite his criticisms he suggested that Middle East supervisors should involve themselves as soon as possible in the New Accord, and should cooperate with banks and other regional supervisors in preparing a flexible adoption of the New Accord. Stubing (2003) agreed with Reding (2001) that there are many effects of implying New Basel Capital Accord in Emerging markets, and that much work by the committee is focused on recalibrating the calculations for credit risk and operational risk. He recommended that the Union of Arab Banks should take an
active role in shaping the final provisions of the forthcoming Basel Accord.

Hasan (2003), emphasized that the soundness of banking system is one of the most important issues for regulatory authorities and financial system stability. He introduced the main characteristics of new Accord Basel 2 which consisted of three pillars: Minimum capital requirements which was the same as 1988 Accord, and two new pillars, (supervisory review process, and Market discipline).

Also Powell (2002), emphasized that the Basel 1988 Capital Accord was the most successful of all recent financial standards. And although it was designed for internationally active banks in G-10 countries, more than 100 countries applied the Accord to all banks, and not just to those that were internationally active. His proposal included a "standardized" approach and also two internal rating approaches. He found that most large internally active G-10 banks applied an internal rating approach that linked credit risk more closely with actual regulatory requirements. While many emerging countries implemented the "standardized" approach which used an external rating agencies to set the risk weights for banks.
Powell discussed how the implementation of New Capital Accord in G-10 countries will affect the cost of capital to emerging economies. He found that the level of regulatory capital was reduced in emerging countries with poor credit rating, while there was a significant increase in capital requirement in G 10 banks. At the same time, banks in emerging economies remained the most important vehicle for financial intermediation, and the appropriate regulation of bank capital remained one of the most important issues for financial sectors.

Concetta, et al (2001), also tested the effects of Basel Capital Requirements in Emerging countries on bank lending policies. They found that the enforcement of capital adequacy requirements negatively affected the supply of bank loans, because the contraction in loan supply could be the most effective way of reducing risk-weighted assets which is (the denominator) in the calculation of capital adequacy ratio. And that such a negative impact on the supply of bank loans was not limited to countries enforcing bank capital asset requirements in the aftermath of a currency/financial crisis.

The adverse impact of bank capital asset requirements was smaller for foreign owned banks, suggesting that opening up to foreign investors may
be an effective way to partly shield the domestic banking sector from negative shocks.

Abdel Karim (1996), studied the impact of Basel capital adequacy ratio regulation on financial and marketing strategies of Islamic banks. He argued that Basle Capital Adequacy Ratio (CAR) which was implemented in 1992 by regulatory authorities in many countries, was irrelevant to Islamic banks because it did not accommodate one of the major instruments—investment accounts—through which Islamic banks mobilize funds on the basis of profit sharing. He developed four possible scenarios for treatment of profit sharing investment accounts (PSIAs) in the calculation of CAR and examined their impact on financial and marketing strategies of Islamic banks in the light of risk-return relationship between funds contributors of these banks.

2.2.6 Capital Adequacy and Industrial Countries:

Wagster (1996), argued that the purpose of Basel Accord is to standardize bank-capital regulations among the twelve leading industrial countries. To address the Accord’s effect on the competitiveness of international banks he used a multivariate regression model (MVRM) which extended to a multi-country studies. Their study measured the wealth effects of
shareholders of international banks from Canada, Germany, Japan, Netherlands, Switzerland, United Kingdom, and United States, to eighteen important events leading to the Basel Accord over the period from September 11, 1985 to March 28, 1990. He found that before Basel capital standards, different countries failed to prevent an increase in an overall risk of the banking industry. Cross-country comparisons of capital levels of international banks were also difficult because many different elements were considered to be bank capital. So Basel Accord, provides a common international definition of bank capital that divides capital into two Tiers.

Ma(2001). Discussed banking reform in China. He found China has been committed to liberalization of banking institutions upon her accession to World Trade Organization (WTO). It was characterized by large non-performing loans, high management risk, low capital adequacy and huge employment. Using financial statistics of Chinese banks. A virtue bank was created in order to assess the feasibility of various policy options that strengthened capital adequacy ratios and competitiveness. A simulation exercise concentrated on the analysis of five policy options (interest rate, liberalization, cost reduction, tax reduction, risk reduction, and re-capitalization) to improve banks capital position and profitability.
This study differs in that it discusses determinants of capital adequacy ratio in two periods from [1985-1994] and [1995-2001], which represents a time before and after banks' capital regulation, in 17 Jordanian banks. Which there is no study made this comparisons and few studies analyzed financial ratios as a determinants of CAR. Time series-Cross sectional regression is applied to test the hypothesis, and a model of nine independent variables is formulated. Mpuga(2002) study is very similar to ours but he only differed in that he compared between foreign and local banks in analyzing determinants of capital adequacy ratio. While we exclude foreign banks from our sample because they don’t have accounts for shareholders' equity. Hassan(1992) study found a significant relationship between bank’s variables and banks’ risks exposure then analyzed the effects on CAR, but he didn’t take the whole on and off-balance sheet items to assess banks’ risks. Also Harold(1999) study was lacked of some variables like size of banks' deposits and credits to assess the strength of risk based capital. Grullon(1997) study differ in that he compared between banks’ capital positions in a case of merger and acquisition by analyzing determinants of medium of payments. Karles(1989) study examined a relationship between CAR and market risks only, he measured CAR by total capital/total assets without mentioned a new Basel capital ratio and its’ implications in banks. While
Shome (1986), analyzed empirically a relationship between banks’ equity and their capital structure, before the application of Basel capital standards. While ChoJ (2000) studied the 1988 regulatory framework and its’ implications on the economic position in Korea, he used banking data only to study factors that affect the supply and demand for banks loans, but not to analyze banks’ financial positions and its’ relation with CAR. Other studies in Middle East and Emerging markets, are a kind of theoretical not empirical studies, which made Arab countries lacked of empirical studies, especially that the New Accord Basel II will be implemented by year 2005.

Abdel Karim (1996) studied the impact of Basel capital adequacy ratio regulation on financial strategies of Islamic banks, which was irrelevant to Islamic banks because of investment accounts, which Islamic banks mobilize funds on basis of profit and sharing accounts, so CAR has different method of calculation in Islamic banks introduced in his study without mentioned benefits or losses faced Islamic banks when implementing CAR. This study didn’t confront way of calculating CAR in Islamic banks because it have been taken from banks’ annual reports.
Chapter Three

General framework of 1988

Basel Capital Accord
3.1 **Introduction to 1988 Basel Accord:**

Basel committee for banking regulations and supervisory practices has been established in 1988. The committee consisted of representatives of the group of ten (G-10) countries which are Canada, France, Germany, Italy, Japan, Holland, Sweden, Switzerland, United Kingdom, United States.

The heads of central banks of G-10 countries had met in 7-Dec 1987 at Basle city to study the first report of Basel committee which tries to establish equilibrium between rules and regulatory actions about measuring the adequacy of capital.

So the report has been published and distributed to the G-10 countries and another countries, to let banks study it for a period of 6 months and to look at the committee and put their opinions and their recommendations.

The committee put their final report and presented it in July 1988 which has been agreed upon by the heads of the central banks and was called (Basel Accord).

Major objectives of Basle committee is to reduce fragility of international banking system, and to reduce competitive inequities.
created by the application of differential standards at the national level (Cornford 2003).

1988 Capital Accord, specified a broad range of principles to govern the division of supervisory responsibilities between parent and host banking supervisory authorities in G-10 countries. It was last amended in 1983 and is widely applied today in financially developed countries.

3.2 Major points in Basle Committee: (Alshama 1990).

1) Connection of bank capital requirements with risks resulted from a bank’s activities. On-balance sheet, or off-balance sheet activities.

2) Division of capital into two Tiers: core capital (paid-in capital, all kinds of reserves, and retained earnings), and supplementary capital (undisclosed reserves, asset revaluation reserves, subordinated debt, loan-loss provisions) all will be clarified in detailed later.

3) Classification of bank’s activities into different categories according to it’s degree of risk, to let a bank reach a minimum capital/weighted risk assets ratio which was determined by 8 percent, and should be adopted by all banks in the world by 1992.

4) Classification of countries into two groups according to their ability to pay back commitments. First group contains the European countries,
Japan, and United States which were members in the OECD countries, in addition to Switzerland and Saudi-Arabia. The second group contains rest of the world countries, and Arab countries excluding Saudi-Arabia. First group was considered as low risk countries, and the second as high risk countries.

3.3 Definition of Capital:

Definition of capital is used by national bank supervisors in the assessment of banks' capital adequacy, it consists of two grouping of capital elements which are called Tier 1 capital (core capital) and Tier 2 capital (supplementary capital) [see appendix 1]. The former group consists of ordinary paid-in capital, disclosed reserves and retained earnings. While the second, consists of undisclosed reserves, asset revaluation reserves, general provisions, hybrid capital instruments and subordinated term debt. Tier 2 capital could be in aggregate, only a maximum of 100 percent of Tier 1 capital. This means that at least 50 percent of capital base, which is derived by adding (Tier 1 and Tier 2) capital, must comprise Tier 1 (Core) capital. Additionally, the inclusion of subordinate term debt with
capital base is limited to a maximum of 50 percent of Tier 1 capital, i.e, 25 percent of capital base.

3.3.1 **Tier 1 capital or (Core Capital):**

The key element of capital is equity capital and disclosed reserves. This key element is the only element common to all countries banking system. It is wholly visible in published accounts, and it is a basis on which most market judgments of capital adequacy are made. This emphasis on equity capital and disclosed reserves reflects the importance attached to securing a progressive enhancement in the quality, as well as, the level of total resources maintained by banks.

3.3.2 **Tier 2 capital or (supplementary capital):**

a. Undisclosed reserves:

Undisclosed reserves may be constituted in various ways according to different legal and accounting regimes in member countries. Under this heading only reserves may be included.

Undisclosed reserves have been passed through profit and loss account, and have been accepted by bank's supervisory authorities. And must be inherently of a same quality as published retained earnings.
b. Asset revaluation reserves:

Some banks' balance sheet traditionally include substantial amounts of equities held in their portfolio at historical cost, but can be realized at current prices and used to offset losses. These revaluation reserves can be included among supplementary elements of capital provided. They are subject to a substantial discount in order to reflect concerns both to market volatility and tax change which would arise when such gains are realized. Accordingly, the committee considered 45 percent of the excess of market value over historical cost book value appropriate for inclusion under supplementary capital.

c. Subordinated term debt:

Subordinated term debt instruments include conventional unsecured borrowing subordinated (in respect to both principal and interest) to all other liabilities of a bank except share capital. Such instruments have significant deficiencies as constituents of capital in view of their fixed maturity and inability to absorb losses except in liquidation. Consequently, it has been concluded that subordinated term debt instruments with a minimum original term to maturity of over five years may be included within the supplementary elements of capital but only to
50% maximum of core capital elements, and subject to adequate amortization arrangements.

During the last five years to maturity, accumulative amortization factor of 20 percent per year will be applied to reflect the diminishing value of these instruments as accounting source of strength.

d. Hybrid (debt/equity) capital instruments:

This capital instruments combine characteristics of equity and of debt. These instruments have close similarities to equity, in particular, when they are able to support losses without triggering liquidation, they may be included in supplementary capital. Their precise specifications differ from country to country. But they should meet the following requirements:

- They are unsecured, subordinated and fully paid-up.

- They are not redeemable without a prior consent of supervisory authorities.

- They are available to participate in losses without a bank being obliged to cease trading (unlike conventional subordinated debt).

- Although capital instrument may carry an obligation to pay interest that cannot permanently be reduced or waived (unlike dividends on ordinary shareholders equity). It should allow service obligations to be deferred (as
with cumulative preference shares) were profitability of a bank would not support payments.

3.3.3 Deductions from capital:

The following deductions from capital should be made from capital base for the purpose of calculating risk-weighted capital ratio.

Deductions consist of:

a) Goodwill, as a deduction from Tier 1 capital element.

b) Investment in subsidiaries engaged in banking and financial activities this would be applicable in a case of branches abroad of locally incorporated banks. A normal practice will be to consolidate the entire assets of a bank including its branches abroad for the purpose of assessing capital adequacy.

If this is not done, deduction is essential to prevent the multiple use of same capital resources in different parts of a group. Subsidiaries are defined as companies incorporated in Jordan or abroad, which a bank controls.
c) Investment in associated companies:
Associated companies are defined (in accordance with international accounting standard No. 3) as companies (other than subsidiaries) in which a bank has a power to exercise significant influence i.e hold 20% or more of the voting shares and intends to retain its interest as along term investment.

d) Investment in other banks/financial institutions capital:
This is subject to arrangement in which two or more banks agree to hold each other’s capital instruments.

3.4 Risk Adjustments:
In assessing capital adequacy, a bank seeks to take account of all possible risks of loss to which an institution may be exposed. These risks include the following: risk of counterparty default whether arising from on-balance sheet or off-balance sheet operations (credit risk), risks arising from ‘open’ foreign exchange positions (foreign exchange risk), risks arising from open interest rate positions or un hedged investment positions (interest rate risk and position risk), risks arising from management negligence or incompetence (operation risk), risks
arising from business concentration (e.g., geographically, sectorally or on an individual counterparty basis) (concentration risk), and risks arising from subsidiaries, associates and other connected companies which might expose the institution to direct financial costs or general loss of confidence by association (contagion risk). Because of that, a bank has to take into account both institutions on-balance-sheet and off-balance-sheet activities, and the nature of its relationship with group and other connected companies, and relating each balance sheet activity to its weighted risk.

3.4.1 **Risk weighting for on balance sheet items:**

1) On-balance sheet items are designed to facilitate weighting of assets for credit risk and the measurement of a bank's capital adequacy requirements. Basel committee on banking regulations and supervisory practices issued five categories of weights applied to on-balance sheet assets in July 1988, which are (0, 10%, 20%, 50%, 100%).

2) In addressing country transfer risk, Basel committee has been conscious to difficulties of devising a satisfactory method for incorporating country transfer risk into the framework of measurement.
Country transfer risk varies greatly between different countries and this risk is of sufficient significance to make it necessary to ensure that broad distinctions in credit standing of industrialized and non-industrialized countries is made and captured in the system of measurement.

Basel committee concluded that a defined group of countries should be adopted as a basis for applying differential weighting coefficients, and that this group should be full member of the OECD.

Saudi Arabia and the OECD- grouping of Western countries and Japan- are classified as low risk.

Basel committee has clubbed the GCC countries other than Saudi Arabia, together with third world countries as high credit risk.

Assets included in type A grouping generally attract a zero weight [see Appendix 2].

Any claims on central governments and central banks within the OECD will attract a zero weight. Claims on governments and central banks other than OECD will also attract a zero weight provided, that such claims are denominated in national currency and funded by liabilities in a same currency. This reflects the absence of risks relating to the availability and transfer of foreign exchange. Claims on domestic, non-commercial in nature public sector entities will attract a zero weight.
The framework recognizes the importance of collateral and guarantees in reducing credit risk, but only to a limited extent. Collateral will apply only to loans secured against cash or against securities issued by OECD and other countrie’s central governments. Loans partially collateralized by these assets will also attract low weights on that part of a loan, which is fully collateralized. The committee has agreed loans guaranteed by third parties, like OECD central governments or OECD incorporated banks and will attract weight allocated to a direct claim on the guarantor (e.g. 20 percent in a case of banks).

Loans guaranteed by non-OECD incorporated banks will also be recognized by an application of a 20 percent weight but only where the underlying transaction has a residual maturity not exceeding one year (New Basel adequacy framework issued by BIS).

In a case of loans covered by partial guarantees, only that part of a loan, which is covered by the guarantee, will attract a reduced weight.

The assets included in Type B category, see [Appendix 3], and generally attract a 20 percent weight. Claims on multilateral development banks and claims that have been guaranteed or collateralized by securities issued by such banks will attract 20%.
The Multilateral banks are:

1. Islamic Development Bank.
3. OPEC Fund for International Development.
5. Arab Fund for Economic and Social Development.
7. Arab Monetary Fund.

There was no differentiation between short-term claims on banks incorporated within or outside OECD. A 20% weight was applied to claims on all banks, wherever incorporated, with a residual maturity of up to one year. Longer-term claims on OECD and GCC incorporated banks would also be weighted at 20 percent. Longer-term claims on banks incorporated elsewhere would be weighted at 100 percent.

The item “loans fully secured by mortgage on residential property” included in type B grouping will by assigned a 50 percent weight. This will include mortgage on residential property, which is rented or is intended to be occupied by the borrower.
Assets included in type C grouping see [Appendix 4], would attract a weight of 100 percent. All claims of a private sector in Jordan or abroad, persons and entities that have not been included in Type A and B should have a weight of 100 percent. Claims on governments and Central Banks other than national currency of the debtor, would attract 100 percent weight. All commercial companies owned by public sector whether in Jordan or abroad will be assigned a weight of 100%.

Off-balance sheet items (Excluding foreign exchange and interest related contracts) was designed to facilitate the calculation of weighted total of such commitments. The framework takes account of credit risk on off-balance sheet exposures by applying credit conversion factors to different types of instruments or transactions. Credit conversion factors would be multiplied by weights applicable to category of the counterparty for an on-balance sheet transaction

3.4.2 Risk weighting for off-balance sheet items:

Basel committee believes that it is of great importance that all off-balance sheet activities should be caught within capital adequacy framework. This approach is comprehensive in that all categories of off-balance sheet items will be converted to credit risk equivalents by multiplying a principal amounts by a credit conversion factor. The
resulting amounts then being weighted according to the nature of the
counter party.

Different instruments can be divided into some broad categories as
indicated below:

a) Those, which substitute loans (e.g. general guarantees of indebtedness,
bank acceptance guarantees and stand by letters of credit serving as
financial guarantees of loans and securities). These will attract a 100%
credit risk conversion factor.

b) Certain transaction related contingencies (e.g. performance bonds, bid
bonds, warranties and standby letters of credit related to particular
transactions) a 50% credit risk conversion factor.

c) Commitments such as formal standby facilities and credit lines with an
original maturity exceeding one year and all note issuance facilities and
revolving underwriting facilities. A 50% credit risk conversion factor.

d) Short-term self-liquidating trade-related contingent liabilities arising
from the movement of goods (e.g. documentary credits collateralized by
underlying shipments). A 20% credit risk conversion factor.
3.4.3 Risk weighting for off-balance sheet foreign exchange and interest related contracts:

Handling of foreign exchange and interest related items need special attention because banks are not exposed to credit risk for full face value of their contracts, but only to a potential cost of replacing cash flow on contracts showing positive value if counterpart defaults.

Instruments that are captured in risk-weighting framework include the following.

**Foreign exchange contract:**

i) Forward foreign exchange contracts (swaps and outright).

ii) Cross-currency interest rate swaps.

iii) Currency futures.

iv) Currency options purchased.

**Interest rate contracts:**

i) Single currency interest rate swaps.

ii) Basis swaps.

iii) Forward rate agreements.

iv) Interest rate futures.

v) Interest rate options purchased.
Majority of supervisory authorities viewed a best way to assess credit risk on these items is to require banks to calculate current replacement cost of the contracts in market value. Thus capturing current exposure without any need for estimation and then adding a factor called (‘add-on’) factor to reflect potential future exposure for the remaining life of a contract. Since exchange rate contracts involve an exchange of principal on maturity, as well as being generally more volatile, higher conversion factors are set for those instruments which features exchange rate risk. Exchange rate contracts with an original maturity of 14 calendar days or less are excluded from weighting requirements. While instruments traded on exchanges may be excluded where they are subject to daily margin requirements. Method of calculating risk weighted foreign exchange and interest-related contracts is shown in [ Appendix Five]. Banks are required first to calculate the current replacement cost of their foreign exchange and interest related contracts with positive value. A factor (‘add-on’) is then added to the replacement cost to reflect potential credit exposure over the remaining life of the contracts. Once a bank has calculated credit equivalent amounts, they are to be weighted according to a category of counterparty using the same classifications into types A, B and C as in the main exposure to each type of counterparty has to be weighted as 0%, 20%, or 100% respectively.
Chapter Four

Basel II Standards and its Implications for Arab Banking Industry
4.1 Introduction to Basel II:


1- Minimum capital requirements.
2- Supervisory review process.
3- Market discipline.

The New Accord is more extensive and complex than 1988 Accord. It emphasized on a role of supervisory review process and market discipline as essential complements to minimum capital requirements. This revised Accord will be implemented in year 2004 (Reding 2001).

After rapid technological, financial, and institutional changes happened in the world, many weaknesses appeared in Basel I Accord. Operational risk becomes increasingly important with the increase in complexity of bank activities. Also, 1988 Accord does not sufficiently recognize credit risk mitigation techniques, such as collateral and guarantees. Much of criticisms centered on the failure of 1988 Accord to make proper allowance for risk reduction attainable through diversification. Its' failure
to differentiate adequately credit worthiness of different countries and
different private-sector counterparties, and the exclusive focus on credit
risk. So the focus of New Accord is credit risk, plus other banking risks
such as operational risk, and interest rate risk.

4.2 Objectives of the New Accord:

Basel committee decided to propose a more risk-sensitive framework
in June 1999. It has a following objectives:

• Promotion of safety and soundness in financial system.

• Enhancease of competitive equality.

• Constitution of more comprehensive approach to addressing risks.

• Development of approaches to capital adequacy that are appropriately
sensitive to the degree of risk involved in a bank's positions and
activities.

• Focusing on internationally active banks, and at the same time keep the
underlying principles suitable for application to banks of varying levels
of complexity and sophistication.
New Basel Accord concentrated more on measuring risks facing a bank, and assessing probability of insolvency. Basel 2 Accord sets capital requirements in terms of credit risk (the principal risk for banks), although the 8% minimum ratio was intended to cover other risks as well, Basel 2 introduced capital charge for operational risk. So major banks now allocate 20% or more of their internal capital to operational risk (Hasan 2003).

Under Basel 1 individual risk weights depend on a broad category of borrowers. While under Basel 2 the risk weights are to be refined by reference to a rating provided by an external credit assessment institution (such as a rating agency), or by relying on internal rating based (IRB) approaches where banks provide inputs for risk weights. In addition to differences between Basel 1 and Basel 2 in terms of defining and measuring risks. Basel 2 introduced two new pillars, supervisory review, and market discipline.

4.3 Main characteristics of New Accord (Basel 2):

4.3.1 The first pillar: Minimum capital requirements

Definition of capital in Basel 2 will not be modified and the minimum ratio of capital to risk-weighted assets including operational and market
risks remained 8% for total capital. Tier 2 capital will continue to be limited to 100% of Tier 1 capital.

The main changes will come from inclusion of operational risk and approaches to measure different kinds of risks. While there were no changes in approaches to measure market risk there were fundamental changes in the approaches to measure credit risk, which are standardized approach to credit risk and internal ratings based (IRB) approach.

4.3.2 The second pillar: Supervisory Review Process

In Basel 1 risk weights were fixed and implementation of the accord is straightforward. In Basel 2 bank can choose from a menu of approaches to measure credit, market, and operational risks (Cornford 2003). This process of choosing the approach requires review of the availability of minimum requirements to implement the approach. In addition to that, in IRB approache risk weight is computed from banks’ inputs. So it is important in this case to make sure that banks’ inputs are measured in an accurate basis. Basel committee suggested four principles to govern the review process:
**Principle one:** Banks should have a process for assessing their overall capital in relation to their risk profile and a strategy for maintaining their capital levels.

**Principle two:** Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios.

**Principle three:** Supervisors should expect banks to operate above minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of minimum.

**Principle four:** Supervisors should seek to intervene at any early stage to prevent capital from falling below a minimum levels required to support risk characteristics of a particular bank.

### 4.3.3 Third pillar: Market Discipline

Third pillar in Basel 2 is market discipline, through enhanced disclosure by banks. Effective disclosure is essential to ensure that market participants can better understand banks' risk profiles and the adequacy of their capital positions. New framework sets out disclosure requirements, including a way by which a bank calculates its capital adequacy and its risk assessments methods.
Disclosure recommendations applied to all banks, with more detailed requirements for supervisory recognition of internal methodologies for credit risk, credit risk mitigation techniques, and asset securitisation.

4.4 Measuring Credit Risk:

4.4.1 Standardized approach for credit risk:

Under standardized approach, one of the main innovations relative to 1988 Accord is the use of external ratings agencies to set risk weights for banks. Under Basel 2 risk weights are to be refined by reference to a rating provided by an external credit assessments institution (Such as rating agency) that meets strict standards.

New proposals include tables defining ‘buckets’ of ratings for corporate and for sovereign to translate a particular rating into a risk weight(Powell 2002). See [Appendix 6] which will illustrate the basic approach.

4.4.2 Internal rating- based approach (IRB):

In an internal ratings approaches, banks may use internal estimates of different parameters which are Probability of Default(PD)of a borrower, and Loss Given Default(LGD) of a transaction, together with parameters
obtained by applying supervisory rules which are Exposure at Default(EAD) of a transaction, and Maturity(M) of a transaction, to obtain a final risk weight for each claim. Most banks based their rating methodologies on risk of borrower default and assign a borrower to a rating grade(Hasan 2003). A bank would then estimate a probability of default(PD) associated with borrowers in each of internal grade.

PD is not the only component of credit risk. Banks measure also how much they will lose when such an event of default occur. This will depend on two elements: First, how much per unit it is expected to recover from a borrower. If recoveries are insufficient to cover banks' exposure, this will give rise to loss given default(LGD) of a borrower. Secondly, loss depends on banks' exposure to a borrower at the time of default, commonly expressed as Exposure at Default(EAD). While many banks are able to produce measures of PD, fewer banks are able to provide reliable estimates of LGD. Because of that, in the foundation approach LGD values were set by supervisory rules. But in advanced approach, a bank will have the opportunity of estimating LGD of an exposure.
4.5 Effects of Basel Capital Requirements on Emerging Markets:

Representatives of banking industry worldwide support objectives of New Basel Accord. While criticisms of existing 1988 Accord have come mainly from leading banks and other institutions in OECD (Concetta 2001). The pressure from an international active banks has led to proposals in New Accord. Therefore, a question will appear whether standards in a proposed framework represent a true and fair basis for business in Middle East markets.

When it comes to standardized approach, one might argue that current S&P and Moody’s ratings do not properly reflect credit standings of Middle East sovereigns and corporate debtors (Powell 2002). Additionally, a small number of corporate clients in Arab countries are externally rated. Therefore, Standardized Approach will not lower regulatory capital requirements. But it could weaken a competitive position relative to banks in more developed markets with higher external rating coverage, or banks that will obtain recognition for their internal ratings of Arab borrowers.
Although the focus of proposals is aimed toward needs of major banks from G-10 countries, New Accord could have significant negative repercussion for developing world (Reding 2001). The fear is that the adoption of rating based approaches will change lending patterns of major banks, leading to a reduction in loans to developing world or a significant increase in pricing for emerging market borrowers.

This could hurt financial institutions from developing countries that rely on inter-bank borrowing in key financial markets to fund their loans.

The BIS itself has also recognized that greater risk-sensitivity resulting from New Accord contains pro-cyclical elements. During prosperous times, ratings will improve, encouraging banks to lend more, whereas during downturn, ratings will be lowered, leading to sharp withdrawal of funds or a credit crunch. This amplifying effect on cycles could be especially hard on developing countries, increasing their vulnerability to contagion.

A major concern is a bout whether some banks can handle a level of regulatory complexity (Stubing 2003). First, disclosure requirements are considered excessive given a small size of home markets in Middle East. Apart from danger of leaking sensitive data or confusing analysts with information overflow, big effort and high cost of preparing extensive
reports raise doubts about the economic benefits. These requirements appear more appropriate for highly sophisticated financial markets in the G-10 countries.

Second, small banks will find it difficult to mobilize capital. In developing countries applying of current trends towards industry consolidation through mergers or an increase in proportion of foreign banks’ control of banking industry.

Third, as to the Arab world, few statistics are available on ratings and loss experiences that would meet strict requirements of New Accord. As most banks in Arab countries are now starting to build their data bases, some institutions ask their regulators for permission to apply IRB approach with less perfect data.
Chapter Five

Methodology of the study

and Model Specification
5.1 **Overview:**

This chapter aims to investigate empirically determinants of capital adequacy ratio in Jordanian banks and it’s effects on financial positions of banks covered by the study. The study examines two important time periods. First period is from [1985-1994] which represents a period before applying Basel standards for capital regulation. While the second is from [1995-2001] which represents a time after applying Basle standards of capital regulation. In this chapter, Both dependent and independent variables will be defined. First we will introduce sources of data, instruments used to analyze relationship between each variables in the model, and sample that has been chosen. Hypothesis will be illustrated and arranged. Then a model and it’s specifications will be shown later.

5.2 **Data sources:**

Data are collected over the two periods from banks’ annual reports. The following variables: return on assets, return on equity, loan loss provisions, total asset, total credits, capital adequacy ratio, total deposits, shareholder’s equity, dividends payout ratio, and equity ratio, are collected from bank’s annual reports. While data on capital adequacy
ratio in a period between [1985-1994] is measured by (Total Capital / Total Assets) ratio. And capital adequacy ratio in a period between [1995-2001] are collected from banks' annual reports.

5.3 Instruments used:

Time-series Cross-sectional regression is used in this study to test and analyze relationships between independent variables which are: The natural logarithm of total assets(LogSIZE), return on assets(ROA) ratio, return on equity(ROE) ratio, equity ratio(EQR), dividends payout (DR) ratio, loan provision ratio(LPR), risks assets(RAR) ratio, deposit assets(DAR) ratio, and loans assets(LAR) ratio, and a dependent variable which is capital adequacy ratio (CAR). All these variables will be clearly defined and justified later in this chapter.

5.4 Population of the study:

Population of the study consists of 17 Jordanian banks under the control of Central Bank of Jordan (CBJ), except a three foreign banks in Jordan, look at [Appendix seven], which gives a list of banks’ names under the two periods of the study. The sample of the study will cover the whole population, which consists of 17 banks in Jordan.
5.5 **Variables included in the model:**

5.5.1 **Dependent variable:**

(CAR) Capital Adequacy Ratio: It is a ratio of total capital to risky-weighted assets. The higher this ratio is, the higher is the banks' soundness. Because with a high capital adequacy ratio, a bank could absorb losses without becoming insolvent (Mpuga 2002).

\[
\text{Total capital} \\
\text{CAR} = \frac{\text{Total capital}}{\text{Risky weighted asset}} \times 100\%
\]

Total capital in the nominator is divided into two Tiers: which are called Tier 1 capital and Tier 2 capital.

Tier one capital consists of paid-in capital, all kind of reserves, retained earnings. While Tier two capital consists of undisclosed reserves, assets revaluation reserves, general provisions, hybrid capital instruments and subordinated term debt. Risk- weighted assets in the denominator of the capital adequacy ratio represents the assets in the bank's balance sheet weighted by their risk. These weights were determined internationally by Basel Committee and adopted by all banks in the world (Wagster 1996). The ratio excluded zero risky assets like cash, treasury securities, any
claims on government or claims guaranteed by the OECD governments and central banks.

5.5.2 Independent variables:

All independent variables that were included in a model of the study have been chosen upon results of previous studies.

1- \( \text{LogSIZE} \) is the natural logarithm of total assets which represent banks’ size.

Banks’ size is important because of its relationship to bank ownership characteristics and access to equity capital. Bank access to equity capital may reflect a relative importance of bankruptcy cost avoidance or managerial risk aversion.

This study will recognize a relationship between CAR and bank’s size to test whether regulations imposed on capital discriminate between small and large banks.

Therefore, we hypothesize a positive and significant relationship between \( \text{LogSIZE} \) and capital adequacy ratio(CAR). Because when bank’s size increase it’s size of operations will also increase. This will lead to an increase in risks associated it’s activities. So depositors and investors will need a guarantee or a cushion against risk of loss. So capital adequacy
ratio which represents a cushion against losses should increase when bank’s size increase.

Hassan(1992) and Mpuga(2002), hypothesized a positive relationship between capital adequacy ratio (CAR) and LogSIZE.

2- **RAR**: calculated as a ratio of risky weighted assets to total assets. Risky assets represent all assets in a bank’s balance sheet weighted by their risk.

These weights were determined by international standards ranging from (0%, 20%, 50%, 100%), which were based on risk-based capital standards and reflect risk inherent in banks’ assets portfolio.

We hypothesize a significant negative relationship between **RAR** and **capital adequacy ratio (CAR)**. Most of literature argued that a bank should increase it’s capital adequacy ratio by shifting it’s portfolio into less risky assets. So any increase in risky assets in a bank’s assets portfolio will lead to a reduction in CAR for a bank.

Mpuga(2002) hypothesized a negative relationship between capital adequacy ratio and RAR.
3- **LAR**: is a ratio of total loans to total assets for bank. This is important because of its relationship with diversification and the nature of investment opportunity set. It measures the impact of loans in assets portfolio on capital.

We hypothesize a significant positive relationship between **LAR** and **capital adequacy ratio (CAR)**. Because more loans would expose a bank to a higher risk. When risk increases, depositors should be compensated for loss so **CAR** should increase.

Mpuiga(2002) hypothesized a positive relationship between capital adequacy ratio and **LAR**.

4- **ROE**: is the return on equity, which is a ratio of net income to shareholder’s equity of a bank. It is also used as an indicator for a bank’s profitability.

We hypothesize a significant positive relationship between **ROE** and **capital adequacy ratio**, because Banks as a profit making organizations interested in high returns for shareholders, will optimize their capital levels to earn a higher return on equity(ROE). So when return on equity increase capital adequacy ratio should increase. Harold(1999) hypothesized appositive relationship between **CAR** and **ROE**.
5- **ROA**: is the return on assets. which is a ratio of net income to total assets for the bank, used as a proxy for a profitability.

The study hypothesizes a significant positive relationship between **ROA** and **capital adequacy ratio**, because profitability should be accompanied with the adequacy of bank’s capital.

6- **DAR**: Is a ratio of total deposits to total assets. Deposits represent all kind of bank’s deposits(Current deposits, Withdrawal deposits, ...). This ratio is used to measure the impact of changes in deposits on capital.

We hypothesize a significant and positive relationship between **DAR** and **Capital adequacy ratio(CAR)**.

When deposits increase, banks should be more regulated and controlled to guarantee the depositors rights, and to protect a bank from insolvency. If depositors cannot assess financial soundness of their banks, banks will maintain lower than optimal capital ratios. Optimal capital ratios are those that banks would have observed if depositors could have assessed their financial positions properly. But if depositors can assess a bank’s capital strength, a bank will maintain a relatively strong capital positions because greater capital induces depositors to accept lower interest rates on their deposits.
Dowd(1999) found the imposition of minimum capital standards on financial institutions was a response of moral hazard problem created by deposit insurance.

7- **EQR**: Is the equity ratio, which is a ratio of total equity to total assets. It measures the risk of default for a bank.

We hypothesize a significant positive relationship between **EQR** and **capital adequacy ratio**. As risk increase capital adequacy ratio should also increase.

8- **DR**: Dividends payout ratio, which is a ratio of cash dividends paid to net income. It is used to measure the impact of cash dividends on bank capital. We hypothesize a significant negative relationship between **DR** and **capital adequacy ratio**. When bank declares to distribute more dividends, retained earnings account will be reduced, and we know from the computation of capital adequacy ratio(CAR) that retained earnings involved in the composition of core capital that represents a nominator of CAR. So if dividends payout ratio increases, retained earnings decreases, so capital adequacy ratio decreases also.
9- **LPR**: Loan Provision Ratio, which is a ratio of loan loss provisions to total loans. It is used to determine the impact of new provisions for possible loan losses and loans written off on bank’s capital levels.

We hypothesize a significant negative relationship between **LPR** and **capital adequacy ratio**, because banks with more loan loss reserves are more aggressive in their lending practices, and are willing to accept losses instead of negotiating concession with loan defaulters.

In addition, high loan loss reserves may signal banks that are willing to write-off problem loans which are expected to reduce bank credit risk.

Blose(2001) found that provisioning of loan losses caused a decline in capital adequacy ratio. Hassan(1992) and Cho(2000) also argued a negative relationship between capital adequacy ratio and LPR.

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5.6 **Hypothesis of the study:**

**H1**: LogSIZE has a positive and significant relationship with capital adequacy ratio (CAR).

**H2**: RAR has a negative and significant relationship with capital adequacy ratio (CAR).
H3: LAR has a positive and significant relationship with capital adequacy ratio (CAR).

H4: ROE has a positive and significant relationship with capital adequacy ratio (CAR).

H5: ROA has a positive and significant relationship with capital adequacy ratio (CAR).

H6: DAR has a positive and significant relationship with capital adequacy ratio (CAR).

H7: EQR has a positive and significant relationship with capital adequacy ratio (CAR).

H8: DR has a negative and significant relationship with capital adequacy ratio (CAR).

H9: LPR has a negative and significant relationship with capital adequacy ratio (CAR).

5.7 Model of the study:

To test our hypothesis, the following model is formulated:
\[ \text{CAR}_{it} = a_0 + a_1 \log \text{SIZE}_{it} - a_2 \text{RAR}_{it} + a_3 \text{LAR}_{it} + a_4 \text{ROE}_{it} + a_5 \text{ROA}_{it} + a_6 \text{DAR}_{it} + a_7 \text{EQR}_{it} - a_8 \text{DR}_{it} - a_9 \text{LPR}_{it} + e_{it} \]

**Where:**

\( \text{CAR}_{it} \): the capital adequacy ratio for bank \( i \) at time \( t \).

\( \log \text{SIZE}_{it} \): the natural logarithm of total assets for bank \( i \) at time \( t \).

\( \text{RAR}_{it} \): the ratio of risk weighted assets to total assets for bank \( i \) at time \( t \).

\( \text{LAR}_{it} \): the ratio of total loans to total assets for bank \( i \) at time \( t \).

\( \text{ROE}_{it} \): return on equity for bank \( i \) at time \( t \).

\( \text{ROA}_{it} \): return on assets for bank \( i \) at time \( t \).

\( \text{DAR}_{it} \): the ratio of total deposits to total assets for bank \( i \) at time \( t \).

\( \text{EQR}_{it} \): the equity ratio for bank \( i \) at time \( t \).

\( \text{DR}_{it} \): the payout ratio for bank \( i \) at time \( t \).

\( \text{LPR}_{it} \): the ratio of loan loss provisions to total loans for bank \( i \) at time \( t \).

\( e_{it} \): Error term.

\( a_0, a_1, a_2, a_3, a_4, a_5, a_6, a_7, a_8 \) and \( a_9 \): coefficients.

Chapter six

Statistical Analysis
6.1 **Statistical Analysis:**

Statistical Analysis will be conducted in two periods. First, we will recognize Descriptive Statistics, then Correlation Matrix, and Regression analysis with its comparisons between two periods.

6.1.1 **Descriptive statistics: [1985-1994]**

Descriptive statistics analyze data over a period before applying Basel Capital Adequacy Standards.

**Table [6-1] Descriptive Statistics [1985-1994]:**

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>-4.27</td>
<td>46.88</td>
<td>8.8090</td>
<td>7.3418</td>
<td>2.811</td>
</tr>
<tr>
<td>RAR</td>
<td>.3292</td>
<td>.9785</td>
<td>.8067</td>
<td>.1082</td>
<td>-.993</td>
</tr>
<tr>
<td>LAR</td>
<td>.00</td>
<td>.7390</td>
<td>.4665</td>
<td>.1369</td>
<td>-.234</td>
</tr>
<tr>
<td>ROE</td>
<td>-520.46</td>
<td>51.83</td>
<td>4.2913</td>
<td>49.7612</td>
<td>-9.428</td>
</tr>
<tr>
<td>ROA</td>
<td>-7.4030</td>
<td>18.2428</td>
<td>1.1188</td>
<td>2.9669</td>
<td>4.195</td>
</tr>
<tr>
<td>DAR</td>
<td>.00</td>
<td>.9468</td>
<td>.7565</td>
<td>.1931</td>
<td>-2.251</td>
</tr>
<tr>
<td>EQR</td>
<td>-42.74</td>
<td>76.00</td>
<td>9.9991</td>
<td>13.0402</td>
<td>1.936</td>
</tr>
<tr>
<td>DR</td>
<td>.00</td>
<td>600.00</td>
<td>44.6890</td>
<td>60.8488</td>
<td>6.202</td>
</tr>
</tbody>
</table>

CAR (capital adequacy ratio), LogSIZE (the natural logarithm of total assets), RAR (risk-weighted assets/total assets), LAR (credits/total assets), ROE (net income/total equity), ROA (net income/total assets), DAR (deposits/total assets), EQR (total equity/net income), DR (cash dividends/net income).

Capital Adequacy Ratio (CAR) ranges from a higher value of **46.88** to a minimum value of **-4.27**, means that there was no regulation on capital represented in a high variation between minimum and maximum.
value of CAR. A negative capital adequacy ratio in some banks represents a high risk of insolvency to those banks. A Mean of 8.8090 indicates a low CAR, but most banks have higher than 8.8 CAR in this period. Because of a positive skewness of 2.811.

LogSIZE variable reach it’s highest value 9.9129 and lowest value 6.3358 in this period. With a Mean 8.2017 and a standard deviation .6614. But most Jordanian banks were large in their total assets as an indicator of banks’ size, because most LogSIZE observations were higher than their Mean with a positive skewness of .138.

While RAR observations ranged between .3292 and .9785. With a Mean of .8057, Jordanian banks have higher risky-assets in their portfolio in a period from[1985-1994]. Loan assets ratio LAR have a minimum amount of .00 and a maximum of .7390 with a Mean .4665 which indicates that most Jordanian banks in this period have low credits to total assets ratio, with a negative skewness -.234.

Return on equity (ROE) observations ranged between –520.46 and 51.83 with a Mean of 4.2913, which indicates a low profitability index for Jordanian banks, because most ROE values are lower than their mean, with a negative skewness of -9.428. While return on assets (ROA)
observations ranged between -7.4030 and 18.2438. With a Mean 1.1188. Most ROA values are higher than their mean with a positive skewness value of 4.195.

Deposits assets ratio (DAR) has a minimum value of .00 which means zero deposits in Jordanian banks’ balance sheet in this period, and a maximum value of .9468, a Mean of .7565 indicates a high DAR ratio. While most DAR values were lower than their Mean with a negative skewness value of −2.251. But it was high enough for regulatory institutions to impose more regulations on banks’ capital to safeguard their depositors. EQR has a Mean of 9.99 and a standard deviation of 13.04 which indicates that most EQR values deviate to the right of their mean with a positive skewness of 1.936.

Dividends payout ratio DR ranged between .00 to 600 with a Mean of 44.68. So most banks have higher than average dividends payout ratio.

6.1.2 Descriptive statistics: [1995-2001]

Table [6-2] Descriptive statistics [1995-2001]:

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>8.00</td>
<td>38.00</td>
<td>16.227</td>
<td>7.6411</td>
<td>.989</td>
</tr>
<tr>
<td>LogSIZE</td>
<td>7.2397</td>
<td>10.1628</td>
<td>8.4794</td>
<td>.6253</td>
<td>.446</td>
</tr>
<tr>
<td>RAR</td>
<td>.2290</td>
<td>.5995</td>
<td>.7752</td>
<td>.1321</td>
<td>-.703</td>
</tr>
<tr>
<td>LAR</td>
<td>.0033</td>
<td>.8570</td>
<td>.4417</td>
<td>.1359</td>
<td>.686</td>
</tr>
<tr>
<td>ROE</td>
<td>-25.10</td>
<td>24.00</td>
<td>5.6435</td>
<td>7.5405</td>
<td>-.692</td>
</tr>
<tr>
<td>ROA</td>
<td>-7.44</td>
<td>10.76</td>
<td>.8634</td>
<td>2.6944</td>
<td>1.387</td>
</tr>
<tr>
<td>DAR</td>
<td>.0025</td>
<td>.9221</td>
<td>.7310</td>
<td>.2115</td>
<td>-2.436</td>
</tr>
<tr>
<td>LPR</td>
<td>.00</td>
<td>.4724</td>
<td>.3350</td>
<td>.0642</td>
<td>4.797</td>
</tr>
<tr>
<td>EQR</td>
<td>.00</td>
<td>40.27</td>
<td>11.6729</td>
<td>8.6096</td>
<td>1.642</td>
</tr>
<tr>
<td>DR</td>
<td>.00</td>
<td>101.61</td>
<td>19.72</td>
<td>29.7752</td>
<td>1.191</td>
</tr>
</tbody>
</table>

CAR (capital adequacy ratio), LogSIZE (the natural logarithm of total assets), RAR (risk-weighted assets/total assets), LAR (credits/total assets), ROE (return on equity), ROA (return on assets), DAR (total deposits/total assets), LPR (loan loss provisions/total loans), EQR (equity ratio), DR (payout ratio).

CAR has a minimum value of 8 and a maximum value of 38 which means that most banks were committed by a minimum capital adequacy ratio after 1995. A Mean of 16.22 indicates that most Jordanian banks have higher than 8 percent ratio. And a Standard Deviation of 7.64, indicates that most CAR observations values deviate to the right of their Mean, because of a positive skewness of .989 .

LogSIZE variable has a minimum value of 7.23 and a maximum value of 10.16. A Mean of 8.47 indicates a large size of banks’ assets, because most LogSIZE values are higher than their Mean with a positive skewness value of .446 .
RAR variable ranged from .2990 to .9995. With a Mean of .7752 which represents a high risky-weighted assets in a banks' portfolio, and standard deviation of .1321. But most Jordanian banks have low than average risky assets in their portfolio, with a negative skewness of -.703.

While LAR ranged from a lower value of .0333 to a maximum value of .8570. With a Mean of .4417 which indicates a low (credits to total assets) ratio in Jordanian banks.

ROE has a minimum value of −25.10 and a maximum value of 24. A Mean of 5.64 indicates a low profitability index for Jordanian banks, And a negative skewness value means that most Jordanian banks have lower than average ROE ratio.

While ROA ranged from −7.44 to 10.16, with a Mean of .8634 which indicates a low profitability. While a positive skewness of 1.387 means that most Jordanian banks have higher than average ROA ratio.

Deposits assets ratio(DAR) ranged between .0025 and .9221, with a Mean value of .731 which indicates high deposits to total assets ratio. Negative skewness value of −2.436 means that most DAR values are lower than their Mean. But Jordanian banks still have higher deposits/assets ratio in this period.
Loan provisions ratio (LPR) ranged between .00 and .4724, with a Mean of .035 which indicates a low provisions for loan losses. While a positive skewness of 4.797 indicates that most LPR values are higher than their Mean.

Equity ratio EQR ranged from .00 to 40.27, with a Mean of 11.67 which indicates a high (equity to total assets) ratio, with a positive skewness value of 1.64 which means that most Jordanian banks have higher than average EQR.

Finally, Dividends payout ratio DR ranged from .00 to 101.61, with a Mean of 19.72 which indicates a high dividends payout ratio, and a positive skewness of 1.191 indicates that most Jordanian banks distribute more than average dividends and higher than previous period.

6.1.3 Correlation Matrix:[1985-1994]:

Correlation coefficients are descriptive measures showing the degree of relationships between each two variables in a model. We will explain first correlation coefficients between dependent variable CAR and other independent variables. Then correlation coefficients between independent variables themselves will be explained later.
Table [6-3] shows correlation coefficients between dependent variable (CAR), and independent variables in the model. CAR has a negative significant correlation **-.450**; with LogSIZE. Means that as banks’ size increases, capital adequacy ratio decreases, so large Jordanian banks have lower regulations on their capital adequacy ratio than small size banks. CAR has a positive insignificant correlation **.108**; with RAR. Means that as risky assets increases, capital adequacy ratio increases. This results represents the inability of a simple capital ratio to assess banks’ risky assets, in a time before applying Basel standards in Jordan.

CAR has a positive insignificant correlation **.024**; with LAR, means that as banks' credits increase, it's capital adequacy ratio increase. So one of the interpretations of a low CAR in Jordanian banks in this period is a lower credits account.
CAR has a positive significant correlation .217; with ROE. Means that as return on equity ratio increases, capital adequacy ratio increases, but Jordanian banks still have lower CAR and ROE ratio. CAR has also a positive significant correlation .713; with the ROA, which means that as return on assets ratio increases, capital adequacy ratio increases in Jordanian banks which have a higher ROA ratio in this period.

CAR has a negative significant correlation -.473; with DAR, which means that as banks' deposits increase capital adequacy ratio decrease. This negative correlation put Jordanian banks in trouble, in that their deposits are not guaranteed by an increase in banks' capital ratio. while CAR has a positive significant correlation .584; with EQR. So as equity ratio increases, capital adequacy ratio increases. Jordanian banks have a higher equity ratio in this period with an increase in CAR.

CAR has also a positive insignificant correlation .036; with DR. Means that capital adequacy ratio and dividends payout ratio move in the same direction but in a small amount.

Now Look at table [6-3] to analyze correlation coefficients between the independent variables themselves:

LogSIZE has a positive significant correlation .176; with ROE. Means that large Jordanian banks, have lower return on equity ratio.
LogSIZE has a negative significant correlation -.289; with ROA. Means that small banks’ size, have higher return on assets ratio. LogSIZE has a positive significant correlation .578; with DAR. Means that large Jordanian banks have higher deposit accounts.

LogSIZE has a negative significant correlation -.197; with DR. Means that large Jordanian banks distribute lower dividends.

The second variable in Table[6-3] is RAR variable which has a positive significant correlation of .577; with LAR. Means that most Jordanian banks’ risky-assets are of their credit accounts.

While RAR has a negative significant correlation -.197; with DAR. Jordanian banks’ deposits have been increased in this period, while their credit accounts have been decrease.

ROA has a negative significant correlation -.444; with DAR. Jordanian banks’ deposits have been increased in this period, while their return on assets ratio have been decreased, because of a decrease in credit accounts.

ROA has a positive significant correlation .612; with EQR. Means that Jordanian banks’ net income and shareholders’ equity accounts have been increased through lower dividends payout ratio.
DAR has a high negative significant correlation -.670; with EQR, means that as banks’ deposits increases, equity ratio decreases. Finally, EQR has a positive significant correlation .312; with DR. Means that as Jordanian banks distribute more dividends, their shareholders’ equity accounts increases through either an increase in paid-in capital or disclosed reserves.

6.1.4 Correlation Matrix: [1995-2001]

Correlation Coefficients between each two variables, in a period after applying Basel Capital Standards in Jordanian banks.

Table [6-4] Correlation Coefficients [1995-2001]:

<table>
<thead>
<tr>
<th></th>
<th>CAR</th>
<th>LogSIZE</th>
<th>RAR</th>
<th>LAR</th>
<th>ROE</th>
<th>ROA</th>
<th>DAR</th>
<th>LPR</th>
<th>EQR</th>
<th>DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LogSIZE</td>
<td>.044</td>
<td></td>
<td>.044</td>
<td>.064</td>
<td>.107</td>
<td>.077</td>
<td>.090</td>
<td>.271</td>
<td>.164</td>
<td>.082</td>
</tr>
<tr>
<td>RAR</td>
<td>-.250**</td>
<td></td>
<td>-.314**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAR</td>
<td></td>
<td>-.064</td>
<td>-.027</td>
<td>.336**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>.107</td>
<td></td>
<td>.356**</td>
<td>-.158</td>
<td>-.093</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>.077</td>
<td>.611**</td>
<td>.054</td>
<td>-.028</td>
<td>.554**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAR</td>
<td>.090</td>
<td>.462**</td>
<td>-.522**</td>
<td>-.501**</td>
<td>.163</td>
<td>.125</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPR</td>
<td>-.271**</td>
<td>-.107</td>
<td>.005</td>
<td>-.023</td>
<td>-.228*</td>
<td>-.050</td>
<td>-.037</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQR</td>
<td>.164</td>
<td>-.553**</td>
<td>.444**</td>
<td>.100</td>
<td>-.208*</td>
<td>-.148</td>
<td>-.731**</td>
<td>-.034</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>DR</td>
<td>.082</td>
<td>.250**</td>
<td>-.071</td>
<td>.092</td>
<td>.196*</td>
<td>.152</td>
<td>-.156</td>
<td>-.180</td>
<td>.087</td>
<td>1.00</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Table [6-4] shows correlation coefficients between dependent variable CAR, and other independent variables in the model.

**CAR** has a positive insignificant correlation .044; with LogSIZE. So large banks’ size have a higher capital adequacy ratio. While **CAR** has a negative significant correlation -.250; with **RAR**. Means that as risky-weighted assets in banks’ portfolio decrease, capital adequacy ratio increases. This interpret the increase in **CAR** which accompanies a decrease in **RAR** in this period in Jordanian banks under the study.

**CAR** has a negative insignificant correlation of -.064 with **LAR**. So as banks’ credit increases, capital adequacy ratio decreases, Jordanian banks have higher credit accounts while their capital adequacy ratio decreased but in a small account. **CAR** has a positive insignificant correlation of .107, .077; with **ROE** and **ROA** respectively, means that as return on equity or return on assets ratio increases, capital adequacy ratio increases. So **CAR** in Jordanian banks have been increased according to an increase in their **ROA** and **ROE** ratios.

**CAR** has also a positive but insignificant correlation of .090, .164, .082; with **DAR**, **EQR**, and **DR**, means that deposit assets ratio, equity ratio, dividends payout ratio, and capital adequacy ratio moves in the same direction. Size of deposits in Jordanian banks increased in this period, so they increased their **CAR** to accommodate an increase in deposits.
While CAR has a negative significant correlation -.271; with LPR. Means as provisions for loan losses decrease, capital adequacy ratio increases. We see that Jordanian banks have lower loan loss provisions accounts, this interpret an increase in CAR in banks in this period.

Look at table [6-4] to analyze the correlation coefficients between the independent variables themselves.

LogSIZE has a negative significant correlation -.314; with RAR. Means that large banks have low risky-weighted assets in their portfolio. While LogSIZE has a positive significant correlation .356, .611; with ROE and ROA respectively. Means that large Jordanian banks have higher profitability index. LogSIZE has a positive significant correlation .462; with DAR. So large banks have higher deposits according to their assets.

LogSIZE has a negative significant correlation -.553; with EQR. Means that large Jordanian banks have low shareholders’ equity according to their assets’ size. But LogSIZE has a positive significant correlation of .250; with DR. Means that large banks distribute more dividends.

The second variable in the table [6-4], is Risky-weighted assets to total assets or risky assets ratio RAR which has a positive significant
correlation of .336; with LAR means that most Jordanian banks’ risky assets are of credit account.

But RAR has a negative significant correlation -.522; with DAR. Banks’ deposits have been increased in this period, and banks’ credits decreased which are considered a large components of risky-assets’ accounts, this relation is represented in a negative significant correlation -.501; with DAR.

We have to paid attention to a high negative correlation again of -.731; which is significant at level 0.01 between DAR and EQR. Which means that as banks’ deposits increase, equity ratio will decrease sharply. Because of this high correlation between DAR and EQR, we conducted the correlation and regression analysis again, but without concerning the equity ratio as an independent variable this time. We found the same results without any changes in the correlation results in the two periods, while regression results have a little changes in a period [1995-2001] in that Durbin Watson became .633, after it was .70, so removing EQR from the analysis hurts the results.
6.1.5 Regression analysis: [1985-1994]:

Regression analysis is used to predict values of dependent variable, through sum of independent variables in the model to show the degree and direction of relations between dependent and independent variables.

Table [6-5] below shows the results of regression analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>21.703</td>
</tr>
<tr>
<td></td>
<td>(2.515)^a</td>
</tr>
<tr>
<td>LogSIZE</td>
<td>-.239</td>
</tr>
<tr>
<td></td>
<td>(-2.852)^*</td>
</tr>
<tr>
<td>RAR</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>(.301)</td>
</tr>
<tr>
<td>LAR</td>
<td>.146</td>
</tr>
<tr>
<td></td>
<td>(1.762)**</td>
</tr>
<tr>
<td>ROE</td>
<td>.119</td>
</tr>
<tr>
<td></td>
<td>(1.786)**</td>
</tr>
<tr>
<td>ROA</td>
<td>.512</td>
</tr>
<tr>
<td></td>
<td>(6.660)^*</td>
</tr>
<tr>
<td>DAR</td>
<td>.051</td>
</tr>
<tr>
<td></td>
<td>(.545)</td>
</tr>
<tr>
<td>EQR</td>
<td>.306</td>
</tr>
<tr>
<td></td>
<td>(1.747)**</td>
</tr>
<tr>
<td>DR</td>
<td>-.083</td>
</tr>
<tr>
<td></td>
<td>(-1.276)</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.568</td>
</tr>
<tr>
<td>F, state</td>
<td>22.181</td>
</tr>
<tr>
<td>Significant</td>
<td>.000</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>1.135</td>
</tr>
</tbody>
</table>

Dependent variable CAR (capital adequacy ratio)
* significant at 0.05 level
** significant at 0.10 level

Before testing hypothesis we have to look to correlation coefficients results in Table [6-3] and regression results in Table [6-5] to make a small comparison. We see from both analysis that CAR has the same direction and degree of significance in its relation with LogSIZE, ROA
ROE, LAR, and EQR. While CAR has the opposite direction in its' relation with DAR, DR.

6.1.6 **Hypothesis testing:**

In order to accept or reject the suggested hypothesis we have first to test these hypothesis. Through regression and T-Test which have provided results concerning the hypothesized relationships among variables.

In a light of these results, following hypothesis were tested:

First hypothesis **H1**: There is a positive and significant relationship between CAR and LogSIZE. But since t.value in Table [6-5] is (-2.852) which means that CAR and LogSIZE has a negative relationship significant at *(0.05)*. We reject hypothesis and accept null hypothesis. This result represents that large Jordanian banks have lower regulations than small size banks.

Second hypothesis **H2**: There is a negative significant relationship between CAR and RAR. But since t.value is (+.301) which means that CAR and RAR has a positive insignificant relationship. We reject hypothesis and accept null hypothesis. Which means that simple
capital to total assets ratio didn't assess risky assets accurately as capital adequacy ratio did after applying Basel standards in Jordanian banks.

Third hypothesis H3: There is a positive significant relationship between CAR and LAR. And since t-value is (+1.762) which means that CAR and LAR has a positive relationship significant at (0.10) level. We accept the hypothesis.

Forth hypothesis H4: There is a positive significant relationship between CAR and ROE. And since t-value is (+1.786) which means that CAR and ROE has a positive relationship significant at level (0.10). We accept the hypothesis.

Fifth hypothesis H5: There is a positive significant relationship between CAR and ROA. And since t-value is (+6.660) which means that CAR and ROA has a positive relationship significant at level (0.05). We accept the hypothesis.

Sixth hypothesis H6: There is a positive significant relationship between CAR and DAR. But since t-value is (+.545) which means that CAR and
DAR has a positive insignificant relationship. We reject hypothesis and accept null hypothesis.

Seventh hypothesis $H_7$: There is a positive significant relationship between CAR and EQR. And since t.value is $(+1.747)$ which means that CAR and EQR has a positive relationship significant at $(0.10)$ level. We accept the hypothesis.

Eighth hypothesis $H_8$: There is a negative significant relationship between CAR and DR. But since t.value is $(-1.276)$ which means that CAR and DR has a negative insignificant relationship. We reject hypothesis and accept null hypothesis.

6.1.6 Regression analysis: [1995-2001]

Regression analysis is used to predict value of dependent variable, through sum of independent variables in a model. In a form of linear equation shows the degree and direction of relationships between dependent and independent variables. Table[6-6] shows regression results for a period.
Table [6-6] Regression between [1995-2001]:

<table>
<thead>
<tr>
<th>variable</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.912</td>
</tr>
<tr>
<td>LogSIZE</td>
<td>-.064</td>
</tr>
<tr>
<td>RAR</td>
<td>-.395*</td>
</tr>
<tr>
<td>LAR</td>
<td>.239*</td>
</tr>
<tr>
<td>ROE</td>
<td>.008</td>
</tr>
<tr>
<td>ROA</td>
<td>.166</td>
</tr>
<tr>
<td>DAR</td>
<td>.474*</td>
</tr>
<tr>
<td>LPR</td>
<td>.222*</td>
</tr>
<tr>
<td>EQR</td>
<td>.646*</td>
</tr>
<tr>
<td>DR</td>
<td>.000</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.243</td>
</tr>
<tr>
<td>Estate</td>
<td>.5104</td>
</tr>
<tr>
<td>Significant</td>
<td>.000</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>.698</td>
</tr>
</tbody>
</table>

Dependent variable is CAR (capital adequacy ratio)

* significant at 0.05 level.

Before testing hypothesis, we have first to make a little comparison between correlation coefficient results in Table [6-4], and regression results in Table [6-6]. We see from both analysis that CAR has a same direction in its' relation with RAR, DAR, EQR, and DR but differ in degree of significance. While CAR differ in a direction of its' relation with LogSIZE, and LAR. While CAR have a same direction and level of significance in its’ relationship with ROE, ROA, and LPR.
6.1.8 **Hypothesis testing:**

In order to accept or reject the suggested hypothesis, we have to test these hypothesis. Through regression and T-Test, which provided results concerning hypothesized relationships among CAR, LogSIZE, RAR, LAR, ROE, ROA, DAR, LPR, EQR, and DR variables.

In light of these results the following hypothesis were tested:

First hypothesis **H1**: There is a positive significant relationship between CAR and LogSIZE. But since t.value is (-.445), which means that CAR and LogSIZE has a negative insignificant relationship. We reject hypothesis and accept null hypothesis.

Second hypothesis **H2**: There is a negative significant relationship between CAR and RAR. And since t.value is (-3.747), which means that CAR and RAR has a negative relationship, significant at level (0.05). We accept the hypothesis. Like Mpuga(2002) who found a negative significant relationship between CAR and RAR, and Harold(1999) who found banks with lower risk-weighted assets ratio (RWAs), have stronger risk based capital (RBC) ratio.
Third hypothesis **H3**: There is a positive significant relationship between CAR and LAR. And since t.value is (+2.173), which means that CAR and LAR has a positive relationship, significant at level (0.05). We accept the hypothesis. Also Mpuga(2002) found a positive significant relationship between CAR and LAR. And Choi(2000) found banks’ lending constrained by a fall in surplus capital as a result of losses.

Forth hypothesis **H4**: There is a positive significant relationship between CAR and ROE. But since t.value is (+.042), which means that CAR and ROE has a positive insignificant relationship. We reject hypothesis and accept null hypothesis. Like Harold(1999) who found banks as a profit making organizations optimized capital levels to earn the highest ROE ratio, while meeting the “well- capitalized” level of regulatory capital.

Fifth hypothesis **H5**: There is appositive significant relationship between CAR and ROA. But since t.value is (+1.254), which means that CAR and ROA has a positive insignificant relationship. We reject hypothesis and accept null hypothesis.
Sixth hypothesis $H_6$: There is a positive significant relationship between CAR and DAR. And since $t$.value is $(+2.873)$, which means that CAR and DAR has a positive relationship, and significant at level $(0.05)$. We accept the hypothesis. Dowd(1999) found also a positive relationship between CAR and DAR, and that the imposition of minimum capital standards was a response of the moral hazard problem created by deposit insurance.

Seventh hypothesis $H_7$: There is a positive significant relationship between CAR and EQR. And since $t$.value is $(+4.434)$, which means that CAR and EQR has a positive relationship, and significant at level $(0.05)$. We accept the hypothesis.

Eighth hypothesis $H_8$: There is a negative significant relationship between CAR and DR. But since $t$.value is $(+0.001)$; which means that CAR and DR has a positive, but insignificant relationship. We reject hypothesis and accept null hypothesis.
Ninth hypothesis H9: There is a negative significant relationship between CAR and LPR. And since t.value is \((-2.556)\); which means that CAR and LPR has a negative relationship, significant at level \((0.05)\). We accept the hypothesis. Like Blose(2001), Hassan(1992), and Choi(2000) whom found also the same negative relation. We realize from this hypothesis that Jordanian banks have increased their loan loss reserves accounts since 1995, to reduce their credit risks and maintain a higher capital adequacy ratio.
7.1 Major Results:

The study analyzed determinants of capital adequacy ratio (CAR) in 17 Jordanian Banks in two periods from [1985-1994] and [1995-2001]. Capital adequacy ratio (CAR) in Jordanian banks have been increased since 1995 because of an increase in their paid-in capital in greater amount after Basel committee regulations. CAR was found to be adversely affected by banks’ size (LogSIZE) in the second period. This means that large Jordanian banks have low supervisory control on their capital adequacy ratio (CAR), while large banks attain a low risky assets in their assets portfolio, represented in a negative relationship between RAR and LogSIZE.

CAR was found to be positively affected by banks’ return on assets ratio (ROA) in a period from [1985-1994]. CAR had a positive significant relationship with banks’ loan assets ratio (LAR), and equity ratio (EQR), in the second period. This interpret a reduction of shareholders’ equity in large banks, which have a negative significant relationship with LogSIZE variable.

CAR was found to be positively related to risk assets ratio (RAR) in a time before applying Basel Capital Adequacy Standards for Banks between [1985-1994]. This result showed that traditional capital-to- total
assets ratio didn’t assess higher risky assets in those banks. While capital adequacy ratio (CAR) between [1995-2001] was found to be negatively related to RAR, after applying Capital to Risky-weighted assets ratio to assess banks’ credit, market, and operational risks.

The most important variable in this study is deposit assets ratio (DAR) on which Basel standards depended, to guarantee depositors’ rights. CAR was found to be negatively affected by deposits’ size in a time before applying Basel’s standards. While after banks’ regulations and the application of Basel’s standards between [1995-2001] CAR was positively affected by a size of banks’ deposits. Knowing that most Jordanian banks’ deposits have been increased in this period, with an increase in their CAR.

The study found CAR to be negatively affected by loan provision ratio (LPR), which represented a banks’ provisions for loan losses to total loans. So CAR has a negative significant relationship with LPR in a period between [1995-2001]. Some Jordanian banks increased their loan loss reserves accounts in this period which interpret a decrease in their capital adequacy ratio.
7.2 Recommendations:

Jordanian banks are committed by a minimum (8%) capital adequacy ratio, but it is not enough for them to increase their paid-in capital, to safeguard their depositors and investors who request more guarantee, especially that their deposits’ size in banks have been increased since 1995 according to their credits’ size.

So Jordanian banks should increase their reserves accounts to increase their capital adequacy ratio for the coming period to enhance the safety and soundness of their banking system. Especially with a small size of loan loss reserves account in Jordanian banks in a second period of a study.

Small Jordanian banks should decrease their risky weighted assets in their assets portfolio if there is no sufficient guarantee for their credits. Jordanian banks should adopt a more disclosure policy for their capital adequacy ratio, and elements of computation, in their annual reports for both Tier 1 and Tier 2 capital and their classifications, besides risky assets and their weights. To let them be able to apply a New Accord (Basel II) by year 2005 to develop a high quality validation and supervisory process that will be recognized by other bank regulators.
References


• Ma J. (2001) "China's Accession to the World Trade Organization and policy options for Banking Reform" Department of Economics and Finance, And APEC Study Center, City University of Hong Kong, and Economic Growth Centers, Yale University, March.


• الزيداني، حمود بن سنجر (2003) "أثر توصيات لجنة بزل و مؤسسات التنظيم الدولية على الدول العربية" البنك المركزي العماني، إتحاد المصارف العربية.

• معهد، فهيم (2003) "أثر توصيات لجنة بزل و مؤسسات التنظيم الدولية على الدول العربية" بحوث في مقررات لجنة بزل الجديدة وأبعادها بالنسبة للصناعة المصرفية العربية، إتحاد المصارف العربية.

• شامان، محمد أحمد (2003) "الرقابة المصرفية في قلب التحولات الاقتصادية العالمية و معايير لجنة بازل" مؤتمر تشريعات عمليات البنوك بين النظرية و التطبيق، 22-24 كانون الأول، جامعة البروكار.

• الشامان، خليل (1990) "مقررات لجنة بازل حول كفاية رأس المال (الملاءمة المصرفية) و أثرها على المصارف العربية"، إتحاد المصارف العربية، 17-20 نيسان.

• د. الزعبي، محمد بلال و الطالب، عباس (2003) "النظام الإحصائي SPSS" فهم و تحليل البيانات الإحصائية.
• B Duane. Grady, H Austin. Spencer (1990) "Managing commercial Banks".

• Hopkins D Kenneth. (1996) "Basic statistics for the behavioral sciences".
Appendices
[Appendix 1]

Amount in JD, 000's

Categories of Capital

Capital Base

a) Core Capital: -
   Paid-up Capital
   Share Premium
   Legal Reserves
   General Reserves
   Other Disclosed Reserves
   Retained Earnings (Closes) of Previous Years

Minus: (i) Good Will
   (ii) Current Year Loss (If Any)
   = Tier 1 Capital = A

b) Supplementary Capital:
   Revaluation of Assets Resources
   Undisclosed Reserves
   Hybrid (Debt/Equity) Capital Instruments
   Subordinated Term debt
   = Tier 2 Capital = B

Deductions:

Investments in Subsidiaries/
Associated companies / Other Bank's Capital

Total Capital Base (A + B)
**Risk Weighting for on Balance Sheet Assets Type(A)**

(Amount in JD,000's)

<table>
<thead>
<tr>
<th>Type A</th>
<th>Outstanding Balance</th>
<th>Risk Weights%</th>
<th>Equivalent Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Cash</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Claims on Govt. in foreign currency</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Claims on Govt. in foreign currency</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3 Claims on other governments and central banks denominated in national currency and funded in that currency.</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 Claims on OECD central Govt. and central banks</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 Claims collateralized by cash or OECD Govt. securities or guaranteed by OECD Govt.</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6 Claims collateralized by countries Govt. securities.</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.7 Claims on domestic non-commercial public sector entities.</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Risk Weighting for on Balance Sheet Assets Type(B)

(Amount in JD.000's)

<table>
<thead>
<tr>
<th>Type B</th>
<th>Outstanding Balance</th>
<th>Risk Weights%</th>
<th>Equivalent Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Claims on-or guaranteed by multilateral development banks.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2.2 Claims on bank incorporated in the OECD and icons guaranteed by such banks.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2.3 Claims on-or guaranteed by banks incorporated outside the OECD with a residual maturity of up to one year.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2.4 Claims on non-commercial OECD public sector entities.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2.5 Claims on non-commercial public sector entities.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2.6 Claims items in process of collection.</td>
<td></td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

**Type B (Contd.)**

| 3.1 Loans fully secured by mortgage on residential property          |                     | 50%           |                  |
## Risk Weighting for on Balance Sheet Assets Type(C)

<table>
<thead>
<tr>
<th>Type C</th>
<th>Outstanding Balance</th>
<th>Risk Weights%</th>
<th>Equivalent Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Claims on the private sector (net of provisions)</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.2 Claims on bank incorporated outside the OECD with a residual maturity of over one year.</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.3 Claims on Govt. And central banks outside OECD (unless denominated and funded in national currency).</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.4 Claims on non-commercial public sector entities in countries other than the OECD.</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.5 Claims on commercial public sector entities in all countries.</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.6 Premises, equipment and other fixed assets (net of dedication).</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>4.7 Real estate and other investments participation in companies.</td>
<td></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

(Amount in JD.000's)
[Appendix 5]

Risk Weighting for off-Balance Sheet Foreign Exchange and Interest related Contracts

Amounts in JD. 000’s

a) current Market Exposure (by residual maturity of contracts).

<table>
<thead>
<tr>
<th>Less than One year</th>
<th>one year and over</th>
<th>Total</th>
</tr>
</thead>
</table>

**Foreign Exchange Contracts**

1. Total replacement cost
2. Principal amount
3. “Add-on” factor
   - 1.0%
   - 5.0%
4. Line 2 x Line 3
5. Line 1 + Line 4

**Interest Rate Contracts**

1. Total replacement cost
2. Notional principal amount
3. “Add-on” factor
   - Nil
   - 0.5%
4. Line 2 x Line 3
5. Line 1 + Line 4
# Risk Weights Given External Credit Ratings Basel

**Committee on Banking Supervision**

<table>
<thead>
<tr>
<th></th>
<th>AAA to AAA-</th>
<th>A+ to A-</th>
<th>BBB+ to BBB-</th>
<th>BB+ to B-</th>
<th>Below B-</th>
<th>Unrated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sovereign</strong></td>
<td>0%</td>
<td>20%</td>
<td>50%</td>
<td>100%</td>
<td>150%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Bank Alternative A</strong></td>
<td>20%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>150%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Bank Alternative B</strong></td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>50%</td>
<td>150%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Corporate</strong></td>
<td>20%</td>
<td>50%</td>
<td>100%</td>
<td>150%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

*a: refers to rating of sovereign.

*b: refers to rating of bank-for loans of less than three months, lent and funded in domestic currency.*
[Appendix 7]

List of Banks under the study

1. Arab Bank
2. The Housing Bank for Trade and Finance
3. Jordan Bank
4. Jordan Kuwait Bank
5. Cairo Amman Bank
6. Jordan National Bank
7. Jordan Islamic Bank for Finance & Investment
8. Arab Banking Corporation
9. Export & Finance Bank
10. Jordan Investment & Finance Bank
11. Middle East Investment Bank
12. Union Bank for Saving & Investment
13. Industrial Development Bank
14. Jordan Gulf Bank
15. Philadelphia Investment Bank
16. Arab Jordan Investment Bank
17. Beit Al-Mal Saving & Investment for Housing
الملخص

صباغ، نور محمد: محددات نسبة كفاءة رأس المال في البنوك الأردنية، رسالة ماجستير بجامعة اليرموك. 2004: (المشرفين، د. علي مقابله، أ/ د. رتب الخوري).

أجريت هذه الدراسة برفع محددات نسبة كفاءة رأس المال (CAR)، عن طريق دراسة الفواتير المالية لبعض البنوك من 17 بنك في الأردن في فترتين زمنيتين. الفترة الأولى تمتد من 1985 - 1994، والتي تمثل الفترة الزمنية قبل تطبيق معايير لجنة بازل لنصية كفاءة رأس المال في قطاع البنوك. بينما تمدد الفئة الثانية من 1995 - 2001، والتي تمثل الفترة بعد تطبيق معايير لجنة بازل لنصية كفاءة رأس المال، والتي تتمثل في أقل نسبة كفاءة لرأس المال وهي 8%.

لقد وجدنا أن كل البنوك قد تزامنت بالنسبة الدنيا للكفاءة رأس المال (8%)، بينما المعظم كان عندهم نسبة أعلى من 8%.


النتائج هذه النتيجة، على البنوك في الأردن أن تحافظ أو تتراجع نسبة كفاءة رأس المال عندها لتعزيز أمان النظام المصرفي، وأمن المودعين لديها.