A MULTIVARIATE ANALYSIS USING FINANCIAL RATIOS FOR THE GCC COMMERCIAL BANKS IN 1988.

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CHAPTER I: Introduction

a. General Background.

Financial ratios' properties and characteristics have received considerable attention in recent years with interest primarily focused on determining the predictive ability of financial ratios and related financial data.

An increased emphasis has been given to the role of ratios in the operation of firms. Managers have generated much interest in the utility of ratios as a management tool. A pressing need has emerged for using quantitative methods in decision making, based on the financial ratios generated from the financial statements of the firm.

The utility of accounting data seems to be assumed axiomatically by most accountants, but it is interesting to trace how accounting data have been used. The historical development of the financial ratio analysis could be traced back to 300 B.C. and is still going on till today. Thus, a history of the development of ratio analysis is, at the same time, a fairly accurate description of its present practice.

The primary cause of evolution of ratio analysis in general was Euclid's rigorous analysis of the properties of ratios in Book V of his

Elements in about 300 B.C. However, the adoption of ratios as a tool of financial statement analysis is relatively a recent development.

After the turn of the century, some important developments in ratio analysis occured during the period prior to and during World War I. Three of these developments were endogenous. First, a fairly large variety of ratios was conceived. As in 1905, James Cannon, a pioneer of financial statement analysis, used ten different ratios in a study of business borrowers. Second, absolute ratio criteria began to appear, the most famous being the 2 to 1 current ratio criterion revealed by William H. Lough in an early attempt to supply criteria for a variety of ratios of the Ronald Press Company in 1917.(1)

Third, some analysts began to recognize the need for interfirm analysis and, consequently, the need for relative ratio criteria.

In the 1920's, interest in ratios increased remarkably. A virtual explosion of publications on the subject of ratio analysis occured. At the same time, many compilations of industry ratio data were initiated by trade associations, universities, credit agencies, and individual analysts. This process of collecting industry

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1. William H. Lough, Business Finance (New York: The Ronald Press Company, 1917), pp. 500-24.

ratio data, and computing averages therefrom were called "scientific ratio analysis," but the label called "scientific" appears to have been a misnomer because there is no evidence that hypothesis formulation and testing were carried out.(2)

In the 1930's, the salient feature was the increased attention given to the empirical bases of ratio analysis. There were two significant developments in this decade relating directly to ratio analysis. The first of these was the determination of the most efficacious group of ratios. However, the second significant development in this decade was the prediction of failure using ratio analysis. In the early 1930's, studies were made of the efficiency of ratios as predictors of business financial difficulties.

In the early 1940's, the development of the empirical base of ratio analysis continued in both a direct and an indirect fashion. The direct development of ratio prediction studies culminated in Merwin's study.(3)

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2. W. H. Justin, "Operating Control Through Scientific Analysis," The Journal of Accountancy, 7 (September, 1924), pp. 183-95.
3. Charles L. Merwin, Financing Small Corporations: In five Manufacturing Industries (Boston: National Bureau of Economic Research, 1942), pp. 1926-36.

Merwin analyzed the last six years' trends of continuing and discontinuing firms. Comparing industry mean ratios of "discontinuing" firms against "estimated normal" ratios, he concluded that three ratios were very sensitive predictors of discontinuance, up to as early as four to five years in some instances. These three ratios were the following: (1) net working capital to assets; (2) net worth to debt; and (3) the current ratio. Merwin's study was the first really sophisticated analysis of ratio predictive power, and the findings of the study still appear to be credible. An important type of indirect development of the empirical base of ratio analysis also accelarated during this period. Ratios were increasingly used as independent and descriptive variables in aggregate economic studies. The idea of using single ratio for these purposes was not new, especially the profits to investment ratio;(4) but the practice of using a number of ratios to describe a wide variety of the firm's characteristics came into fruition during this period.

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4. William Leonard Crum, Corporate Size and Earning Power (Cambridge: Harvard University Press, 1939) pp. 1221-37.

In the last three decades, an important aspect has been shown by the increasing emphasis given to the role of ratios in the operation of small business. Ratios were also being used as variables for examining and describing economic activity, thus further widening the empirical base of the ratio analysis. Another interesting development of this period was the empirical research of the predictive power of ratios in regard to psychological characteristics of firms.(5) This has led to the conclusion that a conservative corporation maintains higher liquidity and solvency ratios.

b. Need for the Study.

This study is concerned with the predictive ability of the financial ratios in the commercial banks in the Gulf Cooperation Council (GCC) countries. These banks have similar activities, characteristics, and problems because of the similar prevailing situation in the Gulf states.6 The banking sector in the Gulf marked a rapid growth starting from 1973 until

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5. George H. Sorter, Selwyn W. Becker, T. Ross Archibald, and William H. Beaver, Research in Accounting Measurment, (Illinois: American Accounting Association, 1960), pp.200-10.
6. Nihad I. Pasha, "A Second View of the GCC Banks," Al Massaref Al Arabiya, Vol VII, No. 73, (January, 1987), pp.23-27.

1982, because of the huge income generated from the oil yields. The oil revenue increased from US$ 13,582 millions in 1973 to US$ 158,283 millions in 1981, as a result of two interelated factors: (1) increase in production and oil exports; and (2) increase in oil prices. Oil exports increased from 4,662 million barrels in 1973 to 5,285 million barrels in 1979 while prices continued to score upwards from US$ 2 per barrel in the early seventies to US$ 10 per barrel in 1974, rising to US$ 34 per barrel in October 1981.(7) The inflow of money to the Gulf states coupled by the need for development in all national sectors led to a remarkable increase in government spending particularly on agriculture, industry, construction, and other projects and services to deploy the incoming capital. Government spending increased from 1973 to 1982 in all the Gulf states and reached the following ratios: (1) 2,700% in Saudi Arabia; (2) 500% in Kuwait; (3) 700% in Bahrain; (4) 650% in Qatar; and 350% in Oman.8

This growth affected positively the banking sector, resulting in its rapid expansion during that period. It was characterized by an

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7. Ibid., pp. 24.
8. Ibid., pp. 24.

increase in deposits from US$ 3,596 millions in 1973 to US$ 52,841 millions in 1982, and an increase in the capital of these banks from US$ 293 millions in 1973 to US$ 7,928 millions in 1982. High profits were also achieved until the beginning of 1982 when oil prices started to decrease.

In the early months of 1982, the golden era of oil come to an end. The price of a barrel which reached 30-40 dollars gradually declined until in early 1986 prices were sharply and rapidly slashed to US$ 15 per barrel accompanied by a reduction in exports of 59 percent from a level of 5,285 million barrels in 1979 to 2,186 million barrels in 1985.(9) This caused an eventual decrease in revenue for governments of the Gulf oil producing states which largely depend on oil exports.

As a consequence of the above, a drop in government expenditure was observed. This led to the cancellation of many projects and the postponment of others. But even these measures were not enough to overcome the deficit in budgets. It is important to mention that government spending is the major activating force

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9. Ibid., pp. 25.

of the economy in the Gulf oil producing states mentioned here in.

As a corollary of the above, recession started to appear. This affected many Gulf companies, particularly those working on projects related to the public sector. Most of these companies suffered heavy losses. With the continuation of this state of affairs, several other establishments and companies suffered equally due to the lack of liquidity, which made them unable to settle their debts to the banks. What worsened the situation for the banks was the devaluation in real estate, stocks, and assets, which had been mortgaged in return of loans offered to these companies. Many loans extended by the banks became non-performing.

The non-existance of quick and effective legal proceedings to deal with loan settlements to banks induced several companies to refrain from settling their debt inspite of their ability to do so.

In Saudi Arabia, for instance, another problem appeared when debtors took advantage of a verse in the Islamic religion which bans interest, to revoke their debenture. In Kuwait the stock exchange collapsed and debtors refrained from settling their debt pretending

that they were waiting for some remedial action by the government to help them out.(10)

In view of these conditions in the Gulf, with their associated effects on the banking system, and with the beginning of the end of this difficult phase, this researcher has chosen to focus his study on the financial ratio analysis in the banking sector which could serve the management of the unsuccessful banks to adjust their position and the successful ones to strengthen their position by revising and reviewing their strategy in the light of this study.

This study aims at analysing data for some related Gulf banks and indicating more sophisticated approaches to financial ratio analysis.

c. General Statement of the Problem.

In the last twenty years, the banking system in the Gulf has passed through the the various phases of the business cycle, namely: (1) prosperity; (2) recession; and (3) normality. These phases are: (1) a rapid growth between 1973 and 1982; (2) a rapid decline from 1982 until the late 1988; and (3) a return to normality since 1989.

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10. Ibid., pp. 26.

These direct and influencing effects mentioned in the previous section, as the increase in government revenues and spending, and increase in banks deposits, then a rapid decrease in government expenditure and the cancellation of many government projects and a decrease in banks' liquidity, could be regenerated in this area or elsewhere in the future. That is why it is important to focus this research on the impact of these external changes on the banking affairs.

As explained above, the banking sector in the GCC area is now in an advanced stage of development, but has not yet reached the stage of maturity. These developments have led the researcher to focus his study on the structure and strength of the commercial Gulf banks.

d. Purpose of the Study.

The purpose of this study is two fold.

1. To assess the quality of ratio analysis within a modern statistical analytical context. Specifically, 45 available financial statements are analysed and the performance of the banking industry in the Gulf area is predicted using the multivariate analysis.11

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11. Freddie C. Baz, Bankdata: 232 Financial Statement Analysed (Beirut: Bankdata Financial Services, S.A.R.L., in association with BAII Paris, 1989).

2. To explore the advance in data management facilities. Many tools will be deployed to gather the data in the required format and to manipulate them using a large number of Advanced Statistical Techniques Through a comprehensive set of procedures. All these procedures are computed through the use of some computer softwares (like Lotus, Dbase III+, and Advanced SPSS package.

e. Research Questions.

This piece of research attempts to answer the following research questions:

1. What are the major characteristics of the selected sample of the banking industry in the Gulf area?
2. What are the major factors underlying the financial ratios in the banking industry for the Gulf area?
3. What is the best use of the financial ratios that will maximize the difference among the Gulf banks relative to the difference within groups?

f. Definition of Terms.

A great many ratios can be developed from the the multitude of items included in a bank's financial statements. Listed bellow are the definition of terms constituting the components of the finan-

cial ratios utilized in this piece of research.

A. Assets: Assets represent uses of funds and are economic resources owned by the bank. They are further classified as liquid assets, loans, investments, fixed assets, and other assets as follows:

1. Cash: It represents the cash in hand or in vault.

2. Liquid Assets: Liquid assets are in the form of cash in hand and readily available bank balances (cash is included) such as demand deposits and current balances (cash and equivalent), and other assets that can be quickly converted into money as central bills, guarentee fund bonds, bankers' negociable certificates of deposit, and deposits with banks.

3. Loans: Loans include all types of loans, advances, discounts, and overdrafts provided to others by the bank.

4. Investments: This category of assets includes all types of investments in shares, bonds, debentures, other security investments, and investments in subsidiaries and affiliates.

5. Fixed Assets: All tangible long term assets such as land, buildings, furniture, and equipments are included in the fixed assets.

6. Other Assets: Any unspecified asset not included in the above categories.

B. Liabilities and Shareholders' Equity: These consist of amounts owed by the bank to others. They also represent sources of funds used by the bank consisting of shareholders' funds or internal funds and external liabilities by which is meant external to shareholders' funds. Liabilities and shareholders' equity are subdivided into the following categories:

1. Deposits: Deposits consist of deposits obtained by the bank from individual customers, other banks, other organizations, and other agencies and certificates of deposits.

2. Other Liabilities: Any external/outside liability not classified under deposits.

3. Shareholders' Equity: It includes share capital and reserves and retained earnings. It represents the funds belonging to the shareholders of the bank.

4. Share Capital: Share capital consists of paid up share capital, share capital raised by rights-issues and bonus share issues.

5. Reserves and Retained Earnings: It includes all types of statutory/legal, special/general reserves created out of the bank profits, and any undistributed/unallocated profits retained.

C. Risky Assets: The sum of investments, loans and contra accounts which carry a high risk premium.

D. Earning Assets: All assets that generate profits.

E. Permanent Assets: The sum of investments and fixed assets.

F. Non-Permanent Assets: All assets other than permanent assets.

G. Contra Accounts: Contra accounts are not assets or liabilities of the bank in the strict sense as they represent direct obligations to customers in the theoretical sense. But in the real world these items may represent potential obligations (liabilities) and equally potential returns (assets) if these obligations are not fully collateralised by the institution and are part of the customer's risk. They represent the off-balance sheet activity of the bank. Items such as outstanding letters of credit, acceptances and guarantees, and commitments in foreign exchange contras are considered contra accounts.

H. Assets and Contra Accounts: The sum total of assets and contra accounts.

I. Loans and Contra Accounts: It is the sum total of loans and contra accounts.

J. Working Capital: It is the difference between shareholders' equity and permanent assets.

K. Free Capital: It is the difference between shareholders' equity and fixed assets.

L. Net Income: It is the net profit for the year.

M. Dividend: It is a part of the net income distributed over the shareholders.

All these items declared in this section will be used in the following chapter according to their definition cited above.

CHAPTER II: Review of Literature

a. General Review of Literature

Many studies in financial ratio analysis where done in the last three decades. Most of these studies emphasized the empirical results in areas of corporate failure prediction, bankruptcy, bond ratings, the effect of size, growth and industry classification based on financial ratios.

Beaver, in his direct study of the predictive power of ratios, has analyzed the ability of ratios to predict the failure of firms during 1954 and 1964.(12) The findings of the study were based upon an investigation of the financial statement data of 79 failed and 79 normal firms. The financial statement data of the failed firms were obtained for five years prior to failure, and the financial statement data of the normal firms were collected for the same fiscal years as failed mates. The data were then grouped according to year before failure, and the financial ratios were computed. The evidence indicates that: the non-liquid asset measures predict failure better than the liquid assets measures, even in the years immediately before failure; the two less frequently advocated liquid

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12. William H. Beaver, "Financial Ratios as Predictors of Failure," The Accounting Review, Vol XIV, No. 5 (January, 1968), pp. 113-121.

asset measures outperform the two more frequently advocated ones; and failed firms tend to have lower, rather than higher, inventory balances.

The study also illustrates a method for empirically evaluating alternative accounting measures in terms of their predictive ability. Persistent differences were found that would enable the decision maker to choose among alternative measures on the basis of their relative predictive power. Another interesting development of this period was some empirical research on the predictive power of ratios in regard to psychological characteristics of firms.

Sorter and Becker examined the relationship of financial ratios to a psychological model of "Corporate Personality" and have found that conservative corporations maintain higher liquidity and solvency ratios.(13)

This research should also prove to be an extremely valuable addition to the empirical base of ratio analysis.

Pinches, Mingo, and Caurthers conducted a study in 1973 to develop an empirically-based

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13. George Sorter and Selwyn Becker,"Accounting and Finacial Decisions and 'Corporate Personality' - Some Preliminary Findings," Journal of Accounting Research, Vol IX, No. 7, (Autumn, 1964), pp. 183-196.

classification of financial ratios and to measure the stability and changes of this classification over the period of 1951-1969. In this study factor analysis was used to isolate independent patterns of financial ratios. The financial data were based on 221 industrial firms for which forty-eight financial ratios were calculated. A common log transformation was applied to all financial ratios to improve normality, reduce outliers, and improve the homoscedasticity of the distribution.(14) The study revealed seven factors or classifications of financial ratios for the industrial firm. The seven factor patterns represent: (1) return on investment; (2) capital intensiveness; (3) inventory intensiveness; (4) financial leverage; (5) receivables intensiveness; (6) short-term liquidity; and (7) cash position. The analysis indicated that the financial intensiveness factor is the least stable across the years. This study leads to a meaningful empirically-based classifications of financial ratios can be determined and that the classifications are reasonably stable over time.

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14. George E. Pinches, Kent A. Mingo, and J. Kent Caruthers, "The Stability of Financial Patterns in Industrial Organizations," Journal of Finance, Vol. XXVIII (June, 1973), pp.389-395.

Johnson conducted a study in 1979 to develop an empirically based classification of the financial ratios and to measure the stability and changes of these classifications for the two years 1972 and 1974. The analysis of 61 ratios across a 306 primary manufacturing and 159 retailing firms resulted in the identification of eight groups or categories of financial ratios.(15) These are:

(1) return on investment; (2) financial leverage; (3) capital intensiveness; (4) inventory intensiveness; (5) cash position; (6) receivables intensiveness; (7) short-term liquidity; (8) decomposition measures. Analysis of the results reveals that eight financial ratio groups possess a high degree of cross-sectional stability for both 1972 and 1974 in terms of the consistency of factor loading across the two types of firms. Factors two and five appear to be the most stable. On the other hand factor seven seems to be characterized by substantial cross-sectional instability. For the two years examined in Johnson's study, firms engaged in primary manufacturing were characterized as (1) being more capital intensive;

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15. W. Bruce Johnson, "The Cross-sectional Stability of Financial Ratio Patterns," Journal of Financial and Quantitative Analysis, Vol. XIV, No. 5, (December, 1979), pp. 1035-1047.

(2) possessing higher levels of inventory, receivables, and return on investment; and (3) having a stronger short-term liquidity position than those firms comprising the retail group.

This study provides further information on the functional similarity of various financial ratios by identifying those ratios which are in the same empirically determined ratio group. With knowledge of the empirical similarity exhibited by various financial ratios, selectivity may be employed in choosing ratios that capture unique aspects of a firm's activities.

In this way, a few carefully chosen financial ratios can be selected which will represent virtually all the different aspects of a firm's operations. However, the selection of appropriate ratios must also be based on knowledge of the predictive significance of individual financial ratios. By maintaining the following approach, knowledge of the predictive as well as the descriptive ability of individual financial ratios may be combined to facilitate the optimal utilization of financial statement data.

The analytical studies on the general macro economic causes of corporate failure was initiated by Altman. Failure was significantly linked to

the prevailing monetary policy, the investor's expectations about economic conditions, and the state of the economy. On the micro level, Altman found that the age of the firm has a significant impact on its chance of failure. The significant micro analysis however, came with the usage of discriminant analysis applied to financial ratios in the prediction of corporate failure. Altman improved on Beaver's univariate method of analysis, which finds after testing the predictive power of financial ratios that the cash flow to total debt ratio is the best predictor of failure five years precedind failure, by introducing the multivariate approach, which allows for the simultaneous consideration of severel variables in the prediction of failure. The approach is that of multiple discriminant analysis.

The following discriminant function turned in the best performance:16

$$Z = .012\ X1 + .014\ X2 + .033\ X3 + .006\ X4 + .999\ X5$$

where:

X1 = working capital to total assets

X2 = retained earnings to total assets

X3 = earnings before interest and taxes

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16. Edward I. Altman, "Financial Ratios, Discriminant Analysis and the Predictive of Corporate Bankruptcy," Journal of Finance, Vol. XXIII, No. 4, (September, 1968), pp. 589-609.

to total assets

X4 = market value of equity to book value

total debt

X5 = sales to total assets

This model was able to predict accurately the bankruptcy up to 2 years prior to actual failure, where the accuracy decreases after the second year.

In a more recent study in 1977, Altman, with a new database adjusted to take into account the latest financial reporting standards, used multiple discriminant analysis once again with both linear and quadratic structures. The study resulted in new variables explaining corporate failure. Altman's latest model predicted better than his earlier model. It is far more accurate in bankruptcy classification in year 2-5 with the initial year's accuracy about equal. The classification accuracy of bankrupt firms five years before failure was 69.8 percent using recent analysis and 36 percent using the 1968 model. While Altman's work, especially his latest, addresses marginally the question of ratio stability, the treatment is far from adequate. It is the stability of every ratio over time that is relevant and not just that of earnings. Wide and increasing downward shifts in the current ratio, for instance, can spell disaster for a firm,

particularly one with a high leverage ratio.

Dambolena and Khoury present in their study a model on corporate failure that uses financial ratios and discriminant analysis as its core. The essential attribute of their model is its use of stability of all financial ratios over time, as well as the level of these ratios, as explanatory variables in the derivation of a discriminant function.(17) The research indicated a substantial degree of instability in the ratios of firms that went bankrupt when compared with those that did not. This instability is measured by: (1) the standard deviation of the financial ratios over the past few years, (2) their standard error of estimate, and (3) their coefficient of variation. The inclusion of the stability of ratios in the analysis improved considerably the ability of the discriminant function to predict failure.

This model classified firms into failed and non-failed groups with 78 percent accuracy five years prior to failure. The strength of the analysis lies not only in the superior predictive power of the model, but in the improvement in the

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17. Ismael G. Dambolena and Sarkis Khoury, "Ratio Stability and Corporate Failure," The Journal of Finance, Vol. XXXV, No. 4, (September, 1980), pp. 1017-1026.

conceptual frame work of models for predicting corporate bankruptcy.

b. Research Related to the Gulf

Shamaa and Abdallah (1990) prepared a recent study which provided financial analysis of Arab banks including those of the Gulf. According to them, there are several ways and means to analyse the financial state of banks. Among these is the financial ratios analysis. According to the theory and based on their experience in the Arab banking system, Shamaa and Abdallah have specified a large number of ratios when studying the structure and performance of Gulf banks.(18) Some of the ratios used in our study are extracted from Shamaa and Abdallah. It is for this reason that this study finds it useful to present Shamaa and Abdallah's ratios according to their classification. These ratios are classified into six groups namely:

1. Liquidity Ratios: The liquidity of a bank is measured by the degree to which it can meet its short-term obligations. Liquidity implies the ability to convert assets into cash or to obtain cash immediately. Liquidity could

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18. Khalil Shamaa and Khaled A. Abdallah, Financial Analysis of Banks, (Beirut: Union of Arab Banks, 1990) pp.77-101.

be measured by using four basic ratios:

a. $\frac{\text{Cash (after adjustment)}}{\text{Demand Deposits}}$

Cash after adjustment means:

Cash - (Net loaned funds from banks + Sold investments on the basis of repurchase agreements).

b. $\frac{\text{Cash (after adjustment)}}{\text{Total Deposits}}$

c. $\frac{\text{Cash + Investment in short-run financial papers}}{\text{Demand Deposits}}$

d. $\frac{\text{Cash + Investment in short-run financial papers}}{\text{Total Deposits}}$

2. Investment Funds Policies Ratios: The investment funds term is used in analyzing the financial state of a bank. It includes the secondary reserves, loans, and investments that is the earning assets. Investment funds policies could be measured by the following basic ratios:

a. $\frac{\text{Earning Assets}}{\text{Total Assets}}$

Earning assets: are part of the assets that generate interest to the bank.

b. $\frac{\text{Loans}}{\text{Total Deposits}}$

$$c.\quad \frac{\text{Loans}}{\text{Total Purchased Funds}}$$

Purchased funds: means the excess reserves for short-run sales + financial papers sold on the basis of repurchase agreements.

$$d.\quad \frac{\text{Treasury Bills}}{\text{Total Deposits}}$$

$$e.\quad \frac{\text{Public Sector Papers}}{\text{Total Deposits}}$$

$$f.\quad \frac{\text{Total Governments' and Municipalities Papers}}{\text{Total Deposits}}$$

$$g.\quad \frac{\text{Mixed Sector Papers}}{\text{Total Deposits}}$$

$$h.\quad \frac{\text{Private Sector Papers}}{\text{Total Deposits}}$$

$$i.\quad \frac{\text{Earning Assets}}{\text{Free Funds}}$$

Free Funds: Include

Total Deposits +

(Ownership right - Fixed Assets) +

Loaned Funds.

3. Financing Structure and Leverage Ratios: This group of ratios shows the relation between the

mixture of deposits and owned funds and the deposits and loaned funds.

a. $\frac{\text{Total Deposits}}{\text{Owned Capital}}$

b. $\frac{\text{Loaned Funds}}{\text{Owned Capital}}$

4. Capital Strength Ratios: This group of ratios shows the relation between the assets and the owned capital at the end of the financial period. Capital strength could be measured by the following ratios:

a. $\frac{\text{Risky Assets}}{\text{Owned Capital}}$

Risky Assets: is equal to

Total Assets - (Cash and Cash at hands other than Government papers + Secured loans by the Government).

b. $\frac{\text{Owned Capital}}{\text{Risky Assets}}$

c. $\frac{\text{Owned Capital}}{\text{Earning Assets}}$

d. $\frac{\text{Owned Capital - Fixed Assets}}{\text{Earning Assets}}$

e. $\frac{\text{Capital Residual - Undistributed Profits and Reserves}}{\text{Earning Assets}}$

f. $\frac{\text{Fixed Assets}}{\text{Owned Capital}}$

5. Profitable Ratios: This group of ratios shows the profitability level of a bank. Profitability could be measured by the following ratios:

a. $\frac{\text{Interest - Induced Income}}{\text{Assets}}$

b. $\frac{\text{Interest Expenses}}{\text{Assets}}$

c. $\frac{\text{Interest - Induced Net Income}}{\text{Assets}}$

d. $\frac{\text{Loans Losses Funds}}{\text{Assets}}$

e. $\frac{\text{Non-Interest-Induced Income}}{\text{Assets}}$

f. $\frac{\text{Wages and Salaries}}{\text{Assets}}$

g. $\frac{\text{Property, Furniture and Equipment Operating Exp}}{\text{Assets}}$

h. $\frac{\text{Profits or Losses of Financial Papers}}{\text{Assets}}$

i. $\frac{\text{Taxes Funds}}{\text{Assets}}$

j. $\frac{\text{Net Income}}{\text{Assets}}$

k. $$\frac{\text{Interest-Induced Income}}{\text{Earning Assets}}$$

l. $$\frac{\text{Interest Expenses}}{\text{Earning Assets}}$$

m. $$\frac{\text{Interest-Induced-Net-Income}}{\text{Earning Assets}}$$

n. $$\frac{\text{Operating Income}}{\text{Earning Assets}}$$

o. $$\frac{\text{Total Operating Expenses (before income taxes)}}{\text{Earning Assets}}$$

p. $$\frac{\text{Net Income (before income taxes,\& operating profits or losses on investments)}}{\text{Earning Assets}}$$

q. $$\frac{\text{Net Income (after income taxes,\& operating profits or losses on investments)}}{\text{Earning Assets}}$$

r. $$\frac{\text{Net Income before deducting exceptionary items}}{\text{Earning Assets}}$$

s. $$\frac{\text{Exceptionary Items}}{\text{Earning Assets}}$$

t. $$\frac{\text{Non-Interest-Induced Income - Non-Interest Exp}}{\text{Assets}}$$

u. $$\frac{\text{Interest and Wages from Loans}}{\text{Total Loans}}$$

v. $$\frac{\text{Interest on Gov't Obligations(transfer \& bond)}}{\text{Gov't Obligations(transfer \& bond)}}$$

w. $$\frac{\text{Interest on Public Sector Obligations}}{\text{Public Sector Obligations}}$$

Interest on Local Gov'ts and Municipalities Obligations

x. ---

Local Gov'ts and Municipalities Oblibations

Interest on Other Investments

y. ---

Other Investments

Interest on Excess Funds (at the central bank and others) and Selled to Others

z. ---

Excess Funds and Selled to Others

Interest and Profit Divisor of Other Financial Papers

a1. ---

Other Investments

Interest + Borrowers Services Wages + Other Income from Loans

b1. ---

Loans

Interest Payment on Savings Deposit

c1. ---

Saving Deposits

Interest Payment on Time Deposits

d1. ---

Time Deposits

Interest Payment on Purchased Free Accounts at the Central Bank

e1. ---

Purchased Free Accounts at the Central bank

Interest Payment on Long-Term Debts

f1. ---

Long-Term Debts

Sources of Operating Income

g1. ---

Operating Income

Operating Expenses Items

h1. ---

Operating Income

Total Operating Expenses

i1. ---

Operating Income

Net Income (before income taxes and before profits or losses on investments)

j1. ----------

Operating Income

Net Income (after income taxes & before profits or losses on investments)

k1. ----------

Operating Income

Net Profits or Losses of Investments

l1. ----------

Operating Income

Net Income (after income taxes and profits or losses on investments)

m1. ----------

Operating Income

Exceptionary Revenues Items after Deducting Taxes on Them

n1. ----------

Operating Income

Interest + Borrowers Services Wages + Other Revenues from Loans

o1. ----------

Operating Income

Doubtful Loans Funds

p1. ----------

Loans Balance (ending period)

Doubtful Loans Funds

q1. ----------

Loans

Dead Debts on Loans (loan losses)

r1. ----------

Loans

Net Loans Losses and Dead Debts Returns

s1. ----------

Loans

Net Income

t1. ----------

Total Assets

Net Income (after deducting income taxes and before profits or losses of investments)

u1. ----------

Owned Capital

$$v1. \quad \frac{\text{Net Income (before deducting net exceptionary items)}}{\text{Owned Capital}}$$

$$w1. \quad \frac{\text{Net Income (after deducting net exceptionary items)}}{\text{Owned Capital}}$$

$$x1. \quad \frac{\text{Net Income}}{\text{Owned Capital}}$$

6. Activity or Labor Productivity Ratios: This group of ratios determines the relative activity of labors during the working hours of a bank. Activity could be measured by the following ratios:

$$a. \quad \frac{\text{Net Income + Taxes + Net Profits or Losses of Investments}}{\text{Total Number of Full-Time Labors}}$$

$$b. \quad \frac{\text{Assets}}{\text{Total Number of Full-Time Labors}}$$

$$c. \quad \frac{\text{Deposits}}{\text{Total Number of Full-Time Labors}}$$

These ratios specified by Shamaa and Abdallah are useful. A few of which are implemented statistically in this study. However, some of the ratios used here are modified in such a way as to accommodate our data base. The reason for this choice is mainly the fact that data is limited and many variables are not available. The ratios chosen for this research are stated in the following chapter.

CHAPTER III: Procedures and Methodology

This chapter discusses the procedures and methodology used in this study. It includes the population selected, the measurements of the variables, and the conceptual framework for analysing the data. It is subdivided into three sections which are:

a. Population and Sample Selection:

A large portion of the banks in the Gulf area whose financial statements are analyzed in the 1989 edition of Bankdata will be used as the population of this study.

These banks are characterized by being local commercial banks of the six countries forming the Gulf Cooperation Council. The banks selected are listed below with respect to their countries.

1. Bahrain:
   a. Al-Ahli Commercial Bank B.S.C.
   b. Bank of Bahrain and Kuwait B.S.C.
   c. Grindlays Bahrain Bank B.S.C.

2. Kuwait:
   a. Alahli Bank of Kuwait K.S.C.
   b. Burgan Bank S.A.K.
   c. The Bank of Kuwait and the Middle East K.S.C.
   d. The Commercial Bank of Kuwait S.A.K

e. The Gulf Bank K.S.C

f. The National Bank of Kuwait S.A.K.

3. Oman:

a. Al Bank Al Ahli Al Omani S.A.O.

b. Bank of Muscat S.A.O.

c. Bank of Oman Bahrain and Kuwait S.A.O.

d. Commercial Bank of Oman Limited S.A.O.

e. National Bank of Oman Limited S.A.O.

f. Oman Arab Bank S.A.O.

g. Oman International Bank S.A.O.

4. Qatar:

a. Al Ahli Bank of Qatar Q.S.C.

b. Doha Bank Limited

c. Qatar National Bank S.A.Q.

d. The Commercial Bank of Qatar Limited Q.S.C.

5. Saudi Arabia:

a. Al Bank Al Saudi Al Fransi

b. Al Bank Al Saudi Alhollandi

c. Arab National Bank

d. Riyad Bank

e. Saudi American Bank

f. The Saudi Investment Bank

g. United Saudi Commercial Bank - USCB

6. United Arab Emirates:

a. Abu Dhabi Commercial Bank

b. Arab Bank for Investment and Foreign Trade ARBIFT

c. Bank of Credit and Commerce (Emirates)

d. Bank of Oman Limited

e. Bank of Sharjah Ltd.

f. First Gulf Bank

g. Investbank

h. Middle East Bank

i. National Bank of Abu Dhabi

j. National Bank of Fujairah

k. National Bank of Sharjah

l. The Commercial Bank of Dubai Limited

m. The National Bank of Dubai Limited

n. The National Bank of Ras Al-Khaimah (P.S.C.)

o. The National Bank of Umm Al-Qaiwain Ltd.

p. Union Bank of the Middle East Limited

q. United Arab Bank

Each of these 45 banks is represented by a Balance Sheet and Contra Accounts, Profit and Loss Account, Summarized Balance Sheet, Working Capital, Commercial Activity, and Cash Management. These statements are standerdized so as the financial differences are minimized.

b. The Selected Variables and their Measurements:

The raw data used in this study are extracted from Bankdata. The published annual reports of most banks in GCC countries do not contain adequate details to allow a comprehensive and in-depth financial analysis. Accordingly, the research is limited to 26 financial ratios that could be extracted from the available source data. Not all ratios described in chapter II could be deducted but other ratios not mentioned in chapter II are added to them to fulfill and replace the non-existing ones.

A common log transformation is applied to all financial ratios mentioned below to improve normality.

The ratios are:

1. $\frac{\text{Cash}}{\text{Total Assets}}$

2. $\frac{\text{Cash}}{\text{Total Deposits}}$

3. $\frac{\text{Liquid Assets}}{\text{Total Assets}}$

4. $\frac{\text{Liquid Assets}}{\text{Total Deposits}}$

$$5.\quad \frac{\text{Earning Assets}}{\text{Total Assets}}$$

$$6.\quad \frac{\text{Loans}}{\text{Total Deposits}}$$

$$7.\quad \frac{\text{Earning Assets}}{\text{Free Funds}}$$

Free Funds includes:
Deposits + (Equity - Fixed Assets)

$$8.\quad \frac{\text{Total Deposits}}{\text{Shareholders' Equity}}$$

$$9.\quad \frac{\text{Shareholders' Equity}}{\text{Total Assets}}$$

$$10.\quad \frac{\text{Shareholders' Equity}}{\text{Total Assets + Contra Accounts}}$$

$$11.\quad \frac{\text{Fixed Assets}}{\text{Shareholders' Equity}}$$

$$12.\quad \frac{\text{Shareholders' Equity}}{\text{Total Liabilities}}$$

$$13.\quad \frac{\text{Loans}}{\text{Total Assets}}$$

$$14.\quad \frac{\text{Contra Accounts}}{\text{Loans}}$$

$$15.\quad \frac{\text{Contra Accounts}}{\text{Assets}}$$

$$16.\quad \frac{\text{Contra Accounts}}{\text{Total Deposits}}$$

17. $$\frac{\text{Shareholders' Equity}}{\text{Loans + Contra Accounts}}$$

18. $$\frac{\text{Working Capital}}{\text{Assets other than Permanent Assets}}$$

$$= \frac{\text{Equity - (Investments + Fixed Assets)}}{\text{Total Assets - (Investments + Fixed Assets)}}$$

19. $$\frac{\text{Shareholders' Equity}}{\text{Risky Assets}} = \frac{\text{Shareholders' Equity}}{\text{Investments + Loans + Contra Accounts}}$$

20. $$\frac{\text{Shareholders' Equity}}{\text{Earning Assets}}$$

21. $$\frac{\text{Free Capital}}{\text{Earning Assets}} = \frac{\text{Equity - Fixed Assets}}{\text{Earning Assets}}$$

22. $$\frac{\text{Free Capital}}{\text{Risky Assets}}$$

23. $$\frac{\text{Net Income}}{\text{Shareholders' Equity}}$$

24. $$\frac{\text{Net Income}}{\text{Total Assets}}$$

25. $$\frac{\text{Net Income}}{\text{Earning Assets}}$$

26. $$\frac{\text{Net Income}}{\text{Total Assets + Contra Accounts}}$$

c. Conceptual Frame Work for Analysing the Data:

1. To describe the major characteristics of the

selected group of Gulf banks, a tabular presentation of the data is prepared in a percentage form.

2. As a data-reduction technique, factor analysis is used to transform the set of financial ratios into a new set of factors.

3. Factor score for each bank is calculated and used as independent variables.

4. As a dependent variable, cluster analysis is used to classify banks into two or more groups based on their financial ratios. A multiple discriminant function using factor scores formed in part (3) and the group memberships formed in part (4) above is then used as a predictive technique.

The populations, variables, and framework stated in this chapter and the results and findings of this study are explained in the following chapter entitled findings of the study.

Chapter IV: Findings of the Study

The findings of the study which is conducted using cross sectional data for one year are presented and discussed in this chapter which is divided into five major sections. The first section summarizes the major characteristics of the selected sample of commercial banks in the Gulf Area. The second section describes the appropriate transformation of the financial ratios computed. The third section presents the factor analysis of financial ratios and building of factor scores. The fourth section introduces the use of cluster analysis in dividing banks into four categories. In the last section, the major findings of the study are identified.

a. Major characteristics of the selected sample:

The selected sample of commercial banks in the Gulf covered by this study is described according to the following characteristics:

(1). Capital Intensiveness

(2). Risk Attitude

(3). Profitability

(4). Off-balance Sheet Activity

A number of financial ratios is included under each dimension:

The financial ratios relating to Capital Intensiveness are:

1. Shareholders' Equity / Total Assets
2. Total Deposits (Banks and Customers' Deposits) / Shareholders' Equity
3. Shareholders' Equity / (Total Assets + Contra Accounts)
4. Shareholders' Equity / Risky Assets
5. Shareholders' Equity / Earning Assets

The financial ratios belonging to Risk Attitude are:

1. Liquid Assets / Total Assets
2. Liquid Assets / Total Deposits
3. Loans / Total Assets
4. Loans / Total Deposits

The financial ratios exposing Profitability are:

1. Net Income / Shareholders' Equity
2. Net Income / Total Assets

The financial ratios identifying the Off-balance Sheet Activity are:

1. Contra Accounts / Loans
2. Contra Accounts / Total Assets

The banks covered by this study were divided into three categories according to the following criteria:

a. Shareholders' Equity to Total Assets Ratio (in table I (Capital Adequacy or Solvancy Ratio).)

Table I.

A Distribution of the Selected Group of Commercial Banks by their Shareholders' Equity to Total Assets ratio

Equity to Total Assets	F	Percent
0.05 <= Eq/As < 0.13	32	71.1
0.13 <= Eq/As < 0.21	8	17.8
0.21 <= Eq/As < 0.27	5	11.1
Total	45	100.0 %

Normally banks tend to be financed primarily through debt (90%). It was argued that the amount of capital a bank needs is not related to deposits, but to assets because a measure of capital adequacy ratio indicates the extent to which a bank's capital can absorb loss and still protect the interest of depositors. Losses are reflected in the bank's Balance Sheet by reducing the values of assets.

Table (I) indicates that thirty-two out of forty-five commercial banks (71.1%) had a shareholders' equity to total assets ratio ranging from 0.05 to 0.12. Eight out of forty five commercial banks (17.8%) had a ratio between 0.13 and 0.20. Five out of forty-five commercial banks (11.1%) had ratio from 0.21 to 0.27.

According to table (I), therefore, 71% of the GCC commercial banks can be said to be normally financed, 18% to be more conservative, and 11% are highly financed by Shareholders' Equity funds.

Therefore, the majority of the banks are well classified according to that ratio.

b. Total Deposits to Shareholders' Equity Ratio (in table II (Leverage ratio).)

Table II.

A Distribution of the Selected Group of Commercial Banks by their Total Deposits to Shareholders' Equity ratio.

Total Deposits to Equity	F	Percent
2.82 <= De/Eq < 8.95	22	48.9
8.95 <= De/Eq < 15.09	21	46.7
15.09 <= De/Eq < 21.22	2	4.4
Total	45	100.0 %

In general, about 85% of a bank's assets is financed by deposits. The primary function of the value of equity capital is considered to be the protection of depositors, depending on the size of the bank. The larger the bank the higher is its capital equity. In general, Banks' equity capital risk are reduced by the control of the regulatory authorities in charge and the central banks' reserves. The protective function has been viewed not only as assuring payoff to depositors in case of liquidation, but also as contributing to the maintenance of the solvency by providing a cushion of excess assets so that a bank

threatened with losses might continue in operation. Regulations relating to the bank's capital are those that have to do with minimum requirements necessary to obtain a charter, establising branches, and limiting the bank's loans portfolio, investments, and acquisitions. The increase in equity could be achieved mainly from retained earnings and sale of common stocks. The ratio of capital funds to total deposits has enjoyed the longest use of any ratio devised to measure and determine leverage.

Table (II) shows that twenty-two out of forty-five commercial banks (48.9%) had a total deposits to shareholders' equity ratio ranging from 2.81 to 8.94. Twenty-one out of forty-five commercial banks (46.7%) had ratios ranging between 8.95 and 15.08. Two out of forty-five commercial banks (4.4%) had ratios of 15.09 to 21.22. This table indicates that about 49% of the selected banks have total Deposits which constitute as much as 282% to 895% of their capital (equity). Therefore, from this ratio one may deduce from table (II) that 49% of the GCC commercial banks are conservative, 47% are normal, and 5% are bellow normal with respect to their deposits to equity ratio. Therfore, the majority of the banks are well classified according to this ratio.

c. Shareholders' Equity to Assets and Contra Accounts Ratio (in table III).

Table III.

A Distribution of the Selected Group of Commercial Banks by their Shareholders' Equity to (Total Assets + Contra Accounts) ratio.

Shareholders' Equity/ (Total Assets+ Contras)	F	Percent
0.03 <= Eq/As+Co < 0.09	25	55.6
0.09 <= Eq/As+Co < 0.15	15	33.3
0.15 <= Eq/As+Co < 0.20	5	11.1
Total	45	100.0 %

This ratio could be interpreted as the amount of equity capital retained for the assets and potential benefits out side the Balance Sheet of the bank.

Table (III) indicates that twenty-five out of forty-five commercial banks (55.6%) had a shareholders' equity to total assets and contra Accounts ratio ranging from 0.03 to 0.08. Fifteen out of forty-five commercial banks (33.3%) had a ratio between 0.09 and 0.14. Five out of forty-five commercial banks (11.1%) had ratio from 0.15 to 0.19. This table confirms that 55.6% of the observations have their equity capital to total assets and contra accounts between 3% to 9%. Table (III) above shows that 56% of the GCC commercial banks have an average ratio, 33% have a medium ratio, and 11% have a high ratio with

respect to Equity to Total Assets and Contra Accounts. Therefore, the majority of banks are classified as normal with respect to this ratio.

d. Shareholders' Equity to Risky Assets Ratio (in table IV.)

Table IV.

A Distribution of the Selected Group of Commercial Banks by their Shareholders' Equity to Risky Assets ratio.

Shareholders' Equity/ Risky Assets	F	Percent
0.04 <= Eq/ Ri As < 0.17	33	73.3
0.17 <= Eq/ Ri As < 0.29	7	15.6
0.29 <= Eq/ Ri As < 0.41	5	11.1
Total	45	100.0 %

The use of the risky assets ratio with several variants is based on a refinement of the logic that led to the adoption of the ratio of capital to total asset. A ratio that is used to measure the adequacy of capital funds to absorb losses must be related to the assets that are subject to loss. This ratio also shows how much of risky assets are financed through capital or equity. On average, a high rate is recommended, but it depends on what the risky assets includes. This ratio is highly recommended by the comptroller of currency since it exposes the ratio of risky assets financed by capital.

Table (IV) shows that thirty-three out of forty-

five commercial banks (73.3%) had a shareholders' equity to risky assets ratio ranging from 0.04 to 0.16; seven commercial banks (15.6%) had a ratio between 0.17 and 0.28, and the remaining five commercial banks (11.1%) had a ratio of 0.29 to 0.40.

In this case, table (IV) shows that 73% of the GCC comercial banks are normal, 27% are bad with respect to their equity to risky assets ratio. Therefore, More than two third of the banks are well classified.

e. Shareholders' Equity to Earning Assets (in table V.)

Table V.

A Distribution of the Selected Group of Commercial Banks by their Shareholders' Equity to Earning Assets ratio.

Shareholders' Equity/ Earning Assets	F	Percent
0.05 <= Eq/Ea As < 0.14	29	64.4
0.14 <= Eq/Ea As < 0.22	10	22.2
0.22 <= Eq/Ea As < 0.30	6	13.3
Total	45	100.0 %

Table (V) presents the equity to earning assets ratio which is more specific than the capital to total assets in that it is restricted to the portion of funds invested in earning assets that represent the internal source of funds used by the banks. The table indicates that twenty-nine out of

forty-five commercial banks (64.4%) had a shareholders' equity to earning assets ratio ranging from 0.05 to 0.13, ten commercial banks (22.2%) had a ratio between 0.14 and 0.22, and six commercial banks (13.3%) had a ratio from 0.22 to 0.29.

Finally, this table indicates that 65% of the GCC commercial banks have a low ratio, 22.2% of them have an average ratio; and 13% of them have a high ratio. A low ratio means that the internal source of funds used to finance the earning assets is low indicating that these banks are risky. A high ratio means that these banks are classified as conservative banks. Therefore, two third of the banks are risky with respect to this ratio.

f. Liquid Assets to Total Assets Ratio (in table VI.)

This ratio shows the portion of assets that are cash or convertible into cash. Normally the higher this ratio is the more the bank is conservative and the lower this ratio is the more the bank is generating income and the more the bank is taking risk in fullfilling its obligations.

Table (VI) indicates that nineteen out of forty-five commercial banks (42.2%) had a low liquid assets to total assets ratio ranging from 0.17 to 0.37; eighteen commercial banks (40.0%) had a

ratio between 0.38 and 0.58; and only eight out of forty-five commercial banks (17.8%) had a high ratio from 0.59 to 0.79. Therefore, more than the half banks are classified as liquid with respect to this ratio.

Table VI.

A Distribution of the Selected Group of Commercial Banks by their Liquid Assets to Total Assets ratio.

Liquid Assets / Total Assets	F	Percent
0.17 <= Li As/As < 0.38	19	42.2
0.38 <= Li As/As < 0.59	18	40.0
0.59 <= Li As/As < 0.79	8	17.8
Total	45	100.0 %

g. Liquid Assets to Total Deposits Ratio (in table VII.)

Table VII.

A Distribution of the Selected Group of Commercial Banks by their Liquid Assets to Total Deposits ratio.

Liquid Assets / Total Deposits	F	Percent
0.21 <= Li As/De < 0.49	18	40.0
0.49 <= Li As/De < 0.76	19	42.2
0.76 <= Li As/De < 1.03	8	17.8
Total	45	100.0 %

This ratio indicates the ability of a bank to pay all its obligations out of its short term assets or liquid assets. This table shows that 40% of the banks could pay up to 49% of their obligations out

of their liquid assets. Strong banks (or conservative banks) could pay up to 76% of their obligations from their liquid assets. Eighteen percent of banks (very conservative) could pay all their obligations out of their liquid assets in order to avoid risk.

Table (VII) shows that eighteen out of forty-five commercial banks (40.0%) had a low liquid assets to total deposits ratio ranging between 0.21 and 0.48; nineteen commercial banks (42.2%) had medium ratios between 0.49 and 0.75, while eight commercial banks (17.8%) had high ratios ranging between 0.76 to 1.02. Therefore, more than the half banks are liquid with respect to this ratio.

h. Loans to Total Assets Ratio (in table VIII.)

Table VIII.

A Distribution of the Selected Group of Commercial Banks by their Loans to Total Assets ratio.

Loans / Total Assets	F	Percent
0.19 <= Lo/As < 0.39	13	28.9
0.39 <= Lo/As < 0.59	17	37.8
0.59 <= Lo/As < 0.78	15	33.3
Total	45	100.0 %

On average, the lower this ratio the safer the bank is. On the other hand, this ratio shows how much the bank is utilizing the deposits from

clients in lending. A normal and average ratio depends on the management policy with respect to risk. The principle of a profit-making activity of commercial banks is making loans to its customers. In the allocation of funds to the loan portfolio, the primary objective of the bank management is to earn income while serving the credit needs of its community.

Table (VIII) indicates that in the Gulf thirteen out of forty-five commercial banks (28.9%) possess a low loans to total assets ratio ranging between 0.19 and 0.38; seventeen out of forty-five commercial banks (37.8%) had ratios between 0.39 and 0.58; and the remaining fifteen commercial banks (33.3%) had ratios from 0.59 to 0.77.

A low ratio of 19% to 38% of banks' assets invested in loans (29% of the banks) indicates a low exposure by banks to a loans portfolio; it does not say anything about the degree of riskiness of this portfolio. In other words, this ratio does not expose the banks attitude toward risk, which in the final analysis depends on the type of loans and their individual riskiness.

The different types of loans known in the United States can be summerized as follows:

1. Federal Funds sold and repurchase agreements.
2. Real estate loans.

3. Loans to financial institutions.

4. Loans for purchasing or carrying securities (high risk).

5. Agricultural loans.

6. Commercial and industrial loans.

7. Consummer installment loans.

8. Personal loans.

Not all these types of loans are available in the Gulf area, Besides; there is no detailed data to classify the banks' laons portfolio according to risk.

Generally speaking, all that can be said is that 38% of the GCC commercial banks have normal loans to total assets ratios, 29% are very conservative, and 33% are very risky. Therefore, one third of the banks are risky according to that ratio.

i. Loans to Total Deposits Ratio (in table IX.)

Table IX.

A Distribution of the Selected Group of Commercial Banks by their Loans to Total Deposits ratio.

Loans / Total Deposits	F	Percent
0.24 <= Lo/De < 0.49	14	31.1
0.49 <= Lo/De < 0.74	19	42.2
0.74 <= Lo/De < 0.98	12	26.7
Total	45	100.0 %

Table (IX) presents forteen out of forty-five commercial banks (31.1%) possessing loans to total

deposits ratio ranging from 0.24 to 0.49; with nineteen commercial banks' ratios (42.2%) ranging between 0.49 and 0.73 being medium; and twelve (26.7%) with high ratios in the range of 0.74 to 0.97.

j. Net Income to Shareholders' Equity Ratio (in table X.)

Table X.

A Distribution of the Selected Group of Commercial Banks by their Net Income to Shareholders' Equity ratio.

Net Income / Shareholders' Equity	F	Percent
0.02 <= NI/Eq < 0.11	33	73.3
0.11 <= NI/Eq < 0.18	10	22.2
0.18 <= NI/Eq < 0.26	2	4.4
Total	45	100.0 %

This ratio shows how much net profit has been produced from the internal funds invested. The higher this ratio is, the higher the profitability is, and the better the policy of investment is. A more interesting approach is the gross profits to equity ratio, but since the data was not available for the gross profits, it has been replaced by net income to equity ratio.

Table (X) reveals that thirty-three out of forty-five commercial banks (73.3%) had a net income to shareholders' equity ratio ranging from 0.02 to 0.10; ten commercial banks (22.2%) had a medium

ratio between 0.11 and 0.17; and two commercial banks (4.4%) had a low ratio ranging between 0.18 to 0.26.

This table confirms that 73% of the GCC commercial banks have displayed in the year of the study a poor performance, 22% have done well, and 4.4% have a good performance. Therefore, less than three third of the banks have poor performance.

k. Net Income to Total Assets Ratio (in table XI.)

Table XI.

A Distribution of the Selected Group of Commercial Banks by their Net Income to Total Assets ratio.

Net Income / Total Assets	F	Percent
0.00 <= NI/As < 0.02	36	80.0
0.02 <= NI/As < 0.04	8	17.8
NI/As = 0.04	1	2.2
Total	45	100.0 %

This ratio is used to assess how much net profit is generated from the internal and external funds invested in the bank. The higher this ratio is the higher the profitability which in the final analysis attests to management's success in running the bank.

Table (XI) shows that thirty-six out of forty-five commercial banks (80.0%) had a low net income to total assets ratio ranging from 0.00 to 0.01; eight commercial banks (17.8%) had a ratio between

0.02 and 0.03; and one (2.2%) had a ratio of 0.04. The above table shows that 18% of the GCC commercial banks have normal ratios, 80% are below average ratio, and 2% are above normal ratio. Therefore, more than the three third of the banks have poor performance.

1. Contra Accounts to Loans Ratio (in table XII.)

Table XII.

A Distribution of the Selected Group of Commercial Banks by their Contra Accounts to Loans ratio.

Contra Accounts / Loans	F	Percent
0.12 <= Co Ac/Lo < 1.80	39	86.7
1.80 <= Co Ac/Lo < 3.48	5	11.1
3.48 <= Co Ac/Lo < 5.15	1	2.2
Total	45	100.0 %

This ratio exposes one aspect of the off-balance sheet activity of the bank. It reflects the percentage of potential obligations or benefits from the loans.

Table (XII) shows that the majority of the banks or thirty-nine out of forty-five (86.7%) had a low contra accounts to loans ratio ranging from 0.12 to 1.79; five banks (11.1%) had a ratio between 1.80 and 3.47; and one (2.2%) had a ratio between 3.48 and 5.14.

From table XII, one could say that the majority of the GCC commercial banks (87%) have an average

ratio which is consistent with the standard ratio and 13% have below average ratio.

m. Contra Accounts to Total Assets Ratio (in table XIII.)

This ratio exposes another aspect of the off-balance sheet activity of the bank. It reflects the percentage of potential obligations

Table XIII.

A Distribution of the Selected Group of Commercial Banks by their Contra Accounts to Total Assets ratio.

Contra Accounts / Total Assets	F	Percent
0.11 <= Co Ac/As < 0.51	31	68.9
0.51 <= Co Ac/As < 0.90	13	28.9
0.90 <= Co Ac/As < 1.28	1	2.2
Total	45	100.0 %

or benefits from the total assets or total internal and external invested funds.

Table (XIII) shows that thirty-one banks (68.9%) had a low contra accounts to total assets ratio ranging from 0.11 to 0.50; thirteen out of forty-five commercial banks (28.9%) had a ratio between 0.51 and 0.89; and only one bank (2.2%) had a high ratio of 0.90 to 1.27. Therefore, the majority have this ratio conforming the standard.

b. Assumptions of Normality and Homogeneity of Variance

The major problems encountered by this study can be expressed in two questions:

1- How many factors are there that underlie the financial ratios?

2- What are these factors?

To answer the first question, the financial ratios of the commercial banks in the Gulf area are factor analyzed and grouped into four major factors. To answer the second question it is imperative to inspect the factor loadings and name the factors.

It must be pointed out, however, that using the original data did not help in answering the question. Few factor loadings were greater than 1.0. One plausible explanation is that the data is malfunctioning and factor analysis will not clean up bad data. One is reminded here of the saying, "never forget the cynical words of wisdom abbreviated as GIGO which stand for Garbage In Garbage Out."19

Two adjustments were applied on the original data in order to improve them:

First, reduction in the number of ratios from twenty six cited in Chapter III into fifteen ratios that best reflect the banking activities

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19. Guertin, W. H., and Bailey, J. P., Jr., Introduction to Modern Factor Analysis, (Michigan: Edwards Brothers, Inc. 1970), p.175.

because of the low number of GCC commercial banks. Second, it was reasoned that in using cross-sectional data the assumption of homoscedastic disturbance may be violated. As X increases, so does the variance of the error term. A common log transformation was apllied to the financial ratios to improve the homoscedasticity of the distributions.

Tables XIV and XV below show that profitable assets to total assets ratio and earning Assets to free funds should be deleted also from the analysis (their variances is zero before and after the log transformation). By inspecting the first thirteen ratios, it is evident that after the log transformation, the transformed ratios have better range and variance. Their measures of skewness and kurtosis became also better. Therefore, thirteen financial ratios have been adopted for the study.

c. Factor Analysis of the Transformed Financial Ratios

As a data reduction technique, factor analysis was used in this study to reduce the 13 financial ratios into four distinct factors. To control the number of factors to be extracted, it was decided to examine the proportion of variance accounted for jointly by the first (m)

Table XIV.

The range, variance, skewness, and kurtosis of the financial ratios before the log transformation

Ratios	Range	Variance	Skewness	Kurtosis
Equity / Assets	.220	.003	1.273	.807
Deposits / Equity	18.390	16.745	.529	.319
Equity / (Assets + Contras)	.160	.002	.881	.146
Equity / Risky Assets	.360	.010	1.487	1.362
Equity / Earn.Assets	.240	.004	1.081	.418
Liq. Assets/ Assets	.610	.023	.379	-.333
Liq. Assets/ Deposits	.810	.040	.436	-.457
Loans / Assets	.580	.028	-.156	-1.040
Loans / Deposits	.730	.043	-.126	-.954
Net Income / Equity	.230	.002	1.231	1.916
Net Income / Assets	.040	.000	1.104	2.601
Contra A/C / Loans	5.020	.956	2.444	7.043
Contra A/C / Assets	1.170	.061	1.341	2.590
Earn. Asset/ Assets	.128	.000	-3.596	14.556
Earn. Asset/ Free Funds	.160	.001	-3.334	13.226

Table XV.

The range, variance, skewness, and kurtosis of the financial ratios after the log transformation

Ratios	Range	Variance	Skewness	Kurtosis
Equity / Assets	.710	.035	.588	-.442
Deposits / Equity	.880	.046	-.538	-.334
Equity / (Assets + Contras)	.810	.047	-.009	-.736
Equity / Risky Assets	1.020	.069	.412	-.428
Equity / Earn. Assets	.790	.038	.295	-.581
Liq. Assets/ Assets	.670	.026	-.390	-.384
Liq. Assets/ Deposits	.680	.030	-.282	-.664
Loans / Assets	.590	.030	-.685	-.654
Loans / Deposits	.610	.031	-.691	-.615
Net Income / Equity	1.030	.067	-.106	-.645
Net Income / Assets	1.520	.138	-.438	-.166
Contra A/C / Loans	1.620	.127	.313	-.041
Contra A/C / Assets	1.060	.078	-.021	-.944
Earn. Asset/ Assets	.070	.000	-.985	.335
Earn. Asset/ Free Funds	.060	.000	-.826	-.193

factors that will be used in oblique rotation. Factors with eigenvalues greater than 1.0 (table XVI) were retained for the final rotation solution.(*20) This criterion ensured that only factors accounting for at least the amount of total variance of a single variable were treated as significant.

Table XVI.

EigenValues and Number of Factors

Ratios	Communality	Factor	Eigenvalue	pct of Var	Cum Pct
Liq.Assets/Assets	1.0	* 1	**5.49924**	**42.3**	**42.3**
Liq.Assets/Deposits	1.0	* 2	**3.73942**	**28.8**	**71.1**
Loans/Deposits	1.0	* 3	**2.09699**	**16.1**	**87.2**
Deposits/Equity	1.0	* 4	**1.02689**	**7.9**	**95.1**
Equity/Assets	1.0	* 5	.24675	1.9	97.0
Equity/(Asset+Cont.)	1.0	* 6	.20121	1.5	98.5
Loans/Assets	1.0	* 7	.08948	.7	99.2
Contra A/C /Loans	1.0	* 8	.05388	.4	99.6
Contra A/C /Assets	1.0	* 9	.01821	.1	99.8
Equity/Risky Assets	1.0	*10	.01500	.1	99.9
Equity/Earn. Assets	1.0	*11	.01112	.1	100.0
Net Income/Equity	1.0	*12	.00152	.0	100.0
Net Income/Assets	1.0	*13	.00028	.0	100.0

PC Extracted 4 factors.

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*20. The respective eigenvalue is the total amount of variance accounted for by a factor and equal to the sum of the square of the loadings in each column, taking into consideration that all the variables are normalized and the variance of each variable is 1. Thus the total variance for the 13 financial ratios in this study is 13 and the percentage of variable accounted for by a given factor (pct of variance) is equal to eigenvalue / 13.

Table (XVII) below reveals that there are four factors underlying the financial ratios. In asking what these factors are, this study has to search for an appropriate name for these factors. The financial ratios that loaded at least 0.70 with the rotated factor pattern were used to name the factors.(*21)

Table XVII below shows that each financial ratio is highly loaded on one factor but not on the other, and is used as a pure measure of the respective factor. It is important to note that it is argued sometimes that factor analysis throws a lot of variables together into a statistical machine and produces factors that have little meaning. It is argued that these factors are simply artifacts (average) of the method.

This argument is basically irrelevant. No competent researcher would ever expect from factor analysis more than producing factors that have meaning. Kerlinger suggests that "this does not mean that nothing is discovered in factor analysis. Quite the contrary, the answer is, of course, that nothing can be obtained out of a factor analysis other than what is inputed into

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*21. A loading of 0.70 was chosen since the square of this equals approximately 50% common variation shared between a given financial ratio and the respective factor.

Table XVII.

Oblique Rotation Factor Solution

Ratios	FACTOR 1 Capital Inten-veness	FACTOR 2 Risk Atti-tude	FACTOR 3 Profita-bility	FACTOR 4 Off-Balance Sheet
Equity/ Assets	**.97340**	.07140	-.17767	.10927
Deposits / Equity	**-.96499**	.10816	-.07940	-.02549
Equity/ Earning Assets	**.88826**	-.13036	.18197	-.05299
Equity / (Tot.Assets + Contra A/C	**.82294**	-.05783	.04859	-.32295
Equity / Risky Assets	**.78022**	.25672	.02816	-.37382
Liq. Assets/ Total Assets	-.07515	**.96550**	.06537	-.07645
Loans/ Total Assets	-.04259	**-.95194**	.04318	-.11720
Liq. Assets/ Total Deposits	.30239	**.91463**	.03733	.01651
Loans/ Total Deposits	.32624	**-.89060**	-.00191	-.01084
Net Income/ Equity	-.19865	.05551	**.99316**	.04407

Table XVII cont.

Oblique Rotation Factor Solution

Ratios	FACTOR 1 Capital Inten-veness	FACTOR 2 Risk Atti-tude	FACTOR 3 Profita-bility	FACTOR 4 Off-Balance Sheet
Net Income/ Total Assets	.46738	.00124	**.79307**	.06765
Contra A/C / Total Assets	-.03638	-.16558	.07995	**.96897**
Contra A/C / Loans	-.01332	.30315	.01593	**.90872**

it. But we don't know all we put into it like the test or measures that share common factor variance and the relations between factors. Only study and analysis can tell us these things."22

d. Factor Scores, Cluster Analysis, and Discriminant Function

The purpose of using factor analysis in this study was the construction of indices to be used as new variables in later analysis. It is important to note here that "One of the most promising developments that has been made possible by multivariate conceptualization of research problems and multivariate analysis and the computer is the

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22. Fred N. Kerlinger, Foundations of Behavioral Research, (New York: Holt, Rinehart and Winston, 1973), pp. 689.

use of so-called factor scores in multiple regression equations. As usual with most bright and powerful ideas, the basic notion is simple: The factors found by factor analysis are used as variables in the regression equation."(23) Since using discriminant analysis in this study required knowing the group membership of the banks in the Gulf area, it became imperative to use cluster analysis to identify relatively homogeneous groups or clusters. Each of the 45 banks in this study is characterized in terms of the 13 financial ratios. This raises the following question stating that: Is it possible to search for several distinct subgroups of banks?

Table (XVIII) below distributes the banks into four groups. From this table, one could characterize each group membership by the following criteria: The first group has a middle to high capital intensivness, a risk taker attitude, high profitability ratios , and middle to high off-balance sheet activities. The second group has a low to middle capital intensivness, a middle risk taker attitude, low profitability ratios, and low off-balance sheet activities.

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23. Fred N. Kerlinger and Elazar J. Pedhazur, Multiple Regression in Behavioral Research, (New York: Holt, Rinehart and Winston, Inc., 1973), pp: 364-365.

The third group has a low capital intensivness, a risk averter attitude, low to middle profitability ratios, and high off-balance sheet activities.

Table XVIII.

The grouping of banks into homogeneous subgroups (Clusters)

Banks' Name	Case	Number of Clusters
Abu Dhabi Commercial Bank (UAE)	1	1
Al-Ahli Bank of Qatar Q.S.C. (QATAR)	2	1
Al-Ahli Commercial Bank B.S.C. (BAHRAIN)	3	2
Al Bank Al Ahli Al Omani S.A.O. (OMAN)	4	1
Al Bank Al Saudi Al Fransi (SAUDI ARABIA)	5	3
Alahli Bank of Kuwait K.S.C. (KUWAIT)	6	2
Albank Alsaudi Alhollandi (SAUDI ARABIA)	7	3
Arab Bank for Investment and Foreign Trade (UAE)	8	2
Arab National Bank (SAUDI ARABIA)	9	4
Bank of Bahrain and Kuwait B.S.C. (BAHRAIN)	10	2
Bank of Credit and Commerce (EMIRATE) (UAE)	11	1
Bank of Muscat S.A.O (OMAN)	12	1
Bank of Oman Bahrain and Kuwait S.A.O. (OMAN)	13	1
Bank of Oman Limited (UAE)	14	1
Bank of Sharjah Ltd (UAE)	15	4
Burgan Bank S.A.K. (KUWAIT)	16	2
Commercial Bank of Oman Limited (OMAN)	17	2
Doha Bank Limited (QATAR)	18	1
Emirates Bank International Limited (UAE)	19	1

Table XVIII (cont.).

The grouping of banks into homogeneous subgroups (Clusters)

Banks' Name	Case	Number of Clusters
First Gulf Bank (UAE)	20	4
Grindlays Bahrain Bank B.S.C. (BAHRAIN)	21	1
Investbank (UAE)	22	1
Middle East Bank (UAE)	23	1
National Bank of Abu Dhabi (UAE)	24	3
National Bank of Bahrain B.S.C. (BAHRAIN)	25	4
National Bank of Fujairah (UAE)	26	4
National Bank of Oman Limited S.A.O. (OMAN)	27	2
National Bank of Sharjah (UAE)	28	1
Oman Arab Bank S.A.O (OMAN)	29	1
Oman International Bank S.A.O. (OMAN)	30	1
Qatar National Bank S.A.Q. (QATAR)	31	1
Riyad Bank (SAUDI ARABIA)	32	3
Saudi Amarican Bank (SAUDI ARABIA)	33	3
The Bank of Kuwait and the Middle East K.S.C.(KUWAIT)	34	2
The Commercial Bank of Dubai Limited (UAE)	35	4
The Commercial Bank of Kuwait S.A.K. (KUWAIT)	36	2
The Commercial Bank of Qatar Limited Q.S.C. (QATAR)	37	4
The Gulf Bank K.S.C. (KUWAIT)	38	2
The National Bank of Dubai Limited (UAE)	39	4
The National Bank of Kuwait S.A.K. (KUWAIT)	40	1
The National Bank of Ras Al-Khaimah (P.S.C.)	41	4
The National Bank of Umm Al-Qaiwain Ltd. (UAE)	42	4

Table XVIII (cont.).

The grouping of banks into homogeneous subgroups (Clusters)

Banks' Name	Case	Number of Clusters
The Saudi Investment Bank (SAUDI ARABIA)	43	3
United Arab Bank (UAE)	44	1
United Saudi Commercial Bank USCB (SAUDI ARABIA)	45	3

The fourth group has a high capital intensivness, a middle risk averter attitude, a middle to high profitability ratios, and low to middle off-balance sheet activities.

Table (XIX) shows a summary information for group membership charateristics.

The result of this study should be treated with caution. The reason for this is the fact that detailed information regarding balance sheet and specifically the quality of assets and loans is not available. The case of Kuwaiti banks, for example, can be taken. Prior to the Iraqi invasion, five out of six commercial banks in Kuwait were classified as deficit banks.* These banks are deficit in the sense that their loans are low quality, specifically those non-performing loans resulting from the Al-Manakh stock market crash of 1983. Some of these banks such as Alahli

*The discussion above is based on an interview with Dr. Saad Andari professor of Money and Banking at AUB.

Bank of Kuwait, Burgan Bank, the Bank of Kuwait and the Middle East, the Commercial Bank of Kuwait, and the Gulf Bank stated in group "2" with middle to high risk attitude should ideally appear in the high-risk grouping, that is group "1". But as this study cannot possibly investigate the quality of loans, it will concentrate on the quantitative side of the problem. Such investigation needs further studies which could not be conducted on the loan portfolios of these banks. A further qualification is to be made here with regard to Kuwaiti banks. The only non-deficit bank, the National Bank of Kuwait, appears to be a high risk bank (group "1"). The fact is this bank was the only Kuwaiti bank permitted to continue operate by the Bank of England, the ECC, and the Federal Reserve Bank in the international banking centers immediately after the invasion. The reason for this is that the NBK appears to retain high foreign currency liquidity. However, one suspects that even in the case of the NBK, local currency portfolio is illiquid and exposed to risky loans in the Kuwaiti local markets.

In order to derive a classification scheme for new banks based on the available data for the 45 banks in the Gulf area, the discriminant function is employed using factor scores as independent

Table XIX.

Group Membership Characteristics

Group Membership	Capital Intensiveness	Risk Attitude	Profitability Ratios	Off-Balance Sheet Activity
Group One	Middle to High	High	High	Middle to High
Group Two	Low to Middle	Middle to High	Low	Low
Group Three	Low	Low	Low to Middle	High
Group Four	High	Low to Middle	Middle to High	Low to Middle

variables and group membership as a dependent variable. A null and alternative hypothesis is formulated:

Ho: In the population, the means of all discriminant functions in all clusters are equal.

H1: It is unlikely that clusters of banks have the same means on the discriminant function.

To assess the relative contribution of the independent variables (factor scores) to the discriminant function, the standardized coefficients using stepwise method are computed. The coefficients are standardized to adjust for the unequal means and standard deviation of the independent variables.

Since the magnitudes of the standardized coefficients are indicators of the relative importance of variables, the variables with large coefficient are thought to contribute more to the overall discriminant function as shown in table XX below. This table shows that the first function primarily represent the off-balance sheet activity. The second function is exclusively composed of capital intensiveness while the third is made up of the risk attitude and profitability.

Table XX.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3
FSCORE1	.47324	.87180	-.11162
FSCORE2	.70304	-.07777	-.73816
FSCORE3	.34341	.41800	.72636
FSCORE4	.92591	-.32097	.24265

Table (XXI) reports the eigen values and associated cononical correlations denoting the relative ability of each function to separate the groups. The low value for the changes in Wilks' Lambda are associated with significant Chi-Square.

Before any functions were removed, Lambda was very small 0.0299 with a significant Chi-Square indicating that great discriminating power exists in the discriminating variables.

The first discriminant function did not completely pick up all of the information in the discriminant

Table XXI.

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr
1*	3.2233	46.03	46.03	.8736
2*	2.5446	36.34	82.37	.8473
3*	1.2344	17.63	100.00	.7433

After Wilks'

Fcn	Lambda	Chisquare	DF	Sig
0	.0299	140.401	12	.0000
1	.1263	82.777	6	.0000
2	.4475	32.160	2	.0000

* marks the 3 canonical discriminant functions remaining in the analysis.

variables. A large amount was left to the second and third possible functions.

After some of the discriminating power are removed by placing it into the first discriminant function, Lambda increased to 0.1263 but with a significant Chi-Square indicating a statistically significant amount of discriminating information exists in the discriminating variables.

After some of these discriminating information are removed by the second function, Lambda increased to 0.4475 with a significant Chi-Square.

Table (XXII) reveals that the first function serves to distinguish the second group who is basically low in the off-balance sheet activity from the other three groups. The second function

Table XXII.

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1	FUNC 2	FUNC 3
1	-.31026	-.31851	1.26530
2	-2.59838	-.18292	-1.15523
3	2.45701	-2.43662	-.95571
4	1.43694	2.46187	-.45331

primarily differentiates the fourth group who is basically high in capital intensiveness from the other groups. The last function primarily differentiate the first group who is basically low liquid high risk and profitable from the other groups.

Table (XXIII) shows the actual predicted group membership.

Table XXIII.

Actual Predicted Group Membership

Case #	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discri Score
1	1	1	.5099	.8137	4	.1653	-.0924
							.8720
							.3439
2	1	1	.5299	.9992	4	.0006	-.1338
							.2449
							2.6298
3	2	2	.7184	.9612	1	.0370	-1.5966
							.4006
							-1.1197
4	1	1	.3340	.6388	2	.3611	-1.6487
							-1.2620
							.4178

Table XXIII (cont.).

Actual Predicted Group Membership

Case #	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discri Score
5	3	3	.3801	.8896	1	.1093	.8466
							-2.1737
							-.3127
6	2	2	.6842	.9993	1	.0007	-3.6392
							-.7752
							-.9153
7	3	3	.7759	.9975	1	.0025	1.9186
							-2.8049
							-.1315
8	2	2	.0533	.7492	3	.1678	-.1226
							-.8633
							-2.1949
9	4	4	.4083	.9721	1	.0207	2.2993
							1.0309
							-.1339
10	2	2	.5172	.9999	1	.0001	-3.9034
							-.7412
							-1.6662
11	1	1	.0951	.7787	3	.2211	1.6938
							-1.7394
							1.8398
12	1	1	.6407	.9898	2	.0102	-1.2557
							-1.0862
							1.7124
13	1	1	.4800	.8226	2	.1737	-1.4688
							.6177
							.7598
14	1	1	.3722	.7851	3	.2125	.9334
							-1.3430
							.5358
15	4	4	.4538	.9360	1	.0640	1.2796
							2.0118
							1.0939

Table XXIII (cont.).

Actual Predicted Group Membership

Case #	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discri Score
16	2	2	.4630	.9993	1	.0006	-2.8783 1.3418 -1.5619
17	2	2	.4808	.9821	1	.0179	-3.3170 .2046 .1875
18	1	1	.4380	.7209	4	.2709	.0752 1.1097 .5407
19	1	1	.6994	.9248	2	.0705	-1.0895 .4657 .8139
20	4	4	.3221	1.0000	1	.0000	1.0204 3.2943 -2.0730
21	1	1	.3176	.7233	3	.2632	1.1530 -.8733 .2283
22	1	1	.8151	.9586	4	.0211	-.3623 .4370 .6576
23	1	1	.5266	.9950	2	.0050	-1.1623 -1.3631 1.9057
24	3	3	.8792	.9999	1	.0001	2.0673 -2.5597 -1.6680
25	4	4	.3171	.9744	3	.0184	1.9475 .8886 -1.3435
26	4	4	.4711	.9999	1	.0001	2.7428 3.0789 .2081

Table XXIII (cont.).

Actual Predicted Group Membership

Case #	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discri Score
27	2	2	.1808	.9984	1	.0015	-2.4007
							-2.2745
							-1.8379
28	1	1	.6837	.9922	4	.0076	.2061
							.5208
							1.9883
29	1	1	.5554	.9982	3	.0016	.3340
							-1.3263
							2.0727
30	1	1	.3602	.9826	2	.0173	-1.5298
							-1.5496
							1.7218
31	1	1	.2760	.5777	4	.4195	.0736
							1.5783
							.9139
32	3	3	.2694	.9985	4	.0014	3.7484
							-.9342
							-.9018
33	3	3	.0858	.9999	1	.0001	4.0792
							-2.6586
							1.0239
34	2	2	.5169	.9877	1	.0122	-2.7994
							1.1154
							-.4128
35	4	4	.8064	.9989	1	.0011	1.4489
							2.9665
							.3974
36	2	2	.8043	.9981	1	.0019	-3.4279
							-.4589
							-.6831
37	4	4	.4399	.8607	1	.1334	-.0101
							1.9150
							.1026

Table XXIII (cont.).

Actual Predicted Group Membership

Case #	Actual Group	Highest Group	Probability P(D/G)	P(G/D)	2nd Highest Group	P(G/D)	Discri Score
38	2	2	.8755	.9885	1	.0112	-1.8987
							.2215
							-1.3480
39	4	4	.4113	.9986	2	.0009	.5314
							2.3944
							-1.8853
40	1	1	.8645	.9553	2	.0418	-.5103
							-.4631
							.4433
41	4	4	.9208	.9999	1	.0001	1.4498
							3.1047
							-.7323
42	4	4	.5129	1.0000	1	.0000	1.6599
							3.9337
							-.1670
43	3	3	.0391	1.0000	2	.0000	2.0955
							-3.1026
							-3.7465
44	1	1	.2364	.9999	2	.0001	-.8003
							-.5734
							3.2498
45	3	3	.9853	.9999	1	.0001	2.4435
							-2.8227
							-.9534

Table (XXIV) shows the classification results. The classification matrix below confirms that 100% of the banks were correctly classified.

Graph (I) displays the separation of the four groups.

In summary, using factor analysis for the log transformed financial ratios resulted in the

Table XXIV.

Classification Results

Actual Group	No. of Cases	Predicted Group Membership			
		1	2	3	4
Group 1	18	100 %	0 %	0 %	0 %
Group 2	10	0 %	100 %	0 %	0 %
Group 3	7	0 %	0 %	100 %	0 %
Group 4	10	0 %	0 %	0 %	100 %

Percent of "grouped" cases correctly classified: 100.00%

Classification Processing Summary
45 Cases were processed.
0 Cases were excluded for missing or out-of-range group codes.
0 Cases had at least one missing discriminating variable.
45 Cases were used for printed output.

following four factors:

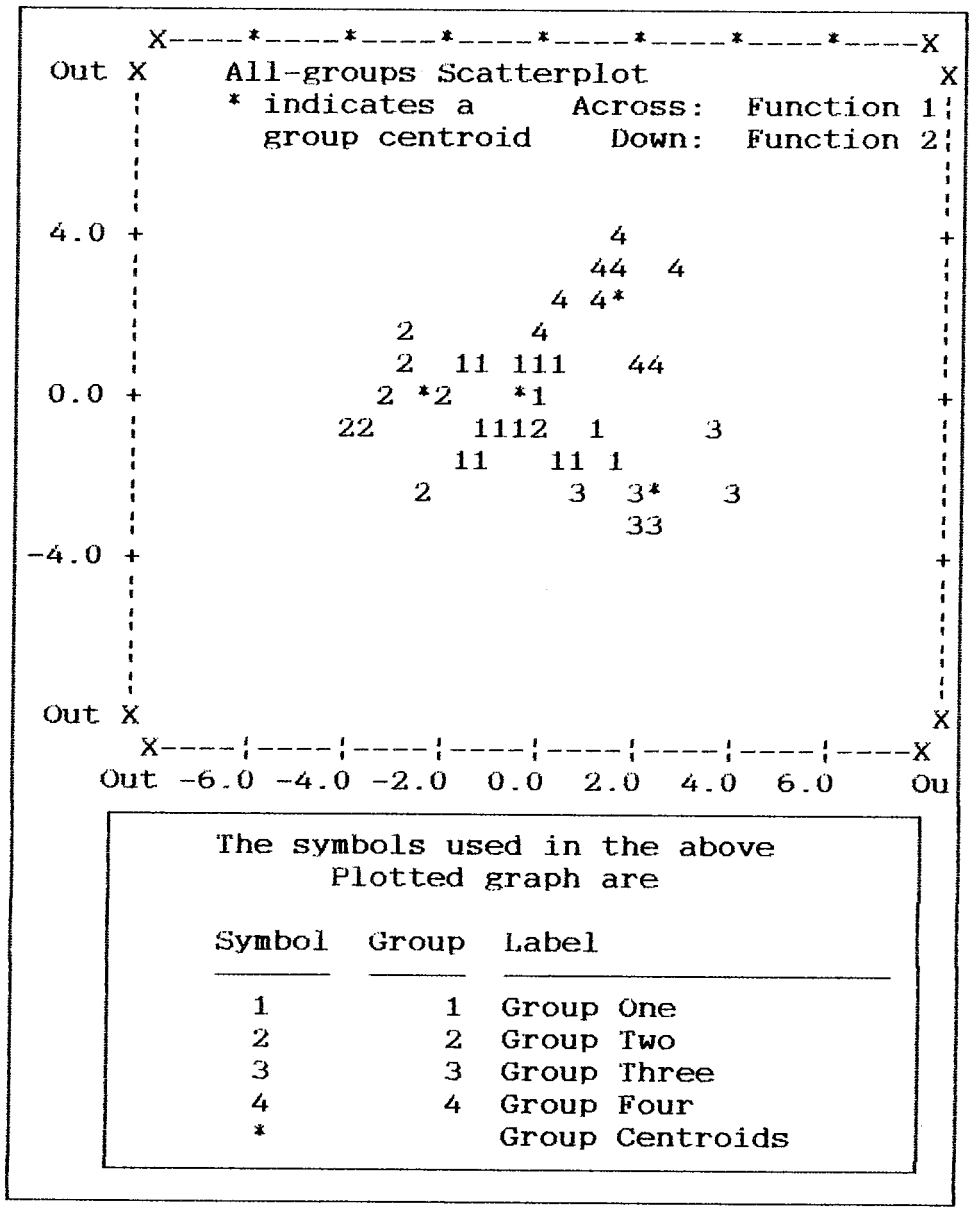
1. Capital Intensiveness
2. Risk Attitudes
3. Profitability
4. Off-Balance Sheet Activity

The factors above are used to build factor scores for later use.

Cluster analysis in this study classifies banks into four categories. Using the group membership obtained above as a dependent variable and factor scores as independent variables in a multiple discriminant functions gives the following three

Graph I.

Separation of the Four Groups



functions:

- Function one measures a low off-balance sheet activity.
- Function two measures a high capital intensiveness.

- Function three measures a high risk and a high profitability.

The findings of this study are used in the last chapter to answer the research questions and to give some implications and recommendations.

Chapter V: Summary and Conclusions

a. Summary of the Answers to the research Questions

This research attempts to identify the major characteristics of a sample of GCC commercial banks based on financial ratio analysis. It illustrates the major factors underlying these ratios, and exposes existing differences, and classifies them into four separate groups using cluster analysis. Finally, the multiple discriminant function is applied as a predictive technique using group membership as a dependent variable and factor scores as independent variables.

The major factors underlying the financial ratios in the banking industry for the Gulf area could be summarized as follows:

1. Capital Intensiveness
2. Risk Attitude
3. Profitability
4. Off-Balance Sheet Activity

The cluster analysis identifies four different groups with the following characteristics:

Group One:

a. Middle to high capital intensiveness
b. High risk attitude (low liquidity and high investments)

c. High profitability

d. Middle to high off-balance sheet activity

Group Two:

a. Low to middle capital intensiveness

b. Middle to high risk attitude

c. Low profitability

d. Low off-balance sheet activity

Group Three:

a. Low capital intensiveness

b. Low Risk attitude

c. Low to middle profitability

d. High off-balance sheet activity

Group Four:

a. High capital intensiveness

b. Low to middle risk attitude

c. Middle to high profitability

d. Low to middle off-balance sheet activity

Using the multiple discriminant function to separate the groups, three functions are identified, namely:

a. The first function represents the off-balance sheet activity.

b. The second function represents the capital intensiveness.

c. The third function is made up of risk attitude and profitability.

b. Implications

This study has concentrated on the classification of commercial banks through the use of their financial ratios analysis as a basic instrument. Classification could be made for additional cases that are not included in the analysis based on the three discriminant functions obtained in this study. Each bank not included in this study could be classified into one of the four groups cited above.

The interpretation of each group or the evaluation of each bank according to its group membership is beyond the scope of this study. Further studies need to be conducted on the relative importance, characteristics, and strength of each group and of individual banks within each group.

c. Recommendations

The scope of this research has been constrained by the limited availability of the Gulf banks' financial data. Accordingly, some useful ratios relating to banks' financial activities, measures of productivity of labor, loans, and deposits of banks, had to be excluded. These ratios include a sixth factor called "Activity or Labor

Productivity Ratios" which was included in the grouping of financial ratios in Shamaa and Abdallah's study. The reason for excluding this factor is the unavailability of the number of employees in each bank in order to calculate the total number of working hours that was spent in each bank. The availability of data for this item may have permitted the construction of a fifth factor in the analysis which describes the performance and efficiency of the banks with respect to the number of hours spent on banks activities by their staff. Therefore, it would have improved the study and covered all the factors mentioned in Shamaa and Abdallah's relating to the financial analysis of banks.

Moreover, the study basically deals with the quantitative aspect of bank loans without emphasizing its qualitative implications. Whereas data limitations restrict the analysis to loan totals, future research should ideally emphasize the qualitative aspects of the loan portfolio. Loans should be grouped into doubtful, secured, long term, and short term loans. The case of the Kuwaiti banks mentioned in the study would be better classified if loans are subdivided into different categories.

On the liability side of the balance sheet, bank deposits are not divided into customers deposits and deposits from other banks. Instead, they are grouped in one item for the sake of uniformity as the data available revealed a disparity between banks in the methods of presenting financial information.

A further data problem is that all financial statements included net income but few included gross income. For this reason the item "net income" was used in the profitability ratios whereas gross income would have better described bank profitability. Gross income shows the profitability of the bank with respect to its activity prior to deducting fixed costs and taxable income.

Finally, the statistical approach to the financial ratio analysis used in this study could be extended to different financial institutions. Besides, it could be applied to a large number of banks which include in addition to the sample of GCC commercial banks used in this research other Arab banks for which sufficient data are not available. Moreover; it is highly recommended that a study such as the one conducted here on the GCC commercial banks be applied to other international institutions such as the EEC commercial banks.

This study of cross sectional analysis could also be used as a predictive tool for estimating banks structure, strength, characteristic, and activity by extending the study to a time series analysis to trace the evolution and development of banks.

This study recommends governments in the GCC states to require banks to provide full disclosure of their banking activities, not only to improve the use of financial ratios as analytical tools, but also to encourage efficiency through competition based on sound information.

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