

Measurement of Banking Structure in Saudi Arabia and Its Effect on Bank Performance

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ABSTRACT. Due to the increasing number and volume of business transactions and development financing in the Saudi Arabian economy and the increasing variation and sophistication of bank services, attention's required to be directed to the study of the major features of banking structure in Saudi Arabia. This includes resource (deposits) concentration, new bank entry barriers, bank branching and product differentiation. This research attempts at measuring the above features, particularly resource concentration in the banking sector of Saudi Arabia and then utilizes the statistical tools of correlation and multiple regression to estimate the relationship between the main features of banking structure and the major indicators of bank performance, significant among which is profitability. Statistically significant relationships are observed and their policy implications suggested. Finally, overall conclusions from the research are drawn.

I. Introduction

Commercial banks are an important factor in the economic development and stability of countries. They are the major suppliers of finance for development projects, credit and services for business transactions. They also affect money supply in the economy through lending practices.

changes in the growth patterns and structure of the various sectors of the economy (e.g. industry, agriculture, minerals, finance, services) affect the welfare of the society through their influence on the competition as well as efficiency of these sectors. Commercial banking, however, differs from the other sectors in the economy, particularly industry, because of certain characteristics peculiar to the banking sector, most significant among which are the following:

- Control over and the regulation of the activities of commercial banks are more intensive and frequent than is the case with the other sectors due to the vital significance of the commercial banks to the monetary supply and stability in the economy.

- Failure of any commercial bank has more repercussions on the remaining banking units compared to a failure of a plant in the industrial sector, specially if the failing bank is among the "core" banks, a matter which may lead to the development of a "confidence" crisis in the banking sector and the emergence of a "running" situation whereby depositors rush to withdraw their money from the banks. This necessitates the regulation of the banking activities by the Central Bank which, in the meantime, acts as a lender of last resort.

- Commercial banks, by their nature and functions, are multi product institutions. Thus, the cost function and scale economies of the banking units are determined in a joint-product market.

- Branching in banking is more frequent than other sectors. This aspect affects the size and profit status of each bank as well as the overall structure of the banking sector.

- Commercial banks are distinguished from other financial intermediaries in that their liabilities are liquid deposits and their assets are composed mainly of loans. In other words, commercial banks discharge loans and receive deposits at the same time. This makes regulation and control by the monetary authorities more imperative than in the case with the other financial intermediaries like savings and loans associations or investment trusts.

The fact that the banking industry has undergone many advances and progress lately, initiated several studies and researches aiming at identifying the effects of such advances and progress on the structure of the industry and its efficiency and competition. The most prominent factors which motivated this concern are the following:

- The disproportionate increase in the size of some "core" banks at the expense of, or even the demise of other smaller banks, a situation which may precipitate an alarming increase in the concentration of the banking structure which may negatively affect the competition in the industry.

- The trend towards merger among some banks, particularly the large ones, or the takeovers of smaller banks by larger ones, all are reasons for concern regarding the concentration level in the industry and its implications for competition and efficiency.

- The increasing calls for further deregulation of the banking sector. Such calls included the easing of the new bank entry regulations, branching and the widening of services banks are allowed to engage in. Attempts by other financial institutions like investment corporations or trusts, savings and loans associations, credit banks, non traditional banks e.g. Islamic banks, to enter into the banking sector services have many repercussions on and implications for the structure of the banking industry and its performance as well as other social performance indicators such as the competition level in the banking market and the pricing of bank services, the utilization level and allocative efficiency of social savings and the efficiency as well as effectiveness with which the monetary authorities can control and influence the main monetary variables in the economy.

The total number of banks in a country is of limited significance as an indicator of the level of competition in the sector without enough information on the relative

distribution of resources among the existing banks, extent of I-uc entry into the sector, other regulatory restrictions and rules, magnitude of mergers and takeovers among banks, extent of branching and the extent of product differentiation in the industry. All these characteristics constitute what has come to be known as the "market structure" of the banking sector or "banking structure".

The importance of studying the banking structure lies in its probable effect on vital bank performance indicators, most prominent among which are: prices of bank services, customer deposit costs, rates of profit (or returns on equity) and the productivity of banks. The extent of this relationship has implications for the types of policies to be followed by the monetary authorities with regard to the regulation of the banking sector, that can sustain its efficiency, competition and growth.

Review of Literature

The extent and determinants of competition in the banking sector have been the focus of academic studies dating back to a major study by L. Chandler⁽¹⁾ titled "Monopolistic Elements in Commercial Banking". Since then many theoretical as well as empirical studies have been conducted on the subject⁽²⁾.

However, the heat of controversy and argument on the magnitude of concentration in the banking sector and its effect on bank performance as well as the most suitable policy measures to cope with it, has escalated recently particularly in countries where regulations and restrictions on banking services, branching and geographical zones, such as interstate banking in the United States of America, are common.

Traces of high concentration levels in regional (district) banking markets were observed (Welch 1983)⁽³⁾. Efforts were also exerted to deduce the causes and determinants of concentration in the banking industry such as bank entry regulations (Alhadeff 1975, Peltzman 1965, Rhoades 1980),⁽⁴⁾ mergers or takeovers among banks (Bellington 1983, Revell 1987b, Veron 1971)⁽⁵⁾ and extent of branching (Gilbert and Longbrake 1974)⁽⁶⁾. According to other studies increases in market demand and

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- (1) **L. Chandler**, Monopolistic Elements in Commercial Banking, *Journal of Political Economy*, **46**, 1 (1938), pp. 7-10.
 - (2) For extensive surveys of such studies see: **Stephen Rhoades**, Structure and Performance Studies in Banking: A Summary and Evaluation, FRB Staff Economic Studies, Washington, D.C., 1977, and **Altonn Gilbert**, Bank Market Structure and Competition: A Survey, *Journal of Money, Credit and Banking*, **16**, 4, 1984.
 - (3) **Patrick Welch**, Concentration in Local Commercial Banking Markets: A Study of the Eighth Federal Reserve District, Federal Reserve Bank of St. Louis Review, Vol. **65**, No. **8**, October 1983, pp. 15-21.
 - (4) **David A. Mhadefr** and **C. P. Albadeff**, Bank Entry and Bank Concentration, *Antitrust Bulletin*, Vol. **20**, No. **3**, Fall 1975, pp. 471-483.
Sam Pdtzizmmn, Bank Entry Regulation, Its Impact and Purpose, *The National Banking Review*, Vol. **3**, No. **3**, December 1965, pp. 163.177.
Slepbm A. Rbmies, Entry and Competition in Banking, *Journal of Banking and Finance*, No. **4**, 1980, pp. 143-150.
 - (5) **Wilbur T. Bellington**, Bank Deregulation and Concentration - What Policy for Mergers, Federal Reserve Bank of Kansas City, *Economic Review*, Vol. **68**, No. **9**, November 1983, pp. 3-6.
Jack Revell, Mergers and the Role of Large Banks, Research Monographs in Banking and Finance, Institute of European Finance, University College of North Wales, Bangor, U.K., 1987b.
Jack R. Veron, Regulatory Barriers to Branching and Merger and Concentration in Banking Markets, *The Southern Economic Journal*, Vol. **37**, No. **3**, January 1971, pp. 349.355.
 - (6) **Gary G. Gilbert** and **W. A. Longbrake**, The Effects of Branching by Financial Institutions on Competition, Productive Efficiency and Stability, *Journal of Bank Research*, Vol. **4**, Nos. **3&4**, 1974, pp. 154-167, 298-307.

expected future profits cause market concentration to decrease, while increase in banking technology tend to increase concentration (Morris, 1985).⁽⁷⁾

As for the extent of relationship between the banking structure, mainly concentration of resources, and the main indicators of bank performance, many studies have been published, the majority being in the U.S.A. Results were not uniform. Several studies have found positive relationship (Hegstad and Mingo 1977, Kaufman 1966)⁽⁸⁾. Others observed weak relationship or reached inconclusive results (Crosse 1965, Fraser and Rose 1971, Schuster 1984, Wall 1985)⁽⁹⁾. Meanwhile, some studies associated the degree of relationship between concentration and performance with the level of prevalent concentration, i.e, there is a minimum (critical) level of concentration of resources in the banking sector beyond which market structure starts affecting the degree of competition and performance of banks (Flechsigt 1965, McCall and Peterson 1980)⁽¹⁰⁾. Efficiency in the operations of the banking units was another possible explanation of a positive relationship between banking concentration and performance, particularly profitability (Evanoff and Fortier 1988, Brozen 1982)⁽¹¹⁾. Outside the United States examples of studies undertaken to measure the concentration level in the banking sectors of some countries and its relationship to bank performance were those of Bourke (1989),⁽¹²⁾ Short (1977 and 1979)⁽¹³⁾ and Mcleay and Moynieux (1989)⁽¹⁴⁾. Among the published research on the relationship between banking structure and performance in the less developed countries, several recent studies were undertaken, examples of which are that on Bangladesh (Bayes 1987)⁽¹⁵⁾ and on Nigeria (Agu

(7) **Charles S. Morris**, The Determinants of Banking Market Structure, *Research Division, Federal Reserve Bank of Kansas City*, September 1985.

(8) **Arnold A. Hegsted** and **J. J. Mingo**, The Competitive Condition of U.S. Banking Markets and the Impact of Structural Reform, *The Journal of Finance*, Vol. **32**, No. **3**, June 1977, pp. 649-661.

Georie G. Kaufman, Bank Market Structure and Performance: The Evidence from Iowa, *Southern Economic Journal*, Vol. **32**, No. **4**, April 1966, pp. 429-439.

(9) **Howard D. Crosse**, Banking Structure and Competition, *Journal of Finance*, Vol. **20**, No. **2**, May 1965, pp. 349-356.

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(10) **Theodore G. Flechsigt**, The Effect of Concentration on Bank Loan Rates, *Journal of Finance*, Vol. **20**, No. **2**, May 1965, pp. 298-311.

Alan S. McCall and **M. O. Peterson**, A Critical Level of Commercial Bank Concentration, *Journal of Banking and Finance*, No. **4**, 1980, pp. 353-369.

(11) **D. D. Evanoff** and **D. L. Fortier**, Revolution of the Structure - Conduct - Performance Paradigm in Banking, *Journal of Financial Services Research*, Vol. **1**, No. **3**, June 1988.

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(12) **Philip Bourke**, Concentration and other Determinants of Bank Profitability in Europe; North America and Australia, *Journal of Banking and Finance*, No. **13**, 1989, pp. 65-79.

(13) **Brock Short**, *Bank Concentration, Market Size and Performance: Some Evidence from Outside the United States*, IMF, Washington D.C., 1977.

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(14) **Stuart McLeay** and **Philip Molyneux**, Bank Profitability and Structure in Finance, the United Kingdom, West Germany and Japan: Some Preliminary Research Papers in Banking and Finance, Institute of European Finance, University of North Wales, Ranqor, U.K., 1989.

(15) **A. Bayes**, Bangladesh Banking: Growth, Structure and Performance, *Banking Parikrama*, Vol. **12**, June 1987.

1985)⁽¹⁶⁾. The findings of such studies on the structure performance relationship were not strong or significant.

With regard to the Saudi banking sector, several major milestone developments occurred which affected its size and structure. Since the establishment of the Saudi Arabian Monetary Agency (SAMA) in 1952 which plays the role of the central banking in Saudi Arabia, the Banking Control Law was issued in 1966 granting SAMA the powers to control loans, reserves and entry of banks. In 1966, the Saudization Act aimed at transferring the majority of ownership of previously non-Saudi banks to Saudi nationals was promulgated. By the establishment of the United Saudi Commercial Bank in 1983 the Saudization process was completed and the number of banking units reached 12 with total branches of 926 in 1988.

With the increasing sophistication and complexity of the financing industry and the expanding differentiation of services provided by the commercial banks in Saudi Arabia, the need is amounting to study the effects of such developments on the structure of the banking industry and its implication for the competitiveness and efficiency of the industry and its growth rate.

Studies on the history and development of the banking sector in Saudi Arabia are plentiful. However, the studies on the market structure of the sector, a measure of relative distribution of resources among the banking units and the way it influences competition and performance, are still few. The closest treatment on the subject is a section titled "Commercial Banking Structure" in a book on the Economy of Saudi Arabia by Moliver and Abbondante (1980)⁽¹⁷⁾. The structure discussed in that section deals, however, with the absolute number of banks, ownership as well as the number of branches. Relative distribution of resources among existing banks, i.e. concentration level and other measures of banking structure like bank regulation, branching and product differentiation were not elaborated in the above book, neither were traces of effects of such structure aspects on vital bank performance indicators e.g. profitability, productivity and efficiency.

A more elaborate study on the Saudi financial system is a book under the same title authored by Adnan Abdeen and Dale Shook (1984)⁽¹⁸⁾. In addition to the discussion of the evolution of the Saudi financial system (Chapter 1) and the Saudi Monetary Control (Chapter 2) the authors set apart a whole chapter for the Saudi commercial banks (Money Market Institutions I). Their analysis included the main features of the Saudi commercial banking growth and development, as well as effects of Saudization on banks, which was completed by the establishment of the United Saudi Commercial Bank in 1983. Profitability, through its main indicators e.g. returns on assets, returns on equity and net profit to revenue ratio, was analyzed, along with the prospects and causes of competition among the banking units existing in Saudi Arabia. An important determinant which promoted such a competition according to the authors were the Saudization process which increased the level of the competition among the Saudi and the Saudized banks mainly through the expansion of the Saudized banks capital base,

(16) C. C. Agu, The Structure and Performance of the Nigerian Banking System 1970-81, *Journal of Social Science* (University of Malawi), Vol. 12, No. 3, 1985, pp.78-90.

(17) Donald M. Moliver and P. J. Abbondante, *The Economy of Saudi Arabia*, New York: Praeger Publishers, 1980.

(18) Adnan M. Abdeen and D. N. Shook, *The Saudi Financial System*, New York: John Wiley & Sons, 1984.

increase in branches and the improvement of and innovation in banking services. Other factors included the expansion of bank activities e.g. diversification of credit outlets to include others which were not previously stressed like corporate financing and retail banking as well as offshore banking units (OBUs) which extended their activities into the Saudi market.

As for profitability, several factors have contributed to the high levels achieved, particularly by the wholly Saudi banks, during the seventies and part of the early eighties. Prominent among such factors were the low cost of obtaining money (service charges on deposits), international and offshore activities which widened the scope of credit and lending capabilities of the Saudi banks, syndicated loan schemes, Saudization process and recently service differentiation and improvement.

The book also covers the activities of the offshore banking units (OBUs), the specialized credit agencies as well as the evolution, growth and performance of Islamic banks.

The above book, however, stops short of discussion or measurement of the main features of the market structure of the Saudi banks, mainly resource (deposit) concentration, entry barriers, product differentiation and branching levels. Measurement or estimation of the size of relationship between the structure features and the degree of competition in the banking sector and so forth the influence on the main bank performance like profitability, efficiency and productivity were not covered in the book.

This research attempts to contribute to the increasingly needed theoretical and empirical research efforts and studies on the structure of the Saudi banking sector and its influence on and relationship with the main bank performance indicators. Hopefully, the results of such efforts can be utilized to guide and rationalize the policies of the financial authorities in general and monetary authorities in particular with regard to the control and regulation of the banking units in order to achieve the optimum social welfare objectives e.g. competition, efficiency and growth of the financial sector in the economy.

II. Banking Structure

"Market" or "Industry" structure assumes different meanings according to the type of market or industry and the objectives of the researcher. Thus, structure may mean the characteristics or features of a certain industry or sector e.g. the volume and distribution of capital, production, employment among the units in the industry or sector. However, structure may go beyond such raw figures to measure the relative distribution of sizes of the existent units in the industry or sector whether that size is capital, output, assets, sales or number of employees. Within this context, the structure includes the concentration level in the industry or sector as well as the main factors or determinants influencing it, like barriers to entry, market growth or product differentiation. Most of the studies on the banking structure emphasize the concentration level and barriers to entry as the main components of the banking structure. They, however, add to them branching as an important element particular to the banking sector and a significant determinant of its structure.

Market structure derives its importance from the influence it exerts on the conduct of firms in the industry or sector e.g. pricing within competitive or monopolistic markets or any one in between. Such a state can be initiated by the market power or absence of it stemming from the market being concentrated or otherwise. The conduct of firms in the market in its turn has a bearing on their performance such as profitability, efficiency and productivity. Such a connection between structure and performance through conduct has come to be known in the industrial economics (organization) as the structure-conduct -performance paradigm.

In the coming sections we will discuss each of the main three elements of banking structure, namely: concentration, regulation and branching. Then, I will measure each of these elements for the Saudi Arabian banking sector through the period 1975-1988. Last, I will measure the relationship, through regression analysis, between the main banking performance indicators and the main measured elements of banking structure.

a) Concentration

Concentration is considered the most significant and researched element of market (industrial) structure, because of its simplicity and capability of being quantified and represented in a unitary measure (index), compared to other elements of structure. Most important, the other elements of structure like barriers to entry and branching are all factors affecting the level of concentration. Thus, changes in concentration are considered indicators of changes in the other elements of structure.

Concentration of resources within the banking sector has been the concern of public policy for many reasons:

- The possibility of domination by the large banks in the banking sector which may turn into market power, thus resulting in monopolistic tendencies in the market.
- Concentration may affect the performance of the banking units in the market. While profitability may increase, at least for the large (core) banks, due to monopolistic abnormal profits, other indicators of performance like productivity, efficiency and technical progress may be suppressed by the low level, or at extreme, absence of competition resulting from a highly concentrated market.
- High levels of concentration in the banking market which may lead to dominant economic power exercised by the large (core) banks, can interfere in the conduct of the monetary and financial policy measures by the relevant policy authorities in the country e.g. the Central Bank. Examples of such policy measures are entry regulations to the banking sector, interest rate changes and policies towards merger among existing banking units. Such an interference may prove harmful to the social welfare of the community specially if accompanied by monopolistic conduct by the large banking units, leading to higher prices for the banking services..
- Large banks with their good reputation and huge assets put small banks at disadvantage with regard to the susceptibility to "runs" (rush to withdraw deposits by customers), thus exposing them to bankruptcy.
- Economies of scale which are associated with the large size of the producing units are a major factor in deciding the optimum (most efficient) size of a banking unit

and thus the number of banks in the sector operating efficiently given the market size. As a relationship between the cost of production and output, economies of scale consequently can act as a barrier to entry to the banking sector by new prospective units if the minimum efficient size of banking unit is high. It also is a major factor in merger or acquisition decisions among existent banking units and also in branching decisions, all of which are determinants of concentration levels.

Many factors influence the level of concentration in the banking sector, most significant among which are the following:

- Barriers to entry to the banking industry. The most important barrier to entry is government entry (license) regulations for new banks. These regulations are determined by several factors and situations which we will discuss later in a separate sector on "Banking Regulations" as an element of banking structure. Other types of regulations consist of maximum deposits as a ratio of capital, capital restrictions, merger restrictions and regulations, branching regulations and national share requirements.

- Market size. This element determines the maximum number of banking units that can exist efficiently in the industry. Market size usually represents the total demand for the services of banks in the form of total deposits. Several factors also influence the market size of the banking sector most important among which are the following:

1. The number and volume of transactions of other financial institutions e.g. money changers and investment companies or trusts that are competing for at least a part of the services rendered by the commercial banks.

2. The number and size of offshore banking units (O.B.U's) which compete for the international transactions of the national commercial banks.

3. The number and size of government financing institutions that compete with commercial banks for the specialized types of credits such as Real State Development Fund, Industrial Development Bank, and Public Investment Fund in Saudi Arabia.

4. The number and size of branches belonging to the unit banks. These branches widen the scope of market for the unit banks as they reach out for market outlets in terms of customers and services not normally possible or feasible to undertake previously.

- The extent and pace of merging or acquisition among the banking units in the sector. This factor affects the number and relative size distribution of the resources among the banking units in the sector and thereby influencing the concentration level. It is elaborated further in the coming section about "Banking Regulations".

The Measurement of Concentration

The main components of the concentration level measurement (concentration index) are the number of the units (firms) in the industry and the size distribution of resources among these units. The most known measures (indexes) of concentration in the literature are: the concentration ratio, the Lorenz curve (measured by the Gini coefficient) and the Herfindahl-Hirschman Index (widely known as the Herfindahl Index).

The "concentration ratio" is simply the sum of the size proportions of a limited number of units in the industry. The numerical representation of a four-firm concentration ratio is:

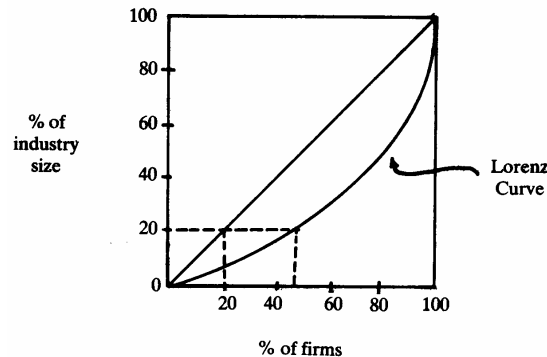
$$C_4 = \sum_{n=1}^4 \frac{d_n}{D}$$

where:

- C_4 : The four largest firms concentration ratio,
- n : The number of firms,
- d_n : The deposits (size) of the nth firm,
- D : Total deposits (size) of the industry.

In spite of its simplicity and easiness in terms of calculation and data requirement, the concentration ratio, however, confines itself to a limited number of units in the industry. Its usage is convenient when the number of units in the sector is huge or is difficult to gather data on. In a banking sector like that of Saudi Arabia with currently twelve banks in operation this virtue of the concentration ratio is no longer clear. In addition, the concentration ratio treats all the firms chosen in the measurement equally in terms of the weight they carry in the index. Thus, a firm which has 50% of the total deposits in the sector is treated the same in the index as another firm which has only 10% of the total deposits just because they are both included in the chosen four largest firms in the sector. Finally, the number of largest firms included in the measurement (whether four or less or more) seems arbitrary without any standard criteria for such a choice.

The Lorenz curve is another index of concentration which measures the inequality level among the sizes of the operating' firms in the sector.



As shown in the above curve, the Lorenz Curve represents the degree of skewness of the actual distribution of resources (deposits) among the banking units (firms) away from the optimum level of distribution, i.e., complete equality of resources among the firms represented by the diagonal line AB. The more the Lorenz curve is skewed away from the diagonal line AB the more concentrated are resources (deposits) in few firms in the sector. The Gini coefficient is a numerical configuration of the Lorenz Curve in that it calculates the area between the Lorenz Curve and the diagonal AB divided by the area of the triangle ABC. The Lorenz Curve (configured by the Gini Coefficient) however emphasizes the inequality among the sizes of the existent firms

and neglects the relative distribution of such sizes among the firms. Thus for example two firms in the sector each holding 50% of the total size (total deposits) of the sector means the Gini Coefficient is zero, *i.e.*, the Lorenz Curve is identical with the diagonal line AB (total equality of resources) which contradicts the fact that there is a concentration of resources in only two firms with duopolistic overtones.

The Herfindahl Index is the sum of the squares of the proportions (market shares) of each firm's size (deposits) out of the total size (deposits) of the sector. It ranges from $1/n$ in the case of an unconcentrated market with n firms to one in the case of completely concentrated markets (monopoly). Numerically it is represented as follows:

$$H = \sum_{i=1}^n \left(\frac{d_i}{D} \right)^2$$

where

- H : The Herfindahl Index,
- n : The number of firms in the sector,
- d_i : The size (deposits) of the i th firm,
- D : Total deposits of the sector.

We notice from the above index that the market becomes more concentrated either through a decrease in the number of firms or as the inequality among the market shares of the firms in the sector increases. The squaring of the market shares of each firm in the sector means that the least sized firms in the sector (least market shares) get less proportional weight in the index signifying the sensitivity of the index to the changes in the upper scale of market shares compared to the lower scale, thus reflecting more efficiently the effect on the banking structure of changes in the sizes of banking units or their number particularly due to mergers among large banks or acquisition by large banks of other banking units in the sector.

Because of these merits of the Herfindahl Index, it was chosen to measure the concentration levels of the Saudi Arabian banking sector during the period 1975-1988.

Measurement of Bank Size

Measurement of the size of banks as the main input in the Herfindahl Index for concentration, centers mainly on total deposits or total assets. Total deposits mainly include: customers' deposits whether current, time or savings, and deposits from banks inside the country and abroad. Total assets meanwhile count cash and deposits with the Central Bank (SAMA in Saudi Arabia), dues from banks, loans and advances, investments, fixed and other assets.

Total deposits are chosen in this research as the measure for size (resources) for the following main reasons:

- Deposit-taking is essentially the main resource activity of commercial banks.
- Deposit-taking is the common function among all commercial banks.
- Deposit accounting is fairly uniform among commercial banks in a country and across countries as well.
- Deposits as the main source of activity, particularly lending, are thus associated with the performance of the banking units *e.g.* profitability and productivity. Thus as

the main input in the concentration index, they are a good link in the chain of structure performance relationship as will be elaborated later.

b) Banks Regulations

As the main component of barriers to entry, bank regulation is considered a major dimension of banking structure. Its significance stems from its effect on the bank concentration level and, thus, on the competition among the banking units and hence on the behavior and performance of such units. The most important types of bank regulation which are relevant to banking structure are: entry regulation, merger regulation, deposit regulation and branch regulation. These regulations are normally exercised by the monetary or financial authorities (usually the central bank). All these types of regulations exert considerable influence on the number and size of bank units, which are the most dominant ingredients in the measurement of concentration.

Entry regulation mainly takes the form of licensing for the incorporation of a new bank. Such a license is granted by the Saudi Arabian Monetary Agency (SAMA) in Saudi Arabia. A licensing requirement for any party that intends to undertake a banking business, defined above, is stipulated in Article 22 of the Banking Control Law issued in 1966. Entry licensing for commercial banks has the apparent purpose of regulating any business in the economy. However, due to the special characteristics, mentioned earlier, of the commercial banking sector, entry restriction through the licensing policy serves the purpose of preventing over-competition in the banking industry due to the increase in the number of banks over the level which is considered necessary to maintain the minimum sufficient size of each bank unit, given the market size of the banking sector. Such a situation may precipitate failure of the least efficient banks and thus may lead to what is called "running" on the existing banks by the depositors, which in its turn may create more bank failures. Over-competitiveness also may mean that liquidity will be spread thin among existing banks, thus reducing the lending and investment capabilities of these banks. Costs also may increase because of over-competitiveness specially when the increase in the number of banks is associated with an expansion of branch units (over-branching). Entry regulation also may reduce the level of uncertainty by the existing banks with regard to the actions and effects of their prospective rival new entrants. At the same time entry regulation, by keeping the number of bank units low, enhances the level of control and supervision by the monetary authorities over the banks.

Excessive regulation, on the other hand, may hinder competition within the banking sector and thus may raise the prices of services to customers as well as reduce the quality of such services. Improvement, development and innovation in the banking sector may also be retarded. In addition, competition may induce financing of new and formerly neglected sectors or activities like industry, services and agriculture.

Merger regulation, in that it affects the number of banks in the economy, serves the same purpose of entry regulation as well as shares some of its disadvantages. However, merger regulation may also affect the relative size of the banks and so the concentration level. The net effect on concentration by any merger action depends on the form of merging, whether among small units or large ones and whether such units are efficient enough to withstand competition or that merging may be the cure for their inefficiency.

Mergers among banks, or, for that matter, acquisition of small banks by other larger banks, are usually justified on several grounds most prominent among which are the following:⁽¹⁹⁾

1. To prevent failure of some banking units which are facing difficulties and may face a bankruptcy situation, thus leading to repercussions in the banking industry, which may prove harmful (the domino effect) to all banking units.
2. A small number of solid banks is usually easier to control and regulate by the monetary authorities (central banks).
3. The importance of size in banking which enables the banking units to take advantage of economies of scale.
4. Mergers may be a suitable defensive procedure against competition from foreign banks specially if these banks are subsidiaries of giant multinational banks.
5. Large banks created through mergers or acquisition are usually better equipped to absorb the exposure to risk. An example of such exposure is the concentration of loans in a single customer (or very few customers) or industry or region.
6. Big size as a result of merger or acquisition brings public confidence which is an important ingredient of success in the banking industry.

On the other hand, mergers in banking, if conducted among large or "core" banks in a way leading to resource concentration or if left unregulated by the monetary authorities, may lead to monopoly in the banking sector. Thus, the monetary authorities before authorizing a merger among banks or acquisition of a bank by another will usually weigh the merits of merger discussed above against any possible precipitation of monopoly powers in the banking industry.

The most noticeable acts of merger in the Saudi banking history was that associated with the process of Saudization. Small banks, mostly foreign, in order to qualify for and maintain their bank status under the new Saudization Act and compete with other already large banks, had to opt for merging. The last example of this was the incorporation of the new United Saudi Commercial Bank in 1983 from the previously Bank Meli Iran, Banq du Liban et d' Outre Mer and the United Bank Ltd.

Deposit regulation usually takes the form of limiting the amount of demand deposits each bank can accept. In Saudi Arabia, such a restriction is stipulated in article 6 of the Banking Control Law which necessitates that the "deposit liabilities of a Bank shall not exceed fifteen times its reserves and paid up or invested capital. If the deposit liabilities exceed this limit, the Bank must, within one month of the date of submission of the statement referred to in paragraph 1 of article 15 either increase its capital and reserves to the prescribed limit or deposit fifty percent of the excess with the Agency (SAMA)". Such restriction, though manifestly is intended as an insurance to depositors against losses due to a decline in the value of bank assets⁽²⁰⁾, serves, on the other hand, the purpose of maintaining a low level of competition in the market, since it ties

(19) **Jack Revell**, Mergers and the Role of Large Banks, *Research Monographs in Banking and Finance*, Bangor, U.K.: Institute of European Finance, University College of North Wales, 1987, pp. 262-278.

(20) For more details see: **Sam Peltzman**, Bank Entry Regulation: Its Impact and Purpose, *The National Banking Review*, 3, 2(1965), pp. 163-177.

expansion of bank resources (deposits) to the amount of its capital, thus keeping the relative size distribution of banks within the limit of the relative distribution of capital assets and hence contributing to the control of the concentration level in the banking sector. In an indirect way, the above-mentioned deposit restriction may serve as a barrier to entry by limiting the amounts of deposits a bank can receive and is free to lend (credit creation) therefore limiting its earning capabilities and thus reducing the incentive to enter by prospective new banks. Other types of regulations exercised by the Saudi Arabian Monetary Agency, that may have a bearing on the performance of the Saudi Commercial banks, are the following:⁽²¹⁾

- The maximum limits of the total loans that can be extended by a bank.
- The prohibition or limitation of specified categories of loans or other transactions.
- Fixing the terms and conditions which banks should take into consideration when carrying out certain types of transactions for their customers.
- The cash margins to be obtained by banks against specified categories of credits or guarantees.
- The minimum ratio to be observed between the limits for loans and the collateral for such loans.
- Fixing the assets to be maintained by each bank within the Kingdom. Such as sets should not fall below a certain percentage of the bank's deposit liabilities which shall be fixed by the Agency from time to time.

The form and extent of the effect of the above regulations on the performance, specially profitability, of the banking units reflect on the desire to enter into the banking industry by prospective parties and therefore can influence the relative size (resource) distribution within the banking sector there by reshaping the concentration level.

c) Branching

Branching of commercial banks is considered one of the major pillars of banking structure. Its significance stems from its effect on the level of concentration in the industry as well as the possibility that it may act as a barrier to entry into the sector by prospective parties. Branching also influences the main performance indicators, namely efficiency and productivity of the banking units.

Branching may have the advantage of increasing the competition in the banking sector particularly at the local level when all or most of the banks extend their branches to the countryside or suburbs instead of being concentrated in the metropolitan areas. Such a situation may take the form of competing for the deposits of the local customers or the amounts and types of loans extended to them, which may reflect positively on the prices of services charged by the banks or the prices of loans. Branching may also result in the development and improvement of services rendered to customers who were previously denied such services because of their remoteness from the metropolitan areas where bank centers are mainly located.

(21) Article 16 of the Banking Control Law (1966).

However, branching could be a stimulant for banking concentration when the existing banks extend their scale and Scope of activities through opening of new branches. This leads to accumulation of resources within these banks and thus creates a barrier to entry for new banks into the banking industry causing an escalation in the concentration level.

Branching also affects the efficiency of the banking units. Such an effect depends on the scale economies of the banking units which in their turn influence the costs of production. Many studies have been conducted to determine whether branching in banking increases efficiency through economies of scale. Most of these studies did not reach conclusive results on this issue. In the words of Dudley Lockett⁽²²⁾ "Perhaps the best that can be said at this point is that branch banking is no less efficient than unit banking and is perhaps more efficient." The monetary authorities in their approval of new branches for any bank and the banks' administration in their decision to open a new branch seem to look beyond mere scale economies to other factors such as the degree of competition in the industry as a whole or in the intended region in particular, the size of the local market and the technical and administrative feasibility of opening a new branch in a local area.

Thus, branching through its widening of the market size and diversification of operations of the branching banks becomes a vital feature of market structure in' the banking sector and, thus, merits to be studied, and its effect on the other elements of banking structure such as concentration and barriers to entry, ought to be measured.

Results of Structure Measurement

The main dimensions of the Saudi banking structure discussed above were calculated for all the banking units operating in each of the years during the period 1975-1988 and shown in Appendix I. The correlations among the above dimensions for the above period are depicted in the correlation matrix in Appendix II. The main conclusions we observe regarding these characteristics are as follows:

1. The concentration levels, measured by the Herfindahl concentration index, for the banking sector during the above-mentioned period were relatively low, not exceeding the figure of 0.37. This signifies that the deposit `resources in the sector are relatively fairly distributed among the banking units with few numbers of banks mastering very large deposits compared to other units as to constitute a heavy weight in the Herfindahl concentration index swinging it towards a high level of concentration.

2. The concentration levels during the period 1970-1980 were in general relatively higher compared to those during the period 1981-1988, with a declining trend. A slightly higher concentration level was recorded in the year 1988 due to the commencement by Al-Rajhi Banking Investment Corporation of its operations during that year. This corporation which used to be mainly a currency exchange company commanded a high volume of deposits compared to some old established banks and conducted its operations through a large number of branches higher than any other bank, reaching 251 branches in 1989.

3. Branching as another dimension of banking structure has escalated since the early 1970's, Such a development has reflected on the structure of the banking sector

(22) **Dudley Lockett**, *Money and Banking*, Tokyo: McGraw Hill, Kogakusha Ltd. (1984), p. 43.

particularly concentration. Through its widening of the deposit resources base of the banks, particularly new Saudized ones, branching helped reduce the concentration level in the system. This is evident in the negative and relatively high coefficient of correlation between the concentration levels (CI) and number of branches (NB) [- 0.50 in Appendix II].

4. Capital requirement was not a significant factor contributing to the concentration level. The correlation coefficient between total capital (TK) and the concentration index (CI) is relatively low (0.15 in Appendix II). Capital requirement, however, may have contributed to the concentration level indirectly through its influence on the decision by the Saudi Arabian Monetary Agency to grant licenses to new banks which may be based, among other considerations, on a minimum level of capital available to the applying bank. In any case, this factor may have affected the number of banks operating in the system but not much the relative sizes (deposits) of the banks, a fact which is supported by the low and relatively steady level of concentration in the system as mentioned above.

5. In general, the main factor which may have kept the concentration level in the Saudi banking system relatively low and declining in the last ten years was the Saudization process which was completed during ten years.

Saudization brought with it an expansion in the resource (deposit) base of the Saudized banks whether through the channeling of Saudi government funds to these banks after Saudization or through its ability to accelerate their branching process, compared to the already Saudized banks or originally Saudi banks. This development narrowed the previously wide gaps in sizes between the banking units, thus leading to lower levels of concentration in the system. Saudization was in several cases implemented through amalgamation among smaller units of non-Saudi banks to form larger Saudized banks (e.g. Saudi Investment Bank and United Saudi Commercial Bank).

6. The concentration level increased slightly in 1988 (Appendix I) mainly due to the incorporation of Al-Rajhi Banking Investment Corporation. The Corporation commanded a relatively large deposit resource (12506 million Saudi Riyals in 1988). This put her in the fourth rank among the banks in terms of deposits' size in 1988. This is only in the first year of its operation as a banking corporation. Its resources are expected to expand at a higher pace in the future particularly that it is an investment oriented corporation which does not receive savings deposits or lends money, a fact which makes it attractive to interest-averse depositors. Also, its above-mentioned large number of branches enables it to master a large portion of business in the sector. However, the fact that it is an investment-Oriented corporation makes it a less threatening factor to competition in the credit-deposit line of business although a positive sign for competition in the investment avenue, specially if it caters to the non-traditional channels of investment (e.g. industry, agriculture and services) which at present are more needed in the Saudi economy.

III. The Relationship between Structure and Performance in the Saudi Banking System

As mentioned earlier in the literature review, studies on the relationship between structure elements of the banking industry and performance were not determinant. Many factors influence the direction of conclusions on such a relationship examples of which are the types and number of independent variables chosen by the researcher which he conceives as the main determinants of performance, the availability of data on some variables in some countries or industries, the proneness of variables to quantification, the length of period covered in the research and the extent of multicollinearity among the independent variables.

This research is not different from the others since it faced some of the above problems, namely the problem of deciding how many variables are to be included in the measurement process and the model to be used in this process.

Taking into consideration such difficulties and handicaps, we will try henceforth to make a stock of all the variables we conceive as significant in determining the level of performance in the banking industry, analyze briefly the nature and type of relationship among each of these variables and the performance indicators, particularly profitability, and then use regression analysis to test such conceived relationships. Lastly, we will draw conclusions from the results of the above tests as a prelude to suggesting suitable government industrial policies relevant to such results.

The term "performance" in general and in banking in particular, takes on many definitions and dimensions most significant among which are: profitability, efficiency, productivity and, sometimes, technical progress.

Profitability is usually measured in researches by either the ratio of net profit (net income) to capital or the ratio of net profit to total assets. Most studies which use the first measure of profitability take equity as representative of capital (or equity capital) which has come to be known as return on equity (ROE). Equity capital includes all amounts invested by the owners of the bank in the form of stocks, paid capital or retained earnings. Return on equity thus provides a good indicator of the rate of return the bank is yielding to its owners. However, it suffers from the shortcoming of being confined by the regulation by government authorities (SAMA in Saudi Arabia) on deposits as a percentage of capital, signifying a tacit correlation with size measured by total deposits in this research, as mentioned earlier, thus in turn correlating it with the concentration level which is the chief independent variable in the regression formula. A wider deflator of profits is needed which is not closely correlated, by regulations, to total deposits and so to size. Return on assets (ROA) comes into help since assets include financial and physical assets such as equipment and buildings. Because most of the banks' activities represented by revenues and expenses are closely related to their total assets changes in returns on assets reflect more accurately changes in profitability.⁽²³⁾

(23) **William Keeton** and **L. Matsunaga**, Profits of Commercial Banks in Tenth District States, *Economic Review*, Federal Reserve Bank of Kansas City, USA, **70**, **6**(1985), pp. 3-4.

Efficiency is measured either by the ratio of net profit to revenue which is an indication of the way the bank holds its cost changes in line with changes in revenues⁽²⁴⁾, or by the ratio of service charges paid by the bank to total deposits. It shows the cost effectiveness of the bank utilization of loanable funds. However, the costs included in this measure are confined to those of loanable funds and ignore other types of banking costs e.g. administrative costs, which in many instances, may reflect progress in the efficiency of banking operations specially in view of the accelerating technological developments occurring in the banking industry.

Productivity as a measure of bank performance is usually measured by the ratio of loans to total deposits. This indicator reflects the degree of utilization of deposits (loanable funds) by the bank. It shows how far a bank is "loaned up"⁽²⁵⁾. A high ratio means that a large portion of loanable funds is utilized which means in turn low liquidity. However, this measure of productivity in singling out loans as the only utilization outlet for funds (output) neglects the possibility of some of these funds being utilized either in acquiring foreign assets (e.g. securities) or investments (local and overseas).

Profitability as a measure of performance is emphasized in most of the studies on the structure-performance relationship in the banking sector. The most significant reasons behind this emphasis are:

- Efficiency and productivity measures are riddled with the types of shortcomings already mentioned. Added to that is the fact that data on the indicators of the above measures are not easily obtained or published by some banks. Also, the reporting practices of such data are not uniform in the Saudi banks balance sheets and annual reports covering the period of the study of this research.

- Profitability is more related to the behavior (conduct) of the banking units particularly the degree of monopoly or competition in the banking market, through the usual textbook price and profit determination analysis of firms under various regimes of markets. Thus, the profitability measure fits more into the already discussed structure-conduct-performance paradigm.

- Efficiency and productivity are considered among the most nominated factors explaining changes in the profits of banks, since they either indicate changes in the costs of operations of banks (efficiency side) or changes in the income earned from the output of the banks (productivity side). Thus, profitability may act as an alternative concise measure of bank performance.

As for the independent variables, we expect that the main factors influencing the level of performance of the Saudi banks, which are to be included in the statistical testing process (regression analysis) afterwards, are the following:

- 1) The concentration level of the banking industry. This variable acts as the main indicator of the banking structure which affects performance in addition to its eligibility to be quantified and calculated in a unified measure (Herfindahl Index) as mentioned

(24) **Adnan Abdeen** and **D. Shook**, *The Saudi Financial System*, New York: John Wiley and Sons, 1984, p. 93.

(25) **Adnan Abdeen** and **D. Shook**, *Ibid.*, p.86.

earlier in the section about concentration. Entry barriers such as regulation, being the other element of industry structure, are actually a major determinant of the level of concentration in the industry.

Concentration influences performance of the banking units through three main channels:

a) The market power dominant firms bold in a banking sector is usually characterized by a high level of concentration. This fact signifies whether the industry market operates under monopolistic conditions perpetuated by fewness of banking firms, uneven distribution of size (deposits) or existence of barriers to entry to the banking sector (e.g. regulation). Through collusion, price leadership or price discrimination, or other forms of firms conduct under monopolistic conditions, firms would achieve supernormal, prices and profits.⁽²⁶⁾

b) Large banks have a greater capability to avoid risk (risk-aversion). Such capability, takes the form of a reduced risk profile on the banks loans books (the risk that borrowers will not fulfill the terms of their loans) or risk of insolvency and illiquidity or operating risk (mainly staff management errors).⁽²⁷⁾ Such a reduced level of the risk factor by large or dominant firms in a concentrated banking market entitles them to the advantage of larger exposure accompanied by the larger profits ex acted from it.

c) Economies of scale This is a relationship between the' size of output of a firm and its cost at that level of output. Economies of scale happen when the average cost is declining as `output increases. Diseconomies of scale occurs when the average cost increases with the increase of output. In the banking sector, economies of scale are derived from several sources most significant among which are: technological advancement such as utilization of computers and telecommunications. These devices can process a large volume of transactions or operations at a relatively small, marginal cost. Thus as the banking units increase in size, and so in the volume of transactions, the average cost of conducting such transactions can be reduced. Technological advancement may also enhance the capability of banks to handle many types of transactions with the same equipment, thus achieving what is called "economies of scope". Larger scale production also enables banks to utilize fixed resources such as capital at reduced costs i.e. decreasing average fixed costs. In addition, unspecialized labor such as tellers and loan officers who may be underutilized in the small banking units can perform specialized functions in larger banks, thus reducing per unit labor costs⁽²⁸⁾.

2) Besides the level of concentration in the banking sector, demand for banking services is another factor (explanatory variable) influencing the performance level in the sector particularly profitability. Changes in the market demand reflects changes either in the customer base (total number of customers) of the banking sector or changes in the individual sizes of such customers. Demand for banking services affects the prices of services rendered by the banking units or the volume of such ser vices both of which determine the magnitude of profit. Gross national income or product (GNP) or

(26) **Philip Bourke**, International Comparisons of Bank Profitability, *Research Monographs in Banking and Finance*, 7, Bangor: Institute of European Finance, University College of North Wales, 1988, p. 53.

(27) **Philip Bourke**, Concentration and Other Determinants of Bank Profitability in Europe, North America and Australia, *Journal of Bonking and Finance*, 13, 1989, pp. 70-71.

(28) **Jeffrey Clark**, Economies of Scale and Scope of Depository Financial Institutions: A Review of Literature, *Economic Review*, Federal Reserve Bank of Kansas City, 73, 8, 1988, pp. 18-19.

personal income may be used to measure the market demand of the banking sector. However, in a country where banking services are not used by all the population or that there are wide differentiations in such usage, market demand is usually measured by the banking market size in the form of total deposits in the banking sector.

3) The ratio of demand deposits to total deposits is expected to exert a noticeable influence on the profitability of Saudi banks. Since demand deposits are acquired free by the commercial banks and because large portions of the liquidity with the public are deposited in the form of demand deposits, mainly due to religious reasons, this situation enables banks to accumulate funds which they can utilize for lending or investment without payment of the cost of attainment of a considerable part of such funds.

4) Through their enlargement of the size of the market and the scope of banking operations, new branches for the banking units can increase the income of these units. On the other hand, new branches inflict extra costs on the banking units, particularly establishment costs. Branching, thus, affects the levels of profitability of banks.

5) The degree of foreign exposition of banks and participation in foreign operations. Such an exposition relieves the banks from the limitations of the local market absorptive capacity. Foreign markets, particularly offshore ones, offer local banks wide outlets for apportionments as well as the opportunity to diversify and enter into new types of business not usually accessible or profitable in the local market. Foreign markets became more significant following the reduction in Saudi government expenditures due to downturn in oil revenues since 1982, a factor which proved influential on the shrinking of the local market size for the Saudi banks. Foreign market exposition or participation by Saudi banks is measured by the ratio of foreign assets belonging to Saudi banks to total deposits with the banking sector.

6) Saudization of banks was a milestone in the history of the Saudi banking sector which affected its structure and performance. The Saudization process and its effects were already discussed in detail in section II. The variable of Saudization is measured by the number of Saudized banks in each year during the research-covered period.

Regression Equation

After listing all the possible factors (explanatory variables) which may influence the profitability level of the Saudi banking sector, the next step is to measure (test) the relationship between profitability, as the dependent variable, and the explanatory variables (independent variables), using time-series regression analysis for the period 1975-1988. The functional form of the regression equation usually used in such studies is the linear equation (model)⁽²⁹⁾. Some studies which attempted other models found no significant improvement in the results⁽³⁰⁾.

The regression equation, thus, takes the following form:⁽³¹⁾

$$PA = a_1 + a_2 CI + a_3 TD + a_4 DD + a_5 NB + a_6 FA + a_7 SB$$

(29) See for example: **C. C. Agu**, The Structure and Performance of the Nigerian Banking System, 1970-81, *Journal of Social Science*, **12**, **3**, 1985, pp.78-79, **Philip Bourke** (1989) op. cit., and **D. Fraser** and **P. Roce**, More on Banking Structure and Performance: The Evidence from Texas, *Journal of Financial and Quantitative Analysis*, **6**, **1**, 1971, pp.601-611.

(30) **Brock Short**, The Relation Between Commercial Bank Profit and Banking Concentration in Canada, Western Europe and Japan, *Journal of Banking and Finance*, **3**, 1979, pp. 209-19.

(31) The data used in the regression testing is included in Appendix 1.

Where:

PA : Profitability rate measured as Profits/Total Assets (the dependent variable).

and the independent (explanatory) variables are:

CI : The Concentration Index (Herfindahl Index).

Th : Total Deposits (measuring market demand).

DD : The ratio of Demand Deposits to Total Deposits for the banking sector.

NB : Number of Branches for the banking sector (as a measure for branching).

FA : The ratio of Foreign Assets to Total Assets, measuring foreign exposure.

SB : The Number of Saudized Banks (includes already Saudi banks and newly Saudized banks).

a_1 : The constant term

and a_2 - a_7 represent the relevant parameters for the above independent variables.

The most vital dimensions which will be searched for in the regression results are:

- the statistical significance of the relevant, independent variables parameters (from the t-ratios).
- the signs and magnitude of the above parameters signifying the direction and volume of relationship (or causation).
- the statistical significance of the regression model and its goodness of fit (from the F-test and the coefficient of determination R^2).
- the degree of correlation (multicollinearity) among the independent variables, particularly those pertaining to banking structure (from the correlation coefficients matrix in Appendix II).

The resulting regression equation is reported as follows:

$$PA = 5.2 - 13.2642CI - 0.00002TD - 0.0016FA - 0.1805B + 0.0542DD + 0.00118NB$$

$$\begin{matrix} (-1.12) & (-0.84) & (-0.45) & (-0.82) & (1.54) & (0.33) \end{matrix}$$

Adjusted $R^2 = 0.88$
 $F(6, 7) = 17.11$
 $D-W = 2.2397$

Where

R^2 = Coefficient of determination.

$F(6, 7)$ = F-test with 6 variables and 7 degrees of freedom.

$D - W$ = Durbin-Watson test

and the figures between brackets are the t-tests for each variable coefficient.

The above equation, though, strong in the coefficient of determination (R^2), is weak in term of statistical significance of the coefficient of all variables⁽³²⁾. The fact that the F-test is high means that the problem does not lie too much in the model of regression used. I expect that the variables included suffer from multicollinearity.

So, I experimented with the variables in the above equation which have relatively high correlation with the other variables (See the Correlation Matrix in Appendix II). These are:

(32) D-W shows that the autocorrelation among independent variables (serial correlation) is insignificant.

FA = Foreign Assets/Total Assets.

SB = Number of Saudi Banks.

NB = Number of Branches.

The correlation between the number of branches (NB) and the concentration level (CI) is relatively high (-0.5 in Appendix II) which supports our ,already mentioned hypothesis of a negative relationship between these two variables. Saudization of banks (measured by the number of Saudized banks in each year SB) did not prove to have a significant relationship with either the concentration level or the profitability index PA.

Saudization, however, reflected positively on the total assets of the banking sector more than total deposits as hypothesized. A tentative explanation for this result may be the restrictive tying regulation by SAMA of each bank's total deposit to fifteen times of total capital. This may have exerted a restrictive effect on the deposit expansion of Saudized banks.

The final equation I obtained is as follows:

$$PA = 2.15083 - 4.56091C1 - 0.00002TD + 0.04187DD$$

(-1.31) (-2.62) (1.72)

Adjusted R² = 0.91

F (3, 10) test = 43.88

D - W = 2.49

The figures in brackets are t-tests.

Actually all the statistics have improved compared to the last equation. Except for the coefficient of the concentration level (CI) which is almost statistically significant, all other coefficients are significant.

The concentration level exerted a relatively high magnitude of effect on the profitability of the Saudi banking system during the period 1975-1988. The sign of effect, however, is negative signifying a negative correlation between the concentration level and profitability rates in the banking system. Such a result which is counter to most research conclusions, may have been due to the Saudization process during this period which precipitated an expansion in the deposits base of the individual Saudized banks resulting in a lower concentration level while strengthening the pro- fit-earning capability of these banks. Total deposits, though statistically significant, negatively and only meagerly influenced profitability of Saudi banks during the period 1975-1988. This means that the total demand for the services of the banking system did not vitally and positively influence the changes in the profitability rates of the Saudi banking system. However, the structure of total deposits did play a vital and positive role. As expected, the ratio of demand deposits to total deposits significantly affected changes in the profitability rates of the Saudi banks. We already mentioned that the ratio of demand deposits to total deposits is expected to exert a noticeable influence on the profitability of Saudi banks. Demand deposits provide free resources to the banking sector. Since they also constitute large portions of total deposits, they provide banks with almost free loanable funds, thus contributing significantly to the reduction of banking costs (expenses). This phenomenon is to a certain degree particular ,to the Saudi banking system, because a large segment of the Saudi customers of banks are interest-averters.

IV. Conclusions

The main conclusions drawn from the above measurement results are the following:

1. The level of concentration in the Saudi banking system is relatively low up until now. The main factor which contributed to such a low level, as hypothesized before, are the Saudization and branching process which brought higher volumes of deposits to the previously lower-sized non-Saudi banks. The capital requirement appears to have no considerable effectiveness as a barrier to entry to the banking sector. The main potential barrier to entry remains to be ,the licensing regulation.

2. The most significant factor found to positively influence profitability of the Saudi banking sector during the period 1975-1988 is the ratio of demand deposits to total deposits, which reflects the extent of economies extracted by the Saudi banks from the large portion of free or low-cost loanable funds out of total deposits.

3. The structure of the Saudi banking sector and thus the performance level of the banking units in the sector may be improved if the financial sector is allowed to develop at the same pace of the real sector (real GNP) instead of tying the volume of deposits in each bank to its total capital.

A certain scheme of deposits insurance may be a preferable substitute to licensing of new banks to achieve the same goals without too much possible harmful consequences to the banking structure particularly concentration.

4. The establishment of investment banks should be encouraged and facilitated in order to skim the still not fully exploited outlets of investment e.g. industry, agriculture, contracting, services, small business etc. Financing of such outlets is much needed by the Saudi economy in the coming phase of development. Examples of such investment banks are: Islamic banks, Islamic Investment Corporations, Trust Banks or corporations, Mutual Funds etc... This will also influence favourably the structure and performance of the Saudi banking sector since the previously idle liquid funds with the public will now be attracted to the financial sector particularly those belonging to interest averse public who constitute a considerable portion of the Saudi population.

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Appendix I

Data on the Saudi Banking System 1975-1988.

Year	Total capital (TK) SR.M.	Total deposits (TD)SR. M.	Total loans (TL) SR.M.	Total assets (TA)SR. M.	Demand deposits ÷ total deposits %	Loans ÷ total deposits %	Foreign assets ÷ total assets %	Concentration level (CI)	Profits ÷ capital %	Number of branches (NB)	Number of Saudi banks (SB)
1975	679	11302	6512	16318	69.3	57.6	22.2	0.372	53.2	88	2
1976	942	19365	9638	30360	74.2	49.8	27.3	0.370	53.1	94	5
1977	1114	28703	9714	44432	76.7	33.8	21.8	0.342	48.0	110	6
1978	1360	37331	13951	59563	73.0	37.4	22.8	0.310	47.2	140	7
1979	1990	43964	25054	63434	61.4	57.0	26.9	0.281	47.0	188	9
1980	3520	54641	34199	76202	54.6	62.6	33.1	0.243	45.8	259	10
1981	4840	74746	42276	107943	51.9	56.6	44.9	0.214	46.4	352	11
1982	6615	95420	49290	129376	52.2	51.7	43.0	0.216	39.9	436	11
1983	8513	93549	55201	131502	47.3	59.0	42.9	0.198	29.8	524	12
1984	10038	110284	58061	150907	42.4	52.6	44.8	0.207	21.6	570	12
1985	11893	110568	59092	156629	40.7	53.4	44.2	0.217	09.4	617	12
1986	13156	115254	58688	166627	39.0	50.9	47.2	0.202	04.2	637	12
1987	13392	120734	57421	200237	40.2	47.6	53.5	0.201	04.8	674	12
1988	14382	138866	63959	216239	40.5	46.1	53.1	0.240	0 4.5	926	12

Sources: Banks Reports, SAMA Reports, and Herfindahl Index calculations for CI.

APPENDIX II

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Correlation Matrix

	TK	TD	TL	TA
TK	1.00000	-0.270541	-0.358917	-0.15875
TD	-0.270541	1.00000	0.102108	0.206404
TL	-0.358917	0.102108	1.00000	0.361198
TA	0.158751	0.206404	0.361198	1.00000
DD	-0.404497	0.150741	-0.895720E-01	0.345612E-02
LD	0.147307	0.181853	-0.301480	0.318001
FA	0.273535	-0.130953	-0.458773	-0.662831
CI	0.154051	-0.515175E	-0.151711	-0.215355
PA	-0.639580E	-0.407964	-0.504561E10	0.230585
PK	0.407255	-0.499612E	-0.177925	-0.154377
NB	-0.108783	0.422545E	-0.819168E	-0.177304
SB	-0.469531E	-0.177196	0.111630	0.404508
	DD	LD	FA	CI
TK	-0.404497	0.147307	0.273535	0.154051
TD	0.150741	0.181853	-0.130953	-0.515175E-01
TL	-0.895720E-01	-0.301480	-0.458773	0.151711
TA	0.345612E-02	0.318001	-0.662831	-0.215355
DD	1.00000	0.627495E-01	0.328598	-0.488769
LD	0.627495E-01	1.00000	-0.934150E-01	-0.466200E-01
FA	0.328598	-0.934150E-01	1.00000	0.170601E-01
CI	-0.488769	-0.466200E-01	0.170601E-01	1.00000
PA	-0.149798E-01	0.283430E-02	-0.273057	-0.270396
PK	-0.348144	-0.345419	-0.538055E-01	-0.340953
NB	0.140413	-0.111300	0.192120	-0.503312
SB	0.373562	0.612643	-0.236622E-01	-0.177856
	PA	PK	NB	SB
TK	-0.639580E-01	0.407255	-0.108783	-0.469531E-01
TD	0.407964	-0.499612E-02	0.422545E-01	0.177196
TL	-0.504561E-01	0.177925	-0.819168E-02	0.111630
TA	0.230585	-0.154377	-0.177304	0.404508
DD	-0.149798E-01	-0.348144	0.140413	0.373562
LD	0.283430E-02	-0.345419	-0.111300	0.612643
FA	-0.273057	-0.538055E-01	0.192120	-0.236622E-01
CI	-0.270396	-0.340953	-0.503312	-0.177856
PA	1.00000	0.109467	0.411676	0.243615
PK	0.109467	1.00000	0.235736	-0.260387
NB	0.411676	0.235736	1.00000	-0.508472E-01
SB	0.243615	-0.260387	-0.508472E-01	1.00000

قياس الهيكل المصرفي في المملكة العربية السعودية وتأثيره على مؤشرات الأداء المصرفية

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جامعة الملك عبد العزيز - جدة - المملكة العربية السعودية

المستخلص: بزيادة عدد المعاملات التجارية وحجمها في المملكة العربية السعودية، علاوة على حاجة تمويل التنمية وتعدد نوعية الخدمات المصرفية واضطراد تقدمها وتطويرها، أصبح من المرغوب فيه القيام بإجراء دراسات عن المعالم الرئيسية لهيكل القطاع المصرفي في المملكة. وتشمل هذه المعالم درجة تركيز المواد المصرفية (الودائع)، القيود على تأسيس مصارف جديدة، عدد الفروع التابعة لكل مصرف، ومدى تنوع الخدمات المصرفية المقدمة. ويهدف هذا البحث إلى قياس المعالم الرئيسية السابقة، وبالأخص درجة تركيز الموارد في القطاع المصرفي السعودي، ثم استخدام الرسائل الإحصائية المتعلقة بدرجة الارتباط والانحدار المتعدد لتقدير العلاقة بين المعالم السابقة المقاسة وبين مؤثرات الأداء الرئيسية، وأهمها معدل الربحية، ثم استخلاص العلاقات ذات المعنوية الكبيرة من عملية القياس ومحاولة تفسيرها مع شرح مدلولات النتائج المستخلصة بالنسبة للسياسات المتبعة من السلطات المصرفية.