HORIZONTAL BANK MERGERS: EMPIRICAL STUDIES AND APPLICATION FOR THE TURKISH BANKING INDUSTRY

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ABSTRACT

Most of the cost studies in banking have found economies of scale for banking institutions at relatively low levels of output. Hence, the smallest, most specialized of depository institutions may be at a cost disadvantage relative to larger, more diversified institutions. On the other hand, the concentration-price studies finds a strong relatioship between concentration and prices; selling prices rise with concentration, and buying prices fall with concentration, which yields massive support for the conventional oligopoly theory. This paper provides a review of some of the emprirical literature on the issue to analyze horizontal bank mergers in both theory and then measures the monopoly power in the Turkish banking industry.

1. INTRODUCTION

Horizontal bank mergers have been expolored in empiricial studies since the early 1960s. A subset of these studies has concentrated on reductions in bank costs, elaborating economies of scale and scope at these institutions. On the other hand, concentration _price relationship in banking industry have been of considerable research interest for some researchers.

While the increasing of bank mergers have led new legislations, such as the Bank Holding Act (1956) and the Bank Merger Act (1960), these changes in laws and regulations have caused to lift some restrictions on interstate banking and intrastate branching in the United States. This was an opportunity for commercial and depository financial institutions to extend their operations. This development might allow a small number of large diversified institutions to dominate the industry. With this market structure, they will of course have a cost advantage relative to the small but large part of the industry, increasing loan rates and depreasing deposit rates. Then, this will be a misallocation for the financial institutions and for a whole society (Clark, 1988:16).

This should be an important interest of regulators and managers to get more correct information to make an appropriate decision on mergers, acquisitions, and so on (Goldstein, at al, 1987: 199). Furthermore, when we think that every individual economic agent in the economy has an important connection with these institutions, we can imagine how the cost and concentration price studies in banking have become an attractive interest of researchers over 30 years.

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Horizontal Bank Mergers

On the other hand regional banking is one of the important concern of the concentration-price relationship; some bank prices are determined in local markets such as check charges and time deposit interest rates. Also monopolization of the banking market is the biggest issue. All these issues are so important things that affect the people's daily life.

This paper will attempt to provide the basic theory of mergers (and of course the theory of oligopoly) and a review and analysis of some the empiricial literature on both cost studies and concentration studies and concentration studies in banking cited in the references, and later on an empirical study on the Turkish commercial banking industry will take place.

2. MERGERS AND THE THEORY OF OLIGOPOLY

The price theory simply tells us that as firms go away from perfectly competitive market, they will lead to market power and reduce the market competition. In these circumstances, the quantity produced will be less and the price will be higher than the perfectly competitive market. For example, if there are two producers in the market, they produce 2/3 of the market (each producing 1/3 of the market), which is less than the competitive market. But the prices will be higher than the competitive one (Cournot duopoly analysis). If there is only one producer (monopoly), it produce less than duopoly but charge higher price than it. Because, the market price will be no longer given to the firm; it faces a downward-sloping demand curve for its products. The price will be higher than marginal cost. Thus, as the firms coilude, it will lead to a market power.

The relationship between concentration and price as the main concern of classical oligopoly theory. Most oligopoly theory predicts that price will rise with concentration. For instance, according to Chamberlin, "many small sellers act independently as purely or monopolistically competitive firms, but as their market shares rise, there comes to a point where they recognize their independence and begin to act collusively. This means that at higher levels of concentration, they will price in response the industry's demand curve" (Weiss, 1989: 2). Also, Stiglerargued that "firms with large market shares can detect secret price cutting by rivals than small firms, and the ability of leaders to identify secret price concessions increases at an increasing rate with cocentration" (Weiss, 1989: 2). Many studies have tried to test this traditional oligopoly concentration-price theory over three decades.

Mergers can be seen in different forms. A"vertical merger" occurs when the output of one firm is an input of the other firm. Purchasing an autoparts producer firm by an automobile producer firm is an example of vertical mergers. If two firms in unrelated markets form a single firm, such as a

firm of textile and a firm of tobacco, it is called "conglomerate merger". Finally when a firm purchase its competitor in the same market, it is called "horizontal merger". Purchasing an international airline company or purchasing a commercial bank by another commercial bank, forming a single company or bank is an example of horizontal merger.

To unterstand the sources of mergers and effective power, we need to analyze important barriers to entry. There are three major barriers to entry. One, legal barriers erected by governments through an exclusive franchise (public utilities, cable television, such as "CINE5" in Turkey), ublic ownerships [(PTT, State Economic Enterprises such as Etibank and Institution of Machinery and Chemicals Industry (MKEK)], patents, copyrights, licences, and some other exemptions. Two, natural barriers to entry, happening in two forms: One is the natural monopoly coming from the nature of nonproducibility of some natural resources and minerals such as, crude oil and iron ore. Another one is economies of scale in production. Especially the last type of entry can be seen in many industries in countries such as automobiles, beer and cola. Since the efficent scale of operation in these markets is very high, entry to these industries will not be so easy for the new investors. The final type of barrier to entry is a behavioral one, coming true by a strategic decision of the successfully operated firms such as product differentiation, limit pricing and invenstment in excess capacity (Tresch, 1994: 467-469).

When the mergers during the nineteenth century gave birth to some important U.S. companies such as General Motors, IBM and Standart Oil, the Federal Government of the U.S. began to control the market power of rapildly spreading mergers in 1890 first with the Sherman Antitrust Act. This act regulates the contracts, combination or conspiracy in trade or commerce such as price fixing and any kind of cartel, forbids anyone from any action of monopolizing trade and commerce, and allows individuals or firms that suffer from the violation of the above regulations and restrictions to sue for triple damages. The second act is the Clayton Antitrust Act of 1914 aiming to remedy a serious defect of the Sherman Act. The thirt act is the Federal Trade Commission Act of 1914. It creates an independent commission and gives it authority to enforce the substantive provisions of both this act and the Clayton Act. The Robinson-Patman Act of 1936, which is the fourth act, intents to protect smaller retailers from chain stores although the small one are less efficient. Finally, the Celler- Kefauver Act of 1950 brings another restrictions on the firm violating the others competition right buying the other's assets (Tresch, 1994:487-489; Ragan and Thomas: 737-740).

Now, we can understand better how the issue is so important for almost every individual economic agent: On the one hand, mergers will lead to market power, which may causes cost reduction in the firm and lack of competition in the industry; in turn, it will cause a misallocation, which will harm both the

sources of banking industry and its consumers. On the other hand, if the concentration increases the prices, like the theory says, the other parties will have been again harmed. Therefore, it should be analyzed very carefully.

3. ECONOMIES OF SCALE

There are two types of production economies: (i) Economies of scope, which is related to the joint production; and (ii) economies of scale, which is associated with firm size. That is, "economies of scale exist if per-unit or average production costs decline as output rises" (Clark, 1988: 17).

Two kinds of economies of scale can be seen: (i) Overall (global) economies of scale, which is associated with increases in all of a firm's outpus, so that a firm's average cost declines as production increases (Rossi, 1991: 5); and (ii) product spectific economies of scale, which is related to the increases in the production of individual products.

It can be mentioned from three major economies of scale at the financial institutions (Clark, 1988: 18). They are briefly: (i) Using more specialized labor in the production process, (ii) increasing computer and telecommunications technology in transactions, and (ii) finally, information.

4. COST STUDIES IN BANKING

There are many studies regarding cost reductions in banking industry since early 1960s. Each study has tries to estimate economies of scale and scope, usually measuring both of them, for credit unions, savings and loan associations, or commercial banks. They employ similar measures of economies of scale and scope, and use a translog cost function since it is flexible enough to yield both economies and diseconomies of scale and scope at different output levels.

In the literature, while some researchers have measured both overall and product-specific economies of scale, some others tried only one of them (usually, overall economies of scale). Also, some of the studies have investigated the issue in a multiproduct context. For example, the studies by Murray and White (1983), Kim (1986) and Cebenoyan (1988) have been done in a maltiproduct context for credit unions: the first study measures only overall economies of scale, and the second one mesaures both overall and product specific economies of scale. But the study, for example, by Goldstein, et al (1987) has been done for savings and loan associations.

Considering model, the transcendental logarithmic (translog) cost function, which is a Taylor series expansion in output quantities and input prices is a widely used model in the field as in te studies above. Because, it allows the researchers to enter the various outputs as separate variables and

does not force them to treat the hypothesis of homogeneity and constant elasticity of substitution. The translog function also provides a second order approximation to any twice-differentiable function, so that the production technology of multiproduct financial institution can easily be modelled with maximum flexibility. Translog function is flexible to use because of its advantages to permit to estimate U -shaped cost curves and separate scale and also to allow the cost elasticities to vary by size of financial institutions*.

Total costs are defined somewhat similar to each other; as all labor and real capital expenses, as well as the interest and dividends paid to depositors and shareholders [Murray and White (1983) and Kim (1986)], labor and real capital expenses [Cebenoyan (1988)] and expenditures on personnel, office occupancy, and all other ope-rating expenses (interest expense is excluded) [Goldstein at al (1987)].

Different measurements are used for output. Murray and White (1983) and Kim (1986) employ three output variables: Mortgage lending, other loans, and invenstments in excess of minimum liquidity requirements. Each of them equal to the average of its begginning and end-of-year dollar values. Cebenoyan (1988) meusures output as total deposit and total loan accounts, and Goldstein at al (1987) employs total asset of the institutions for output.

As far as price variables are considered, Murray and White (1983) and Kim (1986) employ four variables for input prices: The unit price of capital is sum of the major capital expenses such as rent, depreciation, and utilities. The unit cost of labor is an average hourly rate based wage and salaries. The price of demand deposit is an effective interest rate paid to demand deposits. Finally, the price of term deposits is a combination of the interest paid on term deposits, member shares and so on. On the other hand, Cebenoyan (1988) measures input prices as the sum of labor and capital expenses.

$$SCE^* = SCE + SCB(Z),$$
 (1)

where

SCB = InC/ InB = Bb + Bbb InB + Bbq InQ,

(a mesaure of office economies)

(3)

Z = regression coefficient from the auxiliary regression,

InB = a + Z (InQ)

Therefore, SCE* measures the elasticity of cost with respect to output with branch expansion. Since SCE* includes both output and branch expansion, it will always

^{*} The study by Goldstein at al (1987) mesaures scale economies in two ways; the usual scale economy masaure (SCE), and the augmented scale economy measure (SCE*). SCE* covers SCE:

Beyond these commonly used variables, Goldstein at al (1987) use number of offices operated by the individual institution representing the branches operated by the institution, and a vector of other factors influencing operating costs. Under the last variable, they use eight significant variables. Also, Murray and White (1983) and Kim (1986) use some other control variables such as "Branch" (to see any cost differences between bank branches), "Risk" (to capture the effect of risk diffeerences on credit unions), and "Growth" (to see the cost effect of short-term disequilibrium).

Murray and White (1983) found economies of scale in most of their credit unions in their sample. They got no evidence to support the imposition of homotheticity, unitary elasticity of substitution, or constant returns to scale conditions on credit union production functions.

Kim (1986)'s results showed that there are mild overall economies of scale for the "average" credit union, while the study by Murray and White (1983) found overall economies of scale for almost "all" credit unions. It is possible that the difference is coming from the fact that Murray and White (1983) estimate the translog multiproduct function for both the system estimation and the single equation estimation methods while Kim tested it only for the system estimation. Kim (1986)'s results also suggest modest product-specific economies of scale associated with mortgage loans, substantial diseconomies of scale associated with non-mortgage loan services, and constant returns to scale with respect to investment activities. Finally, product-specific diseconomies of scale respect to non-mortgage loans together with economies of scope brought him to the conclusion that British Columbia credit unions are subject to natural monopoly.

Table I: Summary of the Cost Studies in Banking

Studies	Issue	Model	Data	Results
的。以下,这些数据的对象问题。因此这个对象的问题的,更有不多是可以可能是可能的。这种可能可能的是一个不是不	-Multiproduc tc context -Credit unions -Only over- all economies of scale	Translog cost	-Total costs(Sum of labor and real capital expenses) - Output (Mortgagelending Y ₁ , Y ₂ , investment activit. Y ₃) -Input prices(Unit price of capital, unit cost of labor, price of demand deposit and price of term deposit) -Control variables	There exist (overall) economies of scale in most credit unions.
Kim (1986)		TUNCTION	-Total costs(Sum of labor and real capital expenses) -Output (Mortgagelending Y ₁ , nonmortgaga loans Y2 investment activities Y3 -Input prices (Unit price of capital P1, unit cost of labor P2, price of demand deposit P3 and price or term deposit P4) -Control variables (Such as Branch Risk and Growth)	-There exist mild overall econ. of scale for the average credit unionsModest product specific econ. of scale assoc. with Y1Substantial disecon. of scale assoc. with Y2Constant returns to scale with resp. to Y3Product -specific diseconomies of scale with respect to Y2Econom.of scopeBritish Colum. credit unions are subject to natural monopoly.
Cebenoyan (1988)	-Multipro- duct context	Translog cost function	-Total costs (Sum of labor and capital expenses) -Output (Total deposit and total loan aacounts) - Input prices (labor and capital factor expenses)	Economies of scale are exhusted after \$25 million of deposits for unit banks. -As for branch banks, economies of scale don't exist for any size
(1987) Loans		cost	ce occupancy, and all other operating expenses (interest expense is excluded) - Output (Total asset of the institutions) - Branches (number of offices operated by the individual institution) - Other factors (A vector of	-There exist econ of cscale throughout all size classes/ranges of output Expansion through branchhes in the smaller size classe has a greater impact on operating cost than in the largersize classesStock institutions tend to have operating costs almost 10% higher than mutual institutions.

The results of Cebenoyan (1988) indicate that economies of scale are exhausted after \$25 million of deposits for unit banks in the United States. As for branch banks, economies of scale don't exist for any size. Also he did not find any significant evidence for a U-shaped averege cost curve for \$25-\$50 million deposit size class He categorizes all these banks as being inefficient in costs.

Goldstein, at al (1987) compare the results of the usual scale economies (SCE) and the augmented scale economies (SCE*). Their findings are so similar: The elasticities are significantly less than 1 in all cases indicating the presence of economies of scale throughout all size classes /ranges of output. The only difference is that the SCE* estimates are sharply higher than the SCE estimates in the smaller size classes which means that expansion through branches in the smaller size classes has a greater impact on operating costs than in the larger size classes. Also, stock institutions tend to have operating costs almost 10 percent higher than mutual institutions. Findings of Goldstein, at al (1987) are similar to the earlier studies of scale economies of savings and loan institutions. Because, they indicate economies of scale throughout all ranges of output. The difference between these S&L studies and the recent commercial bank studies (indicating diseconomies of scale beyond \$25 million) may be due to the fact that they have different sizes. Therefore, based on this study, policies which encourage larger size firms in the industry need not to be discouraged on the basis of obvious diseconomies of scale.

5. CONCENTRATION-PRICE STUDIES IN BANKING

There are many studies published on concentration-price relationship in banking, Weiss reports the number at least 34 as of 1987. Most of them employ the data created by questionnaires or tabulations of Federal Reserve System in the U.S. (Weiss, 1989: 219). They were done for different banking markets and prices, such as branch banking, and winning depositors; and loan interes rates, mortgage interest rates, deposit interest rates, demand deposit service charges.

Almost all the studies in the concentration-price area in banking use a linear regression function. They also calculate Herfindahl Index (HI) and different concentration rations depending on the number of firms taken into account. For instance, Bell and Murphy (1969) regresses price on marginal cost and concentration linerarly, Berger and Hannan (1989a) regresses price (interest rate) on concentration and a vector of control variables linearly, and finally, Berger and Hannan (1989b) regresses Money Market Deposit Account (MMDA) rate on 5-firm deposit concentration rations (CR1,CR2,CR3,CR4 and CR5), HI, Square root of HI (RTH) and 2 dummy variables linearly again.

Different measures are used for price. For example, Berger and

Hannan (1989a) employs six different interest rates and Berger and Hannan (1989b) employs Money Market Deposit Account (MMDA) rate only. Also, different measures of concentration rations have calculated: While Berger and Hannan (1989a) employ the three-firm concentration rations (CR3), Berger and Hannan (1989b) emyloy 5 different deposit concentration rations (CR1,CR2,CR3, CR4 and CR5). These kinds of studies also calculate Herfindahl Index (HI) and some other control variables and dummy variables.

The results of Bell and Murphy (1969) show that is a positive, significant effect of cost on prices, which supports their argument. Also, concentration has a consistent, positive and statistically significant effect on price. This causes a dilemma for the authorities: On the one hand, while the bank mergers lower costs which should reduce prices, because of scale in banking; on the other hand, the merger increases concentration and causes higher prices. This will be a serious problem for the policy makers. Another finding is that there is no difference among the various mesaures of concentration. Finally, they found that "large accounts have wide geographical alternatives, and the competitive situation in local markets would not affect these accounts".

Berger and Hannan (1989a) is a very detailed study and tries to use different variables and ways to see the differences. The study tests "the structure performance hypothesis" (SPH), which predicts that prices will be less favorable to consumers in concentrated markets since the markets are not competitive. In contrast, the usual form of "the efficient-structure hypothesis" (ESH) predicts that prices are more favorable to consumers in concentrated markets since the production in such markets is more efficient. One important finding of the study is that banks in more concentrated markets pay lower deposit rates, which is consistent with the implication of SPH, rather than ESH. Onother important finding is that the difference in deposit rates in concentrated and unconcentrated markets is strongly related to the aggregate level of interest rates.

Table 2: Summary of the Concentration-Price Studies in Banking

Studies	Issue	Model	Data	Results
Bell & Murphy (1969)		Repressing price on marginal cost & concentration (linearly)	-Price -Marginal cost -Concentration	 A positive, significant effect of cost on prices. Concentration has a consistent, positive and statistically significant effect on price. There is no difference among the various measures of concentration. Large accounts have wide geographical alternatives, and the competitive situation in local markets would not affect these accounts. Banks in more concert
Berger & Hannan (1989a)	Testing and comparing "the structure performance hypothesis" (SPH), and "the efficient structure hypothesis" (ESH)	Regressing price (interstrate) on concentration & a vector of control variables (linearly)	Price (six different interest rates) - Concentration [both 3-firm concentration ratio (CR3) & Herfindahl index (HI)] - Control var.	trated markets pay lower deposit rates, which is consistent with the implication
Berger & Hannan 1989b)	Examining the relationship between local market concentration and pricing behaviour in the banking industry within the same year, focusing on the rates offered by banks for MMDAs.	-Regressing MMDA rate on 5-firm deposit concentratrion rations (CR1,CR2,CR3,C R4 & CR5) HI, Square root of HI & 2 dummy variables (linearly)	-Price [Money Market Deposit Account (MMDA) rate] - Firm deposit concentration ratio (5-CRs: CR1,CR2,CR3,CR4 and CR5) - HI - Square root of HI (RTH) - 2 dummy variables	-The results have supported SPH, suggesting a strong, statistically significant relationship between market structure and bank prices. - The five CRs, HI & RTH were found similar in both adjusted for and predicted quantitative effects of concentration. - The two dichotomous meaures of cocentration (dummy variable higher adjusted for the higher adjusted for the maximum effect of concentration than the

Finally, the findings of Berger and Hannan (1989b) supports SPH, suggesting a strong, statistically significant relationship between market structure and bank prices. The five CRs, HI, and RTH are found similar in both adjusted R-squares and predicted quantitative effects of concentration.

6. SOURCES OF THE DIFFERENCES IN THE RESULTS

There are some differences in the results among the studies. These differences stem from different sources such as the data, variables, model and estimation techniques, context, and markets considered in the study.

The results may differ because of the "data" that they used Because; (i) each data set have different calculation and collection methods. (ii) Also, they may face different econometric problems depending on what kind of data they used. For example, if data is cross-section, they might have a heteroscedasticity problem; or if data is time-series, they might have a serial correlation problem. (iii) The period of data may also differ the results. (iv) The size and the content of sample character may differ from study to study. (v) Finally, the environment of data may affect the results. Because, the institutions may be different in different countries.

They have used different "variables", including control variables. Especially different interest rates are paid to different groups. Even they employed the same variables, definitions of them were not same. This may lead to different results and conclusions. Almost all of them used cost and output variables, but the concents of them were different. For example, while the interest expenses were included in the study by Murray and White (1983), they were exclued in Golstein, at al (1987).

Another source of differences in the results may come from the "model and estimation techniques" employed in each model. (i) They all may use the translog cost function; but econometrically, restrictions on the function and share equations are very important. Recently Cebenoyan (1988) proved that the incorrect specification of homogeneity restrictions on the translog cost functions are leading to different results. (ii) The disagreement among the researchers on the measurement of overall and product specific economies of scale may differ the results, like Goldstein, at al (1987) 's two types measurement of scale economies. (iii) Finally, what kind of estimation techniques have been used, single or system equations; or Maximum Likelihood, Three Stage Least Squares (3SLS), or Zellner's iterative method (SUR), may be the source of difference, such as the different results between the studies of Murray and White (1983) and Kim (1986).

The difference may come from the "context" that the study was done. For example, if it was done in a multiproduct context, it would cause a

different estimation of economies of scale.

Finally, if the studies have been done for different "markets", such as credit unions, Savings and Loan institutions, and commercial banks, that may cause, different results. This is very important especially for the concentration-price studies; usually differences come from being different markets. As we mentioned earlier, Weiss reported-different markets. For example, the relationship was strong for demand deposit service charges, because "banks discriminated when they are few enough to control their prices, and that means they raise prices most where customers resist least -on check charges, of all things" (Weiss, 1989: 260). He also reported that, during the time that the studies for time deposit interwest rates were done, there was a ceiling on them. There was no relationship when the ceiling was tight, at other times, CR tented to reduce time deposit interest rates (Weiss, 1989: 260).

7. MONOPOLY POWER IN THE TURKISH COMMERCIAL BANKING INDUSTRY

Monopoly power varies from industry to industry; sometimes one firm (monopoly), sometimes two firms (duopoly) and sometimes more than two firms (oligopoly) might have the ability to influence price. Economists use different measures to understand and compare the degree of monopoly (or market) power in an industry. The two commonly used measures of monopoly power in a industry. The two commonly used measures of monopoly power are the market concentration ratio (CR) and Herfindahl Index (HI).

7.1. The Market Concentration Ratio (CR)

"Concentration ratio measures the share of the market accounted for by the largest firms in an industry" (Ragan and Thomas, 1993: 726). Although CR is commonly measured for four firms (banks in our case here), it is possible to measure it for less than or more than four firms. It takes a value between 0 and 100 percent. The rule is the higher the CR the greater the monopoly power in the industry.

We have measured CR to have an idea about market power in the Turkish commercial banking industry for three circumstances for the year 1993: One is for the total deposits collected by all public and private commercial banks. Two is for the credits given by all public and private commercial banks. Three is for the total revenues (interest and noninterest revenues) of all public and private commercial banks (for the name of the banks and calculations see Tables A1-A3, 3 and footnote on page 13).

At first, we have calculated CRs for four banks for the above three circumstances, and then the calculation has been repeated for ten banks for the three circumstances again. Following Ragan and Thomas (1993), our

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evaluation is that if CR is below 50 percent, the industry has a low concentration and therefore the industry is relatively competitive if it is above 50 percent, the industry has a high concentration and therefore the industry is relatively oligopolist.

Based on the information up to here and the results obtained on Table 4, we can conclude that the Turkish commercial banking industry is moderately competitive and has relatively low CRs in terms of all above three circumstances, namely total deposits, total credits and total revenues for four banks (CR4). Because, the CR4 is %46.16 for total deposits, %48.65 for total credits and %45.65 for total revenues. On the other hand, the ten banks* concentration ratios (CR10) for the three circumstances give a highly concentradet industry picture. Because, the CR10 is %77.29 for total deposits, %77.88 for total credits and %77.37 for total revenues. Therefore, the results of the CRs need to be interpreted very cautiously**.

Table 3: Four Banks That Have The Highest Market Shares

	Total Deposits	Total Credits	Total Revenues
В	T.C. Ziraat Bankası	T.C.Ziraat Bankası	T.C.Ziraat Bankası
A	T. Emlak Bankası	T. Emlak Bankası	T. Halk Bankası
	T.lş Bankası	T.lş Bankası	Akbañk
	Yapı ve Kredi Bankası	Yapı ve Kredi Bankası	T.lş Bankası

7.2. The Herfindahl Index (HI)

Another commonly used mesure of monopoly power is the Herfindahl Index (HI), which sums the market shares of all firms in the industry. HI takes the sum of the squares of each firm's market share.

$$HI = -S_i^2 = (S1)^2 + (S2)^2 + (S3)^2 + + (S_i)^2 + + (S_i)^2$$

^{*}Ten banks that have the highest market shares in total deposits, total credits and total revenues: T.C. Ziraat Bankası, T. Emlak Bankası, T. Halk Bankası, T.Vakıflar Bankası, Akbank, Pamukbank, Türk Ticaret Bankası, T.Garanti Bankası, T. İş Bankası and Yapı ve Kredi Bankası.

^{**} Concentration rations for most of the manufacturing industries Turkey are much higher than the banking industry. For instance, CR4 is %70 for the soap and detergant industry in 1993 (DPT, 1994: 22-25: Dinler, 1994: 304).

where si is the market share of each (i th) firm, expressed as a decimial function, and n is the number of firms (commercial banks) in the industry. The possible values of the HI vary between 0 and 1, indicating the market structures from purely competitive to purely monopoly. According to the generally accepted guidelines, if the HI is higher than %18, the industry is accepted as highly concentrated, and if the HI is less than %10, the industry is accepted as competitive. For horizontal mergers, the followed guideline (by the U.S. Justice Department) is that if the HI is higher than %10, there is a substantial monopoly power in the industry, and if the HI is less than %10, there is a competitive structure in the industry (Tresch, 1994: 491, 492; and see Ragan and Thomas, 1993: 730 and Case and Fair, 1992: 427, 428 for a different evaluation of the HI results).

We have calculated HI to have an idea about the degree of market power in the Turkish commercial banking industry for three circumstances as in the case of CR for the year 1993: One is for the total deposits collected by all public and private commercial banks. Two is for total credits given by all public and private commercial banks. Three is for the total revenues (interest and noninterest revenues) of all public and private commercial banks (Tables A1-A3).

As seen on Tables A1 to A3, we have calculated the Herfindahl Indexes for the above three circumstances as follows. For the total deposits:

HI =
$$(0.0.171)^2$$
 + $(0.00004)^2$ + $(0.2031)^2$ +...+ $(0.0670)^2$ =0.0845 (%8.5)

For the total credits:

HI =
$$(0.0043)^2$$
 + $(0.1848)^2$ + $(0.1135)^2$ +...+ $(0.0929)^2$ =0.0822 (%8.2)

For the total revenues:

$$HI = (0.0269)^2 + (0.00009)^2 + (0.2204)^2 + + (0.0612)^2 = 0.0879$$
 (%8.8)

Criteria Total Number of Total Total Credits Deposits Banks Revenues 0.0822 0.0845 HI 0.0879 38 0.4865 CR 0.4565 0.7788 0.8655 0.7737

- Table 4: Results of HI and CR

Source: Calculated from Tables A1, A2 and A3.

Since the results of the Herfindahl Indexes for all three cases above are less than %10, the Turkish commercial banking industry has a relatively competitive market structure. Considering both maesures of monopoly power, CR and HI, the Turkish commercial banking industry has a moderately competitive market structure, and therefore it is a lowely concentrated industry. But the results still need to be interpreted very carefully (cautionsly) since the results of both criteria are very close to the critical numbers. For example, in terms of the total deposits, CR4 is 0.4616 < 0.50 and HI is 0.0845 < 0.10; in terms of the total credits, CR4 is 0.4865 < 0.50 and HI is 0.0879 < 0.10; In addition to these results, the ten banks concentration ratios are quite high in the industry (%77.29, %77.88 and %77.37, in total deposits, in total credits and in total revenues, respectively).

8. CONCLUSION AND SUGGESTIONS

Most of the cost studies in banking have concluded economies of scale for banking institutions at relatively low levels of output. Most of them tried to measure only overall economies of scale (Clark, 1988: 20), only a few of them tried to measure product-specifice economies of scale because of long exrapolation calculations. But, the ones that have estimated have not strongly supported the idea of significant economies of scale for all the products. For example, Kim found a modest results for mortgage loans.

Clark rewiewed 13 cost studies and came to this conclusion (Clark, 1988: 26-27) that "the smallest, most specialized of depository institutions may be at a cost disadvantage relative to larger, more diversified institutions". This situation may derive these depository institutions from the the market and leave the market to the more efficient ones. The results also suggest that "once overall scale economies have been exhausted, there will still be opportunities for the smaller, less diversified depository institutions". On the other hand, in the case that there is no cost advantage for the largest, most diversified financial institutions, "the banking industry will be dominated by a few large depository financial institutions. The lifting of restrictions on interstate banking and interstate branching might help consolidate resources in states that have prohibited or severely limited branch banking by permitted small banks to achieve more efficient scale of production".

On the other hand, the conclusion of the above concentration-price studies have shown that there is a strong relationship between concentration and prices. Weiss (1989) reviewed many studies and come to the conclusion that "selling prices rise with concentration, and buying prices fall with concentration",.... which yields massive support for the prediction of conventional oligopoly theory" (Weiss, 1989: 259).

For the studies in the area to be done in the future, in addition to the ones done up to now, we think that the "effect of technological change" on bank prices need to be tested more carefully, may be adding a time trend to the translog cost function, and putting its constrains for different data set. However, banking is one of the most affected industry by technological change. Computer is the basic material due to high-technology.

Again, it would be preferable "to change the structure of factor prices"; adding "human capital" and "information technology". Because, recently there are some important criticism regarding the traditional production factors; there are some developing arguments that labor is not only a production cost, it is a part of capital with a new co-operative organization structure. Also, information technology is being recently considered as an input, which is extremely needed by the banking industry. If the banks have a good information and continue to have it, they will be computing more successfully, and also they may not need to collude more.

Our calculations of concuntration rations and Herfindahl Indexes indicate that the Turkish commercial banking industry has a moderately competitive market structure, and therefore it is a lowely concentrated industry. But the results still need to be interpreted very cautiously since the results of both criteria are very close to the critical numbers. For example, in trems of the total deposits, CR4 is 0.4616 < 0.50 and HI is 0.0845 < 0.10; in terms of the total credits, CR4 is 0.4865 < 0.50 and HI is 0.0822 < 0.10; and in terms of the total revenues, CR4 is 0.4565 < 0.50 and HI is 0.0879 < 0.10.

ÖZET

Bankacılık sahasında maliyet çalışmalarının çoğu, bankacılık kurumları nispeten düşük çıktı düzeylerinde ölçek ekonomilerinin olduğu sonucuna varmışlardır. Dolayısıyla, bu kurumların en kücük, en uzmanlaşmış olanlarının, daha büyük ve daha farklılaşmış kurumlara karşı bir maliyet dezavantajları olabilir. Diğer taraftan, bankacılık endüstrisinde yogunlaşma -fiyat çalışmaları, yoğunlaşma ve fiyat arasında güçlü bir ilişki bulmuşlardır. Geleneksel oligopol teorisini de destekler nitelikte, satış fiyatlarının yoğunlaşma ile arttığı, alış fiyatlarının ise yoğunlaşma ile düştüğü görülmüştür. Bu çalışma, yatay banka birleşmelerini daha iyi analiz edebilmek için, konuyla ilgili yapılmış ampirik çalışmaların bir kısmının incelenmesinden sonra, Türk bankacılık endüstrisinde yoğunlaşma derecesini hesaplamayı konu edinmiştir.

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APPENDIX

Table A1: Total Credits

Banks		s2
Etibank	0.0043	0.0002
Sümerbank	0.0	0.0
T.C. Ziraat Bankası	0.1848	0.0341
T. Emlak Bankası	0.1135	0.0129
T. Halk Bankası	0.0523	0.0027
T.Vakıflar Bankası	0.0548	0.0030
Adabank	0.0004	0.00001
Akbank	0.0536	0.0029
Alternatifbank	0.0037	0.0001
Bank Ekspres	0.0089	0.0008
Demirbank	0.0160	0.003
Derbank	0.0	0.0
Egebank	0.0099	0.0001
Eskişehir Bankası	0.0266	0.0007
Eurocredit Türk Fransız Tic. Bank.	0.0	0.0
Finansbank	0.0103	0.001
Interbank	0.0153	0.0002
Iktisat Bankası	0.0151	0.0002
Koçbank	0.0109	0.0001
Marmara Bankası	0.0098	0.0001
Milli Aydın Bankası	0.0025	0.00006
Pamukbank	0.0560	0.0031
Şekerbank	0.0090	0.0008
Tasarruf ve Kredi Bankası	0.0	0.0
Tekstil Bankası	0.0051	0.0003
Toprakbank	0.0026	0.00007
Türk Boston Bankası	0.0013	0.00002
Türk Dış Ticaret Bankası	0.0153	0.0002
Türk Ekonomi Bankası	0.0081	0.0007
Türk Ticaret Bankası	0.0310	0.0096
T. Garanti Bankası	0.0446	0.0020
T. Imar Bankası	0.0097	0.0009
T. İş Bankası	0.0953	0.0091
T. Ithalat ve Ihracat Bankası	0.0082	0.0007
T. Konut Endüsri ve Tic. Bankası	0.0042	0.0002
T. Turizm Yatırım ve Dış Tic. Bank.	0.0058	0.0003

Source : Calculated from "Bankalarımız 1993", Türkiye Bankalar Birliği,

Table A2: Total Deposits

Banks		S2
Etibank	0.0171	0.0003
Sümerbank	0.0004	0.00001
T.C. Ziraat Bankası	0.2031	0.0412
T. Emlak Bankası	0.0972	0.0095
T. Halk Bankası	0.0630	0.0040
T. Vakıflar Bankası	0.0617	0.0038
Adabank	0.0006	0.00003
Akbank	0.0600	0.0036
Alternatifbank	0.0016	0.0003
Bank Ekspres	0.0207	0.004
Demirbank	0.0125	0.0002
Derbank	0.0003	0.00001
Egebank	0.0045	0.0002
Eskişehir Bankası	0.0125	0.0002
Eurocredit Türk Fransız Bank	0.0036	0.0001
Finansbank	0.0177	0.0003
Interbank	0.0038	0.0001
İktisat Bankası	0.0039	0.0002
Koçbank	0.0046	0.0002
Marmara Bankası	0.0240	0.006
Milli Aydın Bankası	0.0033	0.0001
Pamukbank	0.0476	0.0023
Şekerbank	0.0118	0.001
Tasarruf ve Kredi Bankası	0.0011	0.000012
Tekstil Bankası	0.0053	0.0003
Toprakbank	0.0028	0.00008
Türk Boston Bankası	0.0	0.0
Türk Dış Ticaret Bankası	0.0041	0.0002
Türk Ekonomi Bankası	0.0042	0.0002
Türk Ticaret Bankası	0.0437	0.0019
T. Garanti Bankası	0.0353	0.0012
T. Imar Bankası	0.0094	0.0009
T. İş Bankası	0.0943	0.0089
T. Ithalat ve Ihracat Bankası	0.0281	0.008
T. Konut Endüstri ve Tic. Bank.	0.0030	0.00009
T. Turizm Yatırım ve Dış Tic.Bank	0.0063	0.0004
T. Tütüncüler Bankası	0.0198	0.004
Yapı ve Kredi Bankası Source: Calculated from "Bankalarımı"	2000年1月1日至1月2日的中国中国的大型的大型工程的工程,但是在1月2日的工程的工程的工程的工程的工程的工程的工程的工程的工程的工程的工程的工程的工程的	0.0045

Source: Calculated from "Bankalarımız 1993", Türkiye Bankalar Birliği, 1994.

Table A3: Total Revenues (Interest + Other)

Banks	S	s ²
Etibank	0.0269	0.007
Sümerbank	0.0009	0.00008
T.C. Ziraat Bankası	0.2204	0.0486
T. Emlak Bankası	0.0671	0.0045
T. Halk Bankası	0.0675	0.0046
T. Vakıflar Bankası	0.0478	0.0023
Adabank	0.0010	0.00001
Akbank	0.0780	0.0061
Alternatifbank	0.0029	0.00009
Bank Ekspres	0.0086	0.0007
Demirbank	0.0127	0.0002
Derbank	0.0	0.0
Egebank	0.0073	0.0005
Eskişehir Bankası	0.0140	0.0002
Eurocredit Türk Fransız Tic. Bank	0.0	0.0
Finansbank	0.0169	0.0003
Interbank	0.0183	0.003
Iktisat Bankası	0.0158	0.0003
Koçbank	0.0055	0.0003
Marmara Bankası	0.0073	0.001
Milli Aydın Bankası	0.0036	0.0001
Pamukbank	0.0551	0.0030
Şekerbank	0.0120	0.001
Tasarruf ve Kredi Bankası	0.0013	0.00002
Tekstil Bankası	0.0040	0.0002
Toprakbank	0.0035	0.0001
Türk Baston Bankası	0.0010	0.000009
Türk Dış Ticaret Bankası	0.0109	0.001
Türk Ekonomi Bankası	0.0062	0.0004
Türk Ticaret Bankası	0.0468	0.0022
T. Garanti Bankası	0.0392	0.0.0015
T. Imar Bankası	0.0124	0.0002
T. İş Bankası	0.0906	0.0082
T. Ithalat ve Ihracat Bankası	0.0099	0.0001
T. Konut Endüstri ve Tic. Bankası	0.0024	0.00006
T. Turizm Yatırım ve	0.0046	0.0002
T. Tütüncüler Bankası	0.0160	0.0003
Yapı ve Kredi Bankası	0.0612	0.0037

Source: Calculated from " Bankalarımız 1993", Türkiye Bankalar Birliği, 1994.

