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Test of Market Structure and Profitability in Liberalizing the Deposit Market: The Case of North Cyprus

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Abstract

This paper investigates profitability determinants of North Cyprus depository institutions using panel data between 1991 and 1997. It uses random-effect model to test market power (traditional SCP or collusion) and efficient-structure hypotheses for a single geographical deposit market The results obtained from the study show that none of these hypotheses holds for the North Cyprus deposit market during the study period.

Key words: market structure, banking, profitability, North Cyprus.
JEL Classifications: L1, D21, D40, G20.

1. Introduction

Liberalization policies in developing countries have been accepted as an important component of economic development at the beginning of the 1980's. North Cyprus was among countries which expected to obtain benefit from the application of these policies. Therefore, like other developing economies, North Cyprus has also made significant changes in its money and banking system.

Due to liberalization policies in the banking system, there was an enormous increase in the number of banks, especially during the 90's. The number of banks, which was around 13 during the 1980's, reached 29 at the end of 1997. In addition to an increasing number of banks, their competitors, like credit cooperatives and savings banks number have also increased. Since these institutions have been giving similar services as commercial banks, competition in the banking sector has increased. Moreover, different regulations among banks and cooperative type financial institutions have provided some competitive advantage to cooperatives and savings banks over the commercial banks. As a consequence, unfair competition has been triggered in the deposit market and this has encouraged banks and other depository institutions to take higher risks, as well as unlawful action in their operations.

In this study we investigated structure, conduct and performance (SCP) relationship of the North Cyprus deposit market in which a tight oligopoly prevails with respect to assets, deposits and credit ratios (Bektas, 2002). For this purpose, we employed traditional SCP and efficient market hypothesis. In most of the SCP literature, because of data characteristics, cross-section analysis is used. However, in this study, data structure provides an opportunity to employ panel data for a single market where heterogeneity of the operations and geographical differences are not very important.

The study primarily is divided into four parts. Section 2 summarizes SCP related literature. In section 3, data sources and the model of the study are described. Section 4 presents empirical results and interprets findings of the regression analysis. Finally, section 5 concludes.

2. Traditional Structure, Conduct and Performance and Efficient Market Hypothesis

Economic theory states that market structure is among the most significant determinants of competition in markets. Generally economists use 'Industrial Organization Theory' and the associated 'Structure Conduct and Performance' (SCP) hypothesis to explain relationships among market structure, conduct and performance. Philadelphia National Bank's failure in the United States led to the use of SCP hypothesis in the banking industry (Smirlock, 1985). The aim of SCP studies is to investigate the correlation among structure, conduct and performance and, hence, to reveal the impact of market structure on the performance of firms. The SCP hypothesis asserts

that, in highly concentrated markets, collusion or mutual agreements among firms could be easily accomplished. Therefore, collusive behavior of firms, particularly in terms of pricing policies, has an adverse effect on competition.

Due to measurement problems of the 'conduct' variable, economists generally employ structure and performance variables in their studies. SCP studies related to banking have also called upon these measurable variables. In most of these studies, performance is considered a function of different measures of concentration ratios (Gilbert, 1984). However, insignificant results in some of these studies have caused scepticism among researchers. In addition to this, they have also revealed that these measures may cause inconsistent results (Rhodes, 1977; Rose and Fraser 1976; Gilbert, 1984). For example, the concentration ratio, which was used as a market structure measure in SCP studies, is not affected by bank performance in the way assumed in the hypothesis. Gilbert (1984) stated that inconsistent results of the SCP studies have attracted many criticisms among economists.

Those economists who have criticized the SCP hypothesis have looked for consistent results and tried to develop new models. The primary motives behind these efforts were the potential of other variables than concentration ratio that would affect profitability consistently and significantly. Therefore, they have contemplated identifying other variables. Demsetz (1973), Peltzman (1977) and Brozen (1982) are among economists who have sought these variables. These economists appear to have asserted that concentration is the result not of collusion or mutual agreements among firms, but rather of their superior production efficiency. According to this view, firms with production efficiency have a cost advantage. This allows them to use pricing policies to increase market share. The result is concentration will be higher in markets which contain firms with superior production efficiency. Smirlock (1985) referred to this view as the 'efficient structure' hypothesis. Demsetz (1973) argued that, relationship between concentration and profit is a spurious one and, actually profitability is the result of interrelationship among production efficiency, market share and concentration.

Smirlock (1985), Evanof and Fortier (1988), Berger and Hannan (1989), Hannan (1991), Molyneux (1992a) and Berger (1995) are among economists who attempted to develop new models with different hypotheses. Smirlock (1985), who benefited very much from Weiss (1974) study, grouped SCP related hypotheses under three headings: traditional SCP, efficient structure and product differentiation. He employed concentration ratio, market share and an interaction variable to test efficient structure versus traditional SCP hypothesis. Results favoured to the efficient structure hypothesis. Then, he asserted that, proper use of market share in the model eliminates the relationship between concentration and profitability. According to the findings of this study, concentration in the banking sector is not the result of monopoly power, but reflects the superior efficiency of the leading firms. Hence, penalizing leading banks to avoid monopoly power would therefore cause inefficiencies and, decreases welfare (Smirlock 1985). On the other hand, Molyneux's (1992a) study, which was carried out to determine profitability factors in 'European Banking Industry', found statistically significant and positive correlation between concentration and bank profitability, as indicated by traditional SCP hypothesis. In his second study on 'European Bank Market Structure and Performance', Molyneux (1992b) tested the two competing hypotheses and again found support for the traditional SCP hypothesis. In contrast to the US banking industry, which revealed evidence in favour of the efficient market hypothesis, research findings support the view that in the European banking industry, due to high concentration banks can lower cost of collusion and earn above normal profits (Molyneux 1992b).

Although it is stated that, US based studies are in favour of efficient market hypothesis, generalization cannot be made. For example, Berger and Hannan (1989) found strongly consistent results supporting traditional structure-performance hypothesis. Their results showed that banks operating in most concentrated markets are paying lower rates to MMD, super-NOWs and shorter term CD relative to the least concentrated markets. However, these economists have not ruled out the role of efficient structure hypothesis in the profit concentration relationship. Regarding cost efficiency in banking, Berger and Hannan (1998) found strong evidence that in more concentrated markets banks have lower cost efficiency. Actually, this finding contradicts to the efficient market hypothesis (which claims that concentration is the result of efficiency). Berger (1995) tested the

profit-structure relationship of market power and efficient market hypothesis by employing direct measures for both of them. His findings lent limited support to X-efficiency which assumes that firms with superior management and technology have cost advantage and relative market power. In addition, this study has also showed that scale economies and concentration are not positively related to profits.

3. Data and the Model

Data of this study were acquired from the year-end balance sheets and income statements of commercial banks and cooperative financial institutions operating in the North Cyprus (NC) deposit market over a seven year period 1991-1997. Because of data problems, we could not cover all depository institutions. Our study therefore includes 30 of the commercial banks and 24 cooperative financial institutions. Owing to missing data of some banks, the number of observations is equal to 308.

The absence of geographic markets (sub-markets) as in the USA and the European Union (on a country basis), does not allow us to employ cross section data for NC deposit market. In a single geographical market, fixed variables, like concentration ratio cause multicollinearity in the cross section study. Therefore, possible multicollinearity problem of fixed variables is minimized by transforming cross-section data to panel data. In addition, the pooling of data increases number of observations and provides strength to the econometric analysis by increasing the degrees of freedom.

As in previous literature, ROA (return on assets) is used to measure bank profitability. Since it reflects overall profitability, it covers all aspects of the management of depository institutions. To test the impact of assets concentration to profitability, we use 4 and 8 firm concentration ratios. Heggested and Shepherd (1982) suggest that Herfindahl-Hirschman index (HHI) is a better measure of concentration than simple concentration ratios. In addition to simple concentration measures, we therefore also used the Herfindahl-Hirschman index of assets (HHIA). Market shares of depository institutions are measured with respect to deposits (MSD) and assets (MSA). These variables are used to evaluate depository institutions efficiency. To understand the joint effect of market share and concentration to performance, the product of market share and concentration (as an interactive variable, MSCRA) is added to the model. Using the above variables' coefficients, competing collusion (market power) and efficient structure hypotheses can be tested. They are therefore named the key variables of the study.

In addition to market structure variables, important bank specific profitability variables are also included in the regression equation. One of the important determinants of profitability is the risk level. Hence, to consider risk return relationship we used credit to deposits ratio (LD) and capital to assets ratio (CAPA).

The primary role of depository institutions in the economy is the intermediation function. They perform this function by accepting deposits and supplying loans to customers. Loans are among the most important income generating assets and constitute greatest portion of the depository institutions assets. Moreover, loans affect liquidity and earnings risks. Loans can therefore be used to consider risk and performance together. Higher loans in balance sheet signal higher risk and profitability. Nevertheless, a negative impact of loans on profitability should not be surprising. Bad management or affiliation with other businesses could cause insider lending and this may result in a negative relationship between profit and loan size. On the other hand, deposits constitute largest portion of liabilities. It therefore affects profitability through cost management. Lower deposit rate and efficient use of deposits increase profitability. Hence, to account all these factors the LD ratio is placed in our equation.

The capital to asset ratio is the most popular risk measure among the researchers. It is used to show leverage and, hence, the risk level of the depository institutions. Lower CAPA anticipates higher risk, therefore higher profit is expected. Moreover, a lower capital ratio implies higher capacity utilization and hence, lower opportunity cost. Higher capacity utilization will have positive effect on profitability. Nevertheless, lower capital would have a negative impact on profit-

ability through higher funding cost. Because weakly capitalized banks are asked to pay higher interest rates on borrowed funds.

Microeconomic theory states that scale economies provide lower cost and therefore higher profitability. So, assets size (ASS) is designed to capture differences brought by the size effect on profitability. Finally, dummy variable (DUM) is included to reveal impact of ownership differences. We assign 1 for the commercial banks and 0 for the cooperative type depository institutions.

Following Smirlock's (1985) and Molyneux (1992b) models, we tested the traditional SCP and efficient structure hypothesis for the North Cyprus deposit market. We used following profit equation to test the competing hypotheses for North Cyprus:

$$\pi = a_0 + a_1 MS + a_2 CR + a_3 MSCR + \sum_{i=4}^{n} a_i Z_i \; . \tag{1}$$

After substituting our variables into this model our regression equation comes out as shown below:

$$\pi = a_0 + a_1 MS_{i,t} + a_2 CR_t + a_3 MSCRA_{i,t} + a_4 LD_{i,t} + a_5 CAPA_{i,t} + a_6 ASS_{i,t} + a_7 DUMMY_{i,t} \; . \tag{2}$$

Tests for the traditional collusion and efficient market hypotheses are performed by following Smirlock's (1985) test methodology. According to this methodology $a_1>0$ and $a_2=0$ are two conditions which indicate banks are operating in efficient market. In other words, high concentration in such bank markets is not the result of collusive behavior or monopoly power. Instead, it is the result of efficiency. A coefficient combination of $a_1=0$ and $a_2>0$ states that firm profitability is the result of monopoly power and not of efficiency. $a_3>0$ is attributed to markets where high concentration is the result of collusive behavior. Therefore larger firms earn higher rent. $a_3 \leq 0$ implies that there is no collusion. To investigate relationship between profitability, market structure and efficiency in our model, we use random effect model.

4. Results

Results of regression equation are shown in Table 1. They are estimated by employing the random effect model of generalized least squares (Greene, 1997). In our model, profitability measure ROA is regressed against market structure variables (CRA4 and MSA) and other bank specific variables. By restructuring market structure variables and keeping bank specific variables constant, the equations in Table 1 are estimated. However, statistically significant market variable coefficients can not be found. As results show, when concentration ratios are used with bank specific variables and market share, they take positive values. On the other hand, market share variables take negative values in the same equations. However, inclusions of deposit market share in the equation change the positive sign of concentration ratios to negative. Nevertheless, none of the market structure variables is significant. This implies that profitability of North Cyprus depository institutions is not determined by market share or concentration ratio. In other words, market power and efficiency are not among the determinants of profitability. Since, efficiency and scale economies are closely related, insignificant asset size ASS or economies of scale variable in all equations also support these results. Obviously, results show that neither collusion nor efficiency prevails in the North Cyprus deposit market[1].

In terms of variables specific to depository institutions, as expected, LD coefficients take positive values in all equations. However, it is significant only in model 2 and insignificant in the other models, and therefore casts doubt on results[2]. For the CAPA we could not find negative coefficients which reflect negative relationship between capital and profitability. We found positive and a statistically significant correlation between capital ratio and profitability. Possibly this is because of the lower funding cost. Well capitalized banks can raise funds at a lower cost than the

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[1] Bektas (1999), using 'New Empirical Industrial Organization' methodology finds that North Cyprus deposit market is perfectly competitive. This supports the view that there was no collusion among banks.
[2] Huge amounts of bad debt, related lending to subsidiaries and a hidden amount of deposits which are uncovered by regulatory authority after 2000 banking crisis, may have an impact on these results.

weakly capitalized banks and can accordingly improve profits. The dummy variable is used to reveal ownership differences (commercial bank vs. cooperatives) on profitability. In all models it is negative and statistically significant. As explained in data and methodology section, 1 is assigned to commercial banks. This shows that commercial banks are less profitable than the cooperatives. Since cooperatives are smaller, these results contradict scale economies, but, nevertheless, support our above findings.

Table 1

Regression Results

	C	HHIA	CRA8	CRA4	MSA	MSCRA	MSD	LD	CAPA	ASS	DUMMY	R^2	F-LM
REM_1	0.044 (2.19)			0.0028 (0.093)	-0.015 (-0.16)			0.004 (1.38)	0.146 (5.59)	-0.0015 (-0.21)	-0.05 (-4.61)	0.31	91.55
REM_2	0.036 (1.68)			0.014 (0.45)	0.776 (1.36)	-1.14 (-1.41)		0.006 (1.83)	0.15 (5.62)	-0.001 (-1.10)	-0.05 (-4.61)	0.32	86.65
REM_3	0.048 (2.36)			-0.004 (-0.13)			0.15 (1.25)	0.004 (1.47)	0.16 (5.96)	-0.0003 (-0.36)	-0.058 (-5.19)	0.32	91.88
REM4	0.045 (1.23)		0.0007 (0.02)		-0.015 (-0.15)			0.004 (1.40)	0.15 (5.58)	-0.00017 (-0.22)	-0.052 (-4.62)	0.32	91.43
REM5	0.054 (1.46)		-0.012 (-0.26)				0.16 (1.27)	0.004 (1.49)	0.16 (5.95)	-0.0003 (-0.41)	-0.058 (-5.21)	0.32	91.99
REM6	0.044 (3.94)	0.02 (0.33)			-0.018 (-0.19)			0.004 (1.34)	0.15 (5.61)	-0.0001 (-0.16)	-0.052 (-4.59)	0.32	91.59
REM7	0.044 (4.00)	0.009 (0.14)					0.15 (1.20)	0.0035 (1.41)	0.15 (5.95)	-0.0002 (-0.29)	-0.058 (-5.15)	0.32	91.76

t-values are in parentheses

As can be seen from Table 1, explanatory powers of the regression equations are almost same in all equations. Based on the data for 1991-1997, 32 per cent of variations (except for equation 1) in profitability can be explained by the variables used regression equations. F and LM statistics also show that equations have statistically significant explanatory power.

Conclusion

The main objective of this study was to find a relationship between profitability and the market structure of North Cyprus depository institutions by testing the two competing hypotheses of structure, conduct and performance paradigm. Using panel data method and the random effect model, market power (collusion) hypothesis and efficient structure hypothesis have been tested for the period of 1991-1997. To do this, we used return on assets as a profitability measure. In our regression equations, market structure is measured by concentration ratio and market share variables. Variables specific to depository institutions, such as assets size, capital ratio, loan ratio and ownership types, are used to account for institutional differences.

The results suggest that neither collusion nor efficient structure hypotheses hold in the North Cyprus deposit market for the period of 1991-1997. In other words, profitability is not the result of collusive behavior or efficient operation of depository institutions. Two of the depository institution specific variables, CAPA and DUMMY are statistically significant and correlated with performance. Positive relationship between CAPA and ROA, proposes that well capitalized de-

pository institutions are more profitable than weakly capitalized depository institutions. The negative sign of the DUMMY coefficient shows that cooperative banks are more profitable. The insignificant value of ASS indicates that economies of scale is absent from depository institutions operations. Similar to ASS, LD also takes insignificant values in all equations except one.

These outcomes of the study have two implications for North Cyprus deposit market. The absence of collusion reflects fair pricing of banking services and this is good for the economy in general. Nevertheless, the insignificant coefficient of efficiency raises questions about the efficient allocation of funds.

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