Collusion in the Turkish Banking Sector

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Abstract

In this paper, I consider the Turkish Banking Industry, which is dominated by a few large banks. Using a conjectural variation approach, I estimate a structural model to examine the market conduct of the largest banks for the period 1988-2009. Estimation results suggest that the Turkish banks colluded in the loan market during the sample period where the average mark-up is estimated to be in the range of 44% to 86% depending on the empirical specification. This evidence demonstrates a conflict between market concentration and competition in the Turkish banking industry. Thus, regulatory agencies should be cautious against attempts to increase concentration in the banking industry.

JEL codes: G21, L10

1 Introduction

Recent global crisis has put the banking industry in various parts of the world on the spot light. Many US and European banks have severely affected by the financial crisis. Policy makers have offered solutions to rescue banking industry from this turmoil in Greece, Spain and Italy among other countries. Since the strength of national economies depend on healthy financial sector, which in turn largely comprised by the banking industry in many countries including Turkey, one needs to assess the competitiveness of the banking sector for effective macro-economic policy making. Due to major structural changes after 1999 and 2001 crisis, the Turkish banking industry has been successfully passing through the recent crisis. Some industry analysts and academics claim that the Turkish banking industry is competitive while also profitable. (Aktan and Masood, 2010**)** However, as structure-conduct-performance paradigm argues, there is an inverse relationship between competition and profitability in an industry. In other words, as competition intensifies, industries become less profitable (Stigler, 1964). If this line of thought has some merit, which I believe is true in the context of Turkish banking sector, then high profits observed in the sector imply less competitive conduct than otherwise.

Indeed, contrary to what others claim, recent anecdotal evidence implies that Turkish Banking Industry may not be that competitive. For example, Turkish Competition Authority fined seven major banks after its investigation regarding “gentlemen’s agreement” among eight largest banks in the industry. These banks have been accused of engaging in an anti-competitive agreement regarding the limitations of promotions offered to private and government companies for salary payments. Despite severe objections by the media and the industry, on March 8, 2011, Competition Authority imposed fines totaling 73 million TRY, which is the largest value in its 14 year history (Turkish Competition Authority, 2011). Moreover, Akin et al. (2010) shows that the credit cards market in Turkey is not competitive.

Motivated by these observations, this paper examines the possibility of collusion in the Turkish Banking Sector using conjectural variation approach (Roller and Sickles, 1995). This approach has been applied to evaluate the degree of oligopolistic coordination between banks in countries such as the US (Shaffer, 1989), Canada (Shaffer, 1993), Italy (Coccorese, 2005) and Hong Kong (Wong, et. al, 2007) among others. All these papers found no significant evidence for collusion in the corresponding banking markets. However, this study using the same conjectural variation framework of Coccorese (2005) finds an opposite result. Estimation results suggest that Turkish banks under consideration actually colluded in the loan market during the period 1988-2009 where the average mark-up is estimated to be in the range from 44% to 86% depending on the empirical specification.

2 Data and Empirical Methodology

The relevant variables in this study were constructed using data provided by Turkish Banking Association’s website. To compare results with earlier studies regarding the competitiveness of the Turkish banking industry, I restrict my sample to include only domestic and foreign commercial banks from 1988-2009. The sample contains the following banks: Akbank, Anadolubank, Citibank, Denizbank, Eurobank Tekfen, Finansbank, Fortisbank, HSBC, INGBank, Millenium Bank, Sekerbank, Tekstilbank, Turkishbank, Turklandbank, Turk Ekonomi Bankasi, Ziraat, Garanti, Halkbank, Is bankasi, Vakifbank, YapiKredi. The standard conjectural variation approach is employed to conduct the empirical study. The Turkish banking industry consists of eight large banks, which have strong national presence and much smaller banks, which only operate in a few profitable markets such as Istanbul and Ankara. Hence, the banking industry can be modeled as an oligopoly where there are nine rivals (eight large banks and the other smaller banks as the ninth bank, which is similar to Italian Banking sector as in Coccorese (2005)) which engage in price-competition. Akbank, Finansbank, Ziraat, Garanti, Halkbank, Is bankasi, Vakifbank and YapiKredi are considered to be the eight largest banks in Turkey according to their asset size. Note that except Ziraat and Halkbank, these banks were fined by the Turkish

Competition Authority. I construct a system of demand, cost and price-cost margin equations to estimate essentially a conjectural variation parameter, which captures the degree of coordination between banks. For that purpose, suppose each banking firm has the following demand function:

$$q_{it} = q_{it}\left(p_{it}, p_{jt}, Z_{it}\right) \qquad i = 1, \ldots, 9 \tag{1}$$

where q_{it} is the quantity demanded (measured by value of loans) and p_{it} is the price (interest rate charged on loans) charged by bank i. P_{jt} is the weighted index of the rivals' prices and Z_{it} is the vector of exogenous factors affecting demand. Each bank determines its price given the remaining eight rivals' prices. In this sense, the market for loans can be considered as a duopoly. The demand function is assumed to have the following form:

$$lnq_i = \alpha_0 + \alpha_1 lnp_i + \alpha_2 lnp_j + \alpha_3 lnGDP + \alpha_4 lnBRANCH_i + \varepsilon_i \tag{1i}$$

where GDP is the national income and $BRANCH_i$ is the number of branches of bank i to control for network effect. The own-price elasticity, α_1, is expected to be negative, whereas the cross-price elasticity, α_2, is expected to be positive. Overall economic activity, α_3, and network size, α_4, are both expected to have positive effect on demand.

The cost function depends on the output q_{it} and the price w_{it} of input factors:

$$C_{it} = C(q_{it}(.), w_{it}) \tag{2}$$

I utilize a three-factor translog function commonly used in the banking literature (input factors: deposits, labor and physical capital) to model the cost function:

$$\ln C_i = \delta_o lnq_i + \frac{\delta_1}{2}(lnq_i)^2 + \sum_{r=1}^{3}\theta_r\, lnw_{ri} + lnq_i\sum_{r=1}^{3}\delta_{r+1}\, lnw_{ri} + \sum_{r=1}^{3}\theta_{r+3}\,(lnw_{ri})^2 + \theta_7 lnw_{1i}lnw_{2i} + \theta_8 lnw_{1i}lnw_{3i} + \theta_9 lnw_{2i}lnw_{3i} + \zeta_i \tag{2i}$$

Marginal cost function is easily derived as follows using the cost function above:

$$MC_i = \frac{\partial C_i}{\partial q_i} = AC_i\left(\delta_o + \delta_1 lnq_i + \sum_{r=1}^{3}\delta_{r+1} lnw_{ri}\right), \tag{2ii}$$

where AC_i is the average cost and calculated as the ratio between total costs and loans. Three input factors are employed in the above specification. First, the price of deposits, w_{1i}, is calculated as the ratio between interest expenses and deposits. Second, the price of labor, w_{2i}, is measured as the ratio between total labor costs and the number of employees. Third, the price of physical capital, w_{3i}, is calculated as the ratio between the depreciation of fixed assets plus amortization of intangible assets and property plus equipment plus intangible assets.

Given the demand and cost functions, the profit function is given as follows:

$$\Pi_{it} = q_i(.)p_i - C_i(q_i(.), w_i) \tag{3}$$

Firms maximize their profit functions with respect to their prices. Hence, first order condition (f.o.c.) yields,

$$\frac{\partial \pi_i}{\partial p_i} = q_i + \left(p_i - MC_i(.)\right)\left(\frac{\partial q_i}{\partial p_i} + \frac{\partial q_i}{\partial p_j}\frac{\partial p_j}{\partial p_i}\right) = 0 \tag{4}$$

where $MC_i(.) = {\partial C_i}/{\partial q_i}$ is the marginal cost function. Using the f.o.c, the following price-cost equation can be derived as,

$$\frac{p_i - MC_i}{p_i} = -\frac{1}{\eta_{ii} + \lambda\eta_{ij}\left({p_i}/{p_j}\right)} \tag{5}$$

where $\eta_{ii} = \left({\partial q_i}/{\partial p_i}\right)\left({p_i}/{q_i}\right)$ and $\eta_{ij} = \left({\partial q_i}/{\partial p_j}\right)\left({p_j}/{q_i}\right)$ are the own-price elasticity and the cross-price elasticity of demand, respectively, and $\lambda = {\partial p_j}/{\partial p_i}$ is the conjectural variation parameter of firm i which captures the degree of coordination of banks. Positive values of λ suggest collusive behavior among banks, since a firm expects rivals to match its price. In particular, a unit value of λ indicates perfect collusion. Conjectural derivative being equal to zero indicates a Nash equilibrium in prices, that is, each firm does not react to rivals' actions. As the third case, a negative λ suggests competitive behavior in the industry. Specifically, when $\lambda = -\infty$, industry is perfectly competitive, as P = MC.

Equations (1), (2) and (5) identifies the conjectural variation parameter λ by imposing the following linear homogeneity condition in input prices on Equation (2i) as in Bresnahan (1989):

$\theta_1 + \theta_2 + \theta_3 = 1$, $\delta_2 + \delta_3 + \delta_4 = 0$, $\theta_4 + \theta_5 - \theta_6 - 2\theta_7 = 0$, $\theta_4 + \theta_7 + \theta_8 = 0$ and $\theta_5 + \theta_7 + \theta_9 = 0$.

After substituting (2ii) in (5), we can easily derive the following price-cost margin equation:

$$p_i = AC_i\left(\delta_0 + \delta_1 lnq_i + \sum_{r=1}^{3}\delta_{ri} lnw_{ri}\right) - \frac{1}{\alpha_1/p_i + \lambda(\alpha_2/p_j)} + \nu_i \tag{5i}$$

Using equations (1i), (2i), (5i), the benchmark model, Model 1, is constructed to estimate the relevant parameters in the system. To control for firm-specific (with dummy variable BANK) and time effects (with time trend t), an alternative model, Model 2, is designed with the following three equations:

$$lnq_i = \alpha_1 lnp_i + \alpha_2 lnp_j + \alpha_3 lnGDP + \alpha_4 lnBRANCH_i + \alpha_5 t + \sum_{k=1}^{8} \alpha_{k+6} BANK_k + \varepsilon_i \quad (1ii)$$

$$\ln C_i = \delta_o lnq_i + \frac{\delta_1}{2}(lnq_i)^2 + \sum_{r=1}^{3} \theta_r\, lnw_{ri} + lnq_i \sum_{r=1}^{3} \delta_{r+1}\, lnw_{ri} + \sum_{r=1}^{3} \theta_{r+3}\,(lnw_{ri})^2 + \theta_7 lnw_{1i} lnw_{2i} + \theta_8 lnw_{1i} lnw_{3i} + \theta_9 lnw_{2i} lnw_{3i} + \theta_{10} t + \sum_{k=1}^{8} \theta_{k+10} BANK_k + \zeta_i \quad (2iii)$$

$$p_i = AC_i(\delta_0 + \delta_1 lnq_i + \sum_{r=1}^{3} \delta_{ri} lnw_{ri}) - \frac{1}{\alpha_1/p_i + \lambda(\alpha_2/p_j)} + \mu_1 t + \nu_i \quad (5ii)$$

To compare results with Coccorese (2005), I also estimate two more models, Model 3 (containing the dummy variables BANKs without the time trend) and Model 4 (containing the time trend without the dummy variables BANKs) to isolate the effects due to bank specificity or time.

3 Estimation Results

I use a balanced panel data set of 198 observations for estimation. The sample spans from 1988 to 2009 for eight largest banks and the remaining banks as one group. Hence, I observe nine cross-sectional units over 22 years in the panel. All variables are deflated by the gross domestic product deflator and expressed in 1998 TL values. Simultaneous non-linear three stage least squares method is employed to estimate the parameters. Estimation results are presented in Table 1 below.

		Model 1	Model 2	Model 3	Model 4
Demand Equation					
ln p_i	α_1	-1.6035***	-2.7747***	-2.0635***	-1.4283***
ln p_j	α_2	3.0074***	3.6157***	3.4261***	2.5205***
ln GDP	α_3	13.9391***	6.4689***	14.1129***	6.8253***
ln $BRANCH_i$	α_4	0.6480***	0.2553**	0.3336***	0.6530***
t	α_5	-------	0.2726***	---------	0.2630***
Intercept	α_0	-248.173***	-------	----------	-119.574***
Cost Equation					
ln q_i	δ_0	0.3048	2.1416***	0.5869	0.6232
(ln $q_i)^2$	δ_1	0.0867	-0.1594***	0.0344	0.0455
ln w_{1i}	θ_1	-1.2326**	-0.4342	-0.5875	-0.5062
ln w_{2i}	θ_2	2.5377***	-0.8833	1.7884**	1.6786**
(ln q_i)(ln w_{1i})	δ_2	0.1465***	0.1080***	0.0997***	0.1017**
(ln q_i)(ln w_{2i})	δ_3	-0.2390***	0.1070*	-0.1492**	-0.1543**
(ln $w_{1i})^2$	θ_4	-0.0715	-0.1272**	-0.0471	-0.0097
(ln $w_{2i})^2$	θ_5	0.2072***	-0.0441	0.1373***	0.1378***
(ln w_{1i})(ln w_{2i})	θ_7	0.0130	-0.0358*	0.0278*	0.0293
t	θ_{10}	--------	0.1257**	------	0.0016
Intercept	θ_0	3.9130	---------	-------	2.9096
Price-Cost Margin Equation					
Conjectural Variation Parameter	λ	0.0989***	0.1406***	0.1122***	0.1054***
t	μ_1	---------	-0.0114**	--------	-0.0397***

*Notes: ***, ** and * shows significance of the variables at 1%, 5% and 10% level, respectively. Dependent variables are ln q_i in the demand equation, ln C_i in the cost equation and p_i in the price-cost margin equation.*

Table 1. *Estimation Results*

In the first equation, the coefficients capturing own-price and cross-price elasticities are both statistically significant at the 1% level in each model and have expected signs. The demand for loans is estimated to be elastic in all models. When the bank-specific dummies are added to the benchmark model (Model 1), I observe both own-price and cross-price elasticities rise in Model 2 and Model 3 but drops if time trend is included in Model 4, contrary to the findings of Coccorese(2005). The cross-price elasticity is always larger than the absolute value of own-price elasticity in all specifications and the difference between their values are considerably large which may be thought as a signal for lack of competition among banks. This result is also not in line with Coccorese (2005) where he finds that the difference between the two values is never remarkable. The variable GDP has positive and statistically significant (at 1% level) coefficient in each model indicating the magnitude of bank loans move together with the overall economic activity. Moreover, the branch size has a positive influence on demand for loans as the coefficient of the variable BRANCH is estimated to be positive and statistically significant.

As for estimation of the cost function, due to quadratic and cross-product terms, it is hard to interpret the meaning of the estimates of the coefficients. However, as the estimates in Model 2 suggests, there is evidence for diseconomies of scale in banking industry which is line with the findings of Fields, Murphy and Tirtiroglu (1993). This result essentially explains why foreigners have been increasingly interested in the Turkish banking industry, as entry seems to be attractive.

In the price-cost equation, the estimates of conjectural variation parameter are positive and statistically significant at 1 % level regardless of the model specifications. Hence, there is a statistical evidence for collusive behavior in the Turkish banking industry. This finding contradicts with the results of earlier research on Turkish banks where these studies show that the banking industry is monopolistically competitive in Turkey. (See Kasman (2001); Gunalp and Celik (2006); Aktan and Masood (2010)). It is also important to note that Coccorese (2005) and Wong et al. (2007) utilizing the same empirical methodology reject the hypothesis of collusion in the banking sector of Italy and Hong Kong in their respective papers. (see also Shaffer (1989) and Shaffer (1993)) Thus, as far as I know, this paper is probably the only one finding collusive result with this framework applied to banking industry.

The estimation results suggest that the value of conjectural variation parameter is positive and highly significant in each model. Using Equation (5), one can easily compute the mark-up over marginal costs as follows:

	α_1	α_2	λ	**Mark-up**
Model 1	-1.6035	3.0074	0.0989	77 %
Model 2	-2.7747	3.6157	0.1406	44 %
Model 3	-2.0635	3.4261	0.1122	60 %
Model 4	-1.4283	2.5205	0.1054	86 %

Table 2. *Conjectural Variation Parameter Estimates and Corresponding Mark-up Values*

Mark-up values range from 44 % to 86 % depending on the model specification. Lowest mark-up is calculated in Model 2, where bank specific dummies and time trend are included. When I exclude bank dummies from Model 2 to get Model 4, mark-up rises to 86 %. If I had the Nash outcome, that is $\lambda = 0$, then mark-up would be much lower in each model. For example, mark-up is equal to 36 % in Model 2. Furthermore, competitive outcomes where $\lambda < 0$ would yield even lower mark-up than Nash behavior. Given the high profit performance of the Turkish banking industry, these empirical findings are not surprising. These results suggest that oligopolistic structure of the banking industry, consistent with the structure-conduct-performance paradigm, yield conduct which is conducive to high profits. The estimation results seem to be robust, since the signs, values and statistical significance of the estimated coefficients do not vary substantially across the models. This paper essentially shows how the Turkish Competition Authority in Turkey was right by fining the major banks allegedly formed a cartel in 2009. I empirically demonstrate that major banks actually colluded in the loan market during the sample period from 1988-2009. This critical evidence calls for more scrutiny by regulatory agencies such as BDDK and Turkish Competition Authority on banking industry. In Turkey, as opposed to the U.S., Canadian, Italian and Hong Kong banks, there appears to be a conflict between concentration and competition. In order to intensify competition, any attempts to increase concentration, for example by mergers and acquisition, should be cautiously screened by the authorities.

4 Conclusion

Using the conjectural variation approach, this paper tests whether there exists any collusion among dominant banks in Turkey by estimating a non-linear simultaneous-equation system. The estimation results suggest that the eight largest banks in Turkey actually colluded in the loan market from 1988 to 2009. The market structure of the Turkish banking industry, which is very concentrated, is conducive to lack of competition that can also be observed by high profit margins during the last two decades. This result is consistent with the SCP paradigm, which claims that more concentration in the market place is associated with less competition. As a policy conclusion, regulators should be cautious against any increase in concentration in the Turkish banking industry to protect competition.

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