
Banking Sector's Market Power Analysis In Turkey

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ABSTRACT:

This paper is a framework to analyze competition in the banking sector in Turkey. For this purpose, I examined 49 banks which acted between 2005 and 2013. All data set are obtained from The Banks Association of Turkey. I have also analyzed pre and post crisis periods as an application of Monti-Klein profit function and Translog cost function after that Lerner Index is calculated. Also a Sperman Correlation is applied to understand the relationship between different types of banks, and Lerner Index. Analysis results pointed out the Lerner index has been consistently higher than 0.2 for the 9 years periods. Also, the private-owned banks have more market power than state-owned banks for the same period. This maybe because increment of the foreign assets in private-banks after Global Financial Crisis.

Keywords: *Competition; Lerner Index; Micro analysis; Pre and Post-crisis period*

JEL Classification: *D40, G21, L10, L11*

I. INTRODUCTION

A healthy economy depends on a good working financial system without any unbalanced or any negative expectation in the future because financial system is the first sources for the foundation of investments. For these reasons, the efficiency of financial products (production or services) and a competitive environment is very crucial for banking sectors, similarly other sectors.

There are mainly two hypotheses which are used in the literature about the relationship between competition and stability in the banking sector. They are competition-fragility and competition-stability (Beck, 2008). First hypothesis claims that smaller banks, in more competitive environments, are more likely to take excessive risks and therefore competitive systems are more fragile than less competitive systems (Matutes and Vives, 2000).

On the other hand, Boyd and De Nicolo, (2005) claims that "*there is a risk-incentive mechanism causing banks to become more risky as their markets become more concentrated*". The authors called it as "*competition stability*" suggested less competitive banking environment may cause fragility in competition-stability hypothesis Boyd and De Nicolo, (2005). Because a less competitive banking environments allow banks to increase the interest rate charged to firms (borrowers), firms (borrowers) had probably have difficulties in re-paying their loans. As consequence of it in a higher probability of nonperforming loan ratios (NPL), and more competitive environments are considered to be permit greater stable banks. "*Their theoretical model shows that the higher interest rates may cause firms to assume higher risk, which results in a higher probability that loans turn non-performing (Leon,2015)*". According to Boyd and De Nicolo' (2005) study, there is a positive relationship

between bank fragility and concentration resulting a greater probability of systemic distress because of concentration.

There are very broaden empirical studies in the literature. Some studies evaluate bank fragility from a macro perspective and take into account systemic banking crises such as Beck, Demirguc-Kunt and Levine, 2006. On the other hand, micro-based studies generally support the competition-fragility hypothesis. In the banking literature simply take the concentration ratios, while others use indices such as the Herfihndahl-Hirschman Index (HHI), Lerner, Tobin, and Panzar and Rosse (1987)' H-statistic.

Even if there are very broaden empirical studies examining banking sector, it is not the case for Turkish Banking Sector especially for crisis period. The Turkish economy had hit by 2 crucial economic crises between 1999 and 2001. In 2004, the economy has began to stabilization process. All in all, the primary purpose of this study to investigate whether there is a competition environment for Turkish banking Sector after stabilization. In another word, Banking Sector's efficiency and the market power of Turkish banking sector is analyzed. Also, I research the impact of 2007 Global Financial crisis on the efficiency of the Turkish banking sector. This study is organized as follows; in the section-2 the historical change of the Turkish Banking sector is summarized. In the section-3, the data set is explained, then in section 4 method is represented. In section-5 the analyses results are given and in the section-6 concluding comments are given.

II. BANKING SECTOR'S HISTORY IN TURKEY

- Ziraat Bank was established to support agricultural sector in Turkey in 1863.
- After the declaration of independence of Turkey in 1923, the development in banking sector was evaluated at Izmir Economy Congress (Akbulak and al, 2004).
- Turkiye Is Bank which had 100% nationally capital, was established in 1924.
- Central Bank of the Republic of Turkey is the central bank of Turkey and is founded as a joint stock company on 11 June 1930 (<http://www.tcmb.gov.tr/>).
- Just after World war- II (1939-1945), the depression in the market due to the war, impacted on the banking sector.
- The privately owned deposit banks were developed in Turkey between 1945 and 1959. For instance Yapi Kredi Bank, Garanti, Ak Bank, Pamuk Banks were some of the privately owned banks established in these periods (Akbulak and al, 2004).
- Turkish Banks Association was established in 1958. After a year, the years between 1960 and 1980 was called "planned term", since these 2 decades banks were controlled by the government.
- 1960-1980, 7 banks were founded by government based on the "planned term", 2 of them were merchant banks and others were development banks.
- With adaptation of free market economy model in 1980's, banking sectors' privatization increased in Turkish Banking Sector.

- 1999-2001 can be considered years of transformation for Turkish banks. In the 3 year of period, the Turkish economy had been faced by two crucial economic crises (Yaldiz and Bazzana, 2010).
- The parliament approved the new banking law (no 4389) in 1999. By this law The Turkish government guaranteed on deposits, which had been set at 100 % for the year 1994 was restricted to 100,000 Turkish liras (TL) in 2000.
- In 2001 the guaranteed deposit amount was restricted to 50,000 TL (tbb.org, 2014). Same year, International Monetary Fund (IMF) started a Banking Restructuring Program purposing efficient banking system.
- According to Tunay, (2009) study the restructuring program impacted sector in a negative way.
- In Turkey, there were 81 banks operating in 1999 (BDDK,2015).

After 2004, with the stabilization of the economy, the privatization gave a momentum. In 2014, 51 banks are involved in Turkish Banking sectors, 3 of them are public deposit, 11 private deposit, 16 foreign deposit, 4 public investment, 5 private investment, 4 foreign investment, 4 participation banks, and 2 banks under the supervision of the Savings Deposit Insurance Fund of Turkey (SDIF) (BDDK, 2015). Existence of 51 banks raised the competitive environment. A competitive area in banking sector can lead to lower prices for services and products due to greater efficiencies (Sayim, and Alakel, 2011). Also, greater innovation and access to services and products. On the other hand, banking sector extension may reduce to supervise these institutions. For these reasons, in this paper I analyze Banking Sector's efficiency and the market power of Turkish banking sector.

III. DATA SET

All data sets will be retrieved from The Banks Association of Turkey (www.tbb.org.tr) which are publicly available. The data set includes between 2005 and 2013 data. Since the economical stabilization process began in 2004, so I chose just after the stabilization term. The all period is separated into 2 sub-groups for evaluation the global financial crisis impacts on banks competitiveness. The first subgroup includes precrisis term (2005-2007), and the remain term is postcrisis (2008-2013). The 9 years period panel data set include all assets, deposits, funds for all 49 (excluding SDIF banks) banks. Moreover, I examined the competitiveness among different types of bank groups to determine their market power difference. For this purpose, I seperated all data set as private-owned and state-owned groups.

IV. METHOD

Lerner Index is widely used in the specific case of banks as an indicator of degree of competition in banking sector. The Lerner index's marks-up the price over marginal cost. The value of index ranges between 0 (perfect competition) to 1 (Monopoly) (Ray, and Gramlich, 2015). In other words, Lerner index measures the monopolist's margin. Lerner index is calculated as follows equation-1;

$$(1) \quad L = \frac{1}{|e|} = \frac{P - MC}{P}$$

Where p is price, MC is marginal cost and e is price elasticities of demand. If p is equal MC , then the firms operate in perfect competition ($L=0$). If L is greater than 0, then Lerner index indicates the existence of market power. Thus, the Lerner index can be explained by,

$L=0$ competitive industry

$L>0$ Monopoly Power (or Oligopoly Power)

$L<0$ Either firm not max profit or engaging in predatory activity.

The measurement of Lerner index in the banking industry calculates depending on the Monti-Klein profit function for a bank. This model also examines the behavior of a monopolistic bank faced with a deposit supply curve and loan demand curve (Elzinga and Mills, 2011). The bank's decision variables are the amount of loans and deposits and level of capital is assumed to be given. Here banks are considered to be a price taker in the inter-bank market. The Monti-Klein profit function is given by equation-2 as follows;

$$(2) \quad \pi(D, L) = (r_L(L) - r) * L + (r - r_D(D)) * D - C(D, L)$$

Where r_L is the interest rate on loans, L - loan size, r_D -interest rate on deposits, D -deposit size, r interest rate on the inter-bank market. The first order condition:

$$(3) \text{ Loan Elasticity} \quad \frac{\partial \pi}{\partial L} = \frac{\partial r_L}{\partial L} L + r_L - r - \frac{\partial C}{\partial L} = 0 \rightarrow \frac{\partial \pi}{\partial L} = \frac{1}{\varepsilon_L}$$

$$(4) \text{ Deposit Elasticity} \quad \frac{\partial \pi}{\partial D} = \frac{\partial r_D}{\partial D} D + r - r_D - \frac{\partial C}{\partial D} = 0 \rightarrow \frac{\partial \pi}{\partial D} = \frac{1}{\varepsilon_D}$$

Equation 3 and 4 represent the extend that the monopolist's market power allows it to fix a price above marginal cost, expressed as proportional to the price. If the extreme case is considered of the perfect competition, the Lerner Index value will be 0. It means that there is no monopoly power. Maudos and Guevara (2004) stated that the relative margin instead of absolute margin is the most significant diagnose of competition, and oligopoly competition models determine a relationship of an equilibrium between the negative margin and the structural and competitive condition of the market. Furthermore, the relative margin offers a proxy for the loss of social welfare that is due to the extension of the market power (Maudos and Guevara, 2004).

If the model is extended considering to oligopoly (more than 1 banks in the banking sector, N banks), the following equations are the first order conditions (Freixas and Rochet, 2008);

$$(5,6) \quad \frac{\left[r_L^* - r - \frac{\partial C}{\partial L} \right]}{r_L^*} = \frac{1}{N \varepsilon_L} \quad \text{and} \quad \frac{\left[r - r_D^* - \frac{\partial C}{\partial D} \right]}{r_D^*} = \frac{1}{N \varepsilon_D}$$

This is different from the case of monopoly only in that elasticities are multiply by the number of competitors (N). The marginal cost which is required to calculate the Lerner Index, is estimated on the based on translog cost function (Berger and Mester, 1997)

$$(7) \quad \ln TC = \beta_0 + \beta_1 \ln y + \frac{1}{2} * \beta_2 \ln y^2 + \sum_{j=1}^3 \beta_j \ln W_j + \sum_{j=1}^3 \sum_{k=1}^3 \beta_{jk} \ln W_j W_k + \sum_{j=1}^3 \gamma_j \ln y \ln W_j + v_{it} + z_i$$

where y is total assets, W_i is input prices, W_1 - the price of labor, W_2 - the price of capital, W_3 - the price of funds and TC is the bank's total costs (financial and operating costs). After calculation of total costs, the MC are calculated by derivation of the cost function by y ;

$$(8) \quad MC = \frac{TC}{y} \left[\beta_1 + \beta_2 |\ln y_{it}| + \sum_{j=1}^3 \gamma_j \ln W_j \right]$$

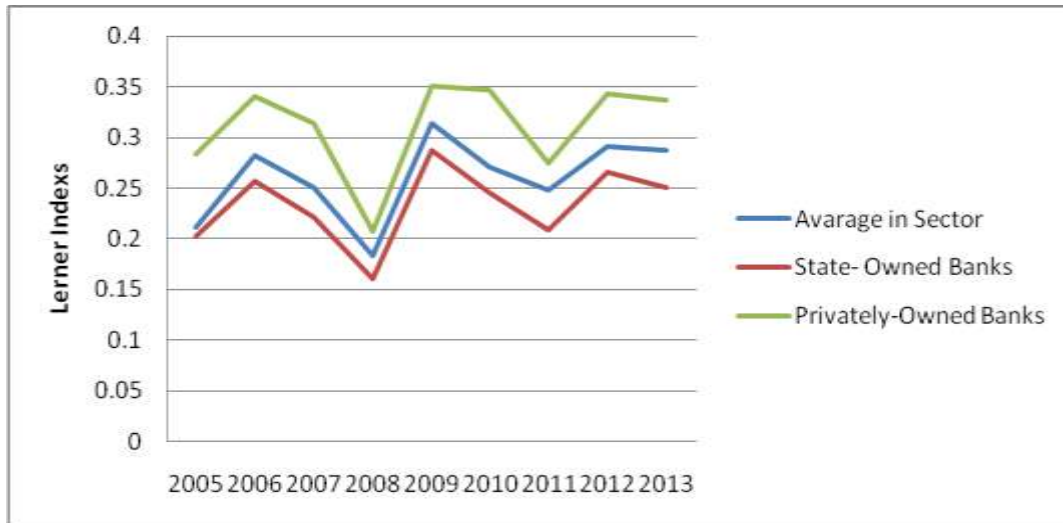
According to De Geuvara et al (2007), the input price in the banking sector is assumed to be interest revenue divided by assets for each bank in the period of t .

V. ANALYSIS RESULTS

Lerner Index is calculated by using the general equation (equation-1). To obtain the marginal cost, equation-7 and 8 are applied. The calculation results are represented in the Table-1. The results show after 2008, there are significant increases in the Lerner index. It means that the competition among banks has been decreasing after 2008. I also separated bank sector based on bank's type. If more than 50% assets of a bank belongs to private owner (including foreign assets), it is called private-owned bank, otherwise the bank is a state-owned bank. Considering these 2 types of banks groups, the results of Lerner index are given in Table-2. It is clear from the Table-2 that state-owned banks have lower Lerner index value than private-owned banks. Therefore, it can be said that state-owned banks are acting in a more competitive area for these 9 years periods. Also, the comparison of the 2 different banks groups' Lerner index are given on Graph-1.

Table-1: Lerner Index for each year for the Turkish Banking Sector between 2005 and 2013 (average)

Years	Lerner Index	Std Dev	Min	Max
2005	0.211	0.196	0.301	0.136
2006	0.282	0.118	0.37	0.205
2007	0.251	0.048	0.34	0.175
2008	0.183	0.021	0.27	0.105
2009	0.314	0.011	0.4	0.235
2010	0.271	0.014	0.36	0.195
2011	0.248	0.097	0.21	0.045
2012	0.291	0.115	0.41	0.245
2013	0.287	0.016	0.37	0.205



Graph-1: Lerner Index for the Turkish Banking Sector by different owners, between 2005 and 2013 (average)

Table-2: Lerner Index for Turkish Banking Sector by different banks groups

years	Avarage in Sector	State-Owned Banks	Privately-Owned Banks
2005	0.211	0.202	0.284
2006	0.282	0.257	0.341
2007	0.251	0.221	0.314
2008	0.183	0.161	0.207
2009	0.314	0.287	0.351
2010	0.271	0.246	0.347
2011	0.248	0.209	0.275
2012	0.291	0.265	0.343
2013	0.287	0.251	0.337

To evaluate the changes in competition between 2 periods whether or not there is any decrease or increase concentration and time of the global financial crisis, the avarage lerner index was estimated for the following 2 sub periods L1: 2005-2007 and L2: 2008-2013. The estimation values for each of the sub period are given on Table-3. The Lerner Index average results demonstrate that there is an increasing trend for these 9 years periods. Between 2005-2007, the level of competition in the entire sector of banks was lower than in 2008-2013 period. This is confirmed by the test for significance of the difference between 2 periods for all banking sectors: $L_1=L_2$. Considering the increase on Lerner Index of second sub period means, there is a decrease in competition. It may be because of the global financial crisis.

Table-3: Sub Periods Evaluation by the Lerner Index

Years	Lerner Index	Std Dev
2005-2007	0.2398	0.02397
2008-2013	0.2656	0.07198
H ₀ : L ₁ =L ₂	p(F-Test)	(0.00785)
L:2005-2013	0.2561	0.7536

Table-4: Sperman's Rank Correlation Coefficients Matrix for Turkish Banks in 2005-2013

Correlation	Banks with majority private-ownership (including foreign owned)	Banks (State-Ownership)	HHI
Lerner Index	-0.03760	0.0796	-0.4651

In Table-4, Sperman Rank Correlation Coefficient Matrix is presented. These correlation coefficients show the relationship between Lerner Index and the privately-owned bank, state-owned bank, and Herfindahl Hirschman Indices (HHI), for the 2005-2013 period. There are negative correlations between Lerner Index and the privately-owned banks. It may be because many private- owned banks in Turkey have foreign equities.

VI. CONCLUSION

In this study, I investigated the competitiveness level in Turkish Banking Sector. In the sector, state-owned and private-owned banks are investigated, as total 49 banks are examined. For these each of the banks, I calculated their marginal cost by using Translog cost function (equation-7), then the Lerner Index is calculated. I applied at the same process for each of the banks for 9 years period. On the base of test an obvious market power was found between state-owned and private-owned banks. Also, there is a significant difference when comparing the behavior of Turkish Banks between 2 sub periods (2005-2007, 2008-2013). This means that the Turkish Banking Sector is not acting in a competitive environment, they enjoyed the oligopoly power for these 9 years periods.

As consequences, the Lerner index was at highest level found in 2009, I believe this was a reflection of Great Financial Regression in the world's other markets. Post crisis period, many financial markets were trying to keep balance, since Turkish Financial market was a stabile and trustable market, it is highly probable that many assets transferred to the market. It means that the assets gave a positive momentum to Turkish banking sector. Therefore, Turkish Banking sector may be investigated by separating foreign assets, especially post crisis years. Even if the evidence pointed out the banks have not been acting in a competitive area, the situation may be changed after the foreign assets are separated.

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