Concentration and Competition in Turkish Banking Industry: The Evidence from 2000 to 2012

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Abstract
Banking industry worldwide has been transformed due to globalization, financial liberalization, technological developments, government policies, deregulation of financial services, financial crises and increase in mergers and acquisitions since 1980. With these changes, there is a trend towards decrease in the number of banks and increase in banking concentration. Increase in banking concentration might affect competition conditions in banking industry. The decrease in the number of banks and the increase in banking concentration dominate the Turkish banking industry after the banking crises in 2000 and 2001. This paper examines the relationship between concentration and competition in Turkish banking industry. I measure the size of banking concentration by concentration ratios and Herfindahl-Hirschman index with the data of commercial deposit banks in Turkey from 2000 to 2012. Competition degree is measured by using Panzar Rosse model. The results of the study suggest that there is no permanent relation between banking concentration and competition in Turkish banks.

Key Words: Banking industry, banking concentration, competition, Panzar Rosse model.

JEL classification: G21, D40

Introduction
Banking industry has been transforming by financial liberalization and globalization worldwide after 1980s. Deregulations and technological developments accelerated the transformation. Government policies and ease of regulations encouraged consolidation. Mergers and acquisitions among banks increased due to the desire to obtain market power and to maximize the shareholder value. Furthermore, financial crises hit the banks as financial liberalization and globalization expanded. Bank failures and further consolidation occurred after financial crises. All these changes in banking sector raised a trend towards decrease in the number of banks and increase in banking concentration.

Increase in banking concentration is closely related to the scale and the number of the banks in the sector. Tendency towards reduced number of banks and change in the scale of banks cause more concentrated banking industry. Concentrated banking industry affects the competition and the efficiency of banks, the market prices and the financial stability.
The reports of international financial institutions remark that increasing concentration might change market structure and reduce competition. When banking concentration becomes higher, it can possibly lead to non-competitive levels of interest rates. More concentrated markets could cause less competitive environment. Banks with increased market power could follow risky policies that increase systemic risks. As banks become ‘too big to fail’ scale, they might use their influence to shape banking regulations and policies (Bank for International Settlements, 2001, International Monetary Fund, 2001, Group of Ten, 2001). On the other hand, there are some opposite studies that suggest increasing concentration might have positive impacts on banking industry. It is claimed that concentrated banking systems tend to have larger, better-diversified and strong banks which lead to positive link between concentration and stability. Banking concentration is associated with a lower probability that the country suffers a systemic banking crisis. It is also stated that banking concentration is not a proxy for a less competitive banking environment (Beck et al, 2003 and 2005). There is also similar trend toward increasing banking concentration in Turkish banking industry. Macroeconomic instability and structural problems in 1990s in Turkish banking industry resulted in 2000 and 2001 banking crises. Banking sector involved more small size banks before the crises. The bank crises caused bank failures and the number of banks in the market reduced. Reconstruction period after crises also affected the bank structure and concentration in the banking sector. In this paper, I will focus on increased concentration and its relation between competition in Turkish banking industry after 2000 and 2001 banking crises.

There are two major streams which are structural and nonstructural approaches in order to assess the degree of competition and the relation between concentration and competition. Main hypothesis of the structural approach are Structure-Conduct-Performance (SCP) hypothesis and efficiency hypothesis. SCP hypothesis which is developed by Mason (1939) and Bain (1951) suggests that market structure affects market performance through the conduct or the behavior of banks. Market structure is defined by the concentration ratio in SCP hypothesis. When the concentration ratio is high, the market is close to monopoly. On the contrary, the market is close to perfect competition with lower concentration. According to SCP hypothesis, banks behave less competitive as banking concentration rises and there is a reverse relationship between banking concentration and competition. According to the efficiency hypothesis which is developed by Demsetz (1973), firm behavior is driven by efficiency rather than market power and structure. Firms seek to produce at a more efficient scale in order to achieve lower costs and higher profits. Efficient firms will increase their productivity and market share as well as concentration in the market. There is a positive relationship between concentration and competition in the efficiency hypothesis. Both structural hypotheses provide one way causality from market structure to performance. Because of the theoretical and empirical deficiencies of the structural models, non-structural models of competitive behavior have been developed. Non-structural models are New Empirical Industrial Organization approaches, namely the Iwata model, the Bresnahan model, the Panzar and Rosse model and Boone competition indicator model. These New Empirical Industrial Organization approaches measure competition in the market by empirical analysis. In this paper, I will use the Panzar and Rosse model in order to assess the degree of competition in Turkish banking system.

The paper proceeds as follows. Section 2 gives a review of related literature about relation between banking concentration and competition. Section 3 presents banking concentration in Turkish banking industry. Section 4 introduces and explains the Panzar Rosse model. Then, an empirical model for Turkish banking is introduced, data and empirical results are reported. Section 5 discusses relation between competition and concentration in Turkish banking industry. Finally, Section 6 concludes.

**Literature Review**

There are many empirical studies assessing relationship between concentration and competition in banking sector. While some studies find reverse relation between banking concentration and competition, the others find that there is not any relevance between concentration and competition.

Bikker and Groeneveld (1998) study competition and concentration in 15 European Union countries over the time span of 1989 and 1996. They use Panzar Rosse methodology to assess the degree of competitiveness in the banking industry of the European countries as a whole and for individual countries. Assets of the five biggest banks as a percentage of total assets (CR-5) are used as a measure of concentration. They find that European banking sectors operate under conditions of monopolistic competition as varying degrees for each country. Their results also support that concentration impairs competitiveness as SCP hypothesis suggests.
Jansen and Haan (2003) analyze the relationship between concentration, competitiveness, efficiency and profitability in the European Union banking markets. They use the data of banks in 15 European countries between 1985 and 1999. CR-5 and Herfindahl-Hirschman Index (HHI) are used as the concentration indicators whereas Panzar Rosse model is used to measure competition degree. Their results do not suggest the existence of any association between concentration and competition at the macro level.

Casu and Girardone (2006) also investigate the impact of increased concentration on the competitive conditions of European Union banking sector. Using bank level balance sheet data for the major European banking markets (16 European countries) in a period following the introduction of the Single Banking License (1997-2003), CR-3, CR-5 and HHI concentration indicators show increased concentration in most European Union countries. Nonstructural Panzar Rosse model is used to investigate the impact of increased concentration on the competitive conditions of EU banking markets. Estimations of Panzar Rosse model for competition indicate monopolistic competition in the countries between 1997 and 2003. They find a little evidence that concentration is negatively associated with competition and most efficient banking systems are also the least competitive.

Bikker and Haaf (2000a) seek to measure the degree of competition in banking markets of 23 industrialized countries between 1988 and 1998, and to investigate the impact of concentration on competition. They apply Panzar Rosse model and Bresnahan model to 5,444 banks from 23 industrialized countries in order to assess competition level. CR-3, CR-5, CR-10 and HHI are used to assess concentration level. They conclude that small banks seem, on average, to operate under less competitive conditions than large banks and there is reverse relation between concentration and competition.

Gelos and Roldos (2002), Yeyati and Micco (2003) and Yildirim and Philippatos (2006) investigate concentration and competition in Latin American banking market. In 1990’s, Latin American banking market faces significant process of bank consolidation and increased concentration due to banking crises. Using banking data of 8 countries between 1994 and 2000, Gelos and Roldos find that markets have not become less competitive as concentration increases. They assess that lowering barriers to entry as allowing increased participation of foreign banks appears to have prevented a decline in competitive pressures associated with consolidation. Also, Yeyati and Micco study the experience of Latin American banking sectors for accelerated process of concentration and foreign participation during 1990s. They use bank level database of 8 Latin American countries between 1996 and 2002 in order to assess concentration ratios and competition degree. Using CR-3, CR-5, HHI and Panzar Rosse method, they find that concentration did not reduce competition in the industry, but foreign penetration appears to have led to less competitive banking sectors. Yildirim and Philippatos examine the consolidation and competitive conditions in the banking industries of eleven Latin American countries for the period from 1993 to 2000. They also find supportive results that banking concentration is not significantly related with competitive conduct.

Aysan, Güneş and Abbasoğlu (2007) investigate the concentration, competition, efficiency and profitability of the Turkish banking sector in the post crises period. Using the data from the banks that operated between 2001 and 2005, they measure the degree of concentration by CR-3, CR-5 and HHI and the degree of competition in the market by applying Panzar and Rosse method. Their empirical results do not suggest the existence of any relationship between concentration and competition.

**Concentration in Turkish Banking Industry**

Banking sector has a high share in Turkish financial system. The share of the banking sector in Turkish financial system is 76.2% as reported in the financial markets report of the Turkish Banking Regulation and Supervision Agency in 2011. There are three types of banks in Turkey; commercial banks, development and investment banks and participation banks (Islamic banks). According to the Turkish Banking Regulation and Supervision Agency reports in 2012, commercial banks constitute 91% of the banking system, development and investment banks constitute 4% of the banking system and participation banks constitute 5% of the banking system.

Table 1 shows the changes in the numbers of banks from 1960 to 2012. There is an increasing trend in bank numbers from 1980 to 2000. Financial liberalization after 1980s in Turkey is the main reason for this trend. The number of banks decreased dramatically after the banking crises in 2000 and 2001.
In order to evaluate the concentration level in Turkish banking industry, I calculate banking concentration ratios by using data obtained from Banks Association of Turkey database. Annual total asset figures of commercial banks operating between 2000 and 2012 are used to calculate concentration ratios (CR-3, CR-5 and CR-10) and Herfindahl-Hirschman index (HHI). CR-3, CR-5 and CR-10 indicates market share of 3, 5 and 10 largest banks in the market respectively. HHI is the sum of the squares of bank sizes measured as market shares.

The concentration indicator results are reported in Table 2. There is a significant rise in concentration ratios after 2000. While CR-3, CR5, CR-10 and HHI are, respectively, 0.33, 0.48, 0.69 and 0.06 in 2000, they increase to, respectively 0.46, 0.63, 0.85 and 0.10 in 2005. Concentration ratios remain stable after 2005.

Table 1. The number of banks in Turkey (1960-2012)

| Year | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 | 2005 | 2010 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total | 51 | 48 | 46 | 42 | 43 | 50 | 66 | 68 | 79 | 51 | 49 | 49 |
| Commercial Banks | 51 | 46 | 44 | 40 | 40 | 47 | 56 | 55 | 61 | 34 | 32 | 32 |
| Public Banks | 14 | 12 | 12 | 12 | 12 | 8 | 5 | 4 | 3 | 3 | 3 | 3 |
| Private Banks | 20 | 23 | 22 | 23 | 24 | 20 | 25 | 32 | 28 | 17 | 11 | 11 |
| Foreign Banks | 5 | 5 | 5 | 5 | 4 | 15 | 23 | 18 | 18 | 13 | 17 | 17 |
| Local Banks | 12 | 6 | 5 | - | - | - | - | - | - | - | - | - |
| Banks under control of TMSF (Deposit Insurance Fund) | - | - | - | - | - | - | - | - | 11 | 1 | 1 | 1 |
| Investment and Development Banks | 2 | 2 | 2 | 3 | 3 | 10 | 13 | 13 | 13 | 13 | 13 | 13 |
| Participation Banks | - | - | - | - | - | n/a | n/a | n/a | 4 | 4 | 4 | 4 |

**Source:** The Banks Association of Turkey

Competition in Turkish Banking Industry

Panzar Rosse Model

The method was developed by Panzar and Rosse in 1977 and 1987. The model is used to assess market structure and degree of competition in the banking sector. It estimates reduced form revenue equation based on cross section data. The H statistics which shows competition degree in the market is calculated from the reduced form revenue equation. H statistics is the sum of the elasticities of the reduced form revenues with respect to factor prices. Value of the H
statistics ranges between $-\infty < H \leq 1$. If $H$ is smaller than zero, market is monopoly. If it ranges between zero and unity, market is monopolistic competition. $H$ of unity indicates perfect competition (Bikker and Haaf, 2000b).

In empirical studies, the ratio of interest revenues to total assets, the ratio of total revenues to total assets, total revenues or interest revenues are used for dependent variables. Panzar Rosse model includes input prices and bank specific factors as explanatory variables. Many studies use the ratio of personnel expenses to total assets or the number of the employees as a proxy for labor price, the ratio of interest expenses to total funds as a proxy for the funds price and the ratio of other expenses to fixed assets as a proxy for capital price. Bank specific factors such as equity to total assets, the ratio of loans to total assets, the ratio of non-performing loans to total loans, the ratio of other income to total interest revenue, total assets and total loans are chosen to reflect differences in risks, costs and size of banks. Bikker et al (2006) remark that using scale variables (e.g. size of deposits, loans, equity or total revenues) as dependent or explanatory variables will lead misspecifications. It is stated that using size variables in the model overestimates the degree of competition (H) and introduces a bias towards perfect competition. Panzar Rosse model is the most popular method as a measurement of competition in empirical studies. Shaffer (1982) and Nathan and Neave (1989) are the pioneer researchers using Panzar Rosse methodology. Shaffer evaluates the market structure of banks in New York. Nathan and Neave estimate the competition level among banks in Canada. They both choose total revenues as dependent variable.

After studies of Shaffer, Nathan and Neave, Panzar Rosse model is used for assessment of competitive structure of banking industry in latter empirical researchs. Bikker ve Groeneveld (1998), Casu ve Girardone (2006), Sun (2011) and Weill (2004) study competitive structure in the European banking industry, Bikker ve Haaf (2000) assess market structure of banking industry in 23 industrialized countries, Gelos and Roldos (2002), Yeyati and Micco (2003), Yildirim and Philippatos (2006) research competitiveness of banks in Latin American countries, Claessens and Laeven (2004) study degree of competition in banking sector for fifty countries. All researchers use Panzar Rosse methodology by choosing suitable dependent and independent variables in their studies. In Turkey, Çelik and Kaplan (2010), Özcan (2012), Aysan, Güneş and Abbasoğlu (2007) study market structure and competitiveness in Turkish banks.

Table 3. Selected studies in which Panzar Rosse Model is used

| Authors          | Countries considered     | Period       | Result                                |
|------------------|--------------------------|--------------|---------------------------------------|
| Shaffer          | New York / United States | 1979         | monopolistic competition              |
| Nathan and Neave | Canada                   | 1982-1984    | 1982: perfect competition             |
|                  |                          |              | 1983-1984: monopolistic competition   |
| Gelos and Roldos | 8 countries              | 1994-2000    | monopolistic competition              |
| Yeyati and Micco | 8 Latin American countries| 1996-2002    | monopolistic competition              |
| Yildirim and Philippatos | 11 Latin American countries | 1993-2000 | monopolistic competition              |
| Bikker and Groeneveld | 15 European countries | 1989-1999  | monopolistic competition              |
| Bikker and Haaf  | 23 industrialized countries | 1988-1998 | monopolistic competition              |
| Claessens and Laeven | 50 countries           | 1994-2000    | monopolistic competition              |
| Sun              | 11 European countries, United States | 1995-2009 | monopolistic competition              |
| Casu and Girardone | 15 European countries | 1997-2003   | monopolistic competition              |
| Weill            | 13 European countries    | 1994-1999    | monopolistic competition              |
| Çelik and Kaplan | Turkey                   | 2002-2007    | 2002-2004, 2007: monopoly              |
|                  |                          |              | 2005-2006: monopolistic competition   |
| Özcan            | Turkey                   | 2002-2009    | monopolistic competition              |
| Aysan, Güneş and Abbasoğlu | Turkey | 2001-2005 | monopolistic competition              |
The empirical Panzar Rosse Model

I use the Panzar Rosse model in order to assess market structure and competition level in Turkish Banking sector between 2000 and 2012. In the empirical analysis, below reduced form equation for revenues is used;

\[ \ln(INTR) = \alpha_0 + \alpha_1 \ln(AFR) + \alpha_2 \ln(PCE) + \alpha_3 \ln(PPE) + \alpha_4 \ln(OI) + \alpha_5 \ln(DD) + \alpha_6 \ln(LO) + \alpha_7 \ln(EQ) + e \]

where INTR is the ratio of total interest revenue to total assets, AFR is the ratio of annual interest expenses to total funds, PCE is the ratio of all other expenses to fixed assets, PPE is the ratio of personnel expenses to the number of personnel, OI is the ratio of other income to total interest revenue, DD is the ratio of demand deposits to total assets, LO is the ratio of loans to total assets, EQ is the ratio of equity to total assets and e is the error term. AFR, PPE and PCE are proxies for the unit prices of the funds, labor and capital respectively. Bank specific exogenous factors are OI, DD, LO and EQ. I do not use scale variables as explanatory variable in consideration of misspecification.

Data and empirical results

I apply Panzar Rosse model to the commercial banks which operated between 2000 and 2012. Annual unconsolidated balance sheet and income statement data were obtained from the Banks Association of Turkey. Table 4 provides the number of the banks in the sample set. According to 2012 figures, 27 commercial banks in the sample set constitute 90.3% of the total banking industry in Turkey.

| Year | Number of banks | Year | Number of banks | Year | Number of banks |
|------|----------------|------|----------------|------|----------------|
| 2000 | 46             | 2005 | 27             | 2010 | 29             |
| 2001 | 34             | 2006 | 30             | 2011 | 26             |
| 2002 | 37             | 2007 | 28             | 2012 | 27             |
| 2003 | 30             | 2008 | 29             |      |                |
| 2004 | 33             | 2009 | 29             |      |                |

The model is estimated annually by using the sample data. Table 5 reports the empirical results of the OLS estimations of Panzar Rosse Model. H statistics which shows competition levels is the total of AFR (the ratio of annual interest expenses to total funds), PCE (the ratio of all other expenses to fixed assets) and PPE (the ratio of personnel expenses to the number of personnel). Annual H statistics are reported in Table 6.
**Table 5. Empirical results of Panzar Rosse Model**

| Variables | 2000  | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2010  | 2011  | 2012  |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AFR       | 0.49*** | 0.62*** | 0.39*** | 0.37**  | 0.05  | 0.59*** | 0.57*** | 0.41*** | 0.68*** | 0.70*** | 0.25*** | 0.52*** | 0.74*** |
|           | (0.49) | (6.10) | (6.11) | (4.33) | (0.61) | (3.06) | (6.68) | (3.17) | (6.27) | (3.86) | (3.41) | (7.35) | (6.79) |
| PCE       | 0.03*  | 0.11*  | 0.07*  | 0.12*  | 0.05  | 0.11*  | 0.05**  | 0.10**  | (0.17)** | 0.16**  | 0.22*** | 0.13*** | 0.01  |
|           | (0.78) | (1.71) | (1.70) | (1.91) | (0.80) | (1.81) | (2.27) | (1.99) | (4.06) | (2.49) | (4.23) | (3.86) | (0.23) |
| PPE       | 0.15*  | 0.17   | 0.04   | -0.22** | 0.27*** | (2.32) | (-0.87) | (-1.04) | -0.17  | 0.05   | 0.17**  | -0.01  | 0.25*** |
|           | (0.15) | (0.17) | (0.04) | (-2.16) | (2.89) | (-2.32) | (-0.87) | (-1.04) | (-1.58) | (0.33) | (2.83) | (-0.01) | (1.87) |
| OI        | -0.11*** | -0.11** | -0.08*  | -0.12*** | -0.04*  | -0.07  | 0.26*** | 0.1    | 0.05   | 0.01   | -0.12  | -0.36** | -0.15** |
|           | (-2.74) | (-1.73) | (-2.04) | (-3.06) | (-2.01) | (1.35) | (-0.34) | (-0.69) | (0.60) | (1.05) | (-3.70) | (1.38) | (0.48) |
| DD        | 0.01   | -0.12  | -0.04  | -0.07  | 0.26*** | 0.1    | 0.05   | 0.01   | -0.12  | -0.36** | -0.15** | -0.36*** | -0.39** |
|           | (0.16) | (-0.59) | (-0.51) | (-0.95) | (3.51) | (1.03) | (1.12) | (0.26) | (-1.37) | (-2.40) | (-2.64) | (-7.27) | (-2.48) |
| LO        | 0.01   | 0.05   | -0.13** | -0.03  | -0.12** | -0.11  | 0.02   | 0.08   | -0.03  | 0.03   | 0.25*** | 0.07   | 0.25** |
|           | (0.07) | (0.83) | (-2.67) | (-0.59) | (-2.44) | (-1.45) | (0.91) | (0.87) | (-0.59) | (0.27) | (4.45) | (0.96) | (2.32) |
| EQ        | 0.13*  | -0.05  | 0.1    | 0.43*** | 0.38*** | 0.45*** | 0.09   | 0.22** | 0.12   | 0.1    | 0.33*** | 0.04   | 0.30** |
|           | (1.96) | (-0.62) | (1.56) | (4.64) | (3.22) | (3.20) | (1.39) | (1.99) | (1.57) | (0.91) | (3.37) | (0.60) | (2.15) |
| Cons.     | 1.27** | 1.82   | 2.37*** | 2.28*** | 2.07*** | 0.8    | 1.08*  | 1.27   | 0.85   | 2.24** | 1.28*** | 2.16*** | 1.44  |
|           | (2.44) | (1.34) | (5.11) | (3.45) | (3.15) | (0.97) | (2.27) | (1.64) | (1.43) | (2.82) | (3.40) | (6.55) | (1.16) |

| F-statistics | 7.4*** | 10.9*** | 18.2*** | 12.6*** | 5.9*** | 8.8*** | 22.3*** | 4.8*** | 14.4*** | 4.90*** | 3.47*** | 24.4*** | 10.4*** |
| R²          | 0.57   | 0.74   | 0.81   | 0.8    | 0.62   | 0.76   | 0.88   | 0.65   | 0.82   | 0.64   | 0.92   | 0.9    | 0.79   |
| Adj. R²     | 0.49   | 0.67   | 0.77   | 0.73   | 0.52   | 0.67   | 0.84   | 0.51   | 0.77   | 0.51   | 0.89   | 0.86   | 0.71   |
| No. of obs. | 46     | 34     | 37     | 30     | 33     | 27     | 29     | 26     | 29     | 27     | 28     | 26     | 27     |
| H-statistics | 0.67†  | 0.90†  | 0.50†  | 0.27†  | 0.37†  | 0.46†  | 0.57†  | 0.40†  | 0.68†  | 0.91†  | 0.64†  | 0.64†  | 1.00‡  |

Notes. t-values in parenthesis. ***p<0.01. **p<0.05. *p<0.10

1 Wald Test for H=0 and H=1 rejected. 2 Wald Test for H=1 not rejected
Table 6. H-statistics and results

| Year | H-Statistics | Result                  |
|------|--------------|-------------------------|
| 2000 | 0.67         | Monopolistic competition|
| 2001 | 0.90         | Monopolistic competition|
| 2002 | 0.50         | Monopolistic competition|
| 2003 | 0.27         | Monopolistic competition|
| 2004 | 0.37         | Monopolistic competition|
| 2005 | 0.46         | Monopolistic competition|
| 2006 | 0.57         | Monopolistic competition|
| 2007 | 0.40         | Monopolistic competition|
| 2008 | 0.68         | Monopolistic competition|
| 2009 | 0.91         | Monopolistic competition|
| 2010 | 0.64         | Monopolistic competition|
| 2011 | 0.64         | Monopolistic competition|
| 2012 | 1.00         | Perfect Competition     |

H-statistics ranges from 0.27 to 1.00 between 2000 and 2012. There is a significant decrease in competition level from 2001 to 2003. H is 0.90 in 2001 and decreases to 0.27 in 2003. The decrease in the competition level follows 2000 and 2001 banking crises in Turkey. The competition levels in these years seem to be affected from the crises. During this period, the dramatic decrease in the number of banks, the reduction in the customer reliance to the banks and macroeconomic reasons must have affected the competition in the industry. The competition level tends to increase after 2003. The period after 2003 is the period in which recovery in the general economic conditions and resurgence in the financial structure of the banks took place. Moreover, entry of some foreign banks into the market influenced the competition in this period. Perfect competition is maintained in 2012.

The Relation between Competition and Concentration in Turkish Banking Industry

There is an increasing trend in concentration after year 2000. When concentration ratios (CR3, CR5 and CR10) and HHI are considered, there is a significant rise in concentration in Turkish banking sector from 2000 to 2005. After 2005, concentration level remains stable. According to SCP hypothesis, concentration level is the determinant for the market structure. Market structure has effect on market performance via affecting behavior of banks. As increase in concentration level, banks will behave less competitively and it will lead competition level to decrease.

When concentration ratios and competition levels in Turkish banking industry are compared, banking concentration increases significantly after 2000 and it is stable after 2005. On the other hand, competition level decreases dramatically from 2000 to 2003 and it starts to increase after 2004. It reaches to perfect competition level in 2012. If only period between 2001 and 2003 is evaluated, there is a reverse relationship between banking concentration and competition as indicated in SCP hypothesis. As concentration rises, competition level decreases in this period. If assumptions of SCP hypothesis were valid, competition levels must remained at low levels even after 2003. But competition level increases rapidly after 2003. Therefore, reverse relation between concentration and competition is transient and concentration is not the main variable impacting competition.

There are many other factors that affect competition level in the banking sector. Besides banking concentration, bank numbers, entry restrictions in the banking sector, foreign bank ownership, activity restrictions on banking, financial stability, macroeconomic conditions, banking profitability and efficiency are some other factors that impact competition level in the banking sector.
Bank numbers decreased considerably after 2000 and 2001 banking crises. New entries to banking sector were not allowed until 2011. Bank failures during crises decreased the reliance of the customers. Because full government security on deposit accounts were removed in order to ensure financial stability in the sector during restructuring period, banking customers tended towards public banks and big private banks. In addition, economic activity in Turkey reduced significantly due to crises. Economic problems of the crises, sudden decrease in the number of banks, the loss of customer reliance are all negative factors for competition. Survival in the market became more important than competition for the banks due to crises.

Banking restructuring and economic programs that applied after 2000 and 2001 crises ensured financial and economic stability, strengthening of banking sector and decrease in inflation and interest rates. Decrease in inflation and interest rates resulted net interest margin narrowing. As interest revenues reduced, banks raised competition in order to increase other revenues. Progress in banking sector and macroeconomic environment has positive impact on competition after 2003.

Domestic borrowing requirement of public sector were reduced significantly by economic program and commercial banks directed their activities to financial intermediation. Share of loans in total assets started to increase significantly after 2004 and it has positive impacts on competition. Entry of foreign banks to Turkish market has also positive influence on competition.

Banks started to increase branch numbers and personnel numbers after 2004 in order to compete in the market. Banking Regulation and Supervision Agency has a role in increasing efficiency and competition in banking industry. In restructuring period, public and private banks’ capital structures were restored. Capital adequacy ratios were improved. Banks with strong capital structure gained power to compete in the market. In addition, Banking Regulation and Supervision Agency ensures public informing and transparency in the banking sector and it leads positive effect on competition.

**Conclusion**

There is a dramatic decrease in the bank numbers after the bank crises in 2000 and 2001 in Turkey. This paper seeks to assess concentration and competitive conditions in Turkish banking industry for the period 2000-2012. Concentration ratios and Herfindahl-Hirschman Index are calculated by using annual total asset figures of commercial banks operating between 2000 and 2012. The results show that there is a significant rise in banking concentration from 2000 to 2005. After 2005, it remains stable until 2012. I apply Panzar Rosse model in order to assess concentration degrees in banking industry. Using data of commercial banks operating between 2000 and 2012, the model estimations report that Turkish banking industry experiences monopolistic competition in the period from 2000 to 2011 and maintains perfect competition in 2012. H statistics show a significant reduction in competition degree from 2000 to 2003, however it tends to rise after 2003. There is a transient reverse relationship between competition and concentration from 2000 to 2003, however it disappears after 2004.

**Acknowledgement**

This research paper is generated from the Ph.D. thesis of the author at the School of Banking and Insurance of Marmara University. The author submits special thanks to Prof. Dr. Hayri Kozanoglu for his supervision.

**References**

Aysan, A.F., A. Güneş, O.F. Abbasoğlu. (2007). Concentration, Competition, Efficiency and Profitability of the Turkish Banking Sector in the Post-Crises Period. *Munich Personal RePEc Archive*, No 5494.

Banks for International Settlements. (2001). The Banking Industry in the Emerging Market Economies: Competition, Consolidation and Systemic Stability. *BIS Papers*, No 4.

Beck, T., A. Demirgüç-Kunt and R. Levin. (2003). Bank Concentration and Crises. *National Bureau of Economic Research*, No. 9921.

Beck, T., A. Demirgüç-Kunt and R. Levin. (2005). Bank Concentration and Fragility: Impact and Mechanics. *National Bureau of Economic Research*, No. 11500.
Bikker, J. A. and J. M. Groeneveld. (1998). *Competition and Concentration in the EU Banking Industry*. *De Nederlandsche Bank*, Research Series Supervision No. 8.

Bikker, J.A. and K. Haaf. (2000a). Competition, Concentration and Their Relationship: An Empirical Analysis of the Banking Industry. *De Nederlandsche Bank*, Research Series Supervision No. 30.

Bikker, J.A. and K. Haaf. (2000b). Measures of Competition and Concentration in the Banking Industry: A Review of the Literature. *De Nederlandsche Bank*, Research Series Supervision No. 27.

Bikker, J. A., L. Spierdijk and P. Finnie. (2006). Misspecification of the Panzar-Rosse Model: Assessing Competition in the Banking Industry. *De Nederlandsche Bank*.

Casu, B. and C. Girardone. (2006). Bank Competition, Concentration and Efficiency in the Single European Market. *The Manchester School*, 74-4, 441-468.

Claessens, S. and L. Laeven. (2004). What Drives Bank Competition? Some International Evidence. *Journal of Money, Credit and Banking*, 36-3, 563-583.

Çelik, T. and M. Kaplan. (2010). Türk Bankacılık Sektöründe Etkinlik ve Rekabet: 2002-2007. *Sosyoekonomi*, 13-2, 7-28.

Gelos R. G. and J. Roldos. (2002). Consolidation and Market Structure in Emerging Markets Banking Systems. *International Monetary Fund*.

Group of Ten. (2001). Report on Consolidation in the Financial Sector. [http://www.imf.org/external/np/g10/2001/01/eng/pdf/file1.pdf](http://www.imf.org/external/np/g10/2001/01/eng/pdf/file1.pdf).

International Monetary Fund. (2001). Financial Sector Consolidation in Emerging Markets. [http://www.imf.org/external/pubs/ft/icm/2001/01/eng/pdf/chap5.pdf](http://www.imf.org/external/pubs/ft/icm/2001/01/eng/pdf/chap5.pdf).

Jansen, D. and J. Haan. (2003). Increasing Concentration in European Banking: a Macro Level Analysis. *De Nederlandsche Bank*, Research Memorandum WO no. 743/0323.

Nathan, A. and E.H. Neave. (1989). Competition and Contestability in Canada’s Financial System Empirical Results. *Canadian Journal of Economics*, 22, 576-594.

Ozcan, A. (2012). Türkiyede Ticari Bankacılık Sektöründe Rekabet Düzeninin Belirlenmesi (2002-2009). *C.Ü. İktisadi ve İdari Bilimler Dergisi*, 13-1, 195-211.

Shaffer, S. (1982). Competition, Conduct and Demand Elasticity, Economic Letters 10.

Sun, Y. (2011). Recent Developments in European Bank Competition. *IMF Working Paper*, WP/11/146.

Weill, L. (2004). On the Relationship between Competition and Efficiency in the EU Banking Sectors. *Kredit und Kapital*, 37, 329–352.

Yeyati, E. L. and A. Micco. (2003). Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk. *Inter-American Development Bank Research Department*, Working Paper 499.

Yıldırım, S. and G. C. Philippatos. (2006). Restructuring, Consolidation and Competition in Latin American Banking Markets. *Journal of Banking and Finance*, 31-3, 629-639.