

## Recent evidence on concentration and competition in Turkish banking sector

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**Abstract.** *In this paper I investigate the concentration and competition in the Turkish banking sector by looking at the recent empirical evidence that covers the period from 2005 to 2010. I look at concentration indicators for different balance sheet items including total assets, loans, and deposits. I find that the degree of concentration did not show a big change since 2005; in fact for some balance sheet items it decreased. Besides that, using Panzar and Rosse's methodology, I look at the competition in Turkish banking sector during this period. I find that the Turkish banking sector is characterized by monopolistic competition and the degree of competition has decreased over the relevant period.*

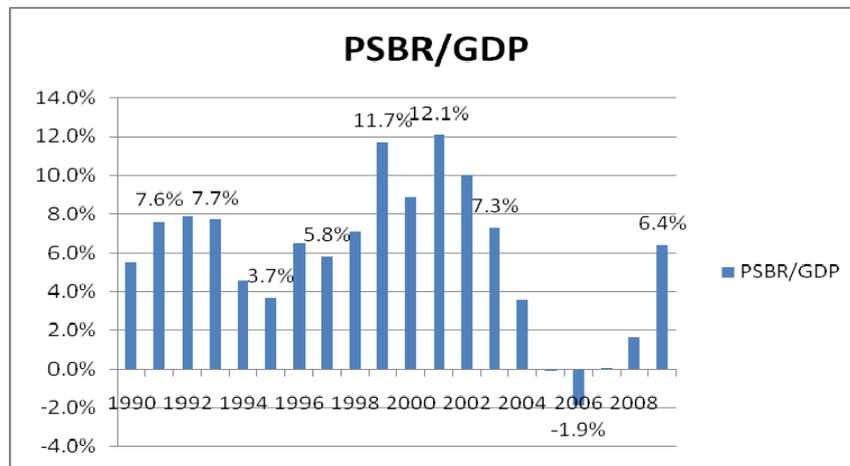
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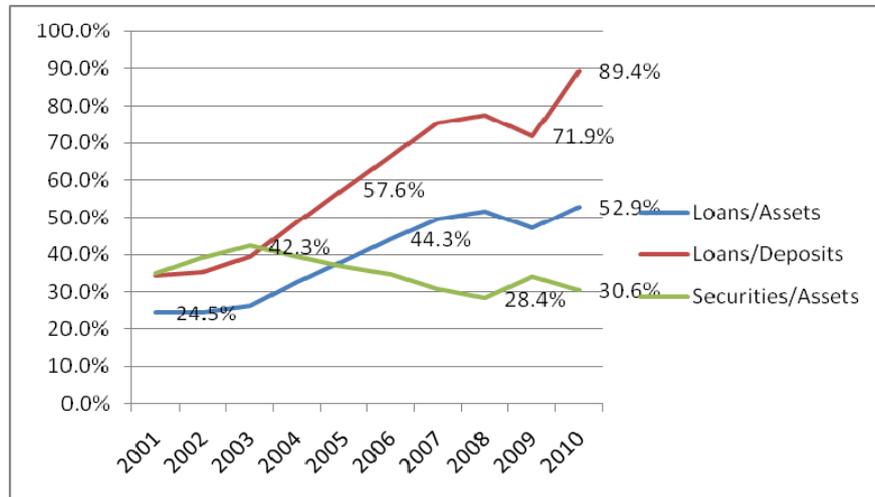
## 1. Introduction

Banks are assumed to play an important role in capital accumulation as they channelize the savings of the economy to productive investment projects. However, this was not the case for Turkish banking sector during 1990s due to the unstable macroeconomic environment. As can be seen in Figure 1, due to the high levels of budget deficits public sector borrowing requirement was very high and the main business of the banking sector was to finance these high budget deficits.



**Figure 1.** Public sector borrowing requirement (PSBR) as a percentage of GDP

After the 2001 economic crisis macroeconomic environment changed significantly and this created important changes in the banking sector. The fiscal discipline resulted in large declines in budget deficits and in turn public sector borrowing requirement was significantly reduced. As a result, the banking sector has turned to its fundamental business that is providing credit to the economy. Figure 2 shows that the loans were only 24% of total assets in 2001 whereas by the end of 2010 more that 50% of assets is composed of loans. Loan-deposit ratio was as low as 34% in 2001 and by the end of 2010 the loan-deposit ratio has reached to 89%.



**Figure 2.** Some selected balance sheet ratios

In this paper I investigate the concentration and competition in Turkish banking sector by looking at the recent empirical evidence. In particular I look at the period between 2005 and 2010. Abbasoglu, Aysan and Gunes (2007) investigated the concentration and competition in Turkish banking sector for the years between 2001 and 2005 and find that during this period concentration in terms of total assets has increased and the degree of competition has decreased in Turkish banking sector. However, the period between 2001 and 2005 is characterized by important mergers and acquisitions in Turkish banking sector and therefore the number of banks has declined significantly. For instance, by 2001 the number of commercial banks in the system was 46, whereas by 2005 the number has declined to 34. Under such a consolidation in the banking sector it is quite normal to see an increase in concentration ratios and a decline in the degree of competition. In this regard it is more interesting to investigate the recent period in terms of concentration and competition in Turkish banking sector as the number of banks did not show a big change during this period. From 2005 to 2010 the number of commercial banks in Turkish banking sector has declined only by two and the total number of commercial banks in the system by the end of 2010 is 32.

There are two competing views in the literature in terms of investigating the relationship between concentration and competition, namely the structure-conduct-performance (SCP) and the efficiency hypothesis (EH). The former one developed by Bain (1951) claims that in a highly concentrated market the degree of competition will be lower and firms will enjoy higher profits. The

latter hypothesis developed by Demsetz (1973) and Peltzman (1977) argues that efficient firms will be able to increase their market share as they are able to generate higher profits and therefore the degree of concentration will naturally increase. According to the efficiency hypothesis there is no relationship between concentration and competition. There are different findings in the banking literature in terms of supporting either hypothesis. Bikker and Groeneveld (2000) investigate the European banking sector and find that there is a negative relationship between the level of concentration and the degree of competition. On the other hand, Jansen and Haan (2003) argue that competition and concentration are not related.

In terms of concentration I explore three important balance sheet items in the banking sector, namely total assets, loans, and deposits. I find that the largest concentration appears to be in total deposits, whereas the smallest concentration appears to be in total loans. As far as the competition is concerned I calculate H-statistics using the Panzar and Rosse's methodology. I find that Turkish banking sector during the particular time period is characterized by monopolistic competition and the degree of competition has decreased over the relevant period.

Panzar and Rosse methodology has been commonly used in analyzing competition in banking sector especially for European banking industry. Lloyd-Williams, Molyneux, and Thornton (1994) investigate the level of competition in a sample of French, German, Italian, Spanish, and UK banks for the period 1986-1989 and find that the banking industry in these countries is characterized by monopolistic competition. Bikker and Haaf (2002) investigate the banking industry for 23 OECD countries and find that the banking sector has a monopolistically competitive market structure in these countries. Claessens and Laeven (2004) carry out banking sector competition analysis for a very huge dataset including fifty developed and developing countries covering the period from 1994 to 2001. They find that monopolistic competition is the dominant market structure for banking industry. Staikouras et al. (2006) investigate the market structure in the EU for 25 member states and find that the banking industry is characterized by monopolistic competition and new member countries have a more competitive banking sector.

The rest of the paper is organized as follows: Section II gives a brief description of the data and presents the results for concentration indicators. Section III provides the estimation results regarding the degree of competition. Section IV concludes.

## 2. Data

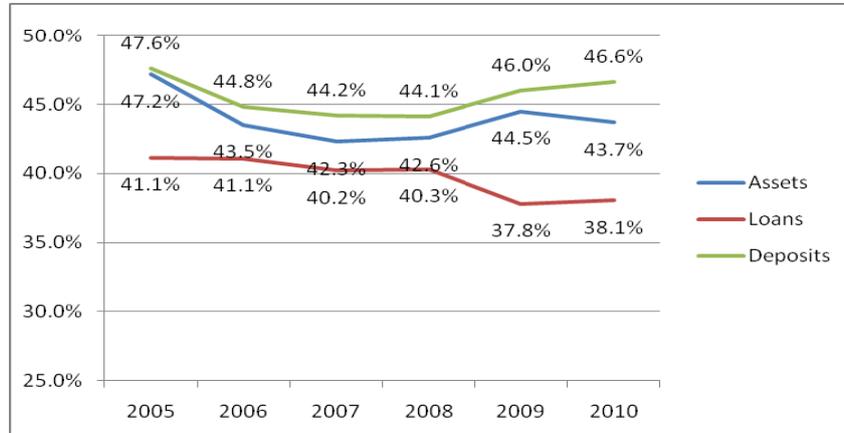
The data uses the unconsolidated balance sheets of commercial banks that operated between the years 2005 and 2010. The data is obtained from Banks Association of Turkey database. Table 1 shows the composition of banks during this period. The table shows that the total number of commercial banks did not show a big change during this particular time interval. The number of non-depository institutions remained the same during this period and the number of commercial banks has declined from 34 to 32. An important fact that is seen in the table is that the number of foreign banks has significantly increased during this period as some privately owned banks are acquired by foreign banks.

Table 1

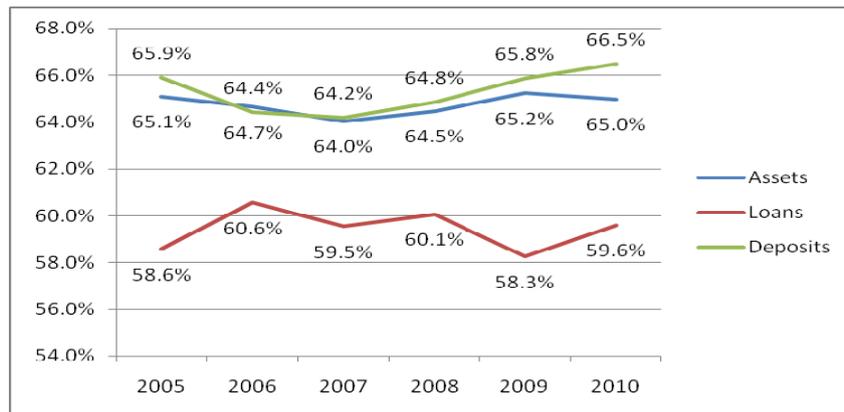
| <b>Composition of banks between 2005 and 2010</b> |      |      |      |      |      |      |
|---|------|------|------|------|------|------|
|   | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| <b>Sector Total</b>                               | 47   | 46   | 46   | 45   | 45   | 45   |
| <b>Commercial</b>                                 | 34   | 33   | 33   | 32   | 32   | 32   |
| State-owned                                       | 3    | 3    | 3    | 3    | 3    | 3    |
| Privately-owned                                   | 17   | 14   | 11   | 11   | 11   | 11   |
| Foreign   | 13   | 15   | 18   | 17   | 17   | 17   |
| Under SDIF  | 1    | 1    | 1    | 1    | 1    | 1    |
| <b>Non-depository</b>                             | 13   | 13   | 13   | 13   | 13   | 13   |
| State-owned                                       | 3    | 3    | 3    | 3    | 3    | 3    |
| Privately-owned                                   | 9    | 8    | 8    | 8    | 8    | 7    |
| Foreign   | 1    | 2    | 2    | 2    | 2    | 3    |

### 2.1. Concentration indicators

In order to measure the degree of concentration I first look at k-bank concentration ratios for different balance sheet items namely total assets, loans, and deposits. For this purpose I calculate C-3 and C-5 ratios which measure the market share of largest 3 and 5 banks respectively. Figure 3 shows the results for C-3 ratios and Figure 4 shows the results for C-5 ratios. For both ratios it is seen that the biggest concentration appears to be in total deposits and the smallest concentration appears to be in total loans. For all three balance sheet items the market share of the largest three firms has slightly decreased from 2005 to 2010 whereas the market share of the largest five firms has slightly increased for loans and deposits and remained constant for assets.



**Figure 3.** Market share of the largest three banks in terms of assets, loans, and deposits



**Figure 4.** Market share of the largest five banks in terms of assets, loans, and deposits

Concentration ratios use information only for a limited number of banks. In order to be able to use information for other banks I also calculate the Herfindahl-Hirschman Index (HHI). Figure 5 shows the results for HHI values for assets, loans, and deposits. In the literature it is generally accepted that HHI values below 0.10 indicate a non-concentrated market, values between 0.10 and 0.18 indicate a moderately concentrated market, and values higher than 0.18 imply a highly concentrated market. As in concentration ratios the highest HHI value appears to be in total deposits and the smallest index value is seen in total loans. Both for total assets and total deposits HHI takes a value slightly higher than 0.10 indicating a moderately concentrated market. However, for total loans the index takes a value less than 0.10 for all years between 2005 and 2010 indicating a non-concentrated market. In terms of changes in the value of the

indices in the particular time period one cannot see a remarkable change in HHI values for the years between 2005 and 2010.

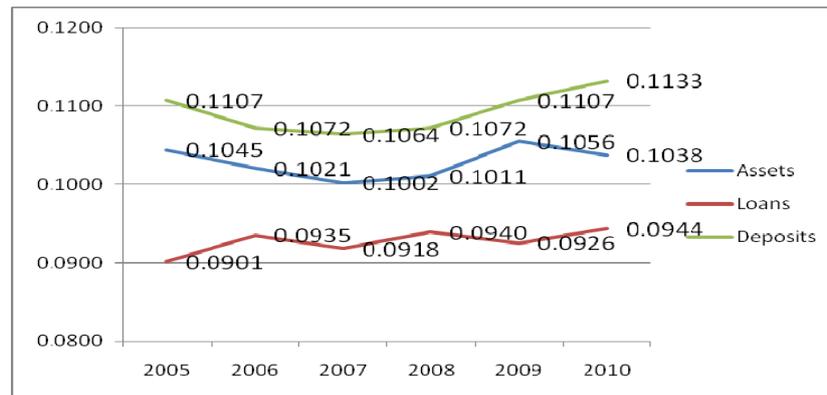


Figure 5. HHI values for assets, loans, and deposits

### 3. Results for competition

In order to measure the level of competition I use the non-structural methodology developed by Panzar and Rosse (1987). The method involves the calculation of an H-statistics which is the sum of factor price elasticities with respect to interest revenue. Gutierrez de Rozas (2007) uses factor price elasticities with respect to total revenue when calculating the H-statistics for Spanish banking sector. As an alternative specification I also look at what value the H-statistics takes when I use total revenue as the dependent variable. In order to calculate the H-statistics the following reduced form equation is estimated:

$$\ln(IRTA_{it}) = \alpha_t + \beta_1 \ln(INTE_{it}) + \beta_2 \ln(PPE_{it}) + \beta_3 \ln(PCE_{it}) + \beta_4 \ln(ETA_{it}) + \beta_5 \ln(NLTA_{it}) + \beta_6 \ln(RA_{it}) + u_{it}$$

The dependent variable, IRTA, is the ratio of interest revenue to total assets. INTE stands for interest expenses to total funds represents the price of capital. PPE is calculated as the ratio of personnel expenses to the number of employees and is an indicator for the price of labor. PCE is the price of capital and is calculated as the other operations and administrative expenses to total assets. In order to capture bank specific effects I include three other explanatory variables. ETA is the ratio of equity to total assets, NLTA is the ratio of net loans to total assets, and RA represents real assets. The H-statistics which is the

sum of factor price elasticities is calculated as  $\beta_1 + \beta_2 + \beta_3$ . Panzar and Rosse methodology implies that for the H-statistics a value less than or equal to zero represents a monopoly. Under monopolistic competition the H-statistics is between zero and one and under perfect competition it becomes one.

Table 2 shows the estimation results for the whole period and also for subperiods. The data used involves 29 commercial banks as for two banks namely Adabank which is under SDIF and JP Morgan net loans to total assets ratio is zero which makes it impossible for them to calculate the log of this variable. Due to the considerations of heteroskedasticity in the data following Gutierrez de Rozas (2007) I use pooled feasible generalized least squares for the estimation of regression equation. The results reveal that the market structure in Turkish banking sector is characterized by monopolistic competition between 2005 and 2010. For the whole period the H-statistics takes a value of 0.388 and the related p-values reveal that the null hypotheses of H-statistics equal to zero and equal to one are both rejected. When one looks at the subperiods one can see that in the first subperiod that covers the years between 2005 and 2007 Turkish banking sector has a monopolistically competitive market structure. However, the H-statistics shows a decline in the second subperiod covering the years between 2008 and 2010 indicating a deterioration in the level of competition.

Table 2

**Pooled generalized least squares estimation results,  
interest revenue as a dependent variable**

| Coefficient          | 2005-2007 | 2008-2010 | 2005-2010 |
|----------------------|-----------|-----------|-----------|
| ln(INTE)             | 0.478***  | 0.335***  | 0.392***  |
| ln(PPE)              | -0.073*   | -0.585*** | -0.094**  |
| ln(PCE)              | 0.082**   | 0.204***  | 0.090***  |
| ln(ETA)              | 0.084**   | 0.121***  | 0.141***  |
| ln(NLTA)             | -0.003    | -0.074*   | 0.012     |
| ln(RA)               | 0.050***  | -0.019**  | 0.031***  |
| const.               | -0.767    | 2.315***  | -0.501**  |
| H-statistics         | 0.487     | -0.046    | 0.388     |
| H <sub>0</sub> : H=0 | 0.000     | 0.566     | 0.000     |
| H <sub>0</sub> : H=1 | 0.000     | 0.000     | 0.000     |

**Notes:** In terms of the statistical significance of the coefficient estimates \* denotes the significance at 10% level, \*\* denotes significance at the 5% level, and \*\*\* denotes significance at the 1% level. The values reported for hypothesis tests are the relevant p-values.

As I mentioned before some authors use total revenue instead of interest revenue as a dependent variable in estimating H-statistics. For Turkish banking sector the non-interest revenue of commercial banks including fees and commissions is about 13% of their total revenues. In this regard it is worthwhile

to look at the level of competition by using total revenue as a dependent variable. Table 3 shows the results. As can be seen using total revenue instead of interest revenue does not make a big difference and the market is still characterized by monopolistic competition. The H-statistics for the whole period is 0.386 and the null hypotheses of H-statistics equal to zero and equal to one are both rejected. Again in the first subperiod the sector has a monopolistically competitive market structure whereas a decline in the level of competition is seen in the second subperiod covering the years between 2008 and 2010.

Table 3

**Pooled generalized least squares estimation results,  
total revenue as a dependent variable**

| <b>Coefficient</b>   | <b>2005-2007</b> | <b>2008-2010</b> | <b>2005-2010</b> |
|----------------------|------------------|------------------|------------------|
| ln(INTE)             | 0.361***         | 0.286***         | 0.342***         |
| ln(PPE)              | -0.032           | -0.464***        | -0.074*          |
| ln(PCE)              | 0.112***         | 0.246***         | 0.118***         |
| ln(ETA)              | 0.127***         | 0.090**          | 0.177***         |
| ln(NLTA)             | 0.015            | -0.082**         | 0.020            |
| ln(RA)               | 0.056***         | -0.003           | 0.038***         |
| const.               | -0.935***        | 1.731***         | -0.469**         |
| H-statistics         | 0.441            | 0.068            | 0.386            |
| H <sub>0</sub> : H=0 | 0.000            | 0.435            | 0.000            |
| H <sub>0</sub> : H=1 | 0.000            | 0.000            | 0.000            |

**Notes:** In terms of the statistical significance of the coefficient estimates \* denotes the significance at 10% level, \*\* denotes significance at the 5% level, and \*\*\* denotes significance at the 1% level. The values reported for hypothesis tests are the relevant p-values.

#### 4. Conclusions

In this paper I investigate the concentration and competition in Turkish banking sector by looking at the recent period covering the years between 2005 and 2010. In another paper Abbasoglu, Aysan, and Gunes (2007) look at the concentration and competition in Turkish banking sector between 2001 and 2005 and find that the degree of concentration has increased and the level of competition has decreased in those years. However, during that period Turkish banking sector was subject to a considerable consolidation and it is normal to see such a change in market structure. In the recent period that is analyzed in this paper one cannot see an important change in the number of commercial banks in the sector. Therefore, it is worthwhile investigating how the concentration and competition evolved in the market during this period.

In terms of concentration I look at total assets, loans, and deposits and find that there has not been an important change in concentration indicators during this particular period. It is seen that the largest concentration is observed in deposits and the smallest concentration is realized in total loans. In terms of competition I run two different regressions with the first one having interest revenue as the dependent variable and the second one having total revenue including fees and commissions as the dependent variable. The results of both regressions reveal that Turkish banking sector is characterized by monopolistic competition for the years between 2005 and 2010. When I divide into two subperiods I find that the level of competition has decreased in this period.

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