EGE AKADEMİK BAKIŞ / EGE ACADEMIC REVIEW

Cilt: 14 • Sayı: 1 • Ocak 2014
ss. 43-52

Dynamics of Profitability in the Turkish Banking Industry

Türk Bankacılık Sektöründe Karlılığın Dinamikleri

Evrim TURGUTLU[1]

ABSTRACT

Dynamics of profitability have important implications for the market structure and competition in the banking industry. There is a well-established literature on this issue comprising non-banking industries, however research on banking is comparatively small. Moreover, there is a lack of research comprising the dynamics of profitability in the developing banking industries. Hence, this paper focuses on the Turkish banking industry to analyze both the dynamics and determinants of profitability in the Turkish banking industry over the period 2006:4-2012:2. First, two competing hypotheses, persistence of profit and competitive environment hypotheses are tested using a dynamic panel data model. Variables representing bank size, credit risk, managerial efficiency, financial soundness, market competition, monetary policy and economic freedom are also incorporated in this model to investigate the determinants of bank profitability. System Generalized Method of Moments (SGMM) is used to estimate this dynamic model. The evidence from the findings indicate the validity of the persistence of profit hypothesis. Moreover, bank profitability has been mostly affected by the capital ratio which could have further implications through the Basel III period. The results also indicate positive impact of improvement in financial soundness of banks on profitability.

Keywords: Profitability, persistence of profits, competitive environment, Turkish banking industry, dynamic panel estimation.

ÖZET

Karlılık dinamiklerinin bankacılık sektöründe piyasa yapısı ve rekabet üzerinde önemli etkileri bulunmaktadır. Bu doğrultuda banka-dışı endüstrileri ele alan kapsamlı bir literatür bulunurken bankacılık endüstrisine ilişkin çalışmalar oldukça sınırlıdır. Dahası, gelişmekte olan bankacılık sektörlerine ilişkin çalışmalar da kısıtlıdır. Bu doğrultuda, bu çalışmanın amacı 2006:4-2012:2 döneminde Türk bankacılık sektöründe karlılığın dinamiklerini ve belirleyenlerini incelemektir. Öncelikle karların kalıcılığı ve rekabetçi çevre hipotezleri bir dinamik panel veri modeli aracılığıyla sınanmaktadır. Banka büyülüğü, kredi riski, yönetimsel etkinlik, finansal sağlamlık, piyasa rekabeti, para politkası ve ekonomik özgürlük değişkenleri aracılığıyla banka karlılığının belirleyenleri araştırılmaktadır. Oluşturulan dinamik panel veri modeli, Sistem Genelleştirilmiş Momentler Yöntemi (SGMY) kullanılarak tahmin edilmektedir. Elde edilen bulgular karların kalıcılığı hipotezinin geçerliliğini desteklemektedir. Bunun yanı sıra banka karlılığının en çok Basel III sürecinde de önemli rol oynayabilecek sermaye oranından etkilendiği görülmektedir. Finansal sağlamlığın banka karlılığı üzerindeki olumlu etkisi de çalışmanın bir diğer önemli bulgusu olarak öne çıkmaktadır.

Anahtar Kelimeler: Karlılık, karların kalıcılığı, rekabetçi çevre, Türk bankacılık sektörü, dinamik panel tahmini.

1. INTRODUCTION

World economy has witnessed dramatic development of financial sectors in the last few decades. The great interest in the financial instruments have led to this change. However, banking is still one of the main actors of the financial system in many countries. Banks play the main role in mobilizing savings, providing risk management instruments and various intermediation tools in bank-based economies. However in market-based economies, banks share this mission with other financial institutions. All financial intermediaries become active as the country becomes richer. Hence, most of the developing countries are expected to be bank-based (Demirguc-Kunt and Huizinga, 1999).

Banks have a dominant role in the Turkish financial system. By September 2012 about 60.9 percent of the assets in the Turkish financial system was built up by the banking sector (BRSA, Financial Markets Report, September 2012). In such an environment, bank performance is crucially important for the functioning of the financial system. There is an extensive literature on the determinants of bank performance. Starting with the Structure-Conduct-Performance (SCP) paradigm the main focus has been on the relationship between bank performance and particularly competition, efficiency and productivity. This literature has evloved around Bain (1951)'s work, a representative of the Structure-Conduct-Performance (SCP) paradigm to Demsetz (1974)'s critique and Chicago School and lately the New

[1] **Assoc. Prof., Dokuz Eylül University, Faculty of Business and Administrative Sciences, Department of Economics, gursoy@deu.edu.tr**

Empirical Industrial Organization (NEIO) approach making use of structural models to analyze this relationship. In this context, there are many empirical papers that analyze the performance-competition mechanism in the banking industry. However, most of these studies are static in the sense that they search for the causality between the variables under the condition that the markets are in equilibrium (Goddard et al., 2011). The Competitive Environment (CE) Hypothesis and the Persistence of Profits (POP) hypothesis provide a critical approach to these static studies. The CE hypothesis suggested by Brozen (1970, 1971a, 1971b) states that excess profits observed in concentrated markets are temporary hence they represent a disequilibrium. However, the POP hypothesis developed by Mueller (1977, 1986) claims that profits are not independent of their initial level which implies a divergence from the competitive rate of return instead of a convergence (Bourlakis, 1997). The test of these hypotheses requires a dynamic model of profitability.

These two competing hypotheses have been widely investigated for the non-bank industries (particularly the manufacturing industry) whereas empirical research comprising the banking industry is growing just recently. Levonian (1994) has used a model to infer expected speed of profit adjustment from stock market and financial accounting data, and the findings indicate a very low speed of adjustment for banks with high profit rates. In another paper Berger et al. (2000) find that profit persistence in US banking has increased substantially between 1969-1997 and further they search for factors that might have generated this persistence. Agostino et al. (2005) analyze impact of ownership structure on the POP in the Italian banking industry for the 1997-2000 period. Their findings indicate strong correlation between ownership structure and persistence of bank profits. Goddard et al. (2010) examine the determinants and convergence of bank profitability in eight European Union member countries over the period 1992-2007. They find that persistence of bank profits have declined with increasing competition in the European Union. Goddard et al. (2011), investigate the persistence of bank profits and its determinants in 65 countries using a dynamic model over the period 1997-2007. Their findings indicate differences in the speed of adjustment in developing and developed banking industries.

There is a limited literature on the validity of POP hypothesis comprising Turkish banking industry. Bektas (2007) analyzes the POP hypothesis in the Turkish banking industry over the period 1989-2003 using a panel unit root testing procedure. He finds that competitive forces have acted to eliminate the abnormal profits over the analysis period. Kaplan and Celik (2008) examine the persistence of profit and source of differences among Turkish banks over the period 1980-1998. They use unit root tests and find that in the short-run persistence of profits is moderate whereas abnormal profits disappear in the long-run. In a recent paper, Iskenderoglu et al. (2011), investigate the POP hypothesis within the Turkish banking system using quarterly data over the period 1998-2009. They utilize panel unit root tests for eight banks and find no evidence of profit persistence. Kirkulak-Uludag and Gokmen (2011) use several panel data models to investigate the profitability of the Turkish banking industry over the period 1999-2009. They find evidence towards persistence of profits with an unstable pattern.

The objective of this paper is to examine the dynamics of profitability in the Turkish banking industry over the period 2006-2012. To this end, the POP hypothesis will be tested and determinants of the bank profitability will be examined using a dynamic panel data analysis. This study contributes to the existing literature in several ways: First, to the author's best knowledge, this is the first study considering the dynamics of profitability in the Turkish banking system testing the POP versus CE hypothesis using a dynamic panel data framework. Second, the determinants of profitability is examined using variables representing the environmental factors such as economic freedom, bank-soundness, economic growth and monetary policy together with sector-specific and bank-specific varaiables. To this end, this is the first study that employs such a wide range of variables to explain profitability in the Turkish banking industry.

The rest of the paper is organizes as follows: the model and methodological issues are discussed in the next section. Data and empirical results are presented in Section 3. Section 4 is devoted to concluding remarks.

2. MODEL AND METHODOLOGY

2.1. Model

To analyze the dynamics of profitability in the Turkish banking system, following the well-established literature (see for example Mueller, 1986; Gschwandtner, 2005) the following empirical model is used:

$$\pi_{i,t} = \alpha_i + \lambda_1 \pi_{i,t-1} + \mu_{i,t} \quad (1)$$

$\pi_{i,t}$ denotes the profit rate of bank i at period t. Profit rate of each bank is a normalized measure of the return on equity (ROE) (or return on assets, ROA) to account for cyclical fluctutations that affect the banks in a similar way . Moreover, if the cross-sectional mean profit rate is taken as a proxy for normal profit, normalized profit rate represents a deviation from the competitive outcome. Model specified in equation (1) has a dynamic nature due to the lagged profit rate variable, $\pi_{i,t-1}$. It is expected to have $\left|\hat{\lambda}_1\right|<1$ where the magnitude of $\left|\hat{\lambda}_1\right|$ provides information about the speed of adjustment of the short-run profits. A value close to one indicates a slow adjustment which implies persistence of profits. However, a value close to zero means that abnormal profits fade away over time.

The model specified in Equation 1 focuses solely on the $\left|\hat{\lambda}_1\right|$. However, it is known that there are other variables affecting the dynamics of profitability in the banking industry. Hence, to assess the impacts of these variables, the model presented Equation 2 will be also estimated.

$$\pi_{i,t} = \alpha_i + \lambda_1 \pi_{i,t-1} + \beta_1 x_{it} + \sum_{i=1}^{3} \beta_{2i} q_{it} + v_{i,t} \quad (2)$$

$x_{i,t}$ is a vector of exogeneous control variables that are expected to affect the profit rate of the banks. The first covariate, LTA, logarithm of the assests, represents the size of the banks. The expected sign of the coefficient of size variable is ambiguous. The banks may experience higher profitability at a higher scale as it exhibits cost efficiency. Moreover, larger size may also increase the profitability of banks due to economies of scope through diversification in related services (Elsas et al., 2010). However, another approach indicates the possibility of a negative relationship between size and profitability. Smaller banks may have an advantage in providing better quality information on customers and their risks (Barros et al, 2007). Capital ratio (ratio of total equity to total assets, ETA) is another variable in the vector of exogeneous control variables. The relationship between ETA and bank profitability may occur in two directions. According to the famous risk-return hypothesis, a very risk-averse bank with high ETA ratio would face with lower profitability. Hence, the relationship would be negative. However, if we assume that banks with high ETA ratios would be safer in case of liquidity crisis, then the expected relationship between these variables would be positive.

Loans are one of the main sources of revenue for banks. Moreover, magnitude of loans may be an indicator of credit risk. To that end, total loans in logarithm (LTL) are used as another variable in the model. In the literature, the relationship between total loans and bank profitability is not conclusive. While some papers indicate a positive relationship (see for example Abreu and Mendes, 2002) some results indicate a negative relationship due to the lack of profit creation capability of bank loan growth (see for example Hassan and Bashir, 2003; Staikouras and Wood; 2003).

TCINC, is measured as ratio of total operating costs to total income and used as an indicator of managerial efficiency. The expected sign of the coefficient of TCINC is negative indicating a positive relationship between managerial efficiency and profitability of the banks. Over the last decade, the strict capital adequecy requirements of the authorities and increased competition have reduced the opportunity of gaining profit through on-balance-sheet activities. Hence banks have shifted towards off-balance-sheet items (e.g. financial guarantees, derivatives like exchange rate and interest rate swaps) either as substitutes to ordinary loans or as tools to hedge risk and generate revenue. The ratio of off-balance-sheet liabilities to total assets have reached 1.4 by the second quarter of 2012 in the Turkish banking system (BRSA, 2012). Since these activites have important impact on costs and profitability, the net effect should be analyzed carefully (Lozano-Vivas and Pasiouras, 2010). To control the impact of these off-balance-sheet activities on the profitability of the banks, LNOBSL, indicating the natural logarithm of the off-balance-sheet liabilities of the banks are also included.

Following the empirical literature on the relationship between competition and profitability, a conduct-based competition indicator, the Panzar and Rosse H-statistic is used as another covariate. The value of H-statistic almost for each period indicates a presence of monopolistic competition in the Turkish banking industry. As H-statistic converges to one, the banking industry approaches perfectly competitive outcome. Hence, according to the CE hypothesis, the coefficient of this variable is expected to be negative.

In the recent literature, a measure for bank's financial soundness, Z-score based on the study by Boyd and Graham (1986) has been widely used (see for example Stiroh 2004a, 2004b; Demirguc-Kunt et al., 2006; Mercieca et al., 2007; Schaeck and Cihak,

2008). Z-score is measured as $Z = \frac{ROA + \frac{EQ}{TA}}{\sigma ROA}$, where ROA is the return on assets, EQ/TA is the equity-to-assets ratio and σROA is the standard deviation of ROA over the sample time period. A higher Z-score indicates improved risk-adjusted performance or lower probability of insolvency. To control for the link between the financial soundness of the banks and dynamics of profitability the variable Z is also used in the model.

Environmental variables comprising the economic and legal framework that the banks are operating are also important in determining the bank profitability. To control for the monetary policy regulations, money market rate (MMRATE) is used as another covariate. Economic growth may be a force behind the persistence of abnormal profits of banks in the long run or on the contrary increased business opportunities brought with economic growth may foster the convergence of bank profits to the norm (Goddard et al., 2011). To control the effect of economic growth on the dynamics of bank profitability, GDPGR, GDP growth is included in the model. Following Goddard et al. (2011) a variable, FREE, representing the economic freedom index is used as another control variable. This index is produced by the Heritage Foundation using four pillars of economic freedom which are rule of law, limited government, regulatory efficiency and open markets. A higher index value indicates higher economic freedom and a positive relationship is expected between bank profitability and the variable FREE. The model also includes time dummies defined for each quarter in order account for possible cyclical behavior. The impact of the recent global financial crisis is controlled by a dummy variable, CRS, which assumes a value 1 for the year 2008 and zero otherwise.

2.2. Methodology

To analyze the dynamics of profitability in Turkish banking industry using Equation 1 and 2, Generalized Method of Moments (GMM) procedure is adopted. Ordinary least squares method leads to upwards biased and inconsistent estimators in such models since the lagged dependent variable is correlated with the error term. To estimate dynamic models, initially, instrumental variables techniques were used (see for example Anderson and Hsiao 1981, 1982; Griliches and Hausman 1986; Holtz-Eakin et al. 1988). Using lagged values of the dependent variable as instruments these have provided consistent but not efficient estimators since they did not take into account all restrictions on the covariances between regressors and the error term. To overcome this problem, Arellano and Bond (1991) developed a dynamic (first-differenced) Generalized Method of Moments (DGMM) method. This estimator utilizes lagged levels of endogeneous variables and strictly exogenous variables as instruments. However, Blundell and Bond (1998) have criticized this estimator to have a poor performance when series are persistent. To solve this problem Arellano and Bover (1995) and Blundell and Bond (1998) have proposed a system Generalized Method of Moments (SGMM) method where first-differenced GMM equation and the equation in levels form a system and estimations are carried out in this system. Instruments for the first-differenced equation are same as in the DGMM method and lagged differences of these variables are used as instruments for the equation in levels. Blundell and Bond (1998) argue that even when the series are persistent the instruments used in the levels equation are good predictors of the endogeneous variables in the model. Both DGMM and SGMM can be estimated in one-step or two-steps, where errors are *iid* in one–step and heterosecdasticity consistent in the two-step case. Hence, SGMM estimator is used to estimate Equation 1 and Equation 2. The validity of the instruments can be tested through the Hansen test (or Sargan test) of overidentifying restrictions which has a χ^2 (chi-square) distribution with degrees of freedom, *j-k*, where *j* is the number of instruments and *k* is the number of endogeneous variables. Another indicator about the consistency of the SGMM estimator is the absence of second order autocorrelation in the residuals. Hence, AR(1) and AR(2) values are reported to check this.

3. DATA AND EMPIRICAL RESULTS

3.1. Data

This paper rests on the bank-level data obtained from the Turkish Banking Association for the commercial banks over the period 2006:4-2012:2. The banks with only positive asset to equity ratios, non-zero deposits and total assets are included. Hence we have an unbalanced panel of 23 periods and 30 banks. Macroeconomic variables (GDP growth rate and money market rate) are obtained from the IMF's International Financial Statistics Database and economic freedom index is obtained thorugh Heritage Foundation.

Descriptive statistics for major variables are reported in Table 1.

Table 1: Descriptive Statistics For Variables

Variables	Mean	Standard Deviation	Minimum	Maximum	Obs.
π_{it}(ROE)	0.404	2.030	-6.681	6.946	650
π_{it}(ROA)	0.274	2.722	-4.528	5.984	650
LTA	3.496	0.901	1.553	4.796	650
ETA	0.159	0.106	0.036	0.784	650
LTL	7.474	2.375	-0.370	10.997	650
TCINC	1.051	0.297	0.470	3.436	650
LNOBSL	8.298	2.225	1.470	11.893	650
H	0.326	0.202	-0.202	0.65	650
Z	19.511	14.339	0.555	89.738	650
MMRATE	10.853	5.843	1.5	17.5	650
GDPGR	1.078	9.681	-14.015	17.045	650
FREE	61.198	2.566	57	64.2	650

(**Note:** LTA (natural logarithm of assets) and LTL (natural logarithm of total loans) are in thousand Turkish Liras; SD abbreviates the standard deviation.)

3.2.Empirical Results

The model represented in equation 1 is estimated using the SGMM approach including the time dummies and a dummy variable representing the global financial crisis. To make a comparison, the estimations are carried out using both ROE and ROA based profitability indicators as the dependent variable. The results are reported in Table 2.

Table 2: Dynamics of Profitability: Without Covariates

	π_{it}(ROE)	π_{it}(ROA)
Constant	0.110 (0.198)	-0.089 (0.312)
$\pi_{i,t-1}$	0.808* (0.000)	0.872* (0.000)
Q1	-0.005 (0.735)	0.044** (0.043)
Q2	-0.025* (0.004)	0.021 (0.334)
Q3	0.091* (0.000)	0.108* (0.000)
CRS	-0.362 (0.483)	0.461 (0.234)
Sargan Statistic	15.942 (1.000),df=138	19.980 (1.000), df=138
AR1	-2.337** (0.019)	-2.453** (0.014)
AR2	-0.686 (0.492)	-1.067 (0.286)

(**Note:** The two-step system GMM estimator is used. The values in brackets are p-values. * and ** indicate statistical significance at 1 and 5 % , respectively. Sargan statistic denotes the chi-square statistic for testing overidentifying restrictions. df is the abbreviation for degrees of freedom. AR(1) and AR(2) are the test statistics for the first and second-order serial correlation in the first-differenced residuals.)

The results presented in Table 2 indicates significant and highly persistent profits in the Turkish banking industry. The POP coefficients are similar in both models. A value of POP coefficients around 0.80 indicates that the abnormal profits observed in the Turkish banking industry have not eroded, but exhibited a persistent pattern. These findings are in line with the findings of Kirkulak-Uludag and Gokmen (2011) who have used a similar panel-data analysis for the Turkish banking industry over the period 1999-2009. However, our findings are contradicting with the previous studies which have employed unit root tests to analyze the persistence of profits in the Turkish banking industry (see for example Bektas, 2007; Kaplan and Celik, 2008; Aslan and Iskenderoglu, 2012). The Sargan and the second-order autocorrelation tests indicate that there is no specification problemi in the estimated models.

After finding evidence of persistent profits in the Turkish banking industry, it is worth including the possible covariates of profitability and examine the dynamics of profitability accordingly, as specified in Equation 2. The estimation results are repoted in Table 3.

Table 3: Dynamics of Profitability: With Covariates

	π_{it}(ROE)	π_{it}(ROA)
Constant	-6.028 (0.307)	-4.646 (0.218)
$\pi_{i,t-1}$	0.359* (0.000)	0.205* (0.000)
LTA	0.397**(0.027)	0.460 (0.125)
ETA	-8.397** (0.021)	2.189 (0.177)
LTL	-0.146***(0.064)	-0.154 (0.426)
TCINC	-1.043* (0.000)	-1.060* (0.000)
LNOBSL	-0.291* (0.000)	-0.070** (0.014)
H	-0.429 (0.392)	0.285 (0.305
Z	0.096* (0.000)	0.043* (0.000)
MMRATE	0.026 (0.477)	0.016 (0.442)
GDPGR	0.017 (0.349)	0.025**(0.030)
FREE	0.106 (0.281)	0.029 (0.530)
Q1	0.293 (0.291)	0.596**(0.011)
Q2	0.417 (0.297)	0.602** (0.024)
Q3	0.055 (0.543)	0.160** (0.05)
CRS	0.046 (0.579)	0.045 (0.410)
Sargan statistic	14.908 (1.000), df=288	13.490 (1.000),df=288
AR1	-2.645* (0.0082)	-1.999**(0.045)
AR2	1.001(0.317)	1.164 (0.245)

(**Note:** The two-step system GMM estimator is used. The values in brackets are p-values. * and ** indicate statistical significance at 1 and 5 %, respectively. Sargan statistic denotes the chi-square statistic for testing overidentifying restrictions. df is the abbreviation for degrees of freedom. AR(1) and AR(2) are the test statistics for the first and second-order serial correlation in the first-differenced residuals.)

This model includes several covariates as well as the lagged profits of the banks. The results indicate that the estimated POP coefficients are statistically

significant when both profitability indicators, ROE and ROA, are considered. The magnitude of POP coefficients once more imply that the competitive forces were not strong enough to erode abnormal profits over the sample period.

It is interesting that these models have not provided many common results except the finding of profit persistence. ROE and ROA are most commonly used indicators of firm profitability. Both of these measure the profitability of a company while they have some differences. ROE particularly focuses on the expected rate of return on a fixed investment based upon the past performance of the firm. This implies that if the firm has been carrying out its operations relying on debt, ROE will differ from ROA. Moreover, as Goddard et al. (2004) state, ROE is a better profitability measure than ROA particularly when there is significant contribution of off-balance sheet items to the bank profits. Hence, although they both measure the managerial effectiveness and performance, the regressions based on these two indicators may provide slightly different results.

Considering the above mentioned possible difference, we first focus on the results obtained from the model with the ROE-based normalized profit rate. The positive coefficient of LTA imply that larger banks have experienced the advantage of reaping higher profits over the sample period. The estimated coefficent for ETA indicates that the high risk-low return hypothesis is valid for the Turkish banking industry. Our findings are similar with Goddard et al. (2010) who state that highly capitalized banks are less risky but at the same time less profitable. Moreover, ETA is one of the most important determinants of bank profitability. Since ETA may also be considered as an indicator of regulatory adjustments towards establishing a sound banking system, this may be a valuable finding for the authorities.

The estimated coefficient for LTL is negative and significant. The negative coefficient indicates a problem in the profit creation capability of loan growth in the Turkish banking industry over the sample period. Turkish banking industry has been experiencing a significant growth in the loans. However, particularly the post-2010 period is characterized by contracting interest margins, declining net interest income, expansion of personnel and other non-interest expenses and losses due to derivatives. Hence, fast growth of loans could not dominate these negative effects on profitability. The estimated coefficient of TCINC is also is negative and significant, as expected, indicating the positive impact of managerial efficiency on bank profitability.

Recently, off-balance sheet activities have been one of the important revenue sources for the banks. Our findings indicate a negative and significant impact on the profitability of the Turkish banking industry. The negative coefficient is not surprising. Banks have witnessed losses from the derivatives which have an increasing share in the off-balance-sheet activites in Turkish banking industry in recent periods. Hence, these have incresed the riskiness of the industry and created a negative cost impact on the profitability of the banks.

The estimated coefficient of Z, indicates that financial soundness has a positive and significant impact on the profitability of banks. The results do not provide a significant relationship between the variables proxying competitive structure (H), the monetary policy (MMRATE), economic growth rate (GDPGR), economic freedom (FREE) and global financial crisis (CRS).

The results obtained from the model with ROA-based normalized profit rate are reported in the third column of Table 3. The findings from this model are slightly different from the model based on ROE, but they are not in contradiction with each other. In this model the covariates indicating the managerial efficiency (TCINC), off-balance-sheet activities (LNOBSL), financial soundess (Z) and economic growth rate (GDPGR) have statistically significant coefficients. These different findings are not surprising due to the different nature of ROE and ROA. Goddard *et al*. (2004) state that, since the contribution of off-balance sheet items to the bank profitability is excluded from the denominator of ROA, ROE and ROA based models may provide different outcomes. The similar situtaion is also valid for the Turkish banking industry over the recent years. Hence this may also have led to these different findings.

In summary, empirical evidence indicates that profits have been significantly persistent in the Turkish banking industry over the sample period, 2006-2012. This implies that the bank profits have not been converging to a norm but rather following a persistent structure. Hence, evidence from this study support persistence of profit hypothesis rather than the competitive environment hypothesis for the Turkish banking industry.

4.CONCLUSIONS

Turkey is a bank-based economy. Banks consititute an important portion of the Turkish financial sector. Hence, functioning of the banks is crucial for the economy. Each dynamic of the banking industry is worth analyzing to build up a better and sound financial system. To this end, this paper aims to analyze the dynamics of profitabilility in the Turkish banking industry over the period 2006:4-2012:2.

First, two competing hypothesis are tested for the Turkish banking industry: Persistence of profit hypothesis versus competitive environment hypothesis. The validity of the persistence of profits hypothesis implies that the competitive forces are not strong enough to erode the abnormal profits and bring them to the norm. However, competitive environment hypothesis assumes that abnormal profits will converge to the norm in the long run. For a panel of commercial banks over the sample period, we have used a dynamic panel data model and system generalized method of moments estimator to test for these hypothesis. Using ROE and ROA based profitability measures, the analysis is carried out under two different models using same variables. The results provide strong evidence towards persistence of profits. It is well known that following the 2001 crisis, Turkish banking industry has undergone a restructuring period. There was a wave of mergers and acquisitions which possibly increased the market concentration. Hence the evidence towards the persistence profits in the banking industry is by no means a surprise.

Second, we use several variables to control bank-specific, sector-specific and macroeconomic factors and analyze behavior of bank profitability accordingly. The results once more indicate the validity of the persistence of profits hypothesis. However, the models with ROE and ROA based profitability indicators provide slightly different outcomes. These differences can be attributed to the different nature of ROE and ROA.

When ROE based model is considered, the results suggest significant impact of the variables indicating bank size, capital ratio, total loans, managerial efficiency, off-balance-sheet liabilities and financial soundness on bank profitability. According to this model, it is interesting that the major variable affecting the bank profitability is the equity-to-assets. Similar to the results of Goddard et al. (2009) the effect is negative. This can be interpreted as high opportunity cost of holding high level of capital on the bank profitability. This is an important finding for the banking industry on the way towards Basel III. Due to high buffer capital requirements of the Basel III framework, falling rate of profit in the banking industry is expected. Hence this might strengthen the opportunity cost of holding capital in the Turkish banking industry which may in turn lead to financial stability problems. The other bank-specific variables, bank size and total loans are positively whereas cost-to-income ratio indicating managerial efficiency and off-balance-sheet liabilities are found to be negatively related with the bank profitability. To investigate the impact bank's financial soundness on Z-score isused. The findings indicate that financial soundness significantly strengthening the bank profitability.

The other model is based on the profitability measured with ROA. However, we find significant coefficients for only variables indicating managerial efficiency, off-balance-sheet liabilities, financial soundness and economic growth. The different findings from the ROE and ROA based models are due to the different nature of these variables. Moreover, significant contribution of off balance-sheet items to bank profits and debt potential of the Turkish banks may have led to these differences. Hence, it is not surprising to find different results based on these two models.

However, the common and most important finding from the two models is the persistence of bank profits in the Turkish banking industry. This has important implications for the future development of the Turkish banking industry and financial system. In order to establish a sound and efficient banking industry the regulations towards bringing competitive forces work should be made. Moreover, the possible liquidity problems of approaching Basel III framework should be analyzed elaborately. Finally, since banking industry has the largest share in the Turkish financial industry, improvement of economic freedom will improve not only the development of the banking industry but also economy as a whole.

END NOTES

[1] BRSA: Banking Regulation and Supervision Agency.

[2] Some of the papers analyzing the POP hypothesis for the non-bank industries are Mueller (1986), Geroski and Jacquemin (1988), Goddard and Wilson (1996, 1999), Waring (1996), Marayuma and Odagiri (2002), Glenn et al.(2001, 2003), Cable and Gschwandtner (2008).

[3] Profit rate of each bank is normalized as follows: $\pi_{i,t} = \frac{\Pi_{it} - \overline{\Pi}_t}{\overline{\Pi}_t}$ where Π_{it} is the ROE (or ROA) for bank i at time t and $\overline{\Pi}_t$ is the the cross-sectional average for period t.

[4] H-statistic is developed by Panzar and Rosse (1987). It relies on the estimation of a reduced form revenue equation : $\ln TR_{it} = \alpha + \beta_1 \ln P_{L,i,t} + \beta_2 \ln P_{F,i,t} + \beta_3 \ln P_{K,i,t} + \delta_1 \ln TA_{i,t} + \delta_2 \ln ETA_{i,t} + \sum_j Q_{j,t} + \varepsilon_{it}$

where $TR_{i,t}$ is the ratio of total interest income to total assets, $P_{L,i,t}$, $P_{F,i,t}$ and $P_{K,i,t}$ are input prices which are price of labor measured as ratio of personel expenses to total assets, price of deposits as the ratio of interest expense to total deposits and price of fixed capital as the ratio of overheads to total assets, respectively. TA (total assests), ETA (equity to total assets) are used as control variables. Time dummies, $Q_{j,t}$, are also included to account for seasonality. H statistic is the sum of elasticity of total revenues with respect to input prices calculated as $\beta_1 + \beta_2 + \beta_3$. An H statistic positive and less than 1 indicates the case of monopolistic competition with freedom of entry wheras a negative value of H indicates that the structure of a market is a monopoly, a perfectly colluding oligopoly, or a conjectural variations short-run oligopoly. *H*-statistic equal to 1, occurs when firms operate under perfect competition. To test whether observations are in long-run equilibrium, the same modelis tested with dependent variable, ROA (return on assets) in which H= 0 indicates equilibrium.

[5] A measure of market concentration , Herfindahl- Hirschman Index (HHI) is also calculated and used in place of H statistic in the model. Similar results are obtained and they are available upon request.

[6] Money market rate is a short-term interest rate similar to the Treasury Bill rate.

[7] Heritage Foundation states that "in an economically free society, individuals are free to work, produce, consume, and invest in any way they please, with that freedom both protected by the state and unconstrained by the state"(http://www.heritage.org/index/).

[8] Profitability of the banks has declined dramatically, by 9.7 per cent, in 2008 (BRSA, 2011). Hence, to focus on this dramatic change a crisis dummy variable is defined for each quarter in 2008.

[9] The sample period is determined according to the availability of data and aims to cover a recent period.

[10] Pairwise correlation between these two indicators is 0.774 for the sample data.

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