

Testing Convergence of Return on Assets: Empirical Evidence from the Turkish Banking Sector

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Abstract: This paper investigates whether there is a convergence of profit rates in the Turkish banking sector for the period 2003:Q4-2014:Q3 and provides empirical evidence from the largest ten banks in the sector by employing the approach of Nahar and Inder (2002). The empirical evidence reveals that only two banks' profits converge to the average. Therefore, the paper concludes that there is not an intense competition that can bring excess profits to competitive levels in the Turkish banking sector.

Keywords: Convergence, Persistence, the Turkish Banking Sector, Return on Assets

JEL Classification: C22, C51, G21

1. Introduction

When the market structure of the Turkish banking sector is examined, it will be observed that the Turkish banking sector exhibits an oligopolistic market. Because, according to the data of The Banks Association of Turkey, the largest ten banks in the sector have about 85% of total assets in the sector by the third quarter of 2014. As a result of this oligopolistic structure of the sector, the degree of competition among these ten banks come into prominence. Starting from this point, it may be argued that there will be a convergence of profit rates of these banks if there is intense competition among them. As Mueller (1977) states, in such a market, the competition will bring excess profits back to competitive levels, and there will not be persistent excess profits. In other words, profits above or below the norm will disappear because of the strong competition.

There is an extending empirical literature on the persistence of profits in banking sectors (Berger et al., 2000; Gaddard et al., 2004a, 2004b; Agostino et al., 2005; Bektas, 2007; Kaplan and Celik, 2008; Aslan et al., 2011, Goddard et al., 2011; Iskenderoglu et al. 2011; Dietrich and Wanzenried, 2012; Kanas et al., 2012; Turgutlu, 2014; Chronopoulos et al., 2015). Among these papers, Bektas (2007), Kaplan and Celik (2008), Aslan et al. (2011), Iskenderoglu et al. (2011), and Turgutlu (2014) investigate the persistence of profitability in the Turkish banking sector. While Bektas (2007), Kaplan and Celik (2008), and Turgutlu (2014) employ an autoregressive equation, Aslan et al. (2011) perform a panel unit root test to examine whether there exist persistent excess profits in the Turkish banking sector. Additionally, Iskenderoglu et al. (2011) adopt both methods. While Turgutlu (2014) finds that excess profits are persistent, other papers yield that there is an intense competition in the Turkish banking sector and this competition removes excess profits. In other words, these papers indicate that there is a convergence of profit rates among the banks in Turkey.

Nahar and Inder (2002) propose an approach to test convergence, and their approach has been mainly utilized to test income convergence so far. This approach lets one examine the validity

of the convergence hypothesis for each unit in the sample individually. The purpose of this paper is to examine whether there is a convergence of profit rates among the largest ten banks in the Turkish banking sector through this approach. The rest of the paper is as follows: Section 2 presents methodology and data. Section 3 reports findings, and Section 4 concludes the paper.

2. Methodology and data

This section presents Nahar and Inder (2002) approach and introduces data set that is used to test the convergence.

2.1. Methodology

Nahar and Inder (2002) produce a procedure to test the convergence hypothesis. This approach lets one test whether one country's output converges to both the average output and to the group leader's output. This paper adopts the approach of Nahar and Inder (2002) to test the convergence of return on assets to the average in the Turkish banking sector and investigates the convergence to the average return on assets.

To test the convergence to the average, the procedure begins as in equation (1):

$$\lim_{n \rightarrow \infty} E_t(\text{roa}_{it+n} - \overline{\text{roa}}_{t+n}) = 0 \quad (1)$$

where $\overline{\text{roa}}$ depicts average return on assets ($\overline{\text{roa}}_t \equiv \sum_{i=1}^N \text{roa}_{it} / N$). Equation (1) indicates that the long-run average of $\text{roa}_{it} - \overline{\text{roa}}_t$ must converge to zero as the forecast horizon enlarges. Nahar and Inder (2002) define $z_{it} = \text{roa}_{it} - \overline{\text{roa}}_t$ and they consider $w_{it} = z_{it}^2$. w_{it} must be coming close to zero for convergence. That is to say, the rate of change in w_{it} with respect to time must be negative, id est $(\partial/\partial t)w_{it} < 0$. The definition of the convergence in Equation (1) implies that:

$$\lim_{n \rightarrow \infty} E_t(w_{it+n}) = 0 \quad (2)$$

as $w_{it} > 0$, $(\partial/\partial t)w_{it} < 0$ is consistent with $w_{it+n} \rightarrow 0$ as $n \rightarrow \infty$. Hence whether there is a convergence can be evaluated from the sign of $(\partial/\partial t)w_{it}$. To obtain $(\partial/\partial t)w_{it}$, w_{it} is described as a function of time trend (t):

$$w_{it} = f(t) + u_{it} = \beta_0 + \beta_1 t + \beta_2 t^2 + \dots + \beta_{k-1} t^{k-1} + \beta_k t^k + u_{it} \quad (3)$$

where the β_i s are parameters, and u_{it} is the error term with mean zero. The slope function can be found from Equation (3):

$$(\partial/\partial t)w_{it} = f'(t) \quad (4)$$

Estimates of this slope function can be used to check the convergence. Nahar and Inder (2002) argue that there is a convergence if the average of these slopes is negative. That condition is depicted as follows:

$$\frac{1}{T} \sum_{t=1}^T \frac{\partial}{\partial t} w_{it} < 0 \quad (5)$$

This can be obtained from Equation (4) as below:

$$\frac{1}{T} \sum_{t=1}^T \frac{\partial}{\partial t} w_{it} = \beta_1 + \beta_2 r_2 + \dots + \beta_{k-1} r_{k-1} + \beta_k r_k = r' \beta \quad (6)$$

where

$$r_2 = \frac{2}{T} \sum_{t=1}^T t, \dots, r_{k-1} = \frac{(k-1)}{T} \sum_{t=1}^T t^{k-2},$$

$$r_k = \frac{k}{T} \sum_{t=1}^T t^{k-1}$$

$$r = [0 \ 1 \ r_2 \ \dots \ r_{k-1} \ r_k], \text{ and}$$

$$\beta = [\beta_0 \ \beta_1 \ \dots \ \beta_{k-1} \ \beta_k]$$

To test the convergence hypothesis, the null hypothesis of no convergence is defined as $H_0: r' \beta \geq 0$, against the alternative hypothesis $H_1: r' \beta < 0$. To test this, Equation (3) is estimated through ordinary least squares (OLS), and then a t-test of this restriction on the β vector is executed.

2.2. Data

The data are quarterly, cover the period 2003:Q4-2014:Q3, and are obtained from The Banks Association of Turkey. The data set belongs to the largest ten banks in the sector (Akbank, Denizbank, Finans Bank, Türkiye Cumhuriyeti Ziraat Bankası, Türk Ekonomi Bankası, Türkiye Garanti Bankası, Türkiye Halk Bankası, Türkiye İş Bankası, Türkiye Vakıflar Bankası, Yapı ve Kredi Bankası) by total assets as of the last quarter of 2014. The profitability indicator is return on assets (ROA) that is calculated by dividing total assets into net income after taxes.

Before employing the approach of Nahar and Inder (2002) to test the convergence, some graphical observations may provide us some initial and/or preliminary inspection. Figure 1 depicts graphical observations of ROAs of the banks and shows that banks' profits do not have a common trend. Therefore, Figure 1 presents weak evidence in favour of the convergence. The plot of the cross-sectional standard deviation of ROAs for ten banks is given in Figure 2. As the cross-sectional standard deviation does not have an explicit downward trend, it can't indicate evidence for σ -convergence (see Sala-i Martin, 1996 for a detailed explanation of σ -convergence).

Beyond graphical analyses and some basic statistical methods, some reliable statistical methodologies may be needed to test the convergence hypothesis. To this end, this paper employs the convergence approach of Nahar and Inder (2002). A few calculations are made for each bank to obtain data that will be utilized for econometric application. First, net income after tax is divided by average total assets, profit rates in interim periods are annualized, and thus ROA is obtained as in Figure 1. Second, average ROA of the ten banks is subtracted from ROA that is obtained in the first step. Third, the number obtained in the second step is squared. The next section presents findings.

3. Findings

Table 1 depicts the results of the convergence test based on average slope estimates. As seen, the results present evidence in favour of the convergence hypothesis for only Akbank and Türkiye Vakıflar Bankası. In other words, these banks' profits converge to the average while other eight banks' profits do not.

These findings have important implications. Accordingly, based on empirical findings, it may be argued that there is not an intense competition among the largest banks in the Turkish banking sector. Because, some banks in the Turkish banking sector enjoy profits above the norm while some banks obtain profits below the norm. In other words, there exist persistent excess profits in the Turkish banking sector, and the competition in the sector can't bring excess profits to competitive levels.

4. Summary and Conclusions

This paper examines whether there is a convergence of profit rates among the largest ten banks in the Turkish banking sector by employing the approach of Nahar and Inder (2002) for the period 2003:Q4-2014:Q3. In other words, this paper investigates whether there exist persistent excess profits in the Turkish banking sector. According to the findings, only profits of Akbank and Türkiye Vakıflar Bankası converge to the average. These findings imply that there is not an intense competition among the largest ten banks in the Turkish banking sector. That is to say, the competition in the sector is not able to bring excess profits to competitive levels and thus there exist excess profits in the sector.

There are a few papers that examine the profit convergence in the Turkish banking sector, and they usually employ panel data methods such as panel autoregressive equation and panel unit root tests. However, this paper employs the approach of Nahar and Inder (2002) that lets one examine the validity of the convergence hypothesis individually. Therefore, the main contribution to literature of this paper is that it presents empirical evidence for each bank individually towards the validity of the convergence hypothesis.

Endnotes

* Detailed information for the authors and acknowledgement.

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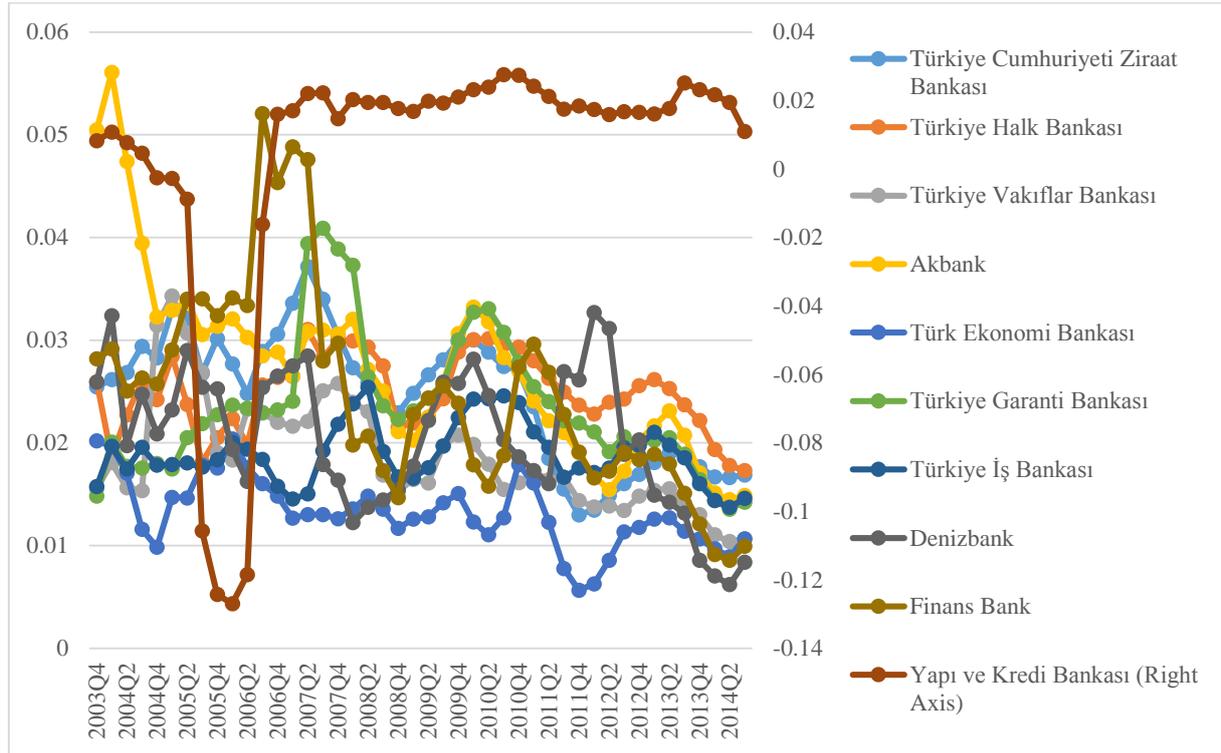
References

- Agostino, M., L. Leonida, and F. Trivieri.** 2005. "Profits Persistence and Ownership: Evidence from the Italian Banking Sector," *Applied Economics*, 37, 1615-1621.
- Aslan, A., K. Koksal, and O. Ocal.** 2011. "Competitive Environment Hypothesis in Turkish Banking System," *International Journal of Economics and Financial Issues*, 1, 74-77.
- Bektas, E.** 2007. "The Persistence of Profits in the Turkish Banking System," *Applied Economics Letters*, 14, 187-190.
- Berger, A. N., S. D. Bonime, D. M. Covitz, and D. Hancock.** 2000. "Why are Bank Profits So Persistent? The Roles of Product Market Competition, Informational Opacity, and Regional/Macroeconomic Shocks," *Journal of Banking & Finance*, 24, 1203-1235.
- Chronopoulos, D.K., H. Liu, F. J. McMillan, and J. O. Wilson.** 2013. "The Dynamics of US Bank Profitability," *The European Journal of Finance*, 21, 1-18.
- Dietrich, A. and G. Wanzenried.** 2011. "Determinants of Bank Profitability Before and During the Crisis: Evidence from Switzerland," *Journal of International Financial Markets, Institutions and Money*, 21, 307-327.
- Goddard, J., P. Molyneux, and J. O. Wilson.** 2004a. "The Profitability of European Banks: A Cross-sectional and Dynamic Panel Analysis," *The Manchester School*, 72, 363-381.
- Goddard, J., P. Molyneux, and J. O. Wilson.** 2004b. "Dynamics of Growth and Profitability in Banking," *Journal of Money, Credit and Banking*, 36, 1069-1090.
- Goddard, J., H. Liu, P. Molyneux, and J. O. Wilson.** 2011. "The Persistence of Bank Profit," *Journal of Banking & Finance*, 35, 2881-2890.
- Iskenderoglu, O., A. Aslan, and I. Ozturk.** 2011. "Persistence of Bank Profit in Turkish Banking Firms: Evidence from Panel LM Tests," *Actual Problems of Economics*, 10, 429-434.
- Kanas, A., D. Vasiliou, and N. Eriotis.** 2012. "Revisiting Bank Profitability: A Semi-Parametric Approach," *Journal of International Financial Markets, Institutions and Money*, 22, 990-1005.
- Kaplan, M. and T. Celik.** 2008. "The Persistence of Profitability and Competition in the Turkish Banking Sector," *Erciyes University Journal of Faculty of Economics and Administrative Sciences*, 30, 157-67.
- Mueller, D. C.** 1977. "The Persistence of Profits above the Norm," *Economica*, 44, 369-380.
- Nahar, S. and B. Inder.** 2002. "Testing Convergence in Economic Growth for OECD Countries," *Applied Economics*, 34, 2011-2022.
- Sala-i-Martin, X.** 1996. "The Classical Approach to Convergence Analysis," *The Economic Journal*, 106, 1019-1036.

The Banks Association of Turkey. 2015. <https://www.tbb.org.tr/en/home>, (Last reached on April 23, 2015).

Turgutlu, E. 2014. "Dynamics of Profitability in the Turkish Banking Industry," *Ege Academic Review*, 14, 43-52.

Figure 1. ROAs of Banks^{a,b}



Notes:

^a Net income after tax is divided by average total assets and profit rates in interim periods are annualized.

^b Left axis is considered, unless otherwise stated.

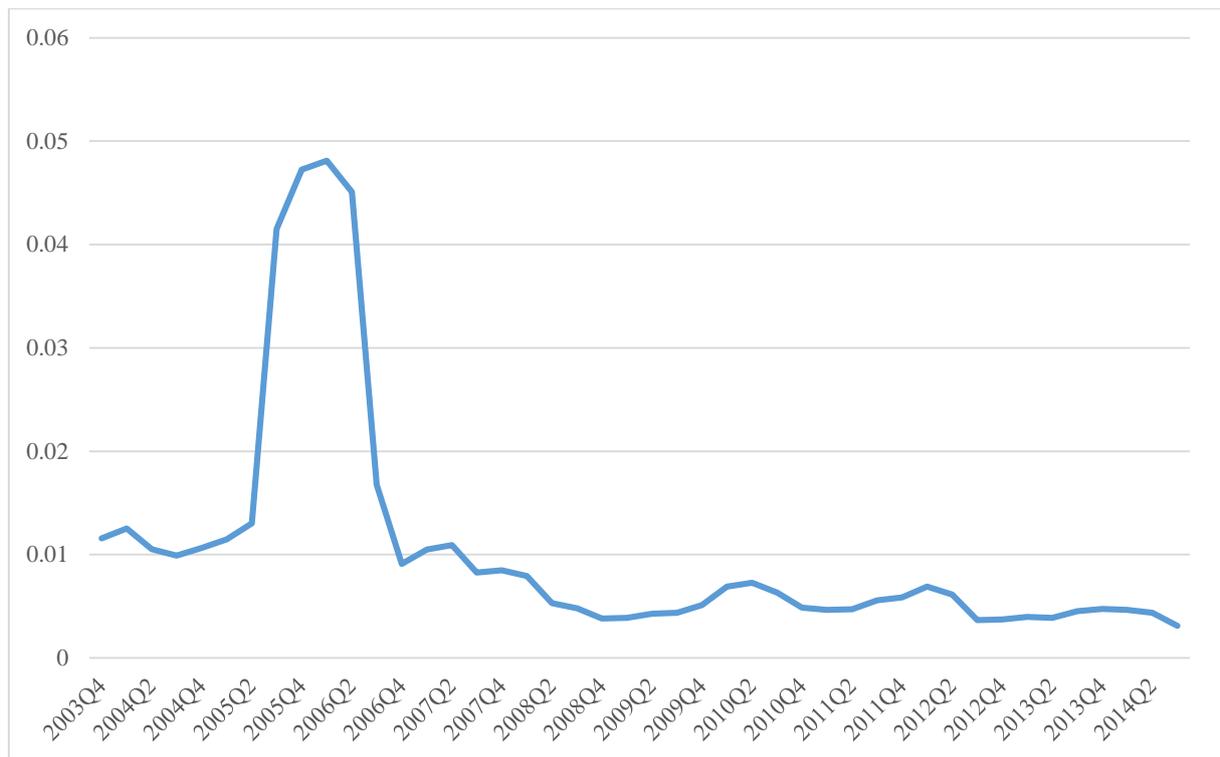
Figure 2. Standard Deviation of ROA

Table 1. Estimates of Average Slops and t-ratios

Bank	Polynomial order ^a	Average slop	Test statistic
Akbank	4	-0.0001	-3.743 ^b
Denizbank	4	0.0066	5.807
Finans Bank	4	-0.0001	-0.096
Türkiye Cumhuriyeti Ziraat Bankası	4	0.0003	5.894
Türk Ekonomi Bankası	2	-0.0001	-1.513
Türkiye Garanti Bankası	3	0.0001	0.383
Türkiye Halk Bankası	4	-0.0001	-0.474
Türkiye İş Bankası	4	0.0001	0.020
Türkiye Vakıflar Bankası	4	-0.0001	-2.397 ^c
Yapı ve Kredi Bankası	4	-0.0001	-0.297

Notes:

^a The AIC is used to select the appropriate polynomial order for each bank while estimating equation 3. Maximum polynomial order is 4.

^b Indicates statistical significance at the 5% level and presents evidence in favour of convergence.

^c Indicates statistical significance at the 10% level and presents evidence in favour of convergence.