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Article *in* Actual Problems of Economics · January 2011

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PERSISTENCE OF PROFIT IN TURKISH BANKING FIRMS: EVIDENCE FROM PANEL LM TESTS

This paper examines the persistence of profit within Turkish banking system for the period 1998:1-2009:4 by focusing on both net income after tax to total assets (ROA) and net income after tax to total equity (ROE) as profit measures by utilizing panel LM unit root test. We found that competition among surviving banks is high within the Turkish banking system for the studied period. When we compare ROA and ROE results in terms of persistence, competition is higher in Turkish banking system for ROE than for ROA.

***Keywords:** persistence of profitability; banking; Turkey.*

***JEL Classification:** C3, G21.*

Омер Іскендероглу, Альпер Аслан, Ільхан Озтюрк

СТІЙКІСТЬ ПРИБУТКУ ТУРЕЦЬКИХ БАНКІВ: АНАЛІЗ ПАНЕЛЬНИХ ДАНИХ ЗА ДОПОМОГОЮ ТЕСТУ МНОЖНИКІВ ЛАГРАНЖА

У статті досліджується стійкість прибутку у межах турецької банківської системи за період з 1998:1 по 2009:4. Критеріями оцінювання за методом множників Лагранжа стали середня рентабельність власного капіталу та прибутковість власного капіталу. Результати показали, що конкуренція серед турецьких банків є досить високою для досліджуваного періоду. Якщо порівнювати показники стійкості для рентабельності та прибутковості власного капіталу банків, то помітно, що конкуренція за прибутковість є вищою.

***Ключові слова:** стійкість прибутку; банківська справа.*

Табл. 3. Форм. 5. Літ. 32.

Омер Искендероглу, Альпер Аслан, Ильхан Озтюрк

УСТОЙЧИВОСТЬ ПРИБЫЛИ ТУРЕЦКИХ БАНКОВ: АНАЛИЗ ПАНЕЛЬНЫХ ДАННЫХ ПРИ ПОМОЩИ ТЕСТА МНОЖИТЕЛЕЙ ЛАГРАНЖА

В статье исследуется устойчивость прибыли в рамках турецкой банковской системы за период с 1998:1 по 2009:4. В качестве критериев оценки методом множителей Лагранжа взяты средняя рентабельность собственного капитала и доходность собственного капитала. Результаты показали, что конкуренция среди турецких банков достаточно высока для исследуемого периода. Если же сравнивать показатели устойчивости для рентабельности и доходности собственного капитала банков, то видно, что конкуренция за доходность выше.

***Ключевые слова:** устойчивость прибыли; банковское дело; Турция.*

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1. Introduction. The competitive environment hypothesis states that competitive process eliminates all economic profits and losses in the long run. Due to this fact in an efficient economy profits above or below the norm should quickly disappear. The increase in competition continues until profitability in a sector equals to a competitive rate. In other words, excess profits are signals for competitors to enter the market. This will continue until the decrease of profitability on a competitive rate. This is very widely known as profit persistence (PP). There is a fast growing empirical literature on PP in the non-financial sector. Starting with the seminal contributions by Mueller (1977, 1986), Geroski and Jacquemin (1988), a vast number of empirical studies have been initiated in order to verify the basic idea that profits persist. Schwalbach et al. (1989), Odagiri and Yamawaki (1990), Cubbin and Geroski (1990), Schohl (1990), Kambhampati (1995), Waring (1996), Goddard and Wilson (1999), McGahan and Porter (1999), Glen and Singh (2001), Maruyama and Odagiri (2002), Glen et al. (2003), Yurtoglu (2004), Gscwandtner (2005), Cable and Jackson (2008) and Aslan et al. (2010) are just some of the papers that search for the evidence on PP in different economies and different time periods.

Since banking has a significant role, as an intermediary in the funds transfer from savers to borrowers, evaluating borrowers, and providing liquidity for economies, understanding the intensity of competition is particularly significant. Despite the importance of persistent excess profits in evaluating the efficiency of a banking system, this question has received relatively little empirical attention. Roland (1997), Berger et al. (2000), Goddard et al. (2004a and 2004b), Agostino et al. (2005) and Bektas (2007) can be counted as contributions on the persistence of profit rates in the banking industry. In the case of banking sector the amount of relevant research does not match the potential significance of profit persistence in emerging economy like Turkey. This article aims to examine the profit persistence within Turkish banking system such as Bektas (2007) which was the first study on PP within Turkish banking system.

The main difference between the present study and the previous examinations of PP in Turkey is the use of longer time series by taking not only return on assets (ROA) but also return on equity (ROE) into account as profit rates. Previous studies related to banking systems used time series of around 20 years with a yearly basis which consists of 20 observations. However, short time series present certain econometric problems, and raise the question of whether one can really infer long-run persistence from these short time series. Our article tries to solve this problem by using long time series with 48 observations (1998:1 − 2009:4). Moreover, the panel Lagrange Multiplier (LM) unit root test is applied which is more powerful than IPS unit root test used by Bektas (2007)[4]. There are several reasons why data on both ROA and ROE may be preferable. The traditional focus on ROA may be biased due to off-balance-sheet activities, but we believe such activities are negligible for Turkish banks. Nevertheless, an analysis of ROE could disregard the financial leverage and the risks associated with it. Therefore, it's expected to have more comprehensive results by taking both ROA and ROE into consideration.

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[4] This study illustrated that the size of the panel LM unitroot test is quite close to the nominal size in every case they experimented and the panel LM test is more powerful than IPS test.

The remainder of the article is composed of 4 sections. Section 2 presents methodology and data. Section 3 provides empirical findings, whereas research findings and their interpretation are presented in Section 4.

2. Data and methodology. This study analyses profit persistency within Turkish banking system (TBS). The sample consists of 8 Turkish banks[5] which were present from 1998:1 to 2009:4 at Istanbul Stock Exchange (ISE). The data is taken from the balance sheets and income statements of the related banks, information obtained from ISE (www.ise.org). ROA and ROE are employed as profit measures. The aim of this study is to investigate the intensity of competition within Turkish banking sector by means of PP methodology. Table 1 illustrates the descriptive statistics related to the data set. As seen in Table 1, ROE has fluctuated more sharply than ROA.

Table 1. **Descriptive Statistics**

		Mean	Std. Dev.	Min	Max	Observations
ROA	Overall	.0153	.028	-.296	.092	N = 384
	Between		.008	.004	.029	n = 8
	Within		.027	-.286	.084	T = 48
ROE	Overall	.174	1.109	-1.72	1.901	N = 384
	Between		.205	-.100	.592	n = 8
	Within		1.093	-1.699	1.651	T = 48

Lee and Strazicich (2003) proposed a 2 break minimum Lagrange Multiplier (LM) unit root test in which alternative hypothesis unambiguously implies the series is trend stationary (Glynn et al, 2007). In contrast to the ADF test, the LM unit root test has the advantage of being unaffected by breaks under null. The LM unit root test can be explained by the following data generating process. Here, r is profit rates and Z_t consists of exogenous variables and ε_t is an error term that follows the classical properties. According to the LM principle, a unit root test statistics can be obtained from the following regression:

$$r_t = \delta Z_t + X_t, \quad X_t = \beta X_{t-1} + \varepsilon_t. \tag{1}$$

Here Δ is the first difference operator; $\overline{S}_t = r_t - \hat{\Psi}_x - Z_t \hat{\delta}_t$, $t = 2,.....T; \hat{\delta}$ are coefficients in the regression of Δr_t on ΔZ_t; $\hat{\Psi}_x$ is given by $r_t - Z_t \delta$. If profit rate has a unit root for company i then $\phi t = 0$, which is the null hypothesis tested using the t-test against the alternative hypothesis that $\phi t < 0$. The panel LM test statistic is obtained by averaging the optimal univariate LM unit root t-test statistics estimated for each banking company. This is denoted as LM_i^τ:

$$LM_{barNT} = \frac{1}{N} \sum_{i=1}^{N} LM_i^\tau. \tag{2}$$

Im et al. (2005) constructed a standardized panel LM unit root test statistics by $E(L_T)$ and $V(L_T)$ denoting the expected value and variance of LM_i^τ respectively under the null hypothesis. Im et al. (2005) then compute the following expression:

$$\Psi_{LM} = \frac{\sqrt{N} [LM_{barNT} - E(L_T)]}{\sqrt{V(L_T)}}. \tag{3}$$

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[5] Akbank, Alternatifbank, Finansbank, Garantibank, Isbank, Sekerbank, Tekstilbank and Yapikredi.

The numerical values for $E(L_T)$ and $V(L_T)$ are in Im et al. (2005). The asymptotic distribution is unaffected by the presence of structural breaks and is standard normal. We begin our empirical analysis by examining the panel LM test. These results are reported in Table 2.

3. Empirical results. As stated by Shiller and Perron (1985), the ADF test has low power with short time spans. In order to increase power in small time spans of data, Levin and Lin (1993) show that implementing a unit root test on the pooled cross-section data set, rather than individual unit root tests, can provide substantial improvement in statistical power (Narayan, 2006). This assertion is investigated by applying the panel version of the LM test to the group of 8 Turkish banks in the sample. The panel LM statistics obtained are -23.184 and -14.705, which are smaller than the critical value (-2.326) at the 1% level of significance suggesting convergence for both rates.

Table 2. **LM unit root tests**

Profit Measures	Panel LM test statistic
ROA	-23.184***
ROE	-14.705***

Note: 1, 5 and 10% critical values for the panel LM test are are -2.326, -1.645 and -1.282 respectively. (***) denotes statistical significance at 1% levels.

Panel analysis which is used to increase power in small time spans of data illustrates that the joint null hypothesis of a unit root is rejected, implying convergence of banks' profits in Turkey. In PP studies, these ideas are formulated within the following first order autoregressive equation:

$$\rho_{i,t} = \alpha_i + \lambda i \rho_{i,t-1} + \varepsilon_{i,t}, \tag{4}$$

where $\rho_{i,t}$ is the profitability of firm i at time t, α is constant, λ_i is the parameter that represents the speed of adjustment coefficients of excess profits to the norm and $\varepsilon_{i,t}$ is the usual error term.

$\rho_{i,t}$ is derived as follows:

$$\rho_{i,t} = \vartheta_{i,t} - \overline{\vartheta}_t \text{ where } \overline{\vartheta}_t = \sum_{i=1}^{n} \frac{\vartheta_t}{n} \tag{5}$$

In Equation (5), $\overline{\vartheta}_t$ is the average profit rate of banks operating in the industry for the current year. As shown by Geroski (1990), equation (1) can be regarded as the reduced form of the 2 equations model. In the first equation, the exit of firms or the threat of entry this year is assumed to be a function of the difference between the actual profit rate and the long-run profit rate in the previous year. In the second equation, this entry threat (or exit of firms) is assumed to reduce (increase) the profit rate in the current year. By regressing $\rho_{i,t-1}$, on $\rho_{i,t}$, the impact of previous years' profit rates to the current year's profit rates can be estimated. In other words, the value of λ_i predicts the intensity of competition or speed of adjustment towards the mean profit of the industry. Hence, it can be used to measure the persistency of profits in a particular industry or at a market. The long-run profit rate or equilibrium profit rate of a firm is provided by

$$\rho_{i,t} = \frac{\alpha}{1-\lambda_i}.$$

In the industries where competitive companies exist and are functional, the value of λ_i is assumed to be at lower values.

The regression results of equation (4) are summarized in Table 3. The estimated λ_i varies between 0.13 and 0.87 with a panel 0.41 for ROA and λ_i varies between 0.05 and 0.86 with a panel 0.17. The panel value of the speed of adjustment is 0.59 and 0.83 for ROA and ROE, respectively. Only 4 banks' profits are above the mean for ROE, 2 banks are above the mean for ROA. We found that competition among surviving banks is high within the Turkish banking system for the period 1998:1 − 2009:4. In addition, when we compare the ROA and ROE results in terms of persistence, competition is higher in Turkish banking system for ROE. The fluctuation is higher for ROE (see Table 1) which means that competition affects earnings more than assets. Nevertheless, the persistency does not exist.

Table 3. **Speed of adjustment and the estimates of long-run projected profit rate for ROA and ROE**

Bank	$\hat{\alpha}$	$t(\hat{\alpha})$	$\hat{\lambda}$	$1-\hat{\lambda}$	$\hat{\rho}_{i,t} = \hat{\alpha}/{1-\hat{\lambda}_i}$	R^2
ROA	0.008	0.002	0.41	0.59	0,01	0.17
ROE	0.106	0.097	0.17	0.83	0,12	0.15

4. Conclusion. In an efficient market economy, profits above or below the norm should quickly disappear. By contrast, if profits above or below the norm appear in the long run, this means that efficient market economy is not valid and profits persist. Since banking has a substantial role as an intermediary in funds transfer from savers to borrowers, evaluating borrowers, and providing liquidity in economies, understanding the intensity of competition is particularly significant. This paper analyzes the profit persistence within Turkish banking system We use a panel data set of 8 Turkish banks for the 1998:1 − 2009:4 period. We measure persistence profit in 2 ways: net income after tax to total assets (ROA) and net income after tax to total equity (ROE) by employing panel LM unit root test which is more powerful than popular IPS test. The unit root hypothesis is rejected for both ROA and ROE which means that persistency of profits does not exist within the Turkish banking system. This result corresponds with Bektas (2007). Distinctively speed of adjustment and the estimates of long-run projected profit rate for ROA and ROE present that competition is found higher in Turkish banking system for ROE than for ROA.

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Стаття надійшла до редакції 02.02.2011.