

THE PERSISTENCE OF PROFITABILITY AND COMPETITION IN THE TURKISH BANKING SECTOR

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ABSTRACT

There is a fast growing empirical literature on the dynamics of competition and the determinants of profitability differences, which undertakes time series analysis of corporate rates of returns using the methodology of 'the persistence of profitability' (PP) studies. However, this literature is mainly concentrated on non-financial sector and the studies employing the PP methodology to the financial sector, namely banking, are very limited. This paper reports on time-series analysis of the persistence of profitability and the regression analysis that relates the differences in profitability across banks to profitability persistency in the Turkish Banking Sector. Contrary to the previous works on the subject, empirical results suggest that the short term persistence of profits are moderate and above normal profits disappears in the long-run implying the presence of high competition in the sector.

Keywords: Competition, Persistence of Profitability, Determinants of Profitability, Banking

TÜRK BANKACILIK SEKTÖRÜNDE KÂRLILIK VE REKABETİN DEVAMLILIĞI

ÖZ

Rekabetin dinamikleri ve karlılık farklılıklarının belirleyenlerini konu alan, 'karlılığın sürekliliği' (KS) metodolojisi yardımı ile firmaların getiri oranlarının zaman serisi analizini içeren ampirik literatür hızlı bir şekilde gelişmektedir. Bununla birlikte, bu literatür genel olarak finansal sektör dışındaki sektörlerde odaklanmış ve KS metodolojini bankacılık gibi finans sektörüne uygulayan çalışmaların sayısı oldukça sınırlıdır. Bu çalışma, Türk bankacılık sektörü için, karlılığın sürekliliğinin zaman serisi analizinden ve bankalar arası karlılık farklılıklarını karlılığın sürekliliği ile ilişkilendiren regresyon analizinden elde edilen bulguları içermektedir. Bu konudaki önceki çalışmalardan farklı olarak bu çalışmada sunulan ampirik bulgular, karlılığın kısa dönem sürekliliğinin ılımlı olduğunu ve uzun dönemde aşırı karların kaybolduğunu ve haliyle sektördeki rekabetin oldukça yüksek olduğunu göstermektedir.

Anahtar Kavramlar: Rekabet, Kârlılığın Sürekliliği, Karlılığın Belirleyenleri, Bankacılık

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Makalenin geliş tarihi: Ekim 2007, kabul tarihi: Şubat 2008

INTRODUCTION

This paper examines the nature and intensity of competition in the Turkish banking sector empirically and provides evidence on the determinants of the observed profitability differences among the Turkish banks. Understanding the intensity of competition is particularly important in the banking sector of the economy. This is due to the importance of banking sector in the modern economies as being intermediary in the transfer of funds from savers to borrowers, evaluating borrowers, and providing liquidity (Gorton and Winton, 2003). As competition increases in the sector, banks will be forced to operate efficiently and allocate their resources where it is required the most, thereby contributing significantly to the performance of the economy. In addition, favorable competitive environment helps banks to strengthen their positions and makes the economy less prone to financial crisis. Despite the undisputed importance of the subject, there has been relatively little empirical research on time series analysis of persistency of profits in banking sector.

Most of the studies in the existing literature on the intensity of competition in Turkish banking carried out using cross-section or panel data concludes that Turkish banking industry is characterized with the oligopolistic market structure. However, competition process and profitability are dynamic process and static measures of concentration cannot represent competition intensity adequately. Competitive dynamics may be better captured by undertaking time series analysis of corporate rates of returns using the well-established methodology of 'the persistence of profitability' (PP) studies in industrial organization (Glen *et. al.*, 2003). There is a fast growing empirical literature on the persistence of profitability in non-financial sector (Muller, 1977; Muller, 1990; Maruyama and Odagari, 2002; Geroski and Jacquemin, 1988; Glen *et. al.*, 2001; Glen *et. al.*, 2003; Yurtoglu, 2004; Gschwandtner, 2005). However, the studies that applied the persistence of profitability methodology to non-financial sector, namely banking, are very limited in number. Bektas (2007) measured the intensity of competition in the Turkish banking sector using the PP methodology and employing the data from 28 banks over the period of 1989 to 2003. The author reports that the short-run persistency coefficient has a mean value of 0.42 and profits above norm erode in the long-run. Taken together, the author concludes that competition is moderately high in Turkish banking sector.

This study aims to investigate the intensity of competition and its relationship with firm characteristics in the Turkish banking sector and extends the previous studies in a number of ways. This study employs time series data covering the period of 1980 to 1998, deliberately excluding the remaining period of 1999 to today. The reason is that widespread fraud and looting began in 1999 led to the deepest banking crisis of 2001 in the history of modern Turkey. In this period, as well documented by Soral *et. al.* (2006), bank owners

lent to their own companies above the legally set limits using intermediary firms, and other banks (back-to-back lending among banks). Later, these companies announced bankruptcy leaving many banks insolvent. For this reason, the balance sheet of many banks cannot be trusted, especially during the period of 1999 to 2001. For example, most of the banks (about 80 percent of the surviving banks) reports negative profits ranging from -64 per cent to 3 per cent averaging -8.5 per cent in 2001. The data set used in this study will enable us to test if the findings of Bektas's (2007) study are sensitive to the sample period employed. More importantly, we will apply regression analysis to examine to what extent firm characteristics explain the observed profit persistency across banks.

I. METHODOLOGY

The methodology of the paper follows the methodology employed in the persistence of profitability studies of Mueller (1986), Glen *et al.* (2001), Maruyama and Odagari (2002), Glen *et al.* (2003), and Yurtoglu (2004). These studies, adopting the Schumpeterian perspective on the competition process, take competition as a dynamic process in which the forces of entry and exit erode profits in the long-run. Intuitively, if competition is intense the above average profits in one period will be eroded in the subsequent periods. Otherwise, firms earning above average profits will be able to maintain the same level of profits in the subsequent periods implying the presence of persistence of profits. In PP studies, these ideas are formulated within the following first order auto-regressive equation.

$$P_{it} = \alpha_i + \lambda_i P_{it-1} + u_{it} \quad (1)$$

where P_{it} is the profitability of firm i at time t , α_i is constant and λ_i is the parameter that represents the speed of adjustment coefficients of excess profits to the norm and u_{it} is the usual error term. Assuming that λ_i is in the range of $(-1,1)$, the equilibrium or long-run profitability level of firm i (P_{iLR}) will be $P_{iLR} = \alpha_i / (1 - \lambda_i)$.

The virtue of equation (1) is that it allows the analysis of competition dynamics without requiring unobservable variable of the threat of entry. As shown by Geroski (1990), equation (1) can be regarded as the reduced form of the two 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 (exit of firms) is assumed to reduce (increase) the profit rate in the current year.

In order to control for the business cycle and other common factors which affect all banks, a normalized profitability measure ($\pi_{it} = P_{it} - P_t$), is employed in the regression analysis. The measure π_{it} represents the deviations of bank i 's profitability at time t from the average profitability across banks (P_t) at time t . Then, the persistency of profit model is given as:

$$\pi_{it} = \alpha_i + \lambda_{1i} \pi_{i(t-1)} + \lambda_{2i} \pi_{i(t-2)} + \varepsilon_{it} \quad (2)$$

where α_i , λ_{1i} and λ_{2i} are coefficients and the ε_{it} are random errors.

In our empirical analysis, we estimated the following Dickey-Fuller regression for equation (2) and recovered the persistency coefficient, λ_i from equation (3).

$$\Delta \pi_{it} = \alpha_i + \beta_i \pi_{i(t-1)} + \gamma_i \Delta \pi_{i(t-1)} + \varepsilon_{it} \quad (3)$$

where $\Delta \pi_{it} = \pi_{it} - \pi_{i(t-1)}$ and comparing the model with (2), $\beta_i = -(1 - \lambda_{1i} - \lambda_{2i}) = -(1 - \lambda_i)$ and $\gamma_i = -\lambda_{2i}$.

To explain the underlying reasons for the differences in persistence profitability across firms, the equation below, which relates the persistency coefficients to bank characteristics, is estimated.

$$\lambda_i = \theta_0 + \theta_1 SOLV_i + \theta_2 LKA_i + \theta_3 SIZE_i + \theta_4 SIZE2_i + \theta_5 INI_i + \theta_6 BOND_i + e_i \quad (4)$$

where $SOLV$ represents the solvency ratio defined as equity capital over total assets, LKA is the liquidity risk and defined as the ratios of liquid assets to total assets, $SIZE$ represents the size and defined as the natural logarithm of total assets, $SIZE2$ is the square of size variable, INI is the ratio of total interest incomes to total interest expenses, and $BOND$ represents the ratio of interest earnings from bonds to total interest earnings.

The explanatory variables included in equation (4) are chosen similar to the empirical studies of Molyneux and Thornton (1992), Berger (1995) and Okumus (2002) on the determinants of profitability in banking sector. The ratio of equity capital to total assets ($SOLV$) is a measure of the capital adequacy of the bank which reflects the solvency risk born by the depositors and ultimately shareholders of the bank. The higher $SOLV$ reflects a lower risk in the sense that the bank's asset portfolio is not expanded beyond what the bank can afford in terms of capital adequacy. Hence, the coefficient for this variable is expected to be negative. Total assets ($SIZE$) can be considered as a proxy for bank size

and they are expected to be positively related to profitability performance. The ratio of liquid assets to total assets (LKA) is used in as a measure of liquidity. Although optimal liquidity ratio is expected to have a positive effect on bank profitability, an excess value of this ratio may have a negative effect implying a lost in interest income. Hence, the sign of this variable may be positive or negative. The other explanatory variables effecting bank profitability are total interest incomes to total interest expenses (INI) and interest earnings from government bonds to total interest earnings. These variables' coefficients are expected to be positive, because an increase in the value of these variables raises the bank profitability.

II. THE DATA AND UNIT ROOT TESTS

Before undertaking the econometric analysis of the persistency of profits and its determinants, this section introduces the data and its time series properties subject to empirical analysis. The data is obtained from the 'Banks in Turkey' published annually by the Banks Association of Turkey. The data set involves a sample of 24 surviving banks over the period 1980-1998. The profitability, P_{it} , variables subject to the empirical analysis are defined as earnings divided by total assets. The definition of the other variables is given in the previous section. We now provide time series characteristics of the data employed in the empirical analysis.

A. UNIT ROOT TESTS

All empirical work undertaken with non-stationary series faces the danger of being spurious. Cointegration analysis, developed in the mid-80's, introduced the idea that even if underlying time series are non-stationary, linear combinations of these series might be stationary. For this reason, empirical work involving time series data should start by searching for the level of integration of the series. For this reason, we employed ADF unit root test and the more powerful Im, Pesaran and Shin's 't-bar' test statistics.

The standardised 't-bar' test proposed by Im, Pesaran and Shin (2003), henceforth IPS, increases the power by exploiting the panel structure of the data, and it is employed in this study to avoid the criticism related to the low power of the ADF test. The 't-bar' test is based on the average value of the Augmented Dickey-Fuller statistics, $t_{IT}(p_i, \hat{\gamma}_i), i = 1, 2, \dots, N$, where p_i is the order of ADF regression, T is the number of observation in the sample and $\hat{\gamma}_i$ is the estimated vector of coefficients on the augmented lag changes. IPS (2003) show that under the null hypothesis, when N and T are large and \sqrt{N}/T small, this statistic has a standard normal distribution. The values of $E[t_T(p_i, 0)]$ and

$V[t_T(p_i, 0)]$ are tabulated in IPS. Using equation (3), we calculated two sets of tests of the unit root hypothesis for each of the 24 banks; In the first (unrestricted) set, $\Delta Y_{i(t-1)}$ is included in all regressions while, in the second (parsimonious) set, we employed a specification search which involves the use of the Schwarz-Bayesian Criterion (SBC) to decide whether or not to exclude the lagged $\Delta Y_{i(t-1)}$ term. In both cases, the standardised t-bar statistics is calculated and compared to the relevant table values.

The results of the ADF unit root test suggest that the null hypothesis of unit root is rejected in most of the cases. The normalised t-bar test results provide strong support for the stationarity process for the persistency variable. Using the Schwarz Bayesian Criterion (SBC) to determine the order of augmentation in the ADF regressions, when applied to the return on assets, the normalised t-bar statistics was -5.79 indicating the rejection of unit root hypothesis. The critical t-bar value is -1.95 and -1.82 at the 1 percent and the 5 percent level of significance respectively for 19 observations and 24 banks. Combining the test results, provided by the ADF and t-bar statistics, the evidence suggests that the data employed in empirical analysis has no unit root.

III. RESULTS

This section, first, presents the empirical evidence on the persistence of profitability in Turkish banking, and then provides evidence on the underlying firm characteristics that is related to persistent profitability differences across banks. Table 1 provides summary results for persistency variable obtained from the estimation of equation (3) and recovering the persistency coefficient, λ_i from equation (3) using the equation (2) across all banks following the specification search described above. The results indicate that the inclusion of the lagged dependent variable in the model is not required for 2 out of 24 banks for the persistency model. Secondly, the regressions have reasonable fits with \bar{R}^2 that is about 0.285 on average and lower than 0.10 for only 3 of 24 banks. The Adf_i gives the t-values associated with β_i in equation (3). The average value for λ_i is 0.36 implying the presence of relatively competitive environment in the banking sector. The long-run persistency of profits which is calculated as $\pi_{iLR} = \alpha_i / (1 - \lambda_i)$ is very close to zero and not statistically significant indicating that profits above the norm erode over time.

Table 1: Persistence of Profits: Summary of Results of Time Series Analysis

| | α_i | λ_i | Adf_i | \bar{R}^2 | π_{iLR} |
|---------------------|-------------------|-----------------|---------|-------------|------------------|
| Mean (st. error) | -0.001 (0.003) | 0.36 (0.048) | -2.638 | 0.285 | 0.004 (0.134) |
| Median | -0.002 | 0.293 | -2.855 | 0.309 | -0.003 |
| St. Dev. | 0.02 | 0.31 | 1.074 | 0.167 | 0.031 |
| Min. | -0.042 | -0.17 | -4.353 | -0.052 | -0.075 |
| Max | 0.064 | 0.931 | -0.455 | 0.529 | 0.073 |

A=22 B= 21 C=0 D=0 E= 0

Note: Estimated coefficients, α_i , λ_i corresponds to the parameters of equation (3), where $\lambda_i = \beta_i - 1$. Reported statistics indicates the distribution of the statistics across banks in the sector. Standard errors are in parentheses. A shows the number of firms for which $\gamma_i = 0$, B indicates the number of firms for which \bar{R}^2 exceeds 0.1, C shows the number of firms for which π_{iLR} is significantly positive (at the 5% level), D shows the number of firms for which π_{iLR} is significantly negative (at the 5% level) and E shows the number of regressions which are dynamically unstable. It is worth mentioning that the total number of firms is 24.

Comparing these findings with Bektas's (2007) study, one can conclude that the average coefficient of determination is considerably high (0.29 against 0.15) and the average persistency coefficient λ is more accurately estimated (t-value of 7.5 against 1.72) in this study. This study supports the finding of Bektas (2007) indicating that the intensity of competition is high in the Turkish banking sector. However, the result of our study show that competition is more intense in the Turkish banking sector than reported by Bektas (2007), who finds λ equal to 0.42 on average. Taken together, all these findings suggest that the inclusion of crisis years might have partially affected the results reported in Bektas (2007).

Table 2 presents the results obtained from the estimation of equation (4) as well as the summary and diagnostic statistics associated with the determinants of profit equation. Taken together, the results provide some important insights into the firm characteristics related to persistent profitability differences across banks. The examination of Table 2 shows that the estimated equation has acceptable diagnostics and explains a considerable amount of variation in the persistency of profitability across banks with R^2 that is equal to 0.526. The results indicate that the solvency (SOLV) and liquidity (LKA) variables, although they assumed the expected signs, have no power in explaining profitability differences across banks. It seems that those banks which invested large share of their funds to highly-yielding and less risky government bonds achieved to have above normal profits. This finding supports the idea that the

banking sector was heavily dependent for its earnings on highly-yielding government bonds in the sample period (Akyüz and Boratav, 2003:1552).

Table 2: Determinants of Persistence of Profit Ratios, 1980-1998

| Regressors | Coefficients | Standard Error | T-ratio (Probability) |
|-----------------------------------|--------------|-------------------|-----------------------|
| Constant | 2.679 | 1.911 | 1.402 (0.179) |
| SOLV | -2.909 | 2.192 | -1.327 (0.202) |
| LKA | 0.007 | 0.009 | 0.745 (0.467) |
| SIZE | -0.969** | 0.557 | -1.739 (0.10) |
| SIZE2 | 0.072** | 0.038 | 1.898 (0.075) |
| INI | 0.002* | 0.001 | 2.503 (0.023) |
| BOND | 1.429** | 0.812 | 1.760 (0.096) |
| Summary and Diagnostic Statistics | | | |
| R^2 | 0.526 | $\chi_{sc}^2(1)$ | 0.529 |
| $S.E.$ | 0.248 | $\chi_{ff}^2(1)$ | 1.959 |
| DW | 2.141 | $\chi_N^2(2)$ | 0.967 |
| $F(7,65)$ | 3.147 | $\chi_{Het}^2(1)$ | 1.082 |

Notes: (*) and (**) indicate that coefficients are significant at the 5% and the 10% levels respectively.

The variables employed to control for size are highly significant implying a non-linear relationship between the size and profitability of banks. The coefficient of SIZE is negative and significant implying the importance of scale economies in explaining profitability differences across banks. The negative sign on SIZE and the positive sign on the SIZE2 variable together imply that as a bank grows in size, an increase in management complexities reduces the bank's profitability at first. However, after a certain point, this effect is reduced, leading to higher profitability for very large banks, probably, due to increased specialization and technological advantages. Similar findings are reported for the US banking industry (Hermalin and Wallace, 1994) and for the UK Insurance industry (Hardwick and Adams, 2003).

CONCLUSION

This paper examines the intensity of competition and the relationship between persistence of profitability and firm characteristics by applying the PP methodology to the data for 24 Turkish banks. The empirical results suggest that the short-run persistence of profits are moderate and above normal profits disappear in the long-run implying the presence of high competition in the sector. In addition, the results of the regression analysis indicate that those banks that invested in high paying government bonds with almost no risk earn profits above the norm. It seems that the solvency and the liquidity are not related to the persistence of profitability across banks. In the face of decreasing real interest on government bonds and increasing competition due to the admission of foreign banks to the sector, those banks that are heavily dependent for their earnings on highly-yielding government bonds will face a danger of decreasing profitability. For this reason, the regulations in the banking sector should be tightened and the banks should develop more efficient risk management techniques to avoid credit defaults.

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