Persistence of Profitability and the Dynamics of Competition in Turkey, 1985-2004

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The existing empirical literature on the intensity of competition in developing countries shows that the persistence of profitability is smaller in developing than in advanced economies. To solve this controversy, Glen, Lee and Singh (2003) propose to look into the underlying sources of the persistency, namely persistency of monopoly power and of economic efficiency. This paper reports on time series analysis of the persistence of corporate profitability and its constituent parts for the largest 114 manufacturing firms in Turkey. Its central result is that the observed persistency of profits in the markets is due to persistency of productivity rather than the persistency of profit margins suggesting that pro-competitive characteristics of markets overweigh the inimical competition characteristics in Turkey.

1. INTRODUCTION

This paper examines the dynamics of the competition process in Turkey empirically uncovering the sources of the persistence of profitability, namely the persistence of monopoly power and the persistence of economic efficiency. Understanding the level and underlying forces of competition is important for a number of reasons. In the theoretical literature, it has been shown that there exits close relationship between market structure and the performance of firms in the industry. Competition leads to higher efficiency and productivity thereby contributing significantly to the rate of economy growth. The nature and the degree of competition also have important implications for the national and international policy making. For example, the lack of competition in emerging markets was blamed on the Asian crisis.

There is a special interest in studying the nature and the intensity of competition in Developing Countries (DCs). As often argued, the oligopolistic market structures[2] and substantial inefficiency are the main characteristics of the DC product markets than Advanced Countries (ACs). A number of reasons are proposed for this in the literature. First, the institutional problems which create entry and exit barriers lead to oligopolistic market structures. Second, the high levels of protection, especially in manufacturing sectors, produce this structure because the small domestic market in DCs can only support a few firms[3]. Third, highly protected industries tend to be high cost ones because they cannot exploit scale economies.

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[2] In his survey article, Lee (1992) mentioned that the vast majority of the empirical literature found higher four-firm concentration ratios for DCs than developed ones suggesting that oligopolistic market structures are widespread in DCs.
[3] See Rodrik (1988) for a discussion on this point.

Fourth, the presence of small and segmented markets as well as infra-structural and transportation deficits is the reason behind the lack of competition in DCs (Lee, 1992; Singh, 2003). The empirical studies carried out in the context of the Structure-Performance-Conduct (SCP) framework provide support for these arguments for the Turkish industries (Katırcıoglu, 1989; Foroutan, 1991, Engin and Katırcıoglu, 1994; Yalcın, 2000)[4].

However, the existing empirical literature on the persistency of profits, which takes the dynamic nature of competition into account, suggests that the intensity of competition is higher in DC markets than that observed for the ACs[5]. For ACs, Geroski and Jacquemin (1988), Mueller (1990), Odagiri and Yamawaki (1990), Goddard and Wilson (1999) and Maruyama and Odagiri (2002) provide evidence that DC persistency coefficients is about 0.46. The average value of corresponding coefficients is about 0.27 for DC, as evidence provided by Kambhampati (1995) for India, Glen, Lee and Singh (2001), henceforth GLS, for India, Malaysia, South Korea, Brazil, Mexico, Jordan and Zimbabwe, and Yurtoglu (2004) for Turkey. Taken together, the empirical evidence paradoxically suggests that the persistency of profits is 60% higher in ACs than that observed for DC indicating that competition is more intense in DCs.

To resolve this paradox, GLS suggest interpreting correctly all the parameters of the reduced form autoregressive equation normally used in PP studies, instead of just focusing on the interpretation of the short-term persistency coefficients. This is because all these parameters and their correlations have important implications for competition dynamics. To this end, GLS investigated the two components of profitability, namely the profit margin (the ratio of profits to sale) and capital productivity (the output/capital ratio) reasoning that the observed high profitability of large firms may be due to their greater efficiency or to greater market power (Demsetz, 1974 and 1989). If the higher persistence of profitability observed for ACs is due to higher efficiency of firms in these countries and the observed persistency for DCs is due to the profit margins, then the controversy will be resolved. However, if efficiency is also higher for DCs, then we need to look for other reasons to explain such a paradoxical situation. In this paper, we will follow the methodology suggested by GLS and investigate the determinants of persistence of profitability for 114 largest firms in Turkey.

To this end, the rest of the paper is organised as follows. Section two provides the details of the methodology employed in the empirical analysis of the determinants of the persistency of

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[4] See Lee(1992), Tybout (1992) and Tybout (2000) for the reviews of the literature for other DCs.
[5] See Glen and Lee and Singh (2003) for a good coverage of this literature.

profits. Section three introduces the data and provides a preliminary analysis of the data subject to empirical analysis. Section four will present results obtained from the time series analysis of the Turkish data. Finally section five provides discussions and policy implications derived from the findings of the paper.

2. METHODOLOGY

Competition is a dynamic process in which the forces of entry erode profits according to Schumpeter. Adopting the Schumpetarian perspective on the competition process, the studies on PP aim to examine the dynamics of the competitive process and measuring the intensity of competition in markets. Intuitively, the methodology of PP studies can be explained as follows. If competition is intense, the above average profits in one period will be eroded in the subsequent periods and therefore profitability of competing firms will not be persistent. If competition is less intense, then 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.

$$P_{it} = \alpha_i + \lambda_i P_{it-1} + U_{it} \tag{1}$$

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 is given by:

$$P_{iLR} = \alpha_i / (1 - \lambda_i) \tag{2}$$

Geroski (1990) showed that the equation (1) can be regarded as the reduced form of two equation models. In the first equation, the exit of firms or the threat of entry this year is assumed to be the function of the difference between the actual profit rate and the long-run profit rate in the previous rate. In the second equation, this entry threat (or the exit of firms) is assumed to reduce (increase) the profit rate in the current year. Since the threat of entry cannot be observed due to the latent variable problem, neither of these two structural equations can be estimated directly.

The virtue of the equation (1) is that it allows the analysis of competition dynamics without requiring unobservable variables. However, the equation does not make distinction between the different sources of persistency, namely the persistency of monopoly power and

efficiency. As mentioned above, the observed high profitability of large firms may be due to their greater efficiency or to greater market power (Demsetz, 1974 and 1989). Departing from this idea, GLS suggests that the examination of the two components of persistency of profits, market power (profits(R)/sales(S)) and productivity (the output(S)/capital(K)), may shed lights on the observed counter-intuitive findings in the empirical literature. This is because the return on assets is equal to $(R/K) = (R/S)*(S/K)$. In other words, uncovering the sources of observed persistency of profits will resolve the paradoxical results presented in the empirical literature.

To this end, GLS suggests to run three different persistency regressions, persistency of profits, the output-capital ratio and profit margins, and then compare the short-run and the long-run persistency coefficients obtained from these three regressions. If the observed persistency of profits in DCs is due to market power rather than the persistency of productivity, then we can conclude that markets in DCs are really more concentrated and lack of competition. This is because the persistency of profits observed in ACs is more likely to stem from the persistence of productivity rather than the persistency of market power since the oligopolistic market structures and inefficiencies are common characteristics of DCs as mentioned before.

In contrast, if the empirical results suggest that the underlying reason behind the persistency of profits in DCs is the persistence of efficiency rather than persistency of market power, then as suggested by Singh (2003) pro-competitive characteristics of DCs overweigh their inimical competition characteristics. It is true that there are many obstacles which discourage competition in DCs but there also exists many factors, which encourage competition in these countries such as the lower sunk cost of entry, rapidly increasing market sizes attracting new entry, the use of price controls acting as an informal competition policy and the existence of large conglomerate firms operating in DCs. Simply, the persistency of profits cannot provide conclusive result and the examination of its components provides rich interpretation about the nature and the intensity of competition, and hence carries important implications for national and international policy making.

3. PRELIMINARY OVERVIEW OF THE DATA

Before undertaking the econometric analysis of the persistency of profits and its components, the data employed in the applied work is introduced and main features and preliminary statistical analysis are provided in this section. The data is obtained from the annual surveys of the 500 largest firms conducted by the Istanbul Chamber of Industry (ICI), which includes accounting data on sales, gross value added, total assets, profits before taxes, exports and the

number of employees. Firms with broken runs of data are excluded and the data set subject to the empirical analysis involves a sample of 114 firms listed continuously over the period of 1985-2004.

The variables that will be used in the empirical analysis of the profitability and its two components, profit margins and output capital ratios are defined as follows. Profitability, P_{it} , is defined as earnings after tax divided by total assets. But data after tax profits are not provided by ICI and therefore earnings before taxes is used in definition of profitability. Profit margins, PM_{it} and output capital ratios, OK_{it} are defined as earnings before taxes divided by total sales and total sales over total assets respectively.

Following the literature, in order to control for the business cycle and other common factors which affect all firms, the regression analysis is undertaken on the transformed profitability measures $Y_{it} = P_{it} - P_t$, where P_t is the average profitability across firms at time t; the transformed profit margins measures $X_{it} = PM_{it} - PM_t$, where PM_t is the average profit margins across firms at time t; the transformed output-capital ratios, $Z_{it} = OK_{it} - OK_t$, where OK_t is the average output-capital ratios across firms at time t. The measure Y_{it}, X_{it} and Z_{it} represents the deviations of firm $i's$ profitability, profit margins and output capital ratios at time t from the profitability profit margins and output capital ratios of all other firms in the country at that time respectively.

The persistency of profits models that will be employed in empirical analysis are as follows:

$$Y_{it} = \alpha_i + \lambda_{1i} Y_{i(t-1)} + \lambda_{2i} Y_{i(t-2)} + \varepsilon_{it} \qquad (3)$$

where α_i, λ_{1i} and λ_{2i} are coefficients and the ε_{it} are random errors. The models for profit margins X_{it} and output-capital ratio Z_{it} are defined correspondingly.

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, the linear combinations of these series might be stationary. Therefore, empirical work involving time series data should start by searching for the level of integration of the series. Especially in PP studies, not rejecting the unit root hypothesis creates

difficulties for the statistical and economic interpretation of empirical results. Therefore, it is important to examine the stationarity of time series before undertaking regression analysis. To this end, we employed the ADF unit root test and the more powerful Im-Peseran and Shin 't-bar' test statistics for testing the stationarity of the data.

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, $t_{iT}(p_i, \hat{\gamma}_i), i = 1, 2, ..., N,$ 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. Then IPS shows 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. The Dickey-Fuller regression for the equation (3) is given as:

$$\Delta Y_{it} = \alpha_i + \beta_i Y_{i(t-1)} + \gamma_i \Delta Y_{i(t-1)} + \varepsilon_{it} \tag{4}$$

where $\Delta Y_{it} = Y_{it} - Y_{i(t-1)}$ and comparing the model with (3), $\beta_i = -(1 - \lambda_{1i} - \lambda_{2i}) = -(1 - \lambda_i)$ and $\gamma_i = -\lambda_{2i}$. Using the equation (4), we calculated two sets of tests of the unit root hypothesis for each of the 114 firms; in the first (unrestricted) set, $\Delta Y_{i(t-1)}$ is included in all regressions while, in the second (pasimonious) set, we employed a specification search which involves the use of the Schwarz-Bayesian Criterion (SBC) test 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 this hypothesis is rejected in most of the cases. The normalised t-bar test results provide strong support for the stationarity process for all three persistency variables. Using the Schwarz-Bayesian Criterion (SBC) to determine the order of augmentation in the ADF regressions, when applied to the capital-output ratio, the normalised t-bar statistics were -11.035 indicating the rejection of the unit root hypothesis, in which the critical t-bar value is -1.59 for 20 observations and for 114 firms. The corresponding calculated t-bar statistics for the rates of return on assets and profit margins are -13.872 and -13.975 respectively. Combining the unit root test results, provided by the ADF and t-bar

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statistics, the evidence suggests that the data employed in empirical analysis (P, X, Z) has no unit root.

4. THE DETERMINANTS OF THE PERSISTENCE OF PROFITABILITY

Table 1, 2 and 3 reports summary results for each persistency variable by estimating (4) across all firms following the aforementioned specification search. The results indicate, first, that the inclusion of the lagged dependent variable in the model is not required for about 17 and 14 out of 114 firms for the persistence of profit (P), the persistence of productivity (Z) and the persistence of profit margins (X) models respectively. Second, the regressions have reasonable fits with $\overline{R}^2$ that is about 0.27 (0.24 and 0.28) on average for P (Z and X) model and is higher than 0.10 for 105 (91 and 108) out of 114 firms. Third, the average values for λ_i are 0.386, 0.484 and 0.360 for P, Z and X models respectively. These findings in the light of the explanations given in the methodology section indicate that the size of the persistency of profitability (0.386) for Turkish manufacturing firms is similar to the figures provided in GLS for DCs and it is lower than that observed for ACs. Furthermore, the result that the persistency of output-capital ratios is higher than the persistency of profit margins indicates that the persistency of profits is due to the higher productivity than the market power. Thus, we can conclude that the observed higher competitiveness compared to ACs among Turkish largest firms is closely related to the characteristics of the economy. Fourth, the long-run persistency of the profits and the profit margins seem to be very close to zero supporting the previous argument and indicating that the higher profits erode over time. The corresponding values for the output-capital ratio and profit margins are also very close to zero and statistically insignificant with 0.037 and -0.001 respectively for the largest firms in Turkey.

Table 1. Persistency of Profits: Summary of Results of Time Series Analysis

	α_i	λ_i	Adf_i	$\overline{R}^2$	Y_{iLR}
Mean	-0.004	0.386	-2.709	0.268	-0.001
(st.error)	(0.006)	(0.021)			(0.038)
Median	0.000	0.443	-2.658	0.258	0.001
St. dev.	0.095	0.258	0.831	0.128	0.185
Min	-0.666	-0.398	-4.993	0.018	-1.510
Max	0.158	0.863	-0.746	0.585	0.302

A=17/114 B= 105/114 C= 4/114 D= 6/114 E=0/114

Note: Estimated coefficients α_i, λ_i corresponds to the parameters of equation (4) in where $\lambda_i = \beta_i - 1$. Standard errors are in parentheses. A shows the number of firms for which $\gamma_i \neq 0$, B indicates the number of firms for which $\overline{R}^2$ exceeds 0.1, C shows the number of firms for which Z_{iLR} is significantly positive (at the 5% level) and

D shows the number of firms for which Z_{iLR} is significantly negative (at the 5% level). E shows the proportion of regressions which are dynamically unstable.

Table 2. Persistency of Output-capital Ratios: Summary of Results of Time Series Analysis

	α_i	λ_i	Adf_i	$\bar{R}^2$	Z_{iLR}
Mean	0.027	0.484	-2.465	0.238	0.037
(st.error)	(0.022)	(0.019)			(0.077)
Median	-0.075	0.561	-2.287	0.207	-0.183
St. dev.	0.660	0.278	1.010	0.152	0.969
Min	-0.965	-0.310	-5.688	-0.061	-1.007
Max	5.392	0.979	-0.140	0.648	6.322

A= 14/114 B= 91/114 C=13/114 D= 9/114 E=0/114
Note: see the note on Table 1.

Table 3. Persistency of Profit Margins: Summary of Results of Time Series Analysis

	α_i	λ_i	Adf_i	$\bar{R}^2$	X_{iLR}
Mean	-0.002	0.360	-2.717	0.277	-0.001
(st.error)	(0.003)	(0.022)			(0.037)
Median	-0.004	0.407	-2.621	0.256	-0.007
St. dev.	0.069	0.261	0.786	0.127	0.127
Min	-0.240	-0.747	-4.498	0.015	-0.601
Max	0.232	1.135	0.440	0.799	0.510

A=14/114 B= 108/114 C= 3/114 D= 4/114 E=1/114
Note: see the note on Table 1.

5. CONCLUSION

In this study, the nature and the intensity of competition are examined for the 114 largest manufacturing firms in Turkey. The results obtained from the time series analysis of the Turkish data indicates that the level of competition is intense among the largest firms in contrast to the finding of the previous studies conducted on Turkish industries using SCP approach. Furthermore, the findings of this study confirm the results presented by GLS for the seven leading developing countries. The two components of the persistency of profits are also investigated in this study. The results show that the observed persistency of profits in the markets is due to the persistency of productivity rather than the persistency of profit margins. These counter-intuitive results may be interpreted, as suggested in the literature, that the pro-

competitive characteristics of markets in Turkey overweigh its inimical competition characteristics. This suggests that a research on the pro-competitive and inimical competition characteristics of the markets in Turkey may provide valuable information about the nature and the intensity of competition in Turkish manufacturing and for the national policy makers.

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