Persistence of firm-level profitability in Turkey

B. BURCIN YURTOGLU

University of Vienna, Department of Economics, BWZ, Bruennerstr. 72, A-1210, Vienna
E-mail: burcin.yurtoglu@univie.ac.at

The dynamics of company profits for 172 of the largest manufacturing firms in Turkey are studied. A time-series analysis is used to estimate the long-run projected profits and firm-specific speed of adjustment parameters that measures the rate at which short-run rents are eroded. While persistent profitability differences across firms are observed, there is also a moderately quick erosion of rents except for the most highly profitable firms. Firm characteristics rather than industry effects account for the differences in permanent profits. Contrary to the widespread view that developing countries suffer from uncompetitive markets, the results in this paper suggest that the intensity of competition in Turkey is no less than in developed countries and similar to other developing countries.

I. INTRODUCTION

The issues related to the nature and intensity of competition are important empirically as well as from a policy perspective for developing countries (DCs). Recently, large-scale privatization and deregulation in emerging markets and the Asian crisis have added to their significance. Some influential economic analysis including that of the IMF and leading US officials (Summers, 1998), suggest that the fundamental causes of the Asian crisis did not lie so much in the macroeconomic imbalances, but rather in the normal microeconomic behaviour of the agents in these economies. In this structuralist analysis of the Asian crisis, the lack of competition in emerging markets receives special emphasis. Together with deficits in other areas (e.g., corporate governance), poor competitive environment in the crisis-affected economies led to over-investment and ultimately to the crisis (IMF, 1998). Despite the undisputable importance of the subject, there has been relatively little empirical research on it mainly due to the lack of data, which led to diverging opinions among leading economists concerning the nature and the degree of competition in these countries’ product markets.

Laffont (1998) suggests for example that developing country markets tend to be small and therefore suffer from a variety of imperfections. Many developing countries do not have any antitrust legislation and the impact of existing antitrust laws is hampered by weak enforcement. Further, governments often subsidize large firms and thereby distort market structure and firm conduct. Rodrik (1988), Krugman (1989) and Lee (1992) also share the view that DCs suffer from highly concentrated and uncompetitive industrial product markets. In a recent survey, Tybout (2000, p.30) presents a summary of these views: ‘because of institutional barriers, labour market regulations, poorly functioning financial markets and limited domestic demand, the industrial sectors of DCs are often described as insulated, inefficient oligopolies.’

On the contrary, existing studies on plant and employment turnover in DCs indicate substantial microlevel reallocation of employment among producers with levels of turnover that exceed those found in Canada and United...
States (Roberts and Tybout, 1996). More recently, Glen, Lee and Singh (hereafter GLS) (2001) provided firm-level evidence from seven emerging markets contrary to the widespread view that DCs suffer from uncompetitive markets.

One objective of this study is to shed some light on the nature and intensity of competition focusing on the issue of persistence in corporate rates of return. It does so by examining the dynamics of firm level profitability data from 1985 to 1998 for 172 of the largest manufacturing companies in Turkey. In particular, the paper tries to answer three questions that are central to the evaluation of industry dynamics: (1) do competitive forces successfully eliminate excess profits? (2) how quickly does this erosion process take place? and (3) which factors account for the observed differences in persistent profitability and for the speed of adjustment to the norm?

Before going into the details of the underlying model, it is worth drawing attention to some of the distinctive features of the environment in which Turkish companies operated over the 1980–1999 period.

Starting in the early 1980s, Turkey launched an ambitious trade liberalization programme that significantly increased the openness of the manufacturing sector. Import liberalization and export promotion were key features of this reform. Studies that looked at the impact of this programme on (industry-level) profitability found a small but significant decrease in price–cost margins concluding thereof that the Turkish private enterprises did not enjoy a competitive return (c) common to all companies; (2) a permanent rent \( r_i \) specific to firm \( i \); and (3) a short-run rent \( s_{it} \) which is also firm specific and tends to erode over time:

\[
\pi_{it} = c + r_i + s_{it}
\]

In a perfectly competitive world no firm would be able to earn a rate of return on capital above the competitive return \( c \), implying that \( r_i = 0 \) and \( E(s_{it}) = 0 \), as \( t \to \infty \). It is further assumed that short-run rents are correlated over time so that short-run deviations from long-run rates of return may need some periods to reach their competitive level. A reasonable assumption concerning the adjustment process of \( s_{it} \) is that they are intertemporally related but converge on zero,

\[
s_{it} = \hat{\lambda}_i s_{i,t-1} + \mu_{it}
\]

where \( |\hat{\lambda}_i| < 1 \), for stationarity\(^5\) and \( \mu_{it} \) is an error term with constant variance and mean zero. Assuming that Equation 3 holds in every period, it can be used to remove \( s_{it} \) from Equation 2 to obtain

\[
\pi_{it} = \Lambda_i c + \hat{\lambda}_i \pi_{i,t-1} + \mu_{it}
\]

Letting \( \hat{\alpha}_i \) and \( \hat{\lambda}_i \) be the estimates of the autoregressive equation

\[
\pi_{it} = \alpha_i + \hat{\lambda}_i \pi_{i,t-1} + \mu_{it}
\]

II. METHODOLOGY

The methodology of the paper follows the approach of Mueller (1986). Let \( \Gamma_i \) denote firm \( i \)'s profit rate defined as profits before taxes divided by its total assets in year \( t \). To remove the variations in \( \Gamma_i \) due to business cycle factors, this measure of profit rate is transformed as the relative deviation from an economy-wide measure of profitability in year \( t \), \( \Gamma_t \):

\[
\pi_{it} = \frac{\Gamma_i - \Gamma_t}{\Gamma_t}
\]

A firm’s profitability in year \( t \), \( \pi_{it} \), is assumed to consist of three components: (1) a competitive return \( c \) common to all companies; (2) a permanent rent \( r_i \) specific to firm \( i \); and (3) a short-run rent \( s_{it} \) which is also firm specific and tends to erode over time:

\[
\pi_{it} = c + r_i + s_{it}
\]

Different studies do not exist on Turkish manufacturing sectors.

States (Roberts and Tybout, 1996). More recently, Glen, Lee and Singh (hereafter GLS) (2001) provided firm-level evidence from seven emerging markets contrary to the widespread view that DCs suffer from uncompetitive markets.

The largest 25 BGs owned 126 of the 406 private companies with a 53% share in sales and 58% in profits.

B. B. Yurtoglu

\(^1\) These findings are based on plant level panel data sets covering the manufacturing sectors in Chile, Colombia, and Morocco. Similar studies do not exist on Turkish manufacturing sectors.

\(^2\) Indeed, the first antitrust legislation (the Law on The Protection of Competition No: 4054) became effective by the end of 1994. The Competition Board which is the decision body of the Competition Authority responsible to apply the Law, was established in 1997.

\(^3\) Note that unlike keiretsu, chaebol were denied to have their own banks by a state-owned banking system.

\(^4\) The largest 25 BGs owned 126 of the 406 private companies with a 53% share in sales and 58% in profits.

\(^5\) Whereas stationarity requires that \( |\hat{\lambda}_i| < 1 \), plausible values of \( \hat{\lambda}_i \) fall in the range \( 0 < \hat{\lambda}_i < 1 \).
the unconditional mean of the $\pi_p$ series can be interpreted as the long-run projected profit rate of firm $i$, $\hat{\pi}_{ip}$.

$$\hat{\pi}_{ip} = \frac{\hat{\alpha}_i}{1 - \hat{\lambda}_i}$$

Equation 5 is a simple autoregressive model to describe the pattern of firm level profits over time. The long-run projected profit rate, $\hat{\pi}_{ip}$, and the parameter $\hat{\lambda}_i$ can be estimated for individual firms using annual observations of the relative deviation of the profit rate of a given firm from the annual economy-wide average rate of return. Both parameters are informative and incorporate two views about the competitive process (Geroski, 1990, p.28). Profits observed at any time reflect the degree of competition in a market and in this neoclassical sense competition can be defined as a state which requires that $\hat{\pi}_{ip} = c$ for all firms (ignoring risk). On the other hand, since high profits attract entry, current profits also cause changes in the degree of competition, thus affect its intensity in the near future. This second Schumpeterian notion views competition as a process in which the forces of entry are strong and rapid enough to bid away profits, i.e., as a process, which requires that $\hat{\lambda}_i = 0$ or sufficiently close to zero.

The expression $1 - \hat{\lambda}_i$ is an estimate of the speed of erosion of short-run rents and indicates how quickly the profit rate $\pi_p$ approaches its long-run equilibrium level, $\hat{\pi}_{ip}$. The bigger $\hat{\lambda}_i$ is, the slower short-run rents erode as the profit rate adjusts toward its permanent level. In other words, the observed profit rate in period $t$ depends largely on its value in period $t-1$ and very little on its permanent level. If $\hat{\lambda}_i$ is small, short-run rents erode very rapidly. $\hat{\pi}_{ip}$, on the other hand, is a measure of permanent rents, which are not eroded by competitive forces. If all firms earn the competitive rate of return, then $\hat{\pi}_{ip} = c$ for all $i$ and $r_i = 0$ for all $i$. If $\hat{\pi}_{ip}$ are not equal across firms, then firms earn permanent rents, which indicates that some firms earn returns above (or below) the competitive norm and that these returns are expected to persist indefinitely.

III. DATA

The existence of persistence differences in profitability is tested for a sample of 172 firms drawn from the annual surveys of the 500 largest firms from 1985 to 1998 conducted by the Istanbul Chamber of Industry (ICI). Firms listed continually from 1985 to 1998 are included in the sample. The annual surveys of ICI include data on sales, gross value added, total assets, profits before taxes, exports and number of employees.

A company’s return on capital is defined as its profits before taxes divided by total assets. Ideally, profits net of taxes would be used assuming that the convergence of profits to the competitive norm is driven by the exit and entry of other firms and that entry and exit respond to after tax profit levels, but data for after tax profits are not provided by ICI. To the extent that tax rates differ across industries, the estimates of $\alpha_i$ will differ across companies and will suggest the existence of firm or industry specific rents that are not due to differences in the competitive environment, but to the tax treatment of profits.

Table 1 displays means and standard deviations of our profit measure ($\pi_{ip}$), its unadjusted value ($\Gamma_i$), and of the profit rate from the grand sample ($\Gamma_\ell$). The mean profit rate of the 500 largest companies (excluding the state owned enterprises) in each year are used as the economy-wide measure of profitability ($\Gamma_i$). Using this measure avoids some of the bias that is introduced when using the mean profit rate of the sample companies. The means indicate that the raw profit rates ($\Gamma_i$) of the sample firms range from 10.9% to 19.6% over the 14-year period from 1985 to 1998, whereas the mean profit rates of the 500 largest Turkish companies ($\Gamma_\ell$) are in all 14 years lower than that of the sample companies. Inclusion of the state-owned companies lowers the mean $\Gamma_i$ from 11.7% to 6.2% for the whole period from 1985 to 1998. The correlation coefficient between the mean profit rate and its standard deviation is equal to $-0.38$ indicating that the dispersion of profit rates gets smaller during booms and wider during recessions.

Requiring the firms to be in the ICI list for each of the 14 years implies that the sample is a collection of survivors. The sample firms are by definition more successful than all other firms over the 14 years. A large negative shock to sales even once in 14 years would result in not being included in the ICI list. To remove some of this bias other sources of accounting data were also checked using the Yearbook of Companies for firms that are listed at the Istanbul Stock Exchange.

IV. RESULTS

Before estimating Equation 5 for individual companies, its admissibility must be tested for the data. An essential
precursor in the analysis of persistent profitability is whether the profitability data are stationary. Whether there is a unit root in the data is tested in subsection A below. In subsection B, whether the disturbances ($\mu_i$) in Equation 5 are autocorrelated is tested. Subsection C employs two procedures to determine whether the true lag structure is of higher-order instead of first-order as assumed in Equation 5.

A. Testing for stationarity

The existence of a unit root in the firm-level profitability series would indicate that shocks to profitability persist indefinitely and that competitive pressures never erode differences in profitability. If confirmed, this observation would imply some serious reconsideration of Turkey’s industrial policy. First the Dickey–Fuller (DF) tests for stationarity is used of firm-level profitability series. A common problem with these tests is that they have low power so that it is hard to distinguish between stationarity and nonstationarity. The DF tests fail to reject the unit root hypothesis in only 56 out of 172 cases. This result is hardly surprising given the relatively short time series dimension of the data.

Relatively more powerful unit root tests can be used if all sample firms (or subgroups of firms within the sample) are assumed to share the same persistence parameter ($\lambda$). The assumption of a common $\lambda$ is, however, inconsistent with the notion that $\lambda$s are firm-specific. Nevertheless a unit root test is applied that has been proposed by Im et al. (1997) for data, which also have a cross-section dimension, as here. They show that when there are no serial correlations, it is possible to augment the power of the unit root tests applied to single time series. Their ‘standardized $t$-bar statistic’ is based on the average value of the augmented DF statistic calculated for each of the individual firms’ data, AD$F$; i.e., the average value of the $t$-statistic on the coefficient $\beta_i$ in the DF version of Equation 5:

$$\Delta \pi_{it} = \alpha_i + \beta_i \pi_{i,t-1} + \epsilon_{it} \tag{7}$$

where $\beta_i = \lambda_i - 1$ and $\Delta \pi_{it} = \pi_{it} - \pi_{i,t-1}$. This formulation allows $\beta_i$ to differ across groups, and allows some of the individual series to have unit roots. The average value of the individual $t$-statistics from Equation 7 is equal to $-2.21$.

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Notes: $\Gamma_o$ is the ratio of profits before taxes to total assets. $\pi_i$ is the relative (percentage) deviation of $\Gamma_o$ from the mean profit rate of all privately owned companies ($\Gamma_{Private}$) contained in the list of 500 largest companies in the corresponding year. $\Gamma_{All}$ is the mean profit rate of all (privately and publicly owned) companies from the list of 500 largest firms surveyed by the Istanbul Chamber of Industry.

1 For example, Evans and Savin (1984) show that DF tests at stable alternatives near unity have very low power even for samples as large as $T = 100$. Their power calculations show that large samples are needed to draw reliable inferences about the autoregressive parameter when the true value is near but below unity. Kamhampati (1995) and Goddard and Wilson (1999) investigate stationarity of profits. They are also unable to reject the nonstationarity null hypothesis in about 70–75% of unit root tests.

10 This number is based on a DF equation with a constant and no lags. Also included are a lag and later a trend variable. The number of firms for which the unit root hypothesis is rejected ranges from 23 to 41 out of a total 172, depending on whether the DF equation includes one or no lag and/or whether a trend variable is included or not. The Phillips–Perron tests reject the hypothesis of a unit root for 56 (a constant and one lag), and 44 (a constant, one lag and a trend variable) cases.

11 See also Breitung and Meyer (1994) for a different approach.

<table>
<thead>
<tr>
<th>Year</th>
<th>$\Gamma_o$ (profits/total assets)</th>
<th>$\pi_i$</th>
<th>$\Gamma_{Private}$</th>
<th>$\Gamma_{All}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Median</td>
<td>Std. dev.</td>
<td>Mean $\Gamma_o$ - Mean $\Gamma_t$</td>
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<td>16.80</td>
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</tr>
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<td>1987</td>
<td>17.23</td>
<td>14.19</td>
<td>15.88</td>
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</tr>
<tr>
<td>1988</td>
<td>18.53</td>
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<td>21.06</td>
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</tr>
<tr>
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<td>17.28</td>
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<td>15.31</td>
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</tr>
<tr>
<td>1990</td>
<td>16.97</td>
<td>11.71</td>
<td>16.58</td>
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</tr>
<tr>
<td>1991</td>
<td>11.43</td>
<td>7.51</td>
<td>16.99</td>
<td>0.52</td>
</tr>
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<td>1992</td>
<td>14.20</td>
<td>11.86</td>
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<td>1993</td>
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<td>1996</td>
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<td>1997</td>
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<tr>
<td>1998</td>
<td>10.94</td>
<td>8.50</td>
<td>16.50</td>
<td>0.38</td>
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</table>
Persistence of firm-level profitability in Turkey

for the sample of 172 firms observed over the 1985–1998 period, which is lower than the critical value of the standardized t-bar test at the 1% level (−1.74). Looking at the subgroups of firms based on industry classification results also in the rejection of the null hypothesis that the profits data are nonstationary for 11 of the 13 industries, which contain more than three firms.

B. Testing for autocorrelated disturbances

The second econometric issue in estimating the Equation 5 is serial dependence of the disturbances. The AR(3), AR(2), and AR(1) processes in the residuals for evidence suggesting omission of important dynamics examined. Breusch–Godfrey and Durbin tests were performed and also the Ljung–Box Portmanteau statistic calculated for the first, second and third order autocorrelation. These three procedures for serial correlation or moving average processes in the residuals showed that for the vast majority of firms the hypothesis of autocorrelation could be rejected.12

C. Tests of lag structure

Equation 5 can be interpreted as a restricted version of a general finite distributed lag model such as,

\[ \pi_{it} = \alpha_i + \sum_{k=1}^{q} \lambda_{ik} \pi_{i-it} + \mu_{it} \tag{8} \]

Various procedures have been suggested for determining the appropriate lag length. Two commonly used model selection criteria are the Akaike information criterion (AIC) and the Schwarz Bayesian criterion (SBC).13 Given the relatively short time dimension of the data, attention is restricted to second \((q = 2)\) and third order \((q = 3)\) autoregressive models as alternatives to Equation 5. Using the AIC, the hypotheses that Equation 5 is a more appropriate way of describing the pattern of profits than Equation 8 can be accepted with \((q = 2)\) and \((q = 3)\) for 158 and 160 cases out of a total 172 firms. The corresponding figures using the SBC are 162 (AR(1) versus AR(2)) and 165 (AR(1) versus AR(3)). Given the superiority of Equation 5 for more than 90% of the whole sample, only the estimated parameters of Equation 5 will be reported in the following sections.

D. Results of the empirical model

The regression results of Equation 5 are summarized in Table 2. The total sample of 172 firms is divided into five subgroups of about equal size according to the firms’ average profit rate for the first two years of the time series. For each subgroup, Table 2 reports the means, medians and standard deviations of the long-run projected profit rate of firm \(i\), \(\hat{\pi}_i = \hat{\alpha}_i / (1 - \hat{\lambda}_i)\), as the relative deviation from the grand sample mean, the speed of adjustment to the long-run norm \((1 - \hat{\lambda}_i)\), the initial profit rate \(\overline{\pi}_0\) along with other descriptive statistics on the estimated equations.

The first thing to note is that the ranking by average initial profit rates of the five subgroups is the same as the ranking by their average long-run projected profit rate. For example, firms in the subgroup with the highest initial profit rates (Group 1) earned, on average, profits that were 3.7 times above the grand sample mean, and their long-run projected profit rates were about 1.6 times above the norm, the highest for all five groups. For firms in the fifth subgroup (lowest \(\overline{\pi}_0\)), which earned, on average, profits that were 108% below the grand sample mean in the initial two years, a long-run projected profit rate is estimated that is, on average, 26% below the norm. Despite persistent profits differences, the results also indicate a convergence towards the average over time. The profit rates for firms with initial profit rates above (below) the average tend to converge towards the average.

Turning now to the speed of adjustment parameter \((1 - \hat{\lambda}_i)\), it is noted that firms with the highest \(\overline{\pi}_0\) and \(\hat{\pi}_i\) have the highest degree of persistence. This is consistent with the prediction that firms with the highest profits rates should have the greatest incentives to block entry. Thus, the convergence process would be expected to work most slowly for these firms, and this is what is observed. The estimated \(\hat{\lambda}_i\)s range from 0.31 to 0.45 around a mean of 0.38. They are similar across subgroups 2–4 and somewhat lower in the first group. T-tests reveal that the differences in \(\hat{\lambda}_i\) across groups are statistically insignificant, the only exception being that the mean \(\hat{\lambda}_i\) of the first group is significantly higher than the mean \(\hat{\lambda}_i\) of the fifth group (with a p-value of 0.042).

The average degree of persistence \((\hat{\lambda}_i)\) is 0.38 implying a moderately fast erosion of short-run rents with excess profits of 10% relative to the norm eroding approximately within two to three years.14 Since the sample size of 14 observations per firm is relatively small, some caution

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12The calculated (Portmanteau) Q statistics suggest that 87% (first-order autocorrelation) to 91% (third order autocorrelation) of all cases do not exhibit autocorrelation (at the 1% level). The Durbin procedure detected first order serial correlation in only nine of the 172 cases using a 5% level significance test for the residuals. Breusch–Godfrey tests revealed that the null hypothesis of first- (second and third) order autocorrelation cannot be rejected for 24, (8 and 1) firms at the 5% level.

13The AIC and SBC are calculated as follows: \(\text{AIC} = T \ln(\text{Residual Sum of Squares}) + 2n\), \(\text{SBC} = T \ln(\text{Residual Sum of Squares}) + n \ln(T)\) where \(T\) is the number of usable observations and \(n\) is the number of estimated parameters including the constant.

14Put differently, if \(\alpha_i = 0\) in Equation 5, then the half-life of profits above the norm is \(\log(1/2) / \log(\hat{\lambda}_i)\) or \(\hat{\lambda}_i \approx 0.5\), about one year.
Estimates of long-run projected profit rates and the speed of adjustment

<table>
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<tr>
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<td>πᵢ</td>
<td>(1 - λᵢ)</td>
<td>πᵢ</td>
<td>(1 - λᵢ)</td>
<td>(1 - λᵢ)</td>
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</tr>
<tr>
<td>Notes: The reported parameters are firm-level estimates of Equation 5: ( \pi_p = a_i + \lambda \pi_{p-1} + \mu_i ). The long-run projected profit rate is calculated as ( \hat{\pi}_p = \hat{a}_i / (1 - \hat{\lambda}_i) ). The groups are formed on the basis of the average firm-level profitability in 1985 and 1986. ( t(\hat{a}_i) ) and ( t(\hat{\lambda}_i) ) are based on the absolute values of the t-statistics of ( \hat{a}_i ) and ( \hat{\lambda}_i ).</td>
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</table>

Table 2.

is required for interpreting the estimated \( \lambda \)'s. The well-known small-sample bias implies that OLS estimates of \( \lambda \) will be biased and will underestimate the true value of the autoregressive parameter (Patterson, 2000). Using a common procedure\(^{15}\) to adjust \( \hat{\lambda}_i \) results in a mean \( \hat{\lambda}_i \) of 0.43, which would imply higher (lower) estimated long-run profit rates for positive (negative) values of \( a_i \). The speed of adjustment parameter was significantly different from zero for about 41% of the sample.

The first-order autoregressive Equation 5 explains more than 10% of the variation in relative profit rates in 111 out of 175 cases (63.4%). The hypotheses that the long-run projected profit rate measured as relative deviations from the grand sample mean are not significantly different from zero at the 10% level (two-tailed test) can be rejected for 74 firms,\(^{16}\) which is about 44% of the sample. Out of these, 43 (31) firms had significantly positive (negative) long-run projected profit rates. Thus, there is evidence that a significant fraction (about one-fourth) of the sample is estimated to earn profit rates significantly above the average.

While estimated \( \lambda \)'s are one indicator of the intensity with which short-run rents are eroded and hence the intensity of competition, the existence of persistent profitability differences among firms offers another way to evaluate the efficiency of the competitive environment hypothesis. In this spirit, the hypothesis that all \( \pi_p \) converge to a common competitive \( c \) can be tested by restricting all firms to have the same \( \pi_p \). The restriction results in a significant increase in the sum of squared residuals from the unconstrained estimates. The \( F \)-statistic with (172, 2064) degrees of freedom is 6.83, considerably above the critical value of 1.30 for a 1% level significance test. Repeating the same exercise for individual industries results in the rejection of the null hypothesis that all firms have the same \( \pi_p \), for 10 of the 13 three-digit industries (ISIC – Rev.2), which contain more than three firms.

The bottom line of Table 2 is that even though some convergence of profits towards the norm is observed, there is a also a considerable degree of persistence. Firms with high initial profit rates have the highest long-run

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\(^{15}\) In a model \( r_t = \beta r_{t-1} + \nu_t \), where \( |\beta| < 1 \) and \( \nu_t \) is a zero mean white noise process, the small sample bias is approximately equal to \(-2\beta/T\), where \( T \) is the number of observations. To adjust for this bias, one can multiply the estimated coefficients by multiplying by \( T/(T-2) \).

\(^{16}\) Since \( \pi_p \) is a ratio of two estimated parameters, its standard error must be calculated from a Taylor approximation to the constraint \( \pi_p = a_i / (1 - \lambda_i) = 0 \) using the variance-covariance matrix of the coefficients. The variance of \( \pi_p \) is then given by the formula \( \text{Est}.\text{Var}[\pi_p] = (1/(1 - \lambda))^2 \text{Var}(\hat{a}_i) + (\hat{a}_i/(1 - \lambda))^2 \text{Var}(\hat{\lambda}) + 2(1/(1 - \lambda))(\hat{a}_i/(1 - \lambda)^2)\text{Cov}(\hat{a}_i, \hat{\lambda}) \) (Greene, 1997, pp. 360–63).
projected profit rates and their short-run rents tend to erode more slowly on the average.

These results can be related to studies that applied the same methodology to other countries. Mueller (1990) contains the results of the studies that applied a slightly different version of Equation 5 to seven industrialized countries\(^{17}\) over mainly the 1960–1982 period. The average \(\hat{\lambda}\) for the most successful group range from 0.34 (Canada) to 0.82 (Sweden).

A more recent study by GLS (2001) covers seven emerging markets over the period 1980–1995 and comes up with estimates of \(\hat{\lambda}\) that range from 0.013 (Brazil) to 0.42 (Zimbabwe) while three of the mean \(\hat{\lambda}\)s being around 0.35. Both the mean long-run projected profit rates of these seven countries and the fraction of firms with statistically significant positive long-run projected profit rates in each sample are close to zero. The mean \(\hat{\lambda}\) of the 172 Turkish companies is equal to 0.38 and the mean \(\hat{\lambda}\) for the most successful group in Turkey is 0.45, which suggest that the intensity of competition in Turkey (based on the estimated \(\hat{\lambda}\)s) is not less than in advanced industrial countries and similar to other emerging markets. The mean long-run projected profit rate of Turkish companies is equal to 0.42 with 25% of them being significantly positive. Based on this criterion, Turkey seems to be somewhat less competitive than the countries in the GLS (2001) sample.

In this section, the observed differences in long-run projected profit rates and the persistence parameters are related both to industry and firm characteristics.\(^{18}\) The main limitation to this exercise is the availability of additional data. One major problem is the broad three-digit industrial classification system employed by the ICI surveys. An attempt was made to assign individual companies to an equivalent four-digit level, which was the basis of the industry data. On the other hand, firm-level variables are not observed for some of the companies in the data set, since some firms stay unlisted and are not obliged to publish their accounts. As a result, it is only possible to use about 100 observations in the analysis below.

An obvious industry characteristic to use to explain the variation in long-run projected profit rates is the four-firm concentration ratio (\(\text{CR}_4\)).\(^{19}\) Several studies at the firm level have documented a positive relationship between concentration and profitability\(^{20}\) even though the importance of it decreased when market share was also included.\(^{21}\) The growth rate of industry output (\(\text{INDGRW}\)) was also employed to explain industry or firm level profitability. Rapid industry growth may make it more difficult for incumbents to maintain their market shares by pre-empting demand, thereby making entry easier. It is also harder to maintain oligopolistic discipline in a rapidly growing industry. On the other hand, growth of industry output can increase margins through maintenance of pressure on capacity. Imports represent the most immediate new entry in the domestic markets and a high level of imports will reduce domestic margins. Exports represent goods in which the country has a comparative advantage and should be associated with higher profitability if it is based on successful product differentiation in world markets. On the other hand, exports might be negatively related to the persistent profitability due to increased fluctuations in internationally open markets. These effects are controlled for by including the import (export) intensity defined as the ratio of industry imports (exports) to industry output (\(\text{IMINT}\) and \(\text{EXINT}\)). Other factors such as advertising and R&D intensity at the industry level proved to be very important determinants of performance in other studies because they form the basis of product differentiation. Unfortunately, data are not available on these two variables and their exclusion might bias the coefficients of industry variables.

\(^{17}\) Khemani and Shapiro (1990), Schwalbach and Mahmood (1990), Jenny and Weber (1990), Odagiri and Yamawaki (1990) and Cubbin and Geroski (1990) apply a similar model to Canada, Germany, France, Japan, and the UK, respectively. The only difference is that profits are measured as the absolute deviation \((\pi_t = \Gamma_t - \Gamma_i)\) from an economy wide profitability measure instead of the percentage deviation as used in this paper.

\(^{18}\) Since both of these variables are estimated parameters, the equations are weighted by the inverse of their standard errors as suggested by Saxonhouse (1976).

\(^{19}\) If the industry effects are assumed to be the main determinant of profitability, then a set of industry dummies should capture all of these characteristics. Twenty-seven industry dummies explain about 11% of the total variation in the permanent profits. Nevertheless, it is required to see which industry characteristics are more important than others.

\(^{20}\) See, Imel and Helmberger (1971), Shepherd (1972), Neumann et al. (1983).

\(^{21}\) See, Shepherd (1972), Ravenscraft (1983), and Mueller (1986).
There are a large number of firm characteristics that might be related to persistent profitability differences across firms. Many studies have emphasized the importance of market share and almost all studies that employed it have shown its importance for firm level profitability. The ratio of company sales to industry sales is included as an (admittedly poor) proxy for market share (MS). The total assets of the firm (ASSETS) is included to control for size. Other firm level variables include the growth rate of the sales of the firm (GRW), the share of exports in total sales (EXP), and the standard deviation of annual rates of return (SDROA). The age of a company, calculated as the logarithm of the number of years from its foundation to 1998 (AGE), can account for life-cycle effects. A dummy is also used for firms that are listed on the Istanbul stock exchange (LISTED).

The following variables related to ownership and control patterns of sample companies are also used. The member companies of a BG can have persistently higher profitability mainly due to their advantage in overcoming the severe agency and asymmetric information problems experienced in DCs. Consistent with this, Khanna and Rivkin (2001) show that BG affiliation raises profitability in emerging markets. These elements are taken into account by using a dummy that designates the membership to one of the major BGs (GROUP). Finally, the ownership structure can be a determinant of persistence in profitability and Yurtoglu (2000) finds a small but significant negative impact of concentrated ownership on the return on assets of listed Turkish companies. For the listed companies in the sample, the percentage of equity capital owned by the largest owner (SH1) is used to study the impact of ownership concentration. Table 3 lists the included variables and their expected effects on the $\hat{\pi}_ip$ and $\hat{\lambda}_i$ along with the data sources.

Table 3 reports the results of the regression analysis. The first four equations explore the determinants of the long-run projected profit rates ($\hat{\pi}_ip$). The first thing noted is that while ‘industry’ variables explain less than 7% of the variation in permanent profits (Equation 2), about 55% of the variation is explained by firm-specific variables (Equation 3). The four-firm concentration ratio ($CR4$) is the only significant industry characteristic throughout the Equations 1–4. The Herfindahl index is slightly more significant than the concentration ratio (Equation 2). The eight firm concentration ratio is also used and a slightly lower coefficient obtained, which is significant at the 10% level. The positive correlation between concentration and the profit rate projected into the indefinite future suggests that this relationship is not a short-run disequilibrium phenomenon as contended by Brozen (1970).

The firm-specific factors that seem to be highly correlated with $\hat{\pi}_ip$ are relative size (MS), the variability of profit rates (SDROA), the rate of exports (EXP) and business group membership (GROUP). MS has a small but significant positive impact on $\hat{\pi}_ip$. The positive coefficient of MS in the presence of $CR4$ is similar to the findings of Shepherd (1972) and Gale (1972) and differs from Ravenscraft (1983), Martin (1983), and Odagiri (1992), who found that industry concentration had a negative impact on profitability when market share was also included. The highly significant coefficient of SDROA suggests that the firms with the highest $\hat{\pi}_ip$ are also those with the highest variability in the accounting profits. Thus, a part of the differences in $\hat{\pi}_ip$ appear to be due to differences in risk. Export oriented firms compete in

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22 Maruyama and Odagiri (2002), however, report different results for Japan.
23 The use of other ownership concentration measures (e.g., the percentage of equity capital owned by the largest five or ten owners) does not change the results. The deviation of voting rights of the controlling owner from her cash flow rights is also employed as a potential determinant of persistent profitability. This variable had also an insignificant impact. It seems that no corporate governance variable other than BG membership has a significant impact on the persistence in profitability.
Table 4. Regressions explaining the estimated parameters of equation 5

<table>
<thead>
<tr>
<th>Constant</th>
<th>INDGRW</th>
<th>IMINT</th>
<th>EXINT</th>
<th>CR4</th>
<th>HERF</th>
<th>MS</th>
<th>EXP</th>
<th>SDROA</th>
<th>GRW</th>
<th>ASSETS</th>
<th>GROUP</th>
<th>AGE</th>
<th>LISTED</th>
<th>SH1</th>
<th>$R^2$</th>
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<td>-0.380</td>
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<td>1.069</td>
<td>1.702</td>
<td>0.009</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>(0.15)</td>
<td>(0.56)</td>
<td>(0.35)</td>
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<tr>
<td>(2)</td>
<td>-0.299</td>
<td>0.09</td>
<td>0.78</td>
<td>2.192</td>
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<td>-</td>
<td>3.780</td>
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<td>-</td>
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<td>-</td>
<td>0.011</td>
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<td>(1.72)</td>
<td>(2.62)</td>
<td>(2.52)</td>
<td>(2.89)</td>
<td>(1.91)</td>
<td>(1.32)</td>
<td>(1.96)</td>
<td>(0.71)</td>
<td>(0.59)</td>
<td>(0.52)</td>
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<tr>
<td>(4)</td>
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<td>0.606</td>
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<td>-</td>
<td>-</td>
<td>0.009</td>
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<td>(1.03)</td>
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<tr>
<td>(5)</td>
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<td>0.498</td>
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<td>(0.72)</td>
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<td>(0.84)</td>
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<td>-</td>
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<td>-</td>
<td>-0.007</td>
<td>0.220</td>
<td>1.112</td>
<td>-0.041</td>
<td>0.013</td>
<td>0.007</td>
<td>0.121</td>
</tr>
<tr>
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<td></td>
<td>(0.985)</td>
<td>(1.31)</td>
<td>(1.83)</td>
<td>(0.50)</td>
<td>(0.40)</td>
<td>(0.11)</td>
<td>(1.31)</td>
<td>(1.01)</td>
<td>(1.31)</td>
<td></td>
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<tr>
<td>(7)</td>
<td>-0.335</td>
<td>0.344</td>
<td>1.073</td>
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<td>0.001</td>
<td>-</td>
<td>-</td>
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<td>-0.042</td>
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<tr>
<td>(0.39)</td>
<td>(1.91)</td>
<td>(1.72)</td>
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Notes: Dependent variables: Equations 1–4: the long-run projected profit rate; Equations 5–7: $\lambda$. Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error. Numbers in parentheses are the (absolute values of) heteroscedasticity consistent $t$-values. Industry variables: $\text{INDGRW} =$ average growth rate of industry output, $\text{IMINT} =$ import intensity, $\text{EXINT} =$ export intensity, $\text{CR4} =$ four firm concentration ratio, $\text{HERF} =$ Herfindahl index. All industry variables are averages over the sample period except for $\text{CR4}$ and $\text{HERF}$ which are averaged over 1985–1992. Company variables: $\text{MS} =$ company sales/industry sales, $\text{EXP} =$ foreign sales/total sales, $\text{SDROA} =$ standard deviation of the return on assets, $\text{GRW} =$ percentage change in sales, $\text{ASSETS} =$ natural logarithm of total assets, $\text{GROUP} =$ dummy variable indicating membership to one of the largest BGs, $\text{AGE} =$ logarithm of number of years between a firm’s foundation and 1998, $\text{LISTED} =$ dummy variable indicating that the firm is listed at the Istanbul Stock Exchange, $\text{SH1} =$ percentage of equity capital owned by the largest shareholder. All balance sheet variables are averages over the 1985-1998 period, except in a few cases.
international markets where systematic forces that erode rents are probably stronger than in domestic markets. Consistent with this argument, a negative coefficient on \( EXP \) is estimated. It is also found that group membership is an important factor correlated with permanent profitability differences. The positive coefficient on \( GRW \) suggests that firms that grow more quickly tend to be more profitable than others. Being a listed or an older firm does not have an appreciable impact on permanent profits. The ownership structure variable has also not much contribution to the explanatory power of firm-level equations.

Turning now to the persistence parameter, it is observed that none of the industry variables seem to affect the estimated \( z \)s.\(^{24}\) Using both industry and company variables accounts for about 20% of the variation in \( z \)s (Equation 7), where also the growth rate of industry and import intensity at the industry level are marginally significant (at 12% and 15% levels, respectively).

The regression results summarized in Table 4 suggest that the following combination of industry and firm specific variables characterize a persistently profitable firm: a relatively high market share in a concentrated market, a domestic market orientation, and membership to one of the stable BGs.

V. CONCLUDING REMARKS

The preceding analyses of the permanent profitability at the firm-level indicates that on average profits converge toward a competitive norm, but for a significant fraction of firms this convergence is incomplete. The competitive forces do not seem to affect all firms equally. Some evidence is found that industry effects, like industry concentration, explain some of the observed differences in long-run projected profit rates. Compared with firm-specific characteristics, these factors seem to be less important. The competitive process is probably far more localized than the three- or four-digit industry classifications suggest. It is also shown that BG membership is associated with higher long-run projected profitability.

A comparison of the results with existing studies on the same topic suggests that the intensity of competition in Turkey is no less than in developed countries and similar to other developing countries.

ACKNOWLEDGEMENTS

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\(^{24}\) Again, 10% of variation in estimated \( z \)s is explained by a set of industry dummies.


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