

## **Persistence of Firm-Level Profitability in Turkey**

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### **Abstract:**

*The paper studies the dynamics of company profits for 172 of the largest manufacturing firms in Turkey. Profits are assumed to consist of three components: (1) a competitive return common to all firms, (2) a permanent firm-specific rent, and (3) a short-run rent which is also firm-specific and erodes over time. We employ a time-series analysis to estimate the long-run projected profits and a firm-specific speed of adjustment parameter that measures the rate at which short-run rents are eroded. The results show the existence of persistent profitability differences across firms and a moderately quick erosion of rents except for the most highly profitable firms. We find that firm characteristics rather than industry effects account for the observed differences in permanent profits. Industry concentration, leverage, export orientation and business group membership appear to be the main determinants of permanent profits.*

**Keywords:** Turkey, Persistence of Profits, Competition, Business Groups

**JEL Classification:** G3, L1, D4, O1

## **I. Introduction**

That the real world is far away from the textbook definition of perfect competition is beyond dispute. The assumption of atomistic sellers and buyers in all markets, complete markets, no externalities, no public goods, no informational asymmetries, etc. are hardly realistic even in the richest industrialized economies of the world. There are compelling reasons to believe that developing country (DC) markets suffer from several other impediments to this ideal world of perfect competition.

It is often argued that the highly concentrated industrial product markets in DCs signal relatively uncompetitive markets (Krugman, 1989; Lee, 1992; Rodrik, 1988). In a recent survey, Tybout (2000, p.30) argues that “because of institutional barriers, labor 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 micro-level reallocation of employment among producers with levels of turnover that exceed those found in Canada and United States (Roberts and Tybout, 1996).<sup>1</sup>

One of the aims of this paper 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 two questions that are central to the evaluation of industry dynamics: (1) do the competitive forces successfully eliminate excess profits?, and (2) how quickly does this erosion process take place? Profits observed at any time reflect the degree of competition in a market, and since high profits attract entry, current profits also cause changes in the degree of competition, thus affecting its intensity in the near future.

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 program 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 program 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 great deal of market power before the reform (Foroutan, 1996).

During this period macroeconomic and price volatility was very high and Turkey has experienced a persistent and slowly accelerating high inflation over the last two decades. The real interest rate has been very high and erratic reaching 52.4 % in dollar terms in 1995 (Selcuk, 1997). Combined with the unpredictable regulatory regimes caused by political instability, an element of uncertainty characterized the nature of doing business in Turkey.

Several policies favored large firms thereby inhibiting the growth among small firms. Anti-trust enforcement was weak and even considered to be detrimental in creating “national champions”. A major actor in the Turkish economy has been the family-controlled, diversified big business group (BG), or the *holding company*. The holding company in Turkey is similar to the Japanese *keiretsu* and even more similar to the Korean *chaebol*, in that it is a collection of a large number of industrial and financial companies owned and managed by the founder family<sup>2</sup>. Many of the largest companies in Turkey are owned and controlled by one of the largest holding companies. According to Sönmez (1992), the largest three BGs owned 60 of the largest 406 private companies in 1985 accounting for 23.8 % of the sales and 27.4 % of the profits of this group.<sup>3</sup> The BGs own and control almost all of the private banks in Turkey having preferential access to credit<sup>4</sup>.

## II. Methodology

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

$$\mathbf{p}_{it} = \frac{\Gamma_{it} - \Gamma_t}{\Gamma_t}, \quad (1)$$

A firm's profitability in year  $t$ ,  $\mathbf{p}_{it}$ , 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:

$$\mathbf{p}_{it} = c + r_i + s_{it} \quad (2)$$

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  $t \rightarrow \infty$ . 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 equal their competitive level. A reasonable assumption concerning the adjustment process of  $s_{it}$  is that they are intertemporally related but converge on zero,

$$s_{it} = \lambda_i s_{it-1} + \mu_{it}, \quad (3)$$

where  $|\lambda_i| < 1$ , for stationary 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 (2) to obtain

$$\mathbf{p}_{it} = (1 - \lambda_i) \left[ (c + r_i) + \lambda_i \mathbf{p}_{it-1} + \mu_{it} \right] \quad (4)$$

Letting  $\hat{\mathbf{a}}_i$  and  $\hat{\boldsymbol{\xi}}_i$  be the estimates of the autoregressive equation

$$\mathbf{p}_{it} = \mathbf{a}_i + \lambda_i \mathbf{p}_{it-1} + \mu_{it} \quad (5)$$

one can interpret the unconditional mean of the  $p_{it}$  series as the long-run projected profit rate of firm  $i$ ,  $\hat{p}_{ip}$ ,

$$\hat{p}_{ip} = \frac{\hat{a}_i}{1 - \hat{l}_i}. \quad (6)$$

Equation (5) is a simple autoregressive model to describe the pattern of firm level profits over time. The long-run projected profit rate of firm,  $\hat{p}_{ip}$ , and the parameter  $\hat{l}_i$  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. The expression  $(1 - \hat{l}_i)$  is an estimate of the speed of erosion of short run rents and indicates how quickly the profit rate  $p_{it}$  approaches its long-run equilibrium level,  $\hat{p}_{ip}$ . The bigger  $\hat{l}_i$  is, the slower short run rents erode and the profit rate adjusts slowly 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  $\hat{l}_i$  is small, short run rents erode very rapidly.

### III. Data

We test for the existence of persistence differences in profitability using 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, one would use profits net of taxes assuming that the convergence of profits to the competitive norm is driven by the exit and entry of other firms and that this entry and exit

respond to after tax profit levels. To the extent that tax rates differ across industries, the estimates of  $\mathbf{a}_i$  will be biased giving also rise to biased estimates of  $\mathbf{p}_{ip}$ .<sup>5</sup>

Table 1 displays means and standard deviations of our profit measure ( $\mathbf{p}_{it}$ ), its absolute value ( $\Gamma_{it}$ ), and of the profit rate from the grand sample ( $\Gamma_t$ ). We use as our economy-wide measure of profitability ( $\Gamma_t$ ), the mean profit rate of the 500 largest companies (excluding the state owned enterprises) in each year. Using this measure avoids some of the bias that is introduced when one uses the mean profit rate of the sample companies<sup>6</sup>. The means indicate that raw profit rates ( $\Gamma_{it}$ ) 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 grand sample ( $\Gamma_t$ ) are in all 14 years lower than the sample companies. Inclusion of the state-owned companies lowers the mean  $\Gamma_t$  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 our sample is a collection of survivors. The sample firms are by definition more successful than all other firms in all 14 years. A large negative shock to sales even once in 14 years would result in not being included into the ICI list. To remove some of this bias we also check other sources of accounting data using the Yearbook of Companies for firms that are listed at the Istanbul Stock Exchange.<sup>7</sup>

#### **IV. Empirical Results**

Before estimating equation (5) for individual companies, we must test its admissibility for our data. An essential precursor in the analysis of persistent profitability is whether the profitability data are stationary. We test whether there is a unit root in our data in section A

below. In section B, we test whether the disturbances ( $\mathbf{m}_i$ ) in equation (5) are autocorrelated. Section 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 the industrial policy. First we use the Dickey-Fuller (DF) tests for stationarity 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 non-stationarity.<sup>8</sup> The DF tests fail to reject the unit root hypothesis in only 56 out of 172 cases<sup>9</sup>. This result is hardly surprising given the relatively short time series dimension of the data.

A relatively more powerful unit root test has been proposed by Im, Pesaran and Shin (1997) for data which also have a cross-section dimension. 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,  $ADF_i$ : i.e., the average value of the t-statistic on the coefficient  $\mathbf{b}_i$  in the DF version of equation (5):

$$\Delta \mathbf{p}_{it} = \mathbf{a}_i + \mathbf{b}_i \mathbf{p}_{it-1} + \mathbf{e}_{it} \quad (7)$$

where  $\mathbf{b}_i = \mathbf{I}_i - 1$  and  $\Delta \mathbf{p}_{it} = \mathbf{p}_{it} - \mathbf{p}_{it-1}$ . This formulation allows for  $\mathbf{b}_i$  to differ across groups, and allows some of the individual series to have unit roots. The average value of the individual t-statistic from equation (7) is equal to  $-2.21$  for our 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 one-percent level.

## B. Testing for Autocorrelated Disturbances

The second econometric issue in estimating the equation (5) is serial dependence of the disturbances. The estimation procedure commenced with a third-order autoregressive process in  $\mathbf{p}_{it}$  for each of the 172 firms taken separately. This equation was estimated and its residuals examined for evidence suggesting omission of important dynamics. We performed Breusch-Godfrey and Durbin tests and also calculated the Ljung-Box Portmanteau statistic 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.<sup>10</sup>

## C. Tests of Lag Structure

The equation (5) can be interpreted as a restricted version of a general finite distributed lag model such as,

$$\mathbf{p}_{it} = \mathbf{a}_i + \sum_{k=1}^q \mathbf{l}_{ik} \mathbf{p}_{it-k} + \mathbf{m}_{it} \quad (8)$$

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)<sup>11</sup>. Given the relatively short time dimension of our data, we restrict our attention to second ( $q = 2$ ) and third order ( $q = 3$ ) autoregressive models as alternatives to equation (5). Using the AIC, we can accept the hypotheses that equation (5) is a more appropriate way of describing the pattern of profits than equation (8) 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) vs. AR(2) ) and 165 ( AR(1) vs. AR(3) ). Given the superiority of equation (5) for more than 90 % of the whole sample, the estimated parameters of only equation (5) will be reported in the following sections.

#### D. Results of the Empirical Model

The regression results of equation (4) 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  $i$ ,  $\hat{p}_{ip} = \hat{a}_i / (1 - \hat{I}_i)$ , as the relative deviation from the grand sample mean, the speed of adjustment to the long-run norm  $(1 - \hat{I}_i)$ , the initial profit rate  $\bar{p}_0$  along with other descriptive statistics on the estimated equations.

The first thing we 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 earned, on average, profits that were 370.3 % above the grand sample mean, and their long run projected profit rates were about 159.2 % above the norm, the highest for all five groups. For firms in the fifth subgroup (lowest  $\bar{p}_0$ ), which earned, on average, profits that were 108 % below the grand sample mean in the initial two years, we estimate a long run projected profit rate 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, which can be observed for all groups except the third one.

Turning now to the speed of adjustment parameter  $(1 - \hat{I}_i)$ , we note that firms with the highest  $\bar{p}_0$  and  $\hat{p}_{ip}$  have the highest degree of persistence. This is consistent with the expectation that firms with the highest profits rates should have the greatest incentives to block entry. Thus, we would expect the convergence process to work most slowly for these firms, and this is what we observe. The estimated  $I_i$ '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  $\hat{\lambda}_i$  of the first group are significantly higher than those of the fifth group (with a p-value of 0.042).

The average degree of persistence ( $\hat{I}_i$ ) 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<sup>12</sup>. Since the sample size of 14 observations per firm is relatively small, some caution is required for interpreting the estimated  $I$  s. The well-known small-sample bias implies that OLS estimates of  $I_i$  will be biased and will underestimate the true value of autoregressive parameter (Patterson, 2000). Using a common procedure<sup>13</sup> to adjust  $\hat{\lambda}_i$  results in a mean  $I$  of 0.43 which would imply higher (lower) estimated long-run profit rates for positive (negative) values of  $a_i$ .

The first-order autoregressive equation (5) explains more than 10 % percent of the variation in relative profit rates in 111 out of 175 cases (63.4%). We can reject 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) for 74 firms<sup>14</sup>, 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. The speed of adjustment parameter was significantly different from zero for about 41 % of the sample.

The bottom line of Table 2 is that even though we observe some convergence of profits towards the norm, there is also a considerable degree of persistence. Firms with high initial profit rates have the highest long run 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 (5) to seven industrialized countries<sup>15</sup> over mainly the 1960-1982 period. The average  $I$  s for the most successful group range from 0.34 (Canada) to 0.82 (Sweden). Another study that covers nine emerging markets over the period 1980 to 1995 comes up with estimates of  $I$  that range from -0.04 (Argentina) to 0.54 (Malaysia) while three of the mean  $I$  s being around 0.35 (Glen, Singh, and Matthias, 1999). The mean  $I$  of the 172 Turkish companies is equal to 0.38 and the mean  $I$  for the most successful group in Turkey is 0.45, which suggest that the intensity of competition in Turkey is not less than in advanced industrial countries and similar to other emerging markets.

#### **IV. Explaining Differences in Permanent Profits and the Speed of Adjustment**

The unit of analysis in the traditional structure-conduct-performance model is the industry. This model assumes that the firms in an industry are all alike in the sense that they have the same technology and benefit equally from industry wide collusion and entry barriers. According to this approach, the main determinant of firm level profitability differences are the characteristics of the industries and taken at its extreme all firms in an industry should have the same profit rate. The so-called “new learning”, on the other hand, emphasizes the importance of firm level differences in explaining the variations observed in firm level profitability.

In this section, we will relate the observed differences in long run projected profit rates and the persistence parameters both to industry and firm characteristics.<sup>16</sup> The main limitation to this exercise is the availability of further data. One major problem is the broad three-digit industrial classification system employed by the ICI surveys. We made an attempt to assign individual companies to an equivalent four-digit level which was the basis of our industry data. On the other hand, firm-level variables are not observed for some of the

companies in our data set, since some firms stay unlisted and are not obliged to publish their accounts. As a result, we are only able to use about 100 observations in the analysis below.

The most obvious industry characteristic that we use to explain the variation in long-run projected profit rates is the four-firm concentration ratio (CR4)<sup>17</sup>. Several studies at the firm level have documented a positive relationship between concentration and profitability<sup>18</sup> even though the importance of it decreased when market share was also included<sup>19</sup>. The growth rate of industry output (INDGRW) was also employed to explain industry or 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 contrary, 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 can be negatively related to the persistent profitability due to increased fluctuations in internationally open markets. We try to control for these effects by including the import (export) intensity defined as the ratio of industry imports (exports) to industry output (IMINT and EXINT). Other factors such as R&D and advertising intensity at the industry level proved to be very important determinants of performance especially because they form the basis of product differentiation. Unfortunately, we do not have data on these two variables and their exclusion might bias the coefficients of industry variables.

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. We include the relative size as the most close measure to market share (MS).

The size of the firm expressed as the total assets of the firm (ASSETS) are included to capture 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), the leverage of companies expressed as the ratio of total debt to total assets (LEVER) 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. We also use a dummy for firms that are listed at 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. A further advantage of BG members in Turkey is easier access to credit due to the existence of a group bank. We try to take these elements into account by using a dummy that designates the membership to one of the major BGs (GROUP) and the interaction of this dummy with LEVER (GRLEV). Finally, the ownership structure can be a determinant of persistence in profitability and elsewhere (Yurtoglu, 2000), we find 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, we use the percentage of equity capital owned by the largest, five largest and ten largest owners (C1, C5, and C10) to study the impact of ownership concentration. For this subset, we also use the cash flow rights and voting rights of the ultimate controlling owner, since these two measures can deviate from direct ownership variables due to the possibility of deviations from one-share-one-vote rule in Turkey.

Table 3 reports the results of the regression analysis. The first four equations explore the determinants of the long-run projected profit rates ( $\hat{p}_{ip}$ ). The first thing we note is that while "industry" variables explain about less than 7 % of the variation in permanent profits (Eq. 2), about 55 % of the variation is explained by firm-specific variables (Eq.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 (Eq. 2). We also use the eight-firm concentration ratio and come up with a slightly lower coefficient which is significant at the 10 percent level.

The firm-specific factors that seem to be highly correlated with  $\hat{p}_{ip}$  are the relative size (MS), the leverage ratio (LEVER), the variability of profit rates (SDROA), the rate of exports (EXP) and business group membership (GROUP). Of these, Leverage is the most important variable with a highly negative impact on long-run projected profit rates. GRLEV on the other hand is positive suggesting a positive role of the group banks. MS has a small but significant positive impact on  $\hat{p}_{ip}$ . The highly significant coefficient of SDROA suggests that the firms with the highest  $\hat{p}_{ip}$  are also those with the highest variability in the accounting profits. Export oriented firms compete in international markets where systematic forces that erode rents are probably stronger than in domestic markets. Consistent with this argument, we estimate a negative coefficient on EXP. We also find that group membership is an important factor correlated with permanent profitability differences. This finding is consistent with the negative coefficient on leverage, because the GROUP dummy takes a value of one if the firm belongs to a BG that also owns a bank probably making external finance less costly. The positive coefficients on R&D and GRW suggest that firm-level R&D tends to have a positive influence on permanent profits and firms that grow more quickly tend to be more profitable than others. Being a listed or older firm does not have an appreciable impact on permanent profits. The ownership structure variables do not contribute much to the explanatory power of firm-level equations.

Turning now to the persistence parameter, we observe that none of the industry variables seem to affect the estimated  $\lambda s^{20}$ . From the firm-specific variables, only high leverage is significantly associated with lower persistence. Using both industry and company

variables accounts for about 20 % of the variation in  $\lambda$ s (Eq. 7), where also the growth rate of industry is marginally significant (13 % significance level).

The regression results summarized in Table 3 suggest that the following combination of industry and firm specific variables might characterize a persistently profitable firm: a relatively high market share in a concentrated market, a domestic market orientation, less use of debt finance, and membership to one of the stable BGs which also owns a bank.

## **V. Concluding Remarks**

The preceding analyses of the permanent profitability at the firm-level indicates that on average profits converge toward a competitive norm. The competitive forces, however, do not seem to affect all firms equally. We find some evidence 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 competition as a process is probably far more localized than the three- or four-digit industry classifications suggest.

One of the most important firm-specific variables has turned out to be the leverage of sample companies. This finding is not surprising due to the high real rates of interest experienced in Turkey over the last decade. We have also shown that BG members were highly isolated from this environment mainly because of their "group banks" and took advantage of the leverage effect. In fact, one finding of the recent paper is that BG members are different from the rest.

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. We hope to provide further evidence on this statement by analyzing data collected for a large number of countries covering the same period in future research.

## References

- Evans, G.B.A. and N.E. Savin, 1984, Testing for Unit Roots: 2, *Econometrica*, Vol. 52, No. 5, 1241-1269.
- Foroutan, F., 1996, "Turkey, 1976-85: Foreign Trade, Industrial Productivity, and Competition," in Mark Roberts and James Tybout, eds., op cit.
- Glen, J., Singh, A., and R. Matthias, 1999, "How Intensive is Competition in the Emerging Markets? An Analysis of Corporate Rates of Return from Nine Emerging Markets," *IMF WP/99/32*.
- Greene, William H. 1997. *Econometric Analysis*. NJ: Prentice-Hall.
- Im, K.S., Pesaran, M.H., and Y. Shin. 1997. Testing for Unit Roots in Heterogeneous Panels, WP, University of Cambridge, <http://www.econ.cam.ac.uk/faculty/pesaran>.
- Imel, B. and P. Helmberger, 1971, Estimation of Structure-Profit Relationships with Application to the Food Processing Sector," *American Economic Review*, 61, 614-27.
- Krugman, P., 1989, "New Trade Theory and Less Developed Countries," in *Debt, Stabilization and Development: Essays in Honor of Carlos Diaz-Alejandro*. Guillermo Calvo, ed. NY: Basil Blackwell.
- Lee, N., 1992, "Market Structure and Trade in the Developing Countries," *Trade Policy, Industrialization and Development: New Perspectives*. Gerald K. Helleiner, ed. Oxford: Clarendon Press.
- Mueller, Dennis C., 1986, *Profits in the Long Run*, Cambridge: Cambridge University Press.
- Neumann, M., I. Böbel, and A. Haid, 1983, "Business Cycle and Industrial Market Power: An Empirical Investigation for West German Industries 1965-1977," *Journal of Industrial Economics*, 32, 187-96.
- Patterson, K.D., 2000, "Bias Reduction in Autoregressive Models," *Economics Letters*, 68, 135-141.
- Ravenscraft, D., 1983, "Structure-Profit Relationships at the Line of Business and Industry Level," *Review of Economics and Statistics*, 65, 22-31.
- Roberts, M. J. and James R. Tybout, eds., 1996, *Industrial Evolution in Developing Countries: Micro Patterns of Turnover, Productivity, and Market Structure*, NY: Oxford University Press.

- Rodrik, D., 1988, "Imperfect Competition, Scale Economies, and Trade Policy in Developing Countries," in *Empirical Studies of Commercial Policy*. Robert E. Baldwin, ed. Chicago: University of Chicago Press for NBER.
- Samin, C. 1987. *Finansal Analiz*. Istanbul: Öney Matbaacilik.
- Samin, C., 1990, *Finansal Analiz*, Istanbul: Hünkar Ofset Matbaacilik.
- Saxonhouse, G. R., 1976, "Estimated Parameters as Dependent Variables," *American Economic Review*, 66, 178-83.
- Selcuk, F., 1997, "A Brief Account of the Turkish Economy 1987-1996, 1997, WP 97/1, Bilkent University.
- Shepherd, W. G., 1972, "The Elements of Market Structure," *Review of Economics and Statistics*, 54, 25-37.
- Sönmez, M., 1992, *Türkiye'de Holdingler*, Ankara: Arkadas Yayınevi.
- Tybout, James R., 2000, "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?," *Journal of Economic Literature*, 38, 11-44.
- Yurtoglu, B.B., 2000, "Business Groups, Liquidity and Investment: Evidence from Turkey, WP, University of Vienna.
- Yurtoglu, B.B., forthcoming, "Ownership, Control and Performance of Turkish Listed Companies," *Empirica*.

## Notes:

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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. We have to note that unlike *keiretsu*, *chaebol* were denied to have their own banks by a state-owned banking system.
3. The largest 25 BGs owned 126 of the 406 private companies with a 53 % share in sales and 58 % in profits.
4. Yurtoglu (1999) presents evidence of financing constraints for firms that are not part of a BG. For manufacturing firms that are part of a BG, availability of internal funds has no statistical impact on fixed capital spending, whereas independent firms' investment is three to four times more sensitive to the availability of internal funds.
5. Note, however, that the speed of adjustment parameter will still be unbiased.
6. Glen, Singh and Matthias (1999) apply the same technique to nine emerging markets using the sample mean of the profit rate as the economy wide profitability measure. This choice is probably responsible for their low average long-run projected profit rate estimate which ranges from -0.08 for Argentina to 0.03 for Malaysia. As we show in the following sections, the top firms are different from the rest of the economy and using the sample mean might imply that their permanent profits are not abnormal with respect to a small set of top firms, whereas they may be persistently above the average manufacturing firm in their respective countries.
7. We also use accounting data contained in Samin (1987, 1990).
8. 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.
9. This number is based on a DF equation with a constant and no lags. We also include 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

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the hypothesis of a unit root for 56 (a constant and one lag), and 44 (a constant, one lag and a trend variable) cases.

10. The calculated (Portmanteau) Q statistics suggest that 87 % (first-order autocorrelation) to 91 % (third order autocorrelation) of all cases do not exhibit autocorrelation (at the one percent level). The Durbin procedure detected first order serial correlation in only 9 of the 172 cases using a five percent 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 five percent level.

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

12. Put differently, if  $\alpha_i = 0$  in equation (5), then the half-life of profits above the norm is  $\log(1/2)$  divided by  $\log(\lambda_i)$ , or of  $\lambda_i = 0.5$ , about one year.

13. In a model  $y_t = \mathbf{b}y_{t-1} + \mathbf{n}_t$  where  $|\mathbf{b}| < 1$  and  $\mathbf{n}_t$  is a zero mean white noise process, the small sample bias is approximately equal to  $-\mathbf{b}/T$ , where  $T$  is the number of observations. To adjust for this bias, one can multiply the estimated coefficients by multiplying with  $T/(T-2)$ .

14. Since  $\mathbf{p}_{ip}$  is a ratio of two estimated parameters, its standard error must be calculated from a Taylor approximation to the constraint  $\hat{\mathbf{p}}_{ip} = \hat{\mathbf{a}}_i / (1 - \hat{\mathbf{I}}_i) = 0$  using the variance-covariance matrix of the coefficients. The variance of  $\mathbf{p}_{ip}$  is then given by the formula

$$Est.Var[\hat{\mathbf{p}}_{ip}] = \left( \frac{1}{1 - \hat{\mathbf{I}}} \right)^2 Var(\hat{\mathbf{a}}) + \left( \frac{\hat{\mathbf{a}}}{(1 - \hat{\mathbf{g}})} \right)^2 Var(\hat{\mathbf{g}}) + 2 \frac{1}{1 - \hat{\mathbf{a}}} \frac{\hat{\mathbf{a}}}{(1 - \hat{\mathbf{I}})^2} Cov(\hat{\mathbf{a}}, \hat{\mathbf{I}})$$

(Greene, 1997, pp. 360-363).

15. The only difference is that profits are measured as the absolute deviation ( $\pi_{it} = \Gamma_{it} - \Gamma_t$ ) from an economy wide profitability measure instead of the percentage deviation as used in this paper.

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

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17. If the industry effects are assumed to be the main determinant of profitability, then an intercept dummy should capture all of these characteristics. Twenty-seven industry dummies explain about 11 % of the total variation in the permanent profits. Nevertheless, we want to see which industry characteristics are more important than others.

18. See, Imel and Helmberger (1971), Shepherd (1972), Neumann, Böbel and Haid (1983).

19. See, Shepherd (1972), Ravenscraft (1983), and Mueller (1986).

20. Again, 10 % of variation in estimated  $\lambda$ s is explained by a set of industry dummies.

## Tables:

**Table 1: Descriptive Statistics of Rates of Return of 172 Turkish Companies, 1985-1998**

$\diamond_{it}$  is the ratio of profits before taxes to total assets.  $\rho_{it}$  is the relative (percentage) deviation of  $\diamond_{it}$  from the mean profit rate of all privately owned companies ( $\diamond_{t,Private}$ ) contained in the list of 500 largest companies in the corresponding year.  $\diamond_{t,All}$  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.

Year	$\diamond_{it}$ Profits / Total Assets (₺)			$\rho_{it} = \frac{\diamond_{it} - \diamond_{t,Private}}{\diamond_{t,Private}}$	$\diamond_{t,Private}$	$\diamond_{t,All}$
	Mean	Median	Std.Dev.	Mean	Mean	Mean
1985	16.33	9.86	27.89	81.39	9.00	9.60
1986	13.97	10.32	16.80	58.76	8.80	7.50
1987	17.23	14.19	15.88	32.53	13.00	8.80
1988	18.53	14.64	21.06	50.68	12.30	8.10
1989	17.28	14.95	15.31	41.62	12.20	7.30
1990	16.97	11.71	16.58	47.59	11.50	5.50
1991	11.43	7.81	16.99	52.42	7.50	-2.80
1992	14.20	11.86	18.33	18.37	12.00	0.30
1993	17.69	14.86	18.44	37.14	12.90	2.80
1994	19.62	16.53	20.99	29.94	15.10	5.10
1995	19.39	18.69	16.58	31.00	14.80	10.00
1996	18.62	16.82	15.32	38.92	13.40	9.80
1997	15.94	13.80	16.25	18.04	13.50	9.40
1998	10.94	8.50	16.50	38.47	7.90	5.90
1985-1998	16.30	13.19	18.49	41.20	11.71	6.24

**Table 2: Estimates of Long-Run Projected Profit Rates and the Speed of Adjustment**

The reported parameters are firm level estimates of equation (5):  $p_{it} = \alpha_i + \beta_i p_{it-1} + \gamma_i m_{it}$ . The long-run projected profit rate is calculated as  $\hat{p}_{ip} = \hat{\alpha}_i / (1 - \hat{\beta}_i)$ . The groups are formed on the basis of the average firm-level profitability in 1985 and 1986.  $t(\hat{\alpha}_i)$  and  $t\hat{\beta}_i$  are the absolute values of the t-statistics of  $\hat{\alpha}_i$  and  $\hat{\beta}_i$ .

	$\bar{p}_0$	$\hat{p}_p = \hat{\alpha}_i / (1 - \hat{\beta}_i)$	$\hat{\alpha}_i$	$t(\hat{\alpha}_i)$	$ \hat{\beta}_i $	$t\hat{\beta}_i$	$\bar{R}^2$
<b>Group 1</b>							
Mean	370.34	159.23	1.00	1.48	0.55	2.06	0.26
Median	289.74	128.61	0.61	1.39	0.51	1.99	0.24
Std. Dev.	315.29	109.90	1.13	0.91	0.24	1.35	0.20
<b>Group 2</b>							
Mean	112.37	40.38	0.24	1.35	0.62	1.51	0.17
Median	117.35	44.18	0.23	1.20	0.62	1.38	0.13
Std. Dev.	31.37	90.33	0.57	0.78	0.20	0.91	0.14
<b>Group 3</b>							
Mean	15.69	24.59	0.14	1.05	0.64	1.49	0.17
Median	16.72	13.58	0.07	1.01	0.63	1.42	0.14
Std. Dev.	18.85	70.76	0.35	0.79	0.24	1.20	0.17
<b>Group 4</b>							
Mean	-47.25	12.98	-0.06	1.14	0.61	1.74	0.21
Median	-50.84	-2.73	-0.01	1.03	0.54	1.66	0.18
Std. Dev.	14.25	133.65	0.49	0.75	0.36	1.13	0.17
<b>Group 5</b>							
Mean	-108.01	-26.03	-0.32	1.65	0.69	1.28	0.14
Median	-89.85	-49.12	-0.37	1.62	0.68	1.14	0.10
Std. Dev.	52.32	104.93	0.71	0.89	0.24	0.98	0.15
<b>Full sample</b>							
Mean	70.07	42.81	0.20	1.33	0.62	1.62	0.19
Median	14.21	28.45	0.14	1.20	0.61	1.42	0.14
Std. Dev.	221.47	120.44	0.83	0.85	0.26	1.14	0.17

**Table 3: Regressions explaining the estimated parameters of Equation (5)**

Dependent variables: Equations (1) - (4): the long-run projected profit rate; Equations (5) - (7) :  $\beta$ . Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error. Numbers in parentheses are heteroscedasticity consistent t-values. Industry Variables: INDGRW=average growth rate of industry output, IMINT=import intensity, EXINT=export intensity, CR4= four firm concentration ratio, HERF= the Herfindahl index. All industry variables are averages over the sample period except for CR4 and HERF which are averaged over 1985-1992. Company Variables: MS=company sales / industry sales, EXP=Foreign Sales / Total Sales, LEVER=Total Debt / Total Assets, GRLEV = LEVER \* GROUP (See below), SDROA=Standard deviation of the return on assets, R&D=Research and Development expenditures / Total Sales, GRW=percentage change in Sales, ASSETS=natural logarithm of total assets, Group=dummy variable indicating membership to one of the largest BGs, AGE=logarithm of number of years between a firm's foundation and 1998, LISTED=dummy variable indicating that the firm is listed at the Istanbul Stock Exchange, 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.

	Constant	INDGRW	IMINT	EXINT	CR4	HERF	MS	EXP	LEVER	GRLEV	SDROA	R&D	GRW	ASSETS	GROUP	AGE	LISTED	SH1	$\bar{R}^2$	
(1)	-0.38 (-1.72)	0.081 (0.15)	1.069 (0.56)	1.702 (0.35)	0.009 (2.52)															0.04
(2)	-0.299 (-1.48)	0.09 (0.17)	0.78 (0.41)	2.192 (0.47)		3.78 (2.84)														0.07
(3)	4.334 (1.72)						4.43E-07 (2.74)	-1.328 (-2.42)	-4.773 (-5.98)	0.715 (0.51)	4.139 (2.71)	6.885 (1.6)	0.495 (1.81)	-0.12 (-1.32)	0.349 (1.96)	0.158 (0.71)	0.264 (1.05)	0.002 (0.52)		0.55
(4)	4.469 (1.77)	0.606 (0.97)	-0.363 (-0.23)	-5.789 (-1.03)	0.008 (2.68)		2.59E-07 (2.13)	-0.739 (-1.24)	-4.669 (-5.86)	0.880 (0.60)	2.46 (1.43)	3.273 (0.73)	0.56 (2.37)	-0.142 (-1.58)	0.38 (2.36)	0.252 (1.05)	0.09 (0.372)	-0.002 (-0.42)		0.61
(5)	0.326 (4.46)	0.081 (0.72)	0.498 (1.22)	-0.307 (-0.21)	0.001 (0.84)															0.03
(6)	-0.206 (-0.278)						4.77E-08 (0.985)	0.22 (1.31)	-0.586 (-2.59)	-0.867 (-0.92)	1.112 (1.83)	0.375 (0.33)	-0.041 (-0.50)	0.013 (0.4)	0.007 (0.11)	0.12 (1.31)	-0.016 (-0.19)	0.002 (1.31)		0.18
(7)	-0.335 (-0.39)	0.344 (1.91)	1.073 (1.72)	-0.827 (-0.53)	0.001 (0.79)		-3.15E-08 (-0.76)	0.272 (1.54)	-0.425 (-1.69)	-1.211 (-1.41)	0.646 (0.87)	-1.469 (-1.09)	-0.042 (-0.43)	0.012 (0.41)	0.586 (1.41)	0.123 (1.47)	-0.054 (-0.61)	0.001 (0.44)		0.21

