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The Determinants of the Price-Cost Margins of the Manufacturing Firms in Turkey

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THE DETERMINANTS OF THE PRICE-COST MARGINS OF THE MANUFACTURING FIRMS IN TURKEY[+]

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Abstract

This study examines the determinants of the price-cost margins in the Turkish manufacturing industry spanning from 1995 to 2003. The literature on this subject points to the importance of market structure, business cycles and input costs. Utilizing panel data econometric techniques on a large number of manufacturing firms by conditioning on their firm size, age, ownership and export orientation, the study finds that there exists a marked difference among the firms' pricing behaviors according to their market share. Import penetration seems to be ineffective to reduce the price-cost margins of large, high market share and foreign partner firms, while exporting activity was observed to act as a factor to enhance competition. The analysis also suggests that price-cost margins behave pro-cyclically in general and an appreciation of the domestic currency reduces price-cost margins by way of lowering input costs.

JEL Classifications: D21; L1
Keywords: Price-cost margins, Market Structure, Import Penetration

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I. Introduction

Turkey has initiated an extensive structural adjustment program in 1980, which aimed at integrating with the international commodity and financial markets. The main motive behind this attempt has been to overcome the foreign exchange constraints led by a long period of inward looking, import substitutionist industrialization policies, which have already turned out to be unsustainable by late 1970s. In January 1980, the declaration of the "stabilization and economic liberalization program" has marked the transformation of the economy from domestic demand oriented import substitutionist industrialization (ISI), in which import competing industries have been highly protected by a strictly regulated import regime, to export-oriented industrialization strategy. During 1980s, the quantitative restrictions on imports were gradually eliminated and the fixed exchange rate regime was replaced with a flexible regime of crawling peg. The introduction of a complex system of export subsidization and tax incentives has been the main policy tool to promote exports during this period.[1] The post-1980 reform process has been, to a great extent, completed by the financial liberalization introduced in 1989, which involved the full convertibility of the Turkish lira and the removal of all controls on foreign capital flows. This process, nevertheless, led to abrupt mini boom-bust cycles throughout the 1990s, which are characterized by the short-term capital flows.

The post-1980 policy reforms have turned the Turkish economy into a completely open one, with a substantial increase in the foreign trade volume. The structure of the manufacturing industry has also undergone significant changes characterized by the increasing volume of exports. Within its new frame, the manufacturing industry was supposed to become the main sector to lead the export orientation of the economy. In addition to this, liberalizing the foreign trade regime by the elimination of the import restrictions was expected to increase competition in the commodity markets and remove excess profit margins endemic in the manufacturing industry. Nonetheless, contrary to the expectation of orthodox theory, as evidenced by a number of empirical researches, trade liberalization process in Turkey failed to increase competition, and oligopolistic mark-up pricing behavior has been maintained along with the high level of concentration in the industrial commodity markets.

[1] For a more detailed examination of the post-1980 reform period, see e.g., Ersel (1991), Uygur (1993), Köse and Yeldan (1998a and 1988b), Ekinci (1998), Metin-Özcan *et al*. (1999), Voyvoda and Yeldan (1999), Boratav *et al*. (2000).

Price-cost margins are generally considered as one of the main indicators reflecting imperfections in product markets. Among the most important of these imperfections is the lack of competition, leading to oligopolistic market structures wherein firms charge prices over their marginal costs. A number of structural variables such as firm size, concentration, export intensity, entry rates or tariff rates might be the sources of excess profits in the markets. Therefore, it is claimed that trade liberalization will enhance competitiveness and remove excess profit margins by way of reducing market power of domestic firms operating in oligopolistic markets.

Some empirical studies examining the effect of trade liberalization on price-cost margins for the Turkish manufacturing industry (Forouton (1991) and Engin *et al*. (1995)) reach the conclusion that import penetration has disciplined the domestic market by lowering costs and price-cost margins of oligopolistic firms. On the other hand, Yalçın (2000) finds that, while import penetration has led to a reduction in the price-cost margins of the overall private sector, it has led to an increase in the price-cost margins of more concentrated industries in private sector. Similarly, Metin-Özcan *et al*. (2000) find that openness had very little impact on the levels of profit margins (mark-ups) and conclude that the manufacturing industry displays a resistance to increased competition despite the import discipline brought by the post-1980 liberalization program. Moreover, profit margins of trade adjusting sectors that were classified as inward-looking in 1980, and became open by mid-1990s respond positively to openness.

The bulk of the studies examining the behavior of price-cost margins in the Turkish manufacturing have generally focused on the impacts of trade liberalization. In this study, we analyze the behavior of price-cost margins taking into account a wider range of structural variables, in addition to import penetration, such as market share, export sales, labor productivity, as well as some other variables like financial position, cyclicality, interest income and real exchange rates. The sample period covers 1995 to 2003. This period is of particular importance since 1995 marks the joining of Turkey to the customs union with the EU, which rendered the foreign trade regime even more liberal and increased competitive pressures. We also split the sample period into two periods, namely 1995-2000, and 2001-2003 to gauge the effects of the 2001 economic crisis, especially in the post-crisis period. Another purpose of the study is to shed light on the inflationary dynamics in Turkey by examining the pricing behaviors of the manufacturing firms.

This study analyzes the determinants of the manufacturing firms' price cost margins in the context of structure-performance framework by using a large panel of data on manufacturing firms compiled by the Central Bank of Turkey. The study finds that market share appears to be one of the most important determinants of the price-cost margins, as suggested by the theory. According to our econometric findings, import penetration proves to be inefficient to increase competition in the domestic commodity markets, while exporting activity improves competitiveness. Given the considerable dependence of the Turkish industrial production structure on imported inputs, real exchange rate appreciation appears to significantly lower price-cost margins through reducing input costs. Interest income that firms acquire generally affects price-cost margins positively, whereas an increase in indebtness of a firm happens to reduce price-cost margins. The econometric findings of the study suggest a negative relationship between labor productivity and price-cost margins. The remainder of the study is organized as follows: Second section summarizes some observations on the Turkish manufacturing industry during 1995-2003. In section three, we present the theoretical background, source of the data and econometric methodology. An analysis of the empirical results is presented in section four. Finally, section five concludes.

II. Some Observations on the Turkish Manufacturing Industry During 1995-2003[2]

In this section, we present some general characteristics of the Turkish manufacturing industry after 1995. Figure 1 reveals that price-cost margins of the overall manufacturing industry display a declining trend for the 1995-2003 period. This feature is more pronounced for large, high market share, exporter and foreign partner firms, whereas price-cost margins of small and young firms exhibit a more moderate decline (See Table 1 and Table 2 for the classification and distribution of the firms).

[2] The great majority of the firms sample consists of private firms. Therefore, the analysis in this study indeed reflects the properties of the private firms.

Table 1: The Classification of Firms

Small	Firms that employ less than 50 workers.
Large	Firms that employ more than 250 workers.
Young	Firms those are younger than 17 years as of 2000.
High Market Share	Firms whose sale ratio to the relevant sector's sales take place in the upper 50 percentile of the distribution.
Exporter	Firms whose export-sale ratio exceeds 25 percent over the period.
FDI	Firms those have foreign partners or owned by foreigners.

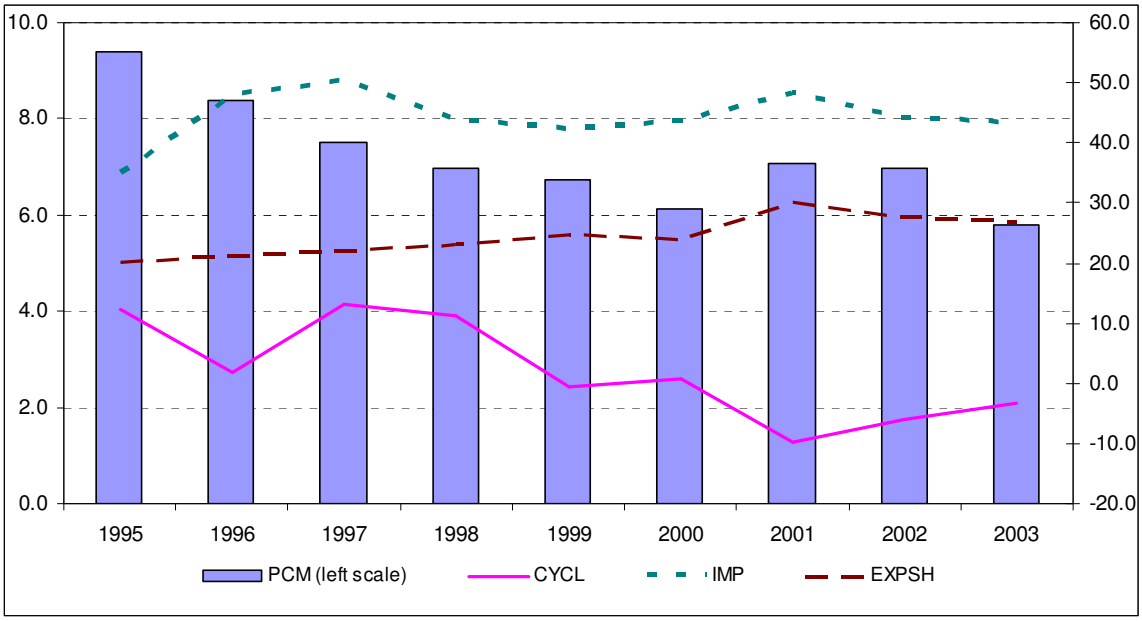
Table 2: Distribution of Firms According to their Classification

	Small	Large	Young	HMS	Exporter	FDI	PUB
Small	1021						
Large	-	393					
Young	565	104	1208				
HMS	29	199	118	391			
Exporter	211	178	445	123	836		
FDI	25	76	84	88	75	196	
PUB	-	6	2	2	-	-	9

Source: State Institute of Statistics and our own calculations.
Note: Since a firm can take place in more than one classification, the sums may not add up.

Exporter firms, on average, have relatively lower price-cost margins, with the lowest level in 2003. This observation is in contrast with Görg and Warzynski (2003), which employs a similar analytical approach as ours, finds that exporter firms have higher mark-ups than non-exporters using company level data for UK manufacturing industry. In fact, labor productivity gains especially after 2001, along with real appreciation of the domestic currency and the decline in real wages, induced exporter firms in Turkey to charge lower mark-ups, which was critical to preserve or even increase their market shares (Table A2).

Figure 1: Some Characteristics of the Manufacturing Industry



Note: PCM, CYCL, IMP and EXPSH denote price-cost margins, sectoral business cycle, import penetration rate and export share, respectively.[3]

Small firms have lower price-cost margins compared to large and high market share firms. This result confirms the positive association between market power and price-cost margins in the Turkish manufacturing industry as suggested often by the theory. Our market structure classification of small and large firms is analogous to Martins *et al.*'s (1996) fragmented and segmented sectors, which reflect relative firm size, a proxy for the existence of size advantages, such as scale economies at the firm level. Small firm category reflects an industry, which is closer to a state of perfect competition (fragmented industry), while large firm category reflects an industry where concentration remains relatively stable (segmented industry). In that sense, these observations are consistent with those of Martins *et al*. (1996), which finds that mark-ups tend to be lower in fragmented industries than in segmented industries. Our high market share firm classification, on the other hand, reflects the most concentrated firms in the manufacturing industry. These firms appear to have higher price-cost margins most probably due to their high market power (Table 3).

[3] See Table 4 in Section III.2 for the definitions of the variables.

Table 3: Price-Cost Margins

	All Firms	Small	Large	Young	HMS	Exporters	FDI
1995	9.4	8.2	12.3	7.1	12.7	9.3	13.1
1996	8.4	7.2	10.6	6.6	11.0	8.0	13.0
1997	7.5	6.7	9.8	5.9	10.1	6.7	12.2
1998	7.0	6.1	8.8	5.7	9.1	5.9	10.7
1999	6.7	6.3	7.4	5.7	8.0	6.0	9.6
2000	6.1	5.6	7.0	5.8	7.8	5.2	9.5
2001	7.1	6.2	8.8	6.4	8.9	7.4	11.3
2002	7.0	6.2	8.6	5.9	9.0	6.8	10.6
2003	5.8	5.3	7.5	5.2	7.6	4.8	9.1
1995-2003	7.2	6.4	9.0	6.0	9.4	6.7	11.0

Source: State Institute of Statistics and our own calculations

Among firm groups, foreign partner firms emerge to have the highest price-cost margins over the 1995-2003 period. They also have high market shares (Table A2). This observation implies that, multinational firms generally tend to build partnership with highly concentrated domestic firms and/or domestic firms with high market power prefer to merge with a foreign firm and emerge as the exclusive retailer of a specific good in the domestic market. Actually, Table A3 shows that foreign partner firms that are located in the industry have rather high import penetration rates.

Young firms represent similarities with small firms in terms of the behavior of their price-cost margins and market shares. The fact that young firms tend to have relatively lower price-cost margins implies that they avoid losing their market shares against new entrants into the markets. Relatively low levels of import penetration and export share levels of young firms indicate that the markets in which they operate are quite competitive (Tables A3 and A5). In addition, young firms' low level of labor productivity occurs as one of the factors that constrains higher price-cost margins (Table A6).

All firm groups seem to have reduced their productions considerably following the deep economic recession that occurred in February 2001 (Table A1). That is the main reason that lies behind the marked increase in price-cost margins in 2001, since we define price-cost margins as the ratio of gross profit of a firm to its net sales. By 2003, although the negative output gap is getting narrower, the whole manufacturing industry continues to operate below potential output. While the extent of cyclicality changes according to different classes of firms, the cyclical behavior is quite prevalent across all sectors. The reaction of foreign partner firms to business

cycle is the most acute, whereas exporter firms respond relatively more moderately. This phenomenon reflects the differences in the production destinations of these two groups of firms; foreign partner firms come across more domestic market oriented, while exporter firms can more effectively protect themselves from the negative impacts of economic downturns.

As for the interest income, foreign partner firms represent the most appealing features in the sense that they have the highest interest income throughout 1995-2003 (Table A4). This situation is simply a result of the fact that these firms come up as the major holders of high interest bearing assets, specifically government borrowing securities. The same observation applies to large and high market share firms as well. The rise in interest income is more salient especially during recession years across all groups of firms, when the domestic borrowing interest rates reached to relatively high levels. These observations suggest that a large fraction of manufacturing firms (especially those who have high market power) in Turkey tend to invest in interest bearing assets including government domestic borrowing securities and earn considerable interest income.

It is observed that high market share firms along with foreign partner firms have the highest labor productivity during the 1995-2003 period (Table A6). This is mostly due to the fact that high market share firms take advantage of economies of scale. As for the foreign partner firms, greater access to knowledge about technology, more intense R&D activities, and management techniques as well as capital enables these firms to reach to higher level of labor productivity. Hallward-Driemeier *et al*. (2002) also find that, firms that are foreign-owned or particularly those controlled by foreign owners in East Asia tend to have higher productivity compared to domestic firms – even after controlling for other variables.

III. Theoretical Background, Data and Econometric Methodology

Starting with Bain (1941), many analytical and empirical studies have been carried out to solve the relationship between market structure and performance (seller concentration and profitability). Bain has tested the structure-conduct-performance relationship empirically by the hypothesis, which accepts the systematic positive relationship between seller concentration and excess profits in the long run. He has suggested that concentration and entry barriers together serve to raise the profitability of the large firms. Entry barriers, economies of scale, absolute capital requirements and product differentiation separate the firm within the industry from

potential entrants outside the industry. Many empirical studies that were carried out after Bain have confirmed the hypothesis that higher seller concentration results in higher excess profit rates, which are accepted as indicator of market power (Martin (1993)).

III. 1. Theoretical Background

Suppose that market consists of oligopolistic firms and these firms exhibit Cournot behavior. It is assumed that a firm does not change its output initially in response to an output change by a rival firm. In this case, the firm maximizes its profit with respect to its output assuming the rival firm will not change its output level. The profit of oligopolistic firm is defined as follows:

$$\Pi_i = pQ_i - c_iQ_i, \qquad (1)$$

where Q_i, c_i and p indicate the output of firm i, variable cost and the market price, respectively, and the market price is a function of total outputs of n firms.

$$p = f(Q_1+Q_2+....+Q_n) \qquad (2)$$

Maximizing (1) with respect to Q_i will give the equilibrium condition for the firm i,

$$\delta\Pi_i/\delta Q_i = 0, \qquad (3)$$

With some manipulations the following equation is obtained:

$$L_i = (p-\mu_i)/p = (1/\varepsilon_d)Q_i/Q \qquad (4)$$

Averaging over n firms both sides of the equation (4), the industry level equation is obtained in the following form:

$$L = (p-\mu)/p = H_d/\varepsilon_d \qquad (5)$$

where L and L_i indicate the Lerner index of the monopoly power of the whole industry and of the firm i, respectively, and μ, μ_i, H_d and ε_d indicate the marginal cost of the industry, marginal cost of firm i, Herfindahl index of concentration, and domestic price elasticity of demand, respectively. H_d indicates the sum of the squares of the share of firms in the industry output.

Assume that the average cost is equal to the marginal cost, then Lerner index in equation (5) would be transformed to a profitability index, namely price-cost margin. In this framework, equation (5) confirms the price-cost margin has a positive relationship with concentration ratio, H_d, and a negative relationship with the price elasticity of domestic demand. Note that this relationship is based on the Cournot assumption.

Empirical studies about the structure-performance relationship suggested that firms are able to exercise some market power by means of product differentiation and other entry barriers. In this case, the market concentration may be considered as a measure of domestic competition, but it does not measure the actual competition that is affected by foreign trade.

The role of monopolistic and imperfect competitive market structure in terms of foreign trade has been recently discussed in the context of the theory of international trade. Increase in the share of the multinational firms in world trade and in the supply of the differentiated goods and services which are produced under the conditions of decreasing costs, externalities and the imperfect competitive structure, have altered the scope of the trade theory substantially (Helpman and Krugman (1986)).

It is commonly claimed that foreign trade liberalization increases the welfare of a country more under imperfectly competitive domestic market because, it reduces the distortions created in imperfect competitive markets, expands market size, lowers the average cost by constructing efficient-size firms and increases the division of labor in the context of the product differentiation and economies of scale (Helpman and Krugman (1986)).

In monopoly models, the country liberalizing trade is assumed to be a small one that is price-taker and thus faces with a perfectly elastic import supply. In this case, the validity of the proposition that import competition generally limits market power depends on domestic costs. If the domestic

marginal cost is sufficiently low, the monopoly could use its monopoly power by charging a higher price that is equal or less than the import price including tariff and transportation cost and additional tariff increases the surplus of the monopolist in this situation and as a result, foreign trade would disappear completely. On the contrary, if the domestic costs are sufficiently high, then monopoly will adopt the same behavior with the competitive firms. And, if the domestic marginal cost is not extremely high and low, the monopoly can only exploit limited market power (Jacquemin (1982)).

In the oligopoly model that has been suggested by Jacquemin (1982), it is assumed that products are homogeneous and firms exhibit Cournot behavior. Also, it is supposed that the import supply is perfectly inelastic, that is, the import supply does not respond to domestic prices. Under these conditions, the gross profit of oligopolistic firm i is formulated as follows:

$$\Pi_i = f(Q+M)\, Q_i - c_i Q_i - F_i \qquad (6)$$

where Q, M and F_i indicate the total output, total import and fixed cost of firm i respectively and domestic price, p is formulated as:

$$p = f(Q+M), \qquad (7)$$

By maximizing equation (6) with respect to Q_i, the equilibrium condition for firm i is obtained:

$$\delta\Pi_i/\delta Q_i = 0, \qquad (8)$$

after some transformations, the following equation is obtained:

$$L_i = (p-\mu_i)/p = (1/\varepsilon_d).(Q_i/Q).(Q/(Q+M)) \qquad (9)$$

and averaging over n firms of both sides of equation (9), the industry level equation is obtained as follows:

$$L = (p-\mu)/p = (H_d/\varepsilon_d).(1-t_m) \qquad (10)$$

where t_m is the import penetration rate (M/(Q+M).

Assume that the average cost equals to the marginal cost, μ, then Lerner index in equation (10) transforms to the gross return on domestic sale that is the price-cost margin and equation (10) indicates that there is a negative relationship between price-cost margins and domestic demand elasticity that is considered as an indicator of potential competition and import penetration rate which is accepted commonly as an indicator of the actual import competition, and a positive relation between the price-cost margin and concentration ratio, namely Herfindahl index.

If import supply is not perfectly inelastic and there exists still a Cournot behavior among domestic firms, then foreign firms that perceive domestic demand as being perfectly elastic are the potential competitors of domestic oligopolistic firms. Then, equation (10) is transformed to the following form:

$$L = (p-\mu)/p = (H_d\,(1-t_m))/(\varepsilon_d+\gamma_s.t_m) \qquad (11)$$

where γ_s is the price elasticity of imports.

In this case, import penetration interacts also with the price elasticity of imports in reducing the price-cost margin. In other words, high price elasticity of the imports enhances the impact of imports on price-cost margins. On the other hand, if the price of imports is perfectly elastic (i.e. if the domestic industry is price-taker in the international markets), the price-cost margins will disappear completely. In this framework, the price elasticity of imports is also accepted as a measure of potential import competition (Jacquemin (1982)).

III. 2. The Data

We use around four thousand manufacturing firms' balance sheets and income statements that have been gathered by the Central bank of the Republic of Turkey. The analysis covers the 1995-2003 period. The data set includes a large panel of information on assets and liabilities,

employment and sales, profits in details. We merge this data set with four-digit *ISIC (International Standard Industrial Classification)* industry level statistics produced by the State Institute of Statistics to use industry level variables (i.e., concentration ratio, import share etc.) that we need but do not take place in our firm level data set.

The definitions of the variables that we use in the econometric analysis are as follows:

Table 4: Definitions of the Variables

PCM_{it}	Firm level price-cost margin; defined as the ratio of pre-tax profit to its net sales (percent).
$CYCL_{jt}$	Cyclicality; defined as a measure of the cycle based on the industrial output gap, which relates actual and trend sectoral output (percentage deviation from trend).[4]
$MMSH_{jt}$	Market share; defined as the ratio of the amount of a specific firm's sales to the whole sales of the relevant sector (per ten thousands).
IMP_{jt}	Import penetration; defined as the ratio of a sector's imports to this sector's amount of production (percent).
$INTINCS_{it}$	Interest income; defined as the ratio of a firm's interest income to its sales (percent).
$EXPSH_{it}$	Export share; defined as the ratio of a specific firm's exports to its sales (percent).
$EMPPR_{it}$	Firm level labor productivity; defined as the ratio of a firm's output to its employment (deflated by a thousand).
$LEVER_{it}$	Firm leverage rate; defined as the ratio of total debt to total assets (percent) .
$RDKUF_t$	Real exchange rate, deflated by producer prices index (1995 base year).
YDUM	Year dummies to control time varying unobserved effects.

Note: *i, j* and *t* denote firm, sector and time, respectively.

[4] Trend output for each sector was computed by using a Hodrick-Prescott filter to the output series of the relevant sector. The weighting factor for the filter was set at 100 (Martins *et al*. (1996)).

III. 3. Econometric Methodology

We employ panel data methods to analyze the determinants of price-cost margins in the Turkish manufacturing industry. Panel data methods allow us to capture firm heterogeneity over time. Firm specific effects are omitted under the pooled ordinary least square (OLS) estimation which leads to biased estimates if unobservable individual specific effects are correlated with the explanatory variables in the model.

A standard model of panel data is specified in the following form:

$$y_{it}=X_{it}\beta+\lambda_t+\alpha_i+\varepsilon_{it} \qquad (12)$$

where i = 1,2,…., *N* refers to a cross section unit (firms in this study), *t* = 1,2,…..,*T* refers to time period. y_{it} and X_{it} denote dependent variable and the vector of non-stochastic explanatory variables for the firm *i* and year *t*, respectively. λ_t represents firm-invariant time-specific effects, α_i is time invariant unobservable firm specific effects and ε_{it} are the disturbance terms that vary with time and across firms. Restrictive assumptions on the nature of firm specific-effects lead to various panel data models. The nature of the data and the specification of the model are important for the selection of an estimation method. There are basically two main panel data models, namely fixed effects and random effects.

Under the random effects specification, the Generalised Least Square estimates are asymptotically efficient. On the other hand, the fixed effects estimates, which are more sensitive to the errors in variables are unbiased and consistent but not efficient. Unlike the fixed effects model, the estimates for random effects model will not be consistent if the individual effects are correlated with the independent variables. We rejected the hypothesis of no systematic difference between coefficients obtained from the random effects and fixed effects models by using the Hausman test. This means that the random effects estimates are efficient but not consistent; therefore we use the method that gives consistent results which is the fixed effects model. Only results obtained from fixed effects estimations are interpreted in the next section, and reported in Appendix B.

In this study, an econometric structure-performance model of the Turkish manufacturing industry is constructed to examine the determinants of price-cost margins *(PCM)* in the Turkish manufacturing industry during the 1995-2003 period. In this context, the following model is estimated by utilizing fixed effects panel data method.

$$PCM = f(CYCL, MMSH, IMP, INTINCS, EXPSH, EMPPR, LEVER, RDKUF, YDUM) \qquad (13)$$

The model includes both firm, i and time, t dimensions. *CYCL* captures the effects of business cycles on price-cost margins. *MMSH*, *IMP* and *EXPSH* are the variables that reflect market structure and openness of the firms. *LEVER* and *INTINCS* are firm specific variables that reflect financial position of the firms. *EMPPR* presents the productivity of labor. *RDKUF* is the real effective exchange rate and captures the non-labor cost component of a firm. *YDUM* denotes the year dummies, which are introduced into the model to control for time varying unobserved effects.

The model in equation (13) has been extended to capture firm heterogeneity concerning the sample. In this framework, we use interaction terms along with the explanatory variables defined above to identify impacts of various firm types defined below. The model is defined as follows:

$$\begin{aligned} PCM = f(&CYCL, CYCL*TYPE, MMSH, MMSH*TYPE, IMP, IMP*TYPE, INTINCS, \\ &INTINCS*TYPE, EXPSH, EXPSH*TYPE, EMPPR, EMPPR*TYPE, \\ &LEVER, LEVER\ *TYPE, RDKUF, RDKUF\ *TYPE, YDUM) \end{aligned} \qquad (14)$$

Firm type dummies *(TYPE)* consist of eight different binary variables reflecting seven different firm characteristics i.e. small, large, young, high market share, export oriented, foreign partner and public firms. We could use only one dummy for each firm's characteristic, namely the firm size to carry out our regressions. Instead, we used two dummies for each firm type to capture the reactions of firms in the tails of the distribution. For example, for the firm size, we carried out estimations by using interactions for both small and large firms as we did not intend to measure the reactions of the medium sized firms. This method enables us to identify the reaction of firms in the tails of firm distribution for a particular type of firm.

IV. Analysis of Econometric Results

There are a number of researches analyzing the evolution of profit margins (or mark-ups) for the Turkish manufacturing industry (Özmucur (1992), Şahinkaya (1993), Boratav *et al*. (1994), Köse and Yeldan (1998b), Yalçın (2000)). It is observed that a large fraction of manufacturing industry consists of monopolistic or oligopolistic market structures, and mark-up pricing behavior is prevalent across manufacturing firms. These analyses suggest that, contrary to the prognostications of the orthodox theory, trade liberalization did not in fact lead to a higher level competition and change the oligopolistic structure of the manufacturing industry. In this section, we present an analysis of the econometric results, which are tabulated in Appendix B. Our panel data regressions consists of a number of classifications of firms (presented in Table 1), which also reflect the market structure of the manufacturing industry, and enable us to examine the determinants of price-cost margins. More specifically, we analyze the effects of some structural features of the manufacturing industry such as import penetration, market share, export sales, labor productivity, and some other variables such as cyclicality (business cycles), interest income, and real exchange rate on profit margins spanning from 1995 to 2003.

We begin our analysis with the examination of the cyclical behavior of profit margins in the Turkish manufacturing industry. Numerous empirical studies provide evidence that a considerable part of the price increases comes from the mark-up pricing behavior. In this sense, it is of importance to pinpoint the behavior of profit margins over the business cycles to envisage the behavior of prices in the short to medium run. Nevertheless, theoretical literature does not provide a clear-cut answer as to how mark-ups behave over the business cycles. Then, whether the mark-up is counter-cyclical or pro-cyclical turns out to be an empirical question. Martins *et al*. (1996) find counter-cyclical mark-ups in most cases of the sector-by-sector analysis for 14 OECD countries, whereas Small (1997) finds pro-cyclical mark-ups for UK manufacturing industry and services, which suggests that price pressures increase during expansion periods and decrease during recessions.

According to our econometric analysis, price-cost margins in the Turkish manufacturing industry are in general pro-cyclical. But the price-cost margins of small, young and exporter firms behave

rather in a counter-cyclical fashion (Tables B1-B4 in Appendix B).[5] These results suggest that, given their small market shares, small, exporter and young firms refrain increasing their prices during economic upturns with the concern to further lose their market shares. In addition, unlike large and high market share firms, which are more likely to hoard labor during the economic downturn, small and young firms may encounter additional labor cost caused by hiring new workers during economic recovery (Cantor (1990) and Sharpe (1994)). Our findings are, in general, consistent with Onaran and Yentürk (2003), which finds that profit margins behave pro-cyclically, while in contrast with Ceritoğlu (2002), which finds counter-cyclical mark-ups for the Turkish manufacturing industry. The fact that price-cost margins behave strong pro-cyclically for large and high market share firms leads us to the conclusion that, during expansionary periods, pricing behavior of the manufacturing firms in general occurs as a significant source of inflationary process in Turkey.

The econometric findings, in line with the structural performance theory, suggest that price-cost margins in general respond positively to an enlargement in the market share. However, when we consider the interaction terms that are introduced into the model to capture the effects of the variables on various firm groups, we face a somewhat mixed picture; an increase in the market share happens to affect firms' price-cost margins negatively except for the young, exporter firms, and to a large extent small firms. The general conclusion arising from these findings is that, highly concentrated firms still have room to raise their profit margins by increasing their market shares. On the other, small, young and exporter firms seem to have no room to enlarge their market shares in order to raise profit margins. Actually, this outcome mostly drives from the fact that these firms operate relatively in a more competitive fashion.

Sectoral import penetration rates seem to have created a positive impact on price-cost margins of the manufacturing firms in general when interaction terms are not considered. When we look at interaction terms, we observe that, by reducing the price-cost margins, imports have created a market disciplining effect only for small and young firms especially for the 2001-2003 period. On the contrary, this effect has been positive for large, exporter and foreign partner firms. Moreover, it is seen that import penetration has positively affected the price-cost margins of high market

[5] We add up the coefficients of relevant variables and their interaction terms in order to assess the total impact of a variable on various firm groups.

share firms, especially throughout the 2001-2003 period. These results are not consistent with the import discipline hypothesis, since under the pressure of imports, it is expected that price-cost margins would decrease especially for the firms that have market power. Nonetheless, this phenomenon might be the result of mergers among domestic and foreign firms in highly concentrated markets. Actually these three groups of firms, namely large, high market share and foreign partner firms occur to be the most concentrated. As a result, contrary to the expectations of the orthodox theory, these observations, similar to the findings of Yalçın (2000), Metin-Özcan *et al*. (2000) and Onaran and Yentürk (2003), suggest that trade liberalization in Turkey has not created a competitive environment enough to reduce the overall price-cost margins in the manufacturing industry.

The interest income share that the firms acquire generally happens to have a positive effect on the price-cost margins over 1995-2003. This effect is the highest for high market share and large firms throughout 1995-2003 as their respective interaction terms are significantly positive. This fact suggests that, especially highly concentrated firms have considerably invested in interest bearing assets, particularly government domestic borrowing securities, during this period when the average domestic borrowing interest rates stood at over 100 percent. As a result, we observe that, interest incomes have constituted a significant source of the profits of highly concentrated firms and helped them to maintain high levels of price-cost margins in the second half of 1990s thanks to their market power. On the other hand, we see a slightly different picture for small, young, exporter and foreign partner firms that have also positive coefficients in general but the impact is much more smaller than that of the large and high market share firms, given the negative coefficients estimated for their interaction terms. This observation has the implication that these groups of firms have invested to a lesser extent in interest bearing assets during this period, or, alternatively, given their smaller market shares, they tended to make use of their interest incomes to charge lower price-cost margins in order to enlarge their market shares through price competition. When we consider the interaction terms for firm groups, the effect of interest income on price-cost margins turns out to be statistically insignificant for the majority of the groups of firms in the 2001-2003 period when the interest rates on government bonds have declined considerably compared to 1995-2000. This observation indicates that the decline in interest rates after 2001 has directed almost all groups of manufacturing firms to invest in their

normal activity of production rather than investing in high interest yielding government securities.

In general, theoretical analysis regarding the relationship between exports and profitability are ambiguous. If the exporter country is price-taker and the demand for its exports is perfectly elastic so that the export price of a good is equal to its world price, and the exporter cannot discriminate price among domestic and foreign markets, then exporting activity might increase the competitiveness of the domestic market by propelling non-competitive sectors to behave in a competitive way (Caves (1985)). The effect of an increase in the exporting activity is found to be significantly negative on price-cost margins of large, high market share and foreign partner firms during the period of 1995-2003. Given that these firm groups are more concentrated, exporting activity appears to increase the competitiveness in the domestic market by way of reducing price-cost margins of these firms.

Our econometric analysis, in general, suggests a negative impact of labor productivity on the price-cost margins during the period of 1995-2003. Small and young firms have decreased their price-cost margins throughout 1995-2000 in response to an improvement in their labor productivities. Exporter firms, as well as foreign partner firms could also take advantage of labor productivity gains to reduce their profit margins and increase their competitiveness. Moreover, high market share firms' price-cost margins also seem to be affected negatively from labor productivity. We are confronted with mixed results for large firms; while these firms increase their price-cost margins in the period of 1995-2000 in response to productivity gains, an inverse effect arises during the 2001-2003 period. This outcome seems mostly due to the competitive pressures coming from other groups of firms, especially during 2001-2003 when significant labor productivity increases were prevalent across almost all manufacturing firms.

Leverage ratio, which reflects the indebtedness and the financial position of a firm, happens to decrease the price-cost margins of all groups of firms in general, but the impact is less pronounced for small and young firms. These results indicate that firms in general sacrifice part of their profits to meet their obligations without encountering any financial distress. This result

also suggests that firms abstain to lose their market shares further by charging higher price-cost margins when they are highly leveraged.[6]

Real appreciation of the domestic currency, in general, leads to a decline in the price-cost margins. This effect is more pronounced in the 1995-2000 period, in which the real exchange rate has been generally overvalued. Especially, large and high market share firms' price-cost margins exhibit a strong negative response to real appreciation during this period. On the other hand, the coefficients of the interaction terms for small and young firms are positive, which implies that the negative impact of real appreciation in domestic currency is less vigorous on the price-cost margins of these group of firms. The effect of real appreciation on foreign partner firms' price-cost margins appears to be also negative. Given the high share of imported intermediate and capital goods in industrial production in Turkey, which reflects a significant level of dependency on imported inputs, foreign exchange occurs as one of the most important constituents of the non-labor costs. Therefore, an appreciation of domestic currency reduces the real non-labor costs through lowering input costs, which allows the firms to charge lower profit margins. The fact that we find a negative relationship between real appreciation and price-cost margins also for the exporter firms suggests that competitiveness losses arising from real appreciation is outweighed by the reductions in imported input costs for trade-oriented firms. These findings are consistent with those of Onaran and Yentürk (2003), which finds a negative relationship between real exchange rate and mark-up rates in the Turkish manufacturing industry for the period of 1980 to 1995 and that the decrease in competitiveness has been more than offset by lower real non-lobar inputs during the 1989-1993 period.

V. Conclusion

In this study, we analyzed the determinants of the price-cost margins in the Turkish manufacturing industry during 1995-2003, using panel data econometric techniques by conditioning on firms' market size, age, financial position, ownership and export shares. The results of the empirical analysis show that, import penetration has not produced the expected competitive effects in the domestic commodity markets for large, high market share and foreign

[6] It is evident that the rise in a firm's indebtness reduces the price-cost margins of that firm via the increase in interest payments. In that respect, our finding is consistent with this fact, since the definition of price-cost margin in this study excludes interest payments. Nevertheless, the aim of the analysis herein is to control the effect of various firm groups' financial positions (leverage) on these firms' price-cost margins.

partner firms. In fact, this result implies the presence of a possible implicit collusion among domestic and foreign firms in more concentrated industries, or, alternatively, importers and domestic manufacturing firms may the parts of same firms. Actually, the fact that the high market share and foreign partner firms have the highest rates of import penetration, respectively lends support to the above-mentioned arguments for the Turkish case.

In most of the cases in our analysis, we found significant differences in the behaviors of price-cost margins of the firms according to their market size. More specifically, pricing behavior differs substantially across firms as to whether a firm has market power or not. These differences are revealed evidently in the classification of small and large firms in our analysis, which in fact represents fragmented and segmented sectors, respectively. We observe that, small firms' price-cost margins behave counter-cyclically while large firms' are pro-cyclical. We found that interest income, in general, has a positive impact on price-cost margins of all groups of firms, but less vigorous for small, exporter and young firms. Labor productivity also negatively affects the price-cost margins of small firms, while there is, in general, a positive impact for large firms. On the other hand, the effect of exporting activity was found to be negative for high market power firms, but positive for small firms. Real appreciation of domestic currency generally reduces the price-cost margins of all firm groups, but the impact on small firms is less pronounced. A general conclusion arising from these observations is that the price-cost margins of small and large firms behave fairly in the opposite direction in response to the changes in some specific variables. As a result, given the high level of concentration in the industrial commodity markets in Turkey, market size appears to be the most important determinant of the price-cost margins in the manufacturing industry.

Appendix A: Some Characteristics of the Turkish Manufacturing Industry According to Market Taxonomy

Table A1: Cyclicality

	Small	Large	Young	HMS	Exporters	FDI
1995	11.8	12.2	13.4	9.6	14.7	13.2
1996	0.0	2.7	2.4	3.3	4.6	3.4
1997	12.2	14.3	12.6	11.3	14.2	11.8
1998	11.1	10.9	11.5	11.2	10.3	9.7
1999	0.9	-0.7	-0.8	2.8	-5.0	-1.4
2000	1.4	0.5	-0.8	4.8	-2.6	1.8
2001	-9.6	-10.5	-8.1	-10.7	-7.6	-12.0
2002	-5.9	-5.5	-5.1	-5.8	-4.3	-6.5
2003	-3.5	-2.9	-3.1	-5.0	-2.5	-2.3
1995-2003	2.2	2.6	2.5	2.7	2.5	2.2

Source: State Institute of Statistics and our own calculations

Table A2: Market Share

	Small	Large	Young	HMS	Exporters	FDI
1995	1.2	10.5	1.1	12.4	4.0	10.9
1996	1.2	10.6	1.4	12.4	4.0	11.4
1997	1.2	10.9	1.5	12.6	4.1	12.1
1998	1.2	11.2	1.7	13.0	4.4	12.6
1999	1.4	12.4	2.0	14.7	5.0	14.2
2000	1.0	11.0	1.7	12.6	4.3	13.0
2001	1.3	13.8	2.2	16.0	5.9	14.7
2002	1.4	12.1	2.1	14.2	5.2	13.5
2003	1.4	12.3	2.2	14.5	5.3	14.8
1995-2003	1.2	11.6	1.8	13.5	4.7	13.0

Source: State Institute of Statistics and our own calculations

Table A3: Import Penetration

	Small	Large	Young	HMS	Exporters	FDI
1995	42.4	27.5	27.7	54.9	25.8	37.6
1996	56.7	40.6	39.7	71.7	33.0	50.6
1997	59.6	40.9	41.3	84.1	32.3	54.1
1998	50.2	37.9	36.1	63.3	29.6	49.1
1999	48.7	36.2	33.6	64.5	27.1	48.0
2000	50.0	39.3	36.4	60.0	31.9	52.0
2001	56.4	39.6	39.9	73.0	33.9	50.9
2002	50.4	37.9	37.7	64.6	31.3	46.0
2003	48.8	38.9	37.9	65.8	29.5	47.1
1995-2003	51.5	37.7	36.7	66.9	30.5	48.4

Source: State Institute of Statistics and our own calculations

Table A4: Interest Income

	Small	Large	Young	HMS	Exporters	FDI
1995	0.4	1.6	0.4	1.6	0.8	2.0
1996	0.9	1.5	0.6	1.6	1.1	3.0
1997	0.5	1.5	0.7	1.3	1.0	1.9
1998	0.5	2.0	0.8	1.7	1.1	1.8
1999	1.0	2.5	1.2	2.4	1.8	2.5
2000	0.6	1.7	0.7	1.5	1.0	1.8
2001	1.4	2.3	1.0	2.7	1.5	2.6
2002	0.8	1.3	0.4	1.5	0.7	1.1
2003	0.4	1.0	0.5	1.1	0.6	1.0
1995-2003	0.7	1.7	0.7	1.7	1.1	2.0

Source: State Institute of Statistics and our own calculations

Table A5: Export Share

	Small	Large	Young	HMS	Exporters	FDI
1995	11.5	27.9	23.4	21.0	53.3	26.2
1996	11.8	29.2	24.2	22.3	55.4	28.7
1997	12.9	29.7	25.0	22.8	56.5	29.1
1998	13.5	31.5	26.2	24.8	59.5	28.9
1999	13.9	33.8	27.5	26.2	62.5	30.7
2000	13.9	32.0	26.7	25.3	59.6	29.6
2001	16.8	42.1	32.2	34.8	66.7	38.9
2002	16.5	37.1	29.2	31.1	62.7	34.8
2003	16.9	35.6	27.8	30.1	59.9	33.7
1995-2003	14.1	33.0	26.9	26.3	59.5	31.0

Source: State Institute of Statistics and our own calculations

Table A6: Labor Productivity

	Small	Large	Young	HMS	Exporters	FDI
1995	3.2	3.4	2.9	5.0	3.4	5.1
1996	3.4	3.3	2.6	5.2	2.9	4.7
1997	3.3	3.7	2.6	5.7	3.1	4.8
1998	2.9	3.7	2.6	5.7	2.8	5.5
1999	3.0	3.6	2.8	5.4	2.8	5.1
2000	3.0	3.7	2.9	5.7	3.1	5.7
2001	4.9	4.0	3.6	6.7	4.1	7.3
2002	3.1	4.2	2.9	6.4	3.3	6.0
2003	3.1	3.7	2.8	5.5	2.7	5.9
1995-2003	3.3	3.7	2.9	5.7	3.1	5.5

Source: State Institute of Statistics and our own calculations

Appendix B: Estimation Results

Table B1: Estimation Results with No Interaction Variables and for Small Firms

	No Interaction Variables			Small Firms		
	1995-2003	**1995-2000**	**2001-2003**	**1995-2003**	**1995-2000**	**2001-2003**
CYCL	0.013***	0.006	0.006	0.019***	0.006	0.024*
	(3.38)	(1.31)	(0.53)	(4.10)	(1.19)	(1.67)
MMSH	0.071***	0.149***	0.212***	0.078***	0.150***	0.201***
	(3.36)	(4.21)	(3.29)	(3.67)	(4.22)	(3.05)
IMP	0.006***	0.006***	0.007**	0.011***	0.009***	0.024***
	(3.69)	(2.80)	(2.27)	(4.56)	(3.16)	(5.01)
INTINCS	0.354***	0.355***	0.309***	0.463***	0.448***	0.470***
	(31.14)	(24.39)	(14.50)	(27.77)	(23.74)	(9.65)
EXPSH	0.006**	0.007	0.007	0.002	0.004	-0.001
	(2.00)	(1.62)	(0.96)	(0.41)	(0.70)	(0.12)
EMPPR	-0.011**	-0.016	-0.007	0.008	0.057***	-0.005
	(2.22)	(1.34)	(1.08)	(0.89)	(3.00)	(0.23)
LEVER	-0.064***	-0.065***	-0.062***	-0.077***	-0.075***	-0.077***
	(22.86)	(17.38)	(10.00)	(20.57)	(15.22)	(8.46)
RDKUF	-0.143***	-0.248***	-0.047***	-0.154***	-0.287***	-0.050***
	(21.36)	(20.77)	(7.99)	(20.59)	(21.00)	(6.44)
CYCL*TYPE	–	–	–	-0.013**	-0.003	-0.033
				(1.98)	(0.36)	(1.43)
MMSH*TYPE	–	–	–	-0.326*	0.156	0.444
				(1.87)	(0.61)	(1.12)
IMP*TYPE	–	–	–	-0.008**	-0.006	-0.027***
				(2.51)	(1.43)	(4.40)
INTINCS*TYPE	–	–	–	-0.205***	-0.228***	-0.181***
				(9.00)	(7.73)	(3.30)
EXPSH*TYPE	–	–	–	0.014**	0.009	0.020
				(2.15)	(1.00)	(1.31)
EMPPR*TYPE	–	–	–	-0.028***	-0.127***	-0.004
				(2.61)	(5.10)	(0.17)
LEVER*TYPE	–	–	–	0.029***	0.024***	0.026**
				(5.22)	(3.24)	(2.05)
RDKUF*TYPE	–	–	–	0.029***	0.111***	0.006
				(3.06)	(5.35)	(0.49)
Constant	25.949***	36.273***	13.254***	25.874***	36.085***	13.173***
	(32.40)	(27.70)	(15.32)	(32.33)	(27.55)	(15.06)
Observations	23988	16248	7740	23988	16248	7740
No. of Firms	5494	5041	3396	5494	5041	3396
R-squared	0.11	0.12	0.09	0.11	0.12	0.10

Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table B2: Estimation Results for Large Firms and Young Firms

	Large Firms			Young Firms		
	1995-2003	**1995-2000**	**2001-2003**	**1995-2003**	**1995-2000**	**2001-2003**
CYCL	0.008*	0.001	-0.004	0.026***	0.011**	0.031**
	(1.92)	(0.21)	(0.36)	(5.36)	(2.07)	(2.05)
CYCL*TYPE	0.037***	0.028***	0.058*	-0.030***	-0.010	-0.065***
	(4.20)	(2.59)	(1.72)	(4.64)	(1.35)	(2.89)
MMSH	0.176***	0.405***	0.642***	0.047**	0.105***	0.361***
	(3.29)	(4.77)	(4.64)	(2.04)	(2.74)	(3.91)
MMSH*TYPE	-0.106*	-0.294***	-0.445***	0.107**	0.165*	-0.279**
	(1.83)	(3.16)	(2.80)	(1.98)	(1.71)	(2.16)
IMP	0.006***	0.005**	0.006**	0.011***	0.009***	0.012***
	(3.22)	(2.54)	(1.99)	(5.43)	(3.70)	(3.45)
IMP*TYPE	0.008	0.002	0.020	-0.015***	-0.009**	-0.018***
	(1.26)	(0.24)	(1.52)	(4.28)	(2.27)	(2.85)
INTINCS	0.320***	0.312***	0.317***	0.385***	0.416***	0.314***
	(26.01)	(19.47)	(14.35)	(29.82)	(25.51)	(14.07)
INTINCS*TYPE	0.227***	0.245***	0.101	-0.138***	-0.285***	-0.060
	(7.20)	(6.56)	(1.13)	(5.12)	(8.03)	(0.77)
EXPSH	0.008***	0.008*	0.011	0.000	0.002	-0.009
	(2.59)	(1.81)	(1.45)	(0.08)	(0.32)	(0.75)
EXPSH*TYPE	-0.023***	-0.018	-0.044*	0.011*	0.010	0.026*
	(2.61)	(1.56)	(1.69)	(1.88)	(1.16)	(1.74)
EMPPR	-0.018***	-0.045***	-0.006	-0.005	0.020	-0.005
	(3.09)	(3.48)	(0.91)	(0.75)	(1.12)	(0.69)
EMPPR*TYPE	0.026**	0.208***	-0.263***	-0.018*	-0.061**	-0.013
	(2.01)	(5.22)	(3.99)	(1.66)	(2.52)	(0.55)
LEVER	-0.057***	-0.058***	-0.059***	-0.066***	-0.066***	-0.056***
	(19.12)	(14.81)	(9.13)	(17.45)	(13.65)	(6.06)
LEVER*TYPE	-0.067***	-0.055***	-0.047**	0.005	0.005	-0.009
	(7.55)	(4.66)	(2.13)	(0.82)	(0.67)	(0.72)
RDKUF	-0.139***	-0.223***	-0.046***	-0.154***	-0.301***	-0.042***
	(19.73)	(17.64)	(7.34)	(19.82)	(21.62)	(4.80)
RDKUF*TYPE	-0.033***	-0.152***	-0.000	0.027***	0.147***	-0.007
	(2.58)	(5.91)	(0.00)	(2.92)	(7.23)	(0.64)
Constant	25.935***	36.046***	12.907***	25.671***	35.268***	13.078***
	(32.45)	(27.64)	(14.74)	(31.93)	(26.86)	(14.96)
Observations	23988	16248	7740	23988	16248	7740
No. of Firms	5494	5041	3396	5494	5041	3396
R-squared	0.11	0.13	0.10	0.11	0.13	0.10

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table B3: Estimation Results for High Market Share Firms and Exporter Firms

	High Market Share Firms			Exporter Firms		
	1995-2003	**1995-2000**	**2001-2003**	**1995-2003**	**1995-2000**	**2001-2003**
CYCL	0.006	0.000	-0.009	0.016***	0.008	0.014
	(1.33)	(0.10)	(0.71)	(3.46)	(1.54)	(0.95)
CYCL*TYPE	0.030***	0.032***	0.038	-0.013**	-0.011	-0.035
	(3.74)	(3.15)	(1.30)	(2.02)	(1.39)	(1.53)
MMSH	0.293***	0.427***	0.592***	0.056**	0.132***	0.200**
	(4.33)	(4.06)	(3.68)	(2.38)	(3.22)	(2.56)
MMSH*TYPE	-0.226***	-0.293***	-0.422**	0.061	0.061	-0.042
	(3.18)	(2.63)	(2.39)	(1.17)	(0.77)	(0.30)
IMP	0.005*	0.007*	-0.004	0.004**	0.005**	0.004
	(1.84)	(1.71)	(0.87)	(2.17)	(2.06)	(0.94)
IMP*TYPE	0.002	0.002	0.017***	0.007*	0.005	0.006
	(0.66)	(0.36)	(2.78)	(1.89)	(1.02)	(1.00)
INTINCS	0.314***	0.312***	0.300***	0.383***	0.405***	0.311***
	(25.68)	(20.28)	(12.93)	(28.84)	(23.94)	(13.59)
INTINCS*TYPE	0.298***	0.398***	0.065	-0.107***	-0.184***	-0.030
	(9.18)	(8.74)	(1.05)	(4.18)	(5.58)	(0.48)
EXPSH	0.011***	0.013***	0.011	0.002	0.010	-0.005
	(3.33)	(2.96)	(1.43)	(0.30)	(1.29)	(0.41)
EXPSH*TYPE	-0.035***	-0.049***	-0.034	0.006	-0.003	0.012
	(3.85)	(3.91)	(1.51)	(0.98)	(0.33)	(0.80)
EMPPR	-0.011**	-0.025*	-0.006	-0.004	0.010	-0.005
	(2.09)	(1.82)	(0.92)	(0.77)	(0.66)	(0.67)
EMPPR*TYPE	-0.015	0.013	-0.020	-0.050***	-0.080***	-0.039
	(0.93)	(0.44)	(0.81)	(3.44)	(3.07)	(1.51)
LEVER	-0.058***	-0.060***	-0.060***	-0.057***	-0.058***	-0.056***
	(19.57)	(15.16)	(9.14)	(17.18)	(13.31)	(7.47)
LEVER*TYPE	-0.051***	-0.038***	-0.018	-0.025***	-0.025***	-0.022
	(5.96)	(3.35)	(0.89)	(4.04)	(3.00)	(1.61)
RDKUF	-0.144***	-0.236***	-0.044***	-0.130***	-0.237***	-0.027***
	(20.42)	(18.27)	(6.96)	(17.60)	(17.56)	(3.68)
RDKUF*TYPE	-0.017	-0.089***	-0.003	-0.045***	-0.038*	-0.063***
	(1.27)	(3.42)	(0.21)	(4.50)	(1.81)	(5.11)
Constant	26.092***	36.170***	12.926***	26.114***	36.561***	13.470***
	(32.65)	(27.51)	(14.64)	(32.41)	(27.84)	(15.33)
Observations	23988	16248	7740	23988	16248	7740
No. of Firms	5494	5041	3396	5494	5041	3396
R-squared	0.11	0.13	0.10	0.11	0.12	0.10

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table B4: Estimation Results for Foreign Partner Firms and Public Firms

	Foreign Partner Firms			Public Firms		
	1995-2003	**1995-2000**	**2001-2003**	**1995-2003**	**1995-2000**	**2001-2003**
CYCL	0.011***	0.005	0.009	0.013***	0.006	0.006
	(2.84)	(1.03)	(0.80)	(3.40)	(1.26)	(0.50)
CYCL*TYPE	0.013	0.013	0.029	-0.044	-0.055	4.916
	(1.14)	(0.89)	(0.72)	(0.67)	(0.79)	(0.97)
MMSH	0.137***	0.201***	0.199***	0.069***	0.144***	0.213***
	(4.17)	(4.03)	(2.68)	(3.25)	(4.07)	(3.30)
MMSH*TYPE	-0.083*	-0.064	0.016	3.860***	5.756***	1.365
	(1.95)	(0.91)	(0.11)	(3.62)	(2.96)	(0.33)
IMP	0.006***	0.005***	0.007**	0.006***	0.006***	0.007**
	(3.32)	(2.61)	(2.27)	(3.65)	(2.72)	(2.27)
IMP*TYPE	0.009	0.011	0.016	0.105**	0.183***	1.143
	(1.45)	(1.45)	(1.24)	(1.96)	(3.06)	(1.23)
INTINCS	0.406***	0.455***	0.285***	0.354***	0.355***	0.309***
	(31.35)	(25.12)	(13.28)	(31.10)	(24.35)	(14.50)
INTINCS*TYPE	-0.224***	-0.284***	0.873***	0.140	0.101	6.006
	(8.40)	(9.37)	(6.54)	(0.90)	(0.60)	(0.45)
EXPSH	0.010***	0.010**	0.009	0.006**	0.007	0.007
	(3.14)	(2.32)	(1.27)	(1.98)	(1.64)	(0.91)
EXPSH*TYPE	-0.044***	-0.044***	-0.090**	0.059	-0.108	0.042
	(3.77)	(2.80)	(2.03)	(0.70)	(0.77)	(0.15)
EMPPR	-0.009*	-0.006	-0.005	-0.011**	-0.016	-0.007
	(1.67)	(0.46)	(0.83)	(2.23)	(1.35)	(1.08)
EMPPR*TYPE	-0.064**	-0.125***	-0.058	-4.035**	-3.368	0.000
	(2.46)	(2.75)	(1.12)	(2.11)	(1.33)	(.)
LEVER	-0.059***	-0.061***	-0.056***	-0.064***	-0.064***	-0.062***
	(20.57)	(15.95)	(8.83)	(22.64)	(17.04)	(10.00)
LEVER*TYPE	-0.083***	-0.076***	-0.097***	-0.196***	-0.252***	0.657
	(6.87)	(4.57)	(3.43)	(3.62)	(4.07)	(0.65)
RDKUF	-0.144***	-0.250***	-0.047***	-0.143***	-0.247***	-0.047***
	(21.03)	(20.44)	(7.78)	(21.29)	(20.72)	(8.00)
RDKUF*TYPE	-0.013	-0.012	-0.014	0.073	0.066	-1.895
	(0.77)	(0.36)	(0.57)	(0.62)	(0.30)	(0.74)
Constant	26.029***	36.546***	13.419***	25.834***	36.056***	13.452***
	(32.61)	(28.03)	(15.48)	(32.25)	(27.52)	(14.30)
Observations	23988	16248	7740	23988	16248	7740
No. of Firms	5494	5041	3396	5494	5041	3396
R-squared	0.11	0.13	0.10	0.11	0.12	0.09

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

References

Bain, J. S. (1941), "The Profit Rates as a Measure of Monopoly Power", *Quarterly Journal of Economics,* Vol.55, No. 1.

Boratav, K., Türel, O. and Yeldan, E. (1994), "Distributional Dynamics in Turkey under Structural Adjustment of the 1980s", *New Perspectives on Turkey,* No. 11.

Boratav, K., Yeldan, E. and Köse, H. (2000), *Globalization, Distribution and Social Policy: Turkey, 1980-1998*, CEPA Working Paper No. 20.

Cantor, R. (1990), "Effects of Leverage on Corporate investment and Hiring Decisions", *Federal Reserve Bank of New York Quarterly Review,* 15(2).

Caves, R. (1985), "International Trade and Industrial Organization: Problem Solved and Unsolved", *European Economic Review,* 28.

Ceritoğlu, E. (2002), *The Cyclicality of Mark-up Ratios: The Case of Turkish Industry,* The Central Bank of Turkey, Research Department Working Paper No. 4.

Ekinci, N. (1998), "Growth and Crisis Dynamics in the Turkish Economy" (in Turkish), *Toplum ve Bilim*, No. 77.

Engin, N., Katırcıoğlu, E. and Akçay, C. (1995), "The Impact of Trade Liberalization on the Turkish Manufacturing Industry: An Empirical Assessment", in *Policies for Competition and Competttitiveness,* ed. by R. Erzan, UNIDO.

Ersel, H. (1991), *Structural Adjustment: Turkey (1980-1990)*, The Central Bank of the Republic of Turkey, Discussion Papers No. 9107.

Forouton, F. (1991), *Foreign Trade and its Relation to Competition and Productivity in Turkish Industry*, PRE Working Paper Series, No.604, The World Bank, Washington DC.

Görg, H. and Warzynski, F. (2003), *Price Cost Margins and Exporting Behavior,* The University of Nottingham, Economics Department.

Hallward-Driemeier, M., Iarossi, G. and Sokoloff, K. L. (2002), *Exports and Manufacturing Productivity in East Asia: A Comparative Analysis with Firm-Level Data,* NBER Working Paper No. 8894.

Hausman, J. A. and Taylor, W. E. (1981), "Panel Data and Unobservable Individual Effects", *Econometrica,* Vol.46, No. 6.

Helpman, E. and Krugman, P. (1986), *Market Structure and Foreign Trade,* MIT, Cambridge, Massachussets.

Jacquemin, A. (1982), "Imperfect Market Structure and International Trade – Some Recent Research", *Kyklos,* Vol. 35, Fasc. 1.

Köse, H. and Yeldan, E. (1998a), "Turkish Economy in the 1990s: An Assessment of the Fiscal Policies, Labor Markets and Foreign Trade", *New Perspectives on Turkey*, No. 18.

Köse, H. and Yeldan, E. (1998b), "The Dynamics of the Turkish Economy during the Process of opening to the World" (in Turkish), *Toplum ve Bilim*, No. 77.

Martin, S. (1993), *Advanced Industrial Economics,* Blackwell Publishers, Cambridge, USA.

Martins, J. O., Scarpetta, S. and Pilat, D. (1996), "Mark-up Pricing, Market Structure and the Business Cycle", *OECD Economic Studies*, II, No. 27.

Metin-Özcan, K., Voyvoda, E. and Yeldan, E. (2000), "On the Patterns of Trade Liberalization, Oligopolistic Concentration and Profitability: Reflections from Post-1980 Turkish Manufacturing", Bilkent University, Department of Economics.

Onaran, Ö. And Yentürk, N. (2003), "The Mark-up Rates in Turkish Private Manufacturing Industry during Trade Liberalization", *Journal of Income Distribution*, Vol. 11, Issue 3-4.

Özmucur, S. (1992), *Mark-up and Profit Rates in Turkish Manufacturing, 1950-1989,* ISS/Ec 92-02; Boğaziçi University Research Papers.

Şahinkaya, S. (1993), "Sectoral Labor Productivity, Real Wages and Gross Profits or Mark-up Rates in the Manufacturing Industry" (in Turkish), *Toplum ve Ekonomi,* No. 4.

Sharpe, S. A. (1994), "Financial Market Imperfection, Firm Leverage and the Cyclicality of Employment", *American Economic Review*, 84.

Small, I. (1997), *The Cyclicality of Mark-ups and Profit Margins: Some Evidence for Manufacturing and Services,* Bank of England, Working Paper No. 72.

Uygur, E. (1993), *Financial Liberalization and Economic Performance of Turkey*, The Central Bank of Turkey, Ankara.

Voyvoda, E. and Yeldan, E. (1999), "Patterns of Productivity Growth and the Wage Cycle in Turkish Manufacturing", Bilkent University, Department of Economics.

Yalçın, C. (2000), *Price-Cost Margins and Trade Liberalization in Turkish Manufacturing Industry: A Panel Data Analysis,* The Central Bank of Turkey, Research Department, March.