The Effects of Foreign Exchange Rate Movements on Domestic Prices in the Turkish Manufacturing Industry

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■ **Abstract:** This paper examines the sensitivity of domestic prices in the Turkish manufacturing industry to fluctuations in exchange rates. In our theoretical model, domestic and foreign firms produce substitutable goods for the domestic market. Some portions of domestic firm's inputs are assumed to be imported. Results show that sensitivity of domestic prices to movements in exchange rates is closely related to the share of imported inputs in domestic production. However, our results are inconclusive, regarding the effects of market structure on the responsiveness of domestic prices to changes in exchange rate.

■ **Resumen:** Este trabajo examina la sensibilidad de los precios domésticos en la industria manufacturera de Turquía a las fluctuaciones en los tipos de cambio. En nuestro modelo teórico, las empresas domésticas y foráneas producen bienes sustitutos para el mercado doméstico. Se asume que algunas funciones del mercado de insumos de las empresas domésticas son importadas. Los resultados muestran que la sensibilidad de los precios domésticos a movimientos en los tipos de cambio está altamente relacionada a la proporción de insumos importados para la producción doméstica. Sin embargo, respecto a los efectos de la estructura de mercado

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sobre la respuesta de los precios domésticos a variaciones en el tipo de cambio, nuestros resultados no son concluyentes.

■ **Key Words**: exchange rate pass-through, inflation, Turkey.

■ **JEL Code:** D43, F31, L16.

■ *Introduction*

Starting from the beginning of the 1980s, Turkey underwent a comprehensive stabilisation and structural adjustment programme to solve the problems of internal and external imbalances that the country had encountered during the late 1970s. However, Turkey remained as being one of the few countries in the world with a persistently high inflation rate for three decades. Having reached an annual rate of 106% on average in 1981, inflation rates declined to nearly 30% in 1983 with the help of an austerity programme in the early 1980s, and then continued to soar afterwards (SPO, 1997: 127). The fluctuations in foreign exchange markets during the reform period have been another cause of concern; 5% decline in the real value of effective exchange rate in 1983 was followed by 2% increase in 1985. However, the extent of these fluctuations became more pronounced after 1989. Following a drastic inflows of capital as a result of the liberalisation in external financial account, the real value of effective exchange rate fluctuated from a 2% decline in 1988 to a 19% increase in 1990 (see SPO, 1997: 64). Given the fact that the great extent of the Turkish imports consists of intermediate inputs and capital goods,[2] these dramatic fluctuations in the foreign exchange market draw attention to the role of these movements in the inflationary price formation process in the Turkish manufacturing industry.

There have been various studies on the causes of inflation in Turkey. Many of them were particularly built upon monetarist causes of the problem at the macroeconomic level, and did draw no attention to the role of structural factors in the inflationary process, such as the market structure and the dependence of domestic production on imported inputs (*e. g*. see Günçavdı *et al*., 2000; Özatay, 1997; Metin, 1995). However, some of recent work in the literature, both theoretical and empirical, have recognised the role of variations in exchange rates in the price formation process from the structural point of view, and have focused

2. The share of imported inputs and capital goods was accounted almost 90% of total imports in 1950, 95% in 1970 and 90% in the period of 1983-1996 in Turkey (see SPO, 1997: 53).

on models of industrial organisation to explain the link between exchange rates and prices in terms of nature of oligopolistic competition (Goldberg and Kenetter, 1997; Yang, 1997; Lee, 1997; Feignberg, 1991, 1989 and 1986). Given the high dependence of domestic production of imported inputs in Turkey, some portions of changes in domestic prices might be caused by movements in exchange rates, and the extent of these changes might be affected by some industry-specific factors, such as the nature of competition, the degree of dependence of domestic production on imported inputs and the degree of product differentiation. Studies in international economics have noted that movements in international prices are transferred into domestic prices via changes in exchange rates according to "the law of one price". In a world without any transaction costs, barriers and tariffs on imports and with perfect market condition, this law postulates that changes in foreign prices will have one-to-one effects on domestic prices. Imperfectly competitive structure may however allow an industry to insulate itself partially from the effects of currency fluctuations.

There have been many theoretical and empirical studies exploring pricing to market and exchange rate pass through. On the theoretical side, Dornbusch's (1987) seminal paper is the leading study in the literature. He investigates the determinants and extents of exchange rate pass through under different market structures. The methodology used in this paper is based on a Salop's type circular city differentiated product model, which indicates that relative prices of imported goods decrease with the appreciation of domestic currency, and the extent of this decrease is influenced by the degree of competition and the relative number of domestic and foreign firms. However, his model postulates nothing about the likely consequences of the use of import inputs in production. On the empirical side of the literature, most of the studies examine the subject for developed and relatively large economies (*e. g.* Yang, 1997; Menon, 1995; Athukorala and Menon, 1995; Feenstra, 1989; Feinberg, 1986 and 1989). However, there have been a few researches on developing small open economies (*e. g.* Günçavdı and Orbay, 1998; Lee, 1997).

In this study, we aim to examine the importance of exchange rate fluctuations in the inflationary process in Turkey, putting particular emphasis on the role of market structure, dependence of domestic production on imported inputs and the degree of product differentiation in this context. The model introduced in this paper consists of two countries, namely small developing domestic country and the developed foreign one. Accordingly, production in the developing country heavily depends on imported inputs, and technology used can be regarded as less

efficient than the counterpart developed country. In our differentiated product model, domestic and foreign firms determine their production levels simultaneously *a la* Cournot. Our theoretical results indicate that the degree of market competition, the share of the cost of imported input in total production costs are among the important determinants of elasticity of domestic and foreign goods' prices with respect to exchange rates. Our theoretical expectations from the model are tested using the data from Turkish manufacturing industry, which covers 12 years (1982-1993) for each of 27 industries defined at 3-digit ISIC classification level. The remainder of the paper is therefore organised as follows. We introduce the theoretical model and examine the impacts of industry-specific factors on exchange rate pass-through in Section 2. Section 3 presents the empirical results. The implications of empirical findings and conclusions of the paper are set out in Section 4.

■ *The Theoretical Model*

In the open economy literature, there are different models explaining international price relationships. Among others, the law of one price (or Purchasing Power Parity Condition) can be considered as the one that holds under homogeneity and perfect competition assumptions (Claassen, 1997). However, when the perfect competition assumption is relaxed, exchange rate movements might not fully pass through on prices. As many studies in literature indicate, exchange rates fluctuations might largely be absorbed in less competitive markets by the firms and their effects on domestic prices are relatively less. On the other hand, when domestic production depends on imported inputs, domestic prices are likely to become more sensitive to exchange rate fluctuations.

In this section, we develop a theoretical model to analyze the effects of exchange rate fluctuations on domestic prices and to observe how this relationship depends on some industry specific factors, such as market structures, imported input use, and the degree of product differentiation. The theoretical framework follows the extended Dornbusch (1987), but differs from it in one major aspect simply by including an explicit distinction between domestic and imported inputs. In our differentiated product model there are n domestic firms producing an identical product in domestic country and n^* foreign firms exporting a substitutable product to domestic country's market. We assume that the domestic country is a developing one with relatively inefficient production technologies and high import dependence in production. For simplicity, we assume that there are no transportation costs.

A typical firm *i* in the domestic country posses a Cobb-Douglas production technology with a constant-returns-to-scale, and uses both domestic, k_i, and imported, k_i^*, inputs:

$$(1) \qquad x_i(k_i, k_i^*) = (k_i)^{1-s}(k_i^*)^s, \qquad i = 1,...,n$$

where x_i is the output level of the i^{th} firm, and s is the share of imported inputs in total costs. Using the production function in equation (1), the indirect cost function accruing to the domestic firm can be written as follows.

$$(2) \qquad c_i(r, r^*, e; x_i) = Ar^{1-s}(er^*)^s(x_i)$$

where $A = ((1 - s)/s)^s$, e is the exchange rate and r, r^* are the unit costs of domestic and foreign inputs respectively. The firms in the foreign country are assumed to use only their own domestic inputs and cost function of the i^{th} foreign firm can be represented in the following form.

$$(3) \qquad c_i^*(y_i) = c^* y_i, \quad i = 1,...,n^*$$

where y_i is the of output level of the foreign firm produced for the developing country. As stated before, we assume that foreign firms possess cost advantages over domestic ones mainly because they operate with more efficient technology and lower input prices. This assumption therefore implies that foreign firms' unit cost of production is lower than the unit cost of the domestic firm; that is $ec^* < Ar^{1-s}(er^*)^s$.

On the demand side of the model, we assume linear demand functions for both types of products, domestic and foreign, respectively as follows.

$$(4a) \qquad p(x, y) = a - bx - dy,$$

$$(4b) \qquad p^*(x, y) = a - by - dx, \qquad a, b, d > 0$$

where $x = \sum_{i=1}^{n} x_i$ and $y = \sum_{i=1}^{n^*} y_i$. The values of b and d respectively show the degree of differentiation of the domestic and imported goods. As b and d become closer, degree of differentiation decreases. Profit functions of domestic and foreign firms can, in turn, be written, respectively, as

(5a) $\pi_i = p(x,y)x_i - c_i(r, r^*, e; x_i), \qquad i = 1,\ldots,n$

(5b) $\pi_i^* = p^*(x,y)y_i - ec_i^*(y_i), \qquad i = 1,\ldots,n^*$

We assume that firms compete *a la* Cournot. Thus, they choose their quantities of production simultaneously. In order to compute Cournot equilibrium outputs, first, we obtain the reaction function of each firm from first-order conditions. Then, we solving the reaction functions with respect to output levels of domestic and foreign firms simultaneously yields the following equilibrium levels of outputs,

(6a) $$\bar{x}_i = \frac{a(b+(b-1)n^*) - bAr^{(1-s)}(er^*)^s(1+n^*) + ec^*dn^*}{b^2N + (b^2-d^2)nn^*}$$

(6b) $$\bar{y}_i = \frac{a(b+(b-d)n) - bec^*(1+n) + dAr^{(1-s)}(er^*)^s n}{b^2N + (b^2-d^2)nn^*}$$

where . Substituting (6) into (4) yields the equilibrium prices for the domestic and foreign products, respectively, as follows.

(7a) $$\bar{p} = \frac{af(f+(f-1)n^*) + (nf^2 + (f^2-1)nn^*)Ar^{(1-s)}(er^*)^s + ec^*fn^*}{f^2N + (f^2-1)nn^*}$$

(7b) $$\bar{p}^* = \frac{af(f+(f-1)n) + (n^*f^2 + (f^2-1)nn^*)ec^* + Ar^{(1-s)}(er^*)^s fn}{f^2N + (f^2-1)nn^*}$$

where shows degree of differentiation of domestic and foreign goods. Having derived equilibrium prices in (7a) and (7b), we are now able to examine how the prices in our domestic developing country are influenced by fluctuations in the exchange rate. For this purpose, the following elasticities with respect to exchange rate can be computed from equation (7a) and (7b).

(8a) $$\eta = \frac{d\bar{p}}{de}\frac{e}{\bar{p}} = \frac{fn^*}{h}\frac{ec^*}{\bar{p}} + \frac{(f^2+(f^2-1)n^*)n}{h}\frac{sAr^{(1-s)}(er^*)^s}{\bar{p}}$$

$$(8b) \quad \eta^* = \frac{d\overline{p}^*}{de}\frac{e}{\overline{p}^*} = \frac{(f^2 + (f^2 - 1)n)n^*}{h}\frac{ec^*}{\overline{p}^*} + \frac{fn}{h}\frac{sAr^{(1-s)}(er^*)}{\overline{p}^*}$$

where $h = f^2 N + (f^2 - 1)nn^*$. As stated in the previous section, the exchange rate elasticities of prices are called exchange rate pass-through in the related literature. Equation (8a) and (8b) indicate that exchange rate pass-through on domestic and foreign good prices have two main components. The first component corresponds to the pass-through effect via the costs of foreign firms. The exchange rate pass-through on domestic prices becomes more pronounced with smaller ratio of the price of domestic good to the unit cost of foreign firm, (p / ec^*). The second component shows the pass-through effect via the costs of domestic firms. Accordingly, the exchange rate pass-through on domestic good prices intensifies with smaller mark-up implying more competition, $(p / Ar^{(1-s)}(er^*)^s)$. Clearly, it also intensifies with an increase in the share of imported inputs in production. Besides, the exchange rate pass-through on the foreign good prices is larger with both a decrease in the mark-up of foreign firms, (p^* / ec^*), and a decrease in the ratio of foreign good price to the unit cost of domestic firms $(p^* / Ar^{(1-s)}(er^*)^s)$. The other important determinant of exchange rate pass through is the degree of product differentiation between domestic and imported products, *f*. Specifically,

$$\frac{\partial \eta}{\partial f} < 0 \quad \text{and} \quad \frac{\partial \eta^*}{\partial f} < 0$$

The extent of pass through is smaller when domestic and foreign products are more differentiated. This is, in fact, consistent with the effect of competition. The more differentiated product leads to less competitive markets, where firms are more capable to absorb exchange rate fluctuations. The results with respect to market structure are similar to those of Dornbusch (1987), in which the extent of price adjustments in response to a change in exchange rates depends only on the degree of market competition, but not on the extend of the use of imported inputs in production. Our findings for the effects of imported inputs in production on the other hand appear to be consistent with Feinberg (1989), where he employs a standard conjectural variation model. Following these theoretical discussions, the model developed above yields the following hypothesis to be tested for the Turkish manufacturing industry.

H1: A depreciation of Turkish Lira against US dollar increases the domestic good prices.

H2: An increase in domestic prices, as a result of a depreciation of Turkish Lira, is more pronounced in more competitive markets, with less differentiated product and with higher share of imported input.

In the following section, we will test these expectations empirically for the Turkish manufacturing data.

■ *An Empirical Analysis*

In this section, we empirically test the link between movements in foreign exchange rate (*EXCH)* and the level of domestic prices (*P*). As stated in the previous section, our prime objective is to show empirically whether or not, the sensitivity of domestic prices to exchange rates is influenced by the level of market concentration, the extent of product differentiation and the dependence of domestic production on the use of imported inputs. The link between movements in exchange rate and domestic prices derives from supply responses of domestic and foreign firms through their cost of production. These supply responses of domestic and foreign firms are determined both by nominal exchange rate and by relative inflationary pressures, implying that it is the real value of foreign exchange movements that matters. Overall foreign exchange movements are measured by an index of the trade-weighted external real value of the Turkish Lira. *EXCH* is calculated by the Central Bank of Turkey as an index of weighted external value against the US dollar and German mark, multiplied by a domestic price index and divided by a foreign price index. We use the data from annual surveys of manufacturing industry in Turkey for the period of 1982-1993 published by State Institute of Statistics (SIS). Our sample consists of 12 years of data corresponding to 27 industries defined at 3-digit ISIC classification level. In the absence of a ready-made database for our analysis, we had to construct the data on most variables. Here we considered some features of these data.

Table 1
The Definition and Sources of Variables

Variables	
P_{it}	Output prices for 3 – digit ISIC industry *i*, year *t*, taken from various Annual Manufacturing Industry Statistics. Source : State Institute of Statistics (SIS).
$EXCH_t$	Trade Weighted Effective Real Exchange Rate Index, calculated from currency baskets consisting of US Dollar and German Mark. The weights in the basket for both currencies differ between the periods of 1982-1986 and of 1987-1993. The weights for the former period are 0.5 for US Dollar and 0.5 for German mark whereas they are 0.75 for US Dollar and 0.25 for German Mark in the second period. Source: The Quarterly Bulletin of the Central Bank of Turkey.
M_{it}	The values of imports for industry *i*, year *t*, Sources: *State Institute of Statistics (SIS)*
X_{it}	The Value of Exports for industry *i*, year *t*, Sources: *State Institute of Statistics (SIS).*
HI_{it}	The Herfindahl Index (sum of squared market shares) for industry *i,* year t is used to measure the market structure in each sector. Source: Günes, M. (1998), Türk Imalat Sanayinde Yogunlasma Oranlarini Belirleyen Faktörler 1980-1994, State Institute of Statistics, Ankara.
$COST^*$	Trade Weighted Unit Labour Cost as a proxy for a foreign cost measure. We take the labour cost for 3-digit ISIC industries from the USA and Germany, two major trade partners for Turkey in terms of origins of imports. Sources: ILO Yearbooks of Labour Statistics.
GDP_t	Real Gross Domestic Product (1987=100). Source: Sate Planning Organisation (1997), Economic and Social Indicators (1950-1997), in Turkish.

The definitions and sources of variables used in estimations are presented in Table 1. Following the theoretical discussion in the previous section, it appears to be necessary for testing the role of imported inputs in production. The data from annual surveys of manufacturing industry in Turkey contains no information on imported inputs in production at 3-digit disaggregation level. Due to the lack of continuous imported input data for the period of 1983-1993, we employ a simple procedure to measure the import dependence of the domestic production of each industry as follows. Using input-output tables available for 1985 and 1990, we classified each industry according to its dependence on imported inputs, and generate three different dummy variables, namely *D1, D2* and *D3*, each corresponding to the degree of import dependence starting from low dependent industry and ending with high

dependent one. *D1, D2* and *D3* take the value of unity for low dependent, dependent and high dependent industries respectively.

Market conditions in each industry are measured by Hirshman-Herfindahl Index (*H*), which is computed for the relevant period by Güneş (1998). The real exchange rate variable is the index of trade weighted real effective exchange rate calculated by using the exchange rates of two important trade partners of Turkey, namely the USA and Germany. Following the empirical literature in intra-industry trade, a working measure of the extent of intra-industry trade (*IIT*) is constructed as an index of trade overlap as follows.

$$(9) \qquad IIT_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}$$

where X_i and M_i are the values of exports and imports in industry *i*, respectively. A higher value of the index is posited to indicate a higher degree of product differentiation in an industry. In order to capture the effects of general macroeconomic conditions, gross domestic product (*GDP)*, which may be considered as a proxy reflecting the demand condition in the economy, is included in estimations. The costs of the production of foreign competitors ($COST^*$) are proxied by the use of unit wage cost variables. Given that the USA and Germany are two major trade partners of Turkey,[3] we use the average labour cost for 3-digit ISIC industries of the USA and Germany weighted by their shares in the total imports of Turkey. The correlation matrix of the variables in concern is reported in Table 2.

Table 2
Correlation Matrix

	p	*iit*	*cost**	*hi*	*exch*
iit	-0.218	—	—	—	—
cost*	-0.289	-0.120	—	—	—
y	0.092	0.161	-0.660	—	—
hi	-0.355	-0.320	0.348	-0.017	—
exch	0.075	-0.071	-0.003	0.110	-0.012

3. Almost 25-30% of the imports of Turkey are from Germany and the USA. The origins of the rest of the imports vary among great variety of countries.

The empirical model is quite simple and follows Günçavdı and Orbay (1998), Lee (1997) and Feinberg (1986). First, pooled cross-section/time-series data are used to estimate the exchange rate elasticity of domestic prices. Then, differences across industries in the estimated elasticity are explained by industry-specific variables, intended to proxy market structure, and the share of imported inputs in domestic production. As explained by the theoretical model above, we estimate the coefficients and standard errors of the industry variables from interaction terms with the exchange rate. Empirical supports for the hypothesis above are found out from the estimation of following regressions on 336 pooled cross-section/time series observations (i=1,…,27; t=1982,…,1993) using the least square dummy variable *(LSDV)* method (see Baltagi, 1995, Green,1993; Hsiao, 1986).

$$(10) \qquad p_{ti} = a_0 + a_1 gdp_t + a_2 exch_t + \varepsilon_{ti}$$

$$(11) \qquad p_{ti} = a_0 + a_1 gdp_t + a_2 exch_t + a_3 \cos t_{ti}^{*} + a_4 h_{ti} + a_5 h_{ti} exch_t + a_6 D_{ji} exch_t + a_7 IIT_{ti} exch_t + \varepsilon_{ti}$$

$$j = 1,2,3 \quad i = 1,...,27$$

where small cases indicate the logarithms of all relevant variables. Assuming that differences across industries are fixed, equation (10) and (11) include a set of industry specific dummy variables. *F*-tests reject, at the 1% significance levels, the hypothesis that all of these dummies had values of zero (calculated *F* statistics is 3.08 for equation (10)). The effects of changes in macroeconomic conditions are captured by the coefficient of *gdp* (a_1), which is kept constant across industries, and is expected to be positive. Coefficient a_3 measures the elasticity of domestic prices with respect to the cost of foreign production; a higher cost of foreign production is expected to lead to a higher level of domestic prices. Equation (11) also enables us to capture the impacts of market structure on the domestic price level for industry *i* through coefficient a_4. Higher values of Hirshman-Herfindahl index, *hi*, which implies a less competitive market structure, leads to higher prices; therefore the expected sign of a_4 is positive. The direct exchange rate pass-through is measured by a_2. In line of theoretical discussion in the previous section, the exchange rate pass through for industry *i* is expected to be affected by some industry specific factors such as market structure, the degree of product differentiation and the dependence of domestic production on imported inputs. From equation (11), exchange rate pass-through can be written as a function of these industries specific factors by differentiating (11) with respect to the exchange rate variable as follows.

(12) $\eta_i = a_2 + a_5 h_{ti} + a_6 D_{ji} + a_7 IIT_{ti}, \; j = 1,2,3$

where η_i shows the exchange rate pass-through for industry *i* (*i. e*. the exchange rate elasticity of domestic prices). Equation (12) indicates that exchange rate pass-through varies over time and across industries. According to our theoretical model, the responsiveness of domestic prices to changes in exchange rate seems to be influenced negatively by market concentration and the degree of product differentiation, and positively by the dependence of domestic production on imported inputs *i. e*. the expected sign of a_5 and a_7 are negative and a_6 is positive. Accordingly, domestic firms in less competitive industries with more differentiated products is expected to be less sensitive to movements in exchange rate, and domestic firms with high dependence on imported inputs will be more sensitive to changes in exchange rate.

Table 3
Estimation Results

(Least Square Dummy Variable Estimation based on Two-way Fixed Effect Model; Dependent Variable: p; Sample Size: 316 no missing observations)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
exch	2.014***	1.831***	1.835***	1.827***	3.046***	2.997***
	(0.180)	(0.172)	(0.178)	(0.172)	(0.741)	(0.743)
cost*	—	0.992***	1.000***	0.999***	1.000***	0.990***
		(0.157)	(0.158)	(0.157)	(0.157)	(0.158)
hi	—	—	—	—	-2.097*	-2.051
					(1.246)	(1.247)
hi*exch	—	—	0.006	—	1.069*	1.04
			(0.034)		(0.633)	(0.634)
IIT*exch	—	—	—	—	—	-0.018
						(0.020)
D1*exch	—	—	0.028	0.028	0.028	0.032
			(0.017)	(0.018)	(0.018)	(1.749)
D2*exch	—	—	0.022	0.021	0.021	0.024
			(0.020)	(0.020)	(0.020)	(1.207)
D3*exch	—	—	0.057*	0056*	0.057*	0.058*
			(0.031)	(0.031)	(0.031)	(0.031)
R^2-adj.	0.965	0.969	0.969	0.969	0.969	0.969
Std.dev.	0.631	0.631	0.631	0.111	0.631	0.111
d.f.	287	286	282	283	281	280

Note: ***, ** and * indicate coefficients that are significant at the 1%, 5% and 10% significance level respectively. The figures in parenthesis show the standard deviations.

The results of estimates are reported in Table 3. The results show that a main determinant of price movements of domestic traded goods in Turkey from 1983 to 1993 was the real external value of the Turkish Lira. Column (1) shows the estimate of equation (10), in which the variable *exch* is significant with expected signs. It is consistently seen from all estimates in the table that the real exchange rate is one of the determinants of domestic prices. The cost of foreign production in estimations given in column (2) to (6) is significant at 1% significance level, and its coefficient is almost unity. The restriction that this coefficient is unity cannot be rejected at the 1% significance level (the calculated *F* value for 1 and 313 degree of freedom is 317.88).

In order to examine the sensitivity of domestic prices to changes in exchange rate, we estimated the models in columns (3)-(6), in which multiplicative terms with the real exchange rate are included. In column (3), we estimated the model with multiplicative terms of exchange rate with *hi* and the dummies, D_j, reflecting the dependence of domestic production on imported inputs. It is clear from the results in column (3) that the coefficient of multiplicative terms of market structure with the exchange rate is insignificant. Dummies for lower and intermediate level of imported input dependence in column (3) and (4) are also individually insignificant. However, sensitivity of domestic prices to movement in the real exchange rate is significant in industries with high imported input dependence in domestic production. Including the market structure variable in the regression equation along with its multiplicative term with exchange rate in column (6), we estimated significant coefficients for these variables only at the 10% significance level with unexpected signs. Including the variable for the degree of product differentiation yielded similar results to those in column (5), with only exception of insignificant coefficient of the *IIT* variable.

Empirical results in this section therefore supports the hypothesis that apart from more conventional causes of the inflationary process, such as excessive monetary expansion etc., there might be some structural reasons for high inflation in Turkey. The high import dependence of domestic production, the imperfect market structure of product markets and the degree of differentiation of imported and domestic products are two structural causes considered in this paper. Depending upon the empirical results in Table 3, real devaluation of the TL against US dollar and German Mark leads to an inflationary process mainly due to high imported input dependency of domestic production. Additionally, real shocks arising from an increase in the cost of foreign production causes a significant inflationary impact on domestic prices.

The pass-through effects of exchange rate seem particularly more pronounced in industries where the share of imported inputs in production is high. In line of these empirical findings, it is clear that the inflationary process in Turkey is not only a monetary problem but also possesses some structural causes.

■ *Conclusion*

The aim of this paper is twofold. The first one is to examine the presence of a link between fluctuations in exchange rate and domestic producer prices in the Turkish manufacturing industries. The second is to analyse the issue of whether some industry specific factors, such as market structure, the degree of dependence on imported inputs and the extent of product differentiation, influence the responsiveness of domestic prices to movements in exchange rates. For this purpose, a theoretical model, which extends Dornbusch's (1987) model by including imported inputs in production, has been developed, and both the significance of the exchange rate fluctuations and the role of industry specific factors on the pass through mechanism have been tested by using the 3-digit data on Turkish manufacturing sector.

The results suggest that depreciations in Turkish Lira (TL) can be considered as a factor that should be paid attention in forming disinflationary policies in Turkey. In this regard, controlling the pace of depreciation of TL could help reducing the inflationary pressure on the domestic prices. According to the empirical findings of the paper, this is particularly important in sectors that possess high dependence on imported inputs. It is therefore likely to expect that depreciations in TL deteriorate cost of production in high import dependent sectors, and might make them more responsive to changes in exchange rate. With respect to the impact of market structure, our empirical results have come out rather inconclusive, but at least calls for further investigation of the role of imperfect competition in the Turkish manufacturing industry. However, this might be because Turkey has been experiencing persistently high inflation for more than 20 years, and the risk-averse firms in the Turkish manufacturing industry might have been responding similarly to changes in instable macroeconomic environment created by this inflationary environment, irrespective of some sector specific factors. The results also suggest, albeit not strictly, that inflationary process in Turkey would not be only a monetary problem, but might have some structural causes due to the structural characteristics of the manufacturing industry.

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