# EXCHANGE RATE CHANGES
# AND
# MANUFACTURING PROFITS IN TURKEY



A THESIS
SUBMITTED TO THE INSTITUTE OF SOCIAL SCIENCES
OF BAŞKENT UNIVERSITY
IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION



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SOSYAL BİLİMLER ENSTİTÜSÜ
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# DÖVİZ KURUNDAKİ DEĞİŞİMLERİN İMALAT SANAYİ KAR MARJLARINA ETKİLERİ

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# ABSTRACT

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This study examines the extent of pass-through in export prices and emphasizing the relative importance of pricing-to-market effect on Turkish manufacturing profits. All firms, especially the exporters, must make a pricing decision when exchange rate changes. So, this study tests how Turkish exporters are responding to the conflicting objectives of maintaining stable profit margins and stable export sales when the value of TL fluctuates.



**Keywords:** exchange rates, pass-through, pricing to market, manufacturing profits.

# ÖZET

## DÖVİZ KURLARINDAKİ DEĞİŞİMLERİN İMALAT SANAYİ KAR MARJLARINA ETKİLERİ


Son zamanlarda, gerek ülkemizde gerekse dünyada en çok tarşılan konulardan biri döviz kurlarının değişiminin reel sektöre nasıl yansıdığı ve nasıl etkiler gösterdiğidir.

Bu çalışmadan, döviz kurundaki değişimlerin Türk İmalat sanayi kar marjlarına etkilerini araştırmış bulumaktayız. Öncelikle, bu çalışmanın ön kısmında ekonomi literatüründeki tüm kur değişimlerinin yabancı piyasalardaki fiyatlara etkisi ve ihracatçı firmalarının kur riskini göz önüne alarak yürüttükleri fiyatlandırma politikalarını araştırmış bulunmaktayız.

Çalışmanın ikinci kısmında, bu literatürdeki teori ve kavramları içine alarak Türk İmalat Sanayisi için bir model oluşturmuş bulunmaktayız ve bu model ile birlikte Türk ihracatçı firmalarının Türk Lirasındaki değişimler karşısında kar marjlarını nasıl koruduklarını analiz etmiş bulunmaktayız.

Araştırmamızın sonuçlarına göre, Türk ihracatçı firmaları, döviz kurlarındaki değişimlerini yabancı piyasadaki malların fiyatlarına direkt yansıtmadıkları ortaya çıkmıştır. Bir başka değişle, Türk ihracatçı firmaları ürettikleri malların rekabet edebilme ve kar marjlarını korumak amacı ile kur oranındaki değişimi fiyatlarına yansıtmak (pass-through) yerine, piyasalara göre fiyatlandırma (PTM) yaptıkları ortaya çıkmıştır. Oysa, Japonya, Almanya ve ABD gibi diğer gelişmiş ülkelerde bu fiyatlandırma politikları taban tabana zıt görülmektedir. Bu ülkelerin ihracatçı firmaları, döviz kurunun değişimlerini ihracat fiyatlarına yansıtarak, kur riskinden kurtulma yoluna gitmişlerdir. Bu sonuç, Türkiye'nin tekstil dahil olmak üzere belli başlı imalat sektörlerinde küçük ülke varsayımını kanıtlamıştır. Ama buna rağmen döviz kuru değişimleri, ihracatçıların TL bazındaki kar marjlarını (yurtdışı ve yurtiçi satışlarından elde ettikleri) doğrudan etkilediğini söyleyebiliriz.

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Changes in exchange rates, shift in trade policy, and other international developments can significantly influence the profitability and performance of a country's manufacturing industries.

The occurrence of large trade deficits in major countries in recent years has encouraged a discussion on the relationship between exchange rate fluctuations and profit margins. This issue is in the literature in terms of two related concepts namely, "pass-through" and "Pricing to Market" (PTM).

The relationship between exchange rate and price of traded goods both $P_x$ and $P_m$ is explained by the term "pass through" and "pricing to market" in literature. It shows the extent of how change in exchange rate is reflected in export or import prices in foreign currency terms. Shortly, pass through concept can be defined as the degree of how exchange rate changes over reflected into prices of exporters. On the other hand, PTM, pricing to market, is a different pricing behavior that can be defined whether exporters charge different prices in the different markets.

This research aims at testing the relationships between the exchange rate and exporters profit margins with respect to the pass-through and pricing to market behaviors in Turkish Manufacturing industries. We focused only on export prices and exporters profit margins for pass through and pricing to market behaviors. A change in export prices in foreign currency terms, when connected to domestic currency, will alter the domestic producer's profits. Therefore, there is a direct relationship between prices or the extent of pass through and pricing to market behaviors and exporters' profit margins. We will understand pricing behaviors and response of profit margins against exchange rate fluctuations in Turkish Manufacturing industries.

The key question is how an appreciation or depreciation in home currency directly affects the prices both in domestic and foreign markets. We will have direct measures of pass through in Turkish Manufacturing industries. An appreciation or

depreciation in exchange rate may change both foreign currency prices and domestic prices of exports. Thus, we will alter domestic producer's profit margins. We compare our empirical pass through measures against tools for other countries.

Our final aim is to try implications for exporters profits depending on their pricing behavior as measured by pass through coefficients, that is we will test the degree of passed through in Turkish Manufacturing Sector do understand how their profits are affected by exchange rate fluctuations.

Our major findings are that there is no pass through in Turkish manufacturing industries. This means that exchange rate movements do not affect foreign currency export prices or in other words, changes in the TL exchange rates are not reflected in foreign currency export prices. This implies a PTM behavior rather than pass-through pricing behavior.

## II. THE ROLE OF EXCHANGE RATES IN MACROECOMOMIC ADJUSTMENT

The relationship between export prices in domestic currency terms and exchange rates has been referred to as the "pass-through" and "pricing to market" relationship in the empirical literature in international economics. Depreciation in home currency affects the prices of the traded goods sold in both domestic markets and foreign markets.

According to Knetter (1989), there are two paradigms for exchange rate relationships:

1. One is the standard competitive model of trade in which the law of one price holds, but exchange rate fluctuations are associated with large changes in import demand due to other factors. For example, if dollar appreciation is correlated with increase in world demand and industry marginal cost is increasing, then pass-through will be less than complete.
2. Other one is an imperfectly competitive model in which exporters are capable of price discriminating across destination markets as phenomenon,
   Paul Krugman (1987) has labeled "Pricing-to-Market". In this model, incomplete pass-through is typically associated with fluctuations in the markup of price over marginal cost on exports. These fluctuations in markups are believed to be home specific (country-specific). They do not reflect the behavior of prices to other export markets.

There are several extreme cases to show the effects of fluctuations in currency on profit margins. A rise in TL's value forces Turkish exporters to decide how much to alter the prices of traded goods in both domestic and foreign markets. For example, an appreciation in TL, will force the Turkish exporters to decide how much of this change can be reflected to prices in foreign markets. In other words, Turkish export prices in foreign currency terms will decrease when there is an appreciation in Turkish currency so that the foreign prices will decrease in foreign markets. This reflection is a *"pass through"* effect in literature. The coefficient of

pass through is changed by the rate of reflection of exchange rate to foreign market prices. An appreciation in TL will not press the volume and prices of exported goods from Turkey to foreign markets. This brings a reverse effect on Turkish profit margins.

If the reflection of exchange rate fluctuations to foreign prices of Turkish exporters is directly and fully, it can be defined as *"completely pass through"* in literature. The export prices in TL of Turkish firms will not change and an appreciation of TL is fully reflected to foreign consumers with higher foreign prices. Then, Turkish exporters profit margin will be changed, volume of the sales will decrease, and off course this provides lower level of profit margins. It is same for devaluation of Turkish currency as well. Depreciation in Turkish currency, will directly affect the both domestic and foreign prices and Turkish export prices in foreign markets will increase as the rate of exchange rate movement in order to keep higher level of profits. These are the examples of *"completely pass through"* to foreign markets.

Another pricing behavior is the *"pricing to market"* case. PTM (pricing to market) is a policy for exporters that Turkish exporters charge different prices both in domestic and foreign markets. A depreciation in home currency can not reflected to foreign market prices and exporters have different price levels in different markets so that the exporters protect themselves to extreme fluctuation of exchange rate in order to keep their market share and competitiveness.
This study tries to analyze how Turkish exporters compromise between fixed profit margins and fixed export sales when Turkish Lira changes. The effects of exchange rate changes in short-term profit margins can be seen the most in manufacturing industries like machinery and transport equipment, clothing and textile.

The explanation of this thought is that, both of the goods in these industries have more effect on foreign currencies since the percentage rate of exports and imports are very high in these industries. (Table – I). Prices are in TL and any fluctuation in exchange rate will not directly affect the pricing behavior of the firms.

In addition to these, the direction of TL will affect the Turkish exporters profit margin and desire of fixing the prices in foreign markets. Firms increase their profit margins when TL depreciated.

There are several hypothesis and studies exist in International economics literature. Lots of economists are studying the case of Japanese Manufactures against currency fluctuations and arguing the pass-through model and pricing to market behavior of exporters.

Thomas Klitgaard explains profit margin concept was started at the beginning of 1997 Asian Crisis in Japan. Japanese manufacturers in electrical machinery industry selected a fully pass-through pricing policy and the profit margins were better than expected at this sector so that people were wondering about these firms pricing policies, which were not affected by fluctuation of Yen (¥).

If Turkish export prices in TL are fixed (fully passed through change in TL), Turkish goods in foreign market export prices will be affected by (foreign currency)/ TL indexes. According to Klitgaard (1999), there are two possible explanation of how the Japanese firms eliminated the effects of currency fluctuations.

1. Japanese currency, Yen, had an incredible effect on production costs. For example, the stronger of Yen would decrease the input costs of export goods manufactured. The decrease in production costs in Yen (¥) facilitated the decrease of export prices in Yen.
2. Secondly, Japanese Manufacturers keep the risk of the floating of Yen at their profit margins. Every profit margin of sales decreases when Yen (¥) appreciated and every profit margin of sales increased when Yen (¥) devaluated against foreign currencies.

These two possible explanations include Turkish Manufacturing sector too. Especially, after the devaluation in 2001 February, Turkish exporters pricing policies

became a pricing-to-market or completely pass-through models in order to protect themselves from extreme depreciation of TL and deep recession of the economy.

According to Ohno (1989), pass-through, which is the reflection of exchange rate changes to foreign prices, is completed, as if exporter does not adjust the prices in home currency. Thus, fluctuation of exchange rate is completely reflected to foreign market export prices, which is called *Fully Pass-through*. By contrast, if the import prices in local currencies remain stable, it is prices received by exporters that must adjust to exchange rate shocks. In this case, pass-through is said to be zero. This is called characteristics of imperfect competition market by lots of manufacturing industries. Since the pass-through coefficient will be the reflection of reliable pricing behavior of the exporters. The reflection of exchange rate changes to foreign prices can be called *the elasticity of import prices with respect to nominal exchange rate*. Nominal depreciation in home currency becomes some amount of inflation at the country. In nominal depreciation, there will be no depreciation in real terms; neither real exchange rate nor the rate of competitiveness is changed. Export goods in foreign markets are pricing in same amount. Thus, pass-through will be zero and there will be a monetary illusion. But if this depreciation is both in nominal and real terms, everything will change.

Subject to passed studies; export prices of manufacturing goods in US in dollars ($) are insensitive to real currency changes, so that any floating in US dollars will directly reflected to foreign prices. (Full Pass-Through). In contrast, foreign manufacturers often use the pricing-to-market policy, which is different pricing behavior depends on the market structure and country, so that dollar prices of foreign products remain relatively stable even when the dollar appreciates or depreciates.

To estimate the pass-through coefficient correctly, two statistical problems must be overcome:

1. One must control for changes in production cost as Klitgaard (1999) said before, exchange rate itself could systematically affect production cost by lowering and raising the price of tradable inputs. Therefore, even when the

TL appreciates against foreign currencies, foreign prices of Turkish exports may not rise as much as the TL. A nominal TL appreciation systematically raises Turkish costs relative to foreign market costs (that is, the real TL exchange rate) only to extent that inputs are non tradable.

2. Secondly, research must choose between aggregate data and disaggregate data. One could avoid the aggregation problem by looking at a number of highly disaggregate products. But conclusions obtained from such studies cannot be easily generalized because of a very limited coverage of industries and data coverage. In contrast, using aggregate data such as export prices of all manufactured goods runs the risk of incompatibility, since the product mixes of foreign and Turkish industries are not identical.

## III. MODELS OF EXCHANGE RATES - PROFITS RELATIONSHIP

### III.1. Theoretical Models

We have several investigations to improve our model and we tried to prove our hypothesis, which was real depreciation, would boost profits of Turkish Manufacturers whether or not depreciation is pass through fully or not at all.
We try to extend Marston's (1990) Model of pricing to market behavior in international trade. In addition to Marston's model, we used Clarida's (1997) theoretical framework of this subject as well.

First of all we have to explain the Marston's Model of Pricing to Market in international trade. According to Marston's model (1990), pricing to market behavior can be seen most clearly if we consider the case of monopolistic firms in $i^{th}$ the industry producing in the domestic country but selling in both domestic and export markets. These firms charge $P_h$ (in TL terms) in domestic market and $Q_f$ (in foreign currency terms) in export markets. We assume that imperfect arbitrage between markets allows prices to differ in each market. Therefore, firms can take advantage of the profit-maximizing strategy of setting prices according to each market's demand characteristics. The firm sells in the domestic market at a price $P_h$ and in the export market at a price $Q_f$, with Q being expressed in foreign currency. As long as commodity arbitrage by third parties is ineffective, the firm will in general set different prices in the two markets even when expressed in domestic currency. And the firm will vary the relative price of export to domestic goods,

$$X_{it} = (S_t Q_{if}) / Pit, \qquad (1)$$

in response to changes in either demand or cost conditions. It is this ratio of the export to domestic prices of the same good which is termed the *export-domestic price margin*.

According to Marston's model, the effects of depreciation in pricing to market behavior are as follows. The firm is assumed to be produce in the domestic country

subject to the cost function, c{.}, and to face demand functions, h (·) and f(·) in the domestic and foreign markets, respectively. The profit function of the firm can be written as:

$$\Pi_{it} = P_{it}\, h\,(P_{ih}/P_t,\ Yt) + S_t Q_{it}\, f\,(Q_{if}/Q_t,\ Zt) - c\ \{[h(\cdot)+f(\cdot)],\ Wt,\ Pmt\} \quad (2)$$

where

$P_t$, Qf = general price level in the domestic, foreign country,

$Y_t$, $Z_t$ = real income in the domestic, foreign country,

$W_t$, $P^m_t$ = wage, raw materials price in the domestic country.

In short terms:

$$\text{Max}_{\{H,\,F\}}\ \Pi = P_h H + SQ_f F - C\ (W;\ H+F) \quad (3)$$

where $\Pi_{it}$ the TL value of profits, $P_h$ is the TL prices of output – H in quantity – sold domestically, $Q_f$ is the foreign currency price of output – F in quantity – sold abroad, $S_t$ it the TL prices of foreign currency, C is total variable costs in TL. The firm faces home and foreign demand curves for its product so that H, F, $P_h$ and $Q_f$ must satisfy:

$$H = D\ ((P_h/P);\ Y_h); \quad (4)$$

$$F = \delta\ ((Q_f/Q);\ Y_f); \quad (5)$$

where P (Q) is the consumer price index at home (abroad) and $Y_h(Y_f)$ is home (foreign) domestic demand. The firm faces a cost function that is increasing in factor prices W and total output H+F. For ease of exposition, suppose that C is homogeneous of degree $\lambda$ in total output (as is the case for a Cobb-Douglas production function). This implies that marginal cost is proportional to average variable cost U≡ C/ (H+F) with:

$$MC = \lambda\, U. \quad (6)$$

At an optimum, the TL price charge in each market is a markup over marginal cost:

$$P_h = (e_h/(e_h - 1))\ MC; \quad (7)$$

$$Q_f = (e_f/(e_f - 1))\ MC; \quad (8)$$

where $e_h$ is the price elasticity of demand in the home market and $e_f$ is the price elasticity of demand in the export market. Using Equations (4) and (8), we see that, at an optimum, the production of output sold domestically and the production of output sold abroad solve the following two equations:

$$H = D_h\left((e_h/(e_h - 1))\,\lambda U\,(W; H+F)/P; Y_h\right); \quad (9)$$

$$F = D_f\left((e_f/(e_f - 1))\,\lambda U\,(W; H+F)(1/SQ); Y_f\right). \quad (10)$$

Essentially, the model says that with common production cost, differences in prices for any particular market are based on marginal revenue calculations made by the firm, which in turn are calculated by responsiveness of demand to changes in prices. Any negative relationship between demand and prices implies a negative relationship between prices and markups. An exchange rate movement alters profit margins on exports because firms know that letting prices automatically rise when their currency falls reduces the demand for their goods. As a result, export prices, in foreign currency terms, do not adjust one-to-one with exchange rate changes.

Production costs and income also affect relative profit margins when consumer demand characteristics differ across markets. For example, an increase in input costs such as energy or wages would push a firm to raise its prices in both markets, but not necessarily in same amount. The relative change in the two prices depends on how customers in the two markets react to higher prices. The impact of income on profit margins is determined by differences in demand elasticities with respect to prices and to income. The dependence on differences in demand characteristics across markets means that, the model does not require any particular direction for relative margins to move with changes in production costs or income.

In sum, the model suggests that the TL and a set of other variables influence the relative markup, which is measured by the ratio of export price index to the price index for Turkish goods sold in Turkey.

Marston (1990) uses this model to investigate the exchange rate pass-through and pricing to market behaviors. For example, he demonstrates that if marginal cost

and the demand elasticities are constant, a depreciation of the exchange rate must result in a *complete pass-through to the foreign currency prices*, $\partial \log Q_f / \partial \log S = -1$, leaving the TL price of exports, $SQ_f$, and the price of the domestic sales, $P_h$, unchanged. If the marginal cost is increasing, pass-through is incomplete, foreign sales rise, and domestic sales fall, as $P_h$ and $SQ_f$ rise in proportion to the increase in marginal cost. If the demand elasticities are not constant, and markups decline with a rise in product prices, pass-through is less than complete even with constant marginal cost, and the TL price of output sold abroad must rise relative to the domestic price, $P_h$.

Our purpose is now to prove the relationship between manufactures profits and the real exchange rates so we would expect a real depreciation to boost the TL profits of Turkish manufacturers regardless of whether or not said depreciation is passed through fully, partially, or not at all. As used in Marston's model (1990), the pass through coefficient $\upsilon$ is related to the elasticity of the markup $N \equiv e_f / (e_f - 1)$ with respect to the foreign currency price $Q_f$, $- (\partial N / \partial Q_f)(Q_f/N) \equiv \tau$

With constant marginal cost:

$$\upsilon = 1 / (1+ \tau). \qquad (11)$$

In general, at a profit maximizing optimum, it must be the case that:

$$SQ_f = N (Q_f / Q) MC, \qquad (12)$$

where we have imposed the assumption that the foreign demand curve is weakly-separable in foreign domestic demand. Totally, differentiating Equation (3) and dividing by $\Pi$, and using an implication equation (12) that

$$d (Q_f/Q)/(Q_f/Q) = \upsilon (dU/U - dS/S - dQ/Q) \qquad (13)$$

we obtain the following relationship between real profits, domestic sales, production costs the real exchange rate, domestic prices, and exports:

$$\begin{aligned} d \Pi/\Pi - d P/P = {} & [\theta - \eta\psi]dH /H + [\gamma - \eta(1 - \psi)dF /F \\ & + [\gamma (1 - \upsilon)](dS /S + dQ /Q - dP /P) \\ & - [\eta - \upsilon\gamma](dU /U - dP /P) \\ & + [\theta](dP_h /P_h - dP /P) \end{aligned} \qquad (14)$$

where $\theta$, $\gamma$, $\eta$ and $\psi$ are given by:

$$\left.\begin{aligned} \theta &= P_h H \quad \Pi \\ \gamma &= SQ_f F / \Pi \\ \eta &= C / \Pi \\ \psi &= H /(H+F) \end{aligned}\right\} \qquad (15)$$

and $\theta + \gamma - \eta = 1$

For Clarida (1997), there are two channels through which real exchange rate depreciation can boost the real profits of US exporters, a *valuation channel* and a *volume channel*.

The valuation channel, any exchange rate depreciation that is not fully passed through to foreign currency price will result in an increase in the dollar value of export sales for any given volume of exports.

The volume channel, any exchange rate depreciation that is at least partially passed through will lower the foreign currency price of the export, boosting the export volumes and profits for any given dollar value per unit exported.

From Equation (14), the elasticity of real profits with respect to a real depreciation is

$$\begin{aligned} &d \log (\Pi /P) / d \log (SQ /P) \\ &= [\gamma (1 - \upsilon)] + [\upsilon e_f(\gamma - \eta (1 - \psi)], \end{aligned} \qquad (16)$$

where we have used Equation (13) and the fact that $e_f = - d \log F / d \log(Q_f/Q)$. The first part reflects the influence of the valuation effect on exporters profits, while the second part reflects the volume effect.

It is easily verified that profits are homogeneous of degree one and that sales volumes and real profits are homogeneous of degree zero in domestic nominal part that are fully reflected in the nominal exchange rate. An increase in TL production cost and Turkish price level, which accompanied by a depreciation of TL, will induce the price setting exporter to raise its domestic price by an amount, $P_h = M (P_h /P)$ MC, and to leave its foreign price unchanged. With no fluctuation in both domestic

and foreign prices, sales volume and profits are unchanged. An increase in foreign price level, when accompanied by an appreciation of TL. will induce the price setting exporter to raise its foreign currency price, leaving export revenues, and nominal and real profits unchanged.

### III.2. Empirical Findings

There are several studies about the relationship between exchange rate changes and corporate profits in Japanese and U.S. markets but not in Turkish markets.

Theoretically, Pricing-to-Market can arise for many reasons. For a monopolist that price discriminates across export destinations, pricing to market is a function of the convexity of demand schedules (Feenstra (1989), Marston (1990), Knetter (1991)). Demand schedules less convex than a constant-elasticity schedule imply LCPS, which is referred to local-currency price stability by Knetter (1993), whereas those more convex than a constant-elasticity schedule will lead to opposite relationship, like markups increase as the buyer's foreign currency depreciates. In general, it appears that the existence of competitors in any market will impose more discipline on firms in their pricing behavior. In other words, for a given form of the market demand schedule, adding competitors will increase LCPS (Local currency price stability). In dynamic models, pricing to market can occur as a result of adjustment costs or demand linkages.

Pricing to market has been documented by several numbers of recent studies that had a variety of data sets. Based on the movement in four-digit industry U.S. import prices relative to a trade-weighted average of foreign production cost,
Mann (1986) concluded that foreign profit margins are adjusted to decrease the impact of exchange rate changes on the dollar price of U.S. imports. Somewhat surprisingly, U.S. exporters showed no tendency to adjust markups in response to exchange rate changes. U.S. exporters increased profit margins even as the dollar appreciated. Foreign producers seem to have responded to a dollar depreciation by

squeezing profit margins, preserving market share in U.S. Exchange rate changes affect the pricing decisions and profit margins for individual imported products: inflation, relative growth in demand, specific market structure, and trade barriers The profit margins and pricing behavior of U.S. exporters seem even less affected by exchange rate changes.

According to Mann (1986), the empirical evidence suggests that the long-run relationship between the exchange rate and import prices may change. A trend toward buying worldwide by U.S. and foreign multinationals, newly established distributor networks in the U.S. and a greater ability to hedge foreign currency exposure in international credit markets could imply a smaller long-run pass-through of exchange rate changes to import and export prices. In addition, huge competition for U.S. market between established suppliers and newly industrialized countries may lead to permanently lower profit margins on some imports and a long delay in the pass-through of exchange rate depreciation to some import prices. With respect to exports, in contrast, U.S. producers appear to be relatively insensitive to exchange rate changes. (Figure – I).

Knetter's study (1989) of export pricing in U.S. and German seven-digit industries documents strong evidence of LCPS (local currency price stability) on German exports to a variety of destinations, sixteen separate export industry model are estimated on this study. Six was in U.S. export products and ten was German export products. The evidence indicates that U.S. export prices are rather insensitive to exchange rate fluctuations. Once again, there is no evidence of local currency price stability for U.S. exports. On the other hand, German export prices appear to be much more sensitive to exchange rate fluctuations. Adjustment tends to be stabilizing with respect to the local currency price in the destination market. This is especially true for exports to the U.S. Real exports appear to be much more responsive than real imports, which is consistent with the industry evidence on price adjustment.

Giovannini (1988), documents large deviations from the law of one price between export and domestic prices of weakly defined Japanese manufactured

goods: Ball bearings, screws, and nuts and bolts. The main results of the theoretical analysis are that co-movements of prices of individual traded goods and the exchange rate depend not only on demand and cost parameters, but also on the stochastic process followed by the exchange rate. The stochastic properties of the deviations from the "law of one price" depend on preceding price discrimination, as well as exchange rate surprises, which are due to price predetermination.

Marston (1990) finds impressive evidence of pricing to market behavior in a wide range of four-digit Japanese industries that export primarily to the U.S. He used seventeen final products from transport and electrical machinery industries. The evidence strongly suggests that Japanese firms vary their export prices relative to their domestic prices in response to changes in real exchange rates. Japanese firms follow different pricing behavior depending on whether the Yen appreciates or depreciates. More specifically, in periods when the Yen appreciates, these firms may vary the relative price of their exports more than when the Yen depreciates. There is some evidence that pricing to market elasticities are higher in periods when the Yen appreciates, although this is true only in the case of five of the seventeen products. The estimation distinguishes between inadvertent but temporary changes in these margins due to exchange rate surprises and planned changes associated with pricing to market behavior. Japanese firms keep their products competitive abroad. Export-domestic price margins are systematically varied to help Japanese firms protect their competitive position.

In Gannon and Knetter (1993) Japanese auto exporters are estimated to offset approximately 70 % of the effect of exchange rate changes on buyers' prices through markup adjustment. The comparable number of number for German auto exports varies by engine size: for small autos, about 40% of the effect of exchange rate changes is offset by specific markup changes, whereas for large autos adjustment is small. No evidence of pricing to market for a U.S. auto export is found in that study.

According to Krugman (1987), pricing to market appears to be clear related to luxury European automobiles. The evidence suggests that, 35 to 40 percent of real

appreciation of the dollar has been covered by exporters in a rise in their prices to the U.S. compared with prices in other markets. He supported that, explaining pricing to market is not as simple as one might think. Perfectly competitive models would not show the real response. The best way to understand pricing to market is to come from dynamic models of imperfect competition.

Klitgaard (1999), set up a model for Japanese manufacturing profits and exchange rate by using a very wide range of data in industrial machinery, electrical machinery, transportation equipment and precision equipment industries that make possible to address issues about how Japanese profit margins respond to exchange rate fluctuations in the short-run to the Yen (¥). He found that, in three of the four industries examined, the firms aggressively protect their foreign customers from price changes by allowing the profit margins on exports to fall 4 percent (relative to margins on goods sold in Japan) for every 10 percent appreciation of the Yen. Japanese electrical machinery and transportation equipment industries show the short-run responses of profit margin to changes in the Yen are significantly greater than long-run responses. This behavior is due to the fact that, many exports in these two industries are denominated in foreign currency terms, making the change in export prices and profit margins automatically, and off course a proportional response to changes in the Yen. Moreover, the response of profit margins to changes in the Yen is not found to depend on the direction of the Yen movements. Firms are as aggressive at raising export prices and building up profit margins after a reasonable Yen shift as they are at reducing profit margins after the Yen moves against them.

## IV. EXCHANGE RATE AND PROFIT MARGINS IN TURKEY

### IV.1. Empirical Preliminaries

The consequence of a change in Turkish currency value depends on how much of this change is passed through by exporters to their foreign customers or not at all. Before specifying the estimate model for the pass through provide some preliminary statistics on the export and import structure of Turkish Manufacturing sector.

Here in our study, firstly, we have to look at the percentage rate of exports and imports by sectors to see effectiveness of exchange rate to corporate profits. Manufacturing sector is the highest percentage in both exports and imports in Turkey, which is 11.30 % of exports and 10.51% of imports during 1996-1999. Agricultural sector comes the second one in exports share by 8.35% but third by 4% in imports. On the other hand, Mining sector is the second in imports by 5.85%, third in exports about 1,35%. (Table-I).

It is obvious that, manufacturing sector has variety of commodities taken into account compare to other sectors like beginning with iron and steel, chemicals, machinery and transport equipment, textile, clothing, etc. Other products like electricity, gas, water supply, business activities etc. are little percentage about 0.17% in exports and 0.55% in imports. It can be easily seen that percentage rate of manufacturing sector exports and imports must be measured for exchange rate fluctuations and profits relative to other sectors.

**Table: I Sector Composition of Exports and Imports (SITC, Rev.3)**

| BY SECTORS | Exports In % | Imports In % |
|---|---|---|
| 1. AGRICULTURAL PRODUCT | 8,35 | 4,175 |
| 2. MINING PRODUCTS | 1,35 | 5,85 |
| 3. MANUFACTURES | 11,30 | 10,51 |
| 4. OTHER PRODUCTS | 0,17 | 0,55 |

*Source: UFT, 1996-1999

**Table: II Commodity Composition of Exports and Imports in Manufacturing Sector**

| SITC REV.3 | Exports In % | Imports In % |
|---|---|---|
| **i. Iron and Steel** | **6,53** | **3,85** |
| **ii. Chemicals** | **4,22** | **15,49** |
| Plastics | 0,93 | 3,81 |
| Pharmaceutical Products | 0,48 | 2,85 |
| Other Chemicals | 2,81 | 8,83 |
| **iii. Other Semi-Manufactures** | **7,74** | **5,53** |
| Leather, Leather Manufactures, n.e.s. and Dressed Fur skins | 0,18 | 0,31 |
| Rubber Manufactures | 1,28 | 0,69 |
| Cork and Wood Manufactures | 0,17 | 0,18 |
| Paper and Paperboard and Articles of Paper-Pulp, of Paper | 0,56 | 1,81 |
| Non-Metallic Mineral Manufactures | 3,23 | 0,93 |
| Lime, Cement and Fabricated Construction Materials | 1,08 | 0,13 |
| Glass and Glassware | 1,16 | 0,38 |
| Others | 0,99 | 0,42 |
| Manufactures of Metals | 2,31 | 1,61 |
| **iv. Machinery and Transport Equipment** | **18,94** | **37,8** |
| **Automotive Products** | **5,41** | **8,12** |
| Office Machines and Telecommunications Equipment | 3,09 | 10,63 |
| Other Machines and Transport Equipment | 10,45 | 19,05 |
| Power Generating Machinery | 0,52 | 1,68 |
| Other Non-Electrical Machinery | 2,77 | 10,22 |
| Other Transport Equipment | 3,52 | 4,14 |
| Electrical Machinery and Apparatus | 3,63 | 3 |
| **v. Textiles** | **13,08** | **4,69** |
| **vi. Clothing** | **24,51** | **0,51** |
| Articles of Apparel, Clothing Accessories & Other Articles | 1,16 | 0,03 |
| Other Clothing Apparels | 23,35 | 0,48 |
| **vii. Other Consumer Goods** | **4,06** | **5,7** |
| Prefab. Buildings, Sanitary Plumbing, Heating & Lighting Fixtures | 0,58 | 0,47 |
| Furniture and Parts thereof | 0,53 | 0,36 |
| Travel Goods, Handbags and Similar Containers | 0,12 | 0,07 |
| Footwear | 0,41 | 0,2 |
| Professional, scientific and Controlling Instruments and Apparatus | 0,18 | 1,66 |
| Others | 2,24 | 2,93 |

*Source: UFT, 1996-1999

When we looked at the manufacturing sector in detail, we can easily say that, clothing branch is the highest percentage by 24.51 % in exports of total manufacturing sector. Machinery and transport equipment branch is in the second place about approximately 19% and textile is in the third place about 13%. Both other semi manufacturers like leather, mineral and metal manufactures; and iron and steel are about 7%. The export of automotive products is about 6%. Other consumer goods like footwear, furniture, prefabric buildings etc. are approximately 4%.

On the other hand, the imports of machinery and transport equipment are the highest percentage about more than 37% in manufacturing sector. Chemical products like pharmaceutical products are in the second place about 15% and automotive products are in the third about 8% imports of total manufacturing products. Imports of semi manufacturers and consumer products are both 5% in total manufacturing sector.

When we looked at the mining sector, total exports are about 1.35% and imports are 5.85%. The export of metal scarps and metalliferous ores are 1.59, mineral fuels and related materials like coal, coke, and petroleum are 1.27% and imports of mineral fuels, lubricants and related materials are about 13%. Exports of mining sector can be ignorable since this sector percentage is very low compared to other sectors like manufacturing and agricultural products.

**Table: III Commodity Composition of Exports & Imports (SITC REV.3)**
**In Mining Products Sector**

| | Exports In % | Imports In % |
|---|---|---|
| **i. Metalliferous Ores and Metal Scarp** | **1,59** | **2,32** |
| **ii. Mineral Fuels, Lubricants and Related Materials** | **1,27** | **13,21** |
| Coal, Coke and Briquettes | 0 | 0,85 |
| Petroleum, Petroleum Products and Related Materials | 1,16 | 8,56 |
| Gas, Natural and Manufactured | 0,05 | 3,61 |
| Electric Current | 0,05 | 0,2 |
| **iii. Non-Ferrous Metals** | **1,2** | **2,01** |

*Source: UFT, 1996-1999

When we looked at the agricultural sector indeed, the export of foods are in the first place with 15% especially food and live animals Agricultural raw materials like hides, fur skins, textile fibers, pulp and waste paper are 1.35%. In imports foods are 5% in agricultural sector.

| **Table: IV Commodity Composition of Exports & Imports (SITC REV.3) In Agricultural Products Sector** | **Exports In %** | **Imports In %** |
|---|---|---|
| **i. Food** | **15,36** | **5,01** |
| Food and Live Animals | 12 | 2,64 |
| Live Animals | 0,05 | 0,06 |
| Cereals and Cereal Preparations | 1,43 | 1,03 |
| Vegetables and Fruit | 8,02 | 0,39 |
| Sugars, Sugar Preparations and Honey | 0,82 | 0,04 |
| Others | 1,69 | 1,12 |
| Beverages and Tobacco | 2,26 | 0,76 |
| Beverages | 0,15 | 0,04 |
| Tobacco and Tobacco Manufactures | 2,11 | 0,72 |
| Animal and Vegetable Oils, Fats, Waxes | 0,96 | 1,07 |
| Oil Seeds and Oleaginous Fruits | 0,14 | 0,54 |
| **ii. Agricultural Raw Materials** | **1,34** | **3,34** |
| Hides, Skins and Fur skins, Raw | 0,04 | 0,25 |
| Crude Rubber | 0,03 | 0,33 |
| Cork and Wood | 0,09 | 0,39 |
| Pulp and Waste Paper | 0 | 0,4 |
| Textile Fibers and Their Wastes | 0,88 | 1,73 |
| Crude Animal and Vegetable Materials | 0,3 | 0,24 |

*Source: UFT, 1996-1999

## IV.2. Formal Empirical Tests

We now present the estimating pass-through equation based on model of Klitgaard (1999) by estimating the response of Turkish Manufacturing profits to exchange rate changes. The Model is:

$$P_{xt} - P_{ht} = \beta_0 + \beta_1 (S_t + P_t^* - P_t) + \beta_2 (C_t - P_t) + \beta_3 EC_t + \beta_4 Y_t + \beta_5 Y_t^* + U_t \quad (17)$$

where

$P_{xt}$ = TL price of exports

$P_{ht}$ = Price of Turkish goods sold in Turkey

$S_t$ = Exchange rate

$P_t$ = Overall wholesale price index

$C_t$ = Labor cost

$EC_t$ = Energy cost

$Y_t$ = Income

$P_t^*$ = Overall wholesale foreign price index

$Y_t^*$ = Foreign Income

*** Data are taken from Central Bank of Turkey and Treasury for the model.

We test this equation by using monthly data over 1994-2001 periods. We estimate this model for total Turkish Manufacturing industry level, textile, clothing, machinery and transport equipment industries. Estimation is carried out in Eviews 3.0 Software Package. Below we present Eviews estimation outputs that have different notations and we make necessary notational connections to the original structural model under Eviews tables.

All variables are in log levels. Coefficients on the real exchange rate, real labor cost, real energy cost and real output measures are dictated by the demand characteristics faced by each industry in both foreign and domestic markets. We estimate the model by the OLS techniques followed shortcuts. Below we estimate two versions of original empirical model. There are:

1. Simple short-run Model (Estimating model 1)
2. Error Correction Model (Estimating model 2)

The expected signs on the coefficients are as follows:

| Coefficients | Expected Signs | Meanings |
|---|---|---|
| Real Exchange Rate, β1 | (0 <β1<1)<br>(β1 = -1)<br>(-1< β1<0) | NO pass through, High PTM<br>Complete pass through, NO PTM<br>High pass through, Low PTM |
| Real Labor Cost, β2 | +<br>- | Direct Relationship between Exchange rate and Labor Cost,<br>Inverse relationship between Exchange rate and Labor Cost. |
| Real Energy Cost, β3 | +<br>- | Direct Relationship between Exchange rate and Energy Cost,<br>Inverse relationship between Exchange rate and Energy Cost. |
| Domestic Income, β4 | +<br>- | Direct Relationship between Exchange rate and Domestic Income,<br>Inverse relationship between Exchange rate and Domestic Income. |
| Foreign Income, β5 | +<br>- | Direct Relationship between Exchange rate and Foreign Income,<br>Inverse relationship between Exchange rate and Foreign Income. |

**TABLE VI -a:**

LS // Dependent Variable is D(A)
Date: 03/12/02 Time: 13:20
Sample(adjusted): 1994:03 2001:06
Included observations: 88 after adjusting endpoints
D(A)=C(1)+C(2)*D(B)+C(3)*D(E)+C(4)*D(F)+C(5)*D(LYT)+C(6)*D(LYTT)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.025182 | 0.004477 | -5.624364 | 0.0000 |
| C(2) | 0.512966 | 0.064595 | 7.941318 | 0.0000 |
| C(3) | 0.156316 | 0.086469 | 1.807771 | 0.0743 |
| C(4) | 0.000760 | 0.002685 | 0.283042 | 0.7779 |
| C(5) | -0.003201 | 0.026821 | -0.119358 | 0.9053 |
| C(6) | 0.304729 | 0.404356 | 0.753615 | 0.4532 |

| | | | |
|---|---|---|---|
| R-squared | 0.648240 | Mean dependent var | -0.048454 |
| Adjusted R-squared | 0.626791 | S.D. dependent var | 0.042848 |
| S.E. of regression | 0.026176 | Akaike info criterion | -7.220055 |
| Sum squared resid | 0.056186 | Schwarz criterion | -7.051146 |
| Log likelihood | 198.8158 | F-statistic | 30.22270 |
| Durbin-Watson stat | 1.778991 | Prob(F-statistic) | 0.000000 |

The sample period extends from January 1994 to October 2001. Variables are in log-level form. The regressions follow the Ordinary Least Squares (OLS) method as described in this part. The t-statistics, standard errors and coefficients are available in the first part of the table based on Newey-West adjusted standard errors.

The notations, A, B, E and F are as follows:

$$A = \ln P_x - \ln P_h$$

$$B = \ln S_t + \ln P_t - \ln P_t^*$$

$$E = \ln C_t - \ln P_t$$

$$F = \ln EC_t - \ln P_t$$

where,

$C_t$ = Seasonal Adjustment of labor cost in Turkey from Jan.1994 to Oct. 2001.

$EC_t$ = Seasonal Adjustment of energy cost in Turkey from Jan. 1994 to Oct.2001

$LY_t$ = Logarithmic terms of domestic output which is Turkish GNP:

$LY_{tt}$ = Logarithmic terms of foreign output which is OECD-GNP.

Also, we made a seasonal adjustment with Eviews 3.0 X11 some of the data since these were three-month averaged for converting into monthly statistics, which are $C_t$ (Labor Cost) and $EC_t$ (Energy Cost).

The results from error correction version are given in Table -VI.

TABLE VI - b:

LS // Dependent Variable is D(A)
Date: 03/12/02 Time: 14:59
Sample(adjusted): 1994:04 2001:06
Included observations: 87 after adjusting endpoints
D(A)=C(1)+C(2)*D(B)+C(3)*D(E)+C(4)*D(F)+C(5)*D(LYT)+C(6)*D(LYTT)
+C(7)*D(RES)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.026926 | 0.003258 | -8.264947 | 0.0000 |
| C(2) | 0.435587 | 0.049152 | 8.861967 | 0.0000 |
| C(3) | 0.197139 | 0.063266 | 3.116036 | 0.0025 |
| C(4) | 0.002255 | 0.001950 | 1.156906 | 0.2508 |
| C(5) | -0.014718 | 0.019444 | -0.756955 | 0.4513 |
| C(6) | 0.056407 | 0.293954 | 0.191892 | 0.8483 |
| C(7) | 0.531090 | 0.062551 | 8.490541 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.820304 | Mean dependent var | -0.048314 |
| Adjusted R-squared | 0.806827 | S.D. dependent var | 0.043076 |
| S.E. of regression | 0.018933 | Akaike info criterion | -7.856694 |
| Sum squared resid | 0.028676 | Schwarz criterion | -7.658287 |
| Log likelihood | 225.3185 | F-statistic | 60.86620 |
| Durbin-Watson stat | 0.838431 | Prob(F-statistic) | 0.000000 |

The econometric Eviews notations are:

$$\Delta (P_{xt} - P_{ht}) = a_1 + b_1 u\Delta (s_{t-i} + P_{t-i} - P^*_{t-i}) + (\Delta (C_{t-i} - P_{t-i})) + \Delta (EC_{t-i}) + \Delta Y_{t-i} + \Delta Y^*_{t-i} + \Delta (P_{xt-i} - P_{ht-i}) + e_i \quad (18)$$

First coefficient C (1) that is constant and C (5), which is domestic output, is negative. The coefficient of exchange rate C (2) is positive in all of the outputs which means the pricing behavior of Turkish exporters are very different than the other countries. These positive coefficients mean that Turkish exporters do not reflect

exchange rate fluctuations into their foreign currency prices, and therefore there is NO pass-through but however, there is a PTM behavior Foreign export prices are constant and are not affected by exchange rate changes. Here in OLS output, coefficient of exchange rate, $\beta 1$, is positive, 0.51, which means any appreciation or depreciation in TL, is not reflected to foreign prices.

Export-domestic price margins are systematically varied to help Turkish firms protect their competitive position and sometimes keeping very constant since Turkish economy was in a recession. Turkish exporters are adding the difference of foreign and domestic prices to their profit margins rather than fluctuating the foreign prices when TL appreciates or depreciates (Pass-through). So that, when TL depreciates, the manufacturing profit margins of Turkish exporters are getting higher and when TL appreciates, profit margins became lower.

This behavior can easily seen on clothing, textile and machinery equipment sectors as well and it is due to the fact that many exports in these three industries are denominated in foreign currency terms, not making any change in export prices but profit margins an automatic, proportional response to changes in the TL. The response of profit margins to changes in the TL is found to depend directly on the direction of the TL movements. Firms are not very as aggressive at raising export prices since they want to protect their competitiveness in foreign markets and building up profit margins after a big TL shift as they are at reducing profit margins after the TL moves against them.



The evidence indicates that Turkish export prices are rather insensitive to exchange rate fluctuations. Once again, there is no evidence of local currency price stability for Turkish exports. Adjustment tends to be stabilizing with respect to the local currency price in the foreign market. This is especially true for exports to the Turkish real exports appear to be much more responsive than real imports, which is consistent with the industry evidence on price adjustment. Especially in textile industry, the coefficient of exchange rate is higher than clothing and machinery equipment.

**TABLE VI – c:**

**CLOTHING**

LS // Dependent Variable is D(X)
Date: 03/12/02 Time: 14:20
Sample(adjusted): 1994:03 2001:06
Included observations: 88 after adjusting endpoints
D(X)=C(1)+C(2)*D(B)+C(3)*D(E)+C(4)*D(F)+C(5)*D(LYT)+C(6)*D(LYTT)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.030107 | 0.006225 | -4.836125 | 0.0000 |
| C(2) | 0.376373 | 0.089815 | 4.190536 | 0.0001 |
| C(3) | 0.019073 | 0.120230 | 0.158633 | 0.8743 |
| C(4) | 0.006518 | 0.003733 | 1.745857 | 0.0846 |
| C(5) | -0.019754 | 0.037294 | -0.529684 | 0.5978 |
| C(6) | 0.665157 | 0.562233 | 1.183062 | 0.2402 |

| | | | |
|---|---|---|---|
| R-squared | 0.286305 | Mean dependent var | -0.045893 |
| Adjusted R-squared | 0.242787 | S.D. dependent var | 0.041827 |
| S.E. of regression | 0.036397 | Akaike info criterion | -6.560814 |
| Sum squared resid | 0.108626 | Schwarz criterion | -6.391905 |
| Log likelihood | 169.8092 | F-statistic | 6.578997 |
| Durbin-Watson stat | 1.831601 | Prob(F-statistic) | 0.000034 |

**TABLE VI – d:**

**TEXTILES**

LS // Dependent Variable is D(Y)
Date: 03/12/02 Time: 14:22
Sample(adjusted): 1994:03 2001:06
Included observations: 88 after adjusting endpoints
D(Y)=C(1)+C(2)*D(B)+C(3)*D(E)+C(4)*D(F)+C(5)*D(LYT)+C(6)*D(LYTT)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.019350 | 0.004556 | -4.247187 | 0.0001 |
| C(2) | 0.584978 | 0.065731 | 8.899562 | 0.0000 |
| C(3) | 0.172428 | 0.087991 | 1.959619 | 0.0534 |
| C(4) | 0.003472 | 0.002732 | 1.270861 | 0.2074 |
| C(5) | 0.024516 | 0.027293 | 0.898231 | 0.3717 |
| C(6) | -0.030041 | 0.411471 | -0.073009 | 0.9420 |

| | | | |
|---|---|---|---|
| R-squared | 0.685204 | Mean dependent var | -0.046439 |
| Adjusted R-squared | 0.666009 | S.D. dependent var | 0.046091 |
| S.E. of regression | 0.026637 | Akaike info criterion | -7.185172 |
| Sum squared resid | 0.058181 | Schwarz criterion | -7.016263 |
| Log likelihood | 197.2810 | F-statistic | 35.69723 |
| Durbin-Watson stat | 1.843366 | Prob(F-statistic) | 0.000000 |

**TABLE VI – e:**

**MACHINERY EQUIPMENT**

LS // Dependent Variable is D(Z)
Date: 03/12/02 Time: 14:23
Sample(adjusted): 1994:03 2001:06
Included observations: 88 after adjusting endpoints
D(Z)=C(1)+C(2)*D(B)+C(3)*D(E)+C(4)*D(F)+C(5)*D(LYT)+C(6)*D(LYTT)

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C(1) | -0.031284 | 0.004593 | -6.810712 | 0.0000 |
| C(2) | 0.340693 | 0.066270 | 5.140971 | 0.0000 |
| C(3) | 0.011170 | 0.088712 | 0.125910 | 0.9001 |
| C(4) | -0.001213 | 0.002755 | -0.440326 | 0.6609 |
| C(5) | -0.008011 | 0.027517 | -0.291142 | 0.7717 |
| C(6) | 0.386647 | 0.414845 | 0.932028 | 0.3541 |

| | | | |
|---|---|---|---|
| R-squared | 0.387165 | Mean dependent var | -0.045828 |
| Adjusted R-squared | 0.349797 | S.D. dependent var | 0.033305 |
| S.E. of regression | 0.026855 | Akaike info criterion | -7.168836 |
| Sum squared resid | 0.059139 | Schwarz criterion | -6.999926 |
| Log likelihood | 196.5622 | F-statistic | 10.36087 |
| Durbin-Watson stat | 1.713893 | Prob(F-statistic) | 0.000000 |

## CONCLUSION:

Turkish Manufacturing firms keep stable the foreign prices of their exports when the TL's value changes, which is a strategy that makes profit margins an important channel through which exchange rate affects the Turkish Economy.

We have found the exchange rate coefficient, $\beta 1$, is all positive in all our estimations, Turkish exporters pricing behavior, is PTM rather than a pass-through which means Turkish exporters set different prices in different markets. For major exporting countries like Japan, Germany and US have high or complete pass-through relationship; the real exchange rate coefficient is negative that exporters directly reflect the exchange rate fluctuations to foreign prices in order to minimize their currency risks.

A positive coefficient in the Turkish case indicates that Turkish exporters keep dollar prices constant, in order not to loose their competitiveness abroad. However, changes in TL exchange rate tend to increase the Turkish Exporters' profit margins in domestic currency terms (TL).

We here in our study, estimate three main industries in Turkish manufacturing sector. These are: clothing, textile and machinery and transport equipment. The evidence indicates that Turkish export prices in foreign currency terms are rather insensitive to exchange rate fluctuations. Exchange rate movements exert at the stabilizing effect on the local currency prices. However, there is significant evidence that exchange rate changes affect profit margins in local currency terms. That is exchange rate depreciation creates a positive wedge between exports and domestic prices in TL terms, which is an encouraging way for exporters.

**REFERENCES:**


Athukorala P., and Menon, J., (1994) 'Pricing to Market Behavior and Exchange Rate Pass-Through in Japanese Exports' *The Economic Journal*, 104, 271-281.

Betts, C., and Devereux, M., (1996) ' The Exchange Rate in a Model of Pricing-To-Market' *European Economic Review*, 40, 1007-1021.

Betts, C., and Devereux, M., (2000) 'Exchange Rate Dynamics in a Model of Pricing-To-Market' *Journal of International Economics*, 50, 215-244

Campa, J., and Goldberg, L., (1995) 'Investment in Manufacturing, Exchange Rates and External Exposure' *Journal of International Economics*, 38, 297-320

Campa, J., and Goldberg, L., (1997) 'The Evolving External Orientation of Manufacturing: A Profile of Four Countries' *Federal Reserve Bank of NY, Economic Policy Review*, July 1997, 53-81.

Campa, J., and Goldberg, L., (1999) 'Investment, Pass-Through, and Exchange Rates: A Cross-Country Comparison' *International Economic Review*, 40(2), 287-314.

Clarida, R., (1997) 'The Real Exchange Rate and US Manufacturing Profits: A Theoretical Framework with some Empirical Support' *International Journal of Financial Economics*, 2, 177-187.

Dornbusch, R., (1987) 'Exchange rates and Prices' *The American Economic Review*, 77, 93-106

Feenstra, R., (1989) 'Symmetric Pass-through of Tariffs and Exchange rates Under Imperfect Competition: An Empirical Test' *Journal of International Economics*, 27, 25-45

Froot, K., and Klemperer, P., (1989) 'Exchange Rate Pass-Through When Market Share Matters' *The American Economic Review*, 79, 637-654

Gagnon, J. and Knetter, M., (1995) 'Markup adjustment and exchange rate fluctuations: evidence from panel data on automobile exports' *Journal of International Money and Finance*, 14, 289-310

Giovannini, A., (1988) 'Exchange Rates and Traded Goods Prices' *Journal of International Economics*, 24, 45-68

Goldberg, P., and Knetter, M., (1997) ' Goods Prices and Exchange Rates: What Have We Learned?' *Journal of Economic Literature*, 35, 1243-1272

Goldberg, P., and Knetter, M., (1999) 'Measuring the intensity of competition in export Markets' *Journal of International Economics*, 47, 27-60.

Gross, D., and Schmitt, N., (2000) 'Exchange Rate Pass-Through and Dynamic Oligopoly: An Empirical Investigation' *Journal of International Economics*, 52, 89-112

Kadiyali, V., (1997) 'Exchange Rate Pass-Through for Strategic Pricing and advertising: An Empirical Analysis of the US photographic film Industry' *Journal of International Economics*, 43, 437-461.

Klitgaard, T., (1999) 'Exchange Rates and Profit Margins: The Case of Japanese Exporters' *Federal Reserve Bank of NY, Economic Policy Review*, April 1999, 41-54.

Knetter, M., (1989) 'Price Discrimination by US and German Exporters' *The American Economic Review*, 79(1), 198-210

Knetter, M., (1993) 'International Comparisons of Pricing-To-Market Behavior' The *American Economic Review*, 83, 473-486

Krugman, P., (1987) 'Pricing To Market When the Exchange Rate Changes' in Arndt, S.W. and Richardson, J.D. (eds.), *Real-Financial Linkages among Open Economies*, MIT Press, Cambridge MA, London, UK, 49-70

Mann, C.L., (1986) 'Prices, Profit Margins, and Exchange Rates' *Federal Reserve Bank of Washington*, June 1986, 72.

Marston, R., (1990) 'Pricing to Market in Japanese Manufacturing' *Journal of International Economics*, 29, 217-236.

Ohno, K., (1989) 'Export Pricing Behavior of Manufacturing' *IMF Staff Paper*, 36(3), 550-579.

Rockerbie, D., (1992) 'Exchange Rates, Pass-Through, and Canadian Export Competitiveness: An Analysis using vector Auto Regression' *Applied Economics*, 24, 627-634

Stock, J., and Watson, M., (1993) 'A simple Estimator of Co integration vectors in higher order Integrated Systems' *Econometrica*, 4, 783-820

Tange, T., (1997) 'Exchange Rates and Export Prices of Japanese Manufacturing' *Journal of Policy Modeling*, 19(2), 195-20

OECD (1994-2002) 'Economic Outlook' *Working Paper Data*, 1-5

OECD (1994-2002) 'Monthly Statistics' *Monthly Bulletin*, 1-2-18

DIE (1994-2002) ' *Devlet Istatistik Enstütüsü Haber Bülteni*', 192, 1-8

# APPENDICES

## APPENDIX I: DATA SOURCES

We used the variety of data in our model from the sources of SIS (State Institute of Statistics), SPO (State Planning Organization), CBTR (Central Bank of Turkish Republic), UFT (Under secretariat Foreign Trade), TTO (Turkish Treasury Office), OECD Monthly Statistics, and OECD Economic Outlook Bulletins.

Turkish price data, at the wholesale level, are available for Turkish exporters and for goods made by Turkish firms that are sold in Turkish domestic market. The prices indexes, (TL price of exports, price of Turkish goods sold in Turkey, domestic overall wholesale price index) published by the Central Bank of Turkey, monthly from January, 1994 to October 2001. Also, exchange rate indexes and income (GDP) are taken to CBTR. Labor cost which was taken for production cost was calculated by SPO. (State Planning Organization.) And Energy cost was taken from Central Bank of Turkey, Monthly Bulletin. Foreign wholesale price index was taken from FRNY, USA (Federal Reserve Bank of New York). We took the foreign income as OECD Countries Total GDP and foreign income index was taken from OECD Monthly Statistics Bulletin. All these indexes were taken from the period of January 1994 to October 2001, and are monthly adjusted using the X-11 (multiplicative) command in the Eviews 3 Software Package.

## APPENDIX – II: Tables

Table: VII Exports and Imports By Countries

| | Exports In % | Imports In % |
|---|---|---|
| **A. OECD Countries** | **65,1** | **68,6** |
| 1. EU Countries | 78,4 | 73,1 |
| 2. EFTA Countries | 2,0 | 3,5 |
| 3. Other OECD Countries | 19,6 | 23,4 |
| **B. Turkish Free Zones** | **2,4** | **0,7** |
| **C. Non OECD Countries** | **32,4** | **30,6** |
| 1. Europe + CIS Countries | 38,1 | 37,4 |
| 2. African Countries | 17 | 15,5 |
| 3. American Countries | 2,8 | 4,3 |
| 4. Middle East Countries | 27,2 | 18,3 |
| 5. Other Asian Countries | 10,2 | 19,9 |
| 6. Other Countries | 4,7 | 4,7 |

*Source: SIS; SPO, 1997-2001

## APPENDIX – III: Figures

A Model of Foreign Suppliers' Profit Margins and Pass-through

**FIGURE - I**

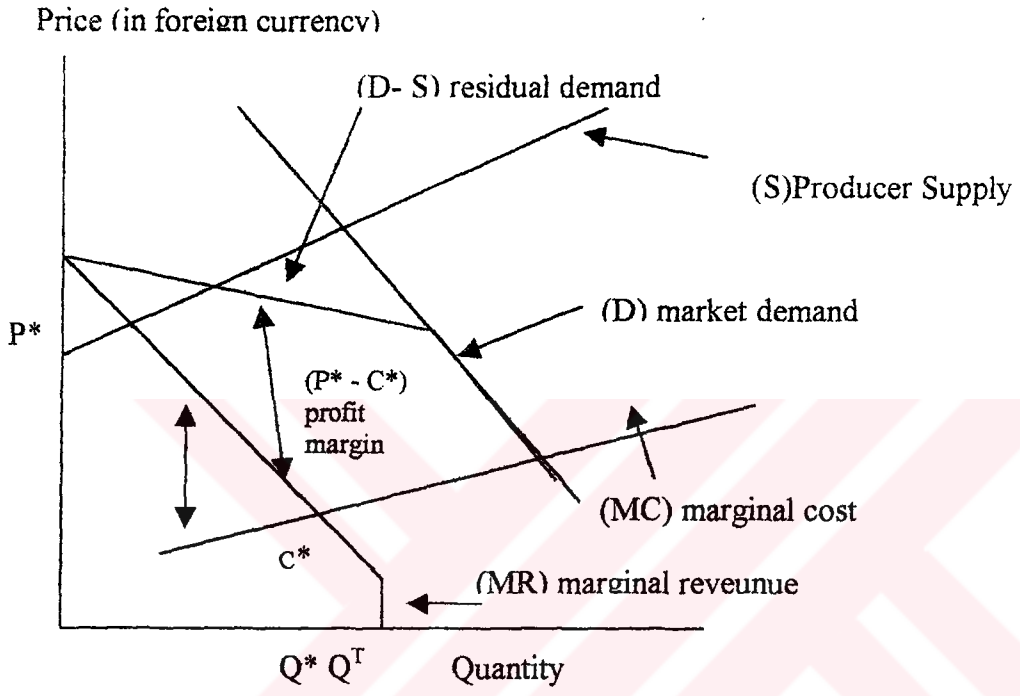



**FIGURE - II**

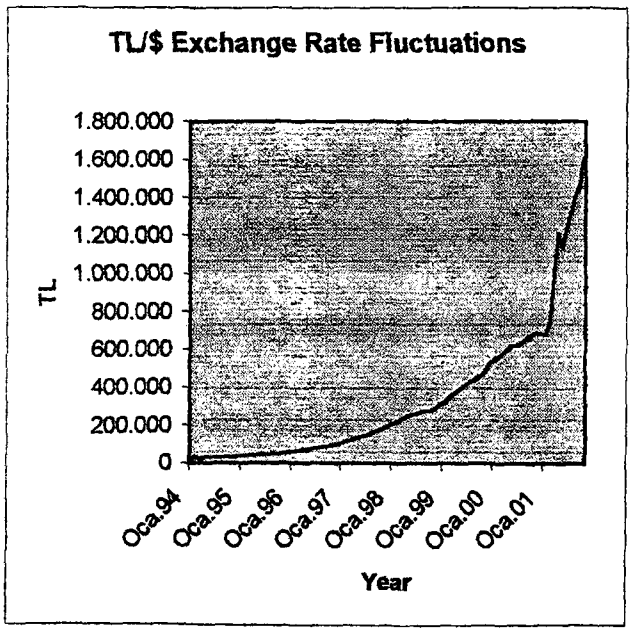
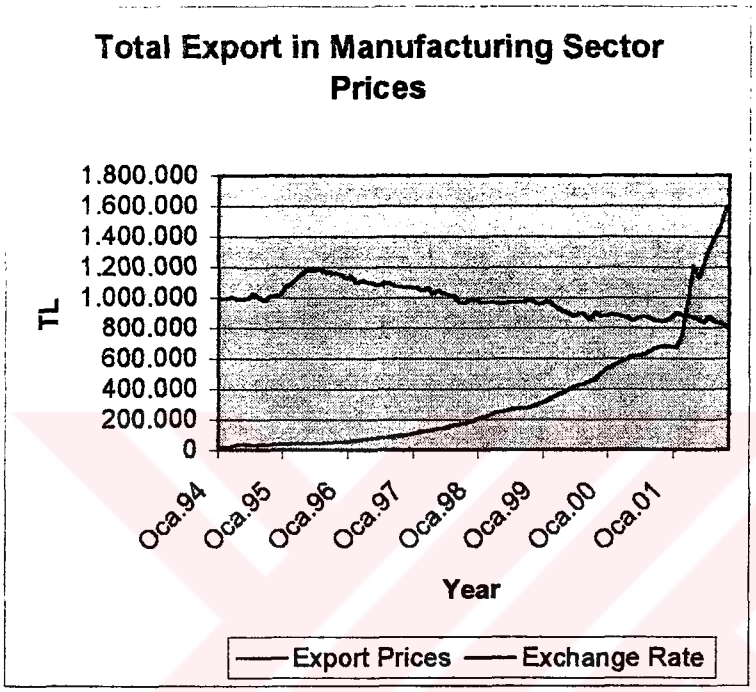


**FIGURE – III**


Total Export in Manufacturing Sector Prices
1.800.000
1.600.000
1.400.000
1.200.000
1.000.000
800.000
600.000
400.000
200.000
0
TL
Oca.94
Oca.95
Oca.96
Oca.97
Oca.98
Oca.99
Oca.00
Oca.01
Year
Export Prices
Exchange Rate

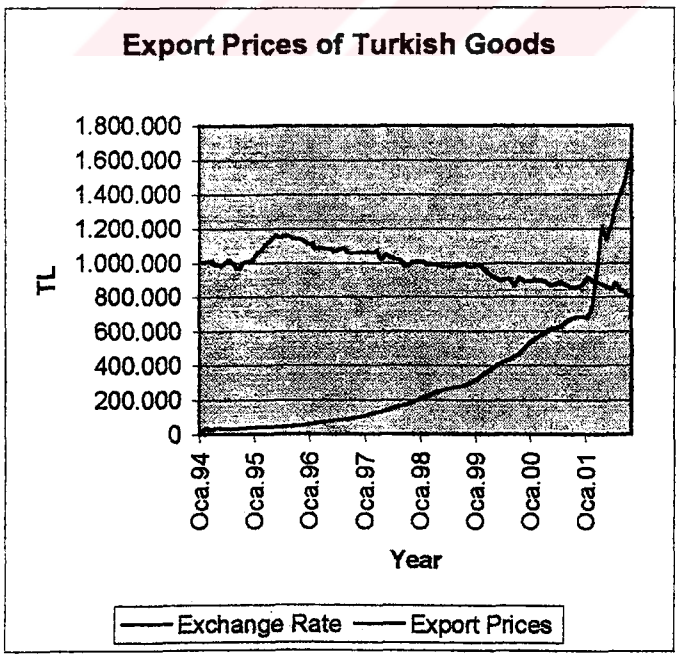
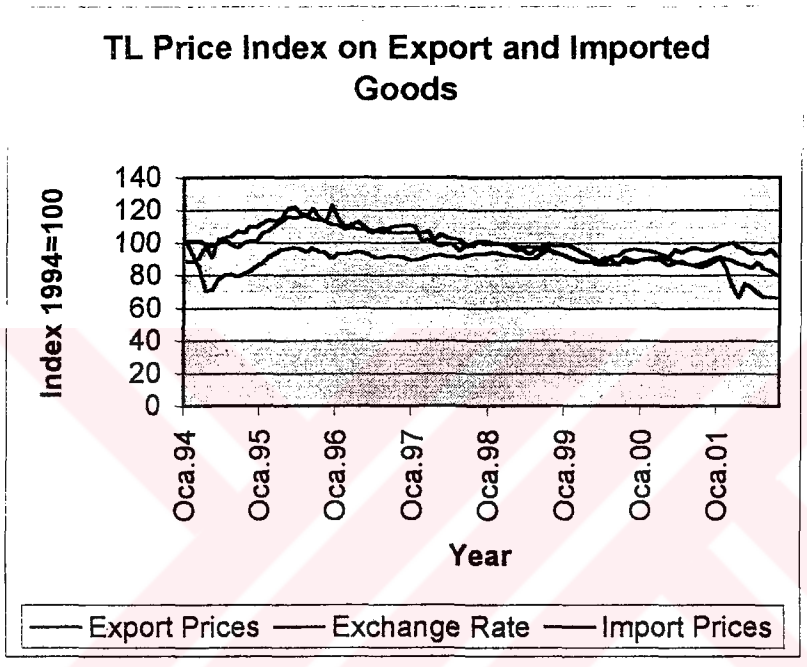

Export Prices of Turkish Goods
1.800.000
1.600.000
1.400.000
1.200.000
1.000.000
800.000
600.000
400.000
200.000
0
TL
Oca.94
Oca.95
Oca.96
Oca.97
Oca.98
Oca.99
Oca.00
Oca.01
Year
Exchange Rate
Export Prices

FIGURE – IV


TL Price Index on Export and Imported Goods
Index 1994=100
140
120
100
80
60
40
20
0
Oca.94
Oca.95
Oca.96
Oca.97
Oca.98
Oca.99
Oca.00
Oca.01
Year
Export Prices
Exchange Rate
Import Prices