

CHAPTER 6
ESTIMATION OF INJURY TO H-SECTION
STEEL PRODUCT INDUSTRY

To achieve the second objective of the study, the following section offers the method of estimating the magnitude of injury. The method developed by Murray and Rousslang¹ will be adopted to estimate the injury caused by dumped imports. Section one contains an analytical framework of the estimation of the magnitude of injury. Section two and section three discuss the effect of dumped imports on the price of dumped imports and the effect on the demand for the competing domestic product respectively. The effects of unfair imports on the domestic price is examined in Section four while Section five and Section six give an explanation of losses to the domestic industry and empirical results respectively.

6.1 Analytical Framework

For analytical framework, we estimate the injury to the domestic industry caused by unfair trade practice by searching for the differences between the statute of industry in the presence of the unfair trade practice (dumping) and its statute in the hypothetical situation which may occur if the unfair trade practice (dumping) is absent. The hypothetical situation cannot be observed and must be estimated.

In order to estimate the hypothetical situation, we construct a model in which dumped imports, competing fair imports, and competing domestic output are imperfect substitutes for each other. As illustrated in figure 6.1, panels U, F, D and O represent the domestic market for the dumped imports, competing fair imports, competing domestic output, and the aggregate of all other products combined respectively.

¹ Tracy Murray and Donald Rousslang, "A Method for Estimating Injury Caused by Unfair Trade Practices," International Review of Law and Economics 9(1989): 149-164.

Next, we shall assume that the supplies in these panels except competing domestic output are infinitively elastic. The dark line represents the actual demand and the supply curves in the presence of dumped imports and the dotted lines represent the hypothetical curves in the absence of dumped imports. A prime symbol denotes a hypothetical value for a variable.

We begin with the presumption that the elimination of dumped imports would cause P_u in panel U to rise to P'_u . This price increase would cause the demands for competing domestic output and fair imports to shift to the right as shown in panels F and D. The demand for the aggregate of non-competing goods in panel O is also shown as shifting to the right. Removing the unfair trade practices shifts the demand curve for domestic output to D' . Price and quantity sold increase to P' and Q'' . Thus, domestic output expands by less than the horizontal shift in demand (the distance between Q and Q'). Total revenue of domestic firms in the industry increases from rectangle $OQaP$ to rectangle $OQ''bP'$. The part of the revenue gain given by trapezoid $PabP'$ is called the gain in producer surplus. The trapezoid $QQ''ba$ is called the output effect. Hence, the losses in producer surplus caused by the unfair trade practice and adverse output effect are trapezoid $PabP'$ and trapezoid $QQ''ba$ respectively.

Having discussed the analytical framework, we now proceed to describe how it is applied to estimate the effects of an unfair trade practice. The following section provides determination of how dumping affects the price of unfair imports, how the change in price of unfair imports causes demand for the competing domestic output to shift and how this demand shift affects price and output in the competing domestic industry.

6.2 The Effect of Dumping on the Price of Unfair Imports

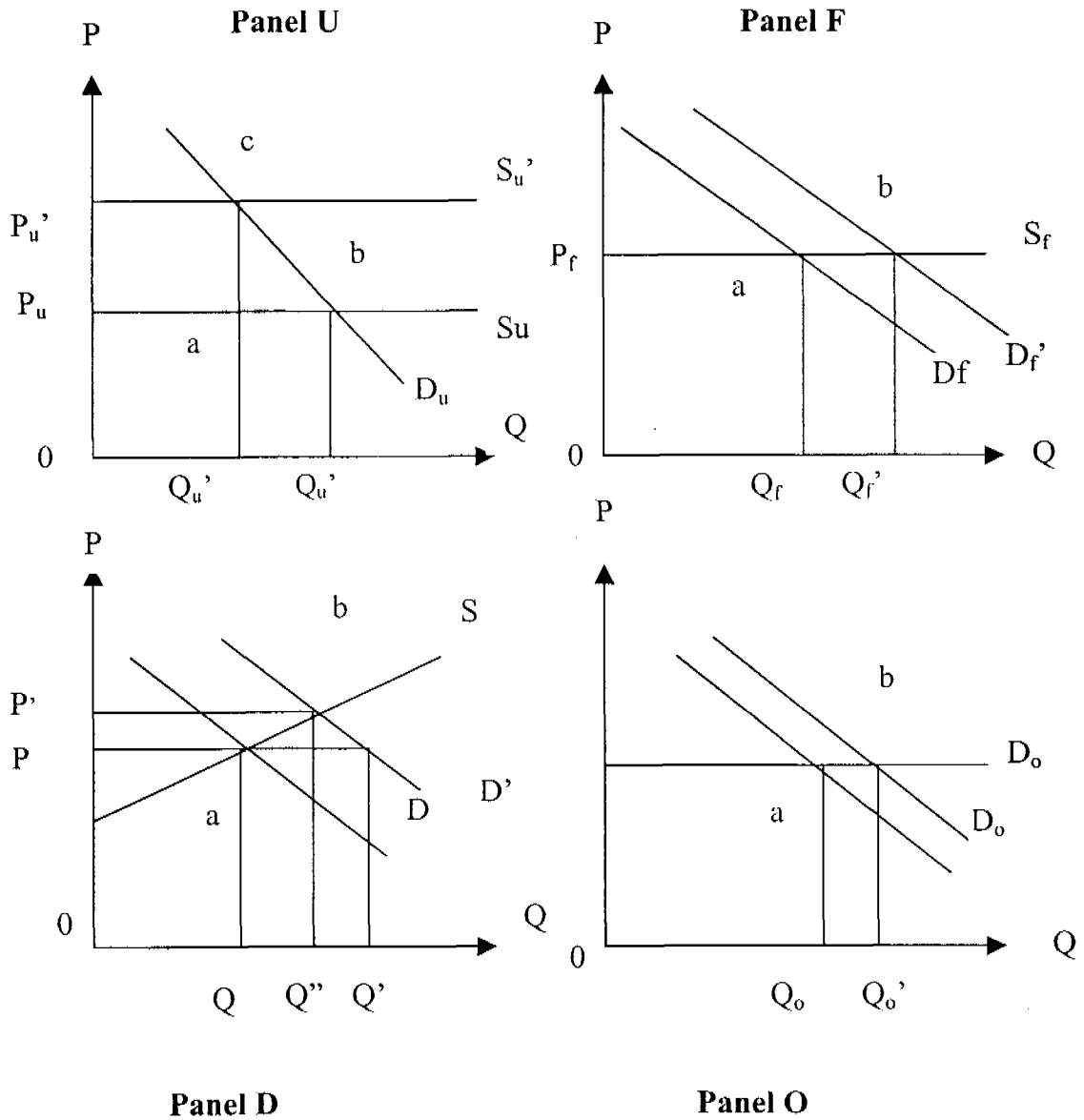
Assuming that the change in price of dumped imports caused by dumping will not exceed the per unit amount of margin of dumping,² we use the margin of dumping

² The information needed to accurately calculate the effect of the unfair trade practice on the price of unfair imports is not available. Therefore, we use margin of dumping as an upper bound for estimation.

determined by the Ministry of Commerce as an upper bound estimate of this effect.

Figure 6.1.

The Effect of Unfair Trade Practice (Dumped Imports)



$$P_u^* = M^* \quad (1)$$

Where P_u^* is the percentage decline in the price of dumped imports and M^* is dumping margin expressed as a percentage of the existing price (the price in the presence of dumped imports). In terms of figure 6.1 panel U,

$$P_u^* = (P'_u - P_u) / P_u.$$

6.3 The Effect of Dumped Imports on the Demand of Domestic Output

We assume that consumers have a fixed national income to spend on unfair imports of a particular product, fair imports of the product, domestic output of domestic like product, and all other (non-competing) goods and services combined. We further assume that unfair imports, fair imports, and competing domestic output are imperfect substitutes with the demand and supply functions as depicted in figure 6.1.

From budget constraint, we obtain

$$P_u Q_u + P_f Q_f + P_d Q_d + P_o Q_o = Y \quad (A1)$$

Differentiating A1 with P_u holding income and other prices constant, we have

$$P_u dQ_u + P_f dQ_f + P_d dQ_d + dC = 0 \quad (A2)$$

Where dQ_i is the horizontal shift in demand for i , and dC is the net change in spending on non-competing product. In terms of figure 6.1, $P_u dQ_u$ is rectangle $Q'_u Q_u b a$ in panel U; $P_f dQ_f$ is rectangle $Q_f Q'_f b a$ in panel F; dC is rectangle $P_u a c P'_u$ in panel U plus rectangle $Q_o Q'_o b a$ in panel O. Denote $P_i Q_i$ as V_i and $P_i dQ_i$ as dV_i . Then A2 can be written as

$$dV_u + dV_f + dV_d + dC = 0 \quad (A3)$$

The individual effects are

$$dV_u = V_u \eta_u P_u^* \quad (A4)$$

$$dV_f = V_f \eta_{fu} P^*_u \quad (A5)$$

$$dV_d = V_d \eta_{du} P^*_u \quad (A6)$$

$$dC = V_o \eta_{ou} P^*_u + V_u P^*_u \quad (A7)$$

where η_u is the own-price elasticity of demand for dumped imports; η_{fu} , η_{du} , and η_{ou} are cross-price elasticities of demand as the price of dumped imports change ; and P^*_u is the percentage change in the price of unfair imports.

For simplicity, we will assume that

$$\eta_{fu} = \eta_{du} \quad (i)$$

$$dC = 0 \quad (ii)$$

In regard to assumption (i) according to Armington (1969)³, imports from each country are equally substitutable in demand for competing output from each country.

Assumption (ii) provides that dumped imports are not a net substitute or complement for any goods except the competing domestic output and competing fair imports. By setting $dC = 0$ we force the entire impact of unfair imports on the demand for domestic output and the demand for fair imports.

In the next step, we search for the relationship between η_u and η_m ,

$$\eta_u = \eta_m - (V_f/V_u) \eta_{fu} \quad (A8)$$

which can be shown as follows:

Consider

$$P_m Q_m = P_f Q_f + P_u Q_u \quad (A8.1)$$

$$P_m = (Q_f/Q_m) P_f + (Q_u/Q_m) P_u \quad (A8.2)$$

Differentiating A8.1 with respect to P_u holding P_f constant yields A8.3

³ S. Armington, "A Theory of Demand for products Distinguished by Place of Production," 16 IMF Staff Papers (1969) : 159-176.

$$Q_m(\partial P_m/\partial P_u) + P_m(\partial Q_m/\partial P_m)(\partial P_m/\partial P_u) = P_f(\partial Q_f/\partial P_u) + 0 + P_u(\partial Q_u/\partial P_u) + Q_u$$

From A8.2 we have $\partial P_m/\partial P_u = Q_u/Q_m$ substitute this into A8.3 to get A8.4

$$Q_m(Q_u/Q_m) + P_m(\partial Q_m/\partial P_m)(Q_u/Q_m) = P_f(\partial Q_f/\partial P_u) + P_u(\partial Q_u/\partial P_u) + Q_u$$

Upon simplifying the left side of A8.4 and multiplying and dividing the right side by P_u , Q_f , and Q_u to obtain terms that will be simplified into elasticities, we have A8.5

$$Q_u + \eta_m Q_u = P_f(\partial Q_f/\partial P_u)(P_u/P_u)(Q_f/Q_f) + P_u(\partial Q_u/\partial P_u)(Q_u/Q_u) + Q_u$$

Subtracting Q_u from both sides of A8.5 and simplifying yields

$$Q_u \eta_m = (V_f/P_u) \eta_{fu} + Q_u \eta_u \quad (\text{A 8.6})$$

Upon multiplying A8.6 through by P_u , dividing by V_u and rearranging terms, we obtain

$$\eta_u = \eta_m - (V_f/V_u) \eta_{fu} \quad (\text{A8})$$

From A3-A5 and Assumption (ii) we have

$$dV_d = -dV_d - dV_f = -V_u \eta_u P_u^* - V_f \eta_{fu} P_u^* \quad (\text{A9})$$

Substitute A8 into A9 to get A10

$$dV_d = -V_u[\eta_m - (V_f/V_u) \eta_{fu}] P_u^* - V_f \eta_{fu} P_u^* = -V_u \eta_m P_u^* \quad (\text{A10})$$

or,
$$dQ = -(P_u/P_d) Q_u \eta_m P_u^*$$

where dQ_d is the change in domestic output demanded ($Q'-Q$), and η_m is the elasticity of demand for fair and unfair imports combined.

From A5, A6, A10, and Assumption 1, we get

$$dV_f = (V_f/V_d) dV_d = - (V_f/V_d) V_u \eta_m P_u^* \quad (\text{A11})$$

Finally, sum A10 and A11, we obtain

$$dV_u = - (dV_d + dV_f) = [1 + (V_f/V_d)] V_u \eta_m P_u^* \quad (\text{A12})$$

Using this method, the equation A10 estimates the horizontal shift in domestic demand that would result from the termination of dumped imports. Equation A11 calculates the shift in the DOMESTIC demand for fair imports in value terms, and A12 calculates the decline in domestic consumption of unfair imports in value terms, where all values are measured in terms of actual prices (in the presence of dumped imports).

6.4 The Effect of Unfair Imports on the Domestic Price

From the definition of demand and supply elasticities, we know the percentage change in quantity is the elasticity coefficient multiplied by the percentage change in price. Thus, we have

$$(Q' - Q'')/Q' = -\eta_d P^* \quad (B1)$$

$$(Q'' - Q)/Q = \varepsilon_s P^* \quad (B2)$$

where the Q's are from panel D in figure 6.1, η_d and ε_s are the elasticities of demand for and supply of domestic output, respectively, and P^* is the percentage increase in the price of domestic output that would result from the termination of dumped imports (= $(P'-P)/P$ panel D in figure 6.1).

According to A10, the horizontal shift in the demand curve ($Q'-Q$) is equal to dQ_d ; hence $Q' = (Q + dQ_d)$. Upon substituting for Q' and solving equations B1 and B2 for Q'' , we obtain

$$Q'' = (Q + dQ_d) (\eta_d P^* + 1) \quad (B3)$$

$$Q'' = Q(\varepsilon_s P^* + 1) \quad (B4)$$

From B3 and B4 we have

$$P^* = dQ_d / [Q\varepsilon_s - \eta_d(Q + dQ_d)] \quad (B5)$$

Where dQ_d is taken from A10, and Q is the observed domestic output in the presence of dumped imports.

6.5 Losses to the Domestic Industry

To determine the losses to the domestic industry, we shall measure the loss of producers' surplus and the output effect.

From panel D in figure 6.1, the increase in domestic output caused by the shift in demand for domestic output is given as

$$dQ_s = Q\varepsilon_s P^* \quad (C1)$$

where Q is the quantity of domestic output (the quantity Q in panel D), dQ_s is the increase in domestic output (the quantity $Q'' - Q$ in panel D), ε_s is the elasticity of the domestic supply curve, and P^* is the percent increase in domestic price (the ratio $(P' - P)/P$ from panel D in figure 7). The equation for this percent price increase is

$$P^* = dQ_d / [-\eta_d(Q + Q_d) + \varepsilon_s Q]$$

We can derive expressions for the loss in producers' surplus and the output effect caused by the unfair trade practice. Looking at panel D in figure 6.1, we see that the loss in producers' surplus ($dPS = \text{trapezoid PabP}'$) is given as

$$dPS = (P' - P)Q + (P' - P)(Q'' - Q)/2, \text{ or} \quad (C2)$$

$$dPS = P^* V_d (1 + \varepsilon_s P^* / 2)$$

The output effect ($OE = \text{trapezoid QQ''ba}$ in figure 7) is given as

$$OE = (Q'' - Q)P + (P' - P)(Q'' - Q)/2, \text{ or} \quad (C3)$$

$$OE = V_d \varepsilon_s P^* (1 + P^* / 2)$$

The sum of dPS and OE is the total loss in revenue of domestic firms caused by the unfair trade practice.

6.6 Empirical Results

The following section discusses the results of the estimation. The estimation of price injury to domestic industry is as follow:

6.6.1 Estimating Injury to Domestic Industry

Table 6.1
H-section Data for Case study

Unfair import of H-section	94,683 metric tons ¹
Total import of H-section	196,076 metric tons ²
Domestic output	200,000 metric tons ³
Average c.i.f. price of unfair imports	9,936 Baht/metric tons ⁴
Domestic price	14,000 Baht/metric tons ⁵
Dumping margin	27.78% ⁶
η_m : Suwat (1986) ⁴	-0.6840
ε_s (see Appendix)	-0.8436

Source: 1 Custom Department.

2 Custom Department.

3 Metallurgy Division, Department of Mineral Resources.

4 Custom Department

5 Department of Foreign Trade, Ministry of Commerce

The case of H-section imports from Poland completed by the Ministry of Commerce is selected as a case study. The data used to apply to the estimation of injury

⁴ Suwat Duangpan. "Demand for Imports and the Effect of Change in Import Tariffs to Government Revenue." Master's Thesis, Faculty of Economic, Thammasat University, 1986.

are listed in Table 6.1. The estimation assumed that domestic supply elasticities equal 1.⁵

Table 6.2
Estimation Results

Loss in domestic output	12,769 metric tons or 6.38 %
	$\epsilon_s = 1$
Domestic Output Price Suppression	3.36%
Total Loss of Domestic Industry	
(in revenue)	219,770,880 (7.85%)
Loss in Producer Surplus (in value term)	109,885,440 (3.93%)
The Output Effect (in value term)	109,885,440 (3.93%)

6.6.2 Estimation Result

The estimation of injury caused by the unfair trade practice is presented in Table 6.2.

Change in domestic output demand: Change in domestic output demand caused by dumped import from Poland (the distance $Q'-Q''$ in Figure 6.1) is 12,769 metric tones or equivalent to 6.38 per cent of total domestic output.

⁵ The unity supply elasticity used in this estimation is based on the characteristic of H-section products. Producer cannot immediately adjust production capacity in response to change in price. The adjustment of production in response to price change would take certain period of time.

Domestic output price suppression: Estimates of domestic output price suppression which is the percentage increase in the price of domestic output that would result from the termination of unfair import (dumping) is 3.36 per cent.

Total losses to domestic industry: The estimation yielded total losses to the domestic industry which are equal to 7.85 per cent. Loss in producer surplus as well as the output effect is equal to 3.93 per cent.

In summary, this section aims to estimate the injury to the domestic industry caused by dumped imports. In order to estimate the domestic injury, a number of assumptions were made. This study applied the method of estimation to H-section imported from Poland. It is interesting to note that the case which we estimated suggested the evidence of domestic at a significant level.