

MichU  
DeptE  
ResSIE  
#268

# RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

Department of Economics  
The University of Michigan  
Ann Arbor, Michigan 48109-1220

SEMINAR DISCUSSION PAPER NO. 268

## Vertically Related Markets and Protectionist Pressure Under Unfair Trade Laws

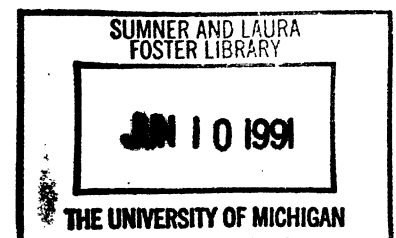
by

Bernard M. Hoekman  
GATT Secretariat

and

Michael P. Leidy  
GATT Secretariat and University of Arizona

December 1990





**Vertically Related Markets and  
Protectionist Pressure Under Unfair Trade Laws†**

by

Bernard M. Hoekman  
GATT Secretariat

Michael P. Leidy  
GATT Secretariat &  
University of Arizona

December 1990

---

† We thank Paul De Grauwe for helpful comments. The views expressed in this paper are our own and should not be attributed to the GATT Secretariat.

## Vertically Related Markets and Protectionist Pressure Under Unfair Trade Laws

### I. Introduction

What determines the structure of protection from foreign competition at a given point in time is an issue that has attracted substantial interest during the last fifteen years. Attempting to augment early work that treated tariffs as exogenously determined, a number of recent models have sought to explain the process leading to prevailing tariff structures.<sup>1</sup> In the existing literature it is commonly assumed that agents in an economy determine the equilibrium level of protection either through the voting process and/or via direct lobbying of legislators. The position of each agent with respect to the desired structure of protection is usually assumed to be a function of factor ownership, with the precise pattern of interests determined by additional variables such as factor mobility and the institutions through which preferences are expressed.

At the same time that the endogenous tariff formation literature was developing, import-competing firms were resorting with unprecedented vigor to instruments of contingent or administered protection (Finger et al., 1982). These include emergency protection,<sup>2</sup> voluntary export restraint agreements (VERs),<sup>3</sup> countervailing duties and antidumping duties.<sup>4</sup> While the opportunity to exploit these avenues of administered protection existed in the past, direct lobbying of legislators was the revealed-preferred path to protection in most instances. This is no longer true. As pointed out by Destler (1986), for example, in the postwar period “(the US) Congress almost never *legislated* specific import protection (p. 57).” In large part this change of tack reflects

---

<sup>1</sup> Examples include Baldwin (1982), Findlay and Wellisz (1982), Mayer (1984), Cassing and Hillman (1986), Hillman and Ursprung (1988) and Magee, Brock and Young (1989).

<sup>2</sup> In the United States, for example, Section 201 of the Trade Act implements Article XIX of the GATT (the so-called *safeguards clause*) which provides a contracting party with the right to escape temporarily from its obligations if a trade concession under GATT has caused or threatens serious injury to a domestic industry.

<sup>3</sup> These are generally government-to-government or government-to-industry agreements that restrict the quantity supplied by foreign firms to a domestic market.

<sup>4</sup> Article VI of GATT empowers contracting parties to countervail certain export subsidies as long as material injury to a domestic industry can be established. Article VI also empowers contracting parties to impose duties on imports that have been dumped conditional on a showing of material injury.

the outcome of successive rounds of multilateral trade negotiations (MTNs) under auspices of the General Agreement on Tariffs and Trade (GATT) which succeeded in achieving significant reductions in average tariff levels. Moreover, these reductions are bound, implying tariffs can only be raised if governments are prepared to offer adequate compensation to affected countries. The MTN process and the resulting contractual restraints on tariff levels has altered the nature of the protection-setting and protection-seeking process. Pressures for protection have been deflected substantially away from the legislative arena toward administrative and executive forums.<sup>5</sup> Antidumping procedures are prominent among such favored instruments of contingent protection, particularly in the United States, Canada, Australia, and the European Community.

A consequence of this is that the level of protection in many industrialized countries to a significant extent is now determined by import-competing industries acting in an administrative, rather than a legislative institutional setting. Instruments of contingent trade policy such as antidumping procedures are not dependent on a voting process or on direct lobbying. Instead, they require that certain conditions be met, such as injury from foreign competition. The decision to seek protection rests on the perceived likelihood that the executive committee or commission will rule that the conditions have indeed been met. Protection follows automatically if these criteria are found to be satisfied. Consumers and negatively-affected user industries have little say in the process. Recourse to antidumping actions under the so-called unfair trade laws not only leads to an increase in the amount of protection granted directly, but the threat of such actions tends to create conditions favorable to the successful negotiation of VER-based protection. Determining an equilibrium level of protectionist activity induced by the institutional foundation set by unfair trade laws is a problem that has not been addressed in the endogenous-protection literature. This paper offers a basic model that serves as a first attempt to fill that gap.

In what follows a simple model is developed that incorporates the major determi-

---

<sup>5</sup> It should be pointed out that the kind of direct lobbying activity commonly modelled in papers on endogenous protection may have played a significant role in persuading legislators to change the institutional setting in which protection is granted. I.M. Destler (1986) argues that the United States Congress effectively delegated its constitutional authority to "regulate commerce with foreign nations" to executive-branch agencies in order to protect itself from trade pressure.

nants of intervention-seeking under unfair trade laws. Section II develops a model of endogenous intervention seeking under unfair trade laws and explores the impact of various variables on the proportion of import-competing industries that will seek protection. Anecdotal evidence suggests that upstream firms sometimes seek protection which stands to severely injure their downstream customers. There have also been instances where unaffiliated downstream customers have supported rather than opposed attempts by upstream supplier industries to obtain potentially injurious protection (Destler and Odell, 1987, p. 46). Such behavior, though paradoxical, is rationalized by the extended model developed in Section III. This model examines the simultaneity of protection seeking across upstream and downstream industries. The level of protection-seeking activity is determined endogenously for producers of intermediates and final goods. It is shown that there is a tendency for protection seeking activity in industries producing intermediates to influence protection seeking activity in final goods sectors, and *vice versa*. The observation cited by Destler and Odell is rationalized in terms of what is called the “transmission-of-injury effect”. Specifically, under certain conditions downstream sectors may gain from upstream protection as it transmits short-term injury downstream which, in turn, enhances downstream prospects for gaining protection as well. There are, however, important qualifications. Section IV concludes with a discussion of policy implications and directions for further research.

## II. A General Model of Intervention Seeking Under Unfair Trade Laws

The decision to seek protection under the unfair trade laws is dichotomous: an import-competing firm or industry either files a complaint or it does not. Our objective in this section is to model the decision of a representative firm acting on behalf of an import-competing industry to seek protection under the unfair trade laws. This is done with an eye toward understanding factors that determine the prevalence of intervention-seeking activity across all import-competing sectors of an economy. It is well known that toward the end of the 1970s and into the 1980s there was a virtual explosion of unfair trade complaints. We will show in Section III that the existence of vertical linkages across industries establishes a link between protection-seeking activity across sectors. Specifically, we show that under conditions which appear to prevail,

at least in the United States, there is a tendency for greater (less) protection-seeking activity among upstream (downstream) sectors to induce the same in downstream (upstream) sectors under the criteria established by unfair trade laws.

Consider a representative import-competing firm that faces the decision of whether or not to pursue an unfair trade complaint. It is by now well-established that of the two principal necessary conditions for winning an unfair trade complaint (showing either subsidization or dumping and material injury), the injury criterion is the only one likely to impose any obstacle to a favorable ruling.<sup>6</sup> Hence whether a firm can anticipate a favorable outcome, other things equal, depends on whether it is perceived to satisfy the injury requirement. Because of the “low track” or administrative nature of unfair trade laws, general-interest or social-welfare considerations play virtually no role. The laws are administered without regard to economy-wide effects.<sup>7</sup> For modelling purposes current profitability is taken to be a composite measure of injury.<sup>8</sup> Let a representative firm’s current profitability be denoted  $\Pi_0$ . Higher levels of current profit signal greater prosperity or reduced injury. Lower levels indicate reduced prosperity or increased injury. The perceived probability of winning an unfair trade petition, therefore, depends inversely on profits during the petitioning stage. The expected return to protection seeking under the unfair trade laws depends on the expected profits of protection relative to those under the *status quo*.

Let  $\Pi_p$  denote the expected present value (EPV) of the flow of future profits un-

---

<sup>6</sup> Material injury is the legal term used in the GATT and in US trade legislation. It is a rather ill-defined standard that revolves around the “health” of an industry as reflected in the levels and trends of production, capacity utilization, market share, inventories, and profits (Kaplan, 1991). Finger and Murray (1990, p. 39), in looking at the United States unfair trade cases, found that “in almost every unfair trade case that gets to a formal determination, the US government finds that the foreigners are unfair—that the foreign merchandise has been dumped or subsidized. When the US government turns down a petition for an import restriction it is almost always because the injury test is negative.” Hindley (1988), Messerlin (1989) and Norall (1987) have all demonstrated that current procedures make it relatively easy to show that dumping has occurred.

<sup>7</sup> Although no public-interest provisions are included in US unfair trade laws, the European Community and Canada do have such provisions. However, while consideration of the public interest is included in Section 45 of Canada’s Special Import Measures Act, Porteous and Rugman (1989) point out that in the four years following the inception of this provision there were just three public interest hearings initiated in a pool of 29 completed unfair trade actions. Similarly, Messerlin (1989) points out that the EC’s “community interest” clause has no practical effect.

<sup>8</sup> Baldwin (1985) found that the change in profit had a significant inverse effect on the ITC’s injury decision in Section 201 (escape clause) cases. In their study of the US steel industry’s use of unfair trade laws from 1982 to 1986, Herander and Pupp (1991) found that industry profitability and the change in profitability were again significant determinants in the injury decision.

der protection and  $\Pi_f$  denote the EPV of the flow of future profits under the current state of commercial policy facing that sector (i.e., no AD duties are in place). Note that  $\Pi_0$  need not equal  $\Pi_f$  due to variations in profits over time. The problem of a representative firm is expressed as follows (we assume that such a problem characterizes the behavior of an industry association when the industry is composed of more than one firm):

$$\max_{s \in \{0,1\}} q(s, \Pi_0, \theta) \Pi_p + [1 - q(s, \Pi_0, \theta)] \Pi_f - c \cdot s, \quad (1)$$

where  $s \in \{0, 1\}$  represents the decision to file a petition ( $s = 1$ ) or not ( $s = 0$ ),  $c$  is the processing cost associated with filing a petition, the function  $q(\cdot)$  denotes the probability of winning protection as a function of the filing variable, current profits and a vector  $\theta$  that captures other relevant factors.<sup>9</sup>

Under the unfair trade laws protection cannot be won unless a petition is filed. Hence

$$q(0, \Pi_0, \theta) = 0 \quad \forall \Pi_0 \text{ and } \theta.$$

Clearly the decision hinges on a simple comparison between the EPV of profits under seeking ( $s = 1$ ) versus those when remaining passive ( $s = 0$ ). Consider the nature of this problem. First, in those industries in which  $\Pi_p \leq \Pi_f$ , then for all  $c > 0$  the optimal choice is  $s = 0$ . That is, if the effect of protection on the EPV of future profits is perceived to be nonpositive (perhaps due to expectations of foreign retaliation), it never pays to seek protection. Only if  $\Pi_p > \Pi_f$  will it ever be optimal to seek protection. When this is true there exists a threshold at which an import-competing industry is just indifferent between seeking and not seeking protection. This threshold is defined implicitly in terms of  $\Pi_p, \Pi_0, \Pi_f, c$  and  $\theta$  by the following equation:

$$q(s, \Pi_0, \theta) \Pi_p + [1 - q(s, \Pi_0, \theta)] \Pi_f - c \cdot s = \Pi_f. \quad (2)$$

We refer to this critical value of  $\Pi_p$  as the *seeking threshold* and denote it by  $\Pi_p^*$ .

---

<sup>9</sup> Such factors would include, for example, the past behavior of the commission with respect to its willingness to find injury, whether some firms within the industry actually oppose the petition at the time it is presented to the commission, the extent to which foreign-policy based considerations influence the mind set of some commissioners, factors influencing the likelihood of finding a dumping margin (e.g., given imports from nonmarket economies, determining whether or not dumping exists will depend on either a constructed value methodology or a comparable third market price. Which methodology is invoked is sometimes a political decision.), and other political intangibles not under the control of the industry.



Since the firm is indifferent between seeking and not seeking protection at the seeking threshold we can set  $s = 1$  and rewrite (2) as:

$$c = q(\Pi_0, \theta)[\Pi_p^* - \Pi_f]. \quad (3)$$

Equation (3) yields combinations of  $c$  and  $\Pi_p^*$ , for given values of  $\Pi_0, \theta$  and  $\Pi_f$ , for which a firm is indifferent between seeking and not seeking protection. This line appears in Figure 1 as the positively sloped ray out of the point  $\Pi_f$  on the horizontal axis. The slope of this ray is  $q(\Pi_0, \theta)$ . Figure 1 describes the decision of a representative firm in any given import-competing industry to either seek or not seek protection. The intersection of the ray out of  $\Pi_f$  and the horizontal line at  $\bar{c}$  determines the value for the perceived EPV of profit under protection beyond which a sector will unambiguously pursue protection and below which it will not. This seeking threshold for  $\Pi_p$  is, of course, defined implicitly as a function of  $\Pi_0, \Pi_f, c$  and  $\theta$  by equation (3). Let this implicit function be denoted by

$$\Pi_p^* = \Pi_p^*(\Pi_0, \Pi_f, \theta, c).$$

From the set of all import-competing sectors not currently protected, those sectors that perceive the profits of protection to be above  $\Pi_p^*$  have an incentive to file a petition for protection under the unfair trade laws.

A sector's perception of the profitability of protection will tend to vary depending on their anticipation of foreign retaliation, sector-specific barriers to entry and exit, the anticipated duration of protection if granted, and so on. The dispersion and concentration of beliefs concerning the profits of protection across all of the import-competing sectors can be represented abstractly by either a probability mass function (for a discrete number of sectors) or by a probability density function (p.d.f.) (for a continuum of sectors). We assume that there is a continuum of import-competing industries for simplicity of exposition. Let the p.d.f. representing the dispersion of beliefs concerning the profitability of protection across import-competing sectors be given by  $f(\pi_p)$ .

If we assume that all industries face the same processing costs associated with

seeking protection ( $c$ ),<sup>10</sup> the same EPV of profit under free trade ( $\Pi_f$ ),<sup>11</sup> the same pre-protection level of well-being as represented by current profits ( $\Pi_0$ ),<sup>12</sup> and the same parameter  $\theta$ , then a simple diagrammatic representation of the proportion of import-competing industries seeking protection under the unfair trade laws is possible.<sup>13</sup> This is achieved by superimposing the p.d.f.  $f(\pi_p)$  on the diagram in Figure 1. This is done in Figure 2.<sup>14</sup> Given the distribution of the perceived profits of protection across import-competing sectors, the *proportion of sectors* that will petition for protection is captured by the shaded region under the p.d.f. Algebraically, the proportion of existing import-competing sectors that will petition for protection is expressed as:

$$P = \int_{\Pi_p^*(\Pi_0, \Pi_f, \theta, c)}^{\infty} f(\pi_p) d\pi_p = 1 - F(\Pi_p^*(\Pi_0, \Pi_f, \theta, c)), \quad (4)$$

where  $F(\cdot)$  is the cumulative distribution function (c.d.f.) corresponding to  $f(\pi_p)$ .<sup>15</sup>

<sup>10</sup> This is not too unrealistic since all industries seeking protection under unfair trade laws face the same kinds of requirements.

<sup>11</sup> Such an assumption is justifiable if we note that in the long run under competitive conditions normal profits will prevail, and factor mobility will tend to establish normal profits across industries.

<sup>12</sup> This is more difficult to justify except, perhaps, in a more discrete sense. That is, if the profitability variable is principally relevant in terms of being “high” or “low” (“good times” or “bad times”), then a business cycle-based explanation can justify such an assumption.

<sup>13</sup> The reason for focusing on the proportion as a measure of protectionist activity instead of on the level of equilibrium tariffs is that under unfair trade laws the level of an antidumping duty is generally set according to the size of the dumping margin. Hence the level of protection is not influenced by seeking activity alone. The resulting average antidumping duty is a function of the extent of seeking activity, but also depends on conditions beyond the reach of domestic import-competing industries such as average dumping margins.

<sup>14</sup> The simplifications underlying Figure 2 are not at all necessary to the results. For example, as noted below, if  $\Pi_0$  was thought to vary across import-competing sectors, then a three dimensional diagram analogous to Figure 2 would apply. A great deal of pedagogical value is gained by introducing the diagrammatic method of analysis while giving up very little in terms of the richness of the model.

<sup>15</sup> Observe that, for example, if  $\Pi_0$  was also thought to vary across industries, and if  $\Pi_p$  and  $\Pi_0$  are distributed independently, then we obtain the following expression for  $P$ :

$$\begin{aligned} P &= \int_0^{\infty} \int_{\Pi_p^*(\Pi_0, \Pi_f, \theta, c)}^{\infty} f(\pi_p) g(\pi_0) d\pi_p d\pi_0 \\ &= \int_0^{\infty} [1 - F(\Pi_p^*(\Pi_0, \Pi_f, \theta, c))] g(\pi_0) d\pi_0 \\ &= 1 - E_{\tilde{\pi}_0} \left\{ F(\Pi_p^*(\tilde{\pi}_0, \Pi_f, \theta, c)) \right\} \end{aligned}$$

where  $g(\pi_0)$  describes the distribution of initial profits across all import-competing industries and  $E_{\tilde{\pi}_0}$  denotes the expectation over  $\tilde{\pi}_0$ . Hence, we obtain a version of equation (4) in terms of the expected value over  $\pi_0$ .

Using equations (3) and (4) we obtain the following set of comparative-static derivatives.

$$\frac{\partial \Pi_p^*}{\partial c} = \frac{1}{q(\Pi_0, \theta)} > 0 \quad (5)$$

$$\frac{\partial \Pi_p^*}{\partial \Pi_0} = -\frac{\frac{\partial q}{\partial \Pi_0} [\Pi_p - \Pi_f]}{q(\Pi_0, \theta)} > 0 \quad (6)$$

$$\frac{\partial \Pi_p^*}{\partial \Pi_f} = 1, \quad (7)$$

and

$$\frac{\partial P}{\partial c} = -\frac{f(\Pi_p^*)}{q(\Pi_0, \theta)} < 0 \quad (8)$$

$$\frac{\partial P}{\partial \Pi_0} = f(\Pi_p^*) \frac{\frac{\partial q}{\partial \Pi_0} [\Pi_p - \Pi_f]}{q(\Pi_0, \theta)} < 0 \quad (9)$$

$$\frac{\partial P}{\partial \Pi_f} = -f(\Pi_p^*) < 0. \quad (10)$$

These comparative-static exercises can be performed diagrammatically. Figure 2 shows the effect of a reduction in current profitability across all import-competing firms (due for example to a downturn in the business cycle). Because the seeking threshold,  $\Pi_p^*$ , declines the proportion of firms seeking protection in this new state rises. For finite changes the extent to which this proportion rises depends critically on the area under  $f(\pi_p)$  in the region just below the initial equilibrium seeking threshold.

Some policy implications are readily apparent from the expressions in equations (8)–(10). Equation (8) indicates that reductions in the processing costs associated with filing antidumping petitions will tend to induce a higher level of seeking activity. This suggests, *inter alia*, that monetary penalties imposed on petitioning industries whose petition is denied will act to inhibit seeking activity. Equation (9) suggests that policymakers should anticipate increased protection-seeking activity during periods of general macroeconomic decline. During such periods import-competing industries are more likely to satisfy the injury criteria for protection and hence petitioning for protection becomes more attractive at the margin. Equation (10) suggests the following example. Suppose the *status quo* consists of a given set of tariff levels. A reduction in tariff levels across the board, due perhaps to the outcome of the multilateral trade negotiations, suggests greater openness to foreign competition in

the future, other things equal. Under conditions of imperfect competition in the initial state this suggests that import-competing firms could anticipate a reduction in the EPV of the flow of future profits under this new status quo; that is,  $\Pi_f$  declines. To the extent that such a shock affects industry perceptions of  $\Pi_p$  less than  $\Pi_f$ , the effect of the negotiated tariff reduction will be to stimulate petitions for protection under the unfair trade laws. Of course, this is perfectly consistent with casual observation of post-war events in the US. As tariff ceilings were reduced under successive GATT Rounds, resort to other administrative avenues for protection has increased.

A weakness of the above model is the extent to which the import-competing sectors of an economy remain undifferentiated in any important way. That is, sectors are treated as fundamentally the same, varying only in their perceptions of the profitability of protection, captured by the p.d.f.  $f(\pi_p)$ . It was argued above that the model could be extended to allow sector-specific variations in the parameters  $\Pi_f$ ,  $\theta$  and  $\Pi_0$ , but that this was a rather trivial exercise, adding virtually nothing to the insights of the model. However, the observation of Destler and Odell noted earlier, that there have been instances in which *downstream* firms have publicly supported potentially destructive bids for protection by their *upstream* suppliers immediately suggests a nontrivial dimension in which import-competing firms might be categorized. In the following section the model is extended to include the notion of upstream and downstream import-competing sectors. The extension points out several channels through which changes in protection-seeking activity among upstream firms will influence protection seeking downstream, and vice versa.

### **III. Upstream and Downstream Industries: Vertical Linkages and Repercussions in Protection Seeking**

The above model of the prevalence of protection seeking applies to all import-competing industries independent of their position along the production stream. In order to analyze the effects of vertical linkages along the production stream on the prevalence of seeking activity (P) we must ask what relevant information is introduced by noting an industry's status in this regard?

Several observations are pertinent. The greater the incidence of upstream pro-

tection seeking ( $P^u$ ), the greater is the *expected level* of protection upstream and the greater is the probability that protection will be granted if sought downstream. The reason is that protection seeking upstream, as it is translated into protection upstream, tends to transmit injury to downstream sectors. That is, higher input prices imply a reduction in current profitability downstream,  $\Delta\Pi_0^d < 0$ .<sup>16</sup> But the transmission of injury is not the only channel through which protection seeking upstream may effect seeking in downstream sectors. Greater protection-seeking upstream also influences the expected present value of profits under the *status quo* in downstream sectors,  $\Pi_f^d$ . Generally, greater protection upstream will imply higher input prices facing downstream industries and so lower profits. Greater protection upstream implies as well a decline in the EPV of profits under protection for downstream sectors ( $\Pi_p^d$ ). Hence, through all of these channels the level of protection seeking upstream affects the level of protection seeking downstream. Before saying anything about the channels through which downstream seeking might affect upstream behavior, the problem facing a representative firm in a downstream sector is examined, incorporating the linkages to upstream seeking activity suggested above. The problem facing a representative downstream firm can then be expressed as follows.

$$\max_{s \in \{0,1\}} q(s, \Pi_0^d(P^u), \theta^d) \Pi_p^d(P^u) + \left[1 - q(s, \Pi_0^d(P^u), \theta^d)\right] \Pi_f^d(P^u) - c \cdot s \quad (11)$$

The functions  $\Pi_0^d(P^u)$ ,  $\Pi_p^d(P^u)$ , and  $\Pi_f^d(P^u)$  represent the relationship between upstream protection seeking (and implicitly the level of actual protection upstream) and current profits downstream, the EPV of profits under protection downstream, and the EPV of profits under ongoing free trade in the downstream sector, respectively. As suggested above, the first derivatives have the following signs:  $d\Pi_0^d/dP^u < 0$ ,  $d\Pi_p^d/dP^u < 0$  and  $d\Pi_f^d/dP^u < 0$ , for all downstream industries.

---

<sup>16</sup> It should be noted that at the same time that higher domestic input prices reduce current profitability for domestic downstream firms, imports will tend to rise to fill the implied domestic demand gap downstream. That is, decreases in  $\Pi_0^d$  due to increased factor prices will coincide with rising imports downstream. This implied contemporaneous change in import levels reinforces the claimed effect on the probability of protection. That is, because imports can be expected to rise contemporaneously the conferred injury will appear as if it is due, in part, to imports.

The problem facing industries producing intermediate inputs can be expressed similarly, but care must be taken in specifying the linkages between downstream intervention seeking and the state of upstream sectors. There are important asymmetries that distinguish upstream from downstream sectors in this context. For example, the transmission of injury to downstream sectors due to greater upstream protection does not occur in reverse. Indeed the opposite is sometimes true. If upstream sectors are sufficiently concentrated to exercise market power they might instead expect to gain from downstream protection as they may be able to capture a share of the protection-enhanced downstream profits. To the extent that there is an open market for foreign intermediates, however, domestic upstream sectors (we are analyzing the decision of whether or not to seek protection facing all those currently not receiving protection) will not generally be able to capture any of the profits of increased downstream protection. If producers of intermediates in the rest of the world are free to enter the home market, then downstream protection can offer no greater prospective profits to a domestic upstream industry. The opportunity for excess profits will be competed away by foreign competition. In other words, a domestic industry producing intermediates cannot hope to capture a share of the downstream profits of protection as long as it operates under the discipline of free trade. Under open markets upstream, therefore, downstream protection is likely to have no effect on the profitability of upstream sectors unless they also are shielded from foreign competition. This suggests that unlike the case of downstream industries,  $\Pi_0^u$  and  $\Pi_f^u$  are independent of the extent of protection seeking downstream,  $P^d$ . On the other hand, should an upstream sector be granted protection, then greater protection downstream suggests a greater opportunity to capture downstream profits than otherwise. Hence the profits of protection in upstream industries will tend to depend positively on the level of downstream protection. This indicates that  $\Pi_p^u$  is a positive function of  $P^d$ . The problem facing a representative upstream sector can be expressed as

$$\max_{s \in \{0,1\}} q(s, \Pi_0^u, \theta^u) \Pi_p^u(P^d) + [1 - q(s, \Pi_0^u, \theta^u)] \Pi_f^u - c \cdot s. \quad (12)$$

As indicated above, because greater protection seeking downstream suggests higher levels of downstream protection; and because domestic producers of intermediates can

expect to capture some of the profits of downstream protection as long as their foreign competitors are held at bay, we conclude that

$$\frac{d\Pi_p^u}{dP^d} > 0,$$

for all upstream industries.

The expected-profit threshold beyond which import-competing industries will find it profitable to petition for protection can now be defined for both upstream and downstream industries,  $\Pi_p^{*d}$  and  $\Pi_p^{*u}$  respectively.

$$c = q(\Pi_0^d(P^u), \theta^d)[\Pi_p^{*d} - \Pi_f^d(P^u)] \quad (13)$$

$$c = q(\Pi_0^u, \theta^u)[\Pi_p^{*u} - \Pi_f^u], \quad (14)$$

where the argument  $s = 1$  has been dropped from the function  $q(\cdot)$  for notational simplicity. Only those downstream sectors that perceive the EPV of profits under protection to exceed  $\Pi_p^{*d}$  and only those upstream sectors that perceive the EPV of profits under protection to exceed  $\Pi_p^{*u}$  will petition for protection. Equations (13) and (14) define these thresholds implicitly as the following functions:

$$\begin{aligned} \Pi_p^{*d} &= \Pi_p^{*d}(\Pi_0^d(P^u), \Pi_f^d(P^u), c, \theta^d) \\ &= \Pi_p^{*d}(P^u, c, \theta^d) \end{aligned} \quad (15)$$

and

$$\Pi_p^{*u} = \Pi_p^{*u}(\Pi_0^u, \Pi_f^u, c, \theta^u). \quad (16)$$

Equations (15) and (16) indicate that the seeking threshold for downstream firms is a function of upstream protection seeking,  $P^u$ , while that for upstream firms is independent of downstream protection seeking,  $P^d$ .

We can now follow the procedure developed in the previous section while separating import-competing industries into two blocks: upstream and downstream. Across all downstream sectors the variety of beliefs about the profits of protection across sectors can be represented by a p.d.f. conditional on the (perceived) level of upstream protection seeking. This conditional p.d.f. is expressed as  $h(\pi_p^d|P^u)$ . Similarly, there is a conditional p.d.f. that represents the distribution of beliefs about the profits of

protection across upstream industries given the (perceived) level of downstream protection seeking. This conditional p.d.f. is expressed as  $g(\pi_p^u|P^d)$ . The proportion of upstream import-competing industries that will petition for protection is determined by superimposing the distribution of  $\pi_p^u$  conditional on  $P^d$  on a diagram that locates the seeking threshold for upstream firms. The proportion of downstream import-competing industries that will petition for protection is determined by superimposing the distribution of  $\pi_p^d$  conditional on  $P^u$  on a diagram that locates the seeking threshold for downstream firms. That is, a diagram like that in Figure 2 now applies to all upstream and all downstream import-competing industries (that are not currently receiving protection), but both the seeking threshold and the distribution of the EPV of profits under protection differ across upstream and downstream industries. Algebraically, the prevalence of protection seeking among downstream industries is given by the following.

$$\begin{aligned}
P^d &= \int_{\Pi_p^{*d}(P^u, c, \theta^d)}^{\infty} h(\pi_p^d|P^u) d\pi_p^d \\
P^d &= 1 - H \left[ \Pi_p^{*d}(P^u, c, \theta^d) \middle| P^u \right]
\end{aligned} \tag{17}$$

The prevalence of protection seeking among upstream sectors is given by

$$\begin{aligned}
P^u &= \int_{\Pi_p^{*u}(\Pi_0^u, \Pi_f^u, c, \theta^u)}^{\infty} g(\pi_p^u|P^d) d\pi_p^u \\
P^u &= 1 - G \left[ \Pi_p^{*u}(\Pi_0^u, \Pi_f^u, c, \theta^u) \middle| P^d \right].
\end{aligned} \tag{18}$$

Equations (17) and (18) define, in effect, *reaction functions* for upstream and downstream industries in terms of the prevalence of protection seeking,  $P^u$  and  $P^d$ . They show the proportion of downstream (upstream) industries to seek protection given their beliefs about upstream (downstream) protection seeking. Together these equations determine a pair of  $P^u$  and  $P^d$  that are consistent in the sense that beliefs correspond to actual levels of protection seeking. The equilibrium prevalence of protection seeking among upstream import-competing industries and among downstream



import-competing industries is determined, therefore, by the simultaneous solution of these equations.

The slopes of the two reaction curves can be determined algebraically by differentiating equations (17) and (18).<sup>17</sup> Nevertheless, determining these slopes can proceed on a more intuitive level by using a diagram. Consider first the sensitivity of  $P^u$  to  $\Delta P^d$  along the reaction curve defined by equation (18). As indicated in (16), the seeking threshold for upstream industries is unchanged by  $\Delta P^d$ . Thus if there is a change in  $P^u$  following a change in  $P^d$  it must come through a change in the conditional distribution of  $\pi_p^u$ . In fact, the displacement of the conditional p.d.f. in response to  $\Delta P^d > 0$  can be deduced from the condition that  $d\Pi_p^u/dP^d > 0$  for all upstream industries.<sup>18</sup> This implies that the p.d.f. of  $\pi_p^u$  is displaced everywhere to the right. That is, greater protection seeking downstream implies that all upstream sectors benefit in the expected sense if they are shielded from foreign competition. Protection offers a greater opportunity to profit given the prospect of capturing a share of the greater protection-induced downstream profits. Figure 3 shows the response of  $P^u$  to  $\Delta P^d$  in the upstream case. It is clear that under the conditions set out

$$\left. \frac{dP^u}{dP^d} \right|_{\text{upstream}} > 0. \quad (19)$$

Further, the closer the derivative  $d\Pi_p^u/dP^d$  is to zero for all upstream sectors, the flatter is this reaction curve. Exercises analogous to that appearing in Figure 2, as well as the comparative-static derivatives equations 8—10 appearing in the previous section, determine the direction and extent of a shift in the reaction curve.

The same sort of diagrammatic approach can be employed to determine the slope of the reaction function for the downstream sectors. Consider an increase in  $P^u$ . The effect of this on  $P^d$  can be decomposed into three distinct pieces (since  $\Pi_0^d$ ,  $\Pi_f^d$ , and  $\Pi_p^d$  are each functions of  $P^u$ ) as shown in Figure 4. First, the increase in upstream protection seeking tends to cause current downstream profits to decline,<sup>19</sup>

<sup>17</sup> In doing this it is helpful to rewrite the conditional p.d.f.'s as the ratio of the appropriate joint and marginal p.d.f.'s. However, the algebra, in this case, does not extend the diagrammatic analysis and the discussion that follows above. Therefore it is omitted.

<sup>18</sup> Recall the discussion above where it is argued that both  $\Pi_f^u$  and  $\Pi_0^u$  are independent of  $P^d$ .

<sup>19</sup> It should be noted that in a model with discrete time periods there will be a lag between an increase

$d\Pi_0^d/dP^u < 0$  for all downstream industries. Other things equal, this tends to increase the prevalence of downstream protection seeking as the ray out of  $\Pi_f^d$  rotates upward. The seeking threshold tends to decline toward that at point B. In other words, there is a tendency for protection seeking upstream to lead to greater protection seeking downstream because upstream protection transmits injury to downstream sectors, thereby enhancing the probability of protection for each downstream sector. Those downstream sectors that had been on the margin of seeking and not seeking are thrown over the seeking threshold, other things equal. If this were the only link between  $P^u$  and  $P^d$ , the reaction curve for the prevalence of downstream protection seeking would be positively sloped.

An increase in  $P^u$  also tends to cause downstream industries to adjust their expectations about the present value of the future flow of profits under ongoing free trade (or, the *status quo*). Specifically,  $d\Pi_f^d/dP^u < 0$  will generally be true. Because of greater anticipated protection upstream, and consequently higher input prices, downstream sectors can expect a reduction in future profit flows under ongoing free trade. Other things equal, the *status quo* (no protection) tends again to become less attractive and there is a tendency for protection seeking to increase downstream. This effect appears in Figure 4 as a leftward shift in the ray out of  $\Pi_f^d$ . This and the previously mentioned effect will be referred to jointly as the *transmission-of-injury effect*. Other things equal, the transmission-of-injury effect points toward a positive relationship between  $P^d$  and  $P^u$  for downstream industries as the seeking threshold is reduced by an increase in  $P^u$ .

The final effect of  $\Delta P^u$  on  $P^d$  operates through the function  $\Pi_p^d(P^u)$ . Since  $d\Pi_p^d/dP^u < 0$ , this effect tends in the direction of countering the transmission-of-injury effect. Figure 4 shows this countervailing force as a leftward shift in the p.d.f. of  $\Pi_p^d$ . Without further restrictions it is clear then that the reaction curve for downstream industries can be positively or negatively sloped. Observe, however,

---

in upstream protection seeking and downstream injury. Nevertheless, while the algebra is a bit more tedious, the results remain unchanged. Only some very intuitive qualifications arise concerning the appropriate timing of these events when this intertemporal characteristic is explicitly included.

that if

$$\left| \Delta \Pi_f^d \right| \geq \left| \Delta \Pi_p^d \right| \forall \text{ downstream sectors} \Rightarrow \left. \frac{dP^u}{dP^d} \right|_{\text{downstream}} > 0. \quad (21)$$

This says that a sufficient condition for the transmission-of-injury effect to dominate is that for each downstream sector the effect of upstream protection on the EPV of future profit flows has either an equivalent effect on  $\Pi_p^d$  and  $\Pi_f^d$ , or the perceived effect on  $\Pi_p^d$  is not greater than that on  $\Pi_f^d$ . It should be emphasized that this is not a necessary condition for the transmission-of-injury effect to dominate. The observation made by Destler and Odell that there have been cases where downstream firms have supported directly harmful upstream bids for protection suggests that such firms perceived themselves to be made better off under greater upstream protection. This can only be the case to the extent that the transmission-of-injury effect is the dominating force. If downstream firms perceive their prospect of protection to be substantially enhanced through the transmission of injury this provides a self-interested motive for supporting an upstream bid for protection.

The implied linkages between protection-seeking activity in upstream and downstream import-competing industries are analyzed in Figures 5 and 6. Figure 5 depicts the case in which the transmission-of-injury effect dominates but is small (implying a positively sloped and relatively steep  $P^d P^{d'}$  schedule). Such cases will be said to imply a “weakly dominant” transmission-of-injury effect. Figure 6 depicts the case in which the transmission-of-injury effect dominates and is large (implying a positively sloped and relatively flat  $P^d P^{d'}$  schedule). Such cases imply a “strongly dominant” transmission-of-injury effect. The equilibrium level of intervention seeking in upstream and downstream sectors is determined by point A. This equilibrium is stable as long as  $P^d P^{d'}$  is steeper than  $P^u P^{u'}$ , as it is in Figure 5 under the weakly dominant transmission-of-injury effect. It is unstable when the transmission-of-injury effect is strongly dominant as in Figure 6.

Consider the stable case. In Figure 5 the effect of an exogenous increase in the incidence of upstream protection seeking is analyzed. This might have been caused, for example, by an autonomous increase in the expected profitability of protection across upstream sectors. Alternatively, an autonomous decline in current profitability

in upstream sectors, which has the effect of increasing the probability of protection if sought, will also cause the  $P^u P^{u'}$  schedule to shift upward. In the case of a stable equilibrium (weakly dominant transmission-of-injury effect), the increase in upstream protection seeking transmits injury across downstream sectors and induces greater protection seeking downstream. Greater protection seeking downstream is, in turn, transmitted back to the upstream industries by enhancing the expected profitability of protection. That is, by inducing greater protection seeking downstream, protection-seeking activity upstream becomes marginally more attractive as upstream industries can hope to capture a share of the downstream profits under greater expected protection. Hence the exogenous stimulus to the incidence of upstream protection seeking causes seeking to cascade downstream while at the same time generating reinforcing repercussion effects. Had an exogenous increase in seeking been introduced downstream this would have induced greater protection seeking upstream due to the perceived increase in the profitability of protection. In turn, greater upstream seeking leads to the transmission of injury downstream which induces an added increase in downstream seeking activity. This process converges on a new equilibrium at point B as long as neither effect is too strong relative to the other. That is, as long as the transmission-of-injury effect is relatively weak (but dominant, implying a relatively steep  $P^d P^{d'}$ ) and the effect on  $\Pi_p^u(P^d)$  is not too strong (implying a relatively flat  $P^u P^{u'}$ ), the adjustment process converges on a new stable equilibrium.

This discussion indicates that the results of this section are qualitatively similar to those in Section II. Specifically, the sign of the comparative-static derivative suggested above is as indicated in equation (9) of the previous section. An expression like equation (9), however, tends to understate the magnitude of the effect since the possible existence of reinforcing repercussion effects was not picked up in the previous version of the model. Hence, by explicitly incorporating the existence of vertical linkages across instances of protection-seeking activity, we have a refined sense of the magnitude of the endogenous response to exogenous changes that effect such activity. It should be noted also that a decrease in the processing costs associated with filing a petition for protection will shift the  $P^u P^{u'}$  schedule upward and the  $P^d P^{d'}$  to the right, leading again to the same qualitative comparative-static result suggested

in equation (8), but with a repercussions effect that reinforces the impact of the initial shock. Finally, it should be kept in mind that the results indicated above are conditional on a weakly dominant transmission-of-injury effect.

The unstable case should not be ruled out *a priori*. After all, there was, with little exaggeration, *explosive* growth in both petitions and favorable rulings under unfair trade laws in the US, and to a lesser extent the EC and Canada, during the 1980s. Whether this growth is best explained in terms of movement toward a new stable equilibrium (as in Figure 5) or as reflecting an inherent instability in the system is not clear. Figure 6 shows the effect of an exogenous increase in the incidence of upstream seeking when the transmission-of-injury effect is strongly dominant. If the system was initially at point A, the shock leaves the economy above the new equilibrium. Both upstream and downstream sectors move toward a greater proportion of protection seeking. The process ends only when all upstream or all downstream import-competing firms (from among those not currently receiving protection) petition for protection. That is, when one block of sectors or the other runs into the constraint  $P \leq 1$ . Again, the quantitative implications suggested here differ from those derived in the previous extension. It is noteworthy also that while the strongly dominant transmission-of-injury effect implies a new equilibrium combination of  $P^u$  and  $P^d$  that implies reduced seeking among both upstream and downstream industries, the implied instability of the system points to the same kind of cascading protection that is observed in the weakly dominant case.

In addition, recall that the slope of  $P^u P^{u'}$  approaches zero as the derivative  $d\Pi_p^u/dP^d$  approaches zero. This suggests that when upstream sectors perceive just a small opportunity to capture the profits associated with higher levels of downstream protection, a weakly dominant transmission-of-injury effect will apply and the stable case of Figure 5 is assured. In such cases, autonomous shocks affecting protection seeking are transmitted from upstream to downstream sectors, but not vice versa.

Finally, there remains the possibility that the transmission-of-injury effect may not be dominant, implying a downward sloping  $P^d P^{d'}$  curve. Whether this is the case is an empirical question. It cannot be deduced from the model. If the transmission-of-

injury effect is dominated the possibility arises that an autonomous increase (decrease) in protection seeking among upstream sectors will induce a decrease (increase) in protection seeking downstream. This opens up the possibility that protection-seeking activity may decline on net (i.e., offsetting upstream increases with downstream decreases) in response to an autonomous increase in seeking among upstream industries. The intuition for this result is apparent from the model. If the transmission-of-injury effect is not dominant this implies that downstream firms perceive, on balance, that greater upstream protection seeking (and hence greater implied levels of future protection) will disproportionately affect their expectations of the profitability of protection downstream. Specifically, the dominating force here is that downstream sectors see any excess profits of protection as being largely captured by upstream sectors given their protection-enhanced market power. Hence, seeking protection becomes less attractive given higher levels of upstream seeking rather than more attractive. Potentially perverse policy implications under such conditions are obvious.

For example, consider an increase in the processing costs associated with filing an AD petition. Policy makers may have intended this increase to induce a reduction in protection-seeking activity, as suggested by equation (8). However, if the transmission-of-injury effect is dominated, so that the  $P^d P^{d'}$  is negatively sloped, the increase in processing costs may induce an *increase* in seeking activity among downstream import-competing sectors. That is, diagrammatically (figure not shown) a positively sloped  $P^u P^{u'}$  curve would shift downward due to the increase in processing costs. At the same time, a negatively sloped  $P^d P^{d'}$  curve shifts to the left. As a result the equilibrium level of seeking activity among upstream sectors unambiguously declines, but among downstream sectors it may rise or fall. The intuition for this ambiguous result is similar to that outlined above. When the transmission-of-injury effect is dominated, any increase in upstream protection seeking acts on balance to suggest greater consolidation of market power upstream and so a greater opportunity to capture downstream profits. Similarly, if there is a reduction in seeking activity upstream (due to the direct effect of an increase in processing costs), this points to a reduction in the consolidation of upstream market power and hence increases the potential for profit under protection for downstream sectors. This is

because the decline in upstream market power diminishes the extent to which such profits will accrue upstream rather than downstream. Hence under an increase in processing costs, downstream sectors will face conflicting forces. Other things equal, the increase in processing costs tends to discourage protection seeking. But the induced reduction in protection seeking upstream acts to induce greater protection-seeking activity downstream when the transmission-of-injury effect is dominated. If this latter force is sufficiently strong, an increase in the processing costs associated with filing an unfair trade petition may ultimately stimulate protection-seeking activity among downstream sectors. The induced change in market structure upstream clearly lies at the heart of this result.

#### IV. Discussion, Policy Implications, and Concluding Remarks

The central purpose of this paper has been to analyze endogenous protection-seeking activity under the institutional foundation set by unfair trade laws. This is a significant departure from the tradition in the literature which has treated the problem of endogenous protection as unfolding in a legislative rather than an administrative institutional setting. In addition, the distinction between upstream and downstream import-competing sectors was identified as fundamental to understanding the mechanism for the transmission of protection-seeking shocks across import-competing sectors. While this distinction arises naturally given the incentive structure created by unfair trade laws, it should be noted that introducing the upstream-downstream distinction would likely also enhance our understanding of the causal processes of endogenous protection in the traditional voting/lobbying models. Hence the current model provides a point of departure for further research in the area of endogenous protection under an administrative institutional setting, while also pointing out the need to examine the significance of the upstream-downstream distinction in existing voting/lobbying models.

We found that when the transmission-of-injury effect is dominant, under a wide range of parameter values anything that inhibits protection seeking upstream also inhibits protection seeking downstream, and *vice versa*. Anything that stimulates protection seeking upstream also stimulates it downstream, and *vice versa*. If, however,

the transmission-of-injury effect is dominated, then increased (decreased) protection seeking among downstream firms tends to stimulate (retard) upstream seeking, while increased (decreased) protection seeking among upstream firms will tend to reduce (stimulate) downstream seeking, other things equal.

Our objective has been to build a general model of endogenous protection seeking in an unfair-trade-law setting. In the process, some potentially interesting details were omitted that suggest possible areas for future research. First, the extent to which upstream protection will transmit actual injury downstream depends on such things as the flexibility of downstream technology, the availability of substitute inputs, the extent to which the world market for the downstream good is competitive, and so on. Whether or not the transmission-of-injury effect is weakly dominant, strongly dominant or not dominant is likely to depend on such details related to downstream technologies and market structures. Furthermore, the question must be asked: is it possible that the likelihood of a sufficiently powerful injurious shock to downstream customers might instead induce upstream suppliers of intermediates to shy away from protection seeking? That is, can the expectation of transmitted injury act directly to inhibit rather than stimulate protection seeking? Preliminary work indicates that in a special case in which the very survival of a downstream industry would be jeopardized by upstream protection it often still pays to seek protection upstream. , Moreover, it frequently pays for downstream firms to support such efforts.

Another issue that has been ignored is the fact that alternative instruments of administered protection exist. The unfair trade laws are an example of administered protection, but VERs and emergency protection are also potentially available. Indeed, it is generally agreed that these instruments are strategically linked. For example, it is often argued that the threat of invoking AD is often used to gain a VER agreement. How might such linkages affect the endogenous level of protection and protection seeking? Finally, the linkages between the incentives set out in this model and the details of competition or antitrust policy is potentially important. It is well known that in the US and the European Community, unfair trade laws and competition laws are largely at odds; the former protect domestic firms from “unfair” foreign pricing practices (practices that are pro-competitive), and the latter protect



competition from anti-competitive strategies by firms. Whether and to what extent sanctions might be invoked under antitrust laws when market power is conferred by protection granted under unfair trade laws will complicate the inter-linkages across sectors between instances of protection seeking. Such issues, however, are probably best studied within a general framework of protection seeking under administrative rules and discretion, rather than starting from scratch in each case. The model presented in this paper offers a point of departure for such further research.

## References

- Baldwin, Robert.** 1982. "The Political Economy of Protectionism," in Jagdish Bhagwati (ed.), *Import Competition and Response*. Chicago: University of Chicago Press.
- —. 1985. *The Political Economy of U.S. Import Policy*, Cambridge Mass.: MIT Press.
- Cassing, James and Arye Hillman.** 1986. "Shifting Comparative Advantage and Senescent Industry Collapse," *American Economic Review*, 76, 516-23.
- Destler, I.M.** 1986. *American Trade Politics: System Under Stress*. Institute for International Economics, Washington DC, and The Twentieth Century Fund, New York, NY.
- Destler, I. M. and John Odell.** 1987. *Anti-Protection: Changing Forces in United States Trade Politics*. Institute for International Economics, Washington, DC.
- Findlay, Ronald and Stanislaw Wellisz.** 1982. "Endogenous Tariffs, the Political Economy of Trade Restrictions, and Welfare," in Jagdish Bhagwati (ed.), *Import Competition and Response*. Chicago: University of Chicago Press.
- Finger, J. Michael and Tracy Murray.** 1990. "Policing Unfair Imports: The United States Example," *Journal of World Trade*, 24, 39-55.
- Finger, J. Michael, H. Keith Hall and Douglas Nelson.** 1982. "The Political Economy of Administered Protection," *American Economic Review*, 72, 452-66.
- Herander, Mark G. and Roger L. Pupp.** 1991. "Firm Participation in Steel Industry Lobbying," *Economic Inquiry*, vol. XXIX, pp.134-147.
- Hillman, Arye and Heinrich Ursprung.** 1988. "Domestic Politics, Foreign Interests, and International Trade Policy," *American Economic Review*, 78, 729-45.
- Hindley, Brian.** 1988. "Dumping and the Far East Trade of the European Community," *The World Economy*, London, December.
- Kaplan, Seth.** 1991. "Injury and Causation in USITC Antidumping Determinations: Five Recent Views," in Matthew Tharakan (ed.), *Policy Implications of Antidumping Measures*, Amsterdam: North Holland.
- Magee, Stephen P., William A. Brock and Leslie Young.** 1989. *Black Hole Tariffs and Endogenous Policy Theory*, Cambridge University Press.

- Mayer, Wolfgang.** 1984. "Endogenous Tariff Formation," *American Economic Review*, 74, 970-85.
- Messerlin, Patrick.** 1989. "The EC Antidumping Regulations: A First Economic Appraisal, 1980-85," *Weltwirtschaftliches Archiv*, 125, 563-87.
- Norall, Christopher.** 1987. "New Trends in Anti-dumping Practice in Brussels," *The World Economy*, 9, 97-111.
- Porteous, Samuel and Alan Rugman.** 1989. "Canadian Unfair Trade Laws and Corporate Strategy," *Review of International Business Law*, 3, 237-70.

**FIGURE 1**

FIGURE 1

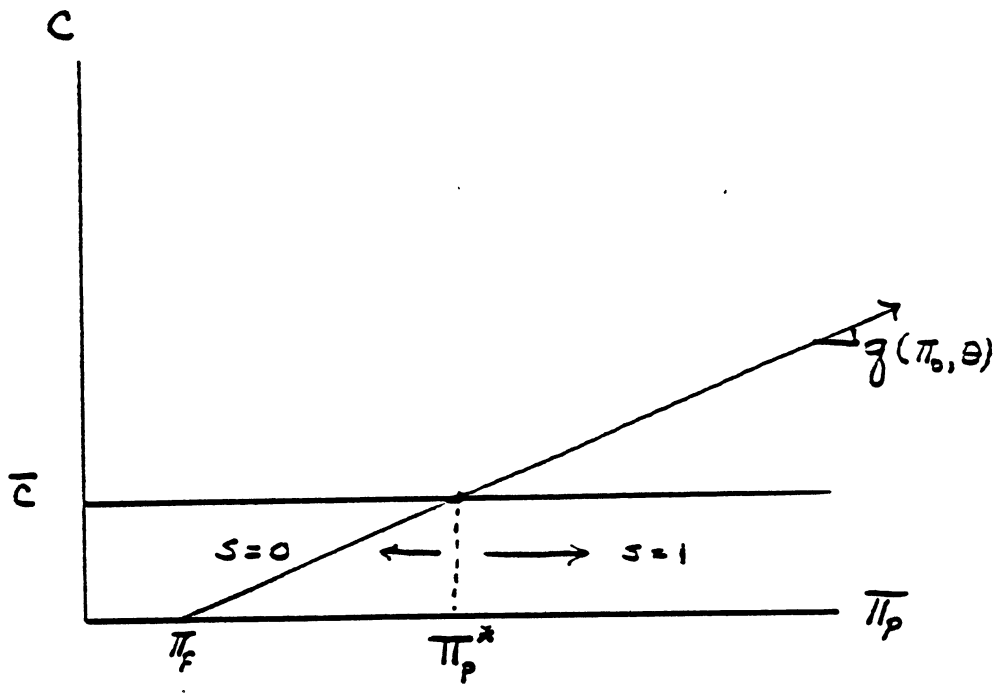


FIGURE 2

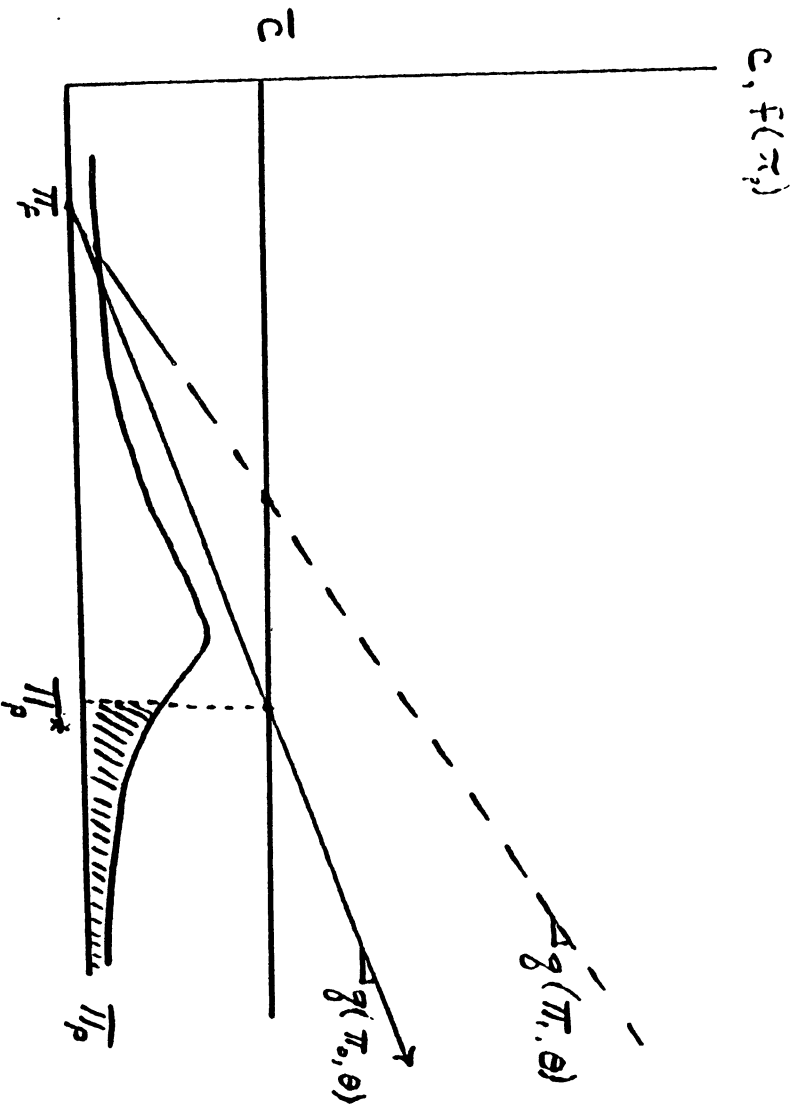


FIGURE 3

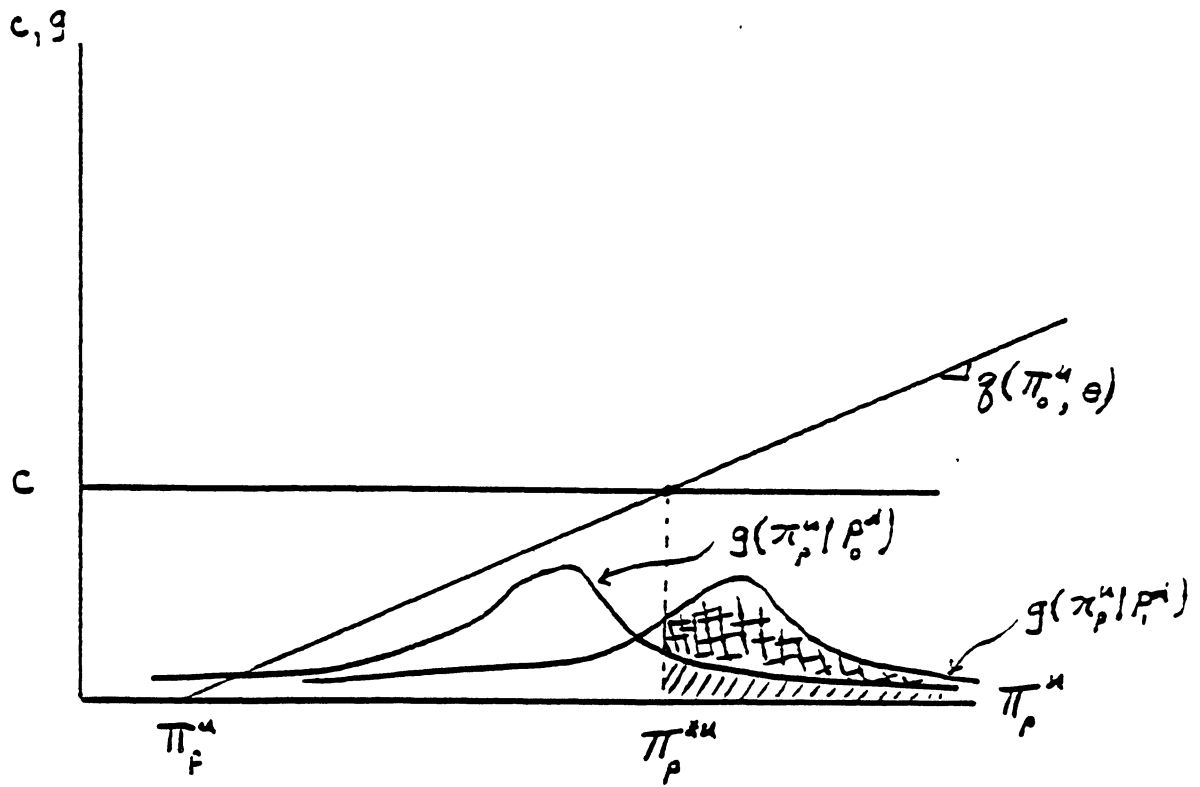


FIGURE 4

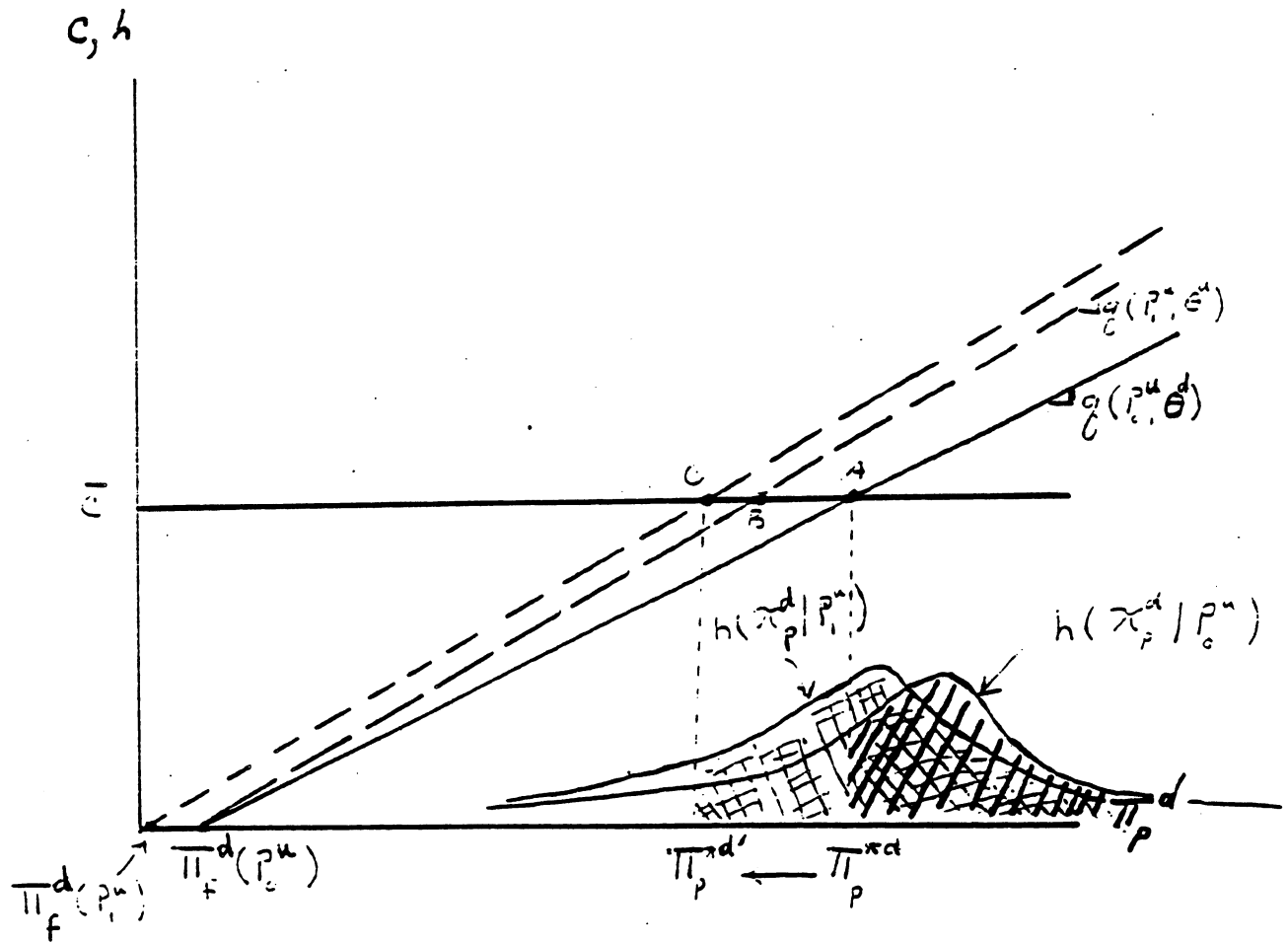
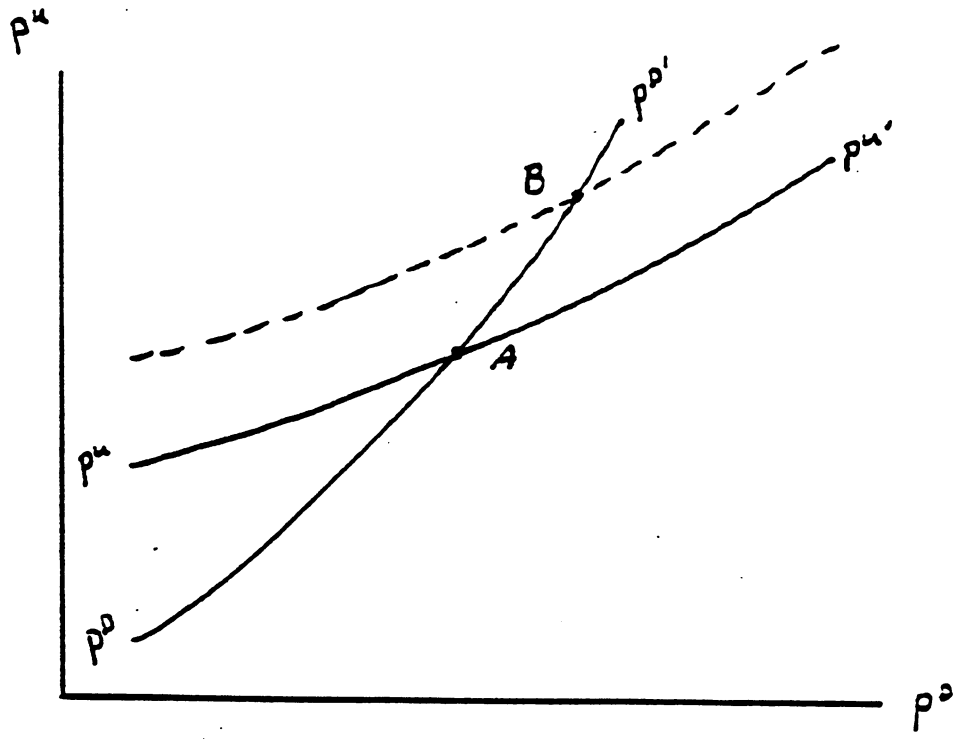




FIGURE 5



DEMCO

FIGURE 6

