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# Import Controls on Foreign Oil: Tariff or Quota?

By GEORGE A. HAY\*

During the recent deliberation of the Cabinet Task Force on Oil Import Controls, considerable attention was devoted to the question whether, regardless of the level of imports which should be allowed, the control should take the form of a quota or a tariff. Occasionally reference was made to a well-known equivalence theorem<sup>1</sup> which holds that when there is perfect competition in the product market a tariff will generate a volume of imports which, if alternatively set as a quota, produces an identical discrepancy between foreign and domestic prices. Therefore, other than the transfer of revenues from quota holders to the treasury, there should be no difference between the two types of control.

Nevertheless, some support for a quota persisted on the grounds that "A tariff can't do anything to help the consumer. It will have the same effect in limiting imports as a quota, but all the money goes into the treasury. With quotas, on the other hand, there's some chance of benefits trickling down to consumers in the form of lower prices."<sup>2</sup> Since the market conditions and import regulations for oil differ somewhat from the textbook examples, it is worthwhile to consider whether, in this particular case, there is some reason for consumers to prefer quotas to an "equivalent" tariff. It will turn out that due to the peculiar nature of oil quotas which are set as a fraction of refinery output, such a proposition can be shown to be true under a very restrictive set of assumptions.

To set up the problem, it is useful to make some preliminary observations and simplifying assumptions. First, it is ap-

proximately true that both the "offer" curve of domestic producers (at the wellhead) and the supply curve for foreign oil delivered to the East Coast of the United States are horizontal for broad segments.<sup>3</sup> Second, we will assume that all refiners can be characterized as being located along a straight line from the single producing area, *A*, to the East Coast port of entry for foreign crude oil, *B*. Refinery capacity need not be evenly distributed along the line; indeed it is simplest to assume that the concentration of refining capacity between any two points is related to the amount of consumer demand in the surrounding region. Furthermore, we will assume that demand for crude oil by the refineries in any neighborhood (and therefore total demand by all refineries) is completely inelastic with respect to price. Finally per barrel transportation costs either from *A*, eastward, or from *B*, westward, are assumed proportional to distance traveled.

The government wishes to limit imports to a fixed fraction *g* of total consumption. It can do this directly by means of a quota, or it can find a tariff which generates that level of imports. If the latter course is chosen, the government must locate the point *W* on *AB* such that a fraction *g* of the total demand lies to the right of *W*. (See Figure 1.) The unit tariff *T* is then chosen

<sup>3</sup> The former is due primarily to the practice of "prorating" whereby state regulatory commissions in the large producing areas control output to keep price constant in the face of month-to-month shifts in demand. Although in the short run a lower price might cause some marginal producers to shut down (and in the long run it might even reduce the amount of investment in domestic production) this could be completely offset by increased output from the large, efficient wells which because of the state-imposed output constraint operate substantially below the point at which marginal cost equals price. However, this argument is meant to hold within a fairly narrow range. For a sizeable reduction in price, the output constraint would no longer be binding, and the total quantity offered would decline.

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<sup>1</sup> See Jagdish Bhagwati.

<sup>2</sup> Former Secretary of Interior Walter Hickel, quoted in *The Wall Street Journal*.

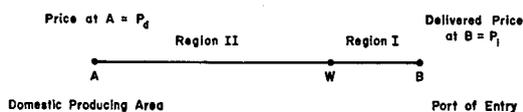


FIGURE 1

so that at  $W$ :

$$(1) P_d + s(W - A) = P_i + T + s(B - W)$$

where:

- $P_d$  = domestic price at  $A$
- $P_i$  = foreign price delivered at  $B$
- $s$  = transport cost per barrel-mile

Therefore:

$$(2) T = P_d - P_i + s[(W - A) - (B - W)]$$

Refiners in Region I (to the right of  $W$ ) will import all their requirements at a cost of  $P_i + T$  plus the inland transportation costs from  $B$ . Refiners in Region II (to the left of  $W$ ) will pay  $P_d$  plus the transportation costs from  $A$ .

Under the quota system as it is currently administered,<sup>4</sup> each refiner is permitted to import a fraction  $g$  of his production. However, since "tickets" are relatively worthless to refiners near  $A$  because of the inland transportation costs, these refiners are permitted to "sell"<sup>5</sup> their tickets to refiners closer to  $B$ . It is clear that under a well-functioning arbitrage system, the end result should again be that all the imported foreign oil still winds up in Region I. A fraction  $g$  of the oil would be available under Region I's quota at a price  $P_i$ , but the rights to the remaining imports would have to be purchased from Region II refiners at some markup  $P_q$  over  $P_i$ .

We now wish to compare the per barrel

cost to refiners in Region I under the alternative control systems.

Under a tariff:

$$(3) C_t = P_i + T + ITP$$

Inland transportation costs ( $ITP$ ) are a function of the dispersion of demand within Region I but need not be specified in detail because they will be the same under a quota system so long as the arbitrage system described above works smoothly.

Under a quota:

$$(4) C_q = gP_i + (1 - g)(P_i + P_q) + ITP$$

By rewriting (3) as:

$$(3') C_t = g(P_i + T) + (1 - g)(P_i + T) + ITP,$$

we can see more clearly the relative costs of the alternative controls. On the one hand, Region I refiners under a quota regime save an average of  $gT$  per barrel by being allowed to import a fraction  $g$  of total requirements with no tariff. On the other hand, Region I refiners lose  $(1 - g)(P_q - T)$  which is the premium paid for Region II's import tickets on a fraction  $(1 - g)$  of total requirements over the amount that Region I refiners would pay under a tariff.

What is  $P_q$  likely to be? If the market for tickets is perfectly competitive (although the total number of tickets is fixed) it is easy to show that  $P_q = T$  and therefore that  $(1 - g)(P_q - T) = 0$ .

In a perfectly competitive market, the price of a ticket will have to be low enough so that none of Region II's tickets go unsold, yet high enough so that Region II refiners will not prefer to utilize the import tickets for their own production rather than sell to Region I. This will occur if a refiner at  $W$ —the border between Region I and Region II—is indifferent between using a ticket himself and selling it.

This in turn requires that:

$$(5) P_i + s(B - W) = P_d + s(W - A) - P_q$$

or

$$(5') P_q = P_d - P_i + s[(W - A) - (B - W)]$$

$$(6) \therefore P_q = T, \text{ and } C_t - C_q = gT$$

<sup>4</sup> With minor modifications discussed below.

<sup>5</sup> "Imported, crude and unfinished oils must be processed in the licensee's refinery or petrochemical plant or exchanged for domestic crude or unfinished oils which are so processed by the licensee. Sales are thus prohibited, but oil companies have developed a system of exchanges utilizing variable exchange ratios which permits licensees to realize an effective financial benefit from the value of the import license" Task Force Report, p. 15.

Therefore, under the assumption of a perfect market for import tickets, refiners in Region I pay out on average  $gT$  per barrel less than they would under a tariff system. Similarly, refiners in Region II benefit under a quota system by an amount equal to  $(1-g)T$  times Region I's requirements. The net effect, therefore, of replacing a quota with a tariff is to increase the federal revenues by an amount equal to  $T$  times Region I's consumption,<sup>6</sup> with refiners in each region "contributing" an amount directly proportional to the region's share of total demand.<sup>7</sup>

Furthermore, since it is consumer not refiner welfare in which we are interested, it is essential to note that the saving to refiners under a quota system tends to reduce *marginal*, not merely average, costs since each refiner's quota allocation is proportional to his expected output. Thus, *at the margin*, the refiners' unit costs are increased by  $gT$  if the quota system is replaced by a tariff, and we would expect oil prices to increase. Therefore, under the conditions of this example, the increased federal revenues are not in fact a transfer from refiners but come ultimately from oil consumers in the form of higher prices.

This is in contrast to the usual textbook situation in which quota allocations are fixed independently of production. In that case, the *marginal* cost to refiners under a quota would be no lower than under a tariff, and there is no reason to expect a pass through of the savings which refiners collect on the barrels imported under the quota.<sup>8</sup>

<sup>6</sup> In the United States in 1969, this would have been something in the order of \$2 billion, since  $g$  is .122, and estimates of the "equivalent" tariff went as high as \$1.75 per barrel. In mid-1970, a short-run tanker shortage caused by events in the Middle East rendered import tickets temporarily worthless.

<sup>7</sup> Using this analysis, it is easy to see that an alternative quota system under which all the tickets were allocated directly to Region I would not change the "real" results but would result in a transfer from Region II to Region I of  $(1-g)T$  times Region I's requirements as compared with the standard quota. Region I should clearly prefer this type of arrangement to the standard quota.

<sup>8</sup> That is, the lower cost of the "quota barrels" would be appropriated by the refiners as a pure rent.

## I. Qualifications

The above result depends on the existence of a competitive market in import tickets. To the extent that tickets are not priced competitively,<sup>9</sup> Region II can push up the costs for Region I refiners. In particular, if the supply of tickets in Region II could be monopolistically controlled, it would be possible to discriminate perfectly in the sale of tickets to Region I charging a price to each refiner which would make him indifferent between buying tickets and using domestically produced oil. For a refiner located at  $B$ , for example, the ticket price would be set at:

$$(7) \quad P_q = P_a + s(B - A) - P_i$$

Depending on the dispersion of Region I's refineries along the segment  $BW$ , it is entirely possible that the total cost to Region I refiners in this situation would be substantially greater than it would be under a tariff. In any case the relative savings to the two regions with a quota system are substantially changed, with Region II coming out ahead.

In addition, we have assumed above that changes at the margin in unit raw materials cost to refiners will be passed through to consumers in lower prices. Obviously, if there is not perfect competition in the refining industry, some of the lower costs of oil under a quota would be absorbed by the refiners, and the preference for a quota is weakened. This is reinforced by the fact that the marginal quota allotment to a refiner declines somewhat at higher outputs.<sup>10</sup>

Furthermore, we have ignored the obvious fact that under a tariff system, the money collected by the treasury is not a complete loss to consumers since oil customers are also taxpayers, and with government expenditures held constant, the tax bill would be lowered. However, unless the use of oil is

<sup>9</sup> Or if the arbitrage process does not work efficiently so that Region I refiners wind up using some domestic crude oil while some Region II refiners do not sell their tickets and actually use the foreign oil.

<sup>10</sup> The Task Force Report p. 22, contains a "guestimate" that no more than half the savings are passed on to consumers.

distributed approximately in proportion to individuals' tax payments (an assumption which is clearly not valid) an across-the-board tax cut to "refund" the tariff revenues would be relatively small consolation to oil users.

Finally, even if all the assumptions most favorable to a quota system are fulfilled, there may still remain strong reasons to favor replacing the quota with a tariff. First, conditions in domestic and world oil markets plus developments in construction of oil tankers make it likely that the tendency will be for the prices of domestic and (delivered) foreign oil to continue to drift further apart. If the tariff is not continuously revised upward to offset this development, or is revised only with a lag, consumers derive some advantage. Looked at another way, the incentive for domestic producers to initiate price increases might be somewhat dampened since each price hike would require a simultaneous request for an increase in the tariff. Second, the administration of the quota system leaves sufficient room for "discretionary" allotments not necessarily based on current refinery output, that incentive for using political influence or bribery to obtain favorable treatment poses a constant threat to the integrity of the system.<sup>11</sup> The tariff system appears to

<sup>11</sup> There is no implication that any dishonest or illegal activity actually takes place, merely that the incentives to cheat are substantial. See the recent paper by Kenneth Dam.

offer a considerable improvement in this regard.

## II. Postscript

A broader and more fundamental issue has not been considered in this paper, although I have dealt with it at length elsewhere. Specifically, what is the rationale for imposing any form of import control on crude petroleum and petroleum products, especially at the restrictive levels currently involved? Both my own estimate and that of the Task Force indicate that the cost to petroleum users of the import control program is of the order of \$5 billion in 1968. It is not obvious that the contribution to national security of import controls is sufficient to justify such a cost.

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