

easily; and thereby be in a position to counteract any monopsonistic advantages that may be expected to arise to the importing countries from administering the quotas by themselves.

HIROFUMI SHIBATA\*

\* The author is associate professor of economics at Queen's University, Kingston, Ontario. He is grateful to Professors Jagdish Bhagwati, David W. Slater, and Mr. T. A. D. Sirisena for helpful comments on an earlier draft. The introduction has been rewritten in the light of Bhagwati's companion note [2].

#### REFERENCES

1. J. BHAGWATI, "On the Equivalence of Tariffs and Quotas," in R. E. Baldwin and others, editors, *Trade, Growth, and the Balance of Payments—Essays in Honor of Gottfried Haberler*, Chicago 1965.
2. ———, "More on the Equivalence of Tariffs and Quotas," *Am. Econ. Rev.*, this issue, 142-46.

### More on the Equivalence of Tariffs and Quotas

In an earlier paper on the equivalence of tariffs and quotas [1], I argued that this equivalence—defined such that a tariff would lead to a level of imports which, if alternatively set as a quota, would generate the same implicit tariff—followed from the assumptions of competitive domestic production, supply of imports, and holding of quotas. This universality of competitiveness sufficed to guarantee equivalence, as defined. It was further argued that a departure from these assumptions could, in general, destroy this equivalence and several such departures were analyzed: (1) perfect competition in domestic production replaced by pure monopoly in production; (2) perfect competition among quota-holders replaced by monopolist-holding of quota; and (3) simultaneous presence of monopoly in quota-holding and in domestic production [1, p. 54].

Recent communications, however, from Hirofumi Shibata [2] who has analyzed the case where there is monopolistic supply of imports, and from G. Yadav [3] who has analyzed the case where there is monopolistic import under both tariffs and quotas, have suggested the following clarifications and extensions of some importance.

1. The definition of equivalence, as stated above, will run into some difficulty if the tariff situation is itself characterized by a discrepancy between the c.i.f. import price and the domestic price (and hence an implicit tariff) which differs from the tariff rate. In this case, is a tariff which gives rise to an import level which, in turn, set as a quota, gives rise to an implicit tariff which is unequal to the tariff *but equal to the implicit tariff under the tariff situation itself* to be regarded as equivalent to that quota?

In the original analysis, which treated only cases where the tariff situation was characterized by a discrepancy between the c.i.f. import price and domestic price (and hence an implicit tariff) which could not depart from the explicit tariff, this question could not arise. It arises directly in the Yadav

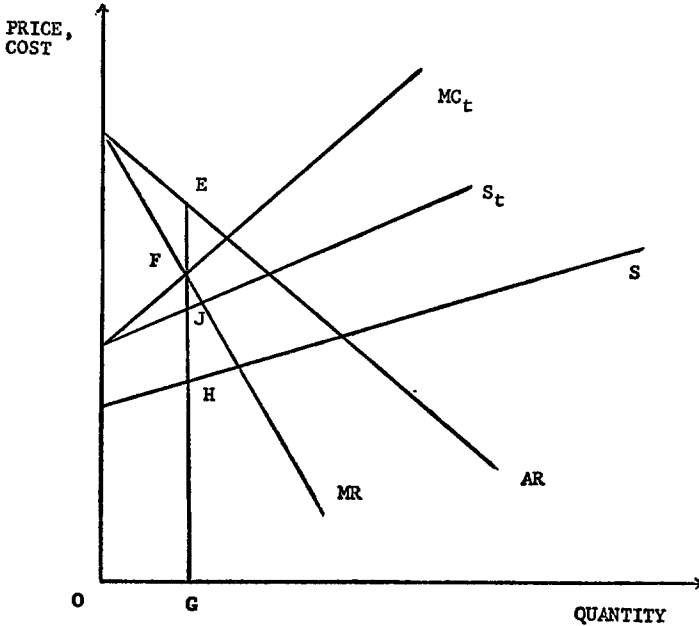


FIGURE 1

case, however, as is seen from Figure 1. Here, imports are made by a single importer, under *both* tariff and quota regimes, but competition holds everywhere else. Under tariff rate  $t$ ,  $S_t$  is the foreign supply curve of imports; without the tariff, it is  $S$ .  $AR$  is the net demand curve for imports, the marginal revenue curve to it being  $MR$ . The intersection of the marginal cost curve  $MC_t$ , which is marginal to  $S_t$ , at  $F$  with  $MR$ , determines the maximum profit position for the monopolist importer under the tariff. The domestic price is  $EG$ , the foreign c.i.f. price is  $HG$ , the landed price is  $JG$  and hence the implicit tariff rate  $EH/HG$  exceeds the explicit tariff rate  $JH/HG$ . When the quota is alternatively set at  $OG$  and the (actual) tariff removed, equilibrium is again at domestic price  $EG$ , so that the implicit tariff rate is again  $EH/HG$  but this differs from the explicit tariff rate  $JH/HG$ .

If, therefore, equivalence is defined in terms of the implicit tariff rate (under the quota) equalling the (explicit or actual) tariff rate, as was undoubtedly done in the original paper, we would be led to conclude that equivalence breaks down in this specific case as well. Indeed, if one takes the *pair-wise definition* of equivalence, as implicit in the original paper, that *a quota will give rise to an implicit tariff rate which, if alternatively set as a tariff, will generate the same level of imports as the quota*, it is unambiguously clear that equivalence breaks down when there is monopoly import under both tariff and quota: for, in this case, the quota  $OG$  will lead to an implicit tariff rate  $EH/HG$  which, when set alternatively as the tariff, will not lead to the same import level  $OG$ .

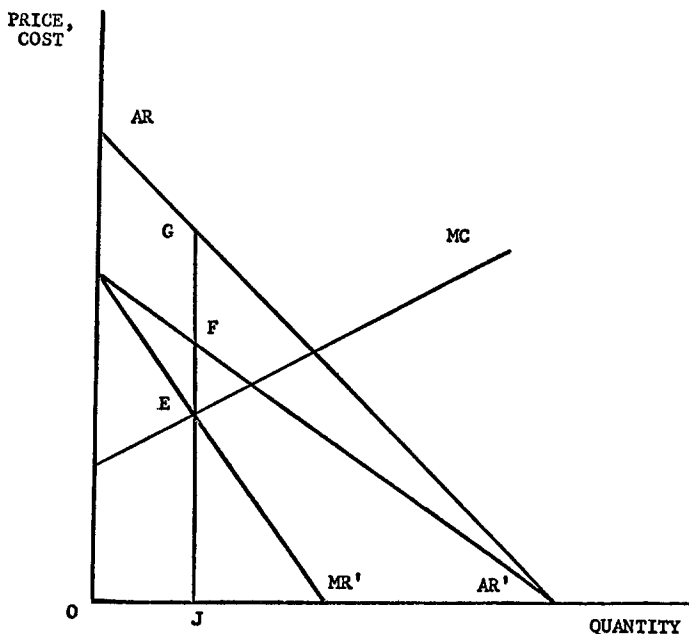


FIGURE 2

Hence, in terms of the definition of equivalence used in the original paper, the Yadav case does not represent an exception to the presumption, stated earlier, that equivalence will generally break down with the introduction of monopoly elements.

2. A similar conclusion holds for the case analyzed by Shibata, where foreign supply is monopolistic under both tariff and quota. In Figure 2 the monopolist supplier of imports is faced with the net import demand schedule  $AR$  which, in case of a tariff at rate  $GF/FJ$ , will shift to  $AR'$ . The marginal revenue curve to  $AR'$  is  $MR'$ . The intersection of the monopolist's marginal cost curve  $MC$  with  $MR'$  at  $E$  determines his maximum-profit point, giving  $OJ$  as the volume of imports,  $JG$  as the domestic price, and hence  $FJ$  as the c.i.f. price. The shift to the alternative situation, where the tariff  $GF/FJ$  is removed and replaced by a quota of  $OJ$ , leads on the other hand to the same domestic price  $GJ$ , but the c.i.f. price now shifts also to  $GJ$ , so that the implicit tariff rate is zero.

The equivalence proposition thus breaks down unequivocally: an explicit tariff will not lead to an import level which, if set alternatively as a quota, will generate an implicit tariff equal to the explicit tariff; nor will a quota lead to an implicit tariff which, if set alternatively as an explicit tariff, will generate the same level of imports. Hence, the Shibata case also is no exception to the presumption that equivalence will generally break down with the introduction of monopoly elements.

3. Suppose, however, that the definition of equivalence is changed as fol-

lows: a tariff will give rise to a level of importable production and of imports which, if set alternatively as a quota, will generate the *same level of importable production*. With this definition, if the reader refers back to Figure 2, he will notice that equivalence follows except that the pair-wise criterion (that a quota will give rise to a level of importable production and an implicit tariff rate which, if set alternatively as a tariff, will generate the same level of importable production) will not yet be satisfied.<sup>1</sup> A similar conclusion holds for the Yadav case, as the reader can check by referring back to Figure 1.

But now follow this shift in definition to its logical end and define equivalence quite simply as follows: if a tariff leads to a specified level of imports and domestic production, there will be a specific quota which can be alternatively set which will lead to an identical level of imports and domestic production. Note that, on this definition, both the cases discussed above will go through as exceptions to the presumption that the introduction of monopoly elements will, in general, disrupt equivalence.

4. The question which immediately arises then is how equivalence should be defined. As with all definitional questions, this cannot be resolved except with reference to the kinds of questions on which light is sought by analysis deploying the chosen definition.

The advantage of the definition that was used in my original paper is that it enables one to answer directly the question whether under a quota regime the observed implicit tariff rates can be treated as equivalent to identical tariff rates (levied instead of the quota) in the sense of generating the same level of imports and domestic production. This is a question that comes up frequently and the general practice is indeed to treat the observed, implicit tariff rate under a *QR* regime as the "effective tariff rate." It is also customary to treat a tariff as "redundant" if the implicit tariff rate, in a *QR*-plus-tariff regime, exceeds the actual tariff rate. Examination of the equivalence proposition, in terms of the original definition, throws up the limitations of these deductions when monopoly elements are present.

Thus, for example, in the case when foreign supply is monopolistic, the implicit tariff rate is zero under the quota—refer back to Figure 2—but setting the actual tariff rate at zero and removing the quota restriction will not yield the same level of imports and domestic production; the truly equivalent tariff rate is higher. Similarly, in the case where there is domestic, import monopoly instead, the truly equivalent tariff is lower than the implicit tariff rate in the quota alternative—refer back to Figure 1. Similar conclusions apply to the cases analyzed in the original paper: (i) where there is monopolistic-holding of quotas, but competition elsewhere, again the implicit tariff rate will exceed the explicit tariff rate, thus overstating the truly equivalent tariff rate, when the quota is underutilized; (ii) where there is monopoly in domestic production as well as in the holding of quotas, again the underutilization of the quota would imply an implicit tariff rate that exceeds the explicit tariff rate and hence overstate the truly equivalent, effective tariff [1, p. 63]; and (iii) where there is monopoly in domestic production but competition everywhere else, the im-

<sup>1</sup> On the other hand, the universally competitive system will satisfy equivalence both ways, under either definition.

PLICIT tariff will exceed the explicit tariff, thus overstating again the truly equivalent, effective tariff that the quota represents [1, p. 58].

Indeed, these were precisely the kinds of questions which had prompted my interest in the original analysis of the equivalence proposition. Hence my definition of equivalence in terms of the relationship between explicit and implicit tariff rates.

If, however, the analyst were interested in investigating whether the "real" equilibrium corresponding to a tariff (quota) could be reproduced exactly by *some* quota (tariff) alternatively imposed, and if this real equilibrium were taken to refer to the level of imports and importable production (which may well be the case—if the "protective" effect of trade policy were the main interest of the analyst), then the alternative definition of equivalence stated in this note, and suggested by Shibata, would be the appropriate one.

JAGDISH BHAGWATI\*

\* The author is professor of economics at the Massachusetts Institute of Technology. This note was written when he was visiting professor of economics at Columbia University. The note has been written in response to two stimulating comments from Hirofumi Shibata and Gopal Yadav of Queen's University, Kingston, on an earlier paper of the author's on this subject in the Haberler *Festschrift* volume [1].

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2. H. SHIBATA, "A Note on the Equivalence of Tariffs and Quotas," *Am. Econ. Rev.*, this issue, 137-42.
3. G. YADAV, "A Note on the Equivalence of Tariffs and Quotas," unpublished.

### On the Function of Behavioral Theory and Behavioral Research in Economics

Fritz Machlup in his 1966 Presidential Address to the American Economic Association [9] again clarified major issues relating to the respective roles of theoretical and empirical studies. Yet his analysis of the function of behavioral science in economics is far from complete and requires further clarification.

I shall recapitulate first (very briefly) the important points made by Machlup, with which at least one behavioral scientist, namely the writer, is in full agreement:

1. There is a fundamental difference between theoretical constructs and empirical or operational concepts. Only propositions regarding the latter can be verified by observation.

2. The crucial question in comparing the theory of the economic man with a behavioral theory is whether conclusions from the two theories (what Machlup calls "inferred outcomes") differ, and if so, which conclusions lead to better understanding and prediction of what has happened or will happen.

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