

## Protection and the Optimal Tariff

Ronald W. Jones\*

### Abstract

*A simple diagrammatic device, featuring the foreign offer curve and several alternative home income-consumption loci, is presented to illustrate those cases in which the Metzler tariff paradox may arise. In this paradoxical outcome, a tariff lowers the relative domestic price of importables. It is shown that the imposition of an optimal tariff may lead to such an outcome, even though the existence of an optimal tariff is often cited as a condition sufficient to rule out various paradoxes in trade theory, including the Metzler tariff paradox.*

The theory of international trade is noted for several paradoxical outcomes that may emerge when a trade equilibrium is disturbed from an initial, free-trade, competitive level: Growth in production possibilities in one country may so depress the country's terms of trade as to lower real income. In similar fashion a gift from abroad may, in a multi-country trading world, lower home welfare. And the imposition of a small tariff may lower the world price of imports sufficiently to cause the relative domestic price of imports to decline, the celebrated Metzler paradox.

As argued by Bhagwati and others, paradoxes such as these can be avoided if a country levies an optimal tariff. Specifically, if such a tariff is in place, (i) growth at home or a gift from abroad must raise aggregate welfare, and (ii) a further rise in the tariff rate must serve to protect local import-competing industries. Thus the optimal tariff is associated with the absence of such paradoxical possibilities. However, such a broad conclusion still leaves open the question of whether the move from free trade to an optimal tariff must itself be protective, even though it is established that *further* increases in the tariff rate raise domestic import prices. The purpose of this note is to illustrate that the Metzler paradox may indeed emerge with an optimal tariff. Furthermore, the simple graphical construction used to illustrate this result focuses on the home country's income-consumption locus in a manner which reveals how the possibility

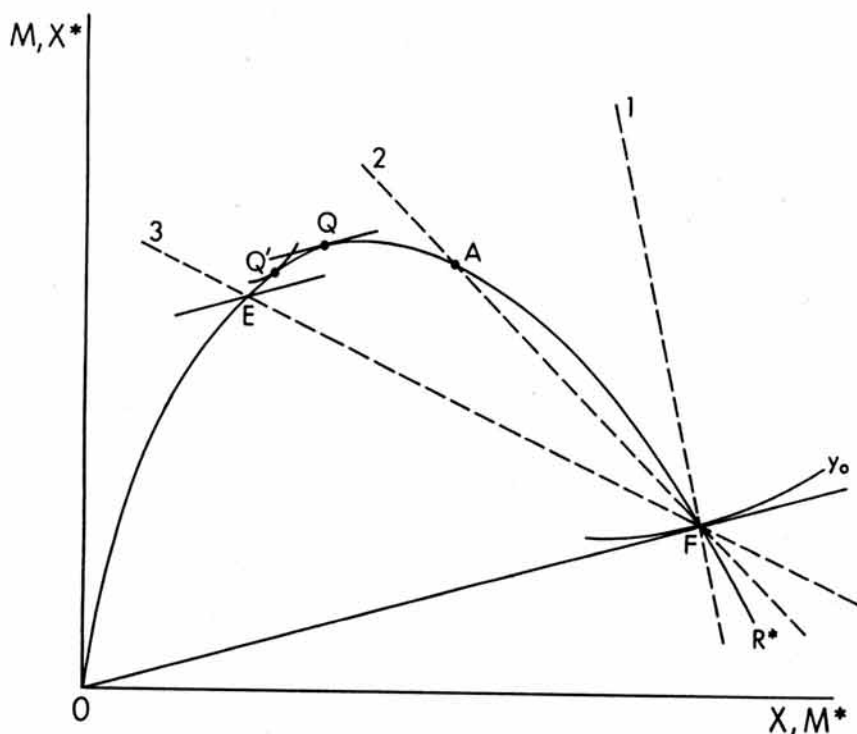
---

\* Department of Economics, University of Rochester, U.S.A.

Research support has been provided by the National Science Foundation Grant #SES-851069F.

of a Metzler tariff paradox is sensitive to the height of the tariff. A sufficiently high rate of protection can always serve to raise the relative price of imports behind the tariff wall.

The argument is based on the accompanying offer curve diagram. I have assumed that the slope of ray  $OF$  depicts the initial terms of trade and that the foreign offer curve,  $OR^*$  is inelastic at equilibrium point  $F$ . The diagram differs from those traditionally shown in that it is designed to represent three alternative taste patterns for the home country. They all share indifference curve  $y_0$  tangent to ray  $OF$  at the initial equilibrium, but differ in the values for the home marginal propensity to consume. Three alternative income-consumption curves are drawn, each corresponding to a different set of tastes. Thus the steepest curve, 1, is associated with a taste pattern heavily biased towards importables—a high value for  $m$ , the home marginal propensity to consume. Curve 3, by contrast, reflects a low marginal propensity to consume. With such a taste pattern indifference curves have the same slope as  $y_0$  at  $F$  everywhere along curve 3. An intermediate case is shown by income-consumption curve 2. Each income-consumption curve is associated with a different home offer curve, not drawn, with each offer curve passing through point  $F$ .



If taste patterns at home support income-consumption curve 1, any tariff levied by the home country must raise the domestic relative price of importables and thus be protective. The rationale is simple: The income-consumption curve divides the positive quadrant into two spaces. Northeast of the income-consumption locus home indifference curves are all steeper than the  $y_0$  curve at F, so that any solution in that space would show a relative domestic price for home importables lower than shown by initial price line OF. A tariff shifts the home offer curve inwards, resulting in a new equilibrium somewhere along the foreign offer curve closer to the origin than is point F. Any such point lies southwest of income-consumption locus 1, and therefore would reflect a relative domestic price for imports at home higher than initially at F.

Income-consumption curve 2 is flatter than 1 and cuts the foreign offer curve at A. If the tariff shifted the home offer curve so that it intersected the foreign OR\* curve at A, the world price of imports would be depressed by precisely the amount of the tariff and domestic prices would remain unchanged. A smaller rate of tariff, however, would correspond to an equilibrium point on the foreign offer curve between point A and F, and the indifference curve for the home country at any such point must be steeper than along I-C curve 2. The consequence is that the tariff has lowered the relative domestic price of importables—the Metzler tariff paradox.

Income-consumption curve 1 is steeper than the foreign offer curve at point F, whereas locus 2 is flatter. The distinction between the two involves the classic comparison between the value of the home marginal propensity to import,  $m$ , and the (absolute) value of the foreign demand elasticity,  $e^*$ , at point F. Case 2, in which a small tariff fails to be protective, corresponds to such a low value of  $m$  that:

$$e^* + m < 1.$$

The lower the value of  $m$ , the greater the range along OR\* such that a tariff will fail to protect the home import-competing industry.

At point Q the foreign offer curve has the same slope as initial price-line OF, and the foreign offer curve has deliberately been drawn so that this point lies northwest of point F. Income-consumption locus 3 has a sufficiently low value for  $m$  that it cuts the foreign offer curve closer to the origin than at Q, at point E. A home indifference curve would, in this case, have the same slope at E as the foreign offer curve at Q. Consequently the point Q' along OR\* at which a home indifference curve is tangent to OR\* lies between E and Q. That is, the optimal tariff rate lies in range EF and

thus corresponds, in case 3, to a *lower* relative domestic price of imports than in free trade. The optimal tariff has, in Metzler paradox fashion, failed to protect the domestic import-competing industry.