

**Protection,
Growth and Trade**
Essays in International Economics

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If (1) the producer prices right up to the import-preventing price OT and (2) B imported from C before the union, then the cost-reduction effect is $GHFJ$ and the trade-diversion effect for the union as a whole is $FKNU$ (both shaded). The loss of customs revenue to B, and hence the total loss to B, is $UQWN$, of which the trade-diversion effect $FKNU$ is a net loss to the union countries combined and $FQWK$ is a redistribution toward A's producer, who gains $FQWK$ plus the cost-reduction effect. From the point of view of B alone, one would describe the customs revenue loss $UQWN$ as the 'trade-diversion effect'.

If the made-to-measure system operated, the price to A's consumers before the union is formed would be given by the point Q' , and the price to A's and B's consumers after the union is formed, by V' . Bearing this in mind, the diagram could be used to illustrate the various arguments of section II.

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A Tariff that Worsens the Terms of Trade*

It is a familiar proposition that the imposition of some level of tariff can raise a country's real income by improving its terms of trade. This argument is usually demonstrated by means of a two-product, two-factor and two-country model.

In the past the terms of trade argument has been used on occasions as a justification for protecting manufacturing industry in Australia. This essay seeks to show that, once a second export product is explicitly allowed for in the analysis, a favourable terms of trade effect of protection is less likely. In fact we shall show that in a particular world with three products and three factors and certain factor-intensity conditions not unlike those of Australia, a tariff may worsen the terms of trade by leading to increased production of one of the export products.

I The Model

Suppose we have an economy A operating under free trade where one product, textiles, is imported and two products, wool and grain, are exported. Initially we shall suppose that A is a small country confronted with an infinitely elastic demand for its exports. This assumption will of course be removed later, since otherwise there could be no terms of trade effect.

There are three factors of production, land, labour and capital. We assume that the production of both wool and grain require land and labour but not capital, and that textile production uses capital and labour but not land. Capital is therefore a specific input for the textile industry, land is specific for the two agricultural industries, while labour is mobile between all three industries. We assume perfect competition throughout, perfect

* From I. A. McDougall and R. H. Snape (eds) 1970: *Studies in International Economics*, Monash Conference Papers, Amsterdam: North-Holland. Written jointly with Fred H. Gruen.

divisibility of all factors and that all production functions are linear and homogeneous. Finally, and this assumption is crucial, we assume that grain production is always more labour intensive than wool production. In other words, for any given ratio of the price of labour to the price of land the labour/land ratio is always higher in grain than in wool production.

II The Imposition of a Tariff

We shall now examine the effect of the imposition of a tariff on the imported good, textiles. This will have two effects: (a) on the allocation of productive resources within the economy, and (b) on the allocation of consumers' expenditures. We shall first examine the effect on the allocation of productive resources.

The imposition of a tariff will raise the domestic price of textiles. As a result textile production will become relatively more profitable and the value of the marginal product of labour and capital in textile production will increase. On the other hand, the marginal product of labour in wool and grain production has not altered. Some labour previously used in the production of wool and grain will therefore be attracted to textile production. The effect of protecting textile production will thus be to reduce the amount of labour which remains available for wool and grain production.

What will be the effect of a reduction in the supply of labour on the quantities of wool and grain? This question has in fact been answered by Rybczynski (1955). He shows that, in a two-factor, two-product model, if the quantity of one factor is increased with the quantity of the other remaining unchanged, the maintenance of the same factor-price ratio requires that there be an absolute expansion in the production of the commodity intensive in that factor and an absolute curtailment of production of the other commodity. In our model this means that if the quantity of labour available to agricultural industries is reduced while the quantity of land is fixed, and if the factor-price ratio is to stay unchanged, there must be an absolute reduction in the production of the labour-intensive good, grain, and an absolute increase in the production of the land-intensive good, wool. In this model, and at this stage of the argument, the factor-price ratio must stay unchanged, since, with constant returns to scale in both industries, there is a unique relation between the product-price ratio, which is given by the world prices of wool and grain, and the factor-price ratio. Hence the imposition of a tariff on textiles will increase the production of textiles *and of wool* and reduce the production of grain.

The effect of the imposition of a duty on textiles on consumers' expenditures will be to reduce consumption of textiles (since the local price has risen) and to increase the consumption of grain and wool.

If we look at the total effect of the duty on imports and exports of particular products, we obtain the following picture:

- 1) Imports of textiles will decline since local production of textiles increases whilst consumption declines.
- 2) Exports of grain will decline since local production declines whilst consumption increases.
- 3) The effect on exports of wool is uncertain. Both production and consumption will increase. Obviously if the increase in production exceeds the increase in consumption, exports of wool will increase and vice versa.

III The Terms of Trade Effect

We shall now drop the 'small country' assumption for wool exports and suppose that increased exports of wool would lead to a fall in the price of wool. We continue to assume that the country cannot affect the prices of grain and textiles. In the case of Australia there is some justification for this type of model.

The imposition of a duty on textiles may then lead to a deterioration of the country's terms of trade. The external prices of wheat and textiles have remained unchanged whilst the possible increase in wool exports would reduce local and world prices of wool and thus adversely affect the economy's terms of trade.

If our model were to present a valid and useful simplification of the real world, what policy should country A adopt in order to improve its terms of trade? Obviously the first-best policy would be to put an export tax on wool. Exactly the same result could be obtained by an appropriate export subsidy on grain combined with a tariff at the same rate on textiles. While a tariff on its own may worsen the terms of trade, this policy would be biased against wool, hence would reduce wool output and increase consumption of wool, and so would improve the terms of trade.¹ If the only available policy instrument is a tariff on textiles, the optimal tariff is zero. If taxes and subsidies on production and consumption of grain and textiles are feasible, then taxing production of textiles, subsidizing production of grain, and taxing consumption of textiles and of grain would all improve the terms of trade.

IV Effect on the Pattern of Exports

Apart from this demonstration of a possible perverse terms-of-trade effect of protection, the model can be used to examine some interesting effects of

1. These two sentences were not in the original article. The original article contained the following sentence, which I now believe to be wrong: 'Exactly the same result could be obtained by an appropriate export subsidy on grain combined with an import subsidy (negative tariff) at the same rate on textiles.'

protection on the allocation of resources between different export industries. In our example, with grain a closer substitute on the side of production for textiles than is wool, wool production increased and grain production decreased; factors of production moving from grain to wool. We might replace grain with another product M which can be taken to represent actual or potential exportable manufactures. A tariff will then shift resources out of industries producing manufactured exports into wool. Alternatively we might let M represent the domestic value-added element in exports of a processed (refined) mineral, say steel, and replace wool with the crude mineral iron ore. Exports consist then of iron ore and steel, the latter being a package of iron ore and the value added element in steel. A tariff will then increase the crude content of exports and reduce the processing or value added element in total exports. In this model protection will thus encourage more minerals to be exported *before* being processed.²

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2. Another alternative is to assume that there is only one export, but there are two importables, on only one of which a tariff is imposed, this being the one that is complementary with the exportable. The basic story is then the same: a tariff may worsen the terms of trade. Suzuki (1973) has analysed this case and has provided general conditions (allowing also for effects on the demand side) under which a tariff may worsen the terms of trade.

Urban Unemployment, Intersectoral Capital Mobility and Development Policy*

A recent contribution by Harris and Todaro (1970) presents a simple but powerful explanation of urban unemployment in less-developed countries. Rural-urban migration is assumed to take place until there is equality between the actual rural wage and the *expected* urban wage, which is the actual wage times the probability of being employed. Unemployment is thus consistent with equilibrium in this model. Essential ingredients are an institutionally or parametrically determined minimum wage in manufacturing and a wage differential between the two sectors. (Some of the main ideas in this explanation were originated by Todaro (1969). They were developed independently by Wellisz (1968) and Harberger (1971). See also Frank (1968) and Stiglitz (1974).) The implications differ considerably from those of the orthodox wage differentials model on the basis of which familiar arguments for subsidizing labour in manufacturing or using a shadow wage below the actual wage have been developed (Hagen, 1958; Bhagwati and Ramaswami, 1963). In this orthodox model there is no urban unemployment and the wage differential, rather than the urban wage, is fixed.

Our objectives in this essay are to present (a) a simple geometric exposition of the Harris-Todaro model designed to make its principal implications readily accessible to the reader; (b) an extension of the model to permit capital mobility between the two sectors in response to any differential in the return on capital; (c) examination of the effects of economic expansion both in the original model and the model with perfect capital mobility; and (d) policy implications of the model in each of its two versions. Our main contribution is the introduction of capital mobility, but we also feel it desirable to bring out clearly some positive and normative implications of the original model of which the authors were obviously aware but which are left implicit or not very clear. A simplification which we introduce - letting commodity prices be externally determined - greatly helps in this respect.

* *Economica*, 43, Feb. 1975, pp. 59-78. Written jointly with Ronald F. Findlay.