

## INTERNATIONAL TRADE POLICY

The world recession from the mid-1970s has thrown into reverse the post-war process of trade liberalisation, and many countries have turned to protectionism and in particular to non-tariff instruments.

David Greenaway's *International Trade Policy* examines all aspects of tariff and non-tariff intervention, not just the economic effects of tariffs. The major methodological difficulties of quantifying the effects are given a chapter and full stress is laid upon the significant increase in the use of non-tariff barriers in the world economy.

Part I of the book examines the environment of international exchange and the benefits of unrestricted trade. Part II reviews the economic consequences of tariffs and explores the concept of effective protection. The GATT framework is outlined alongside an evaluation of means of computing the effects of tariff liberalisation. Part III is concerned with the 'new protectionism'. It opens with an investigation of the economic effects of a variety of non-tariff barriers. David Greenaway considers the causes of the new protectionism and the problems of quantifying the effects of non-tariff instruments. The book concludes by focusing on a number of aspects of the economics of adjustment, in particular the potential employment effects of trade, and the institutional changes necessary to accommodate further trade liberalisation.

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NEW FROM TARRIFFS TO THE  
NEW PROTECTIONISM

DAVID GREENAWAY

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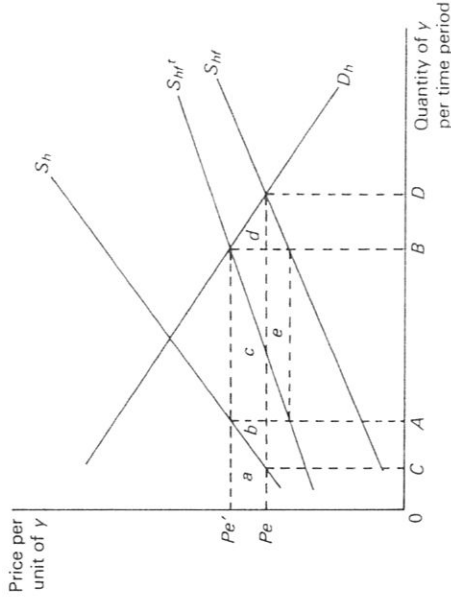


Figure 6.1

price  $OB$  is the market clearing quantity of  $y$ , of which  $OA$  is provided by domestic producers and  $AB$  imported.

When the tariff is removed, the market clearing price falls to  $Pe$ , and as a consequence quantity demanded expands to  $OD$ . In the new equilibrium domestic producers not only supply a smaller fraction of the market, but supply less in absolute terms -  $OC$  rather than  $OA$ . Import penetration increases from  $AB/OB$  to  $CD/OD$  as a result of tariff liberalisation.

These changes give rise to a number of readily identifiable effects which we now discuss.

*Static effects*

- (1) *Production effect.* Since relatively inefficient domestic producers supply fewer units, the resource misallocation loss associated with the tariff (the triangular area  $b$ ) disappears.
  - (2) *Consumption effect.* As existing consumers purchase  $y$  at a lower price, there is a net gain in consumer surplus equivalent to the triangular area  $d$ .
- Most studies of the consequences of tariff liberalisation make some attempt at quantifying these 'deadweight gains'.
- (3) *Revenue effect.* In the most elementary static analyses the revenue effect is viewed as a straight redistribution from government

## 6 Measuring the Effect of Tariff Barriers

Our analysis of tariff imposition/liberalisation has been entirely qualitative so far. We have simply indicated the effects which may follow restriction/liberalisation without giving any indication of the likely order or magnitude of such changes. This is an important question. The net welfare effects of a given liberalisation process may be positive in magnitude but may only amount to the smallest fraction of GNP. If so, one may consider the lengthy and often complicated process of reducing trade barriers simply not worth the effort. If, on the other hand, the welfare effects are not only positive but relatively large (when expressed as a proportion of GNP) then trade policy may be expected to figure prominently in the policymakers' 'portfolio'.

In this chapter we will commence by reiterating the expected effects of trade liberalisation. Once we have identified what may happen we will outline in some detail the techniques currently available which can be used as a basis for quantifying these effects. Finally, a review of some existing studies of the liberalisation process will provide us with examples of applications of the methodology discussed.

### IDENTIFYING THE EFFECTS OF TARIFF LIBERALISATION

The methodology to be outlined below will be discussed in terms of quantifying the effects of tariff liberalisation. The methodology can, however, be applied just as easily to an analysis of tariff restriction.

In Figure 6.1 we outline the now familiar partial equilibrium analysis for the 'large' country case.  $D_h$  and  $S_h$  represent home demand and supply of commodity  $y$  respectively, commodity  $y$  being the import substitute.  $S_{hf}$  represents the total market supply, i.e. home supply plus imports.  $S_{hf}$  lies everywhere below  $S_h$  because given pre-trade factor endowments, foreign producers can produce  $y$  at lower unit costs than home producers.  $S_{hf}'$  represents a tariff-distorted market supply curve. Thus with a nominal tariff rate of  $t$  on all imported units of  $y$ , the home market price is  $Pe'$ . At this

to consumer, and the issue is given no further consideration. In reality, however, it is necessary to go further. If the revenue from a tariff is lost as a by-product of liberalisation, and if government expenditure is to be maintained, then revenue has to be raised from alternative sources. In terms of Figure 6.1  $e + c$  is 'lost'. The effects of any subsequent increases in income tax, expenditure taxes, etc., should be allowed for.

(4) *Balance-of-payments effect.* Again, elementary analyses tend to ignore this effect because they are implicitly barter models, within which balance-of-payments imbalance has no meaning. When trade flows are matched by opposite monetary flows, however, unilateral trade liberalisation could result in a tendency towards payments deficit. Policy action may be required to correct this deficit (e.g. devaluation or deflation) which in principle should be allowed for.

In the case of a 'small' country liberalising tariffs, this is as far as we would need to go. When, however, the country in question is a 'large' country we must make some allowance for:

(5) *Terms-of-trade effects.* Unilateral tariff reduction by a large country would generate an adverse shift in the international terms of trade. This is, of course, consistent with a fall in real income. In terms of Figure 6.1, this would be represented by the area  $e$ , and any such losses would have to be offset against the positive gains resulting from production and consumption effects.<sup>1</sup>

As we shall see, most empirical studies of the trade liberalisation process make some attempt to quantify some or all of these static effects. It is widely agreed that there may also be certain dynamic effects which follow the liberalisation of tariff barriers.

#### *Dynamic effects*

Dynamic effects are altogether more speculative. Possible consequences would be as follows:

(1) *Economies of scale.* It is often argued that the widening of markets which follows from trade liberalisation can result in increased opportunities for exploiting scale economies, with larger output leading to reductions in unit cost. If such reductions are passed on to consumers (as they would be in competitive markets) then there would be 'second round' gains from consumption and production effects as price falls below  $P_e$ .

(2) *Efficiency.* Another common argument is that the widening of markets results in greater competition, which in turn results in greater efficiency.<sup>2</sup> This too generates further falls in unit costs and/or higher quality products. If an exhaustive investigation of the effects of a given tariff reduction were conducted, then any gains realised

here would have to be offset against deadweight gains since this would result in a rightward shift of the supply curve of import substitutes.

These dynamic consequences provide the researcher with quite intractable measurement problems, in part because of their more nebulous nature, but more so because of the difficulties of extricating such influences from other influences (whether policy-induced or otherwise). It is usually the case that researchers either have to ignore these influences or make some informed 'guesstimate' of their importance.

#### ESTIMATING THE STATIC CONSEQUENCES OF TARIFF LIBERALISATION

Where most policy changes are concerned, the estimation of the policy's effect(s) can be attempted prior to the policy change, or some time after, when it seems to have taken effect. If we estimate the effects of a change *ex ante*, we generally have to make certain assumptions about the behavioural relationships we are examining. If we approach the problem *ex post*, we may face difficulties in extricating the effects of the policy change we are examining from the influence of other policies and from the 'counter-factual' problem, i.e. what would have occurred if the policy was not carried out.

Empirical examination of trade policy can follow the same approaches. Thus, when a tariff is removed or reduced, we can either estimate the effects of the removal (reduction) in advance of the liberalisation, or we can wait until some time after the tariff has been removed and attempt to estimate the effects.

#### EX ANTE ESTIMATION

The principles of *ex ante* estimation for the small-country case can be easily elaborated by reference to Figure 6.2. In panel (a) we can see that the net effects of removing tariff  $t$  amount to the triangles  $CDE$  and  $HJK$ . These we will recognise as our static production and consumption gains.

Take first of all the consumption gain. Since the demand curve for importables is linear over the relevant range, we can calculate the area  $HJK$  as follows:

$$HJK = \frac{1}{2} t \Delta D \quad (6.1)$$

where  $t$  = tariff rate (= change in price) and  $\Delta D$  = change in quantity demanded.

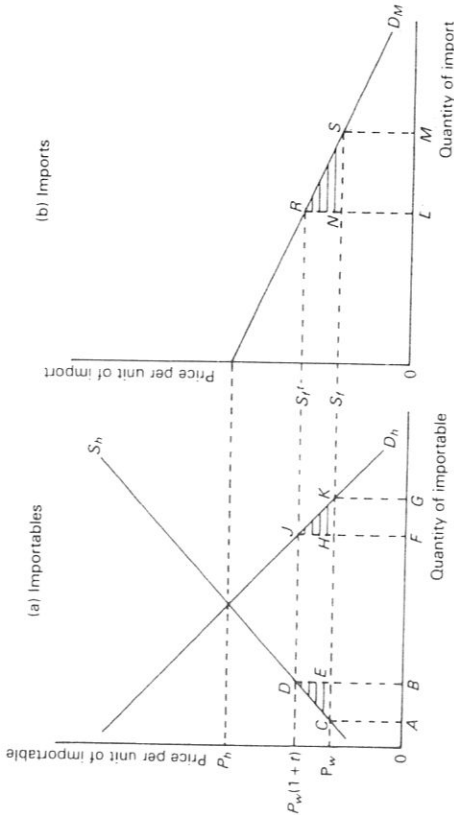


Figure 6.2

By definition we have information on the price change beforehand, since this is simply the tariff which previously prevailed. Since this is an *ex ante* estimate of the consumption gain, we do not have information on the change in quantity demanded; this we have to calculate. Clearly, the change in demand will depend on the change in price, and the slope of the demand curve over the relevant range; this we can approximate by arc elasticity of demand, which (ignoring signs) can be written as:

$$\epsilon = \frac{\Delta D}{\Delta P} \epsilon \frac{P_o}{D_o} \tag{6.2}$$

Thus,

$$\Delta D = t \epsilon \frac{D_o}{P_o} \tag{6.3}$$

Substitution of (6.3) into (6.1) yields:

$$HJK = \frac{1}{2} t^2 \epsilon \frac{D_o}{P_o} \tag{6.4}$$

If, for ease of exposition, we set the price prior to tariff liberalisation equal to one, we can write:

$$HJK = \frac{1}{2} t^2 \epsilon D_o \tag{6.5}$$

By analogy we can derive a formula for estimating the production gain:

$$CDE = \frac{1}{2} t \Delta S \tag{6.6}$$

$$\Delta S = t \lambda \frac{S_o}{P_o} \tag{6.7}$$

where  $\lambda = \frac{\Delta S}{\Delta P} \frac{P_o}{S_o}$

Again, setting  $P_o$  equal to one and substituting (6.7) into (6.6), we obtain

$$CDE = \frac{1}{2} t^2 \lambda S_o \tag{6.8}$$

The total static gain ( $W$ ) from tariff liberalisation therefore amounts to the sum of (6.5) and (6.8), i.e.

$$W = HJK + CDE = \frac{1}{2} t^2 (\epsilon D_o + \lambda S_o) \tag{6.9}$$

Before we proceed to an examination of some of the technical and empirical difficulties faced in this sort of exercise, we might note that the same result can be (and usually is) obtained by a slightly different route. Rather than estimating areas below the supply and demand curves for *importables*, we could estimate the total change in one calculated if we know the total change in *imports*. This is easily elaborated by reference to Figure 6.2. Imports simply represent the difference between domestic supply of importables and demand. As long as we know what this difference is, by definition we know what the volume of imports is. With the information given in Figure 6.2(a) we can derive an import demand curve.

At a price of  $P_h$  domestic producers would supply the entire market, imports would be zero, and the import demand curve would intersect the price axis at  $P_h$ . At the tariff distorted price of  $P(1+t)$ , imports amount to  $BF$ , which is equal to  $OL$  in Figure 6.2(b). By taking a series of such prices, one can derive the import demand function  $DM$ . Thus, when we eliminate the tariff, one only calculates the area under this curve, in this case the area  $NRS$ . Thus,

$$NRS = \frac{1}{2} t \Delta M \tag{6.10}$$

$$\Delta M = t \epsilon \frac{M_o}{P_o} \tag{6.11}$$

where  $\Theta = \frac{\Delta M}{\Delta P} \frac{P_o}{M_o}$

Setting  $P_o = 1$  to simplify, and substituting (6.11) into (6.10),

$$NRS = \frac{1}{2} t^2 \Theta M_o \tag{6.12}$$

where  $\Theta$  is the price elasticity of demand for imports, and  $\Delta M$ ,  $M_o$  respectively the change in, and base level of, imports.

Estimation via the import demand curve, rather than via home supply curve of importables and the domestic demand curve for importables, is relatively common. Computationally it is very much more straightforward to work from the import demand curve, since one only has to estimate a single unknown, namely  $\Theta$ . Where, however, we work from domestic demand for and supply of importables, we have two unknowns,  $\epsilon$  and  $\lambda$ .

Of course, not all tariff liberalisation takes the form of complete removal of tariffs, as Figure 6.2 implies. It is more common to find that tariffs are reduced rather than removed.

In Figure 6.3 we maintain the small-country assumption. On this occasion, however, rather than removing the tariff completely, which would reduce price from  $P_2$  to  $P_o$ , we cut the tariff in half. As a consequence of this, price falls from  $P_2$  to  $P_1$ . We can recognise immediately that deadweight production and consumption gains of  $ABC$  and  $DEF$  are realised. These gains can be estimated as above. In this respect the analysis is no different from the case described in Figure 6.2. Here, however, we have one important difference. Since the tariff is only reduced and not removed, any additional imports generated by tariff reduction are taxed at the new tariff rate, and thus further net gains are realised. Specifically, we have to allow for the areas  $ACGH$  and  $DFLK$ . These areas are simply the revised tariff rate ( $t_2 - t_1$ ) times the additional units imported ( $MN$  and  $RS$ ).

In the same way as we simplified the tariff removal case described in Figure 6.2, we can simplify the tariff reduction case of Figure 6.3 by deriving the import demand curve, thereby estimating the area below one curve rather than two. In Figure 6.3(b) we would therefore estimate the net welfare effects of tariff reduction as the sum of  $TUV$  and  $TVWX$ . Following from equation (6.10)  $TUV$  can be written as:

$$TUV = \frac{1}{2} (t_2 - t_1) \Delta M \tag{6.13}$$

The rectangle  $TVWX$  can be approximated by:

$$TVWX = t_1 \Delta M \tag{6.14}$$

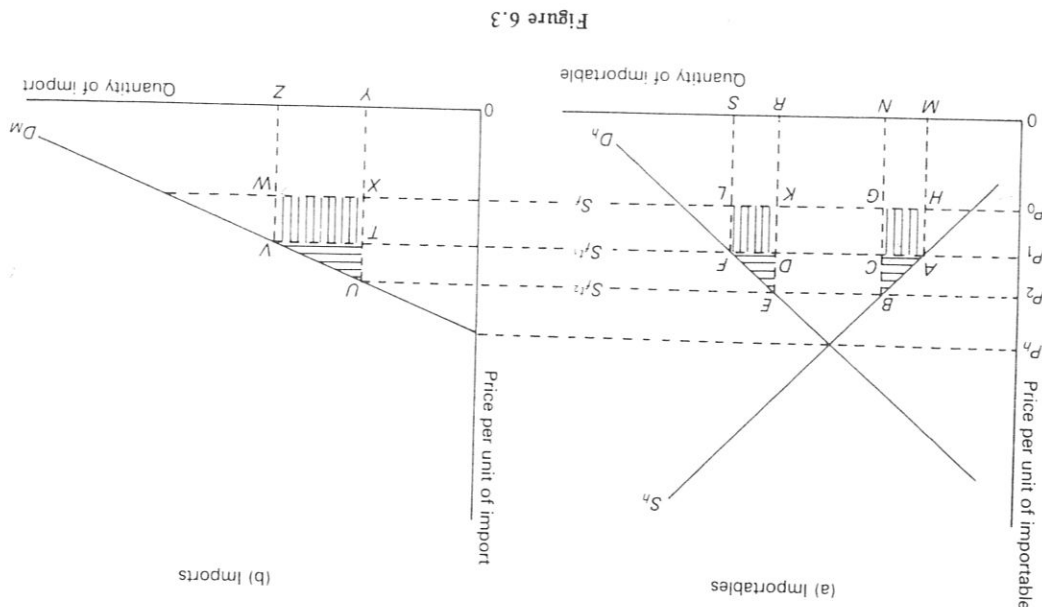


Figure 6.3

Thus the total welfare gain can be expressed as:

$$\begin{aligned} W &= \frac{1}{2}(t_2 - t_1) \Delta M + t_1 \Delta M \\ &= \Delta M \left[ \frac{1}{2}(t_2 + t_1) \right] \end{aligned} \quad (6.15)$$

$\Delta M$  we know can be estimated if we have information on the price elasticity of demand, and the initial level of imports.

#### PROBLEMS WITH EX ANTE ESTIMATION

We will take as our point of reference the elasticity approach as outlined in Figure 6.2. This is in fact the most commonly used method of estimating the cost of protection/gains from liberalisation.

The problems associated with this type of *ex ante* estimation procedure can be grouped into technical problems and practical problems. Although the dividing line between the two may to some extent be arbitrary, the former relate to difficulties which are inherent characteristics of the methodology employed, while the latter are difficulties related to the application of the technique, and which it may be possible to correct to some extent.

#### Technical problems

(1) *Income and substitution effects.* As most students of economics learn quite early in their studies, it is possible to separate conceptually the effects of a price change into an income effect and a substitution effect. In the case of a fall in price, the former is the result of the consumer's real income increasing and may lead to an increase in consumption of the commodity whose price has fallen and/or an increase in consumption of other commodities. The substitution effect follows from the change in relative prices which the price fall stimulates. Because one commodity becomes cheaper relative to others, the consumer will normally substitute units of the cheaper commodity for the now relatively more expensive commodity.

When we are attempting to measure changes in consumer surplus which follow from changes in prices (as we are doing in the tariff liberalisation case) we are only interested in the pure substitution effect, i.e. the substitution away from import substitutes towards imports which is stimulated by the change in relative prices. If one wished to focus unequivocally on this effect, one would have to

derive a *compensated demand curve*, i.e. a demand curve for which the consumer's real income was held constant and which traced out the relationship between changes in relative prices and quantity consumed.<sup>3</sup>

Information on compensated demand curves is not, however, readily available; thus one simply uses the import demand curve  $D_M$  in Figure 6.2(b). This involves making the implicit assumption that income effects are relatively unimportant. Corden (1975) does not seem to think that this is an implausible assumption to make. Commenting on the compensated demand curve problem he concludes (p.56): 'In practice, when elasticity figures have such high margins of error and are often just guesses, and since income effects do not appear to be very large anyway, this is probably not worth worrying about.'

Although we must respect this judgement, it must be emphasised that the greater the change in the tariff in question, the higher the probability that the income effect will be significant. This suggests that when we are dealing with Rounds where substantial tariff cuts are made on a wide range of traded goods, we cannot simply assume away any income effects.

(2) *The nature of demand changes.* A second technical problem we face is again one which is shared with researchers analysing the implications of any price change. In estimating our triangle of consumer surplus we are making the implicit assumption that the tariff reduction results in a movement along an existing import demand curve rather than a shift of the initial curve. If in fact the demand curve shifts, then the methodology which we have outlined is inappropriate.

There is, of course, nothing that can be done to alleviate this problem. In the case of relatively small tariff reductions (however defined) it is probably reasonable to assume that we are observing different points on a given demand curve. Where, however, the tariff reduction is relatively large, it may be a more heroic assumption.

(3) *Linearity of the demand curve.* A third implicit assumption in this analysis is that the demand curve under consideration is linear. This is what makes application of the formula in equation (6.12) appropriate. The assumption is made because it is methodologically expedient - if the demand curve is non-linear and is not of a constant elasticity form, more sophisticated statistical techniques are necessary. If the relevant curve is non-linear, the area  $ABC$  will provide an overestimate or underestimate of the change in consumer surplus, depending on whether the demand curve is convex or concave to the origin.<sup>4</sup>

(4) *Second best considerations.* The final implicit assumption behind the procedure is that we are analysing the welfare effects of a tariff reduction, when all other 'first best' assumptions hold. Thus we are moving from a position of second best to a situation of Pareto optimality. This, of course, is never the case in practice. In considering one tariff reduction with all other tariff and non-tariff barriers unchanged, we are in the indeterminate world of second best. As Lipsey and Lancaster (1956-7) demonstrate, strictly speaking we cannot conclude that reduction of this or that particular tariff necessarily results in a welfare gain!

(5) *Expectations regimes.* Saidi (1980) has recently argued that the implicit assumption made about the manner in which economic agents reach decisions is sufficient not only to create a 'technical problem', but also to make the entire exercise meaningless. The foundation to Saidi's critique is the assertion that individuals form their expectations about future events 'rationally' rather than 'adaptively'. It follows from this that the decision-making process of agents in export sectors and import substitute sectors will itself be affected by changes in commercial policy. One cannot therefore estimate the effects of the policy change *ex ante* because one is using estimates of price and income elasticities which prevailed prior to the policy change, and which will themselves alter as a consequence of the policy change. This is a fundamental criticism which calls into question the entire methodological procedure of *ex ante* estimation. The seriousness with which one views the point depends on the strength of one's faith in the underlying tenets of the rational expectations hypothesis - in particular one's view on the speed with which agents in product and factor markets react to changes in economic policy.

As we indicated above, these difficulties are all inherent in the procedure, and there is little we can do to alleviate them. They must nevertheless be borne in mind when considering the results of any particular analysis. Although it is not possible to estimate the quantitative significance of these complications, it may be possible to make some quantitative assessment, e.g. by indicating whether the results on hand are likely to be an over- or underestimate. Thus, if we follow Corden's conclusion on the income and substitution problem, we would feel that this is unlikely to distort our results unduly. Where the shift/movement problem is concerned, we would be aware of the fact that this is likely to be more of a problem where tariffs are adjusted by large, discrete amounts than where they are adjusted by small and/or continuous amounts. Linearity is something we can do little about, while second best considerations may be less important when (as is often the case) we are considering across-the-board cuts in tariffs rather than tariff reductions on individual commodities.

### Practical problems

1. *Data.* Although it is not always explicitly recognised, empirical studies in economics invariably face data difficulties. In some studies data problems can be intractable - for instance, studies examining market power and innovation have great difficulty in obtaining economically meaningful proxies of market power and measures of innovation. In the case of the analysis of tariff liberalisation, data do not create insuperable difficulties. Referring to equation (6.12), we would require data on the tariff rate, the base level of imports and the price elasticity of demand for imports. Data are easily obtainable in the case of the first two. Price elasticity, however, is more problematic. Either one has to estimate elasticities oneself (which could in itself be a major research project) or one relies on the results of other researchers. The latter convention is usually followed. Since estimates of elasticity often have a relatively large margin of error associated with them, it is not uncommon to find calculations conducted for a range of estimates.

Another data problem which one faces is that trade data are generally classified according to the Standard International Trade Classification (which we introduced in Chapter 1). We might proceed to estimate the consequences of a reduction in tariffs on the assumption that the import and the domestically produced counterpart are perfect substitutes for each other. Within the SITC groups which we are examining, however, they may be imperfect substitutes, and effectively in different sub-markets. For example, the import may be a high quality machine tool and the import substitute a low quality machine tool used in different production processes. In such circumstances, substitution effects may be weaker, and income effects stronger than in the case of perfect substitutes.

2. *Discounting.* Often when the costs of protection of a given tariff (or the gains from liberalising a given tariff) are calculated, the calculations are conducted on a once-and-for-all basis. Thus when a tariff is imposed, a figure may be presented representing the once-and-for-all costs of imposing a given tariff, or a once-and-for-all gain from removing a given tariff.

This is not, however, a correct procedure, and is almost certain to underestimate the gains/losses associated with tariff liberalisation/imposition. This follows because once a tariff is levied, it imposes costs for the duration of its existence. Thus if the tariff is levied for, say, a period of ten years, then the calculation of any costs should take account of the length of time over which the tariff is in existence. Furthermore, these costs will vary as the growth of the economy

varies, the costs rising in absolute terms as the level of GNP rises. Similar comments apply to tariff liberalisation.

If one takes account of the time span involved, then future gains or losses have to be discounted to the present, to take account of the fact that money accruals in the future are worth less than accruals in the present. To accomplish this, a discount rate has to be chosen which suitably represents society's preferences between present and future consumption. In other words, an appropriate 'social rate of time preference' has to be applied to future gains/losses. This is not as straightforward as it first appears. For a number of years the question of what interest rate in the economy, if any, adequately represents society's rate of time preference has been the subject of heated academic debate. In principle, one should use the rate of return which the resources would gain if released for more productive employment. This is far from obvious.

3. *Non-uniform tariffs.* When researchers investigate the costs of tariff imposition or the gains from liberalisation for a system of tariffs, it is, strictly speaking, necessary to make allowance for any variation which may exist between rates. Typically, analyses of the tariff structure focus on the costs of some average rate of tariff across all commodities - the uniform tariff equivalent. As Johnson (1960) pointed out some years ago, however, there may be an aggregation problem here. The cost of protection is not dependent solely on the uniform tariff equivalent but also on the dispersion of tariff rates. The responsiveness of resources into and out of different activities is never likely to be equal across all activities. Thus the dispersion of tariff rates could have an important bearing on the costs associated with the tariff system. The problem has been recognised for some time, and a few investigators have made some allowance in their calculations.

4. *Balance of payments effects.* If the net trade effects of a given tariff change are non-zero, then payments imbalance must result. Other things being equal, adjustment forces will be set in motion to correct the imbalance. Thus, under a fixed exchange rate regime, expenditure-reducing policies might be used to reduce import demand. A tendency towards deficit under floating exchange rates would stimulate exchange rate depreciation. The effects of tariff liberalisation/imposition-induced changes in the balance of payments, and their effects on trade flows, should be allowed for. In practice, however, the exchange rate is a notoriously difficult variable to forecast, and often researchers simply ignore such effects, or assume that the trade policy change results in a balance expansion (or contraction) of

Such practical problems relate to the application of the methodology rather than the methodology itself, and can prove soluble to some degree or other.

### EX POST ESTIMATION

*Ex post* estimation is somewhat different from *ex ante* estimation. As the title implies, *ex post* analysis attempts to assess the impact of tariff liberalisation some time after the tariffs have been reduced or eliminated.

The principles behind *ex post* estimation can be readily understood by reference to Figure 6.4, in which we plot the growth of imports against time. Suppose tariffs are removed in time period  $t_4$  and we are investigating the effects of tariff liberalisation in  $t_{12}$ . By first examining the trend rate of growth of imports over the period  $t_0$  to  $t_4$  (when tariffs were in force) and projecting this forward, we can get some idea of expected imports over the period  $t_4$  to  $t_{12}$ . Thus we are assuming that import volume would have continued to grow along the path  $m_1$  had tariffs remained unchanged. Upon examination of the trade data for the period  $t_4$  to  $t_{12}$ , in  $t_{12}$  we might discover, however, that in actual fact imports had grown along a path  $m_2$  rather than  $m_1$ . The difference between what was expected to occur and what actually occurred can be attributed to the elimination of tariffs in  $t_4$ . The same principle applies to the so-called 'reduced group-non-reduced group' method. Here the growth paths  $m_1$  and  $m_2$  would refer to different groups of commodities, rather than the same com-

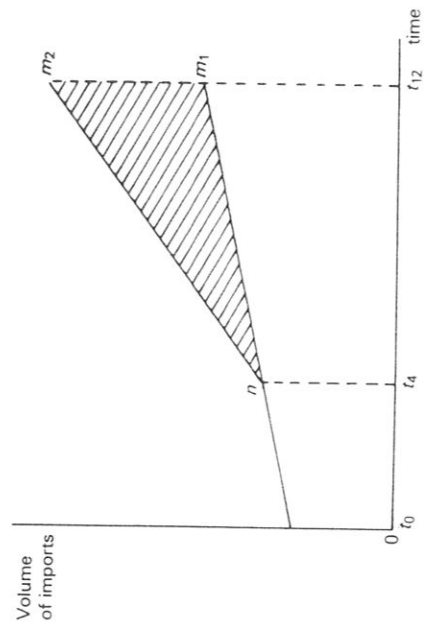


Figure 6.4



modity group. For instance,  $m_2$  may be a group of commodities for which tariffs have been reduced, while  $m_1$  are a similar group of commodities for which tariffs have not been reduced. On *ceteris paribus* assumptions the difference between the two in  $t_2$  compared with  $t_4$  is taken as the outcome of trade or tariff liberalisation.

This is, in simplistic terms, how the *ex post* methodology operates. In practice one does not simply conduct an exercise of linear extrapolation, i.e. projecting the trend line forward. We have drawn our trends as linear for expositional convenience. In practice techniques are somewhat more sophisticated, the expected volume of imports being determined by careful perusal of income elasticities of demand for imports and detailed examination of the trade matrix. Ultimately, however, we would still end up with an area equivalent to  $mm_2m_1$  in our diagram. On the assumption that the demand for imports is linear, we could then include this figure for  $\Delta M$  in formula (6.10) above and proceed to estimate the welfare effects of the liberalisation.

This methodology has one broad advantage over the *ex ante* methods. As long as  $t_2$  is selected such that all of the liberalisation effects have worked themselves out, the area  $mm_2m_1$  provides an estimate of the total static effects of liberalisation. There is no need to estimate the 'deadweight' effects, balance-of-payments effects and terms-of-trade effects separately, since we have a global figure which includes all of these. It is also possible that the impact of some of the dynamic effects is included. For instance, if the liberalisation results in a reduction of X-inefficiency and increased competitiveness of import substitutes, then this will also show up in the volume of imports demanded.

Against this, however, there are two major drawbacks to using this methodology. First, there is a technical consideration. The volume of imports observed at  $t_2$  may not just be the outcome of a change in tariffs which occurred in  $t_4$ . Other policy changes may have taken place between  $t_4$  and  $t_2$  which influenced the demand for imports. Some changes might be obvious and it may be possible to make some allowance for them. For instance, it may be possible to make some allowance for imports of a completely new product which appears between  $t_4$  and  $t_2$  and which would have been imported whether or not any tariff liberalisation took place in  $t_4$ . Even here, however, there may be an element of arbitrariness in that one has to draw a line between those which would have been imported anyway, e.g. some revolutionary petroleum substitute due perhaps to a technological breakthrough abroad, and those that are tariff-induced, e.g. new varieties of existing products. At the other extreme it may be very difficult to allow for obvious changes like a movement towards the greater use of non-tariff barriers following the liberalis-

ation of tariffs; or less obvious policy influences like regional incentives to encourage industrial development which subsidise the production of import substitutes. In other words, one cannot 'control' for all other influences in order to extricate the effects of tariff liberalisation from other policy changes.

The second difficulty associated with *ex post* studies is more subtle, but no less important. By definition if one wishes to conduct an *ex post* analysis one has to wait until after the event. In order to ensure that the effects have worked themselves out fully, this may have to be a considerable time after the event. In the case of the Tokyo Round tariff reductions, for example, we have the introduction of the reductions on 1 January 1980, and there is then up to an eight-year phasing-in period! Presumably some further time would have to elapse before any *ex post* calculations could be made. Apart from the obvious point that the longer the time lag, the more likely it will become that other influences will play a significant role, there is the very pertinent consideration that such calculations may be of little value to the policy-maker. After all, when one is involved in negotiations on tariff reductions, one would wish to have some idea of the anticipated effects of the change. Of course, one could refer to *ex post* studies of previous cases of tariff liberalisation for guidance. Ultimately, however, the information which would be given greatest weight in the policy-makers' 'calculations' is information on the matter at hand. It is this consideration which is predominant in explaining the more general use of *ex ante* methods.

We have dwelt at some length on an examination of the principal methods used in assessing welfare changes which may follow from trade liberalisation. It is important that the uses and limitations of these techniques are clearly understood, since these provide the basis for empirical analyses of protection and liberalisation. A clear understanding of the principles involved is important since, in the last analysis, even using imperfect techniques, trade policy prescriptions should be guided by empirical findings rather than any blind faith in free trade or protectionism. We will now turn our attention to some of the results of research in this area.

## EMPIRICAL STUDIES OF THE EFFECTS OF TARIFF BARRIERS

### *Ex ante* studies

One of the earliest applications of the *ex ante* methodology discussed above was Stern's (1964) attempt to evaluate the deadweight gains

which would be associated with a unilateral tariff reduction on the part of the USA.

Using a range of elasticity estimates to predict  $\Delta M$  in equation (6.10), Stern reached the conclusion that a unilateral removal of tariffs by the USA would stimulate an increased demand for imports of between 2.8 and 3.9 billion dollars depending on the elasticity assumed. If, on the other hand, both tariffs and quotas were eliminated, imports would increase by 4.1 to 5.2 billion dollars. (Both of these estimates are in 1960 prices.) The higher of these estimates amount to 28 per cent and 36 per cent of 1960 imports respectively. Although this is a relatively large proportion of total imports, the fact that imports amount to such a small proportion of GNP in the USA means that even the highest figure of \$5.2 billion represents only 1 per cent of 1960 GNP.

Referring to our earlier discussion, we know that from an estimate of the induced change in imports, we can estimate the total deadweight welfare gain according to equation (6.12). This Stern estimates at 0.11 per cent of GNP.

Expressed in these terms this seems a relatively insignificant effect. We must bear in mind, however, that the calculations take no account of the reciprocal benefits which may follow as a result of increased purchasing power overseas - so-called 'responding effects'. Furthermore, the calculation refers to a unilateral action on the part of the USA. Since tariff liberalisation in the post-war period has been multilateral rather than unilateral, this would undoubtedly be a source of understatement. Against this, no account is taken of possible terms-of-trade effects. In the case of a *unilateral* tariff reduction, in the USA one would expect these to be adverse, and indeed this has subsequently been confirmed by Basevi (1968).

If these effects were more or less to cancel each other out, two concluding comments could be made on the figure of 0.11 per cent of GNP. First, the impact of many non-macroeconomic policies often appears small when expressed as a proportion of GNP. Even so, the sums involved may be significant in terms of their opportunity cost. In this study, 0.11 per cent of GNP amounts to something approaching \$600 million, at 1960 prices. One might argue that the alternative forgone associated with this type of saving is well worth having. Second, we are of course looking at a once-and-for-all effect rather than an ongoing benefit which tariff elimination represents. Also, we are only considering the static consequences of the action - it may be that the dynamic consequences are more significant. As we indicated earlier, imputing a value for improvements in X-efficiency or a widening of consumer choice is far from straightforward. The gains may nevertheless be significant if domestic market concentration

is relatively high (in the case of X-efficiency gains), and if intra-industry trade forms a relatively high proportion of total trade (in the case of widening of consumer choice).

Thus, referring back to the various 'effects' introduced earlier in this chapter, Stern concerned himself only with estimating the dead-weight production and consumption changes associated with a *unilateral* action. No attempt was made to incorporate terms-of-trade, balance-of-payments or dynamic effects. Subsequent work relating to the USA has been more extensive. Basevi (1968), for example, did allow for terms-of-trade changes and exchange-rate changes, but none the less confined himself to estimating the effects of a unilateral tariff reduction. Interestingly Basevi uses a more sophisticated model than Stern and finds that efficiency losses from the presence of tariffs are greater, but these are outweighed by terms-of-trade considerations, such that the net effect of tariff reduction would be negative (coincidentally by -0.11 per cent of GNP).

Additional studies for the USA have been completed by Magee (1972) and Baldwin (1976). The latter we will examine in detail in Chapter 11 when we consider employment consequences of trade policy. For the moment we might merely note that the trade changes predicted by Magee and Baldwin are consistent with net welfare changes of a similar order of magnitude to those identified by Stern and Basevi.

By contrast, Batchelor and Minford (1977) investigate the costs of tariff imposition in the United Kingdom - an economy which is altogether more dependent on the foreign trade sector than the USA, and one which we can reasonably safely refer to as a 'small open economy'.<sup>5</sup> They estimate the effects of unilateral tariff imposition.

Two interesting features of the study distinguish it from Stern's model. First, the time dimension of the problem is explicitly recognised. Thus, rather than calculating once-and-for-all deadweight losses, losses which will accrue sometime in the future are included, and discounted to obtain a present value. Second, the authors do not rely solely on the usual 'classical model' which assumes that the imported and domestically produced varieties of a given commodity are perfect substitutes. Instead, because such a large proportion of UK trade comprises manufactures, allowance is made for the possibility that in the short to medium term (up to five years) they may be imperfect substitutes, which would reduce the extent to which a given tariff encourages domestic consumers to switch away from imports to import substitutes.

Using the elasticity methodology, the authors predict the effect on import demand of a range of tariff rates. From this they estimate the cumulative deadweight production and consumption losses.

TABLE 6.1 Welfare effects of tariff imposition in the United Kingdom

Balance of payments deficit to be eliminated (% of GDP)	Required tariff rate (%)	Cumulative total cost* (% of 1976 GDP)
0.5	8	6.4
1.0	18	20.2
1.5	30	20.9
2.0	45	21.8
2.5	65	23.2
3.0	92	25.1
3.5	132	27.8
4.0	196	31.7

\* The present discounted value, applying a discount rate of 5 per cent, of future losses. The calculation assumes that real GDP grows at 2 per cent p.a.

Source: Adapted from Batchelor and Minford (1977) tables 4.5 and 4.6.

Their estimates are presented in Table 6.1. It is immediately apparent that these calculations suggest the costs of protection are considerably in excess of the figures suggested by US studies. This is in part due to the fact that the foreign trade sector is relatively more important in the United Kingdom, in part due to the fact that future costs are allowed for. Even the lowest tariff rate implies a cost of over 6 per cent of GDP, while the highest rate estimated (196 per cent) is consistent with a cumulative cost of over 30 per cent of GDP.

There is one point which the authors make to suggest that these results are possibly an overestimate. The study only allows for import controls on finished consumer goods. The authors argue that a widening of incidence to intermediate goods and raw materials might reduce the total welfare costs of controls because 'any move from a discriminatory system to one which approaches more closely the ideal uniform tariff/subsidy implicit in devaluation will be an improvement in terms of resource reallocation' (p. 71). On the basis of their estimate about elasticity of demand for producer goods, the authors feel that a reduction of about 20 per cent of the cumulative cost figures in Table 6.1 would be in order. One ought perhaps to be a little circumspect about this conclusion since we are making no allowance for differences in effective protection which would result from a given uniform, non-discriminatory, nominal tariff.

Against this the authors feel that a discount rate of 5 per cent is on the high side, and that a discount rate of 2-3 per cent would be more appropriate. Application of a lower discount rate would, of

course, raise the cumulative total cost of the controls. Furthermore, the calculations apply only to static deadweight losses, making no allowances for any dynamic losses, and they apply to a unilateral action on the part of the United Kingdom and assume no retaliation.

Note that no allowance is made for induced exchange rate changes because of the way in which the analysis is conducted. The average nominal tariff necessary to remove a given payments deficit is estimated. By implication, therefore, there are no induced exchange rate changes.

One of the most ambitious and comprehensive *ex ante* studies of the effects of tariff changes is the attempt by Cline *et al.* (1978) to predict the economic effects of the outcome of the Tokyo Round negotiations. The authors estimate the effects of a *multilateral* tariff reduction implemented by the EEC and ten other industrial countries.<sup>6</sup> This feature alone immediately differentiates it from those studies which we have thus far reviewed. When the study was completed, final agreement on a tariff-cutting formula had not yet been reached by the participating countries. The authors had therefore to assume a particular tariff change, and in fact they estimated the welfare changes (and as we shall see in Chapter 11, employment changes also) for no less than twelve different tariff-cutting formulae. Static welfare effects were estimated for all countries, but not just on a once-and-for-all basis. The gains were projected, then discounted to obtain a present value. In addition, a 'guesstimate' of dynamic effects was included in the final summary statistics. Since the model was examining the effects of a multilateral tariff reduction, responding effects were also allowed for, as were induced exchange rate changes. Finally, there was also an attempt to estimate the effects of non-tariff barriers.

Since the study is *ex ante*, it is methodologically similar (although somewhat more sophisticated, of course) to the framework developed earlier in the chapter. Changes in imports were estimated at a highly disaggregated level, at the so-called 'tariff-line' of the Brussels Trade Nomenclature. There tend to be some 5,000 such categories for a given industrialised country. Clearly, with so many product categories and such a large number of countries in the sample, data problems are at their most intractable. Trade and tariff data can be obtained relatively easily. The same cannot be said, however, of data on the most crucial parameter in the entire exercise, namely elasticities - both of import demand and of substitution between alternative suppliers.

As we noted earlier, elasticities in general, and import demand elasticities in particular, are notoriously difficult to compute - indeed, many researchers, following Orcutt (1950), have questioned whether they can be identified in any meaningful sense. This is a sentiment

which has gained even more currency with the increasingly influential presence of the rational expectations school of thought (see Saidi, 1980). Notwithstanding this 'technical' criticism, Cline *et al.* faced especially intractable problems in obtaining reliable elasticity estimates. First, although the detailed predictions of trade flows were being conducted at a highly disaggregated level, available elasticity estimates were invariably prepared for more highly aggregated product groups. Consequently, aggregate estimates were applied across more disaggregated component product groups. Second, as the study applied to some ten importing areas, elasticity estimates had to be drawn from a number of sources - in fact, five different studies. Third, where the EEC was concerned, elasticity estimates were only available for individual member countries, yet the EEC was treated as one importing area; therefore a weighted average 'composite' elasticity had to be derived for the EEC as a whole.

To many, these difficulties, and the procedures which had to be followed to overcome them, are sufficiently fundamental to render the entire exercise meaningless and incapable even of being trusted as a basis for reporting relevant orders of magnitude. The authors themselves recognise the problems inherent in the exercise and, as well as carefully selecting elasticity estimates from available sources to ensure the maximum degree of consistency, they conduct a 'sensitivity' analysis to ascertain how responsive the results are to alternative elasticity estimates.

Space constraints preclude detailed comment on the estimated welfare effects for all twelve tariff-cutting formulae, but Table 6.2 summarises the once-and-for-all static welfare effects at 1974 prices for all countries, and Table 6.3 (p.122) for the four main negotiating groups.

Before we comment on these results we might note parenthetically that most of these formulae were actually proposed during the Tokyo Round. As we saw in Chapter 5, there was some discussion over the formula to be adopted, and the degree of harmonisation acceptable - the range of formulae proposed should give some idea of the problem faced by the negotiators.

Formula 12 reported above in fact comes very close to the actual 'Swiss formula' agreed in the Tokyo Round. This yields an aggregate static welfare gain of \$1.53 billion per annum. In addition, the authors also attempt to make some allowance for dynamic gains from increased X-efficiency, economies of scale and a boost to growth rates caused by a stimulus to new investment and marketing opportunities. Referring to the existing literature on these effects, they suggest that a *conservative* estimate would put them at some five times the static gains, i.e. around \$7.65 billion per annum. The trade

TABLE 6.2 Static welfare effects of various multilateral tariff cuts

Formula number	Tariff formula	Static welfare effect \$ millions
1	60% linear cut	1,681
2	Three iteration harmonisation $t_1 = t_0 (1 - t_0)$ 3 times	1,397
3	If $t_0 < 5\%$ , $t_1 = 0$ If $t_0 > 40\%$ , $t_1 = 20\%$ If $5\% < t_0 < 40\%$ , $t_1 = 0.5 t_0$	1,601
4	100% linear cut	1,991
5	$30\% + t_0$ cut	1,603
6	60% cut plus 3%	1,330
7	43.4% linear cut	1,374
8	60% linear cut and reduce $t_1 = 0$ when $t_0 5\%$	1,686
9	60% cut with 5% floor	1,568
10	Sector harmonisation $t_1$ set equal to lowest $t_0$	1,098
11	$20\% + 3t_0$	1,622
12	Six iteration harmonisation $t_1 = t_0 (1 - t_0)$ 6 times	1,530

$t_0$  = base tariff;  $t_1$  = reduced tariff.

Source: Adapted from Cline *et al.* (1978) tables 3.1 and 3.2, pp. 77-8.

balance implications of these changes are explored and their effects on exchange rates estimated. The results of this exercise lead the authors to conclude that exchange-rate changes would be 'negligible', since we are dealing with a multilateral tariff cut with an allowance made for responding effects. Finally, the authors take account of the fact that these gains would accrue on a recurring basis. To take account of the time dimension it was assumed that world trade would grow at 5 per cent per annum (which is 2 per cent below the trend growth for 1948-73) and then discounted future gains at an interest rate of 10 per cent. This calculation would suggest a total welfare gain of over \$150 billion, or about 15 per cent of the 1974 value of world exports.

Table 6.3 provides details of the estimated static effects of the various formulae for the principal negotiating parties. Again, taking formula 12 as our reference point, it is clear that all parties gain, the figures as a proportion of 1974 GNP amounting to 0.04 per cent for

TABLE 6.3 Static welfare gains of alternative tariff-cutting formulae

Formula number	Value \$ millions 1974			EEC
	USA	Canada	Japan	
1	490.3	178.2	289.3	451.2
2	437.8	124.5	268.5	304.4
3	470.3	159.4	296.2	415.5
4	583.7	212.1	344.4	527.7
5	491.0	151.5	293.7	384.6
6	395.2	134.4	244.4	317.8
7	400.6	145.6	236.4	374.3
8	491.1	178.4	289.9	453.0
9	448.9	171.5	276.8	409.4
10	395.4	150.2	83.7	235.1
11	470.8	174.0	281.7	426.9
12	451.1	160.4	270.5	384.5

Source: Adapted from Cline *et al.* (1978) table 3.8, p. 99.

the USA, 0.11 per cent for Canada, 0.07 per cent for Japan, and 0.03 per cent for the EEC. These are only static figures, however, and a similar exercise in 'grossing up' for dynamic effects and discounting to gain a present value yields figures of \$21 billion for the USA, \$8 billion for Canada, \$12 billion for Japan and \$19 billion for the EEC, or 1.99 per cent, 6.0 per cent, 3.02 per cent and 1.40 per cent of their respective 1974 GNPs.

By any standards these are significant gains. If the assumptions which underpin the calculations are reasonable, and if the calculations themselves are accurate, then they suggest that the potential gains of multilateral trade liberalisation are considerable. The final figures rely heavily on the estimate of the dynamic gains - in particular the very reasonableness of even attempting to impute a value for such effects. The authors, however, do emphasise that the figures are deliberately conservative, and if anything are likely to understate any such gains which accrue. A more obvious source of understatement is the fact that the calculations refer only to trade liberalisation in the major industrial economies. Although these economies dominate world trade, it seems reasonable to assume that the total 'gains' would be even greater if trade with LDCs were included.

We have dwelt at length on this study because it is an excellent example of a multilateral, general equilibrium application of the *ex ante* methodology. Other multilateral studies in a similar vein have recently been concluded, and the reader is referred to Stern (1979) in particular.

### Ex post studies<sup>7</sup>

Studies using the 'reduced group-non-reduced group' methodology date back to Krause's (1959) paper. Here Krause attempted an *ex post* assessment of the effect of tariff concessions granted by the USA in the Torquay Round in 1951. The method involved examining the post-1951 growth of imports for one group of commodities which had experienced tariff reductions, and comparing these with a similar group of commodities for which no tariff reductions were made.

Referring to our discussion of methodologies earlier in this chapter, Krause does avoid the difficulty of having to apply income elasticities of demand. There is, however, bound to be an element of arbitrariness in selecting comparable groups. In principle, the 'reduced' group and 'non-reduced' group should be matched according to cross elasticities of demand. In fact, Krause merely matched commodities from tariff lines. As we have already stressed, there is always a difficulty in interpreting *ex post* results since we can never be certain of what would have happened anyway. This is likely to have been particularly important in Krause's case as the analysis was conducted for the immediate post-war period. From his comparison Krause concluded that 'no significant difference' could be found between the reduced and non-reduced group.

Krause's paper was quickly followed by a study conducted by Kreinin (1961) who employed the same methodology to investigate the impact of the 1956 Geneva Round of tariff cuts. Kreinin finds clearer evidence to suggest that the tariff reductions had a significant impact. He finds, for example, that the growth in the volume of manufactures in the reduced group was a full percentage point more than imports of finished manufactures in the non-reduced group. He suggests a number of reasons why his results differ markedly from Krause's; he found in particular that many of the tariff concessions promoted in 1951 were simply 'dissipated in the elimination of excess protection', while those granted in 1956 genuinely served to encourage import growth.

This in fact is what we found in our discussion of GATT liberalisation in the previous chapter. Furthermore, the main suppliers (i.e. Western Europe) were in a better position by the later 1950s to penetrate the US market to any significant degree. Kreinin translates his findings into an assessment of the gain in welfare which amounts to \$31.5 billion (1955 prices).

The most sophisticated recent applications of the reduced group-non-reduced group technique are Finger's (1974, 1977) attempts to estimate the effects of the Dillon Round and Kennedy Round tariff

reductions. With respect to the former, he estimates that some five years after the implementation of the concessions, imports were \$700 million higher than they would have otherwise been.

Finger's (1977) analysis of the effects of the Kennedy Round is worth examining in more detail, much as we did with the Cline study, in order to bring out a little more fully the difficulties one faces in *ex post* analysis.

The study is firmly in the 'reduced group-non-reduced group' mould. Finger took a random sample of products on which large tariff reductions were made by the principal industrial countries (the USA, the EEC and Japan). He then prepared a sample of similar products on which smaller tariff reductions were made. The changes in trade volume which occurred in the two groups between the conclusion of the Kennedy Round (1967) and 1970 were compared, and this provided the basic material for estimating the effects of the tariff reductions.

Finger recognised at the outset that this methodology involved three crucial assumptions. First, he assumed that over the control period, any other policy changes affect the product groups being examined with equal intensity. Second, he assumed that there is no substitutability between the products in the small reduction group and the large reduction group. Finally, he assumed that the elasticities of import demand for, and supply of, the products in one group are equal to their counterparts in the other group.

The first assumption is clearly made in order to avoid the general problem of *ex post* studies which we identified above, namely that we can never be certain that any changes which take place are solely due to tariff alterations. Finger selected his sample period in order to minimise the effects of exogenous shocks - for instance, 1970 was selected as the end year in order to avoid distortions associated with the 'Nixon shock' of 1971 (which included a 10 per cent import surcharge).

The second assumption is crucial. Clearly, if there is any substitutability between the two groups then the estimate of the effects of tariff reduction is likely to be an overstatement. Since the two groups are chosen such that there are similar products in each group, then there must by definition be some degree of substitutability between the products in the two groups. In recognising this difficulty, Finger points out that although it might lead us to be somewhat cautious about the precise magnitude of estimated effects, it does not invalidate using the technique to establish direction of magnitude. In other words, the method cannot indicate a response to tariff reduction when there is none, and therefore it can still be used to comment on whether tariffs matter or not.

With respect to the final assumption, Finger was assuming that his sample was genuinely 'random' in the sense that products with particularly high elasticities were not systematically omitted. Without very detailed data on elasticities, there is no way of checking this.

With these caveats in mind, Finger examined the response of imports at the tariff line level, for a sample of some 200 product groups, which comprised about 15 per cent of the items on which concessions were made in the Kennedy Round for the USA, Japan and the EEC. Upon comparing the changes which took place in imports into these three areas of commodities in the 'large' reduced group with commodities in the 'small' reduced group, Finger reached two conclusions. First of all, there was evidence to indicate that tariffs do matter in restricting trade flows, i.e. there was a greater responsiveness of imports to tariff reduction in the large reduced group than the small reduced group in all three areas. Second, his findings indicated that developing countries gained significantly from the concessions.

Although precise figures are not furnished to facilitate comparison with the other studies mentioned, this particular study is worthy of note. As the Cline study served to provide a practical example of the problem of *ex ante* estimation, this study did likewise for *ex post* methods.

## SUMMARY AND CONCLUSIONS

We have seen that there are a number of established methods of providing quantitative estimates of the effects of tariff liberalisation/imposition. Although there are a number of difficulties associated with the use of *ex ante* and *ex post* methods, there have been a large number of studies applying these techniques. We have only really considered a fraction of this literature by selecting a few studies for detailed comment. Notwithstanding this, a number of concluding comments can be made:

- (1) Available *ex ante* and *ex post* studies provide overwhelming support that tariffs 'matter' in the sense that they influence trade flows. The majority of studies seem to point to the general conclusion that there tend to be net gains associated with tariff liberalisation and net costs associated with tariff imposition.
- (2) The estimated importance of tariff liberalisation/protection varies directly with the 'openness' of the economy. Thus we find that some studies relating to the USA report the welfare changes as being relatively small. In the case of the United Kingdom, however, potential changes seem altogether more significant, and this conclusion can be

supported by research on other small open economies (e.g. MacAleese, 1977, Cline *et al.*, 1978).

(3) The results of empirical analyses are markedly influenced by whether or not one discounts future costs/benefits, and if so, the rate used. As we have seen, some studies calculate the net benefits on a once-and-for-all basis, with the consequences that they appear to be relatively unimportant. The essence of trade restriction or liberalisation is that although initial effects may appear to be limited, their long-term effects are a good deal more significant, and there is a good deal of empirical evidence to support this supposition.

(4) A complete analysis of the welfare implications of tariff liberalisation would involve an assessment of multilateral rather than unilateral tariff reduction. Not all studies are so comprehensive. Those that are indicate, as we would expect, that the benefits of bilateral or multilateral liberalisation exceed those associated with unilateral action.

(5) Few studies have made an allowance for induced exchange rate changes. Those that have indicate that, as we would expect, these reduce the magnitude of the welfare changes. The extent of the reduction will be greater with a unilateral action (Baldwin and Lewis, 1978) than with a multilateral action (Cline *et al.*, 1978; Stern, 1979).

It could be argued, however, that this type of exercise does not tell the full story about the effects of tariff liberalisation, because by taking an aggregate view it fails to focus on the most important feature of the repercussions of tariff changes, namely that their effects are concentrated. The fact that certain sectors contract following liberalisation often means that the employment displacement effects are geographically concentrated. If so, one may find that adjustment pressures build up which not only resist liberalisation efforts, but actually press for protection to maintain employment.

The relationship between changes in trade policy and employment change is something which we have yet to consider. It is a fundamentally important issue, but we will defer a review of empirical work in this area until we have spent some time examining the new protectionism.

#### NOTES ON FURTHER READING

A rigorous appraisal of the mechanics of the estimation process can be found in Leamer and Stern (1971) chapter 9. A more intuitive treatment is given in Cline *et al.* (1978) chapter 3. Useful papers which provide surveys of the literature relating to the question are Corden (1975), Kreinin and Officer (1979) and

Mayes (1978). The latter deals particularly with *ex post* studies of regional liberalisation.

Additional empirical studies not mentioned above are Balassa and Kreinin (1967), Lowinger (1976) and Pelzman and Bradberry (1980), all of which cover the USA.